SEBU8021-13 (en-us)
April 2019

Operation and Maintenance Manual

303C CR, 303.5C CR, 304C CR, 305C CR
Mini Hydraulic Excavators

BXT 1-Up (303C CR)
DMY 1-Up (303.5C CR)
FPK 1-Up (304C CR)
HWJ 1-Up (305C CR)

Important Safety Information

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

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

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

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

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

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

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

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

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

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

⚠ WARNING

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

Failure to follow this warning may lead to premature failures, product damage, personal injury or death.

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

Table of Contents

Foreword

California Proposition 65 Warning

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

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

www.P65Warnings.ca.gov

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

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

www.P65Warnings.ca.gov

Wash hands after handling components that may contain lead.

Literature Information

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

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

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

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

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

Safety

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

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

Operation

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

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

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

Maintenance

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

Maintenance Intervals

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

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

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

Certified Engine Maintenance

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

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

Machine Capacity

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

Product Identification Number

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

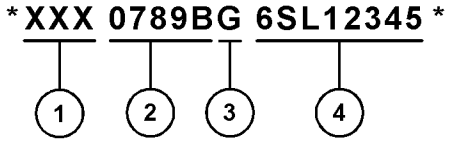

Illustration 1 g03891925

Where:

1. World Manufacturing Code (characters 1-3)

2. Machine Descriptor (characters 4-8)

3. Check Character (character 9)

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

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

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

Safety Section

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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. Please 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. Clean the safety messages or replace the safety messages 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 detach from the machine.

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

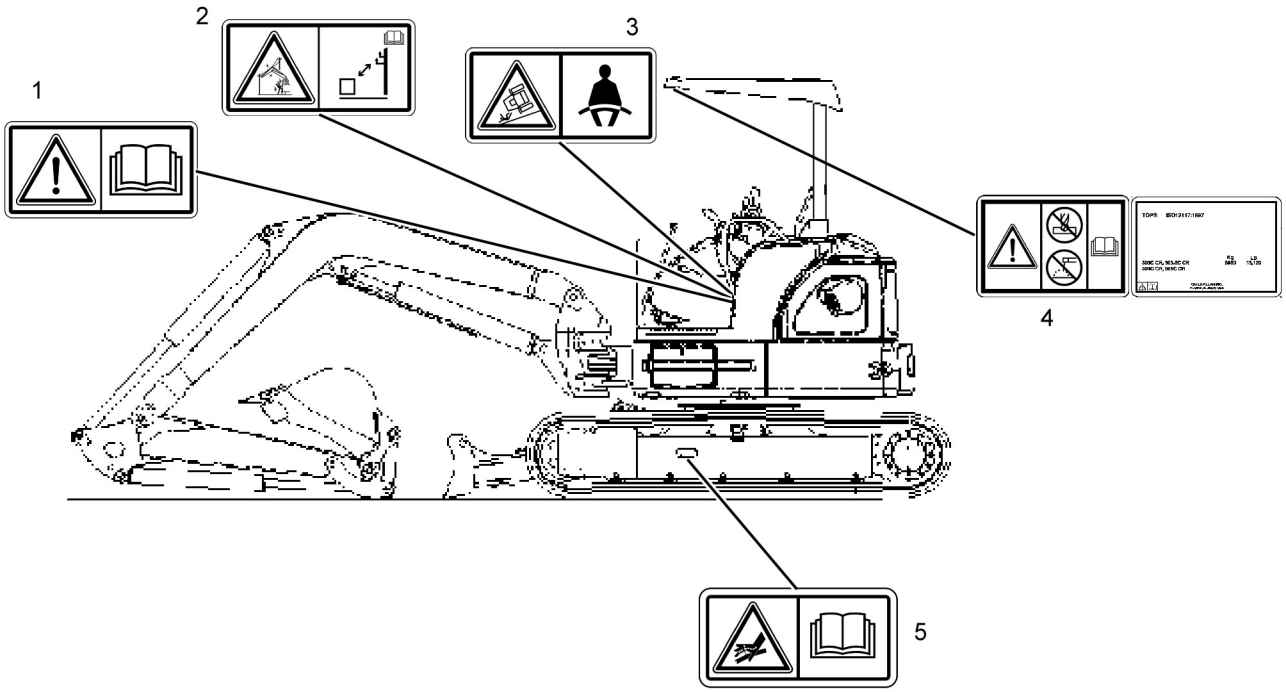

Illustration 2 g01958453
Canopy

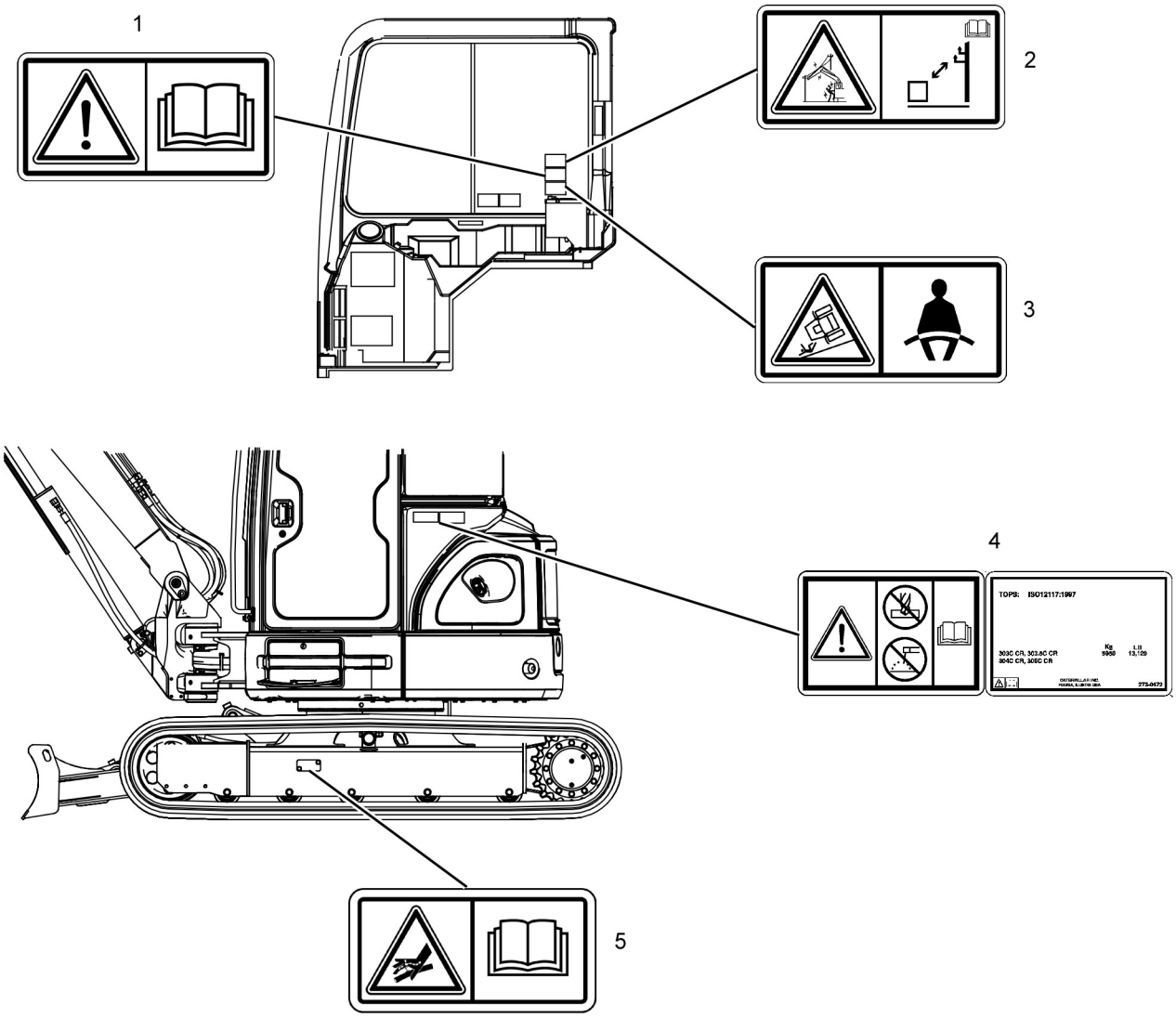

Illustration 3 g01958465

Cab

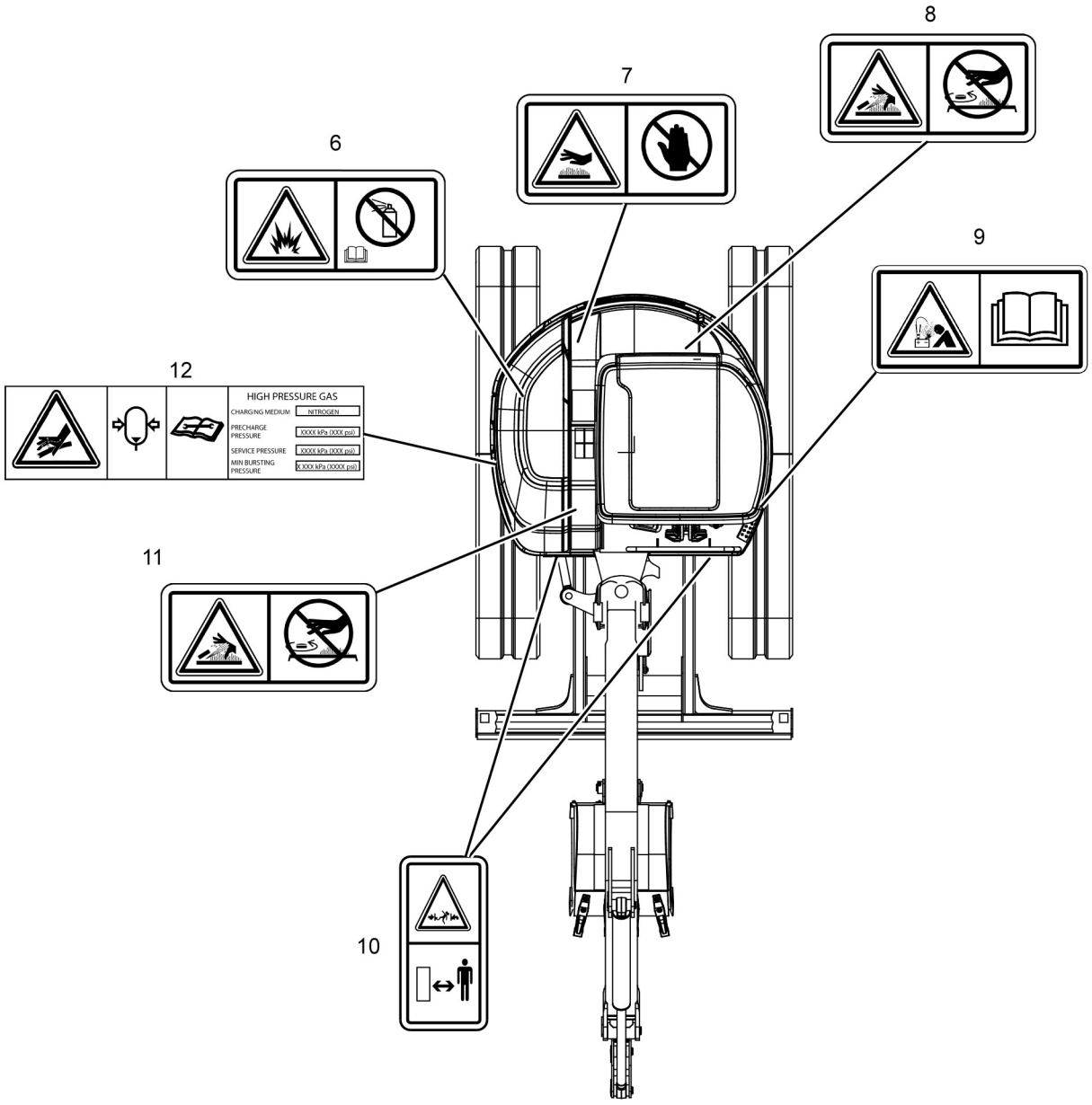

Illustration 4 g01958467

Do Not Operate (1)

On machines with a canopy , this safety message is located on the access cover for the fuse panel below the operator seat. On Cab equipped machines, this safety message is located on the right side window.

Illustration 5 g01370904

⚠ WARNING

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

Electrical Power Lines (2)

On machines with a canopy , this safety message is located on the access cover for the fuse panel below the operator seat. On Cab equipped machines, this safety message is located on the right side window.

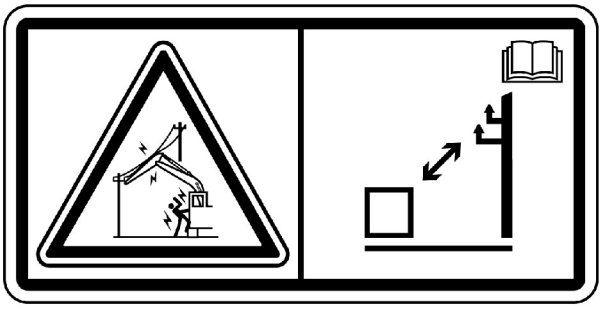

Illustration 6 g01374045

⚠ DANGER

Electrocution Hazard! Keep the machine and attachments a safe distance from electrical power. Stay clear 3 m (10 ft) plus twice the line insulator length. 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

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

Seat Belt (3)

On machines with a canopy , this safety message is located on the access cover for the fuse panel below the operator seat. On Cab equipped machines, this safety message is located on the right side window.

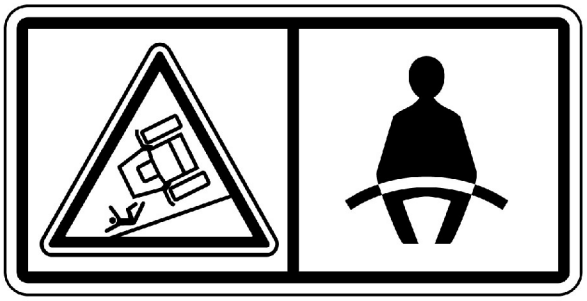

Illustration 7 g01370908

⚠ WARNING

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

TOPS (4)

This safety message is located on the canopy about the operator's seat. This safety message is located on the left side of the machine.

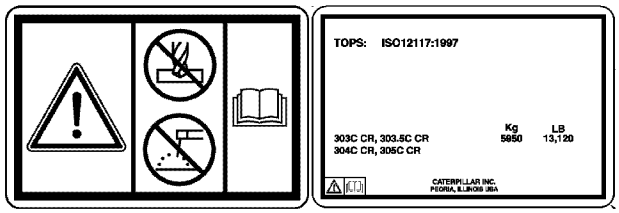

Illustration 8 g01960169

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. This will void the certification. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

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

High Pressure Cylinder (5)

This safety message is positioned on the track adjusters.

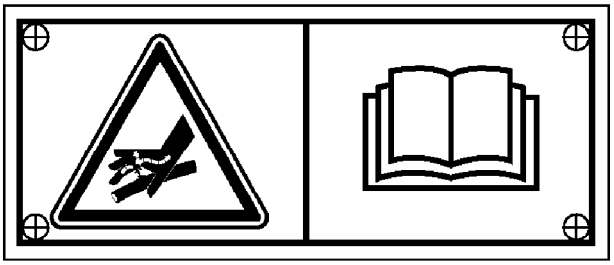

Illustration 9 g01076729

WARNING

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

See the Operation and Maintenance Manual , “Track Adjustment - Adjust” information for your product.

Aerosol Starting Aid (6)

This safety message is located on the bracket that supports the air cleaner housing.

Illustration 10 g01372254

WARNING

Explosion hazard! Do not use ether! This machine is equipped with an air inlet heater. Using ether can create explosions or fires that can cause personal injury or death. Read and follow the starting procedure in the Operation and Maintenance Manual.

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

Relieve Hydraulic Tank Pressure (7)

This safety message is located on the top of the hydraulic tank.

Illustration 11 g01371640

WARNING

HYDRAULIC TANK

RELIEVE TANK PRESSURE WITH ENGINE OFF BY REMOVING CAP SLOWLY TO PREVENT BURNS FROM HOT OIL.

Hot Surface (8)

This safety message is located by the muffler.

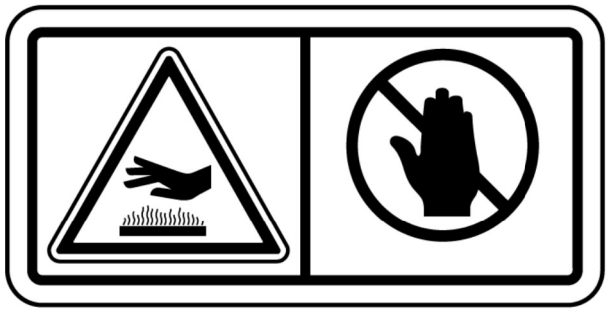

Illustration 12 g01372256

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.

Improper Connections For Jump Start Cables (9)

This safety message is located next to the battery.

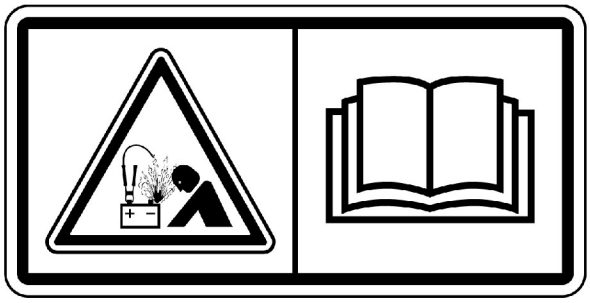

Illustration 13 g01370909

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.

Crushing Hazard (10)

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

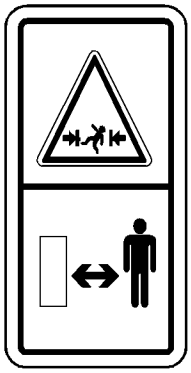

Illustration 14 g01958622

WARNING

Stay clear of this area when machine is operating. You can be crushed by swinging boom.

Pressurized System (11)

This safety message is located next to the cooling system filler cap.

Illustration 15 g01371640

WARNING

Pressurized system! Hot coolant can cause serious burns, injury or death. To open the cooling system filler cap, stop the engine and wait until the cooling system components are cool. Loosen the cooling system pressure cap slowly in order to relieve the pressure. Read and understand the Operation and Maintenance Manual before performing any cooling system maintenance.

Refer to Operation and Maintenance Manual, “Cooling System Coolant Level - Check” for further information.

High Pressure Gas (12)

This safety message is located on the accumulator.

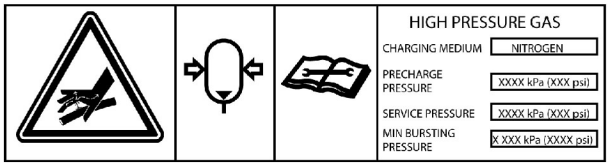

Illustration 16 g01374065

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.

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Additional Messages

SMCS Code: 7000; 7405

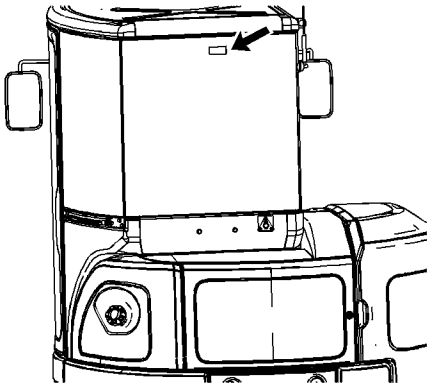

Illustration 17 g01216643

Alternate Exit

This message is located on the rear window.

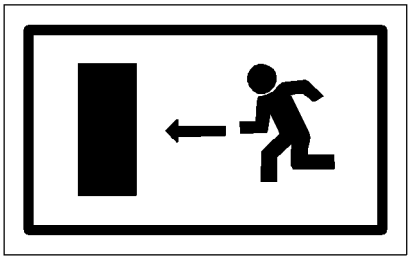

Illustration 18 g01002993

If the Primary exits are blocked, the rear window serves as the alternate exit. Exit the machine through the window.

For more information, refer to Operation and Maintenance Manual, “Alternate Exit”.

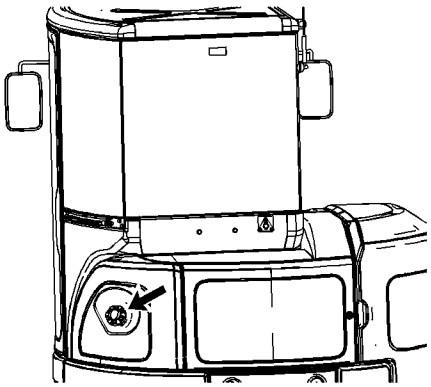

Illustration 19 g01429151

Low Sulfur Fuel

This message is located on the fuel inlet.

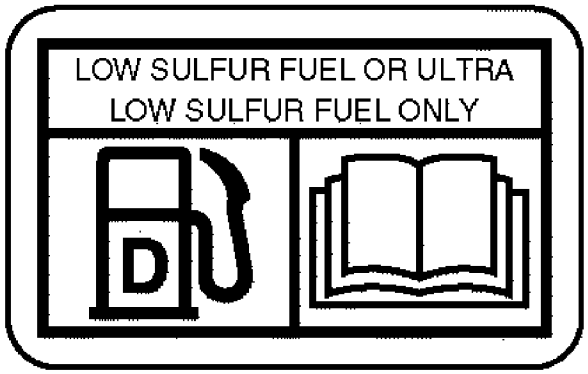

Illustration 20 g01429152

Use only Low Sulfur Fuel or Ultralow Sulfur Fuel.

Note: This film pertains only to machines that operate in areas that are regulated by the Environmental Protection Agency (EPA) of the United States.

i07500894

General Hazard Information

SMCS Code: 7000

Illustration 21 g00104545

Typical example

Attach a “Do Not Operate” warning tag or a similar warning tag to the start switch or to the controls. Attach the warning tag before you service the equipment or before you repair the equipment. Warning tag SEHS7332 is available from your Cat dealer.

⚠ WARNING

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

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

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

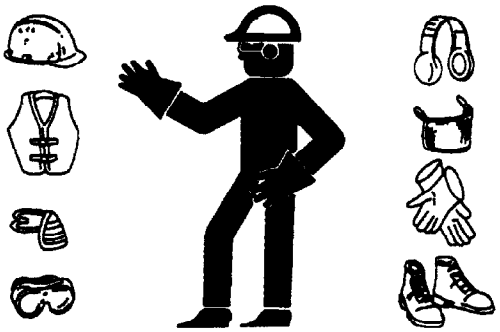

Illustration 22 g00702020

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

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

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

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

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

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

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

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

Obey all local regulations for the disposal of liquids.

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

Do not allow unauthorized personnel on the equipment.

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

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

Pressurized Air and Water

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

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

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

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

Trapped Pressure

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

Fluid Penetration

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

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

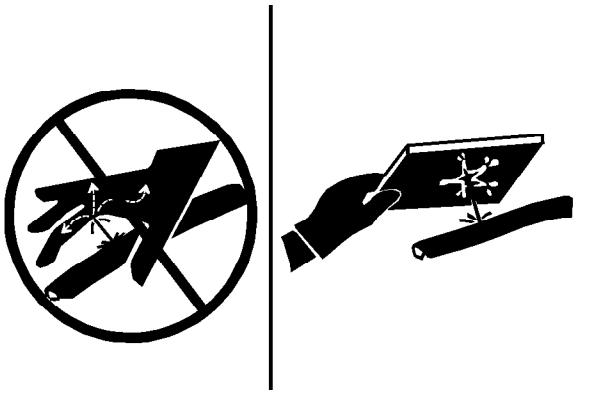

Illustration 23 g00687600

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

Containing Fluid Spillage

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

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

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

Obey all local regulations for the disposal of liquids.

Inhalation

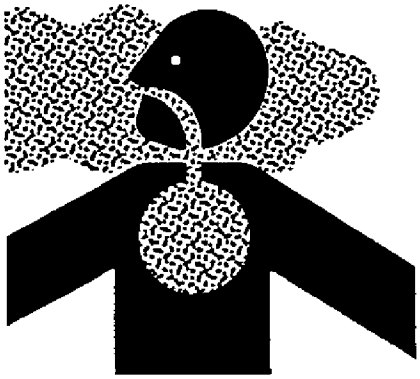

Illustration 24 g02159053

Exhaust

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

Asbestos Information

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

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

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

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

Dispose of Waste Properly

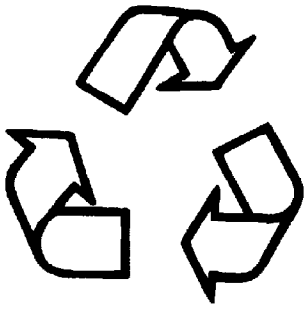

Illustration 25 g00706404

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

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

i01359664

Crushing Prevention and Cutting Prevention

SMCS Code: 7000

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

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

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

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

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

Stay clear of all rotating and moving parts.

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

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

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

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

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

i04760300

Burn Prevention

SMCS Code: 7000

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

Coolant

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

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

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

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

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

Oils

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

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

Batteries

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

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

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

i06180998

Fire Prevention and Explosion Prevention

SMCS Code: 7000

Illustration 26 g00704000

General

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

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

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

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

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

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

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

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

Do not operate the machine near any flame.

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

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

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

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

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

Illustration 27 g03839130

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

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

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

Battery and Battery Cables

Illustration 28 g03839133

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

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

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

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

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas. Do not use cell phones or other electronic devices in battery charging areas.

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

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

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

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

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

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

⚠ WARNING

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

Wiring

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

- Fraying
- Signs of abrasion or wear
- Cracking
- Discoloration

- Cuts on insulation
- Other damage

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

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

Consult your Cat dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes, and Hoses

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

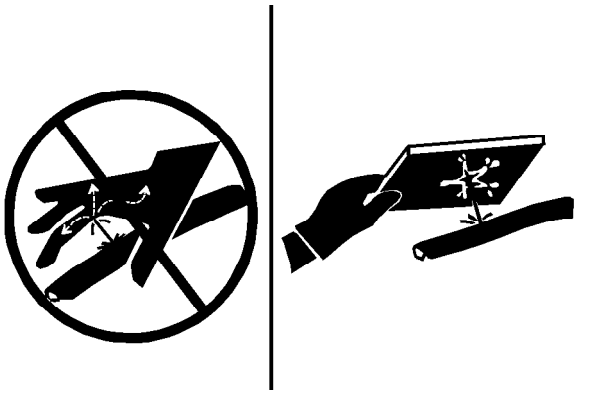

Illustration 29 g00687600

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

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

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

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

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

Ether

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

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

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

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

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

Fire Extinguisher

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

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

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

i02399849

Fire Extinguisher Location

SMCS Code: 7000; 7419

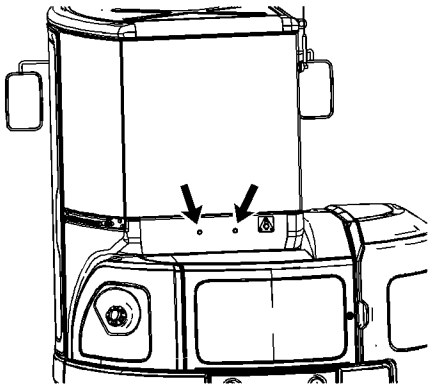

Illustration 30 g01198683

Location on cab

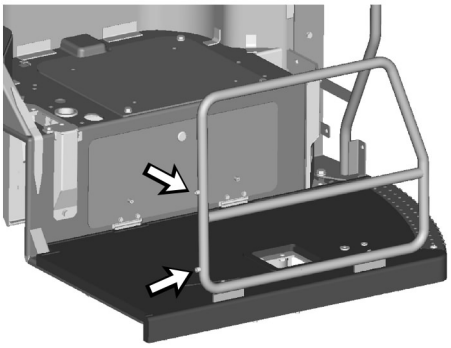

Illustration 31 g01198687

Location on canopy

For machines that are equipped with a cab, the fire extinguisher is mounted on the rear of the cab. For machines that are equipped with a canopy, the fire extinguisher is mounted on the front right side of the canopy.

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

i01329108

Track Information

SMCS Code: 4170; 7000

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

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

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

i01122596

Electrical Storm Injury Prevention

SMCS Code: 7000

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

- Mount the machine.
- Dismount the machine.

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

i01186721

Before Starting Engine

SMCS Code: 1000; 7000

Start the engine only from the operator's compartment. Do not short across the battery terminals and do not short across the battery. 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 three years of use. Do not use an extension for a seat belt on a retractable seat belt.

Adjust the seat so that full pedal travel can be achieved. 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 control console is in the RAISED position. When the hydraulic control console is in the RAISED position, the hydraulic controls 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.

Put the cover on the control pedal for the swinging boom. Put the cover on the auxiliary hydraulic control.

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.

i04862936

Visibility Information

SMCS Code: 7000

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

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

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

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

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

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

i03570026

Engine Starting

SMCS Code: 1000; 7000

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

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

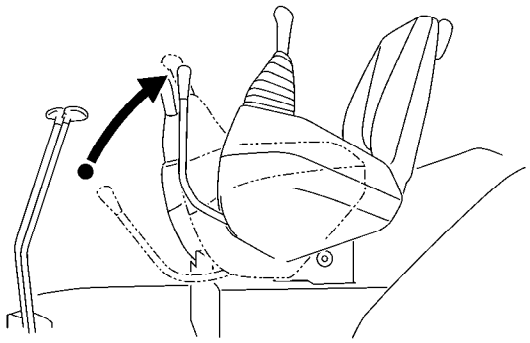

Illustration 32 g00817901

Put the hydraulic control console in the RAISED position.

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

Briefly sound the horn before you start the engine.

i01340061

Before Operation

SMCS Code: 7000

Clear all personnel from the machine and from the area.

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

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

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

Fasten the seat belt securely.

Warm up the engine and the hydraulic oil before operating the machine.

Before moving the machine, check the position of the undercarriage. The normal travel position is with the idler wheels to the front under the cab and the drive sprockets to the rear. When the undercarriage is in the reversed position, the directional controls must be operated in opposite directions.

i04159629

Work Tools

SMCS Code: 6700

Only use work tools that are recommended 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.

Keep all windows and doors closed on the host machine. A polycarbonate shield must be used when the host machine is not equipped with windows and when a work tool could throw debris.

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

If your machine is equipped with an extendable stick, install the transport pin when you are using the following work tools: hydraulic hammers, augers and compactors

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.

i07496288

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 standard machine configuration is intended for use within an ambient temperature range of −18 °C (−0 °F) to 41 °C (106 °F). Special configurations for different ambient temperatures may be available. Consult your Caterpillar dealer for additional information on special configurations of your machine.

Limiting Conditions and Criteria

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

The Safety Section of the Operation and Maintenance Manual 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.

The Maintenance Interval Schedule in the Operation and Maintenance Manual 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 Monitoring System (if equipped) described in the Operation Section of the Operation and Maintenance Manual provides information on limiting condition criteria, including a warning level that requires immediate shutdown of the machine.

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.

Shut the machine down until damaged or nonfunctional visibility aid(s) is repaired (if applicable) or until appropriate job site organization is used to minimize hazards that are caused by any resulting restricted visibility.

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 unless the machine has an additional seat with a seat belt.

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.

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

Only connect trailing equipment to a drawbar or to a hitch.

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

When you maneuver to connect the equipment, make sure that no personnel are between the machine and trailing equipment. Block up the hitch of the trailing equipment to align the equipment with the drawbar.

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 cab. This could result in personal injury. Be aware of the position of the work tool.

i06299648

Engine Stopping

SMCS Code: 1000; 7000

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

After the machine is parked and the parking brake is engaged, allow the engine to run at low idle for 5 minutes before shutdown. Running the engine allows hot areas of the engine to cool gradually.

i01591879

Lifting Objects

SMCS Code: 7000

There may be some local regulations and/or government regulations that govern the use of excavators which lift heavy objects. Obey those regulations.

i01561790

Parking

SMCS Code: 7000

When an accumulator has a charge, the hydraulic equipment is active. The accumulator may have a charge even if the engine is not running. When the accumulator is used to activate the hydraulic circuit, the charge should bleed off in less than one minute. Movement can occur under the following conditions:

- The ignition key is in the ON position.
- The hydraulic control console is in the LOWERED position.
- The work tool is not positioned on the ground.

⚠ 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 it is necessary to park on a grade, chock the tracks.

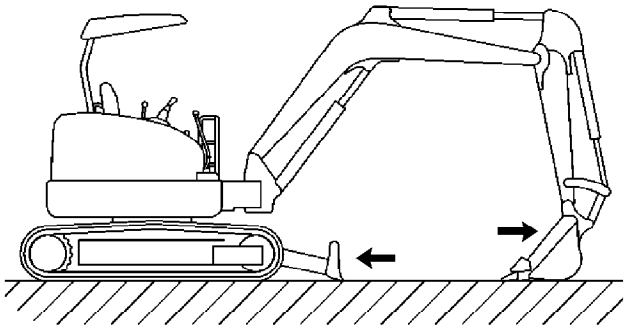

Illustration 33 g00811194

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 five minutes in order to allow the engine to cool down.

4. Turn the engine start switch to the OFF position.

5. When the engine has stopped, turn the engine start switch key to the ON position.

6. Move the hydraulic control levers back and forth in order to relieve hydraulic pressure.

Note: The hydraulic control console must be lowered in order for the hydraulic circuit to be activated.

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

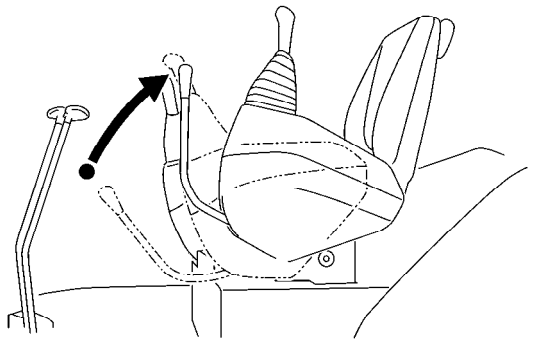

Illustration 34 g00817901

8. Place the hydraulic control console in the RAISED position.

i07378239

Slope Operation

SMCS Code: 7000

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

i01329161

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.

i03648175

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

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

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

The dynamic operator sound pressure level is 83 dB (A) when “ISO 6396:1992” is used to measure the value for an enclosed cab with a heater. The cab was properly installed and maintained. The test was conducted with the cab doors and the cab windows closed.

The dynamic operator sound pressure level for the canopy is lower than 83 dB(A) when “ISO 6396:1992” is used to measure the value.

“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 meter per second squared.

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 1 in order to calculate the daily vibration exposure. A simple evaluation of the machine application can be used.

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

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

Table 1

"ISO Reference Table A - Equivalent vibration levels of whole body vibration emission for earthmoving equipment."							
Machine Type	**Typical Operating Activity**	**Vibration Levels**			**Scenario Factors**		
		X axis	**Y axis**	**Z axis**	**X axis**	**Y axis**	**Z axis**
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 Supplement , SEBU8257 for more information about machine vibration levels.

The Caterpillar suspension seat meets the criteria of "ISO 7096". This represents vertical vibration level under severe operating conditions.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

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

1. Use the right type and size of machine, equipment, and attachments.

2. Maintain machines according to the manufacturer's recommendations.

a. Tire pressures

b. Brake and steering systems

c. Controls, hydraulic system and linkages

3. Keep the terrain in good condition.

a. Remove any large rocks or obstacles.

b. Fill any ditches and holes.

c. Provide machines and schedule time in order to maintain the conditions of the terrain.

4. Use a seat that meets "ISO 7096". Keep the seat maintained and adjusted.

a. Adjust the seat and suspension for the weight and the size of the operator.

b. Inspect and maintain the seat suspension and adjustment mechanisms.

5. Perform the following operations smoothly.

a. Steer

b. Brake

c. Accelerate.

d. Shift the gears.

6. Move the attachments smoothly.

7. Adjust the machine speed and the route in order to minimize the vibration level.

a. Drive around obstacles and rough terrain.

b. Slow down when it is necessary to go over rough terrain.

8. Minimize vibrations for a long work cycle or a long travel distance.

a. Use machines that are equipped with suspension systems.

b. Use the ride control system on compact track 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.

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

Sources

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

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

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

Refer to Operation and Maintenance Manual Supplement , SEBU8257 for more information about vibration.

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

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

Caterpillar, Inc.
www.cat.com

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Operator Station

SMCS Code: 7300; 7301; 7325

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

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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 determine the type of guard that should be used.

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

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

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

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

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

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

Other Guards (If Equipped)

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

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

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

- Demolition applications
- Rock quarries
- Forestry products

Additional guards may be required for specific applications or work tools. The Operation and Maintenance Manual for your machine or your work tool will provide specific requirements for the guards. Refer to Operation Maintenance manual, "Demolition" for additional information. Consult your Cat dealer for additional information.

Product Information Section

General Information

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Specifications

SMCS Code: 7000

Intended Use

The intended use of this machine is for excavating with a 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. This machine can be used in object handling applications that are within the lift capacity of the machine. When this machine is used in object handling applications, ensure that the machine is properly configured and operated properly. Obey any local governmental regulations and regional governmental regulations. Only lift objects from approved lifting points and with approved lifting devices.

Specification Data

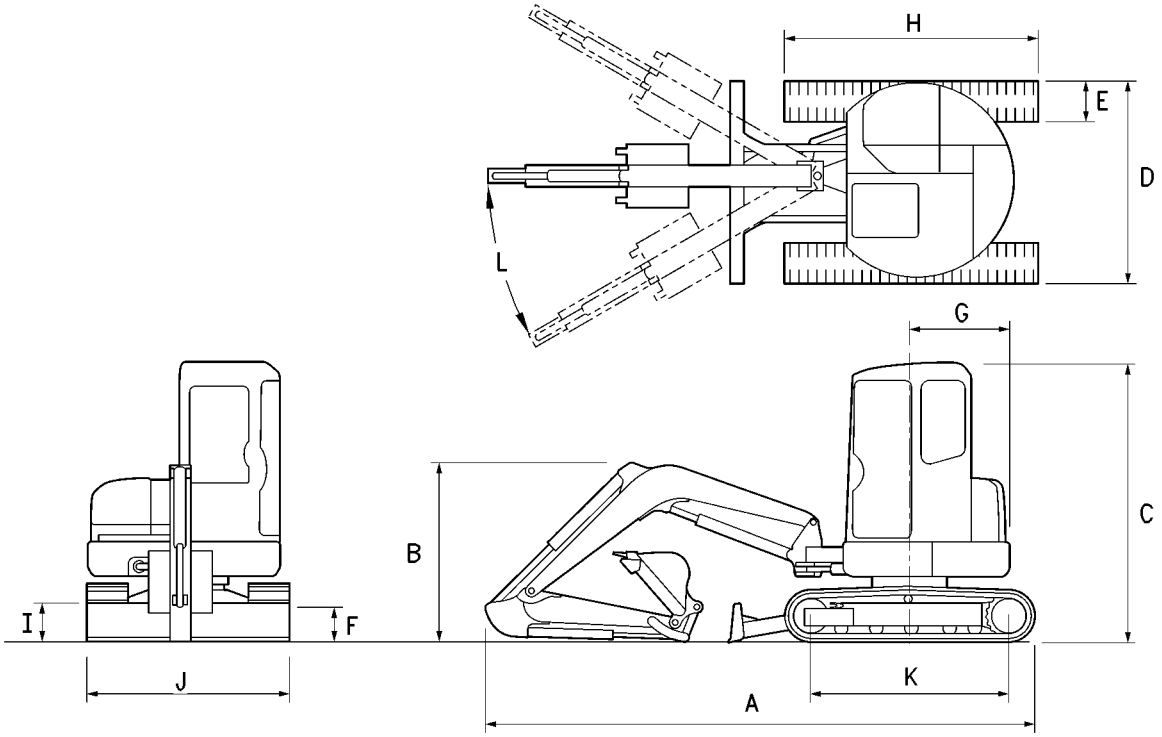

Illustration 35 g00880822

Table 2

	303C CR Excavator with Cab (1)		303.5C CR Excavator with Cab(2)		304C CR Excavator with Cab (3)		305C CR Excavator with Cab (4)	
	Rubber Track	Steel Track	Rubber Track	Steel Track	Rubber Track	Steel Track	Rubber Track	Steel Track
Approximate Weight	3560 kg (7850 lb)	3700 kg (8160 lb)	3950 kg (8710 lb)	4080 kg (9000 lb)	4920 kg (10850 lb)	5070 kg (11180 lb)	5390 kg (11880 lb)	5540 kg (12210 lb)
Overall Length (A)	4740 mm (15.55 ft)		4820 mm (15.81 ft)		5170 mm (16.96 ft)		5330 mm (17.49 ft)	
Boom Height (B)	1340 mm (4.40 ft)		1420 mm (4.66 ft)		1730 mm (5.68 ft)		1730 mm (5.68 ft)	
Height of Cab (C)	2500 mm 8.20 ft	2505 mm 8.22 ft	2500 mm 8.20 ft	2505 mm 8.22 ft	2550 mm 8.37 ft	2545 mm 8.35 ft	2550 mm 8.37 ft	2545 mm 8.35 ft
Overall Width (D)	1550 mm (5.09 ft)		1780 mm (5.84 ft)		1980 mm (6.50 ft)			
Track Shoe Width (E)	300 mm (0.98 ft)				400 mm (1.31 ft)			
Ground clearance (including height of lugs) (F)	315 mm 1.03 ft	320 mm 1.05 ft	315 mm 1.03 ft	320 mm 1.05 ft	340 mm 1.12 ft	335 mm 1.10 ft	340 mm 1.12 ft	335 mm 1.10 ft
Swing radius (G)	890 mm (2.92 ft)		970 mm (3.18 ft)		1070 mm (3.51 ft)			
Overall length of track (H)	2220 mm 7.28 ft	2240 mm 7.35 ft	2220 mm 7.28 ft	2240 mm 7.35 ft	2580 mm (8.47 ft)			
Height of blade (I)	325 mm (1.07 ft)				375 mm (1.23 ft)			

(continued)

(Table 2, contd)

Width of blade (J)	1550 mm (5.09 ft)		1780 mm (5.84 ft)		1980 mm (6.50 ft)			
Distance between the tumbler centers (K)	1760 mm (5.77 ft)				2065 mm (6.78 ft)			
Contact pressure	30.3 kPa (4.40 psi)	31.5 kPa (4.57 psi)	33.5 kPa (4.86 psi)	34.6 kPa (5.02 psi)	26.8 kPa (3.89 psi)	27.7 kPa (4.02 psi)	29.4 kPa (4.26 psi)	30.2 kPa (4.38 psi)
High travel speed	4.6 km/h (2.9 mph)							
Low travel speed	2.7 km/h (1.68 mph)				2.5 km/h (1.55 mph)		2.7 km/h (1.68 mph)	
Maximum grade	58% or 30°							

(1) These specifications are for a machine that has a swing boom, a standard stick, a 0.09 m^3 (0.12 yd^3) standard bucket, and an extra counterweight.
(2) These specifications are for a machine that has a swing boom, a standard stick, a 0.16 m^3 (0.21 yd^3) standard bucket, and an extra counterweight.
(3) These specifications are for a machine that has a swing boom, a standard stick, a 0.14 m^3 (0.18 yd^3) standard bucket, and an extra counterweight.
(4) These specifications are for a machine that has a swing boom, a standard stick, a 0.16 m^3 (0.21 yd^3) standard bucket, and an extra counterweight.

Table 3

Excavation Bucket	**Excavator with Cab Boom Swing Angle (L)**			
	303C CR	**303.5C CR**	**304C CR**	**305C CR**
Boom swing stop in factory installed position	80°	70°	80°	
The boom swing stop is not installed.	The bucket will hit the cab.			

Table 4

Ditch cleaning bucket	**Excavator with Cab Boom Swing Angle (L)**			
	303C CR	**303.5C CR**	**304C CR**	**305C CR**
Boom swing stop in factory installed position	55°		60°	
The boom swing stop is not installed.	The bucket will hit the cab.			

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Boom/Stick/Bucket Combinations

SMCS Code: 6000; 6700

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

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

The following tables show various compatible boom-stick-bucket combinations. Select an optimum combination according to the working conditions and according to the type of work that is being done.

Table 5

303C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) J200 Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity(ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
303 - 1324	300 mm (12 inch)	65 kg (143 lb)	0.05 m^3 (0.06 yd^3)	100%	5370(2)	4760(2)
303 - 1325	400 mm (16 inch)	74 kg (162 lb)	0.07 m^3 (0.09 yd^3)	100%	3707(2)	3271(2)
303 - 1326	450 mm (18 inch)	82 kg (181 lb)	0.08 m^3 (0.11 yd^3)	100%	3144(2)	2763(2)
303 - 1327	500 mm (20 inch)	90 kg (199 lb)	0.09 m^3 (0.12 yd^3)	100%	2706(2)	2367(2)
303 - 1328	600 mm (24 inch)	101 kg (223 lb)	0.12 m^3 (0.15 yd^3)	100%	1938(2)	1683(3)
303 - 1329	750 mm (30 inch)	117 kg (258 lb)	0.16 m^3 (0.20 yd^3)	100%	1353(4)	1163(5)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Max Material Density 1200 kg/m3
(5) Not recommended

Table 6

303C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) Vertical Retention System						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
255 - 3398	400 mm (16 inch)	72 kg (158 lb)	0.07 m^3 (0.09 yd^3)	100%	3736(2)	3300(2)
255 - 3392	450 mm (18 inch)	80 kg (176 lb)	0.08 m^3 (0.11 yd^3)	100%	3169(2)	2788(2)
252 - 2623	500 mm (20 inch)	88 kg (193 lb)	0.09 m^3 (0.12 yd^3)	100%	2728(2)	2389(2)
252 - 2600	600 mm (24 inch)	99 kg (217 lb)	0.12 m^3 (0.15 yd^3)	100%	1954(2)	1700(3)
252 - 2616	750 mm (30 inch)	115 kg (253 lb)	0.16 m^3 (0.20 yd^3)	100%	1366(4)	1175(5)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Max Material Density 1200 kg/m3
(5) Not recommended

Table 7

303C CR Mini Hydraulic Excavator Digging Buckets (Standard Duty) Bolt on Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
281-3824	400 mm (16 inch)	59 kg (130 lb)	0.06 m^3 (0.07 yd^3)	100%	4575(2)	4067(2)
279-4320	460 mm (18 inch)	64 kg (141 lb)	0.07 m^3 (0.09 yd^3)	100%	3850(2)	3414(2)
279-4313	500 mm (20 inch)	69 kg (152 lb)	0.07 m^3 (0.09 yd^3)	100%	3779(2)	3343(2)
281-1551	600 mm (24 inch)	77 kg (170 lb)	0.09 m^3 (0.12 yd^3)	100%	2850(2)	2511(2)
279-4321	750 mm (30 inch)	88 kg (194 lb)	0.12 m^3 (0.16 yd^3)	100%	2046(2)	1792(3)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3

Table 8

303C CR Mini Hydraulic Excavator Ditch Cleaning Buckets						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
279-4323	1200 mm (47 inch)	101 kg (222 lb)	0.135 m^3 (0.177 yd^3)	100%	1722(2)	1496(3)
282-9315	1400 mm (55 inch)	113 kg (249 lb)	0.159 m^3 (0.208 yd^3)	100%	1387(3)	1195(4)
279-4325	1200 mm (47 inch)	162 kg (357 lb)	0.135 m^3 (0.177 yd^3)	100%	1270(3)	1044(4)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1500 kg/m3
(3) Max Material Density 1200 kg/m3
(4) Not Recommended

Table 9

303.5C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) J200 Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
303 - 1324	300 mm (12 inch)	65 kg (143 lb)	0.05 m^3 (0.06 yd^3)	100%	7896(2)	7074(2)
303 - 1325	400 mm (16 inch)	74 kg (162 lb)	0.07 m^3 (0.09 yd^3)	100%	5511(2)	4924(2)
303 - 1326	450 mm (18 inch)	82 kg (181 lb)	0.08 m^3 (0.11 yd^3)	100%	4723(2)	4209(2)
303 - 1327	500 mm (20 inch)	90 kg (199 lb)	0.09 m^3 (0.12 yd^3)	100%	4109(2)	3652(2)
303 - 1328	600 mm (24 inch)	101 kg (223 lb)	0.12 m^3 (0.15 yd^3)	100%	2990(2)	2648(2)
303 - 1329	750 mm (30 inch)	117 kg (258 lb)	0.16 m^3 (0.20 yd^3)	100%	2143(2)	1886(2)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3

Table 10

303.5C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) Vertical Retention System						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
255 - 3398	400 mm (16 inch)	72 kg (158 lb)	0.07 m^3 (0.09 yd^3)	100%	5540(2)	4953(2)
255 - 3392	450 mm (18 inch)	80 kg (176 lb)	0.08 m^3 (0.11 yd^3)	100%	4748(2)	4234(2)
252 - 2623	500 mm (20 inch)	88 kg (193 lb)	0.09 m^3 (0.12 yd^3)	100%	4131(2)	3674(2)
252 - 2600	600 mm (24 inch)	99 kg (217 lb)	0.12 m^3 (0.15 yd^3)	100%	3007(2)	2664(2)
252 - 2616	750 mm (30 inch)	115 kg (253 lb)	0.16 m^3 (0.20 yd^3)	100%	2155(2)	1898(2)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3

Table 11

303.5C CR Mini Hydraulic Excavator Digging Buckets (Standard Duty) Bolt on Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
281-3824	400 mm (16 inch)	59 kg (130 lb)	0.06 m^3 (0.07 yd^3)	100%	6680(2)	5995(2)
279-4320	460 mm (18 inch)	64 kg (141 lb)	0.07 m^3 (0.09 yd^3)	100%	5654(2)	5067(2)
279-4313	500 mm (20 inch)	69 kg (152 lb)	0.07 m^3 (0.09 yd^3)	100%	5583(2)	4996(2)
281-1551	600 mm (24 inch)	77 kg (170 lb)	0.09 m^3 (0.12 yd^3)	100%	4253(2)	3797(2)
279-4321	750 mm (30 inch)	88 kg (194 lb)	0.12 m^3 (0.16 yd^3)	100%	3098(2)	2756(2)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3

Table 12

303.5C CR Mini Hydraulic Excavator Ditch Cleaning Buckets						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
279-4323	1200 mm (47 inch)	101 kg (222 lb)	0.135 m^3 (0.177 yd^3)	100%	2658(2)	2353(2)
282-9315	1400 mm (55 inch)	113 kg (249 lb)	0.159 m^3 (0.208 yd^3)	100%	2181(2)	1923(2)
279-4325	1200 mm (47 inch)	162 kg (357 lb)	0.135 m^3 (0.177 yd^3)	100%	2206(2)	1901(2)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3

Table 13

304C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) J200 Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
303-1310	300 mm (12 inch)	70 kg (154 lb)	0.06 m^3 (0.07 yd^3)	100%	8815(2)	7423(2)
303-1311	400 mm (16 inch)	78 kg (172 lb)	0.08 m^3 (0.11 yd^3)	100%	6511(2)	5468(2)
303-1312	450 mm (18 inch)	87 kg (192 lb)	0.09 m^3 (0.11 yd^3)	100%	5688(2)	4760(2)
303-1313	500 mm (20 inch)	97 kg (212 lb)	0.10 m^3 (0.13 yd^3)	100%	5019(2)	4184(2)
303-1314	600 mm (24 inch)	106 kg (239 lb)	0.13 m^3 (0.17 yd^3)	100%	3792(2)	3149(2)
303-1315	750 mm (30 inch)	127 kg (279 lb)	0.17 m^3 (0.23 yd^3)	100%	2776(2)	2285(2)
303-1316	900 mm (36 inch)	148 kg (325 lb)	0.22 m^3 (0.28 yd^3)	100%	2050(2)	1670(3)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3

Table 14

304C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) Vertical Rentention System						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**

(continued)

(Table 14, contd)

280-4200	300 mm (11.8 inch)	69 kg (151 lb)	0.06 m^3 (0.07 yd^3)	100%	8832(2)	7440(2)
280-4201	400 mm (15.8 inch)	77 kg (169 lb)	0.08 m^3 (0.11 yd^3)	100%	6524(2)	5480(2)
280-4202	460 mm (18 inch)	86 kg (189 lb)	0.09 m^3 (0.11 yd^3)	100%	5699(2)	4771(2)
280-4203	500 mm (20 inch)	94 kg (207 lb)	0.10 m^3 (0.13 yd^3)	100%	5049(2)	4214(2)
280-4204	600 mm (24 inch)	106 kg (234 lb)	0.13 m^3 (0.17 yd^3)	100%	3792(2)	3149(2)
280-4205	750 mm (30 inch)	125 kg (274 lb)	0.17 m^3 (0.23 yd^3)	100%	2788(2)	2296(2)
280-4206	900 mm (36 inch)	145 kg (319 lb)	0.22 m^3 (0.28 yd^3)	100%	2063(2)	1684(3)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3

Table 15

304C CR Mini Hydraulic Excavator
Digging Buckets (Standard Duty)
Bolt on Tip

Bucket Part Number	Width of Bucket	Weight(1)	Capacity(ISO)	Fill Factor	Std Stick	Long Stick
276-7370	300 mm (11.8 inch)	76 kg (168 lb)	0.06 m^3 (0.07 yd^3)	100%	8715(2)	7323(2)
276-7378	400 mm (15.8 inch)	77 kg (170 lb)	0.08 m^3 (0.11 yd^3)	100%	6524(2)	5480(2)
279-4283	460 mm (18 inch)	82 kg (181 lb)	0.09 m^3 (0.11 yd^3)	100%	5743(2)	4816(2)
279-4287	500 mm (20 inch)	89 kg (196 lb)	0.10 m^3 (0.13 yd^3)	100%	5099(2)	4264(2)
249-4260	600 mm (24 inch)	99 kg (218 lb)	0.13 m^3 (0.17 yd^3)	100%	3845(2)	3203(2)
279-4291	750 mm (30 inch)	114 kg (251 lb)	0.17 m^3 (0.23 yd^3)	100%	2852(2)	2361(2)
279-4295	900 mm (36 inch)	138 kg (304 lb)	0.22 m^3 (0.28 yd^3)	100%	2095(2)	1715(3)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3

Table 16

304C CR Mini Hydraulic Excavator
Digging Buckets (High Capacity)
J200 Tip

Bucket Part Number	Width of Bucket	Weight(1)	Capacity (ISO)	Fill Factor	Std Stick	Long Stick
303-1330	300 mm (12 inch)	83 kg (183 lb)	0.08 m^3 (0.11 yd^3)	100%	6449(2)	5405(2)
303-1331	400 mm (16 inch)	92 kg (203 lb)	0.11 m^3 (0.14 yd^3)	100%	4608(2)	3849(2)
303-1332	450 mm (18 inch)	102 kg (225 lb)	0.12 m^3 (0.16 yd^3)	100%	4141(2)	3445(2)
303-1333	500 mm (20 inch)	111 kg (245 lb)	0.14 m^3 (0.19 yd^3)	100%	3485(2)	2889(2)
303-1334	600 mm (24 inch)	125 kg (275 lb)	0.18 m^3 (0.24 yd^3)	100%	2633(2)	2169(2)
303-1335	750 mm (30 inch)	146 kg (321 lb)	0.24 m^3 (0.32 yd^3)	100%	1887(2)	1539(3)
303-1336	900 mm (36 inch)	169 kg (372 lb)	0.30 m^3 (0.39 yd^3)	100%	1433(4)	1155(5)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Max Material Density 1200 kg/m3
(5) Not recommended

Table 17

304C CR Mini Hydraulic Excavator Digging Buckets (High Capacity) Vertical Rentention System						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
280-4210	300 mm (11.8 inch)	82 kg (179 lb)	0.08 m^3 (0.11 yd^3)	100%	6461(2)	5418(2)
280-4211	400 mm (15.8 inch)	91 kg (200 lb)	0.11 m^3 (0.14 yd^3)	100%	4617(2)	3858(2)
280-4212	460 mm (18 inch)	100 kg (220 lb)	0.12 m^3 (0.16 yd^3)	100%	4158(2)	3462(2)
280-4213	500 mm (20 inch)	109 kg (241 lb)	0.14 m^3 (0.19 yd^3)	100%	3499(2)	2903(2)
280-4214	600 mm (24 inch)	123 kg (271 lb)	0.18 m^3 (0.24 yd^3)	100%	2644(2)	2180(2)
280-4215	750 mm (30 inch)	144 kg (316 lb)	0.24 m^3 (0.32 yd^3)	100%	1895(2)	1548(3)
280-4216	900 mm (36 inch)	166 kg (366 lb)	0.30 m^3 (0.39 yd^3)	100%	1443(4)	1165(5)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Max Material Density 1200 kg/m3
(5) Not recommended

Table 18

304C CR Mini Hydraulic Excavator Ditch Cleaning Buckets						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
279-4326	1000 mm (39 inch)	117 kg (257.9 lb)	0.139 m^3 (0.181 yd^3)	100%	3467(2)	2866(2)
279-4327	1300 mm (51 inch)	115 kg (253.5 lb)	0.184 m^3 (0.239 yd^3)	100%	2630(2)	2176(2)
279-4328	1600 mm (63 inch)	135 kg (297.6 lb)	0.229 m^3 (0.298 yd^3)	100%	2026(2)	1661(3)
279-4329	1600 mm (63 inch)	250 kg (551 lb)	0.229 m^3 (0.298 yd^3)	100%	1524(3)	1159(4)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Not recommended

Table 19

305C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) J200 Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
303-1310	300 mm (12 inch)	70 kg (154 lb)	0.06 m^3 (0.07 yd^3)	100%	988(2)	7677(2)
303-1311	400 mm (16 inch)	78 kg (172 lb)	0.08 m^3 (0.11 yd^3)	100%	6716(2)	5658(2)
303-1312	450 mm (18 inch)	87 kg (192 lb)	0.09 m^3 (0.11 yd^3)	100%	5870(2)	4929(2)
303-1313	500 mm (20 inch)	97 kg (212 lb)	0.10 m^3 (0.13 yd^3)	100%	5183(2)	4336(2)
303-1314	600 mm (24 inch)	106 kg (239 lb)	0.13 m^3 (0.17 yd^3)	100%	2918(2)	3266(2)
303-1315	750 mm (30 inch)	127 kg (279 lb)	0.17 m^3 (0.23 yd^3)	100%	2872(2)	2374(2)
303-1316	900 mm (36 inch)	148 kg (325 lb)	0.22 m^3 (0.28 yd^3)	100%	2124(2)	1739(3)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3

Table 20

305C CR Mini Hydraulic Excavator Digging Buckets (Heavy Duty) Vertical Rentention System						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
280-4200	300 mm (11.8 inch)	69 kg (151 lb)	0.06 m^3 (0.07 yd^3)	100%	9105(2)	7693(2)
280-4201	400 mm (15.8 inch)	77 kg (169 lb)	0.08 m^3 (0.11 yd^3)	100%	6729(2)	5670(2)
280-4202	460 mm (18 inch)	86 kg (189 lb)	0.09 m^3 (0.11 yd^3)	100%	5881(2)	4940(2)
280-4203	500 mm (20 inch)	94 kg (207 lb)	0.10 m^3 (0.13 yd^3)	100%	5213(2)	4366(2)
280-4204	600 mm (24 inch)	106 kg (234 lb)	0.13 m^3 (0.17 yd^3)	100%	2918(2)	3266(2)
280-4205	750 mm (30 inch)	125 kg (274 lb)	0.17 m^3 (0.23 yd^3)	100%	2884(2)	2386(2)
280-4206	900 mm (36 inch)	145 kg (319 lb)	0.22 m^3 (0.28 yd^3)	100%	2138(2)	1753(3)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3

Table 21

305C CR Mini Hydraulic Excavator Digging Buckets (Standard Duty) Bolt on Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
276-7370	300 mm (11.8 inch)	76 kg (168 lb)	0.06 m^3 (0.07 yd^3)	100%	8988(2)	7577(2)
276-7378	400 mm (15.8 inch)	77 kg (170 lb)	0.08 m^3 (0.11 yd^3)	100%	6729(2)	5670(2)
279-4283	460 mm (18 inch)	82 kg (181 lb)	0.09 m^3 (0.11 yd^3)	100%	5926(2)	4984(2)
279-4287	500 mm (20 inch)	89 kg (196 lb)	0.10 m^3 (0.13 yd^3)	100%	5263(2)	4416(2)
249-4260	600 mm (24 inch)	99 kg (218 lb)	0.13 m^3 (0.17 yd^3)	100%	3972(2)	3320(2)
279-4291	750 mm (30 inch)	114 kg (251 lb)	0.17 m^3 (0.23 yd^3)	100%	2949(2)	2361(2)
279-4295	900 mm (36 inch)	138 kg (304 lb)	0.22 m^3 (0.28 yd^3)	100%	2170(2)	1785(3)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 800 kg/m3
(3) Max Material Density 1500 kg/m3

Table 22

305C CR Mini Hydraulic Excavator Digging Buckets (High Capacity) J200 Tip						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
303-1330	300 mm (12 inch)	83 kg (183 lb)	0.08 m^3 (0.11 yd^3)	100%	6654(2)	5595(2)
303-1331	400 mm (16 inch)	92 kg (203 lb)	0.11 m^3 (0.14 yd^3)	100%	4757(2)	3987(2)
303-1332	450 mm (18 inch)	102 kg (225 lb)	0.12 m^3 (0.16 yd^3)	100%	4278(2)	3572(2)
303-1333	500 mm (20 inch)	111 kg (245 lb)	0.14 m^3 (0.19 yd^3)	100%	3602(2)	2997(2)
303-1334	600 mm (24 inch)	125 kg (275 lb)	0.18 m^3 (0.24 yd^3)	100%	2724(2)	2253(2)

(continued)

(Table 22, contd)

303-1335	750 mm (30 inch)	146 kg (321 lb)	0.24 m^3 (0.32 yd^3)	100%	1955(2)	1603(3)
303-1336	900 mm (36 inch)	169 kg (372 lb)	0.30 m^3 (0.39 yd^3)	100%	1488(4)	1205(4)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Max Material Density 1200 kg/m3

Table 23

305C CR Mini Hydraulic Excavator Digging Buckets (High Capacity) Vertical Rentention System						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
280-4210	300 mm (11.8 inch)	82 kg (179 lb)	0.08 m^3 (0.11 yd^3)	100%	6666(2)	5608(2)
280-4211	400 mm (15.8 inch)	91 kg (200 lb)	0.11 m^3 (0.14 yd^3)	100%	4766(2)	3996(2)
280-4212	460 mm (18 inch)	100 kg (220 lb)	0.12 m^3 (0.16 yd^3)	100%	4294(2)	3588(2)
280-4213	500 mm (20 inch)	109 kg (241 lb)	0.14 m^3 (0.19 yd^3)	100%	3616(2)	3011(2)
280-4214	600 mm (24 inch)	123 kg (271 lb)	0.18 m^3 (0.24 yd^3)	100%	2735(2)	2264(2)
280-4215	750 mm (30 inch)	144 kg (316 lb)	0.24 m^3 (0.32 yd^3)	100%	1964(2)	1611(3)
280-4216	900 mm (36 inch)	166 kg (366 lb)	0.30 m^3 (0.39 yd^3)	100%	1498(4)	1215(4)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Max Material Density 1200 kg/m3

Table 24

305C CR Mini Hydraulic Excavator Ditch Cleaning Buckets						
Bucket Part Number	**Width of Bucket**	**Weight(1)**	**Capacity (ISO)**	**Fill Factor**	**Std Stick**	**Long Stick**
279-4326	1000 mm (39 inch)	117 kg (257.9 lb)	0.139 m^3 (0.181 yd^3)	100%	3585(2)	2976(2)
279-4327	1300 mm (51 inch)	115 kg (253.5 lb)	0.184 m^3 (0.239 yd^3)	100%	2719(2)	2259(2)
279-4328	1600 mm (63 inch)	135 kg (297.6 lb)	0.229 m^3 (0.298 yd^3)	100%	2097(2)	1728(3)
279-4329	1600 mm (63 inch)	250 kg (551 lb)	0.229 m^3 (0.298 yd^3)	100%	1595(3)	1225(4)

(1) Weight is calculated with the bucket cutting edge only.
(2) Max Material Density 1800 kg/m3
(3) Max Material Density 1500 kg/m3
(4) Max Material Density 1200 kg/m3

Consult your Caterpillar dealer for more information.

i04640452

Lifting Capacities

SMCS Code: 7000

Lifting capacities will vary with different work tools and attachments. Consult your Cat dealer or the machine Operation and Maintenance Manual regarding the lifting capacities for specific work tools and attachments.

The lifting capacities in the machine Operation and Maintenance Manual were calculated with a machine that was equipped with a standard bucket and no quick coupler. If other combinations of work tools are used, the difference between the weight of the work tool and/or quick coupler and the standard bucket must be subtracted from the lifting capacity.

i06015506

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: Lifting capacities are based upon a standard machine with the following conditions:

- lubricants
- full fuel tank
- rubber track
- canopy
- 75 kg (165 lb) operator

Lifting capacities will vary with different work tools and attachments. Consult your Caterpillar dealer regarding the lifting capacities for specific work tools and attachments.

Note: Lifting capacities should be used as a guide. Work tools, uneven ground conditions, soft ground conditions, or poor ground conditions have effects on lifting capacities. 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 and European applications, the lifting capacities are defined by “ISO 10567 2007”. The lifting capacities are defined as the lower value of 75% of the static tipping capacity or 87% of the hydraulic lift capacity.

The lifting capacities were calculated with a machine that was equipped with a standard bucket. The difference between the weight of a work tool attachment and the standard bucket must be subtracted.

This machine may be equipped with a standard stick or with a long stick. Lifting capacities may vary between a standard stick and a long stick. Measure the distance on the stick between the boom hinge pin and the work tool hinge pin. This distance will tell you if the machine is equipped with a standard stick or with a long stick.

303C CR

- A Standard Stick is approximately 1260 mm (50 inch).
- A Long Stick is approximately 1560 mm (61 inch).

303.5C CR

- A Standard Stick is approximately 1315 mm (52 inch).
- A Long Stick is approximately 1615 mm (64 inch).

304C CR

- A Standard Stick is approximately 1351 mm (53 inch).
- A Long Stick is approximately 1751 mm (69 inch).

305C CR

- A Standard Stick is approximately 1418 mm (56 inch).
- A Long Stick is approximately 1818 mm (72 inch).

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 force that is greater than 40000 N·m (29500 lb ft) is created during object handling applications. If the machine is not equipped with these devices, even if the hydraulic lift capacity is capable, do not exceed a load of 1000 kg (2200 lb). Do not exceed a force of 40000 N·m (29500 lb ft) in European object handling applications.

Note: In European countries, regulations require the blade to be equipped with a lock if the blade is used to increase stability. If a mechanism that locks the position of the blade 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 position of the blade is installed, use the values that are given in the tables for the machine when the blade is down.

303C CR

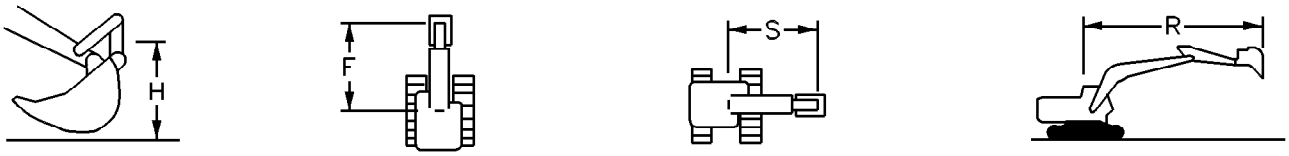

Illustration 36 g00586902

(H) Height
(F) Lifting capacity over the front of the machine
(S) Lifting capacity over the side of the machine
(R) Reach

Table 25

303C CR Lift Capacity with a Standard Stick and the Blade Up Lifting Point in the Center of the Swing

(H)	All lifting capacities are in kilograms and pounds.(1)																
	(R)																
	1.0 m 3.5		1.5 m 5.0 ft		2.0 m 6.5 ft		2.5 m 8.5 ft		3.0 m 10.0 ft		3.5 m 11.5 ft		4.0 m 13.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
3.5 m 11.5 ft									716(2) 1493(2)	512 1149	578 1236	404 864			514 1160	358 809	3.73 12.08
3.0 m 10.0 ft									691(2) 1520(2)	533 1144	577 1238	404 866			435 973	300 672	4.08 13.28
2.5 m 8.5 ft									748 1606	522 1122	571 1226	398 855	451 965	311 666	388 862	265 589	4.33 14.16
2.0 m 6.5 ft							993 2136	677 1460	726 1562	502 1082	559 1202	387 833	445 954	306 656	360 796	244 540	4.50 14.73
1.5 m 5.0 ft									701 1508	479 1032	545 1172	374 805	436 937	298 640	340 750	228 504	4.62 15.14
1.0 m 3.5 ft									678 1459	458 988	531 1142	361 777	428 920	290 623	331 730	221 488	4.66 15.29
0.5 m 2.0 ft									664 1427	445 959	520 1119	351 756	421 905	284 609	332 732	222 488	4.63 15.19
0							891 1911	587 1261	657 1413	440 946	514 1106	346 744	417 896	280 601	344 758	229 506	4.52 14.83
-0.5 m -2.0 ft					1362 2909	868 1861	894 1817	589 1266	657 1411	439 944	513 1102	344 740	416 895	279 600	369 815	247 546	4.33 14.19
-1.0 m -3.5 ft			2248(2) 4875(2)	1502 3208	1367 2920	872 1870	901 1931	595 1279	661 1419	443 952	515 1108	347 746			415 919	279 619	4.04 13.20
-1.5 m 5.0 ft					1380 2951	884 1896	912 1956	605 1301	669 1439	451 970					501 1119	340 759	3.61 11.76
-2.0 m 6.5 ft															560(2) 1197(2)	480 1091	2.95 9.51

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 26

**303C CR Lift Capacity with a Standard Stick and the Blade Down
Lifting Point in the Center of the Swing**

(H)	All lifting capacities are in kilograms and pounds.(1)																
	(R)																
	1.0 m 3.5		1.5 m 5.0 ft		2.0 m 6.5 ft		2.5 m 8.5 ft		3.0 m 10.0 ft		3.5 m 11.5 ft		4.0 m 13.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
3.5 m 11.5 ft											674(2) 1491(2)	452 969			635(2) 1405(2)	380 858	3.84 12.45
3.0 m 10.0 ft									707(2) 1546(2)	583 1251	704(2) 1540(2)	445 956			627(2) 1383(2)	323 722	4.17 13.61
2.5 m 8.5 ft									792(2) 1720(2)	572 1229	759(2) 1653(2)	437 938	729(2) 1592(2)	344 737	637(2) 1402(2)	290 644	4.39 14.35
2.0 m 6.5 ft							1120(2) 2380(2)	752 1619	934(2) 2009(2)	555 1194	829(2) 1797(2)	428 919	769(2) 1677(2)	338 724	662(2) 1456(2)	270 598	4.52 14.80
1.5 m 5.0 ft									1117(2) 2390(2)	534 1150	927(2) 1999(2)	416 893	816(2) 1771(2)	331 711	698(2) 1535(2)	259 572	4.58 15.02
1.0 m 3.5 ft									1289(2) 2758(2)	513 1106	1022(2) 2201(2)	403 868	868(2) 1877(2)	324 696	742(2) 1631(2)	254 561	4.59 15.07
0.5 m 2.0 ft									1393(2) 2989(2)	499 1075	1092(2) 2350(2)	394 847	906(2) 1955(2)	318 682	757(2) 1669(2)	255 562	4.56 14.96
0							1843(2) 3979(2)	656 1410	1414(2) 3042(2)	492 1059	1117(2) 2405(2)	388 833	915(2) 1970(2)	314 674	761(2) 1677(2)	263 579	4.46 14.65
-0.5 m -2.0 ft					1786(2) 4083(2)	969 2075	1724(2) 3725(2)	658 1413	1363(2) 2935(2)	491 1055	1090(2) 2343(2)	385 829	880(2) 1883(2)	312 672	760(2) 1676(2)	281 620	4.29 14.06
-1.0 m -3.5 ft			2248(2) 4875(2)	1696 3618	1884(2) 4085(2)	974 2087	1543(2) 3330(2)	663 1425	1243(2) 2674(2)	494 1061	997(2) 2131(2)	387 833			751(2) 1654(2)	315 697	4.01 13.13
-1.5 m 5.0 ft			1820(2) 3909(2)	1706 3642	1531(2) 3293(2)	985 2113	1275(2) 2732(2)	672 1445	1034(2) 2201(2)	501 1078					716(2) 1571(2)	377 840	3.62 11.79
-2.0 m 6.5 ft					977(2) 2042(2)	977(2) 2042 (2)	846(2) 1751(2)	689 1483							604(2) 1302(2)	513 1163	3.02 9.74

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 27

**303C CR Lift Capacity with a Long Stick and the Blade Up
Lifting Point in the Center of the Swing**

(H)	All lifting capacities are in kilograms and pounds.(1).																
	(R)																
	1.0 m 3.5		1.5 m 5.0 ft		2.0 m 6.5 ft		2.5 m 8.5 ft		3.0 m 10.0 ft		3.5 m 11.5 ft		4.0 m 13.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft

(continued)

(Table 27, contd)

303C CR Lift Capacity with a Long Stick and the Blade Up Lifting Point in the Center of the Swing																	
3.5 m 11.5 ft											584 1250	409 875			452 1017	312 703	4.00 12.99
3.0 m 10.0 ft											582 1248	408 873	455 973	315 672	386 861	263 587	4.36 14.20
2.5 m 8.5 ft											575 1233	401 859	452 968	311 667	347 770	234 519	4.59 15.01
2.0 m 6.5 ft									734 1578	508 1094	561 1206	388 834	444 952	304 652	320 708	213 471	4.77 15.63
1.5 m 5.0 ft							960 2066	646 1395	706 1518	483 1039	545 1171	373 802	434 932	295 633	303 669	200 441	4.88 16.00
1.0 m 3.5 ft									679 1460	458 986	528 1136	358 769	423 910	285 612	295 652	193 427	4.92 16.14
0.5 m 2.0 ft							884 1900	579 1248	659 1416	440 947	515 1106	345 742	414 890	277 594	296 653	193 426	4.88 16.03
0							876 1879	572 1230	648 1392	430 924	506 1087	337 724	408 877	271 581	305 673	199 439	4.78 15.68
-0.5 m -2.0 ft			1231(2) 2765(2)		1328 2837	800 1765	876 1878	572 1228	644 1383	426 916	501 1077	333 715	405 870	268 575	325 717	213 470	4.60 15.08
-1.0 m -3.5 ft			1924(2) 4338(2)	1454 3105	1335 2852	800 1765	880 1887	576 1237	645 1385	427 918	502 1078	333 716	406 873	269 578	360 796	237 526	4.33 14.17
-1.5 m 5.0 ft			2464(2) 5224(2)	1400 3090	1348 2883	800 1765	889 1908	584 1255	651 1399	433 931	507 1090	338 727			422 939	281 626	3.94 12.86
-2.0 m 6.5 ft					1267(2) 2674(2)	850 1875	905 1943	598 1286	664 1429	445 958					549 1239	370 834	3.38 10.95

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 28

303C CR Lift Capacity with a Long Stick and the Blade Down Lifting Point in the Center of the Swing																	
(H)	**All lifting capacities are in kilograms and pounds.(1)**																
	(R)																
	1.0 m 3.5		**1.5 m 5.0 ft**		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum Reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**
3.5 m 11.5 ft											572(2) 1267(2)	453 971			615(2) 1353(2)	334 750	4.11 13.36
3.0 m 10.0 ft											600(2) 1321(2)	447 958	617(2) 1357(2)	348 746	611(2) 1347(2)	288 642	4.41 14.39
2.5 m 8.5 ft											650(2) 1424(2)	440 943	646(2) 1416(2)	343 735	621(2) 1366(2)	260 577	4.61 15.08
2.0 m 6.5 ft									792(2) 1708(2)	561 1206	731(2) 1586(2)	429 921	689(2) 1504(2)	337 722	639(2) 1406(2)	242 535	4.74 15.53

(continued)

(Table 28, contd)

303C CR Lift Capacity with a Long Stick and the Blade Down Lifting Point in the Center of the Swing																	
1.5 m 5.0 ft							1266[2] 2679[2]	724 1560	985[2] 2112[2]	537 1156	839[2] 1811[2]	415 892	750[2] 1627[2]	329 705	664[2] 1460[2]	230 508	4.82 15.80
1.0 m 3.5 ft									1182[2] 2530	513 1105	951 2048[2]	400 860	815[2] 1763[2]	319 685	679[2] 1497[2]	225 495	4.84 15.89
0.5 m 2.0 ft							1856[2] 3965[2]	652 1404	1328[2] 2848[2]	494 1064	1042[2] 2244[2]	388 834	870[2] 1878[2]	311 668	689[2] 1518[2]	224 493	4.82 15.83
0							1885[2] 4050[2]	642 1381	1396[2] 2999[2]	483 1039	1095[2] 2357[2]	379 815	901[2] 1941[2]	305 655	699[2] 1541[2]	229 505	4.73 15.53
-0.5 m -2.0 ft			1231[2] 2765[2]		1700[2] 3875[2]	939 2011	1816[2] 3910[2]	641 1377	1387[2] 2984[2]	478 1028	1099[2] 2364[2]	374 805	896[2] 1926[2]	302 648	708[2] 1562[2]	243 537	4.57 14.97
-1.0 m -3.5 ft			1971[2] 4301[2]	1646 3511	2201[2] 4744[2]	945 2027	1675[2] 3605[2]	644 1384	1310[2] 2816[2]	479 1029	1046[2] 2244[2]	374 804	840[2] 1789[2]	302 650	714[2] 1575[2]	269 595	4.31 14.11
-1.5 m 5.0 ft			2622[2] 5588[2]	1660 3543	1868[2] 4006[2]	957 2052	1455[2] 3120[2]	652 1400	1156[2] 2473[2]	483 1040	917[2] 1948[2]	378 814			710[2] 1563[2]	315 700	3.94 12.87
-2.0 m 6.5 ft			1805[2] 3777[2]	1686 3601	1390[2] 2940[2]	974 2091	1119[2] 2366[2]	665 1429	886[2] 1851[2]	494 1065					672[2] 1472[2]	403 906	3.43 11.11
-2.5 m -8.5 ft																	2.59 0.00

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

303.5C CR

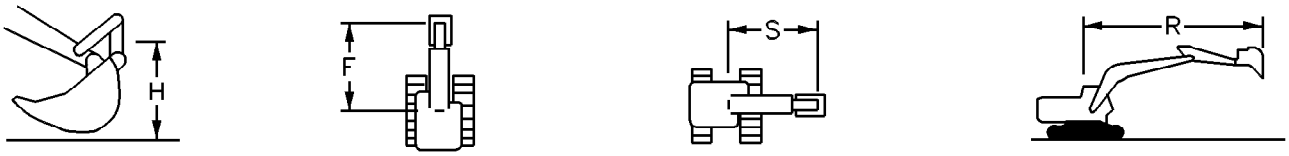

Illustration 37 g00586902

(H) Height
(F) Lifting capacity over the front of the machine
(S) Lifting capacity over the side of the machine
(R) Reach

Table 29

303.5C CR Lift Capacity with a Standard Stick and the Blade Up Lifting Point in the Center of the Swing																	
(H)	**All lifting capacities are in kilograms and pounds.[1].**																
	(R)																
	1.0 m 3.5		**1.5 m 5.0 ft**		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum Reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**

(continued)

(Table 29, contd)

303.5C CR Lift Capacity with a Standard Stick and the Blade Up Lifting Point in the Center of the Swing																	
3.5 m 11.5 ft											680 1456	603 1291			569 1281	505 1136	3.84 112.46
3.0 m 10.0 ft											678 1454	601 1290	533 1141	472 1011	480 1072	425 950	4.23 13.78
2.5 m 8.5 ft									770(2) 1664(2)	769 1654	668 1436	592 1272	530 1136	469 1007	432 959	382 848	4.47 14.60
2.0 m 6.5 ft							1149 2473	1001 2156	844 1817	743 1600	653 1404	577 1241	521 1119	461 990	397 878	350 775	4.66 15.26
1.5 m 5.0 ft									812 1749	712 1535	634 1365	559 1204	510 1096	450 968	376 831	331 732	4.78 15.66
1.0 m 3.5 ft									785 1690	686 1478	617 1328	543 1168	499 1073	440 946	367 810	323 712	4.81 15.79
0.5 m 2.0 ft									767 1651	669 1441	604 1300	530 1141	490 1054	431 927	368 812	324 714	4.78 15.68
0							1028 2203	886 1902	760 1633	662 1424	596 1282	522 1124	484 1041	425 915	380 838	334 737	4.67 15.32
-0.5 m -2.0 ft					1565 3343	1323 2830	1029 2208	888 1907	758 1629	661 1420	593 1276	520 1118	482 1037	423 911	406 895	356 787	4.48 14.70
-1.0 m -3.5 ft			2444(2) 5509(2)	2386 5076	1569 3353	1326 2840	1036 2222	894 1920	761 1636	664 1427	595 1280	521 1122	485 1044	426 917	451 999	397 878	4.20 13.75
-1.5 m 5.0 ft			2857(2) 6075(2)	2395 5098	1582 3383	1338 2867	1047 2247	904 1943	770 1655	672 1445	603 1298	528 1139			534 1189	469 1045	3.80 12.38
-2.0 m 6.5 ft					1532(2) 3240(2)	1361 2918	1066 2290	922 1984							713 1614	625 1415	3.20 10.33

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 30

303.5C CR Lift Capacity with a Standard Stick and the Blade Down Lifting Point in the Center of the Swing																	
(H)	**All lifting capacities are in kilograms and pounds.(1)**																
	(R)																
	1.0 m 3.5		**1.5 m 5.0 ft**		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum Reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**
3.5 m 11.5 ft											685(2) 1529(2)	651 1395			666(2) 1472(2)	546 1229	3.84 12.46
3.0 m 10.0 ft											685(2) 1514(2)	650 1394	728(2) 1617(2)	512 1096	626(2) 1383(2)	461 1030	4.23 13.78
2.5 m 8.5 ft									770(2) 1664 (2)		749(2) 1632(2)	640 1376	740(2) 1627(2)	509 1091	623(2) 1372(2)	415 921	4.47 14.60
2.0 m 6.5 ft							1218(2) 2560(2)	1087 2341	981(2) 2099(2)	805 1733	864(2) 1868(2)	625 1344	800(2) 1741(2)	500 1074	615(2) 1356(2)	381 844	4.66 15.26

(continued)

(Table 30, contd)

303.5C CR Lift Capacity with a Standard Stick and the Blade Down Lifting Point in the Center of the Swing																		
1.5 m 5.0 ft									1236(2) 2633(2)	774 1667	1005(2) 2162(2)	607 1306	880(2) 1906(2)	489 1052	621(2) 1369(2)	361 798	4.78 15.66
1.0 m 3.5 ft									1462(2) 3119(2)	747 1609	1138 2446(2)	590 1270	960(2) 2075(2)	479 1029	642(2) 1413(2)	353 778	4.81 15.79
0.5 m 2.0 ft									1595(2) 3417(2)	730 1571	1237(2) 2660(2)	577 1242	1024(2) 2210(2)	470 1010	679(2) 1494(2)	354 780	4.78 15.68
0							2150(2) 4632(2)	970 2081	1634(2) 3514(2)	722 1554	1286(2) 2769(2)	570 1226	1058(2) 2281(2)	464 998	736(2) 1623(2)	365 805	4.67 15.32
-0.5 m -2.0 ft					1924(2) 4419(2)	1456 3113	2045(2) 4416(2)	972 2085	1602(2) 3450(2)	721 1550	1281(2) 2758(2)	567 1219	1050(2) 2258(2)	462 994	825(2) 1823(2)	389 859	4.48 14.70
-1.0 m -3.5 ft			2444(2) 5509(2)		2419(2) 5216(2)	1460 3123	1886(2) 4069(2)	978 2099	1504(2) 3238(2)	724 1557	1214(2) 2607(2)	568 1223	979(2) 2084(2)	464 1000	880(2) 1942(2)	432 958	4.20 13.75
-1.5 m 5.0 ft			2857(2) 6075(2)	2687 5708	2063(2) 4434(2)	1472 3151	1643(2) 3527(2)	988 2123	1324(2) 2833(2)	732 1575	1054(2) 2232(2)	576 1241			886(2) 1952(2)	511 1138	3.80 12.38
-2.0 m 6.5 ft					1532(2) 3240(2)	1495 3204	1250(2) 2636(2)	1007 2164							854(2) 1871(2)	680 1539	3.20 10.33

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 31

303.5C CR Lift Capacity with a Long Stick and the Blade Up Lifting Point in the Center of the Swing																	
(H)	**All lifting capacities are in kilograms and pounds.(1).**																
	(R)																
	1.0 m 3.5		**1.5 m 5.0 ft**		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum Reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**
3.5 m 11.5 ft											575(2) 1232		536 1146	475 1015	492 1105	435 978	4.18 13.58
3.0 m 10.0 ft											557 (2) 1235 (2)		536 1147	475 1017	427 953	377 842	4.50 14.68
2.5 m 8.5 ft											626(2) 1369 (2)	595 1278	530 1137	470 1007	385 856	340 755	4.75 15.48
2.0 m 6.5 ft									804(2) 1725 (2)	752 1617	655 1409	579 1245	520 1116	460 987	356 788	313 692	4.92 16.10
1.5 m 5.0 ft							1108 2387	962 2074	819 1762	718 1547	635 1365	559 1203	507 1090	447 961	338 747	297 655	5.02 16.47
1.0 m 3.5 ft									786 1692	686 1479	614 1321	539 1160	494 1062	434 943	330 728	289 637	5.06 16.59
0.5 m 2.0 ft							1018 2187	876 1885	761 1638	663 1428	597 1285	523 1125	483 1037	423 910	330 728	289 636	5.02 16.49

(continued)

(Table 31, contd)

303.5C CR Lift Capacity with a Long Stick and the Blade Up Lifting Point in the Center of the Swing																	
0							1008 2162	866 1862	748 1607	650 1398	586 1260	512 1101	474 1019	415 892	339 747	296 653	4.92 16.15
-0.5 m -2.0 ft			1367[2] 3066[2]		1522 3252	1282 2744	1006 2159	865 1858	742 1594	645 1386	580 1247	506 1089	469 1009	410 883	358 791	313 692	4.75 15.57
-1.0 m -3.5 ft			2105[2] 4738[2]		1529 3310	1288 2758	1010 2167	869 1867	742 1595	645 1386	579 1245	505 1087	469 1009	410 882	393 870	344 761	4.49 14.70
-1.5 m 5.0 ft			2932 6209	2332 4963	1543 3299	1301 2787	1020 2188	878 1886	748 1608	650 1398	583 1255	509 1096	474 1022	415 895	453 1007	397 883	4.13 13.47
-2.0 m 6.5 ft			2861[2] 6016[2]	2362 5031	1565 3348	1321 2832	1035 2222	893 1919	760 1635	662 1425					569 1278	498 1119	3.61 11.70
-2.5 m -8.5 ft					1258[2] 2572[2]										828[2] 1800[2]	762 1774	2.81 8.92

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 32

303.5C CR Lift Capacity with a Long Stick and the Blade Down Lifting Point in the Center of the Swing																	
(H)	**All lifting capacities are in kilograms and pounds.[1]**																
	(R)																
	1.0 m 3.5		**1.5 m 5.0 ft**		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum Reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**
3.5 m 11.5 ft											575[2] 1232[2]		616[2] 1385[2]	515 1100	644[2] 1417[2]	472 1061	4.18 13.58
3.0 m 10.0 ft											557[2] 1235[2]		608[2] 1355[2]	514 1102	634[2] 1399[2]	410 915	4.50 14.68
2.5 m 8.5 ft											626[2] 1369[2]		640[2] 1407[2]	509 1092	628[2] 1387[2]	370 823	4.74 15.48
2.0 m 6.5 ft									804[2] 1725[2]	804 1725	745[2] 1613[2]	627 1348	708[2] 1544[2]	499 1071	626[2] 1380[2]	342 756	4.92 16.10
1.5 m 5.0 ft							1419[2] 2981[2]	1047 2257	1062[2] 2268[2]	780 1697	893[2] 1924[2]	607 1306	797[2] 1728[2]	486 1045	637[2] 1402[2]	325 717	5.02 16.47
1.0 m 3.5 ft									1317[2] 2810[2]	748 1610	1043 2243[2]	587 1263	890[2] 1924[2]	473 1018	661[2] 1455[2]	317 698	5.06 16.59
0.5 m 2.0 ft							2129 [2] 4543 [2]	960 2064	1502 [2] 3216 [2]	724 1558	1167 [2] 2509 [2]	570 1227	971 [2] 2095 [2]	462 993	700 [2] 1542 [2]	317 698	5.02 16.49
0							2175[2] 4668[2]	950 2040	1597[2] 3429[2]	710 1528	1246[2] 2682[2]	559 1203	1026[2] 2212[2]	454 976	759[2] 1673[2]	325 717	4.92 16.15
-0.5 m -2.0 ft			1367[2] 3066[2]		1885[2] 4307[2]	1414 3025	2117[2] 4577[2]	949 2037	1612[2] 3467[2]	705 1516	1274[2] 2743[2]	553 1190	1045[2] 2251[2]	449 966	801[2] 1766[2]	344 759	4.75 15.57
-1.0 m -3.5 ft			2105[2] 4728[2]		2712[2] 5837[2]	1420 3040	2011[2] 4328[2]	953 2045	1558[2] 3353[2]	705 1516	1246[2] 2679[2]	552 1188	1017[2] 2183[2]	449 965	827[2] 1825[2]	377 833	4.49 14.70

(continued)

(Table 32, contd)

303.5C CR Lift Capacity with a Long Stick and the Blade Down Lifting Point in the Center of the Swing																	
-1.5 m 5.0 ft			2985[2] 6756[2]	2621 5568	2408[2] 5165[2]	1434 3070	1819[2] 3904[2]	962 2065	1432[2] 3072[2]	711 1528	1149[2] 2456[2]	557 1198	913[2] 1926[2]	454 979	852[2] 1880[2]	434 965	4.13 13.47
-2.0 m 6.5 ft			2861[2] 6016[2]	2653 5640	1961[2] 4169[2]	1455 3117	1516[2] 3226[2]	977 2098	1201[2] 2544[2]	723 1555					867[2] 1911[2]	543 1221	3.61 11.70
-2.5 m -8.5 ft					1258[2] 2572[2]										828[2] 1800[2]		2.81 8.92

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

304C CR

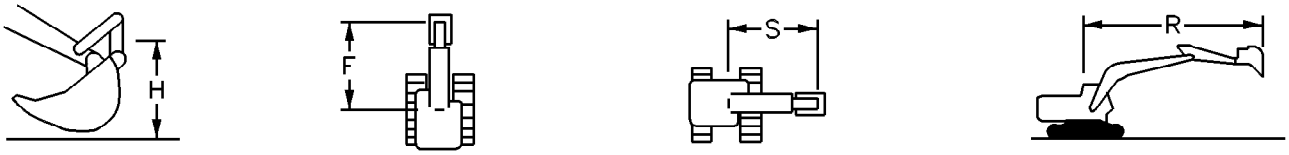

Illustration 38 g00586902

(H) Height
(F) Lifting capacity over the front of the machine
(S) Lifting capacity over the side of the machine
(R) Reach

Table 33

304C CR Lift Capacity with a Standard Stick and the Blade Up Lifting Point in the Center of the Swing															
(H)	**All lifting capacities are in kilograms and pounds.[1]**														
	(R)														
	1.5 m 5.0 ft		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**
3.5 m 11.5 ft									710[2] 1602[2]		845[2] 1822	666 1422	780 1829	608 1423	4.19 13.17
3.0 m 10.0 ft									768[2] 1689[2]		832[2] 1825	665 1425	675 1508	525 1172	4.53 14.76
2.5 m 8.5 ft							962[2] 2053[2]		927[2] 2006[2]	821 1766	839 1802	653 1404	607 1348	470 1043	4.79 15.66
2.0 m 6.5 ft							1331 2863	1016 2191	1028 2211	794 1709	822 1767	637 1370	566 1253	436 965	4.96 16.23
1.5 m 5.0 ft							1277 2749	967 2086	996 2144	764 1647	803 1727	619 1332	544 1201	418 922	5.04 16.53
1.0 m 3.5 ft							1239 2666	932 2010	971 2089	741 1596	785 1689	603 1297	536 1183	411 906	5.05 16.58
0.5 m 1.6 ft							1222 2625	916 1972	954 2051	725 1560	772 1660	590 1270	543 1196	415 914	5.00 16.40

(continued)

(Table 33, contd)

304C CR Lift Capacity with a Standard Stick and the Blade Up Lifting Point in the Center of the Swing															
0							1216 2610	911 1959	945 2030	716 1541	764 1643	583 1254	564 1243	431 950	4.86 15.96
-0.5 m -1.64 ft			2069[2] 4752[2]	1875 4009	1692 3620	1242 2662	1217 2611	912 1960	942 2024	714 1536	761 1638	580 1249	605 1335	462 1021	4.65 15.25
-1.0 m -3.5 ft	2866[2] 6466[2]		2687 5719	1880 4021	1699 3635	1247 2675	1223 2625	918 1973	946 2033	718 1543	765 1647	584 1258	677 1499	518 1147	4.34 14.21
-1.5 m 5.0 ft	3950[2] 8580[2]	3509 7449	2704 5758	1895 4054	1715 3673	1262 2709	1236 2655	930 2000	957 2059	728 1568			810 1806	620 1383	3.90 12.71
-2.0 m -6.5 ft	3474[2] 7238[2]		2479[2] 5243[2]	1927 4128	1745 3740	1288 2769							1118 2540	850 1930	3.23 10.42

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 34

304C CR Lift Capacity with a Standard Stick and the Blade Down Lifting Point in the Center of the Swing															
(H)	**All lifting capacities are in kilograms and pounds.[1]**														
	(R)														
	1.5 m 5.0 ft		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**
3.5 m 11.5 ft									710[2] 1602[2]		845[2] 1928[2]	741 1584	889[2] 2072[2]	678 1588	4.19 13.17
3.0 m 10.0 ft									768[2] 1689[2]		832[2] 1846[2]	740 1588	854[2] 1891[2]	587 1311	4.53 14.76
2.5 m 8.5 ft							962 2053[2]		927[2] 2006[2]	914 1966	914[2] 1997[2]	729 1566	829[2] 1830[2]	527 1170	4.79 15.66
2.0 m 6.5 ft							1381[2] 2917[2]	1137 2449	1155[2] 2476[2]	886 1908	1045[2] 2265[2]	712 1532	825[2] 1818[2]	491 1086	4.96 16.23
1.5 m 5.0 ft							1844[2] 3889[2]	1086 2342	1406[2] 3008[2]	857 1845	1197[2] 2582[2]	694 1493	839[2] 1847[2]	471 1040	5.04 16.53
1.0 m 3.5 ft							2184[2] 4639[2]	1051 2264	1629[2] 3486[2]	832 1793	1340[2] 2887[2]	677 1457	870[2] 1915[2]	464 1022	5.05 16.58
0.5 m 1.46 ft							2341[2] 5010[2]	1034 2225	1783[2] 3825[2]	816 1756	1452[2] 3129[2]	664 1430	922[2] 2030[2]	469 1033	5.00 16.40
0							2378[2] 5113[2]	1029 2212	1860[2] 3999[2]	807 1737	1519[2] 3274[2]	657 1413	1001[2] 2207[2]	487 1073	4.86 15.96
-0.5 m 1.6 ft			2069[2] 4752[2]	2069[2] 4587[2]	3033[2] 6531[2]	1408 3017	2336[2] 5031[2]	1030 2213	1864[2] 4014[2]	805 1732	1531[2] 3296[2]	654 1408	1121[2] 2476[2]	522 1152	4.65 15.25
-1.0 m -3.28 ft	2866[2] 6466[2]		3678[2] 8141[2]	2153 4600	2804[2] 6029[2]	1414 3030	2217[2] 4773[2]	1036 2226	1792[2] 3853[2]	809 1739	1467[2] 3142[2]	658 1417	1263[2] 2787[2]	584 1293	4.34 14.21

(continued)

(Table 34, contd)

304C CR Lift Capacity with a Standard Stick and the Blade Down Lifting Point in the Center of the Swing														
-1.5 m **5.0 ft**	3950[2] 8580[2]	3247[2] 6933[2]	2168 4634	2486[2] 5340[2]	1429 3065	1993[2] 4274[2]	1048 2253	1608[2] 3427[2]	819 1764			1317[2] 2909[2]	697 1555	3.90 12.71
-2.0 m **6.5 ft**	3474[2] 7238[2]	2479[2] 5243[2]	2202 4711	1967[2] 4160[2]	1456 3127							1357[2] 2993[2]	955 2168	3.23 10.42

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 35

304C CR Lift Capacity with a Long Stick and the Blade Up Lifting Point in the Center of the Swing															
(H)	**All lifting capacities are in kilograms and pounds.[1]**														
	(R)														
	1.5 m 5.0 ft		**2.0 m 6.5 ft**		**2.5 m 8.5 ft**		**3.0 m 10.0 ft**		**3.5 m 11.5 ft**		**4.0 m 13.0 ft**		**Maximum reach**		
	(F)	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**(F)**	**(S)**	**m ft**
3.5 m 11.5 ft											594[2] 1350		645 1444	498 1116	4.62 15.06
3.0 m 10.0 ft											623[2] 1385[2]		566 1262	434 969	4.94 16.13
2.5 m 8.5 ft									671[2] 1462[2]		716[2] 1570[2]	649 1394	516 1144	393 872	5.17 16.93
2.0 m 6.5 ft							976[2] 2071[2]		897[2] 1931[2]	795 1710	817 1755	631 1355	484 1070	367 811	5.32 17.44
1.5 m 5.0 ft							1291 2777	977 2105	995 2140	761 1639	794 1707	609 1310	466 1028	351 665	5.40 17.71
1.0 m 3.5 ft							1238 2662	928 2000	962 2068	730 1571	772 1660	589 1265	459 1011	345 760	5.41 17.76
0.5 m 1.64 ft							1204 2586	897 1931	936 2013	707 1520	754 1620	571 1228	462 1018	347 764	5.36 17.59
0					1639 3507	1191 2554	1187 2547	882 1895	920 1977	691 1487	741 1592	559 1202	477 1051	358 788	5.24 17.20
-0.5 m -1.64 ft			1927[2] 4396[2]	1796 3839	1638 3504	1190 2551	1181 2533	876 1883	912 1959	684 1470	734 1577	553 1187	506 1116	380 838	5.05 16.56
-1.0 m -3.5 ft	2255[2] 5075[2]		2603 5539	1805 3859	1644 3519	1196 2564	1182 2537	878 1886	911 1957	683 1468	733 1574	551 1185	555 1227	418 924	4.78 15.64
-1.5 m -5.0 ft	3256[2] 7371[2]	3256[2] 7187	2621 5581	1821 3894	1658 3550	1208 2592	1191 2556	886 1903	917 1970	688 1480	738 1589	557 1199	638 1419	482 1072	4.40 14.37
-2.0 m -6.56 ft	3565[2] 8109[2]	3428 7282	2655 5658	1849 3959	1682 3602	1229 2638	1208 2595	901 1939	932 2006	702 1513			796 1788	603 1354	3.87 12.56
-2.5 m -8.5 ft	3526[2] 7161[2]	3506[2] 7161[2]	2357[2] 4888[2]	1895 4064									1206 2803	907 2103	3.05 9.73

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 36

304C CR Lift Capacity with a Long Stick and the Blade Down Lifting Point in the Center of the Swing															
(H)	All lifting capacities are in kilograms and pounds.(1)														
	(R)														
	1.5 m 5.0 ft		2.0 m 6.5 ft		2.5 m 8.5 ft		3.0 m 10.0 ft		3.5 m 11.5 ft		4.0 m 13.0 ft		Maximum reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	S	(F)	(S)	(F)	(S)	m ft
3.5 m 11.5 ft											594(2) 1350		768 1684	559 1252	4.62 15.06
3.0 m 10.0 ft											623 1385		742 1642	490 1092	4.94 16.13
2.5 m 8.5 ft									671 1462		716 1570	716 1557	727 1604	445 987	5.17 16.93
2.0 m 6.5 ft							976 2071		897 1931	889 1911	855 1857	706 1518	727 1602	416 921	5.32 17.44
1.5 m 5.0 ft							1441 3049	1097 2364	1164 2492	854 1838	1021 2205	685 1472	741 1631	400 883	5.40 17.71
1.0 m 3.5 ft							1867 3963	1048 2256	1421 3042	822 1769	1187 2558	663 1426	768 1691	393 867	5.41 17.76
0.5 m 1.6 ft							2152 4594	1016 2185	1628 3492	798 1717	1330 2866	646 1388	812 1788	396 872	5.36 17.59
0					2323 5464	1356 2907	2297 4925	1000 2149	1765 3792	783 1683	1435 3093	633 1361	876 1931	408 900	5.24 17.20
-0.5 m -1.6 ft			1927 4396	1927 4396	3137 6734	1355 2904	2338 5024	994 2135	1829 3934	775 1666	1492 3215	627 1347	970 2143	433 955	5.05 16.56
-1.0 m -3.5 ft	2255 5075		2914 6651	2076 4434	3005 6460	1361 2918	2293 4932	996 2139	1821 3918	774 1664	1491 3207	625 1345	1114 2469	475 1051	4.78 15.64
-1.5 m -5.0 ft	3256 7371		3575 7858	2092 4470	2783 5974	1374 2947	2161 4639	1004 2157	1732 3715	780 1677	1410 3012	631 1359	1180 2609	547 1215	4.40 14.37
-2.0 m -6.5 ft	3565 8109		3261 6935	2122 4538	2424 5172	1395 2995	1904 4057	1020 2193	1515 3203	794 1710			1251 2768	681 1530	3.87 12.56
-2.5 m -8.5 ft	3526 7161		2357 4888	2171 4649									1326 2934	1023 2372	3.05 9.73

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

305C CR

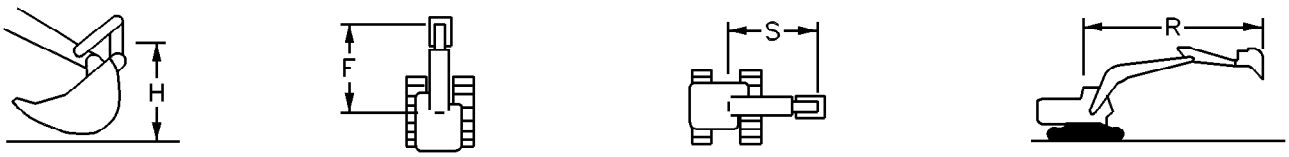

Illustration 39 g00586902

(H) Height
(F) Lifting capacity over the front of the machine
(S) Lifting capacity over the side of the machine
(R) Reach

Table 37

305C CR Lift Capacity with a Standard Stick and the Blade Up
Lifting Point in the Center of the Swing

(H)	All lifting capacities are in kilograms.[1]														
	(R)														
	1.5 m 5.0 ft		2.0 m 6.5 ft		2.5 m 8.5 ft		3.0 m 10.0 ft		3.5 m 11.5 ft		4.0 m 13.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
3.5 m 11.5 ft											825[2] 1859[2]	744 1592	803 1798	616 1380	4.41 14.34
3.0 m 10.0 ft									810[2] 1771[2]		861[2] 1898[2]	737 1581	699 1558	533 1189	4.75 15.50
2.5 m 8.5 ft							1074[2] 2278[2]		1005[2] 2166[2]	904 1946	941 2021	721 1550	634 1408	481 1068	4.99 16.33
2.0 m 6.5 ft							1477 3181	1109 2394	1145 2465	870 1875	919 1976	701 1507	595 1316	449 994	5.15 16.87
1.5 m 5.0 ft							1412 3024	1050 2267	1108 2385	835 1800	895 1926	678 1461	573 1264	431 951	5.23 17.15
1.0 m 3.5 ft							1369 2947	1011 2180	1077 2319	807 1739	874 1881	658 1418	565 1245	423 933	5.24 17.20
0.5 m 2.0 ft							1352 2903	995 2140	1057 2274	788 1698	858 1846	644 1385	570 1256	426 940	5.19 17.02
0.0							1346 2888	990 2126	1047 2250	779 1675	849 1825	635 1365	589 1299	441 972	5.06 16.60
-0.5 m -2.0 ft			1981[2] 5000[2]	1981[2] 4364	1873 4008	1350 2894	1346 2890	990 2127	1044 2243	776 1668	844 1816	631 1357	627 1385	469 1036	4.86 15.93
-1.0 m -3.5 ft	3080[2] 6926[2]		2973 6327	2045 4372	1880 4022	1356 2907	1353 2903	996 2140	1047 2249	778 1674	846 1821	633 1361	693 1533	519 1149	4.57 14.96
-1.5 m 5.0 ft	4561[2] 9868[2]	3815 8098	2989 6364	2058 4403	1895 4057	1369 2937	1365 2931	1007 2166	1056 2271	787 1695	857 1847	642 1386	808 1798	607 1351	4.16 13.58
-2.0 m 6.5 ft	3902[2] 8550[2]	3854 8186	3021[2] 6430[2]	2087 4469	1922 4118	1393 2992	1388 2982	1028 2212					1044 2354	783 1765	3.58 11.58

[1] Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
[2] The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 38

305C CR Lift Capacity with a Standard Stick and the Blade Down
Lifting Point in the Center of the Swing

(H)	All lifting capacities are in kilograms.[1]														
	(R)														
	1.5 m 5.0 ft		2.0 m 6.5 ft		2.5 m 8.5 ft		3.0 m 10.0 ft		3.5 m 11.5 ft		4.0 m 13.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft

(continued)

(Table 38, contd)

305C CR Lift Capacity with a Standard Stick and the Blade Down Lifting Point in the Center of the Swing															
3.5 m 11.5 ft											825 (2) 1859 (2)	824 1764	943(2) 2068(2)	684 1533	4.41 14.34
3.0 m 10.0 ft									810 (2) 1771 (2)		861(2) 1898 (2)	816 1753	926(2) 2049(2)	594 1325	4.75 15.50
2.5 m 8.5 ft							1074 (2) 2278 (2)		1005 (2) 2166 (2)	1002 2157	973(2) 2117 (2)	801 1721	909(2) 2005(2)	538 1195	4.99 16.33
2.0 m 6.5 ft							1559 (2) 3280 (2)	1237 2667	992(2) 2128(2)	877 1888	918(2) 1973 (2)	698 1501	510(2) 1127(2)	504 837	5.15 16.87
1.5 m 5.0 ft							2084(2) 4382(2)	1175 2537	1553(2) 3315(2)	932 2009	1302 (2) 2804 (2)	757 1630	931(2) 2049(2)	484 1068	5.23 17.15
1.0 m 3.5 ft							2441(2) 5180(2)	1135 2447	1798(2) 3844(2)	904 1946	1463 (2) 3149 (2)	737 1586	968(2) 2131(2)	476 1050	5.24 17.20
0.5 m 2.0 ft							2588(2) 5543(2)	1120 2407	1964(2) 4212(2)	884 1904	1590 (2) 3422 (2)	722 1553	1027(2) 2261(2)	480 1058	5.19 17.02
0.0							2621(2) 5634(2)	1114 2393	2048(2) 4403(2)	874 1881	1668 (2) 3593 (2)	712 1533	1114(2) 2455(2)	496 1094	5.06 16.60
-0.5 m -2.0 ft			1981(2) 5000(2)	1981(2) 4977	3345(2) 7208(2)	1525 3268	2577(2) 5553(2)	1114 2394	2059(2) 4433(2)	871 1874	1691 (2) 3643 (2)	709 1524	1242(2) 2745(2)	528 1166	4.86 15.93
-1.0 m -3.5 ft	3080(2) 6926(2)		3779(2) 8622(2)	2334 4985	3134(2) 6745(2)	1531 3282	2466(2) 5313(2)	1120 2407	1999(2) 4302(2)	874 1880	1649 (2) 3544 (2)	710 1529	1324(2) 2924(2)	583 1291	4.57 14.96
-1.5 m 5.0 ft	4561(2) 9868(2)	4505 9532	3746(2) 8020(2)	2348 5018	2821(2) 6070(2)	1544 3313	2266(2) 4870(2)	1132 2433	1848(2) 3962(2)	883 1901	1502 (2) 3188 (2)	720 1554	1388(2) 3067(2)	680 1514	4.16 13.58
-2.0 m 6.5 ft	3902(2) 8550(2)		3021(2) 6430(2)	2378 5086	2373(2) 5059(2)	1570 3370	1916(2) 4069(2)	1153 2481					1452(2) 3208(2)	876 1976	3.58 11.58

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 39

305C CR Lift Capacity with a Long Stick and the Blade Up Lifting Point in the Center of the Swing															
(H)	All lifting capacities are in kilograms.(1)														
	(R)														
	1.5 m 5.0 ft		2.0 m 6.5 ft		2.5 m 8.5 ft		3.0 m 10.0 ft		3.5 m 11.5 ft		4.0 m 13.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
3.5 m 11.5 ft													663 1484	503 1127	4.87 15.87
3.0 m 10.0 ft											648(2) 1436(2)		588 1310	443 986	5.18 16.92
2.5 m 8.5 ft											766(2) 1672(2)	721 1549	540 1198	404 895	5.40 17.66
2.0 m 6.5 ft							1111(2) 2350(2)		992(2) 2128(2)	877 1888	918 1973	698 1501	510 1127	378 837	5.54 18.15
1.5 m 5.0 ft							1436 3090	1069 2306	1112 2392	837 1802	891 1915	673 1446	492 1085	363 801	5.61 18.40
1.0 m 3.5 ft							1374 2957	1013 2184	1073 2308	801 1725	865 1859	648 1394	484 1068	356 785	5.62 18.45
0.5 m 2.0 ft							1337 2873	978 2107	1044 2244	774 1665	843 1812	628 1350	487 1073	357 788	5.57 18.29
0.0					1819 3893	1298 2785	1318 2830	961 2068	1025 2203	756 1627	828 1780	614 1319	501 1103	367 810	5.46 17.92
-0.5 m -2.0 ft			2005(2) 4563(2)	1957 4183	1818 3890	1297 2782	1311 2814	955 2053	1016 2182	747 1607	819 1760	605 1301	527 1163	387 855	5.28 17.32
-1.0 m -3.5 ft	2397(2) 5387(2)		2884 6138	1966 4203	1823 3901	1302 2792	1313 2817	957 2055	1013 2177	746 1603	816 1755	603 1295	572 1265	421 932	5.03 16.46
-1.5 m 5.0 ft	3392(2) 7659(2)		2903 6108	1981 4238	1837 3933	1314 2820	1321 2835	964 2072	1018 2188	750 1613	820 1764	606 1304	646 1434	478 1061	4.68 15.27
-2.0 m 6.5 ft	3917(2) 8592(2)	3724 7908	2934 6251	2008 4298	1860 3983	1334 2865	1337 2871	979 2105	1031 2218	762 1640	834 1797	619 1335	776 1737	577 1291	4.20 13.65
-2.5 m -8.5 ft	4679(2) 9658(2)	3794 8067	2982(2) 6266(2)	2051 4393	1895 4064	1366 2937	1366 2937	1005 2166					1058 2416	787 1797	3.50 11.26

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.
(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Table 40

305C CR Lift Capacity with a Long Stick and the Blade Down Lifting Point in the Center of the Swing							
(H)	All lifting capacities are in kilograms.(1)						
	(R)						
	1.5 m 5.0 ft	2.0 m 6.5 ft	2.5 m 8.5 ft	3.0 m 10.0 ft	3.5 m 11.5 ft	4.0 m 13.0 ft	Maximum Reach

(continued)

(Table 40, contd)

305C CR Lift Capacity with a Long Stick and the Blade Down Lifting Point in the Center of the Swing															
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
3.5 m 11.5 ft													810(2) 1791(2)	562 1259	4.87 15.87
3.0 m 10.0 ft											648(2) 1436(2)		778(2) 1720(2)	497 1107	5.18 16.92
2.5 m 8.5 ft											766(2) 1672(2)		765(2) 1688(2)	455 1009	5.40 17.66
2.0 m 6.5 ft							1111(2) 2350(2)		992(2) 2128(2)	976 2100	928(2) 2010(2)	778 1672	767(2) 1689(2)	428 946	5.54 18.15
1.5 m 5.0 ft							1633(2) 3446(2)	1196 2578	1291(2) 2759(2)	935 2013	1116(2) 2405(2)	752 1617	781(2) 1719(2)	411 908	5.61 18.40
1.0 m 3.5 ft							2096(2) 4443(2)	1139 2454	1574(2) 3366(2)	898 1933	1301(2) 2800(2)	727 1563	808(2) 1779(2)	404 892	5.62 18.45
0.5 m 2.0 ft							2393(2) 5106(2)	1103 2374	1799(2) 3856(2)	870 1872	1460(2) 3142(2)	706 1518	851(2) 1874(2)	406 895	5.57 18.29
0.0					2304(2) 5399(2)	1473 3158	2540(2) 5444(2)	1086 2334	1946(2) 4180(2)	852 1833	1577(2) 3396(2)	692 1487	913(2) 2013(2)	417 920	5.46 17.92
-0.5 m -2.0 ft			2005(2) 4563(2)		3216(2) 7440(2)	1472 3155	2581(2) 5548(2)	1080 2319	2018(2) 4341(2)	843 1813	1645(2) 3543(2)	683 1468	1002(2) 2213(2)	440 970	5.28 17.32
-1.0 m -3.5 ft	2397(2) 5387(2)		3002(2) 6832(2)	2252 4811	3328(2) 7154(2)	1477 3165	2541(2) 5467(2)	1081 2321	2020(2) 4346(2)	841 1809	1656(2) 3565(2)	680 1463	1134(2) 2513(2)	478 1056	5.03 16.46
-1.5 m 5.0 ft	3392(2) 7659(2)		3927(2) 8611(2)	2269 4848	3117(2) 6695(2)	1489 3194	2420(2) 5202(2)	1089 2338	1946(2) 4181(2)	846 1819	1599(2) 3429(2)	684 1472	1223(2) 2703(2)	540 1199	4.68 15.27
-2.0 m 6.5 ft	3917(2) 8592(2)		3772(2) 8042(2)	2297 4911	2789(2) 5965(2)	1510 3240	2195(2) 4695(2)	1104 2372	1771(2) 3777(2)	858 1847	1426(2) 3008(2)	697 1504	1292(2) 2859(2)	650 1454	4.20 13.65
-2.5 m -8.5 ft	4679(2) 9658(2)	4485 9505	2982(2) 6266(2)	2342 5013	2261(2) 4768(2)	1543 3515	1784(2) 3742(2)	1130 2435					1370(2) 3035(2)	884 2017	3.50 11.26

(1) Lift capacities are based on “ISO 10567:2007” standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities.

(2) The lifting capacity is limited by the hydraulic capacity rather than the tipping load.

Identification Information

i03646089

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.

Product Identification Number (PIN) and CE Plate

This plate is positioned on the front of the machine.

- Model_____
- PIN_____

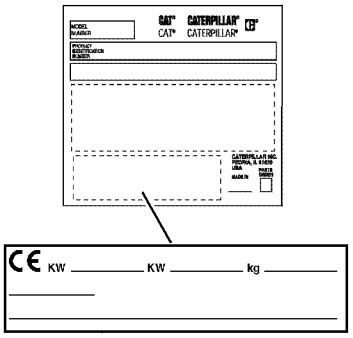

Illustration 40 g01883459

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_____

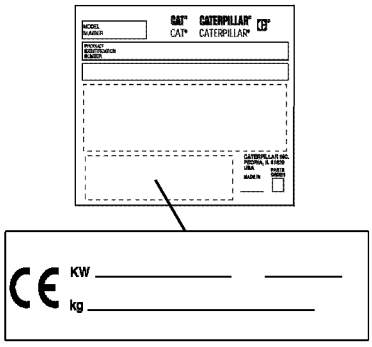

Illustration 41 g01120192

For machines that are compliant to “1998/42/EC”, the following information is stamped onto the CE plate. For quick reference, record this information in the spaces that are provided below.

- Primary Engine Power (kW)_____
- Typical Machine Weight (kg)_____
- Year of Construction_____

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

Engine Serial Number

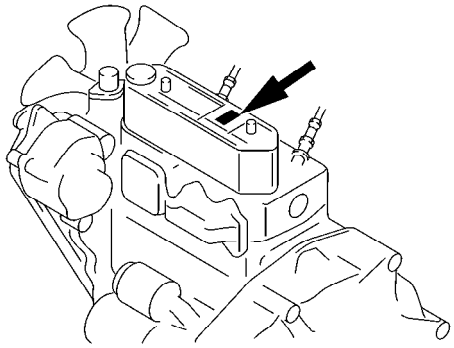

Illustration 42 g00837364

Engine Serial Number _____

TOPS Plate

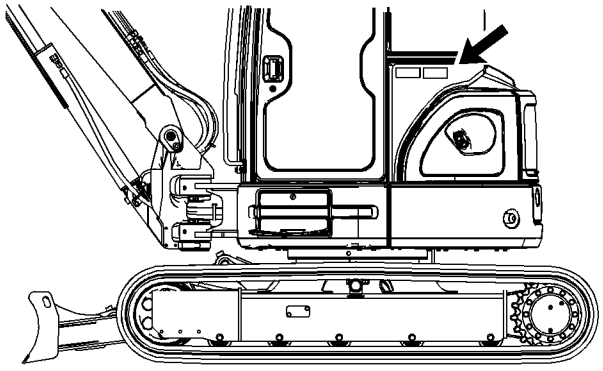

Illustration 43 g01212259

If equipped, this certification label is located on the front left side of the machine.

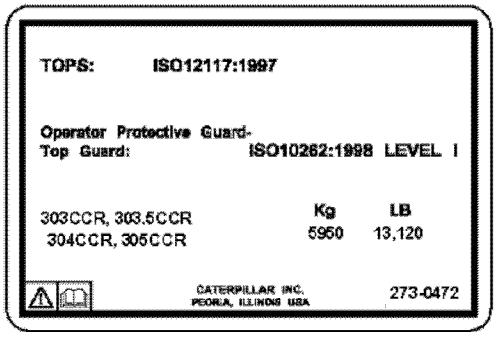

Illustration 44 g01212195

Sound Certification Film

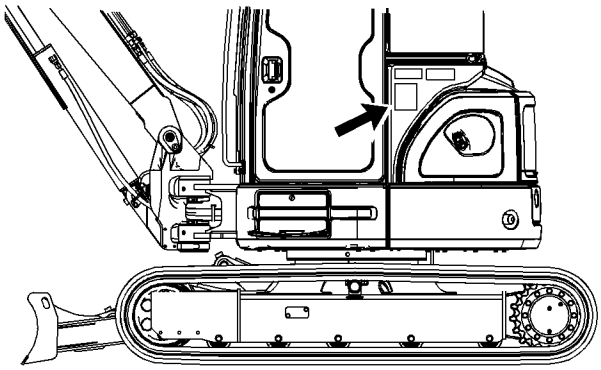

Illustration 45 g01212262

If equipped, this label is located on the front left side of the machine.

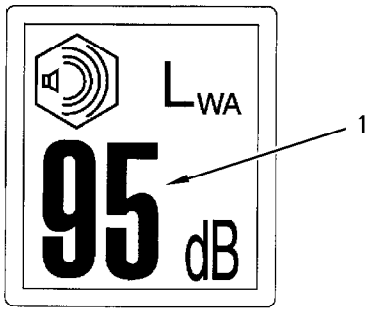

Illustration 46 g00919897

303C CR

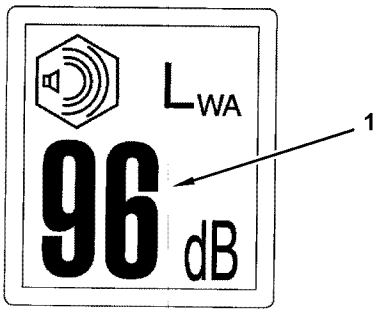

Illustration 47 g01212198

303.5C CR and 304C CR

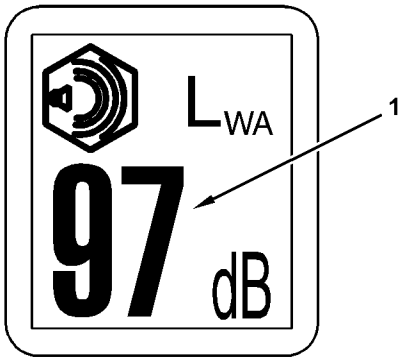

Illustration 48 g01225465

305C CR

If equipped, the certification label is used to verify the environmental sound certification of the machine to the requirements 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”.

i07709181

Emissions Certification Film

SMCS Code: 1000; 7000; 7405

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

Consult your Cat dealer for an Emission Control Warranty Statement.

This label is located on the engine.

Declaration of Conformity

SMCS Code: 1000; 7000

Table 41

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

EC DECLARATION OF CONFORMITY OF MACHINERY

Manufacturer: Caterpillar Inc., 100 N.E. Adams Street, Peoria, 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, B.P. 55, 38041 Grenoble Cedex 9, France

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

Description:	Generic Denomination:	Earth-moving Equipment
	Function:	Hydraulic Excavator
	Model/Type:	303CCR, 303.5CCR, 304CCR, and 305CCR
	Serial Number:	
	Commercial Name:	Caterpillar

Fulfills all the relevant provisions of the following Directives

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

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

Done at: **Signature**

Date: **Name/Position**

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

Operation Section

Before Operation

i04021647

Mounting and Dismounting

SMCS Code: 6700; 7000

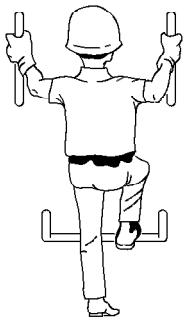

Illustration 49 g00037860

Typical example

Mount the machine and dismount the machine only at locations that have steps and/or handholds. Before you mount the machine, clean the steps and the handholds. Inspect the steps and handholds. Make all necessary repairs.

Face the machine whenever you get on the machine and whenever you get off the machine.

Maintain a three-point contact with the steps and with the handholds.

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

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

Machine Access System Specifications

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

Alternate Exit

Machines that are equipped with cabs have alternate exits. For additional information, see Operation and Maintenance Manual, “Alternate Exit”.

i02365130

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

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

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

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

Inspect the Falling Object Protective Structure for damage. Tighten any loose bolts. If repairs are needed, consult your Caterpillar dealer.

Inspect the operator compartment for trash buildup. Check for trash buildup under the floorplate. Keep these areas clean.

Inspect the cab 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.

Machine Operation

i02388697

Alternate Exit

SMCS Code: 7310

Machines with cabs are equipped with alternate exits. The rear window serves as an alternate exit.

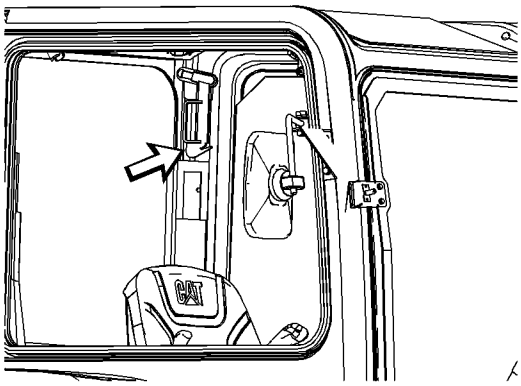

Illustration 50 g01192940

Use the hammer to break the glass in order to exit the machine. The hammer is located on the post on the left side of the cab.

Note: Do not use the alternate exit except in an emergency situation.

i02389325

Seat

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

Put the hydraulic lockout control (lever) in the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, “Hydraulic Lockout Control”. Perform this procedure before you adjust the seat. Also perform this procedure before you adjust the seat and the console as a unit. This will prevent any possibility of unexpected movement of machine.

Adjust the seat at the beginning of each work period and adjust the seat when you change operators.

Always use the seat belt when you operate the machine.

The seat should be adjusted so that full travel of the controls is allowed.

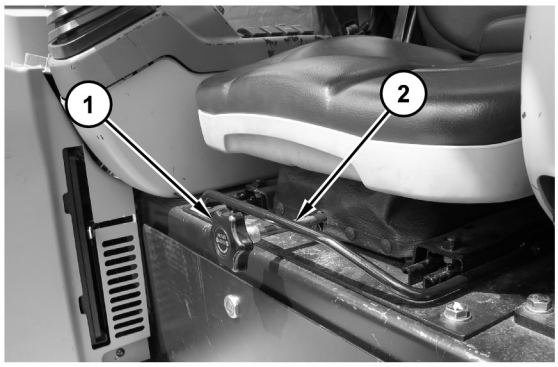

Illustration 51 g01193023

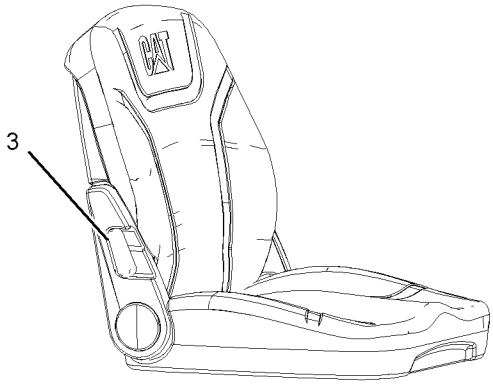

Illustration 52 g01193061

Pull up on fore/aft lever (2). Slide the seat forward to the desired position or slide the seat backward to the desired position. Release the fore/aft lever in order to lock the seat into position.

In order to adjust the seat back tilt to the desired position, pull up on lever (3). Release lever (3) when the seat back tilt is in the desired position.

Turn the knob (1) clockwise in order to increase the stiffness of the suspension. Turn the knob counterclockwise in order to decrease the stiffness on the suspension.

i02014437

Seat Belt

SMCS Code: 7327

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

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

Seat Belt Adjustment

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

Lengthening the Seat Belt

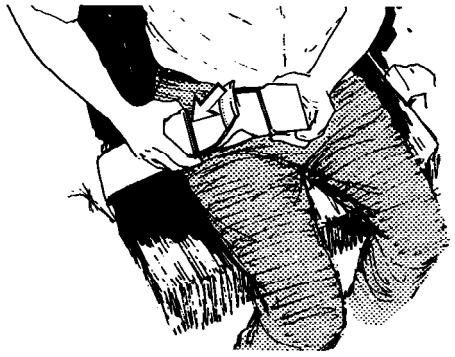

Illustration 53 g00100709

1. Unfasten the seat belt.

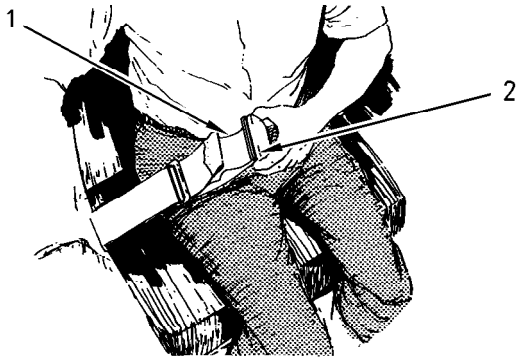

Illustration 54 g00932817

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

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

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

Shortening the Seat Belt

Illustration 55 g00100713

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

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

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

Fastening The Seat Belt

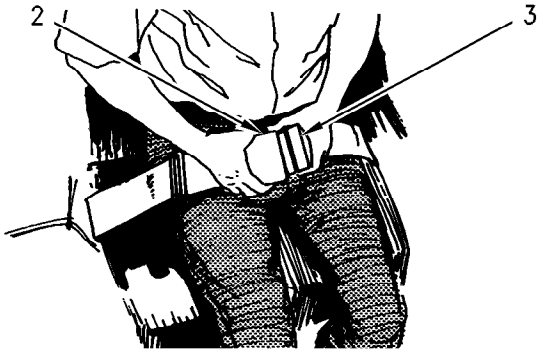

Illustration 56 g00932818

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

Releasing The Seat Belt

Illustration 57 g00100717

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

Extension of the Seat Belt

⚠ WARNING

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

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

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

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

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

i03998635

Operator Controls

SMCS Code: 7300; 7301; 7451

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

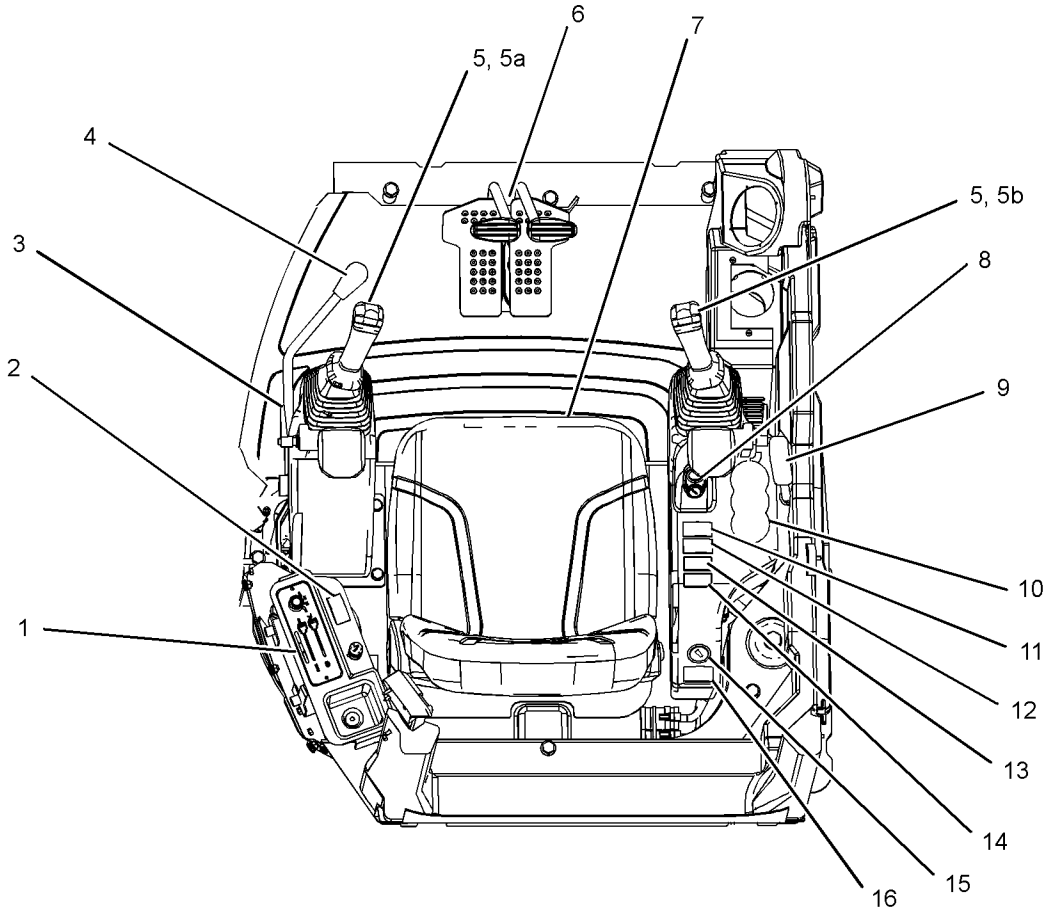

Illustration 58 g01212636

(1) Air Conditioning and Heater Control
(2) Window Wiper/Washer Switch
(3) Service Hour Meter
(4) Hydraulic Lockout Control
(5) Joystick Controls
(5a) Swing Boom Control
(5b) Horn
(6) Travel Controls
(7) Operators Seat
(8) Engine Start Switch
(9) Dozer Blade Control
(10) Monitoring System
(11) Work Light Switch
(12) Travel Speed Control
(13) Secondary Auxiliary Switch (If equipped)
(14) Travel Alarm Cancel Switch (If equipped)
(15) Engine Speed Control
(16) Automatic Engine Speed Control (If equipped)

Air Conditioning and Heating Control (1)

The heater/air conditioner provides comfort for the operator that is working under various temperature conditions. For more information on the air conditioning and heating controls, refer to Operation and Maintenance Manual, “Air Conditioning and Heating Control”.

Window Wiper/Washer Switch (2)

NOTICE
If the wiper does not operate with the switch in the ON position, turn the switch off immediately. Check the cause. If the switch remains on, motor failure can result.

Machines that are equipped with a cab have a window wiper as standard equipment. The window wiper/washer switch is located in the rear of the cab on the left side.

Window Wiper – Push the switch to the MIDDLE position in order to turn on the wiper. Push the bottom of the switch in order to turn off the wiper.

NOTICE
If the washer is used continuously for more than 20 seconds or used when no washer solution comes out, motor failure can result.

Window Washer – Push the switch downward in order to spray washer fluid onto the window. Release the switch in order to stop the flow of washer fluid. The switch will return to the middle position.

Service Hour Meter (3)

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

Hydraulic Lockout Control (4)

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 – Pull the hydraulic lockout control upward to the RAISED position in order to deactivate the hydraulic controls.

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

Note: Be sure to put the hydraulic lockout control in the RAISED position when starting the engine. The engine start switch will not function if the hydraulic lockout control is in the LOWERED position.

Unlocked – Push the hydraulic lockout control downward to the LOWERED position. When the left console is in the LOWERED position the hydraulic controls are operable.

Joystick Controls (5)

The joystick control is 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”.

Swing Boom Control (5a)

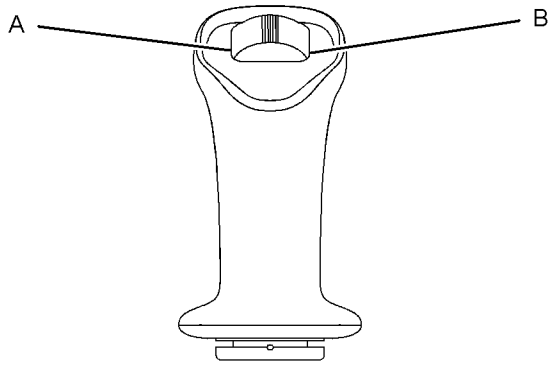

Illustration 59 g02175357

Type A

Swing Left (A) – Move the switch that is on top of the left joystick to the left in order to swing the boom to the left.

Swing Right (B) – Move the switch that is on top of the left joystick to the right in order to swing the boom to the right.

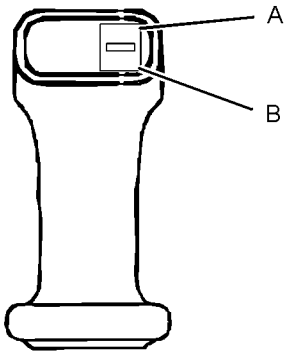

Illustration 60 g02175362

Type B

Swing Left (A) – Move the switch that is on top of the left joystick downward in order to swing the boom to the left.

Swing Right (B) – Move the switch that is on top of the left joystick upward in order to swing the boom to the right.

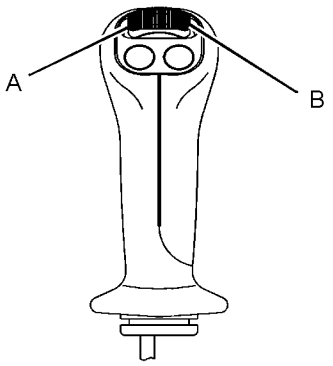

Illustration 61 g02175365

Type C

Swing Left (A) – Move the switch that is on top of the left joystick to the left in order to swing the boom to the left.

Swing Right (B) – Move the switch that is on top of the left joystick to the right in order to swing the boom to the right.

Horn (5b)

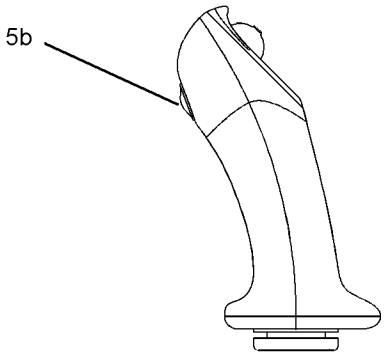

Illustration 62 g02175370

Type A

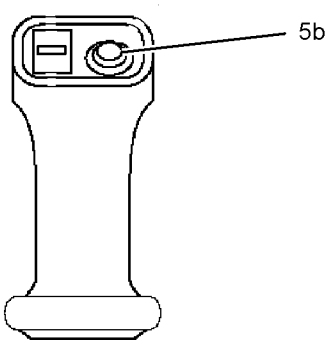

Illustration 63 g02175373

Type B

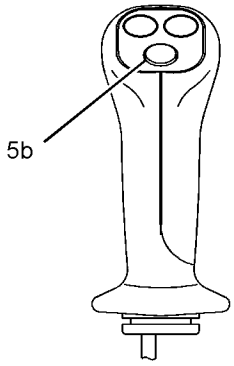

Illustration 64 g02175377

Type C

Horn (5b) – The horn button is located on the right side joystick. Depress the horn button in order to sound the horn. Use the horn for alerting personnel or for Signaling personnel.

Travel Controls (6)

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 or the foot controls (if equipped) are moved in the forward direction, the machine will always travel toward the blade. When the travel levers or the foot controls (if equipped) are moved in the reverse direction, the machine will always travel away from the blade.

If you move a travel lever or foot control (if equipped) farther in the forward direction, the forward travel speed will increase. If you move a travel lever or foot control (if equipped) farther in a backward direction, the reverse travel speed will increase.

Move both of the travel levers or foot controls (if equipped) equally in the same direction in order to travel in a straight line.

Note: You should not attempt any grade that is steeper than 30 degrees. In steep downhill operation, carefully operate the travel levers.

Right Travel Lever

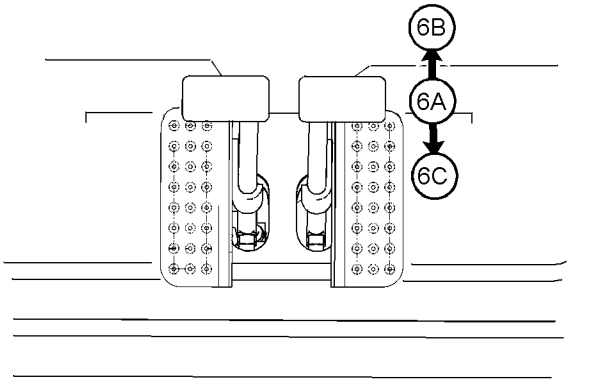

Illustration 65 g02176110

STOP (6A) – Release the right travel lever in order to stop the right track.

FORWARD (6B) – Move the right travel lever forward in order to operate the right track in a forward direction.

REVERSE (6C) – Move the right travel lever backward in order to operate the right track in a reverse direction.

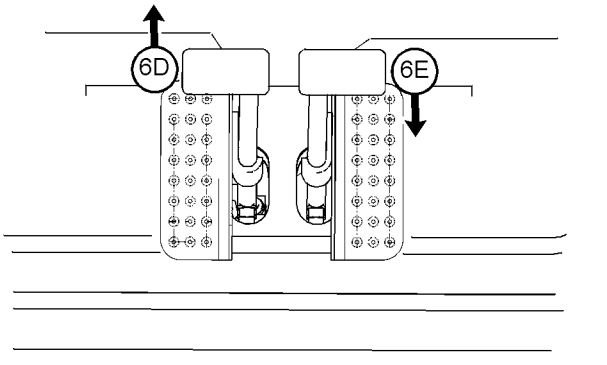

Illustration 66 g02176111

Spot Right Turn – Move the right travel lever (6E) backward. Move the left travel lever (6D) forward at the same time. This will turn the machine quickly to the right.

Pivot Right Turn – Move the left travel lever (6D) forward. This will turn the machine to the right.

Left Travel Lever

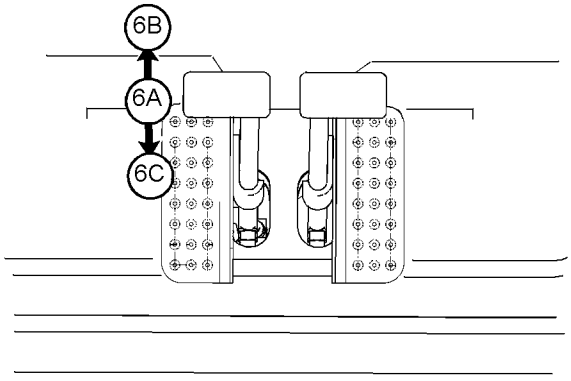

Illustration 67 g02176112

STOP (6A) – Release the left travel lever in order to stop the left track.

FORWARD (6B) – Move the left travel lever forward in order to operate the left track in a forward direction.

REVERSE (6C) – Move the left travel lever backward in order to operate the left track in a reverse direction.

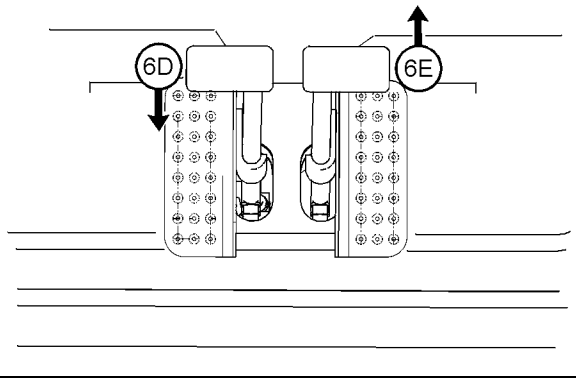

Illustration 68 g02176113

Spot Left Turn – Move the left travel lever (6D) backward. Move the right travel lever (6E) forward at the same time. This will turn the machine quickly to the left.

Pivot Left Turn – Move the right travel lever (6E) forward. This will turn the machine to the left.

Operators Seat (7)

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

Engine Start Switch (8)

NOTICE
To start the engine, be sure to put the hydraulic activation control lever in the LOCKED position. If the lever is in the UNLOCKED position, the engine start switch will not function.

Note: Be sure to put the console for the hydraulic lockout control in the RAISED position when you are starting the engine. The engine will not start if the console for the hydraulic lockout 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 in the cab.

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

ON – Turn the engine start switch key to the ON position. Hold the key in this position in order to activate the glow plugs. The indicator for the glow plugs will light on the instrument panel.

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

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

Dozer Blade Control (9)

Float – Push the lever forward to the detent position. The blade will lower to the ground. The blade will float with the contour of the ground. The lever will remain in the FLOAT position until the lever is removed from the detent position. After the lever is removed from the detent position, the lever will return to the HOLD position.

Lower – Push the lever forward in order 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 – The lever will return to the HOLD position when the lever is released from the RAISED or LOWERED position.

Raise – Pull the lever backward in order 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.

Monitoring System (10)

The machine gauges and alert indicators are located in the monitoring panel.

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

Work Light Switch (11)

Lights – Press the top of the switch once in order to turn on the work light that is located on the boom. Press the top of the light switch again in order to turn on the work light that is located on the cab. Press the bottom of the light switch in order to turn off the work lights.

Beacon

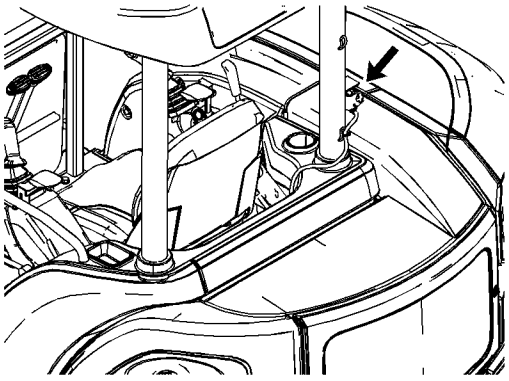

Illustration 69 g01244336
Canopy

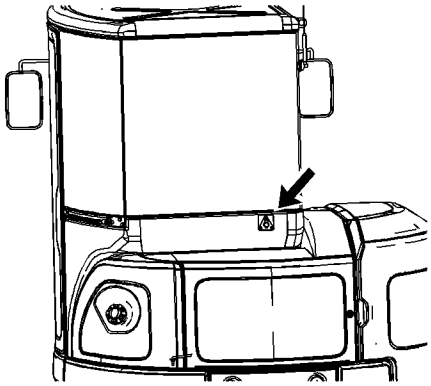

Illustration 70 g01195453

Cab

The receptacle for the beacon is located on the right side rear post of machines that are equipped with a canopy. The receptacle for the beacon is located on the rear of the machine on the bottom right corner of machines that are equipped with a cab. The receptacle for the beacon can be used for the service light.

Insert the connector for the beacon into the receptacle in order to provide power for the beacon.

Cab Dome Light

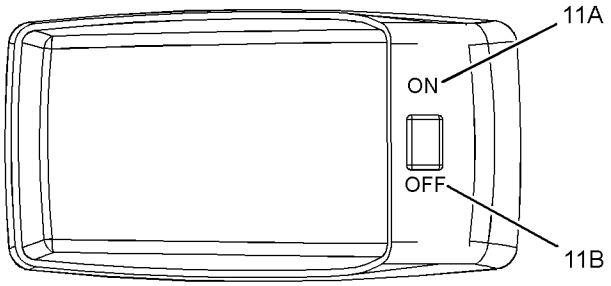

Illustration 71 g02176114

“ON” (11A) – Move the switch for the cab dome light to this position in order to turn on the cab dome light.

“OFF” (11B) – Move the switch for cab dome light to this position in order to turn off the cab dome light.

Travel Speed Control (12)

Use the switch in order to change the travel speed.

Low – Move the switch to this position in order to travel at low speed.

High – Move the switch to this position in order to travel at a high speed.

Travel always at a slow speed on slopes. Travel always at a slow speed on rough ground.

Secondary Auxiliary Switch (If Equipped) (13)

The hydraulic system has the capability of a secondary auxiliary circuit. For more information, refer to Operation and Maintenance Manual, “Work Tool Control”.

Travel Alarm Cancel Switch (If Equipped) (14)

Travel Alarm Cancel Switch – This switch is used to stop the travel alarm from sounding. Press the switch in order to stop the alarm. The indicator lamp will turn on.

Note: The travel alarm is located under the hydraulic tank. The travel alarm will sound when the travel lever or the travel pedal is activated.

Engine Speed Control (15)

Engine Speed – Turn the engine speed dial in order to control the engine speed (engine rpm). Select the desired position from the ten available positions. The selected position of the engine speed dial is indicated on the electronic monitor panel.

Decrease – Turn the engine speed dial counterclockwise in order to decrease the engine speed (engine rpm).

Increase – Turn the engine speed dial clockwise in order to increase the engine speed (engine rpm).

Automatic Engine Speed Control (If Equipped) (16)

The Automatic Engine Speed Control automatically reduces engine speed when the machine has been inactive for 5 seconds. The AEC system is designed to reduce fuel consumption and noise. Lower engine speeds can also increase engine life.

The engine rpm will recover automatically to the setting of the engine speed dial when any hydraulic function is activated.

Automatic Engine Speed Control (AEC) – Press the right side of the switch in order to turn on the function of AEC. Press the left side of the switch in order to turn off the function of AEC.

Note: If the hydraulic oil temperature is below 8 °C (46 °F), the AEC will not function.

i05670510

Monitoring System

SMCS Code: 7451; 7490

NOTICE
When the monitor provides a warning, immediately check the monitor and perform the required action or maintenance as indicated by the monitor.

The monitor indicator does not guarantee that the machine is in a good condition. Do not use the monitor panel as the only method of inspection. Maintenance and inspection of the machine must be performed on a regular basis. See the Maintenance Section of this Operation and Maintenance Manual.

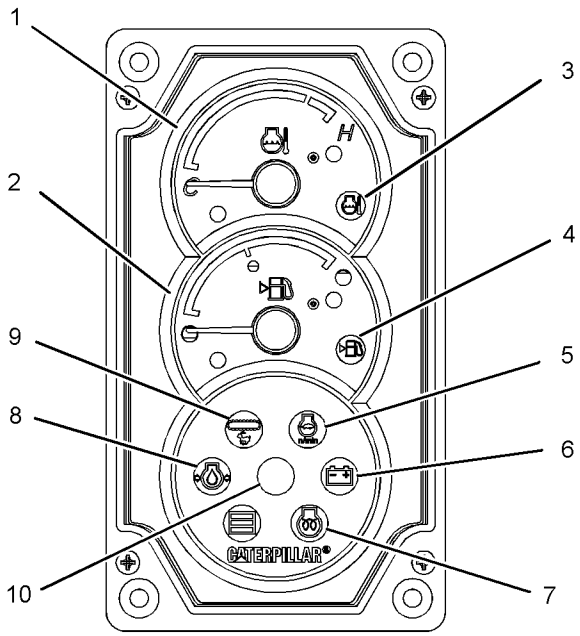

Illustration 72 g01247296

The instrument panel is located on the right console.

(1) Engine Coolant Temperature – This gauge indicates the temperature of the engine coolant. The white range is the normal operating temperature. The red range indicates overheating.

(2) Fuel Level – This gauge indicates fuel tank levels. When the fuel gauge indicates that the fuel level is in the lower range, add fuel immediately.

(3) Engine Coolant Temperature Indicator Light – The alert indicator comes on when the temperature of the engine coolant indicates abnormal engine temperature.

(4) Fuel Level Indicator Light – If the fuel level in the tank goes below the specified level, the alarm indicator will come on. Add fuel immediately.

(5) Low Idle Indicator Light – The low idle indicator light will illuminate when the AEC system reduces the engine speed to low idle.

(6) Alternator Indicator Light – The alert indicator comes on when the engine start switch key is turned to the ON position. The alert indicator goes off after the engine is started. The alert indicator will light when there is a malfunction in the electrical system. If this alert indicator comes on, the system voltage is too low for normal machine operation.

If electrical loads are high and the engine speed is near idle, increase the engine speed to high idle. This will generate more output from the alternator. If the alert indicator for the electrical system turns off within one minute, the electrical system is probably operating in a normal manner. However, the electrical system may be overloaded during periods of low engine speeds. If an overload occurs at low engine speed you should perform one or a combination of the following actions.

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

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

(7) Preheat Light – The indicator comes on when the engine start switch key is turned to the ON position. The glow plug will preheat at this time to aid in cold weather starting. The indicator goes off after the engine is started.

(8) Engine Oil Pressure Indicator Light – The alert indicator comes on when the engine start switch key is turned to the ON position. The alert indicator will go off before the engine is started. The engine oil pressure indicator will come on, and the alarm will sound, if the engine oil pressure is insufficient. If the alert indicator comes on, stop the engine immediately and check the engine oil level. Make any necessary repairs before starting the engine again. In cold weather, the indicator and the alarm may remain on for more than 10 seconds after the engine is started. In this case, stop the engine once and start the engine again.

(9) Travel Speed Indicator Light – The alert indicator comes on when the machine is traveling in the high speed mode.

(10) Action lamp – The action lamp will illuminate during a warning category 2 or warning category 3. The operator should take immediate action.

Warning Categories

The monitoring system provides three warning categories. The first category requires only operator awareness. The second category requires an operator response and the earliest possible response. The third category requires immediate shutdown of the machine systems.

Warning Category 1

In this category, only the alert indicator is activated. This makes the operator aware that the machine needs attention. The following systems have indications in Warning Category 1:

- Fuel level (4)
- Alternator (6)

Warning Category 2

In this category, the alert indicator is activated and action lamp (10) will turn on. This category requires a change in machine operation in order to reduce excessive temperature in one or more of the machine systems. The following system will have indications in Warning Category 2:

- Engine coolant temperature (3)

Warning Category 3

In this category, the alert indicator is activated and action lamp (10) will turn on. The action alarm will also sound. This category requires immediate shutdown of the machine in order to prevent the following conditions:

- Injury to the operator
- Severe system damage
- Severe machine damage

The following system will have indications in Warning Category 3:

- Engine oil pressure (8)

i02471238

Air Conditioning and Heating Control

SMCS Code: 7304; 7320; 7337

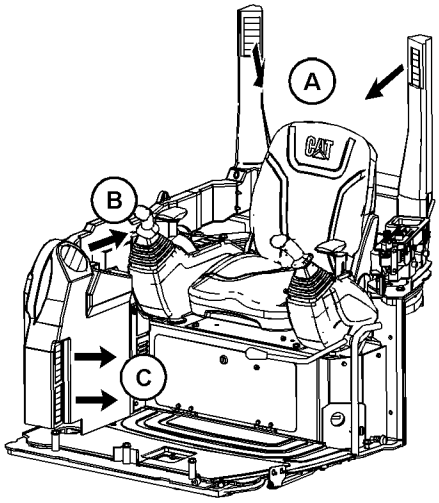

Illustration 73 g01195815

(A) Vent for upper body (If equipped)
(B) Defroster vent
(C) Floor vent

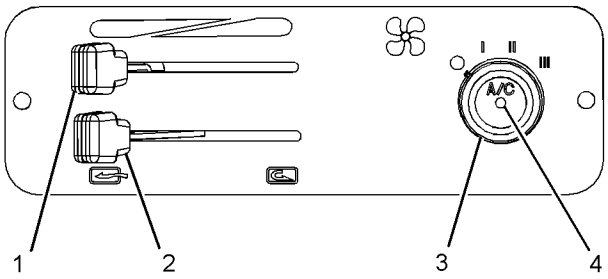

Illustration 74 g01195816

Air conditioning and heating equipped models

(1) Temperature control lever
(2) Air outlet lever
(3) On/Off and fan speed switch
(4) Compressor switch

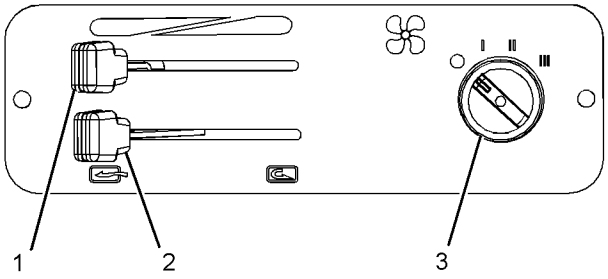

Illustration 75 g01232267

Heating only equipped models

(1) Temperature control lever
(2) Air outlet lever
(3) On/Off and fan speed switch

Temperature Control

Lever (1) controls the temperature. Move the lever to the right in order to increase the temperature. Move the lever to the left in order to decrease the temperature.

Air Control

Recirculate – Move lever (2) to this position in order to close the air inlet. The air will recirculate inside the cab.

Fresh Air – Move lever (2) to this position in order to open the air inlet. Fresh air will circulate into the cab.

Fan Control

On/Off and Fan Speed Switch (3) – This knob controls the air conditioning, the heater, and fan speed.

OFF – Move the knob to this position in order to turn off the air conditioning and the heater.

Low – Turn the switch to this position in order to operate the fan at low speed.

Medium – Turn the switch to this position in order to operate the fan at medium speed.

High – Turn the switch to this position in order to operate the fan at high speed.

Air Conditioning Control (If Equipped)

On/Off Switch (4) – Push the switch in order to turn on the compressor or push the switch in order to turn off the compressor. In humid conditions, the compressor may be used to remove moisture from the air in the cab. In cool weather, operate the compressor weekly in order to prevent leakage of the refrigerant gas. This will also help to maintain the compressor in optimum working order.

i02389572

Window (Front)

SMCS Code: 7310-FR

To provide full ventilation inside the cab, the upper front window can be fully opened.

⚠ WARNING

When opening or closing the windows, be extra careful to prevent any personal injury. Also, the hydraulic control console 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 change the position of the front window until the following items have been done:

- Park the machine on a level surface.

- Lower the work tools and the blade to the ground.
- Move the hydraulic lockout control to the RAISED position.
- Stop the engine.

Perform the following procedure in order to open the front window.

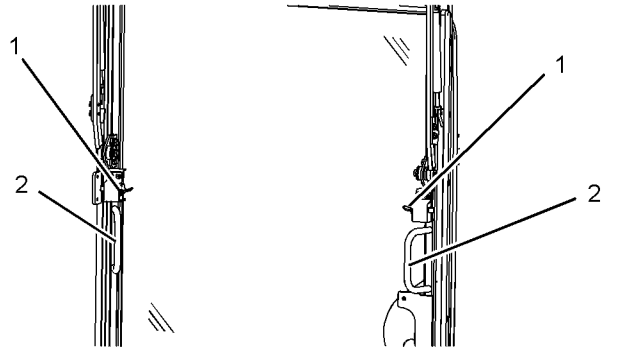

Illustration 76 g01193096

1. Release both latches (1) on the sides of the front window in order to release the front window.

2. Hold both grips (2) that are provided on the front window frame. Move the front window upward into the STOWED position until the auto-lock latch is engaged.

Perform the following procedure in order to close the front window.

1. Use latches (1) in order to unlock the front window when the front window is in the STOWED position.

2. Securely hold grips (2), and slowly pull the front window downward until the front window locks in the DOWN position.

Perform Step 3 through Step 5 in order to open and close the lower window.

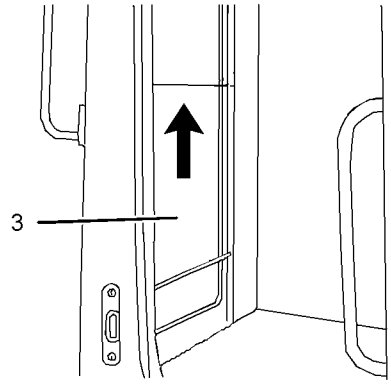

Illustration 77 g01145824

3. Raise the lower window (3) out of the window frame.

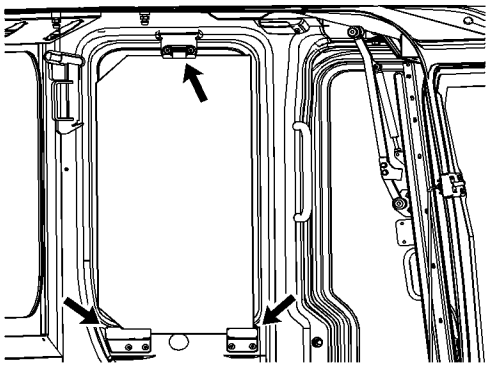

Illustration 78 g01198078

4. Store the lower window in the holders that are located on the left side of the cab frame.

5. To close the lower window, reverse the procedure that is used to open the lower window.

Note: The upper window must be in the raised position for removal or installation of the lower window.

i04665415

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.

⚠ WARNING

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

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

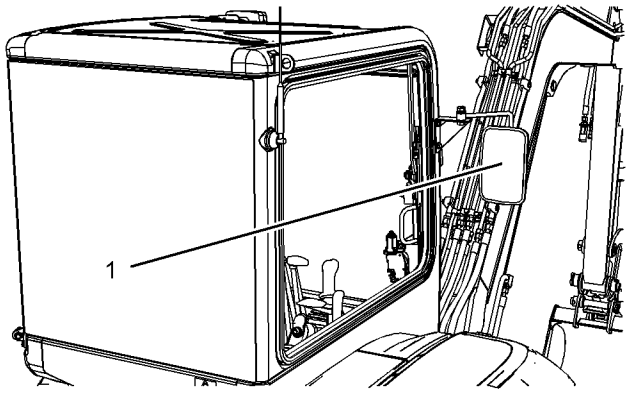

Illustration 79 g01623756

Right side mirror for viewing the rear of the machine (1)

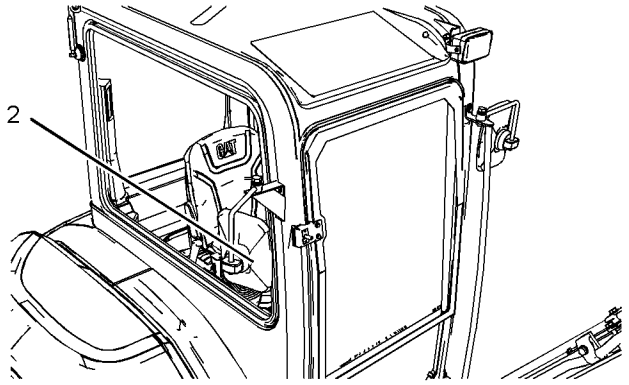

Illustration 80 g01623755

Right side mirror for viewing the front (2)

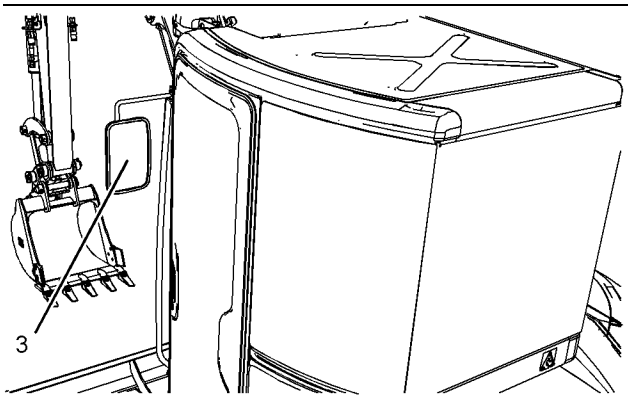

Illustration 81 g01623757

Left side mirror for viewing the rear (3)

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.

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.

Adjustment of the Mirrors

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, “Operator Controls”
- Stop the engine.
- Adjust 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.

Right Side Rear View Mirror (1)

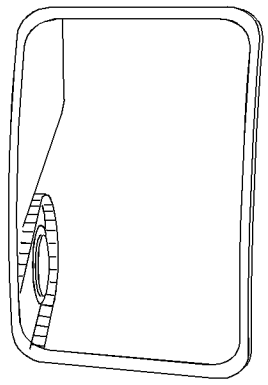

Illustration 82 g01623758

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.

Right Side Front View Mirror (2)

If equipped, adjust the right side front view mirror (2) so that an area of at least 12 m (39.4 ft) from the front of the machine can be seen from the operator seat. Additionally, adjust the mirror in order to provide operator visibility in front of the cab pillars.

Left Side Rear View Mirror (3)

If equipped, adjust the left side rear view mirror (3) so that an area of at least 12 m (39.4 ft) from the side of the machine can be seen from the operator seat. Additionally, adjust the mirror in order to provide operator visibility to the rear of the cab.

i04036189

Joystick Controls

SMCS Code: 5705

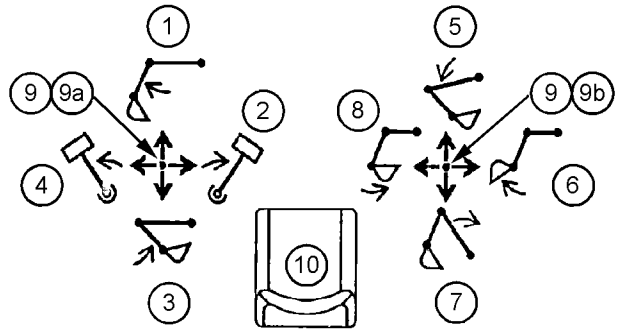

Illustration 83 g02233473

(1) STICK OUT
(2) SWING RIGHT
(3) STICK IN
(4) SWING LEFT
(5) BOOM LOWER
(6) BUCKET DUMP
(7) BOOM RAISE
(8) BUCKET CLOSE
(9) HOLD
(9a) HORN (IF EQUIPPED)
(9b) AUTOMATIC ENGINE SPEED CONTROL SWITCH (IF EQUIPPED)
(10) Seat

⚠ WARNING

The Fine Swing Control delays the engagement of the swing parking brake.

If the machine is operating on a slope with the Fine Swing Control in the ON position, the swing motion may become uncontrollable which could result in property damage, personal injury or death.

Turn the Fine Swing Control to the OFF position when the machine is operating on a slope.

When you release the joysticks from any position, the joysticks will return to HOLD position (9). Movement of the upper structure will stop unless the fine swing control (if equipped) is ON. When the fine swing control is ON, the swing parking brake will not activate until 6.5 seconds after the joystick control for the swing function returns to the HOLD position.

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

The machine control pattern is initially set at the factory to the SAE system, as shown. The pattern on the left pertains to the left joystick and the pattern on the right pertains to the right joystick.

The machine control pattern can be varied. Refer to Operation and Maintenance Manual, “Joystick Controls Alternate Patterns” for more information.

i02500390

Work Tool Control

SMCS Code: 6700

Primary Auxiliary Hydraulic Circuit

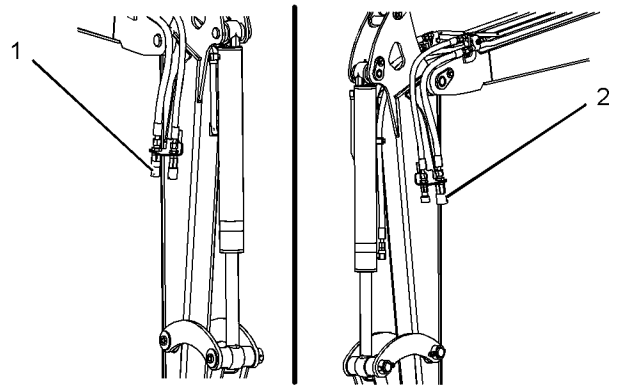

Illustration 84 g01194386

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

The line (1) that is located on the right side of the stick is for oil feed. The line (2) that is located on the left side of the stick is used as a return line.

The 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 in order to connect the coupler assemblies to the work tool. Relieve the pressure in the auxiliary hydraulic lines by performing the following steps:

1. With the accumulator charged and the hydraulic lockout control lowered, turn the engine start key to the ON position. Do not start the engine.

2. Operate the auxiliary control in both directions.

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

The hydraulic lines only provide one-way hydraulic flow. If the machine is equipped with a flow control valve, two-way hydraulic flow is possible. Refer to “Work Tool Flow Mode Control”.

Auxiliary Control

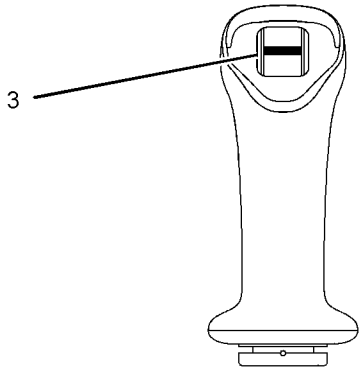

Illustration 85 g01214059

Type A

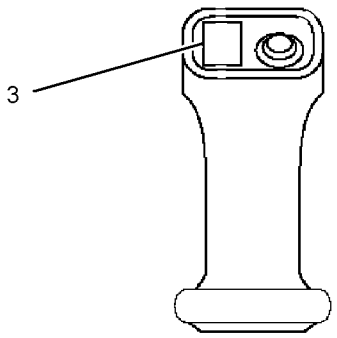

Illustration 86 g01194528

Type B

The switch (3) on the right joystick is the auxiliary control.

In order to pressurize the line that is connected to the right hand side of the stick, push switch (3) upward.

In order to pressurize the line that is connected to the left hand side of the stick, push switch (3) downward.

Secondary Auxiliary Hydraulic Circuit

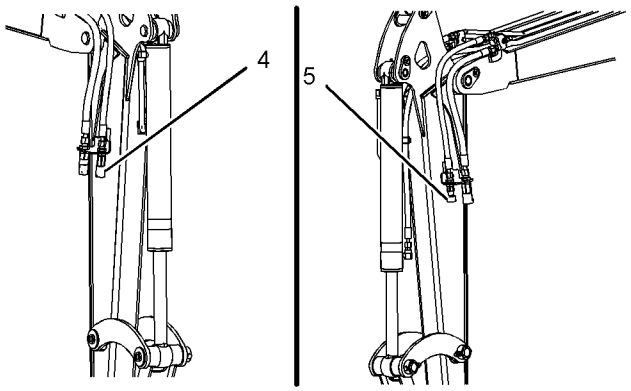

Illustration 87 g01194387

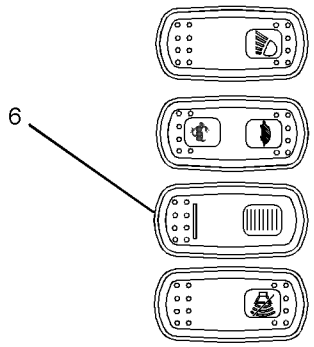

Illustration 88 g01250399

The line (4) that is located on the right side of the stick is for oil feed. The line (5) that is located on the left side of the stick is used as a return line.

A secondary auxiliary hydraulic switch (6) is used to divert oil from the swing circuit to the auxiliary lines. This switch is located in the cab. Pull the red button to the left and push down on the right side of the switch in order to activate the secondary auxiliary hydraulic circuit. Press the left side of the switch in order to deactivate the secondary auxiliary hydraulic circuit.

Secondary Auxiliary Control

The switch (7) on the left joystick is the secondary auxiliary control.

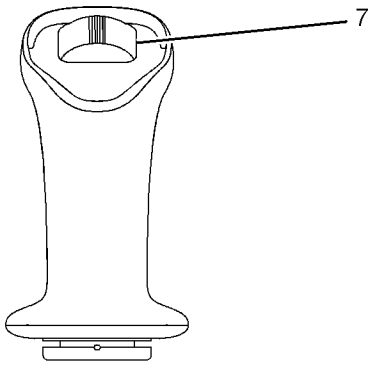

Illustration 89 g01214060

Type A

In order to pressurize the line that is connected to the right hand side of the stick, push switch (7) to the right.

In order to pressurize the line that is connected to the left hand side of the stick, push switch (7) to the left.

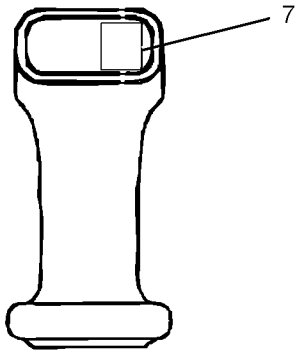

Illustration 90 g01194531

Type B

In order to pressurize the line that is connected to the right hand side of the stick, push switch (7) upward.

In order to pressurize the line that is connected to the left hand side of the stick, push switch (7) downward.

Work Tool Flow Mode Control

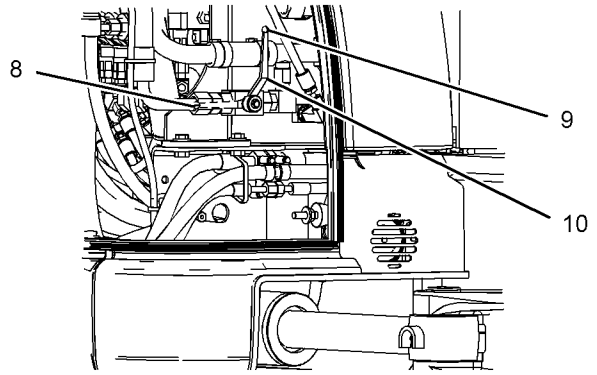

Illustration 91 g01194449

The valve for work tool flow mode control is located on the right side of the machine. Open the right side access cover in order to gain access to the valve for work tool flow mode control.

One-Way Flow (8) – Move lever (10) to this position when one-way flow is required.

Two-Way Flow (9) – Move lever (10) to this position when two-way flow is required.

Hammer Control

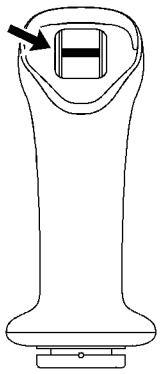

Illustration 92 g01214069

Right side joystick

Type A

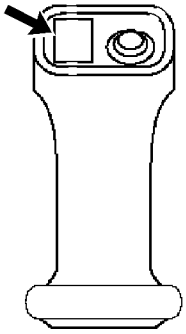

Illustration 93 g01194525

Right side joystick

Type B

Hydraulic Hammer ON – Push the switch upward in order to activate the hydraulic hammer.

Hydraulic Hammer OFF – Release the switch in order to deactivate the hydraulic hammer.

i02425815

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.

Joystick Control Selector (If Equipped)

Illustration 94 g01193185

The joystick control selector is located on the left side of the cab floor.

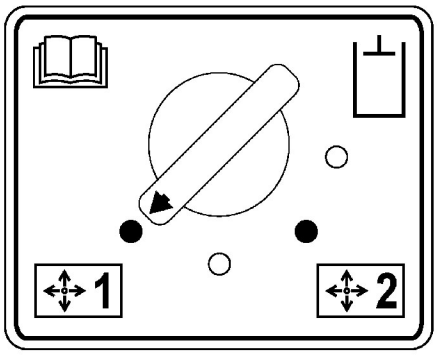

Illustration 95 g01214115

The machine may be equipped with a joystick control selector. The machine control pattern can be varied by turning the valve on the left side of the cab floor. 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.

Alternate Joystick Control Pattern

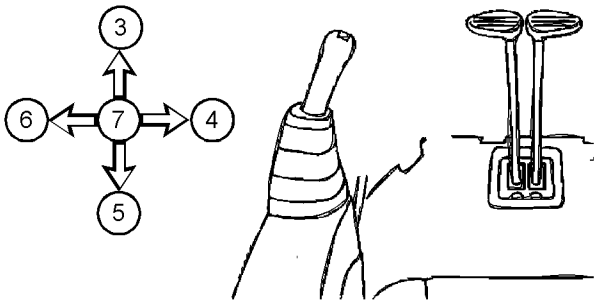

Illustration 96 g01193186

Left hand joystick

BOOM LOWER (3) – Move the joystick to this position in order to lower the boom.

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

BOOM RAISE (5) – Move the joystick to this position in order to raise the boom.

SWING LEFT (6) – Move the joystick to this position in order to swing the upper structure to the left.

HOLD (7) – When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

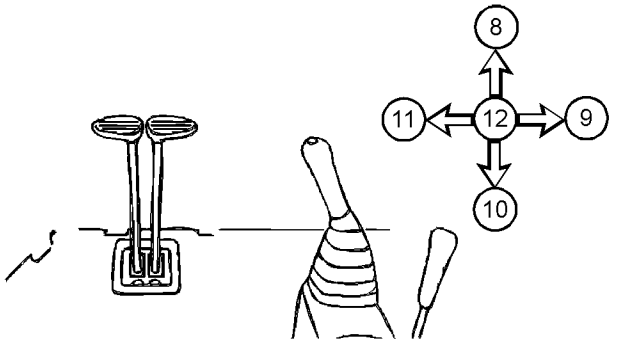

Illustration 97 g01193187

Right hand joystick

STICK OUT (8) – Move the joystick to this position in order to move the stick outward.

BUCKET DUMP (9) – Move the joystick to this position in order to dump the bucket or the work tool.

STICK IN (10) – Move the joystick to this position in order to move the stick inward.

BUCKET CLOSE (11) – Move the joystick to this position in order to close the bucket or the work tool.

HOLD (12) – 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.

Engine Starting

i03569998

Engine Starting

SMCS Code: 1000; 1090; 1456; 7000

WARNING

Do not spray ether into engine when using thermal starting aid to start engine. Personal injury and machine damage could result. Follow procedure in the Operation and Maintenance Manual.

NOTICE
The engine start switch must be in the ON position and the engine must be running in order to maintain electrical functions and hydraulic functions. This procedure must be followed in order to prevent serious machine damage.

1. Move the hydraulic lockout control (lever) to the LOCKED position.

2. Move the joysticks to the HOLD position.

3. Turn the engine start switch to the ON position. During cold weather, leave the engine start switch in the ON position for six seconds in order to preheat the glow plugs.

4. All of the indicators on the monitor panel should be activated and the action alarm should sound for approximately 2.5 seconds. If any of the indicators are not activated or if the action alarm does not sound, check the electrical system. Make any necessary repairs before you start the engine.

Note: For more information on the monitoring system, refer to Operation and Maintenance Manual, “Monitoring System”.

If any fluid levels are too low, add the corresponding fluid to the specified level. Add the fluid before you start the engine.

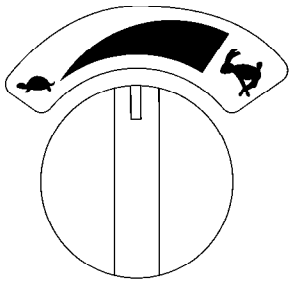

Illustration 98 g00817952

5. Turn the engine speed dial to the MEDIUM SPEED position.

6. 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.

NOTICE
Do not crank the engine for more than 30 seconds. If the engine does not start, allow the starter to cool for two minutes before cranking again. The engine start switch must be turned to the OFF position before trying to restart.

7. Turn the engine start switch to the START position.

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

9. If the engine does not start, turn the key to the OFF position. Repeat step 7 and step 8.

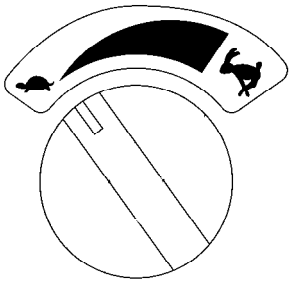

Illustration 99 g00817961

10. Once the engine is started, turn the engine speed dial counterclockwise to the LOW SPEED position in order to allow the engine to warm up. Refer to Operation and Maintenance Manual, “Engine and Machine Warm-Up”.

i03636436

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

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

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

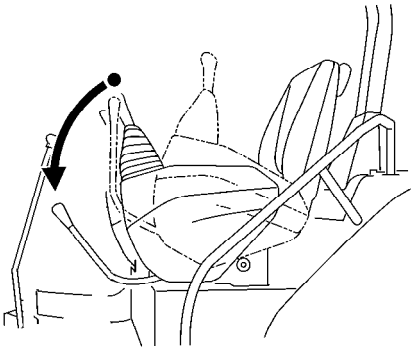

Illustration 100 g00818250

Note: The hydraulic lockout control (lever) must be in the UNLOCKED position before the hydraulic controls will function.

1. Allow the engine to warm up at low idle for at least five minutes. Engage the joystick controls and disengage the joystick controls. This will speed up the warm-up of the hydraulic components.

When you idle the machine for warm-up, observe the following recommendations:

- If the temperature is greater than 0°C (32°F), warm up the engine for approximately 15 minutes.
- If the temperature is less than 0°C (32°F), warm up the engine for approximately 30 minutes.
- If the temperature is less than − 18°C (0°F) 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 five 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. Turn the engine speed dial to the maximum engine speed and 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 all hydraulic lines, and through the swing motor and travel motors.

⚠ 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.

Operation

i02400329

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. Select the desired travel speed by operating the travel speed control switch.

6. 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.

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

8. 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.

9. See Operation and Maintenance Manual, “Operator Controls” for information about spot turning and about pivot turns.

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

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

i00059294

Frozen Ground Conditions

SMCS Code: 7000

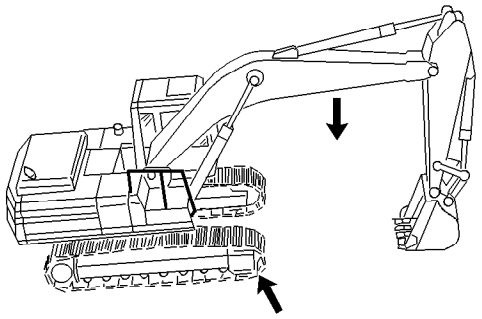

Illustration 101 g00101468

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.

i02389654

Equipment Lowering with Engine Stopped

SMCS Code: 7000

To lower the boom, place the hydraulic activation control lever in the UNLOCKED position. Move the joystick to the BOOM LOWER position. If the accumulator is still charged, the boom will lower.

If the boom does not lower, the accumulator is empty. Use the following method to lower the boom.

⚠ WARNING

Be sure no one is under or near the work tools before manually lowering the boom. Keep all personnel away from the boom drop area when lowering the boom with the engine stopped in order to avoid possible personal injury.

⚠ WARNING

Personal injury can result from oil under high pressure.

DO NOT allow high pressure oil to contact skin.

Wear appropriate protective equipment while working with high pressure oil systems.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

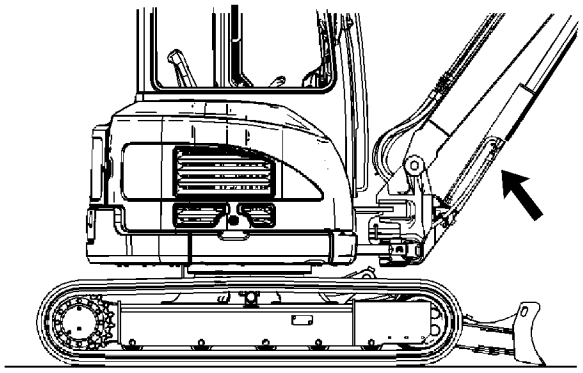

Illustration 102 g01194776

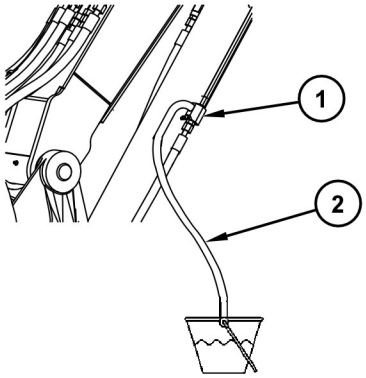

Illustration 103 g01193858

1. Connect hose (2) to boom manual lowering valve (1).
2. Slowly open boom manual lowering valve (1) by a maximum of 1/2 turn in order to lower the boom. Drain hydraulic oil into a suitable container.
3. Make sure that the work tool has lowered all the way to the ground. Tighten boom manual lowering valve (1) to a torque of 13 ± 2 N·m (9 ± 1 lb ft).
4. Make the necessary repairs before you operate the machine.
5. Check the level of the hydraulic fluid. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level-Check”.

Operating Techniques

i06529669

Operating Technique Information

SMCS Code: 7000

⚠ WARNING

Know the maximum height and the maximum reach of your machine. Serious injury or death by electrocution can occur if the machine or the work tools are not kept a safe distance from electrical power lines. Keep a distance of at least 3000 mm (118 inch) plus an additional 10 mm (0.4 inch) for each 1000 volts over 50000 volts.

For safety, one of the following may require a greater distance:

- Local codes
- State codes
- Requirements of the job site

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.

With certain boom-stick-bucket combinations, the bucket or worktool can hit the cab and/or the front structure of the machine. Always check for interference when first operating a new bucket or a new work tool. Keep the bucket or work tool away from the cab and away from the front structure during operation.

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 IT WITH THE HYDRAULICS. Damage to the machine can result.

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

Consult your Caterpillar 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 during the operating cycle.

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

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

Use a comfortable travel speed while you operate the machine.

Operating efficiency can be increased by using more than one machine control to perform a task.

Never swing a load over a truck cab or workers.

Position the truck so that material can be loaded from the rear of the truck or from the side of the truck. Load the truck evenly so that the rear axles are not overloaded.

An oversize bucket or a bucket that is equipped with blade type side cutters should not be used in rocky material. These types of buckets slow down the cycle. Damage to the bucket and to other machine components could result.

Restricted Operation

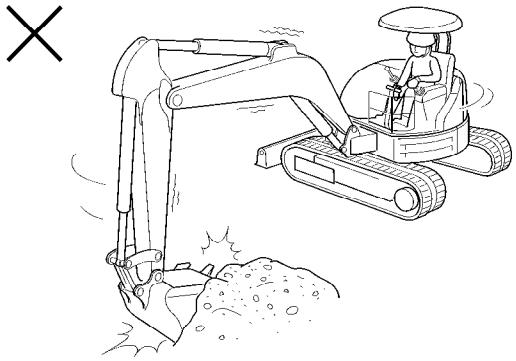

Illustration 104 g00818695

Do not use the swing force to perform the following operations:

- Soil compaction
- Ground breaking
- Demolition

Do not swing the machine while the bucket tips are in the soil.

These operations will damage the boom, the stick, and the bucket and the operations will reduce the life of the equipment.

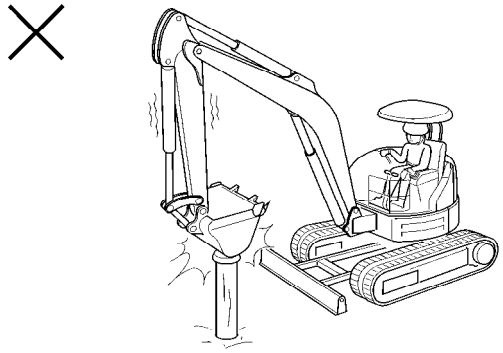

Illustration 105 g00818699

Do not use the dropping force of the bucket as a hammer. This will bring excessive force on the rear of the machine. Possible damage to the machine could result.

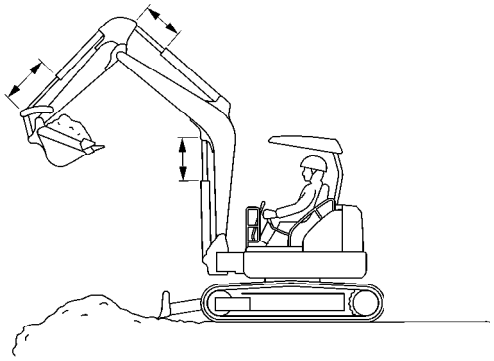

Illustration 106 g00818702

If the cylinder is operated at the end of the stroke during operations, excessive force will occur on the stopper on the inside of the cylinder. This will reduce the life of the cylinder and structures. To avoid this problem, always leave a small margin of play when the cylinder is operated.

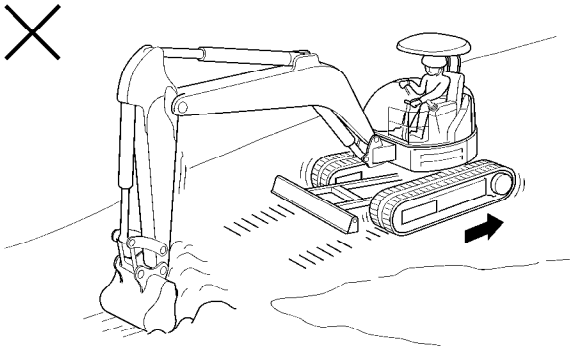

Illustration 107 g00818707

While the bucket is in the ground, do not use the travel force for any excavation. This operation will cause excessive force on the rear of the machine.

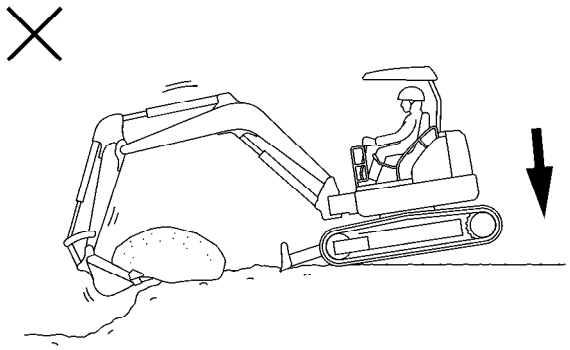

Illustration 108 g00818711

Do not use the dropping force of the rear of the machine for excavation. This operation will damage the machine.

Operating Precaution

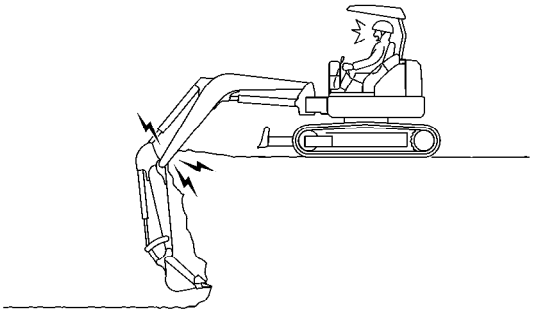

Illustration 109 g00818715

When deep holes are dug, do not lower the boom so that the bottom side of the boom touches the ground.

When deep holes are dug, do not allow the boom to interfere with the tracks.

i05035329

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.

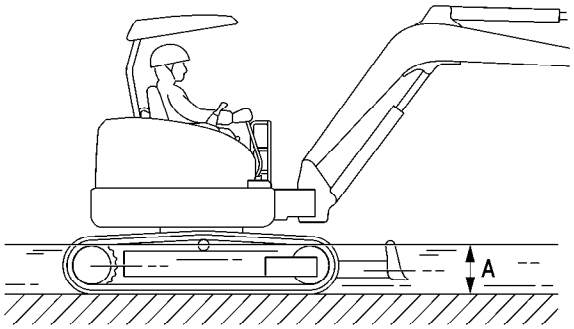

Illustration 110 g00818869
Depth of water to the center of the track carrier roller

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, you should frequently check the height of the undercarriage from ground level and the depth of water on the ground.

Check the swing gear by looking through the inspection port that is on the upper frame. If there is water in the swing gear, consult your Cat dealer for the required maintenance on the swing gear.

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

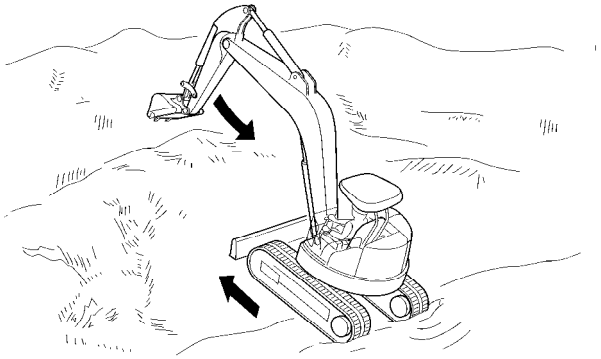

Illustration 111 g00818886

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.

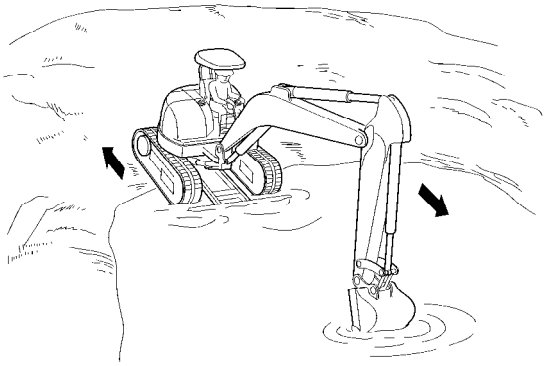

Illustration 112 g00818890

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.

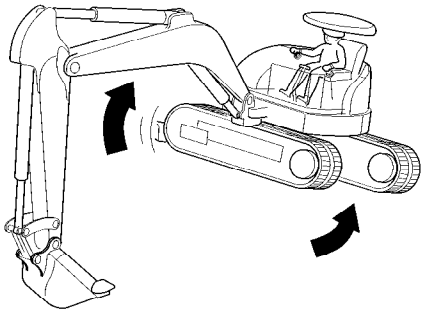

Illustration 113 g00818893

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.

i02434743

Boom, Stick and Bucket Operation

SMCS Code: 7000

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.

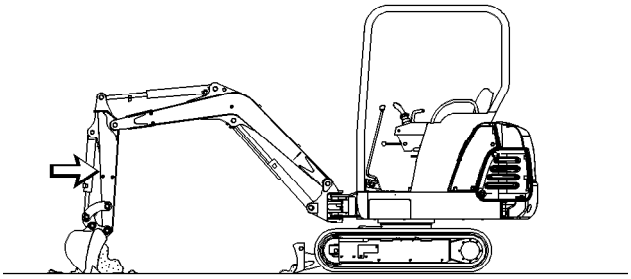

Illustration 114 g00394783

4. Move the stick toward the cab 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 cab.

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.

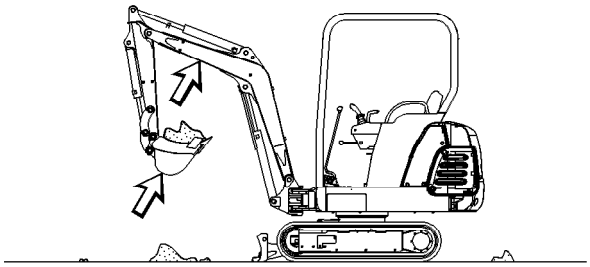

Illustration 115 g00394917

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.

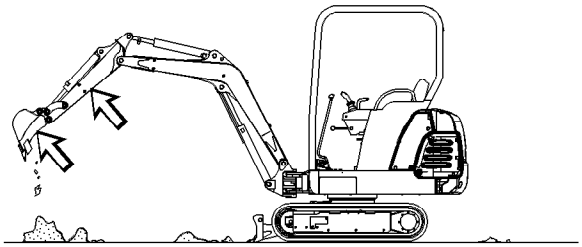

Illustration 116 g00394937

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

Lifting Objects

⚠ 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.

⚠ 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.

Short slings will prevent excessive load swing.

Note: There may be local government regulations about the use of excavators for the lifting of heavy objects. Please comply to those regulations.

Only use the lifting point (if equipped) that has been supplied on the power link 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.

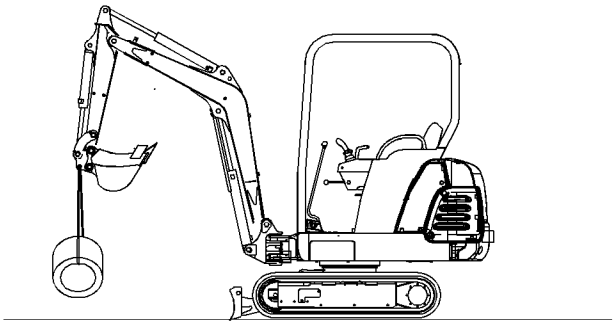

Illustration 117 g01216478

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.

i02467626

Quick Coupler Operation

SMCS Code: 6129; 6522; 7000

S/N: HWJ1–Up

S/N: FPK1–Up

Securing 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 locking mechanism is 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.

1. Remove the safety bar.

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

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

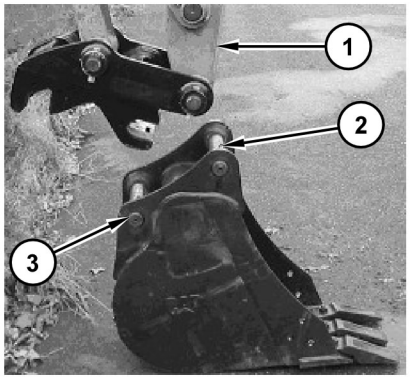

Illustration 118 g01230997

4. Move stick (1) inward and lower the stick until the hook engages the top pivot pin (2) of the work tool.

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

6. Extend the work tool cylinder in order to rotate the quick coupler toward the work tool until the quick coupler engages the lower pin (3) of the work tool. Stop the engine.

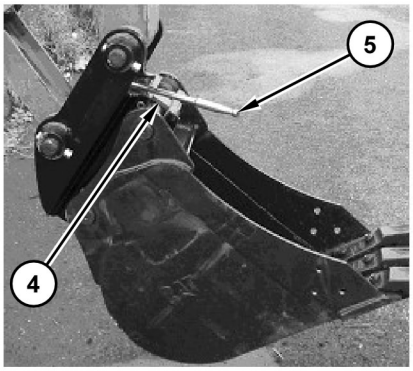

Illustration 119 g01231001

7. Fully insert the safety bar (4) into the bore of the quick coupler.

8. Turn wrench (5) in a clockwise direction in order to fully tighten the locking mechanism.

9. 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.

Releasing the Work Tool

⚠ WARNING

Disengaging the locking mechanism 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 locking mechanism.

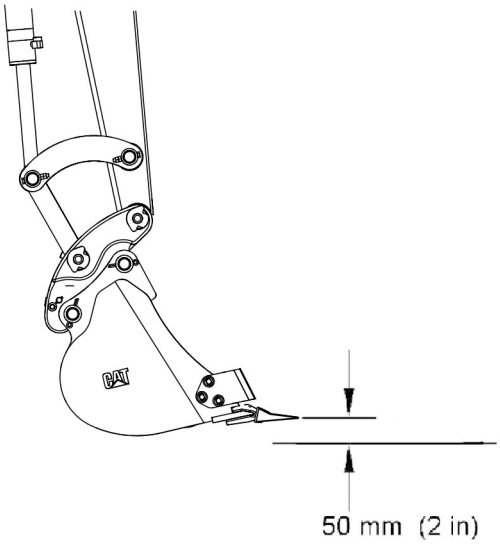

Illustration 120 g01233992

1. If a bucket is coupled to the quick coupler, lower the bucketto approximately 50 mm (2 inch) above the ground. The cutting edge should be slightly higher than the rear of the bucket. Other work tools may need to be lowered to the ground.

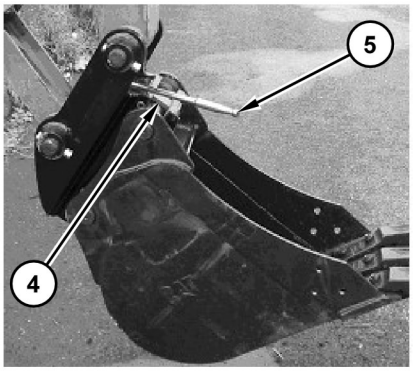

Illustration 121 g01231001

2. Turn wrench (5) in a counterclockwise direction in order to fully release the locking mechanism.

3. Remove the safety bar (4) from the quick coupler.

4. Lower the work tool to the ground.

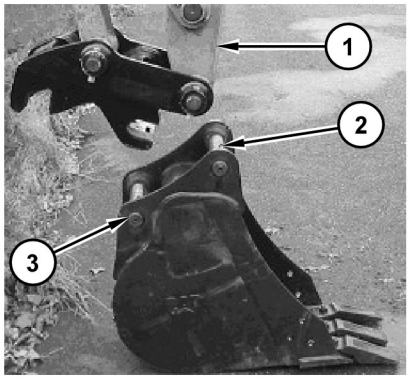

Illustration 122 g01230997

5. Retract the work tool cylinder in order to rotate the quick coupler away from the work tool until the quick coupler disengages the lower pin (3) of the work tool.

6. Raise stick (1) and move stick (1) away from the work tool in order to release the quick coupler from pivot pin (2) of the work tool.

Securing the Hammer

WARNING

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

Do not operate this machine until you have positive indication that the locking mechanism is 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.

Position the hammer horizontally on the ground.

1. Remove the safety bar.

2. Start the engine.

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

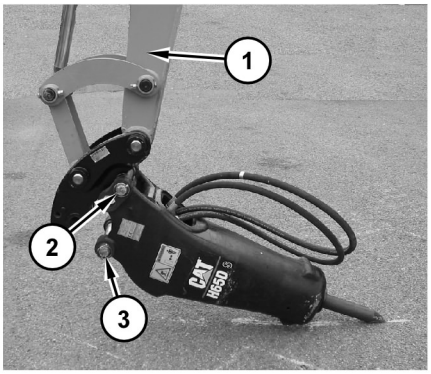

Illustration 123 g01216496

4. Move the stick (1) inward and lower the stick until the hook engages the top pivot pin (2) of the hammer.

5. Extend the work tool cylinder in order to rotate the quick coupler toward the hammer until the quick coupler engages the lower pin (3) of the hammer. Raise the hammer off the ground and stop the engine.

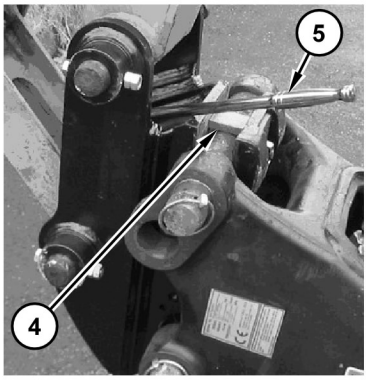

Illustration 124 g01231017

6. Fully insert safety bar (4) into the bore of the quick coupler.

7. Turn wrench (5) in a clockwise direction in order to fully tighten the locking mechanism.

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

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

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

c. Visually confirm the engagement of the hammer.

9. Connect the two hammer lines.

Releasing the Hammer

WARNING

Disengaging the locking mechanism 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 locking mechanism.

Illustration 125 g01232939

1. Position the hammer close to the ground.

2. Disconnect the two hammer lines.

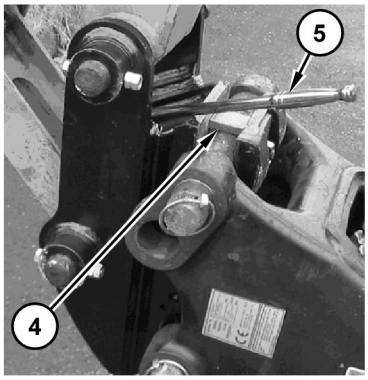

Illustration 126 g01231017

3. Turn wrench (5) in a counterclockwise direction in order to fully release the locking mechanism.

4. Remove safety bar (4).

5. Lower the hammer to the ground.

Illustration 127 g01215618

6. When the hammer is in full contact with the ground, rotate the coupler out of the top pin.

i04775787

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

SMCS Code: 6129; 6522; 7000

Installation

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.

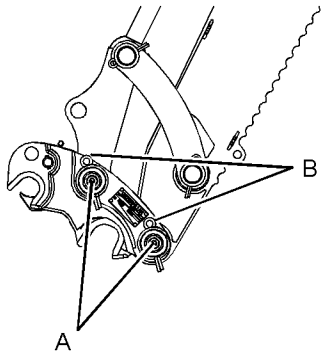

Illustration 128 g02878319

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

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

3. Install the cotter pins (B).

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 cab 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.

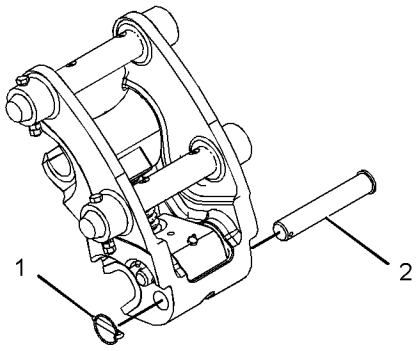

Illustration 129 g02165934

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.

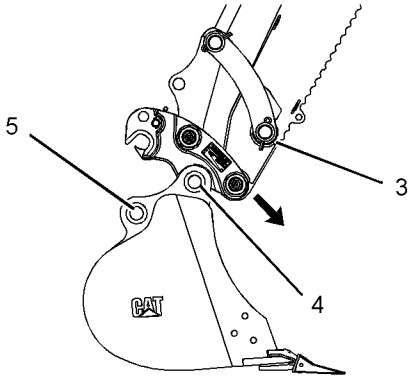

Illustration 130 g02165936

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.

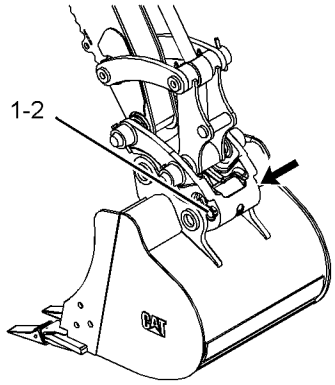

Illustration 131 g02193894

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.

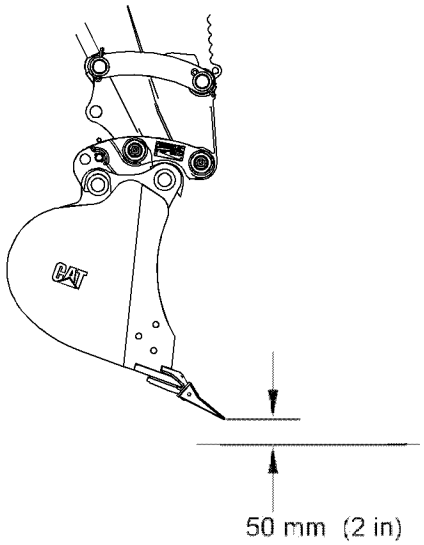

Illustration 132 g01502436

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.

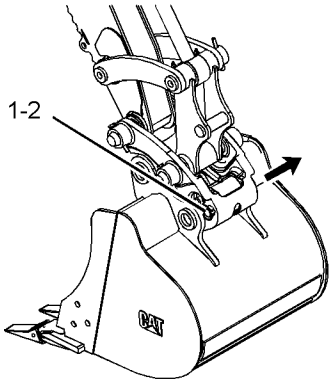

Illustration 133 g02165954

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

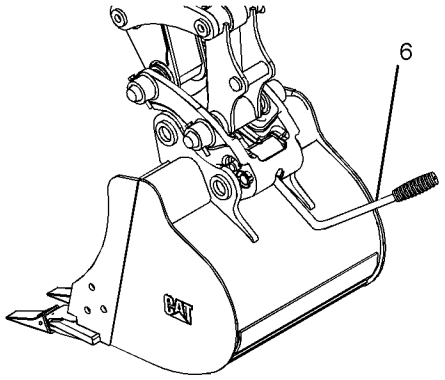

Illustration 134 g02165973

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.

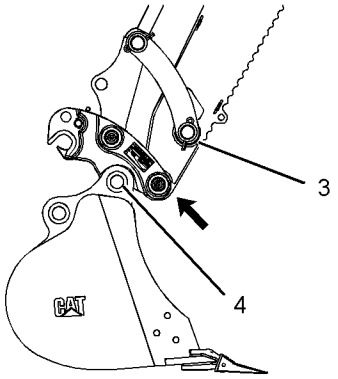

Illustration 135 g02193895

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.

Coupling the Hammer

⚠ 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.

Position the hammer horizontally on the ground.

1. Start the engine.

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

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

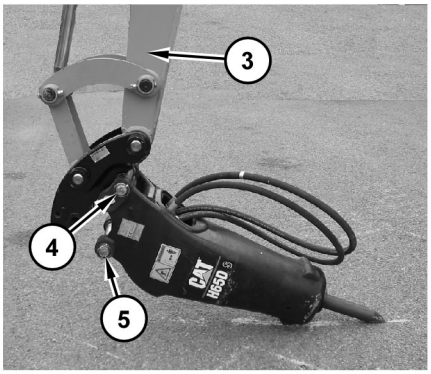

Illustration 136 g02166033

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

5. Extend the work tool cylinder in order to rotate the quick coupler toward the hammer until the quick coupler engages the lower pin (5) of the hammer. Stop the engine.

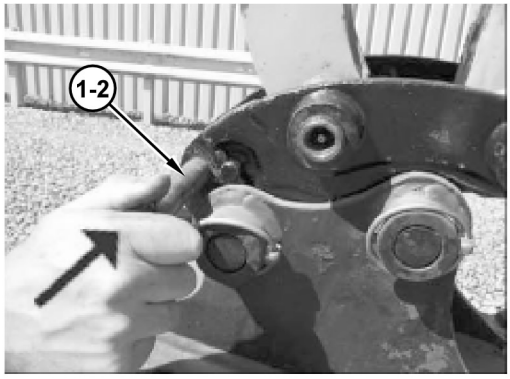

Illustration 137 g02166013

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

7. In order to verify the engagement of the hammer, perform the following procedure.

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

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

c. Visually confirm the engagement of the hammer.

8. Connect the two hammer lines.

Uncoupling the Hammer

⚠ 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.

Illustration 138 g01216467

1. Disconnect the two hammer lines.

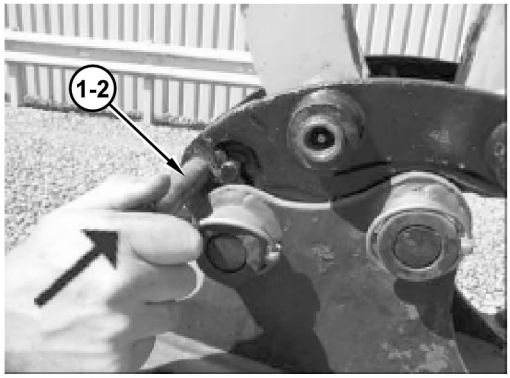

Illustration 139 g02166013

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

Illustration 140 g01215423

3. Position the hammer with light pressure on the tip.

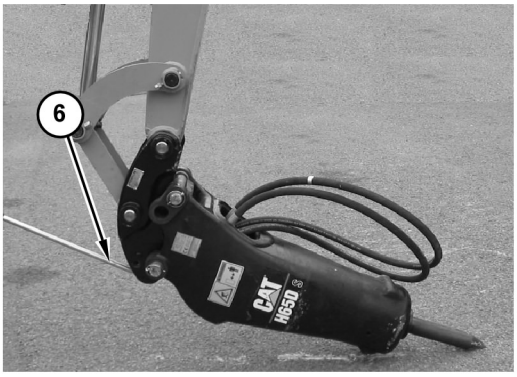

Illustration 141 g02166054

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

Illustration 142 g01215618

5. When the hammer is in full contact with the ground, rotate the coupler out of the top pin.

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

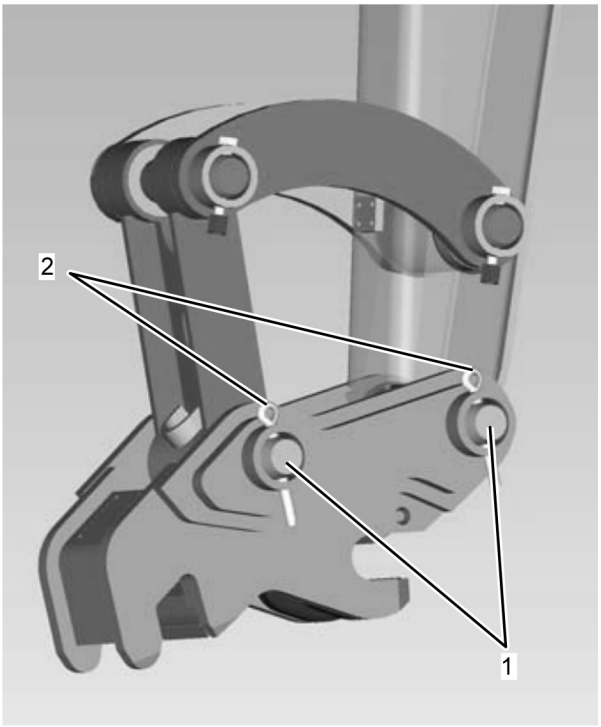

Illustration 143 g02869245

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).

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:

- **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.**
- **Visually confirm positive indication of the ISO Engagement indicator, if equipped.**
- **Retract the bucket cylinder and drag the work tool on the ground.**
- **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.

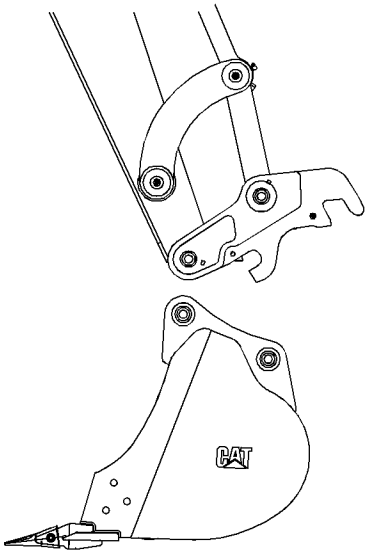

Illustration 144 g02163290

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.

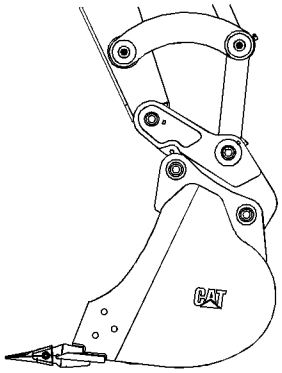

Illustration 145 g02163292

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.

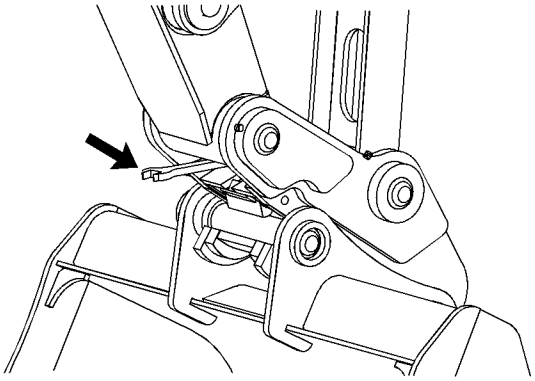

Illustration 146 g02165065

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.

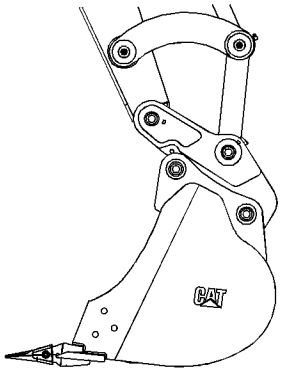

Illustration 147 g02163292

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.

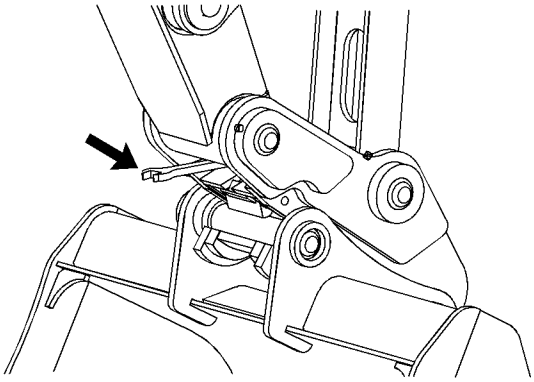

Illustration 148 g02165065

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.

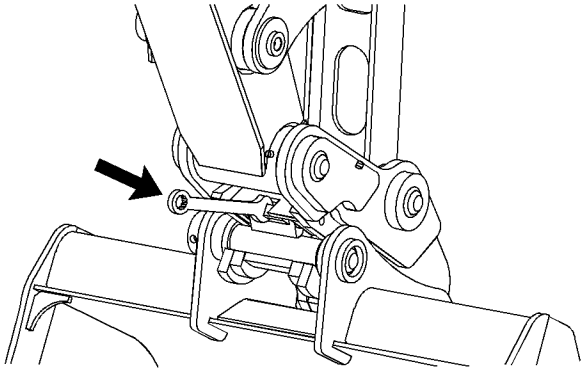

Illustration 149 g02165068

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.

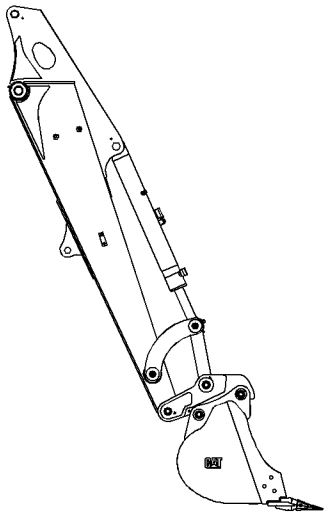

Illustration 150 g02163425

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.

i06014398

Quick Coupler Operation (Dual Lock Tilt Coupler (If Equipped))

SMCS Code: 6129; 6522; 7000

The quick coupler is used to change work tools while the operator remains in the cab. 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 Dual Lock Tilt Quick Coupler also allows the work tool to rotate through a 180 degree arc.

The work tools are held onto the quick coupler by two independent locking mechanisms. The work tool rear pin locking mechanism consists of a hydraulically driven wedge. If pressure is lost, a check valve in the hydraulic cylinder traps oil to ensure that the lock remains in place. Additionally, a fully independent locking system exists on the front pin of the work tool. This system is spring applied and hydraulically released, ensuring that the work tool is locked immediately after the front pin of the work tool is seated. Always ensure that the hydraulic system and the locking mechanisms are working properly before using the quick coupler.

⚠ 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:

- **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.**
- **Visually confirm positive indication of the ISO Engagement indicator, if equipped.**
- **Retract the bucket cylinder and drag the work tool on the ground.**
- **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
Before beginning installation, operating of machine, or repair of the Dual Lock Tilt Coupler:

The Dual Lock Tilt Coupler should only be used to perform tasks for which it was designed. Abusing the product and/or using it for purposes for which it was not intended can expose the operator and others to hazards as well as result in damage to the Dual Lock Tilt Coupler, carrier and/or other attachments.

Modification to the Dual Lock Tilt Coupler is done at the owner's risk and may void warranty.

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 indication of the ISO Engagement Indicator, if equipped. A physical test is required by dragging the work tool on the ground to confirm that the coupler pins are engaged.

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.

Quick Coupler Operation

Refer to Operation and Maintenance Manual, “Quick Coupler Operation (Hydraulic Pin Grabber Quick Coupler)” for coupling and uncoupling the work tools.

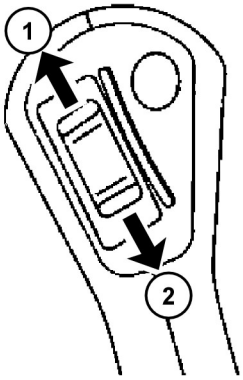

Illustration 151 g03774098

Actuate Tilt Coupler to the Right (1) – Push the thumb wheel on the right joystick upward in order to tilt the coupler to the right.

Actuate Tilt Coupler to the Left (2) – Push the thumb wheel on the right joystick downward in order to tilt the coupler to the left.

DO NOT actuate angling of the coupler while in the process of digging. Angle actuation should be performed while the coupler is in the air and not engaged in material.

DO NOT operate the Dual Lock Tilt Coupler unless it is fully connected to a host machine. Auxillary lines must be connected at all times to provide pressure relief.

i07174894

Quick Coupler Operation (Hydraulic 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 while the operator remains in the cab. 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 hydraulically driven wedge. If pressure is lost, a check valve in the hydraulic cylinder traps oil to ensure that the lock remains in place. Also, a fully independent locking system exists on the front pin of the work tool. This system is spring applied and hydraulically released, ensuring that the work tool is locked immediately after the front pin of the work tool is seated. Always ensure that the hydraulic system and the locking mechanisms are working properly before using the quick coupler.

Quick Coupler Operation

Description of the Instruction Film

An instruction film is included with the quick coupler. The instruction film illustrates the proper operation of the quick coupler.

Note: For detailed instructions on the operation of the quick coupler, refer to “Coupling the Work Tool” and “Uncoupling the Work Tool”.

The instruction film should be legible at all times. Clean the film or replace the film if the film is not legible. When you clean the film, use a cloth, water, and soap. Do not use solvent, gasoline, or harsh chemicals to clean the film. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the film. Loose adhesive will allow the film to fall. If the film is damaged or the film is missing, replace the film. For more information, consult your Cat dealer.

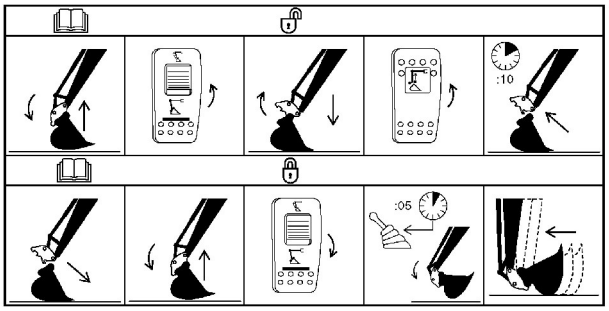

Illustration 152 g02165534
Instruction film

Description of the Top Frame on the Film (Uncoupling the Work Tool)

1. Position the work tool so that it 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.
2. Move electric switch (1) to the UNLOCK position.
3. Retract the bucket cylinder, ensuring that the work tool rear pin locking mechanism is unlocked. The rear of the quick coupler should be rotated away from the work tool. Place the work tool in a stable and safe position on the ground.
4. Depress the electric momentary switch (2). This will unlock the work tool front pin locking mechanism. This locking mechanism will remain unlocked for 10 seconds.
5. Within the 10 second time period, retract the stick cylinder until the quick coupler is disengaged from the work tool. Ensure that the work tool is in a stable and safe storage position on the ground.

Description of the Bottom Frame on the Film (Coupling the Work Tool)

1. 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.
2. Extend the bucket cylinder until the rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. Position the work tool so that it 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.
3. Move electric switch (1) to the LOCK position.
4. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds after the electric switch has been locked.
5. Ensure that the quick coupler pins are engaged. Retract the bucket cylinder and drag the attachment on the ground. Visually confirm that there is no movement between the work tool and the quick coupler.
6. Visually confirm positive indication of the ISO Engagement indicator, if equipped.

⚠ 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
Back drag the work tool on the ground to ensure the quick coupler is properly locked.

Do Not strike the work tool on the ground to ensure the quick coupler is properly locked. Striking the work tool on the ground will result in damage to the coupler cylinder.

Electric Switch Operation

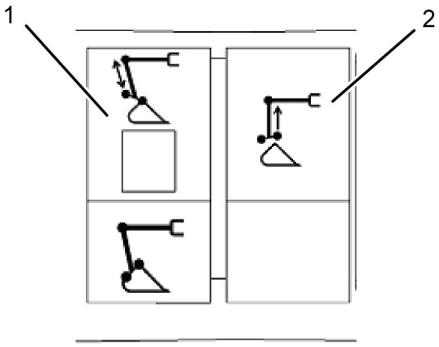

Illustration 153 g03881026

(1) Lock/Unlock (Rear pin)
(2) Unlock (Front pin)

Two electrical switches are located inside the cab. Use of both switches is required to release the work tool. Switch (1) is a two-position switch used to unlock the work tool rear pin locking mechanism. Switch (2) is a momentary switch used to unlock the work tool front pin locking mechanism. Switch (2) will function only when switch (1) is in the unlock position. Once switch (2) is depressed, the work tool front pin locking mechanism will unlock for 10 seconds. After this time, the mechanism will automatically close. Depressing switch (2) during the 10 second sequence will also close the work tool front pin locking mechanism.

Refer to this Operation and Maintenance Manual, “Operator Controls” for the location of the electric switch.

UNLOCK – To unlock the coupler, position the work tool so that it 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. Move electric switch (1) to the UNLOCK position. 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. Retract the bucket cylinder, ensuring that the work tool rear pin locking mechanism is unlocked. The rear of the quick coupler should be rotated away from the work tool. Place the work tool in a stable and safe position on the ground. Depress the electric momentary switch (2). Confirm that the buzzer is sounding with an intermittent pattern of two beeps per second. This will unlock the work tool front pin locking mechanism. This locking mechanism will remain unlocked for 10 seconds. Within the 10 second time period, retract the stick cylinder until the quick coupler is disengaged from the work tool. Ensure that the work tool is in a stable and safe storage position on the ground.


LOCK – To lock the coupler, 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. Confirm that switch (1) is in the UNLOCK position and 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 rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. Position the work tool so that it 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. Move electric switch (1) to the LOCK position. The buzzer will no longer sound. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds after the electric switch has been locked. To verify the engagement of the work tool, perform the following procedure. 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. Retract the bucket cylinder and drag the attachment on the ground. Visually confirm that there is no movement between the work tool and the quick coupler. Visually confirm positive indication of the ISO Engagement indicator, if equipped.

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:

- **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.**
- **Visually confirm positive indication of the ISO Engagement indicator, if equipped.**
- **Retract the bucket cylinder and drag the work tool on the ground.**
- **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
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 indication of the ISO Engagement Indicator, if equipped. A physical test is required by dragging the work tool on the ground to confirm that the coupler pins are engaged.

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.

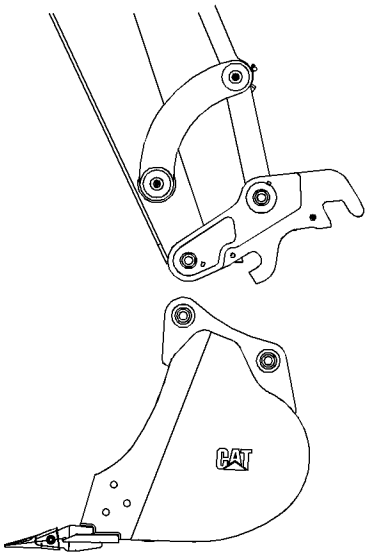

Illustration 154 g02163290

1. 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.

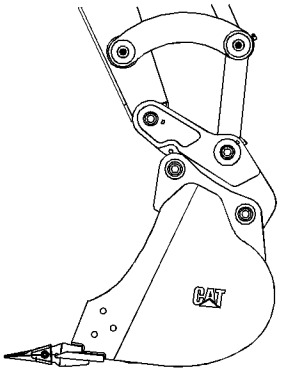

Illustration 155 g02163292

2. Confirm that switch (1) is in the UNLOCK position and 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 rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. Position the work tool so that it 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.

3. Move electric switch (1) to the LOCK position. The buzzer will no longer sound.

⚠ 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.

4. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds after the electric switch has been locked.

5. To verify the engagement of the work tool, perform the following procedure:

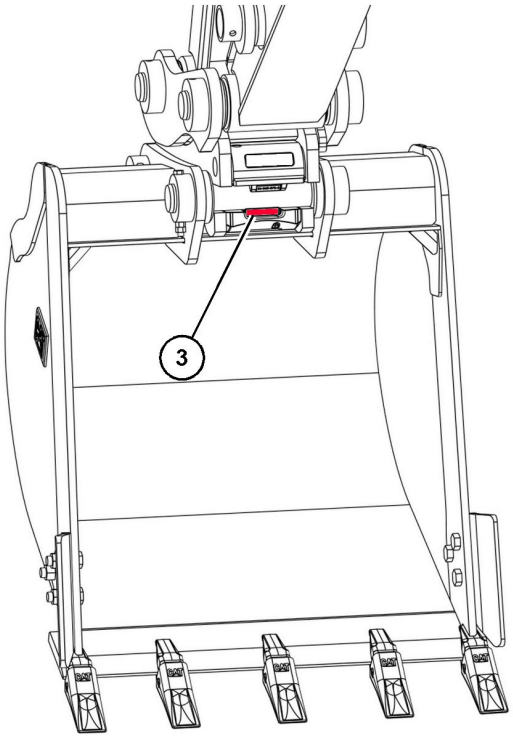

Illustration 156 g06222081

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. Visually confirm positive indication of the ISO Engagement indicator (3), if equipped.

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

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

NOTICE
Back drag the work tool on the ground to ensure the quick coupler is properly locked.

Do Not strike the work tool on the ground to ensure the quick coupler is properly locked. Striking the work tool on the ground will result in damage to the coupler cylinder.

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.

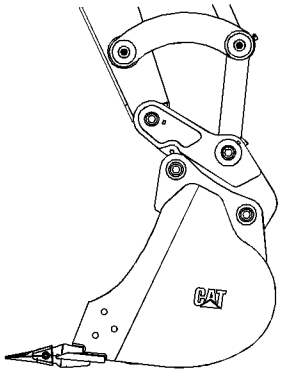

Illustration 157 g02163292

1. To unlock the coupler, position the work tool so that it 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.

2. Move electric switch (1) to the UNLOCK position. 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.

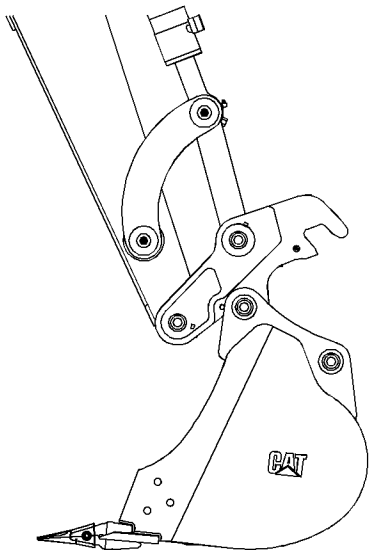

Illustration 158 g02163415

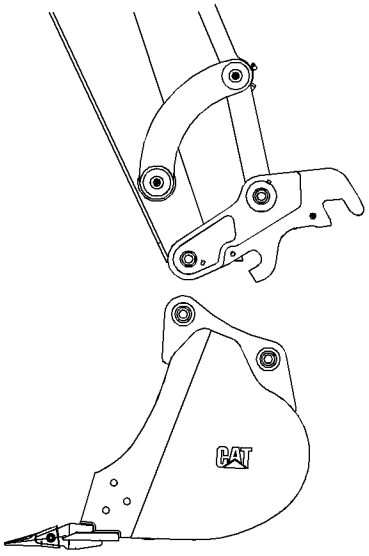

Illustration 159 g02163290

3. Retract the bucket cylinder, ensuring that the work tool rear pin locking mechanism is unlocked. The rear of the quick coupler should be rotated away from the work tool. Place the work tool in a stable and safe position on the ground.

4. Depress the electric momentary switch (2). Confirm that the buzzer is sounding with an intermittent pattern of two beeps per second. The work tool front pin locking mechanism will unlock. This locking mechanism will remain unlocked for 10 seconds.

5. Within the 10-second time period, retract the stick cylinder until the quick coupler is disengaged from the work tool. Ensure that the work tool is in a stable and safe storage position on the ground.

Coupling 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.

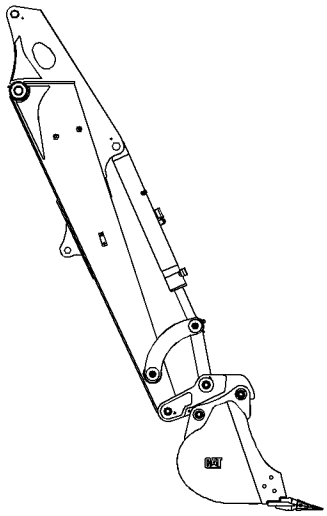

Illustration 160 g02163425

1. Follow the same steps for coupling and uncoupling the work tool 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.

i05261243

Hammer Operation
(If Equipped)

SMCS Code: 5705-WTL

⚠ 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.

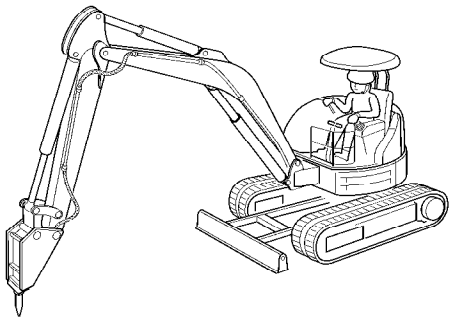

Illustration 161 g00821410

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.

If the machine is equipped with a cab, close the front window before you start hydraulic hammer operation. If the machine is equipped with a canopy, use protective equipment such as a hard hat and protective goggles before you start hydraulic hammer operation.

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 15 seconds. 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 cause damage to the accumulator or to 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 Caterpillar 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 could allow the stick cylinder to vibrate excessively.

Do not operate the hydraulic hammer on objects in water. This 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.

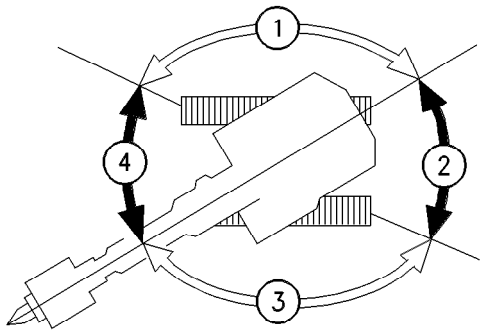

Illustration 162 g00101503

(1) Incorrect position
(2) Correct position
(3) Incorrect position
(4) Correct position

The use of hammers shortens the life of hydraulic oil. If a hammer is used, the following measures should be taken:

- Shorten the interval for changing the hydraulic oil to 1500 service meter hours.
- Use SAE 30 hydraulic oil or 15w40 hydraulic oil in order to sustain seal life.

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.

i01582993

Blade Operation

SMCS Code: 6060

NOTICE
Avoid hitting or moving rocks using the blade. Blade and cylinder damage could occur.

When using the blade as outrigger, be sure to support the machine with the edge of the blade against the ground. When curling the front attachment, do not allow the bucket to hit the blade.

During digging operation, do not allow the boom cylinder to contact the blade edge. When no blade operation is needed, operate with the bucket on the opposite side of the machine from the blade.

Do not swing the upper structure with cab door and/or upper structure covers opened. An opened door and/or cover can hit the blade when the blade is in the raised position while the machine is swinging.

i02049840

Rubber Belt Track Operation (If Equipped)

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 travelling at sites for demolition.
- Travelling 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 travelling on pavement.
- Use the rubber belt tracks at temperatures within −25 °C (−13 °F) to 55 °C (131 °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 very 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.

Parking

i02388306

Stopping the Machine

SMCS Code: 7000

Park on a level surface. Lower the blade and the bucket to the ground. If necessary, refer to Operation and Maintenance Manual, “Equipment Lowering with Engine Stopped”. If it is necessary to park on a grade, chock the tracks. Position the bucket at a slight digging angle.

Note: The swing parking brake is automatically applied when the machine is stopped. The swing parking brake is released when the engine is running and the left control console is lowered.

1. Turn the engine speed dial counterclockwise in order to reduce engine speed.

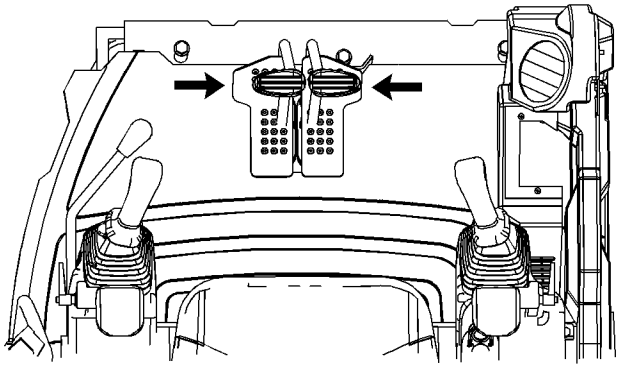

Illustration 163 g01192386

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 cause damage to the machine. Slow down and bring the machine to a smooth stop.

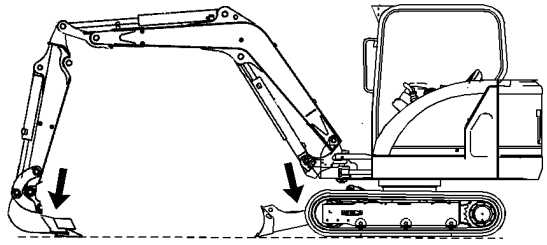

Illustration 164 g01192390

3. Lower the work tool and the blade to the ground. Apply a slight downward pressure.

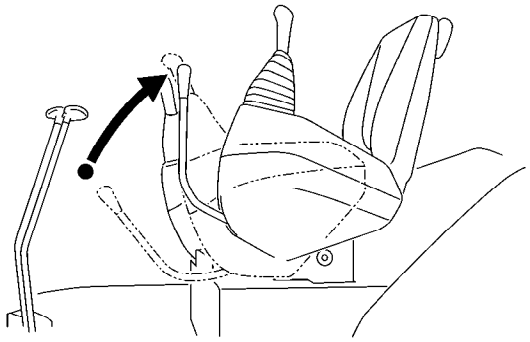

Illustration 165 g00817901

4. Raise the left console for the hydraulic lockout control in order to deactivate the hydraulic controls.

⚠ 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.

i01584067

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.

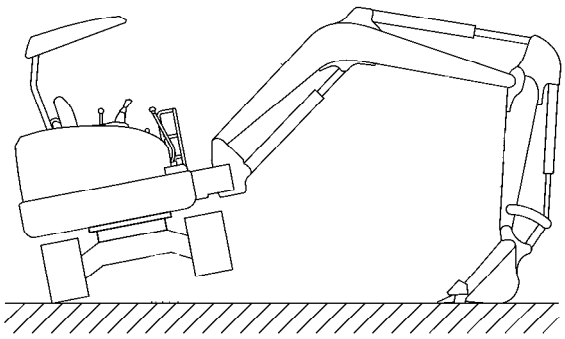

Illustration 166 g00821797

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 carrier rollers and around the track rollers.

6. Lower the implement onto a wood plank.

i02389618

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 engine components.

Refer to the following procedure to allow the engine to cool and to prevent excessive temperatures in the turbocharger housing, which could cause oil coking problems.

1. Stop the machine and lower the work tool to the ground.

2. Move the hydraulic lockout control to the LOCKED position.

3. Run the engine at low idle for five minutes.

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

Stop the Engine if an Electrical Malfunction Occurs

Lower the work tool 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.

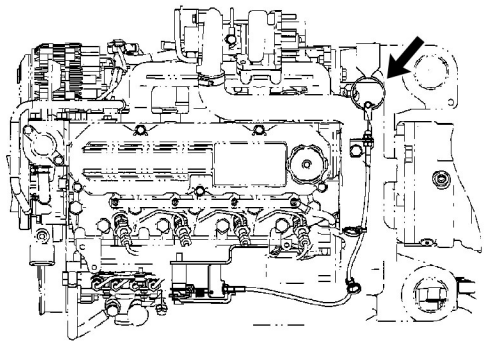

Illustration 167 g01193127

2. Pull the ring for the fuel shutoff valve in order to stop the engine.

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

i01584089

Leaving the Machine

SMCS Code: 7000

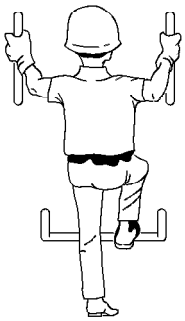

Illustration 168 g00037860

1. Use the steps and the handholds when you dismount. When you dismount, face the machine and use both hands.

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

3. Remove all flammable debris from the front bottom guard through the access doors in order to reduce a fire hazard. Discard the debris properly.

4. Lock all compartments.

Transportation Information

i01585244

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 and before you unload the machine remove ice, snow, or other slippery material from the loading dock and from the surface of the trailer. Removal of ice, snow, or other slippery material will help prevent the slipping of the machine as you load the machine. Removing ice, snow, or other slippery material will help 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.

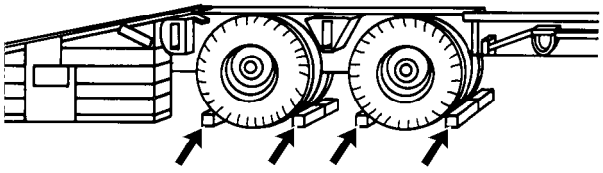

Illustration 169 g00040011

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

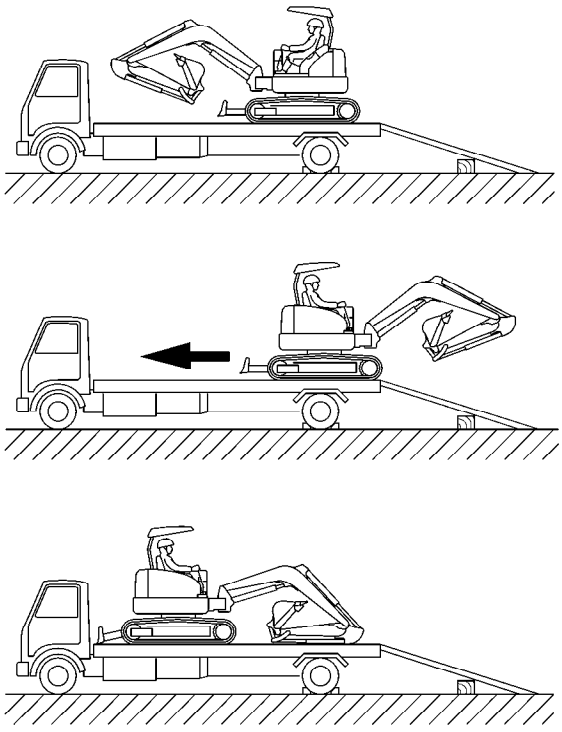

Illustration 170 g00822718

NOTICE
Set the travel speed control switch to LOW before loading the machine. Never operate this switch when loading the machine on a trailer.

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 blade will be the first machine components to travel up the loading ramps. Make sure that the 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 blade will be the last machine component to travel down the loading ramps. Make sure that the 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.
3. Use caution when you travel over the areas around the loading ramp joints in order to maintain the balance point of the machine.

i02016404

Securing the Machine

SMCS Code: 7000

Comply with any laws that govern the characteristics of a load (length, width, height, and weight).

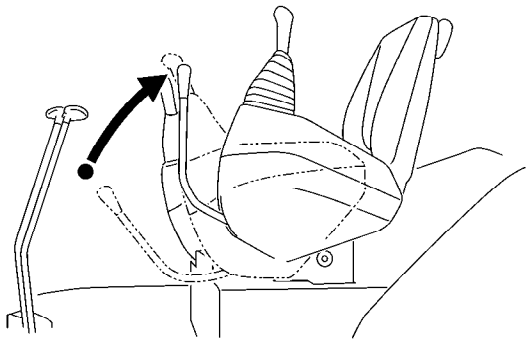

Illustration 171 g00817901

1. Move the hydraulic lockout control (lever) to the LOCKED position.
2. Turn the engine start switch to the OFF position in order to stop the engine. Remove the engine start switch key.
3. Lock the door and the access covers.

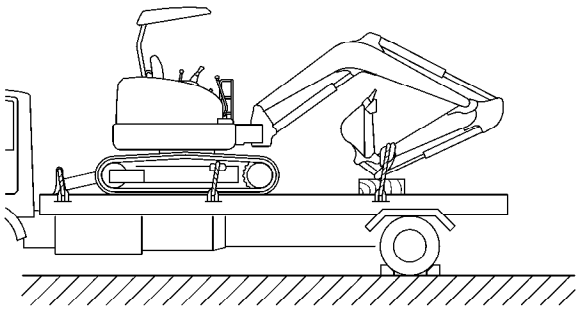

Illustration 172 g00822767

4. Chock the tracks and secure the machine with tie-downs. Make sure that you use the proper rated wire cable.

   Use the holes on each end of the blade and on the lower frame.

   Install tie-downs on the swing boom in order to prevent the boom from shifting.

   Securely fasten all loose parts and all removed parts to the trailer or to the rail car.

i02016407

Counterweight Removal and Installation
(If Equipped)

SMCS Code: 7056

WARNING

Unexpected machine movement can cause injury or death.

In order to avoid possible machine movement, move the hydraulic lockout control to the LOCKED position and attach a Special Instruction, SEHS7332, "Do Not Operate" or similar warning tag to the hydraulic lockout control.

WARNING

Personal injury or death can occur from a counterweight falling during removal or installation.

Do not allow personnel under or around the counterweight during removal or installation.

Make sure that the lifting device is in good condition and is capable of handling the weight of the counterweight.

WARNING

Make certain personnel are clear of cable when there is a load on it. Cable can break and cause personal injury.

Counterweight Removal

1. Position the machine on a surface that is hard and level. Lower the front implements to the ground.
2. Move the hydraulic lockout control (lever) to the LOCKED position.

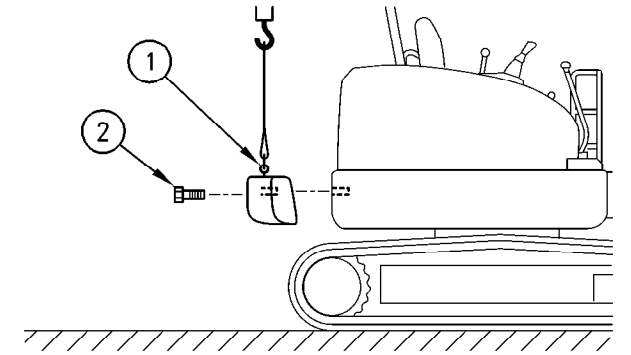

Illustration 173 g00848208

3. Install eyebolts (1) in the top of the extra counterweight.
4. Fasten a proper rated wire cable with shackles to eyebolt (1). Use an appropriate lifting device in order to tension the cable.

Note: Removing the mounting bolts will be difficult if the cable tension is too high or too low.

5. Remove mounting bolts (2).
6. Separate the counterweight from the machine. Lower the counterweight onto suitable supports.
7. Replace the two plugs on the standard counterweight.

Counterweight Installation

1. Position the machine on a surface that is hard and level. Lower the front implements to the ground.
2. Move the hydraulic lockout control (lever) to the LOCKED position.

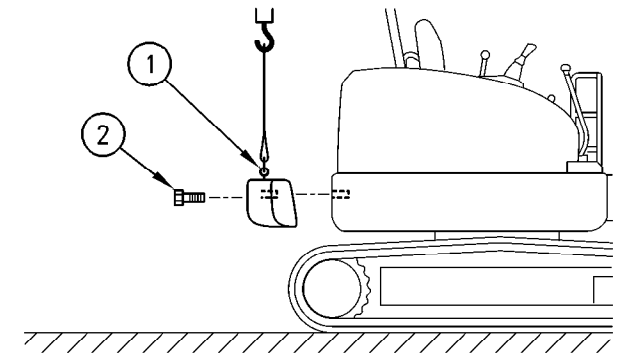

Illustration 174 g00848208

(1) Eyebolt
(2) Mounting bolt

3. Remove the two plugs from the standard counterweight.

4. Install eyebolts (1) in the top of the extra counterweight.

5. Fasten a proper rated wire cable with shackles to eyebolt (1). Use an appropriate lifting device in order to tension the cable.

Note: Installing the bolts will be difficult if the cable tension is too high or too low.

6. Lift the extra counterweight up to the standard counterweight. Install mounting bolts (2) and temporarily tighten mounting bolts (2).

7. Decrease the tension on the lifting cable. Make sure that the counterweight is correctly positioned.

8. Tighten mounting bolts (2).

9. Remove eyebolts (1).

i06243721

Lifting and Tying Down the Machine

SMCS Code: 7000; 7500

NOTICE
Improper lifting or tiedowns can allow load to shift and can cause injury and damage.

Refer to the table in Operation and Maintenance Manual, “Specifications” for specific weight information.

Use properly 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

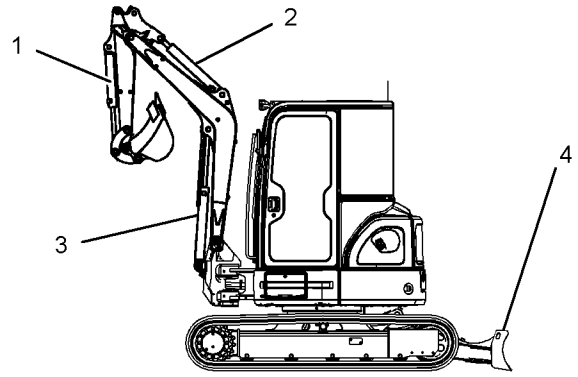

Illustration 175 g01192936

1. Raise the blade (4).

2. Position the boom in a straight ahead position.

3. Extend the stick cylinder (2), the work tool cylinder (1) and the boom cylinder (3) to the end of the stroke.

Note: Remove all work tools except for the bucket.

4. Swing the upper structure so that the blade (4) is to the rear of the machine.

5. Stop the engine. Raise the hydraulic control console and dismount the machine. Lock the door and covers.

Lifting the Machine

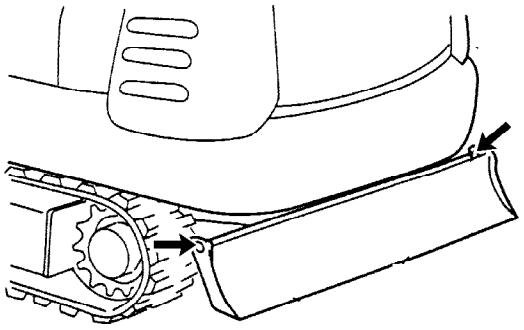

Illustration 176 g00309343

1. Attach shackles to the lifting eyes in the ends of the blade and fasten slings to the shackles.

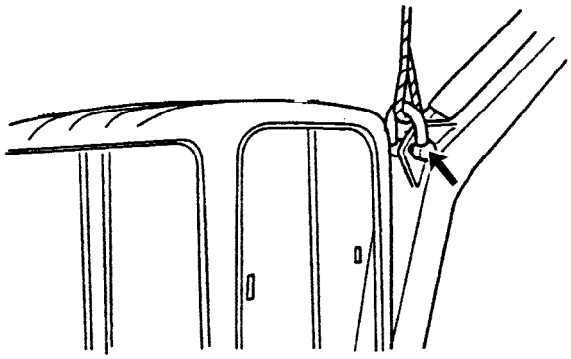

Illustration 177 g00309363

2. If equipped, attach a shackle to the lifting eye in the middle bracket of the boom. Fasten a sling to the shackle.

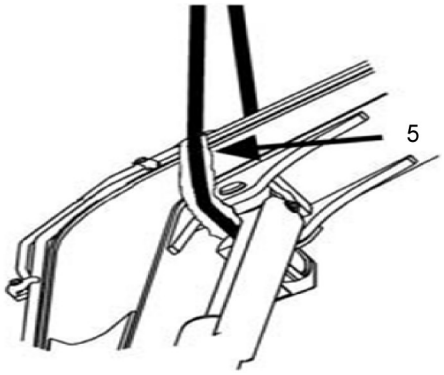

Illustration 178 g03869592

3. If your machine is not equipped with a lifting eye, loop a sling between the boom and boom cylinder rod as shown in illustration 178 .

4. Put a protective pad (5) between the machine and the slings in order to prevent damaging the machine.

5. Raise the machine slowly in order to ensure that the machine remains in a horizontal position. If the machine does not remain in a horizontal position, lower the machine to the ground. Adjust the length of the lifting sling or cable. Slowly lift the machine.

Tying Down the Machine

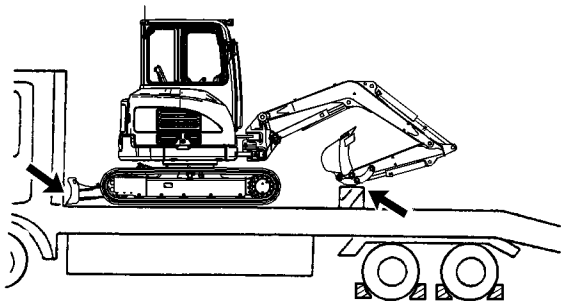

Illustration 179 g01192938

1. Lower the blade to the trailer.

2. Extend the work tool 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.

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

6. Move all of the hydraulic control levers in order to relieve any trapped pressure.

7. Turn the engine start switch key to the OFF position. Remove the key.

8. Move the hydraulic control console to the RAISED position.

9. Lock the door and the access covers.

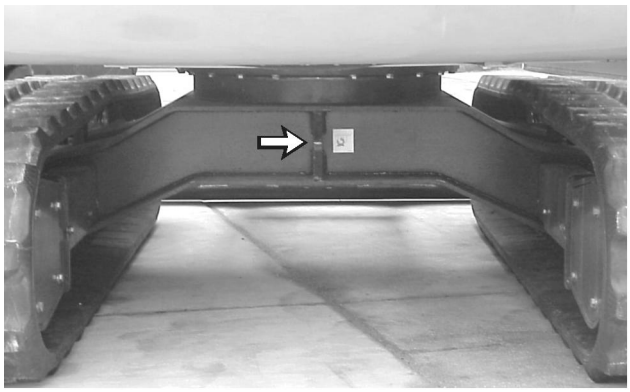

Illustration 180 g00697082

10. Chock the tracks and install tie-downs to the following places in order to prevent shifting in transit:

- Lifting eyes on the blade
- Bucket control linkage
- Lower frame lift eye

Note: Use protectors between the machine and the tie-downs.

11. Separately tie down all hydromechanical work tools that will accompany the machine. Refer to the owner's manual for instructions on tying down the individual work tools.

Towing Information

i05240220

Towing the Machine

SMCS Code: 7000

⚠ WARNING

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

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

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

Relieve the hydraulic tank and line pressure before any disassembly.

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

NOTICE
To tow the machine, both final drives must be disengaged.

Do not operate the travel motors with the final drives disengaged. Damage could result.

These towing instructions are for moving a disabled machine for a short distance at low speed. Move the machine at a speed of 2 km/h (1.2 mph) or less to a convenient location for repair. Always haul the machine if long distance moving is required.

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

Do not allow an operator to be on the machine that is being towed.

Before you tow the machine, make sure that the tow line or the tow bar is in good condition. Do not use a wire rope that is kinked, twisted, or damaged. Make sure that the tow line or the tow bar has enough strength for the towing procedure that is involved. The strength of the tow line or of the tow bar should be at least 150 percent of the gross weight of the towed machine. This requirement is for a disabled machine that is stuck in the mud and for being towed on a grade.

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

During towing, do not allow anyone to step between the towing and the towed machines.

Do not allow the wire rope to be straddled while the machine is being towed.

Keep the tow line angle to a minimum. Do not exceed a 30 degree angle from the straight ahead position.

Avoid towing the machine on a slope.

Quick machine movement could overload the tow line or the tow bar. This could cause the tow line or the tow bar to break. Gradual, steady machine movement will be more effective.

Prior to releasing the brake of the final drive, firmly lock both tracks in order to prevent the machine from moving suddenly. When the machine is ready to be towed, release the brake of the final drive. Refer to Operation and Maintenance Manual, “Final Drive Sun Gear Removal”.

Normally, the towing machine should be as large as the disabled machine. Make sure that the towing machine has enough brake capacity, enough weight, and enough power. The towing machine must be able to control both machines for the grade that is involved and for the distance that is involved.

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

All situation requirements cannot be listed. Minimal towing machine capacity is required on smooth, level surfaces. Maximum towing machine capacity is required on an incline or on a surface that is in poor condition.

Do not tow a loaded machine.

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

Retrieval and Towing of Machine

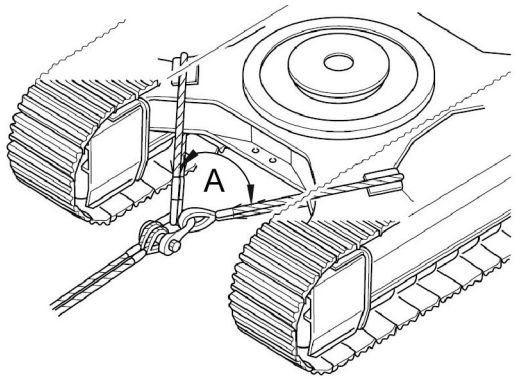

Illustration 181 g02533437

Note: Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. The permissible force for the lower frame is 100 percent of the gross weight of the towed machine.

Note: In order to prevent damage to the wire rope or the lower frame of the machines, use protective sleeves on the corners of the lower frame.

Retrieve the disabled machine carefully. The applied load for each wire rope should be equal. The angle (A) between each wire rope should be 60 degree maximum. Operate the machine at a low speed.

Lightweight Towing

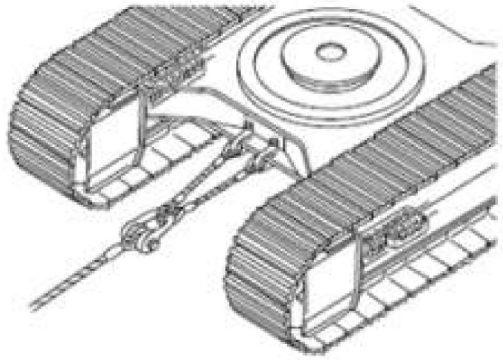

Illustration 182 g03342415

Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. Operate the machine at a low speed.

i01410874

Final Drive Sun Gear Removal

SMCS Code: 4050

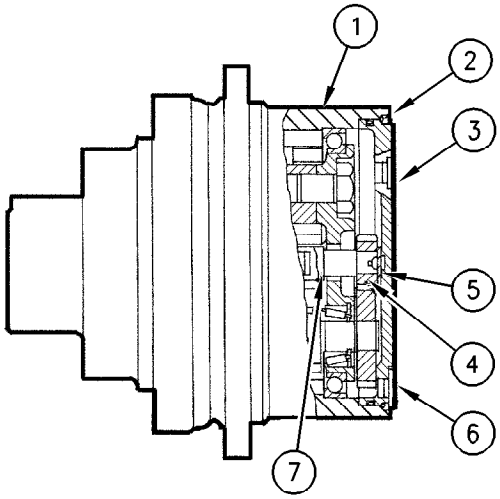

Illustration 183 g00742711

(1) Hub
(2) Ring
(3) Cover
(4) Sun gear
(5) Ring
(6) Plug
(7) Shaft

1. Thoroughly clean the area around the final drive. Make sure that you also clean the track shoes that are positioned above the final drive.
2. Remove three plugs(6). Drain the final drive oil into a suitable container. See Operation and Maintenance Manual, “Final Drive Oil - Change” for the procedure.
3. Remove ring (2) with a screwdriver.
4. Install three bolts into the holes for plugs (6). The bolts should have pipe threads.
5. Pull cover (3) off hub (1).
6. Remove ring (5).
7. Remove sun gear (4) from shaft (7).
8. Install cover (3) and ring (2) by using all of plugs (6) that were removed previously.

9. Fill the final drive with clean oil. See Operation and Maintenance Manual, “Final Drive Oil - Change” for the procedure.

10. Repeat the procedure for the other final drive.

WARNING

Without the sun gear in place, the brakes are ineffective. Personal injury or death could result. Provide other means to hold or stop the machine.

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.

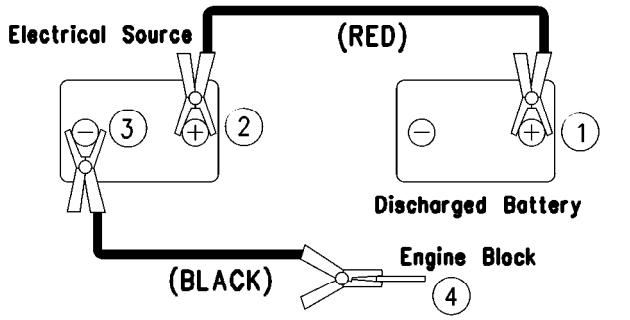

Illustration 184 g00818210

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.

Maintenance Section

Maintenance Access

i05150549

Access Door and Cover Locations

SMCS Code: 726A-CH

Engine Access Door

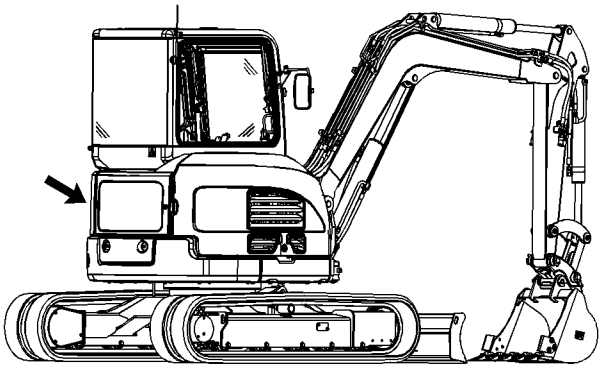

Illustration 185 g01191684

Right Hand Access Door

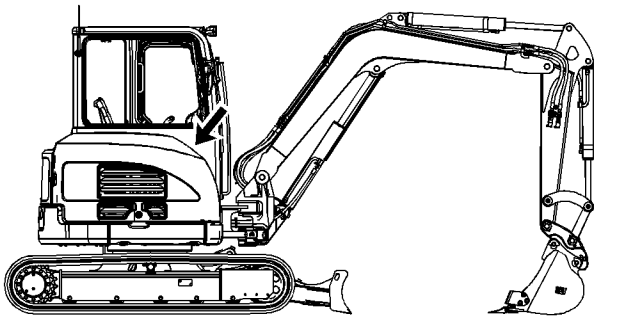

Illustration 186 g01191685

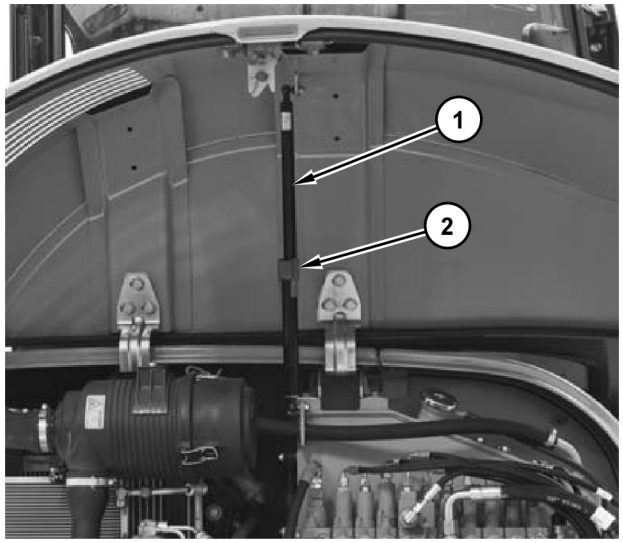

Illustration 187 g03306679

1. Unlatch the right access door and fully open.

Note: When opening right-hand access door make sure gas spring (1) locks into place.

WARNING

Operation of the Push Button Release for the Access Door

When closing the access door, only operate the push-button release by hand.

Failure to remove hands from the push-button release before closing the access door could result in personal injury.

Be sure to remove hands from the push-button release before completely closing the access door.

2. In order to close the right-hand access door, press push-button release (2) in order to unlock the gas spring.

3. Release the push button and slowly close the right-hand access door.

Access Cover (Battery)

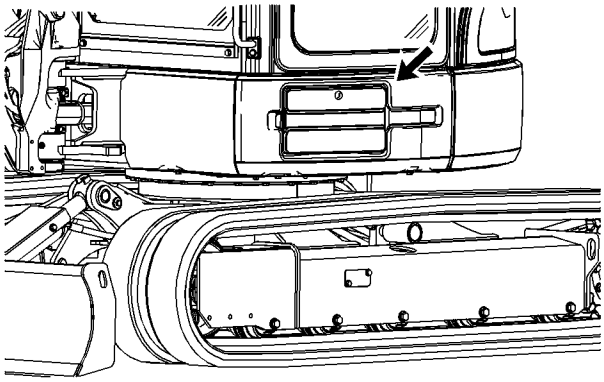

Illustration 188 g01191687

Lubricant Viscosities and Refill Capacities

i06015513

Lubricant Viscosities

SMCS Code: 7581

General Information for Lubricants

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

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

The footnotes are a key part of the tables. Read ALL footnotes that pertain to the machine compartment in question.

Selecting the Viscosity

In order to select the proper oil for each machine compartment, refer to the “Lubricant Viscosity for Ambient Temperature” table. Use the oil type AND oil viscosity for the specific compartment at the proper ambient temperature.

The proper oil viscosity grade is determined by the minimum ambient temperature (the air in the immediate vicinity of the machine). Measure the temperature when the machine is started and while the machine is operated. In order to determine the proper oil viscosity grade, refer to the “Min” column in the table. This information reflects the coldest ambient temperature condition for starting a cold machine and for operating a cold machine. Refer to the “Max” column in the table for operating the machine at the highest temperature that is anticipated. Unless specified otherwise in the “Lubricant Viscosities for Ambient Temperatures” tables, use the highest oil viscosity that is allowed for the ambient temperature.

Machines that are operated continuously should use oils that have a higher oil viscosity. The oils that have the higher oil viscosity will maintain the highest possible oil film thickness. Refer to “General Information for Lubricants” article, “Lubricant Viscosities” tables, and any associated footnotes. Consult your Cat dealer if additional information is needed.

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

Engine Oil

Cat oils have been developed and tested in order to provide the full performance and life that has been designed and built into Cat engines.

Table 42

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance Requirements	Oil Viscosities	°C		°F	
			Min	Max	Min	Max
Engine Crankcase	Cat DEO-ULS Cat DEO Cat DEO-ULS SYN Cat DEO SYN Cat Cold Weather DEO-ULS Cat ECF-1-a, Cat ECF-2, Cat ECF-3	SAE 0W-40	−40	40	−40	104
		SAE 5W-30	−30	30	−22	86
		SAE 0W-30	−40	30	−40	86
		SAE 5W-40	−30	50	−22	122
		SAE 10W-30	−18	40	0	104
		SAE 10W-40	−18	50	0	122
		SAE 15W-40	−9.5	50	15	122

Hydraulic Systems

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

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

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

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

Second choice oils are listed below.

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

Table 43

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

Other Fluid Applications

Table 44

Mini-hex Lubricant Viscosities for Ambient Temperatures						
Compartment or System	**Oil Type and Performance Requirements**	**Oil Viscosities**	**°C**		**°F**	
			Min	**Max**	**Min**	**Max**
Differentials and Final Drives	**Cat GO (Gear Oil) Cat Synthetic GO API GL-5 gear oil**	SAE 75W-90	−30	40	−22	104
		SAE 75W-140	-30	45	-22	113
		SAE 80W-90	−20	40	−4	104
		SAE 85W-140	−10	50	14	122
		SAE 90	0	40	32	104
Track Roller Frame Recoil Spring and Pivot Shaft Bearings	**Cat TDTO Cat TDTO-TMS Cat Cold Weather TDTO Cat TO-4, Cat TO-4M**	SAE 0W-20	−40	0	−40	32
		SAE 10W	−30	0	−22	32
		SAE 30	−20	25	−4	77
		SAE 40	−10	40	14	104
		SAE 50	0	50	32	122
		Cat TDTO-TMS	−25	25	−13	77

Special Lubricants

Grease

In order to use a non-Cat grease, the supplier must certify that the lubricant is compatible with Cat grease.

Each pin joint should be flushed with the new grease. Ensure that all old grease is removed. Failure to meet this requirement may lead to failure of a pin joint.

Table 45

Recommended Grease						
Compartment or System	Grease Type	NLGI Grade	°C		°F	
			Min	Max	Min	Max
External Lubrication Points	Cat Prime Application Grease	NLGI Grade 2	−20	140	−4	284
	Cat Extreme Application Grease	NLGI Grade 1	−20	140	−4	284
		NLGI Grade 2	−15	140	+5	284
	Cat Extreme Application Grease-Artic	NLGI Grade 0.5	-50	130	-58	266
	Cat Extreme Application Grease-Desert	NLGI Grade 2	−10	140	+14	284
	Cat Utility Grease	NLGI Grade 2	−20	140	−4	284
	Cat Ball Bearing Grease	NLGI Grade 2	−20	160	−4	320

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

Diesel Fuel Recommendations

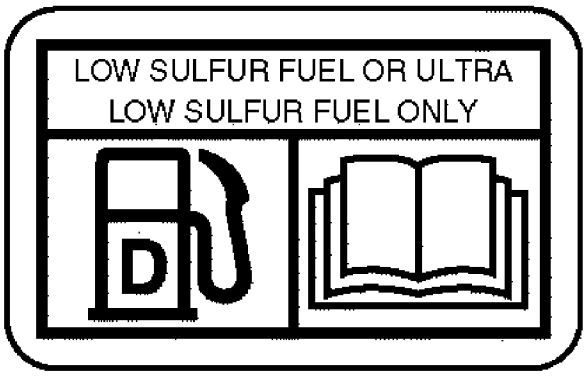

Illustration 189 g01429152

Diesel fuel must meet “Caterpillar Specification for Distillate Fuel” and the latest versions of “ASTM D975” or “EN 590” in order to ensure optimum engine performance. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for the latest fuel information and for Cat fuel specification. This manual may be found on the Web at Safety.Cat.com.

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.

Fuel Additives

Cat Diesel Fuel Conditioner and Cat Fuel System Cleaner are available for use when needed. These products are applicable to diesel and biodiesel fuels. Consult your Cat dealer for availability.

Biodiesel

Biodiesel is a fuel that can be made from various renewable resources that include vegetable oils, animal fat, and waste cooking oil. Soybean oil and rapeseed oil are the primary vegetable oil sources. In order to use any of these oils or fats as fuel, the oils or fats are chemically processed (esterified). The water and contaminants are removed.

U.S. distillate diesel fuel specification “ASTM D975-09a” includes up to B5 (5 percent) biodiesel. Currently, any diesel fuel in the U.S. may contain up to B5 biodiesel fuel.

European distillate diesel fuel specification “EN 590” includes up to B5 (5 percent) and in some regions up to B7 (7 percent) biodiesel. Any diesel fuel in Europe may contain up to B5 or in some regions up to B7 biodiesel fuel.

Note: Up to B20 biodiesel blend level is acceptable for use in Excavator engines.

When biodiesel fuel is used, certain guidelines must be followed. Biodiesel fuel can influence the engine oil, aftertreatment devices, non-metallic, fuel system components, and others. Biodiesel fuel has limited storage life and has limited oxidation stability. Follow the guidelines and requirements for engines that are seasonally operated and for standby power generation engines.

In order to reduce the risks associated with the use of biodiesel, the final biodiesel blend and the biodiesel fuel used must meet specific blending requirements.

All the guidelines and requirements are provided in the latest revision of Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”. This manual may be found on the Web at Safety.Cat.com.

Coolant Information

The information provided in this “Coolant Recommendation” section should be used with the “Lubricants Information” provided in the latest revision of Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”. This manual may be found on the Web at Safety.Cat.com.

The following two types of coolants may be used in Cat diesel engines:

Preferred – Cat ELC (Extended Life Coolant)

Acceptable – Cat DEAC (Diesel Engine Antifreeze/ Coolant)

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.

i02865335

Capacities (Refill)

SMCS Code: 1000; 7000

Table 46

303C CR and 303.5C CR Approximate Refill Capacities				
Component or System	**Liters**	**US gal**	**Imp gal**	**Recommended Type**
Fuel Tank 303C CR	**45**	**12**	**10**	**No. 1 Diesel Fuel or No. 2 Diesel Fuel**
Fuel Tank 303.5C CR	**51**	**14**	**11**	
Cooling System	6	1.6	1.3	Caterpillar Extended Life Coolant (ELC)
Coolant Reservoir	0.4	0.1	0.09	
Engine Oil Pan	6	1.6	1.3	Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.
Hydraulic System(1)	37	10	8	
Each Final Drive	1.0	0.26	0.22	

(1) The amount of hydraulic fluid that is needed to refill the hydraulic system after performing Operation and Maintenance Manual, “Hydraulic System Oil - Change”

Table 47

304C CR and 305C CR Approximate Refill Capacities				
Component or System	**Liters**	**US gal**	**Imp gal**	**Recommended Type**
Fuel Tank	**68**	**18**	**15**	**No. 1 Diesel Fuel or No. 2 Diesel Fuel**
Cooling System	11	3	2.5	Caterpillar Extended Life Coolant (ELC)
Coolant Reservoir	0.4	0.1	0.09	
Engine Oil Pan	7	2	1.5	Refer to Operation and Maintenance Manual, “Lubricant Viscosities”.
Hydraulic System(1)	48	13	11	
Each Final Drive	1.0	0.26	0.22	

(1) The amount of hydraulic fluid that is needed to refill the hydraulic system after performing Operation and Maintenance Manual, “Hydraulic System Oil - Change”

Note: Use only low sulfur or ultra low sulfur fuel.

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.

Maintenance Support

i03019299

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 in order 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. Turn the key to the ON position before moving the joysticks.
4. Move the joysticks through the full range of travel. This will relieve any pressure that may be present in the hydraulic system.
5. Slowly loosen the filler cap in order to release the pressure in the hydraulic tank.
6. Tighten the filler cap.
7. The pressure in the hydraulic system has been released. Lines and components can be removed.

i07539955

Welding on Machines and Engines with Electronic Controls

SMCS Code: 1000; 7000

Do not weld on any protective structure. If it is necessary to repair a protective structure, contact your Cat dealer.

Proper welding procedures are necessary in order to avoid damage to the electronic controls and to the bearings. When possible, remove the component that must be welded from the machine or the engine and then weld the component. If you must weld near an electronic control on the machine or the engine, temporarily remove the electronic control in order to prevent heat related damage. The following steps should be followed in order to weld on a machine or an engine with electronic controls.

1. Turn off the engine. Place the engine start switch in the OFF position.
2. If equipped, turn the battery disconnect switch to the OFF position. If there is no battery disconnect switch, remove the negative battery cable at the battery.

NOTICE
Do NOT use electrical components (ECM or sensors) or electronic component grounding points for grounding the welder.

3. Clamp the ground cable from the welder to the component that will be welded. Place the clamp as close as possible to the weld. Make sure that the electrical path from the ground cable to the component does not go through any bearing. Use this procedure in order to reduce the possibility of damage to the following components:
   - Bearings of the drive train
   - Hydraulic components
   - Electrical components

- Other components of the machine

4. Protect any wiring harnesses and components from the debris and the spatter which is created from welding.

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

i07731421

Maintenance Interval Schedule

SMCS Code: 7000

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

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

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

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

Note: If Cat HYDO Advanced 10 hydraulic oil is used, the hydraulic oil change interval is extended to 3000 hours. S·O·S services may extend the oil change to a longer interval. Consult your Cat dealer for details.

When Required

Every 6000 Service Hours or 3 Years

Every 12 000 Service Hours or 6 Years

Every 10 Service Hours

Every 50 Service Hours

Initial 100 Service Hours

Every 100 Service Hours

Initial 250 Service Hours

Every 250 Service Hours

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

Every 500 Service Hours

Every 1000 Service Hours

Every 2000 Service Hours or 1 Year

Every Year

Every 3000 Service Hours or 18 Months

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

i02788833

Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/ Replace

SMCS Code: 1054-510-A/C; 1054-040-A/C

NOTICE
An air recirculation filter element plugged with dust will result in decreased performance and service life to the air conditioner or cab heater.

To prevent decreased performance, clean the filter element, as required.

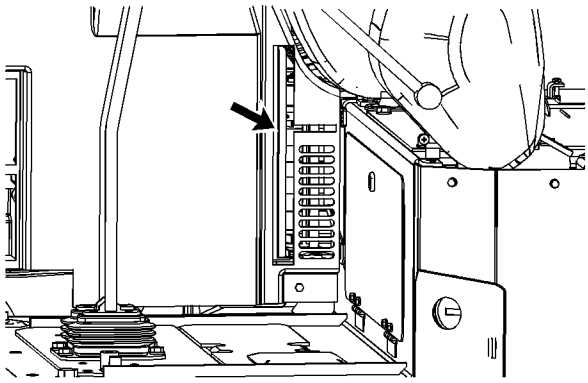

Illustration 190 g01213860

The filter element is located on the lower right side of the cab.

1. In order to remove the filter element, slide the filter element outward.
2. Inspect the filter element. If the filter element is dirty, clean the filter element with a mild solution of soap and warm water.

Note: Do not use organic solvents in order to clean the filter element.

3. The filter element may also be cleaned with a maximum of 200 kPa (30 psi) pressure air.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” before using pressure air to clean the filter element.

4. After you clean the filter element, inspect the filter element. If the filter element is damaged or badly contaminated, use a new filter element.
5. Make sure that the filter element is dry. Install the filter element into the filter housing. Make sure that the filter element is seated in the bottom of the filter housing before the system is operated.

i00934864

Battery - Clean

SMCS Code: 1401-070

Clean the battery surface with a clean cloth. Keep the terminals clean and keep the terminals coated with petroleum jelly. Install the post cover after you coat the terminal post with petroleum jelly.

i06543763

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

i01586700

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.

i01999587

Battery or Battery Cable - Inspect/Replace

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

⚠ WARNING

Personal injury can result from battery fumes or explosion.

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

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

Always wear protective glasses when working with batteries.

1. Turn the engine start switch key to the OFF position. Turn all of the switches to the OFF position. Remove the key.
2. Disconnect the negative battery cable at the battery.
3. Disconnect the positive battery cable at the battery.
4. Disconnect the battery cables from the machine if new cables are needed.
5. Make necessary repairs or replace the battery.
6. Connect the battery cables to the machine if the battery cables were removed.
7. Connect the positive battery cable of the battery.
8. Connect the negative battery cable of the battery.
9. Install the key into the engine start switch.

i02385778

Belt - Inspect/Adjust/Replace

SMCS Code: 1357-040; 1357-025; 1357-510; 1397-510; 1397-040; 1397-025

NOTICE
The V-belt must be tensioned correctly. Failure to tension the belt properly could cause damage to the belt and/or to the air conditioner compressor.

For maximum engine performance and maximum utilization of your engine, inspect the belts for wear and for cracking. Check the belt tension. Adjust the belt tension in order to minimize belt slippage. 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 30 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 due to the fact that the older belts are stretched. The additional load on the new belt could cause the new belt to break.

Water Pump Belt, Fan Drive Belt, and Alternator Belt

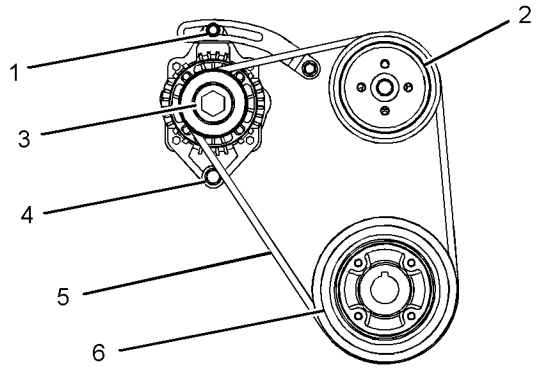

Illustration 191 g01190206

(1) Adjusting bolt
(2) Water pump pulley
(3) Alternator pulley
(4) Alternator mounting bolt
(5) Belt
(6) Crankshaft pulley

1. Open the engine access door.
2. Apply approximately 98 N (22 lb) of force midway between the pulleys.
3. Measure the deflection of the belt. The belt should deflect 8 to 11 mm (5/16 to 7/16 inch).
4. If the deflection is not correct, loosen alternator mounting bolt (4) and adjusting bolt (1). Move the alternator forward and backward in order to adjust belt (5) to the specified tension.
5. When the adjustment is correct, tighten adjusting bolt (1) and mounting bolt (4) securely.
6. Check the deflection of the belt again.
7. Close the engine access door.

Note: If a new belt is installed, check the belt adjustment again after 30 minutes of engine operation at the rated engine speed.

Air Conditioner Belt (If Equipped)

NOTICE
The V-belt must be tensioned correctly. Failure to tension the belt properly could cause damage to the belt and/or to the air conditioner compressor.

1. Open the engine access door.

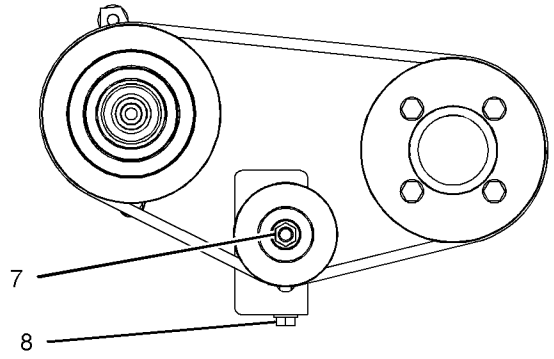

Illustration 192 g01190210

(7) Nut
(8) Adjustment bolt

2. Check the belt tension.

Note: To check the belt tension, apply 98 N (22 lb) of force midway between the pulleys. Correctly adjusted belts will deflect 8 to 11 mm (5/16 to 7/16 inch).

3. If the deflection is not correct, loosen nut (7). Turn adjusting bolt (8) in order to adjust the belt tension.

4. Adjust the belt tension.

5. When the adjustment is correct, tighten bolt (7) to a torque of 28 ± 7 N·m (21 ± 5 lb ft) and tighten bolts (8) to a torque of 28 ± 7 N·m (21 ± 5 lb ft).

6. Check the deflection again.

7. Close the engine access door.

Note: If a new belt is installed, check the belt adjustment again after 30 minutes of engine operation at the rated speed.

i02304927

Blade Linkage - Lubricate

SMCS Code: 6060-086

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

Wipe all grease fittings before lubricating.

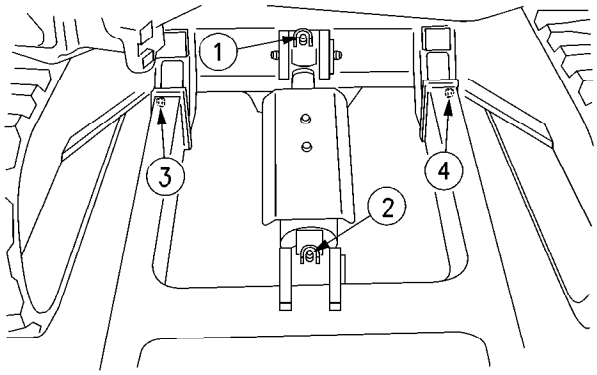

Illustration 193 g00823677

1. Apply lubricant to grease fitting (2) at the head end of the blade cylinder. Apply lubricant to grease fitting (1) at the rod end of the blade cylinder.

2. Apply lubricant to grease fittings (3) and (4) for the blade linkage.

Angle Blade (If Equipped)

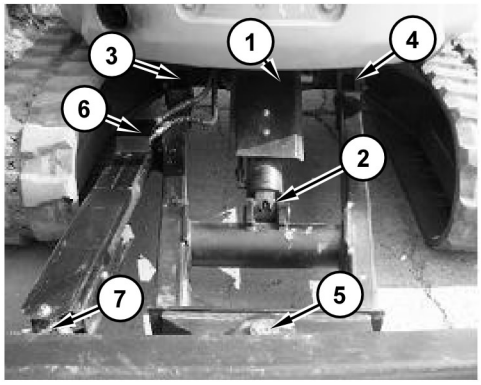

Illustration 194 g01154347

1. Apply lubricant to grease fitting (2) at the head end of the blade cylinder. Apply lubricant to grease fitting (1) at the rod end of the blade cylinder.

2. Apply lubricant to grease fittings (3) and (4) for the blade linkage. Apply lubricant to grease fittings (5) for the center pin of the angle blade.

3. Apply lubricant to grease fitting (6) at the head end of the cylinder of the angle blade. Apply lubricant to grease fitting (7) at the rod end of the cylinder of the angle blade.

i02386747

Boom and Stick Linkage - Lubricate

SMCS Code: 6501-086; 6502-086

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the boom and stick linkage. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for more information on grease.

Position the machine into the service position.

Wipe all fittings before you apply lubricant.

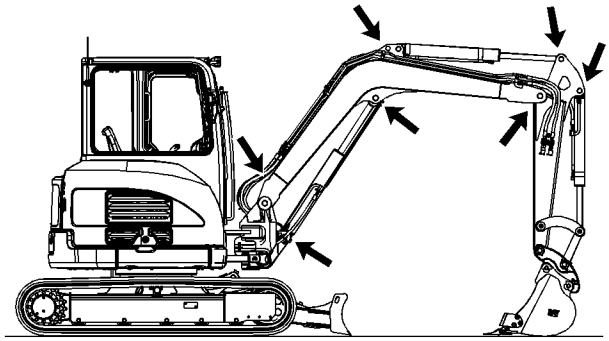

Illustration 195 g01190209

Apply lubricant to the grease fittings.

i02860835

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 kind of accident, the machine must be inspected thoroughly. Inspect the machine regardless of the date of the last inspection.

The machine must be clean before the machine is inspected.

Proper repair of frames and structures requires specific knowledge of the following subjects.

- Materials that have been used to manufacture the frame members
- Frame member construction
- Repair techniques that are recommended by the manufacturer.

Consult your Caterpillar dealer if repairs are necessary. Your Caterpillar dealer is qualified to carry out repairs on your behalf.

All repairs should be carried out by a Caterpillar dealer. If you carry out your own repairs, contact your Caterpillar dealer for advice about proper repair techniques.

Particular attention should be given to all welded structures. The following items should be thoroughly inspected for cracks and for defects:

- 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.

Boom

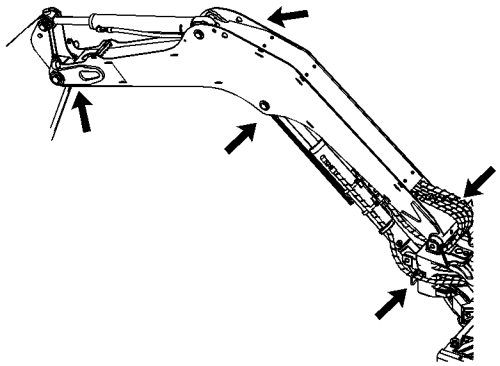

Illustration 196 g01425291

Check all welded joints and check the mounting points for the cylinder.

Stick

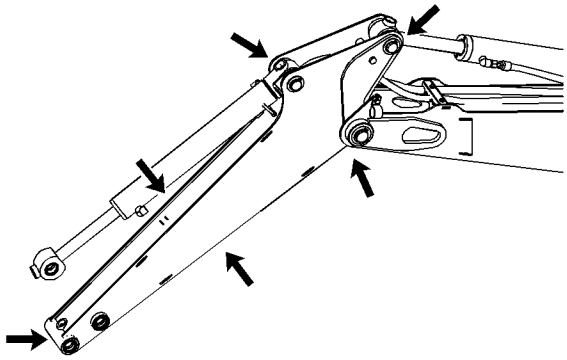

Illustration 197 g01425293

Check all welded joints and check the mounting points for the cylinder.

Blade

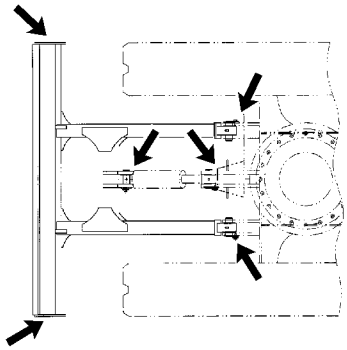

Illustration 198 g01425286

Check all welded joints and check the mounting points for the cylinder.

Lifting Points

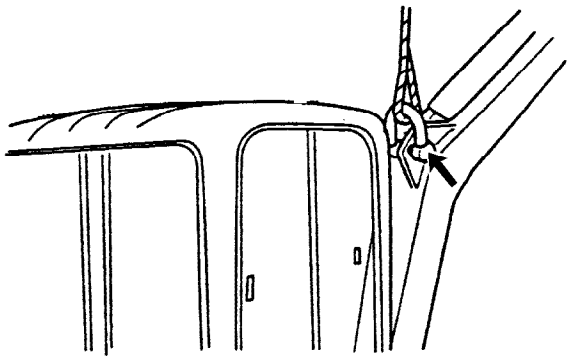

Illustration 199 g01425213

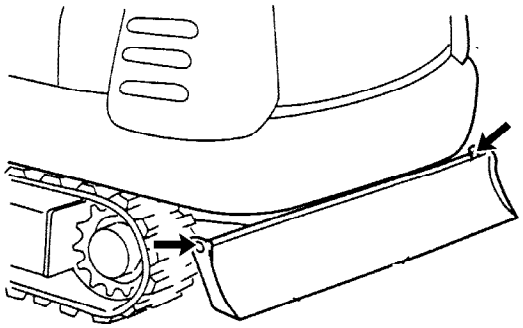

Illustration 200 g00309343

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

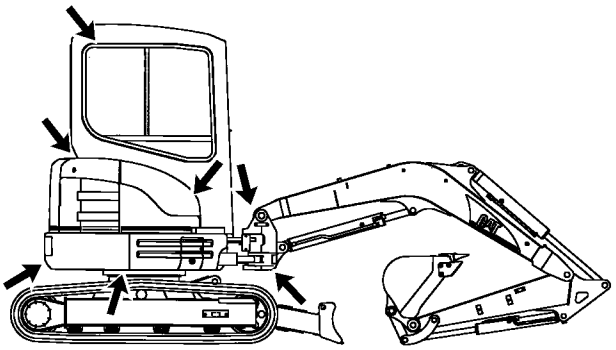

Illustration 201 g01425289

Check for damaged panels. Specifically look for any damage to the cab or damage to the canopy that might invalidate the certification. The cab or the canopy is a safety device that must be maintained in good condition. Check for loose hardware or missing hardware.

Lower Frame

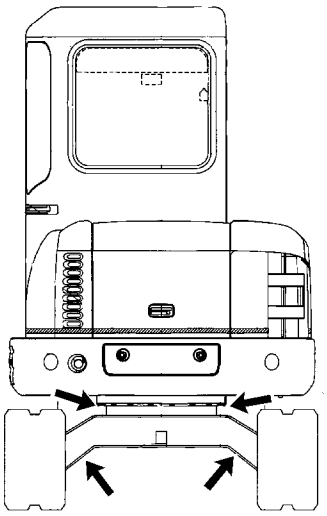

Illustration 202 g01425287

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.

i02386794

Bucket Linkage - Lubricate

SMCS Code: 6513-086

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the bucket linkage. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for more information on molybdenum grease.

Apply lubricant through all fittings after operation under water.

Wipe all fittings before you apply lubricant.

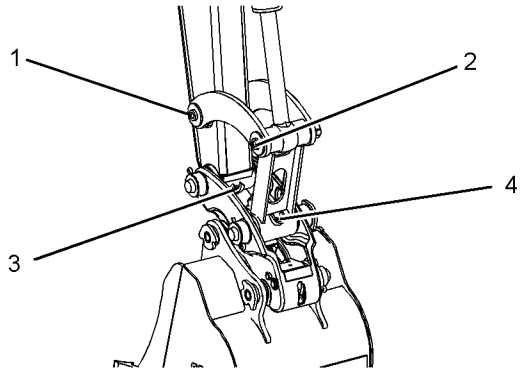

Illustration 203 g01190973

Note: Completely fill all cavities of the bucket control linkage with grease when you initially install a bucket.

1. Apply lubricant through fittings for the linkages (1) and (2).
2. Apply lubricant through fittings for the bucket (3) and (4).

Note: Service the above fittings after you operate the bucket under water.

i02798352

Bucket Tips - Inspect/Replace (J200 Tips)

SMCS Code: 6805-040; 6805-510

⚠ WARNING

Block the bucket before changing the bucket teeth.

To prevent possible injury to the eyes, wear a protective face shield when striking the pin.

The pin, when struck, can fly out and cause injury to nearby personnel.

Bucket Tips

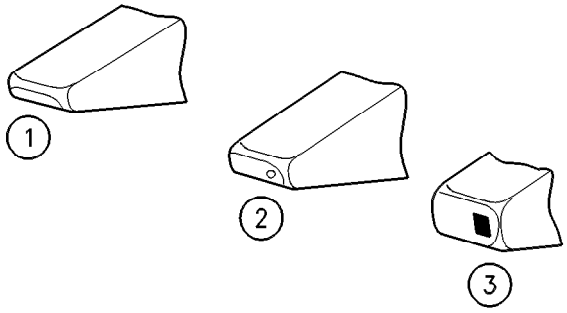

Illustration 204 g00101352

(1) Usable
(2) Replace this bucket tip.
(3) Overworn

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

1. Remove the pin from the bucket tip. The pin can be removed by one of the following methods.

- Use a hammer and a punch from the retainer side of the bucket to drive out the pin.
- Use a Pin-Master. Follow Step 1a through Step 1c for the procedure.

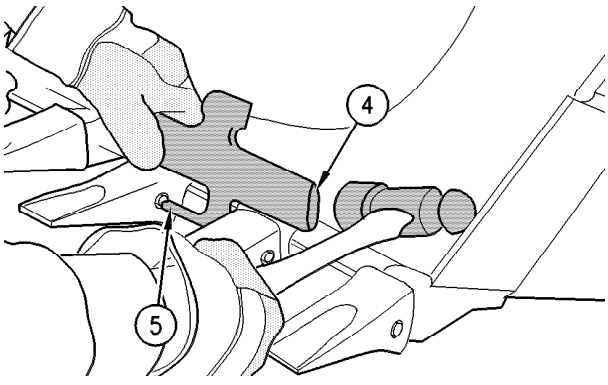

Illustration 205 g00590670

(4) Back of Pin-Master
(5) Extractor

a. Place the Pin-Master on the bucket tip.

b. Align extractor (5) with the pin.

c. Strike the Pin-Master at the back of the tool (4) and remove the pin.

Note: Discard the old pin and the retainer assembly. When you change tips, use a new pin and a new retainer assembly. Refer to the appropriate parts manual for your machine.

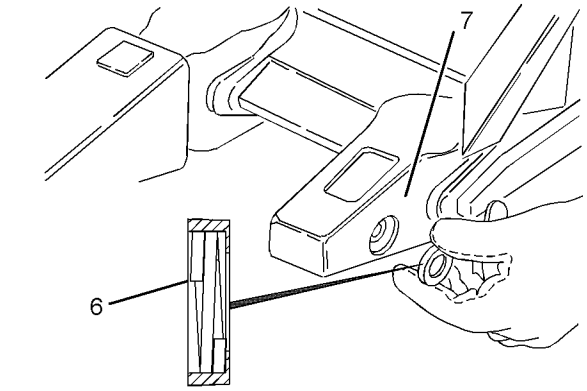

Illustration 206 g01194448

(6) Retainer assembly
(7) Adapter

2. Clean the adapter and the pin.

3. Fit retainer assembly (6) into the counterbore that is in the side of adapter (7). Make sure that the face of the retainer assembly with the marking “OUTSIDE” is visible.

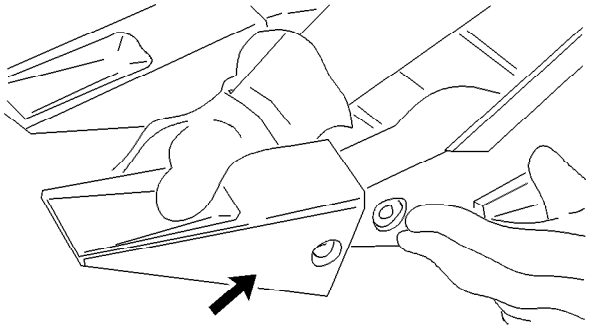

Illustration 207 g00101359

4. Install the new bucket tip onto the adapter.

Note: The bucket tips can be rotated by 180 degrees in order to allow the tip to wear evenly. You may also move the tips from the outside teeth to the inside teeth. Check the tips often. If wear is present on the tips, rotate the tips. The outside teeth generate the most wear.

5. Drive the pin through the bucket tip. The pin can be installed by using one of the following methods:

- From the same side of the retainer, drive the pin through the bucket tip, the retainer assembly, and the adapter.
- Use a Pin-Master. Follow Step 5a through Step 5e for the procedure.

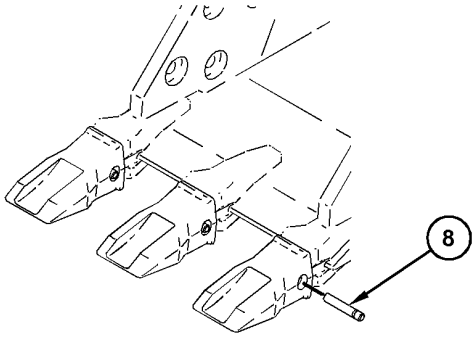

Illustration 208 g01209166

(8) Pin

a. Insert pin (8) through the bucket tip.

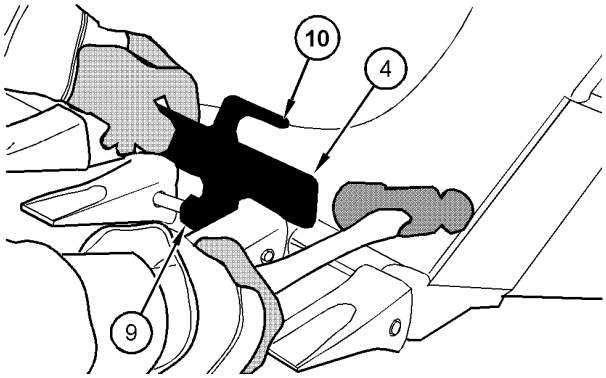

Illustration 209 g01209140

(4) Back of Pin-Master
(9) Pin holder
(10) Pin setter

b. Place the Pin-Master over the bucket tips so that the pin will fit into the counterbore of the pin holder (9).

c. Strike the Pin-Master with a hammer at the back of the tool (4) in order to insert the pin.

d. Slide pin holder (9) away from the pin and rotate the tool slightly in order to align pin setter (10) with the pin.

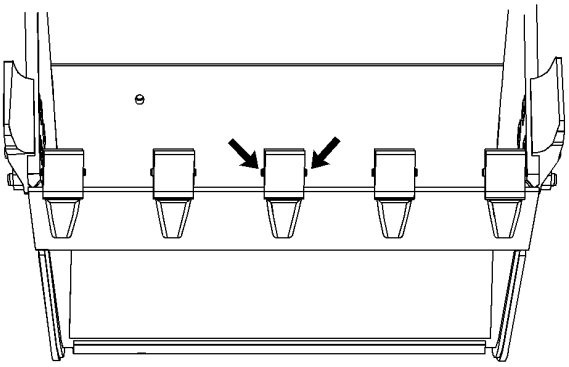

Illustration 210 g01209159

Final assembly of pin into bucket tip.

e. Strike the end of the tool until the pin is fully inserted.

Side Cutters

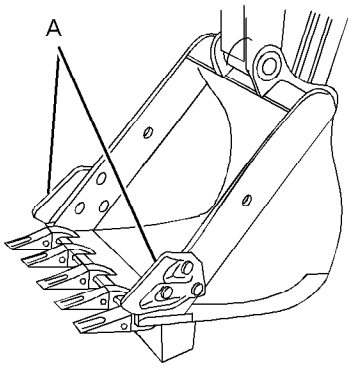

Illustration 211 g01092808

Bucket With Side Cutters

(A) Side cutters

1. Remove the mounting bolts and the side cutters.

2. Clean the mounting surface of the side plate on the bucket and of the side cutter. Remove any burrs or protrusions on the mating surfaces.

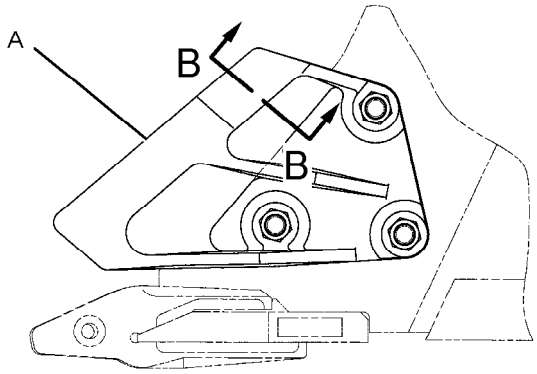

Illustration 212 g01092810

(A) Side cutter

Note: Some side cutters may be rotated for additional wear.

3. Install the side cutter.

Note: Certain bolts may require thread compound.

4. Hand tighten the bolts.

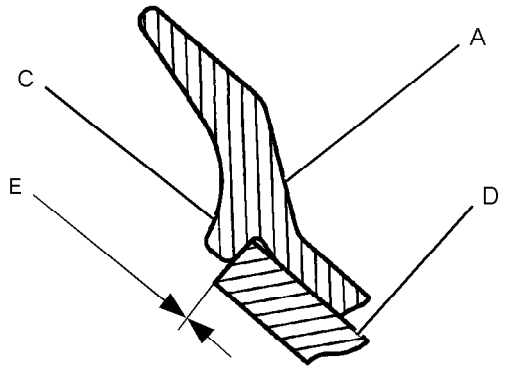

Illustration 213 g01092812

Section B-B From Illustration 212

(A) Side cutter
(C) Shear ledge on a side cutter
(D) Side plate on a bucket
(E) 0.0 mm (0.0 inch)

5. Make sure that there is not a gap between the side plate on the bucket and the shear ledge on the side cutter.

6. Torque the mounting bolts to the correct specification.

i02869831

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

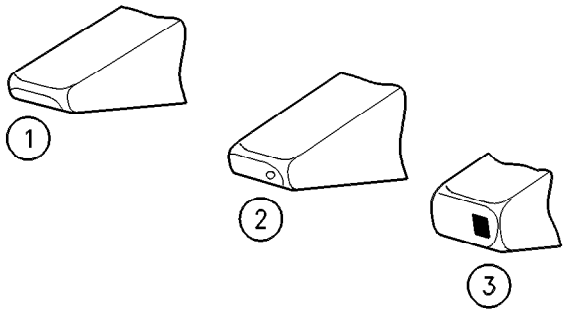

Illustration 214 g00101352

(1) Usable
(2) Replace this bucket tip.
(3) Overworn

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

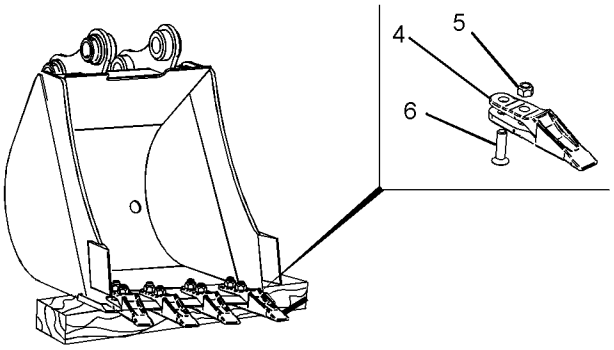

Illustration 215 g01429324

1. Block the bucket.

2. Remove mounting bolts (6) and nuts (5). Remove bucket tip (4).

3. Clean the mounting surfaces.

4. Install the new bucket tip onto the adapter.

i02873799

Bucket Tips - Inspect/Replace (Vertical Retention System for a Round Hole Tip)

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

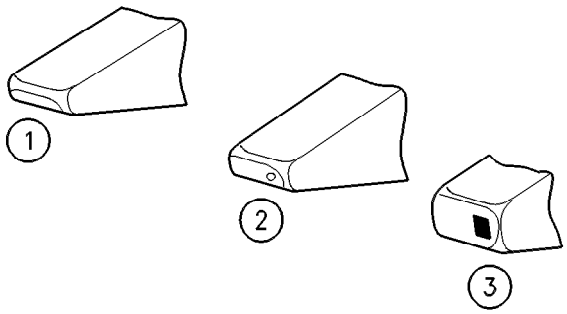

Illustration 216 g00101352

(1) Usable
(2) Replace this bucket tip.
(3) Overworn

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

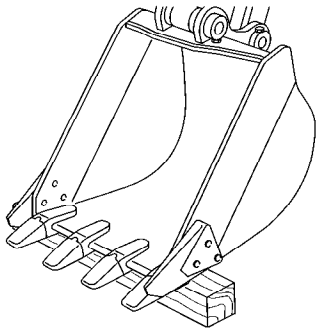

Illustration 217 g00823856

1. Block the bucket.

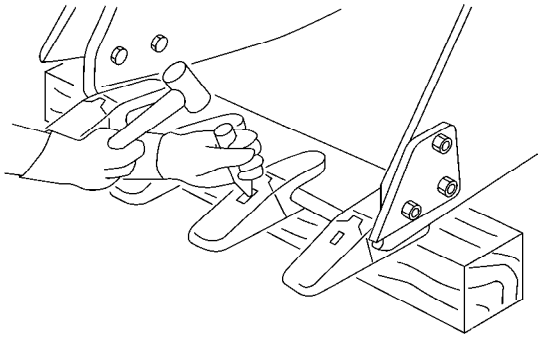

Illustration 218 g00823857

2. Remove the pin from the bucket tip. Use a hammer and a punch in order to drive the pin from the bucket tip.

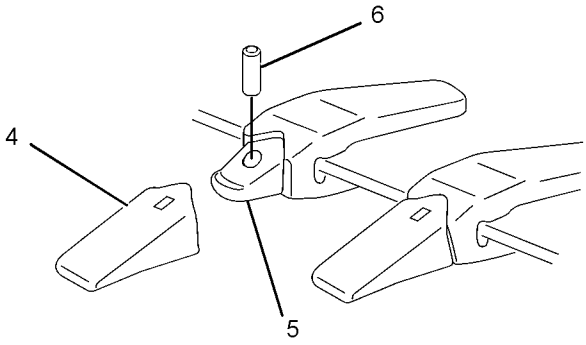

Illustration 219 g01198006

(4) Tip
(5) Adapter
(6) Pin

3. Clean the adapter and the pin. When you replace tip (4), also replace pin (6).

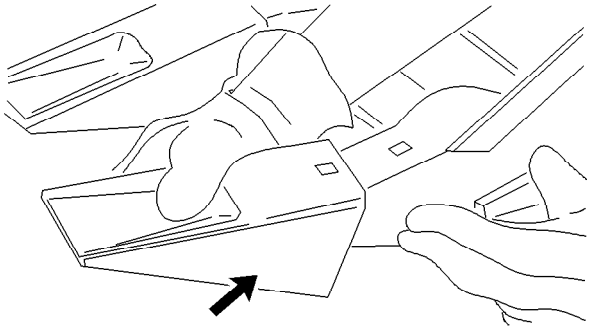

Illustration 220 g00823892

4. Install the new bucket tip onto the adapter.

Note: The bucket tip can be rotated by 180 degrees in order to allow greater penetration or less penetration.

5. Drive pin (6) through tip (4).

6. After you drive pin (6), make sure that the pin fits snugly into the groove.

Side Cutters

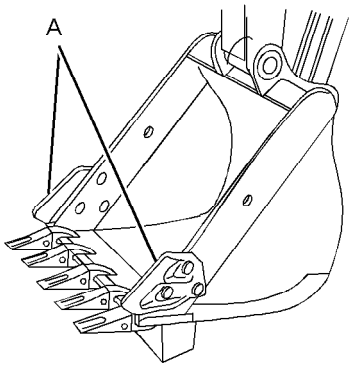

Illustration 221 g01092808

Bucket With Side Cutters

(A) Side cutters

1. Remove the mounting bolts and the side cutters.

2. Clean the mounting surface of the side plate on the bucket and of the side cutter. Remove any burrs or protrusions on the mating surfaces.

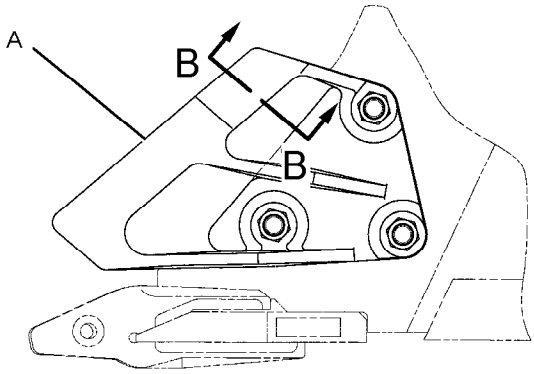

Illustration 222 g01092810

(A) Side cutter

Note: Some side cutters may be rotated for additional wear.

3. Install the side cutter.

Note: Certain bolts may require thread compound.

4. Hand tighten the bolts.

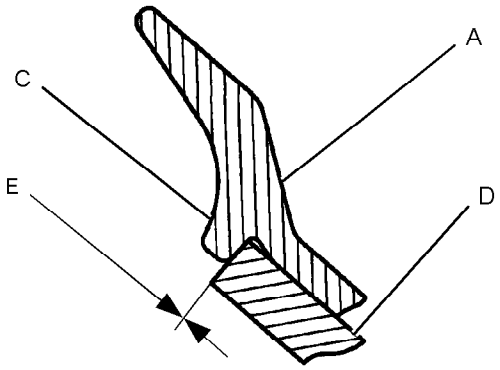

Illustration 223 g01092812

Section B-B From Illustration 222

(A) Side cutter
(C) Shear ledge on a side cutter
(D) Side plate on a bucket
(E) 0.0 mm (0.0 inch)

5. Make sure that there is not a gap between the side plate on the bucket and the shear ledge on the side cutter.

6. Torque the mounting bolts to the correct specification.

i02399962

Condenser (Refrigerant) - Clean

SMCS Code: 1805-070

NOTICE
If excessively dirty, clean condenser with a brush. To prevent damage or bending of the fins, do not use a stiff brush.

Repair the fins if found defective.

1. Open the access cover on the right side of the machine.

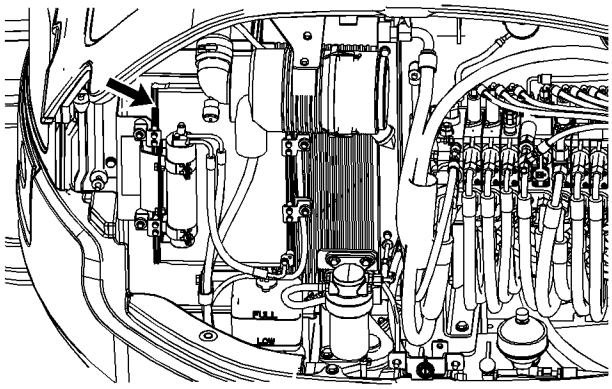

Illustration 224 g01198735

2. Inspect the condenser for debris. Clean the condenser, if necessary.

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

4. Close the access cover on the right side of the machine.

i02379208

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044

NOTICE
Do not change the coolant until you read and understand the cooling system information in Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”.

Failure to do so could result in damage to the cooling system components.

NOTICE
Mixing ELC with other products will reduce the effectiveness of the coolant.

This could result in damage to cooling system components.

If Caterpillar products are not available and commercial products must be used, make sure they have passed the Caterpillar EC-1 specification for premixed or concentrate coolants and Caterpillar Extender.

Note: This machine was filled at the factory with Caterpillar Extended Life Coolant.

If the coolant in the machine is changed to Extended Life Coolant from another type of coolant, see Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”.

1. Open the right side access door.

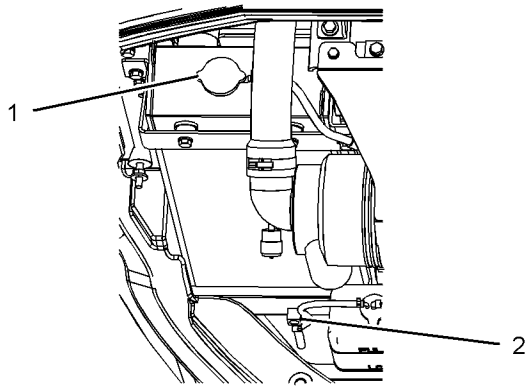

Illustration 225 g01187906

2. Slowly loosen the cooling system pressure cap (1) in order to relieve cooling system pressure. Remove the pressure cap.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

3. Open the drain valve (2) that is under the radiator. Allow the coolant to drain into a suitable container.

4. Close the drain valve. Fill the system with a solution that consists of clean water and of cooling system cleaner.

5. Start the engine. Run the engine for approximately ten minutes in order to raise the coolant temperature.

6. Stop the engine. Open the drain valve and allow the cleaning solution to drain into a suitable container.

7. Flush the cooling system with water until the draining water is transparent.

8. Close the drain valve.

9. Add the Extended Life Coolant. Refer to the following topics:

- Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”
- Operation and Maintenance Manual, “Capacities (Refill)”

10. Start the engine. Leave the cooling system pressure cap off. Run the engine in order to expel any air from the system.

11. Maintain the coolant level within 13 mm (0.5 inch) of the bottom of the filler pipe.

12. Install the cooling system pressure cap after the thermostat and the coolant level stabilizes.

13. Stop the engine.

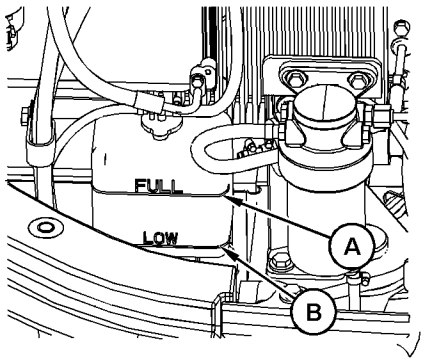

Illustration 226 g01187910

14. Check the coolant level of the coolant reservoir. Maintain the coolant level between the “FULL” mark and the “LOW” mark.

15. If additional coolant is necessary, remove the reservoir cap and add the appropriate coolant solution.

16. Install the reservoir cap.

17. Close the right side access door.

Note: Drained fluids should always be disposed of according to local regulations.

i01278063

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352; 1353; 1395

⚠ WARNING

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

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

Table 48

RECOMMENDED AMOUNT OF EXTENDER BY COOLING SYSTEM CAPACITY	
Cooling System Capacity	**Recommended Amount of Extender**
4 to 8 L (1.1 to 2.1 US gal)	.2 L (0.19 qt)

For additional information on the addition of extender, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Coolant Recommendations” or consult your Caterpillar dealer.

i02379547

Cooling System Coolant Level - Check

SMCS Code: 1350-040; 1350-535-FLV; 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. Open the right side access door.

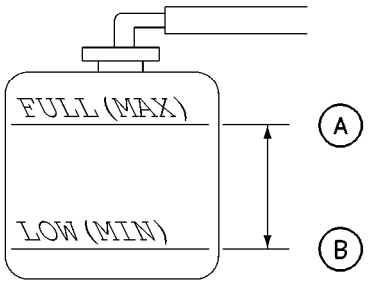

Illustration 227 g00824033

2. Maintain the coolant level between “FULL” mark (A) on the coolant reservoir and “LOW” mark (B) on the coolant reservoir.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on containing fluid spillage.

3. If additional coolant is necessary, remove the filler cap for the coolant reservoir and add the appropriate coolant mixture. Install the filler cap.

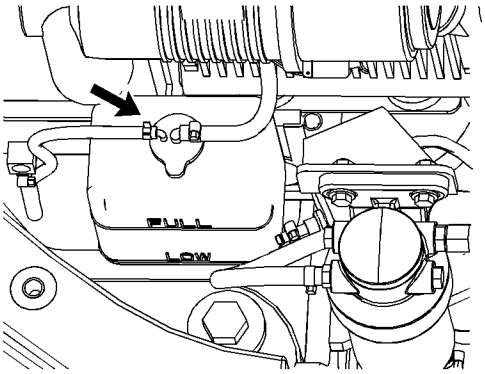

Illustration 228 g01188129

4. If the coolant reservoir is empty, remove the cooling system pressure cap slowly in order to relieve pressure. Add coolant to the radiator.

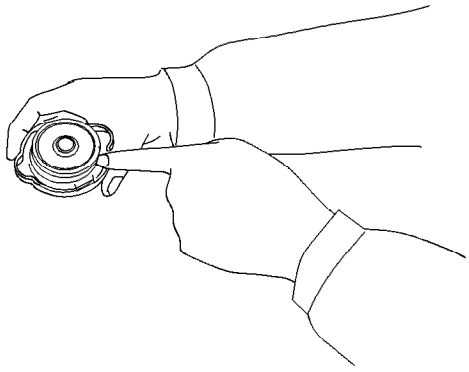

Illustration 229 g00102170

5. Inspect the condition of the cap gasket. If necessary, replace the cap.

6. Install the cooling system pressure cap.

7. Close the right side access door.

i02425978

Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1395-554; 1395-008; 7542

Note: It is not necessary to obtain a Coolant Sample (Level 1) if the cooling system is filled with Cat ELC (Extended Life Coolant). Cooling systems that are filled with Cat ELC should have a Coolant Sample (Level 2) that is obtained at the recommended interval that is stated in the Maintenance Interval Schedule.

Note: Obtain a Coolant Sample (Level 1) if the cooling system is filled with any other coolant instead of Cat ELC. This includes the following types of coolants.

- Commercial long life coolants that meet the Caterpillar Engine Coolant Specification -1 (Caterpillar EC-1)
- Cat Diesel Engine Antifreeze/Coolant (DEAC)
- Commercial heavy-duty antifreeze/coolant solution

NOTICE
Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

Note: Level 1 results may indicate a need for Level 2 Analysis.

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

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Obtain the sample of the coolant as close as possible to the recommended sampling interval. The recommended sampling interval for Level 1 Coolant Analysis is every 250 service hours. In order to receive the full effect of S·O·S analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
- Keep the unused sampling bottles stored in plastic bags.
- Keep the lids on empty sampling bottles until you are ready to collect the sample.
- Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
- Never collect samples from expansion bottles.
- Never collect samples from the drain for a system.

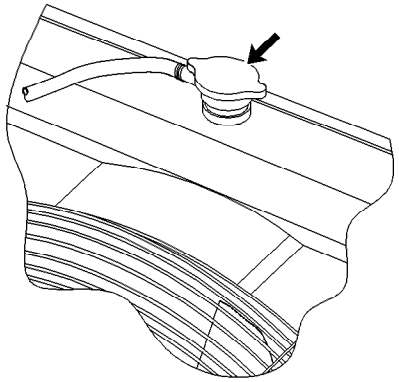

Illustration 230 g00544510

⚠ WARNING

Pressurized System: Hot coolant can cause serious burns. To open the cooling system filler cap, stop the engine and wait until the cooling system components are cool. Loosen the cooling system pressure cap slowly in order to relieve the pressure.

1. The machine needs to be operated in order to circulate the coolant. Collect the sample after a normal workday. Collect the samples from one to two hours after the engine has been shut off.
2. Start the engine momentarily in order to circulate the coolant again.
3. Shut off the engine.
4. Carefully remove the radiator cap.
5. Use a vacuum pump and draw the sample. Do not allow dirt or other contaminants to enter the sampling bottle. Fill the sampling bottle three-fourths from the top. Do not fill the bottle completely.
6. Place the sampling bottle with the completed label into the mailing tube.
7. Install the radiator cap.

i07349178

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1395-008; 1395-554; 7542

Reference: Refer to Operation and Maintenance Manual, “Cooling System Coolant Sample (Level 1) - Obtain” for the guidelines for proper sampling of the coolant.

Obtain the sample of the coolant as close as possible to the recommended sampling interval. Supplies for collecting samples can be obtained from your Cat dealer.

Submit the sample for Level 2 analysis.

Reference: For additional information about coolant analysis, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Cat dealer.

i02379557

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-510; 1054-070

Cleaning Primary Air Filter Elements

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

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

Do not tap or strike the filter element in order to remove dust.

Do not wash the filter element.

Use low pressure compressed air in order to remove the dust from the filter element. Air pressure must not exceed 207 kPa (30 psi). Direct the air flow up the pleats and down the pleats from the inside of the filter element. Take extreme care in order to avoid damage to the pleats.

Do not use air filters with damaged pleats, gaskets, or seals. Dirt entering the engine will cause damage to engine components.

The primary air filter element can be used up to six times if the element is properly cleaned and if the element is properly inspected. When the primary air filter element is cleaned, check for rips or tears in the filter material. The primary air filter element should be replaced at least one time per year. This replacement should be performed regardless of the number of cleanings.

NOTICE
Do not clean the air filter elements by bumping or tapping. This could damage the seals. Do not use elements with damaged pleats, gaskets, or seals. Damaged elements will allow dirt to pass through. Engine damage could result.

Visually inspect the primary air filter elements before cleaning. Inspect the air filter elements for damage to the seal, the gaskets, and the outer cover. Discard any damaged air filter elements.

There are two common methods that are used to clean primary air filter elements:

- Pressurized air
- Vacuum cleaning

Pressurized Air

Pressurized air can be used to clean primary air filter elements that have not been cleaned more than two times. Pressurized air will not remove deposits of carbon and oil. Use filtered, dry air with a maximum pressure of 207 kPa (30 psi).

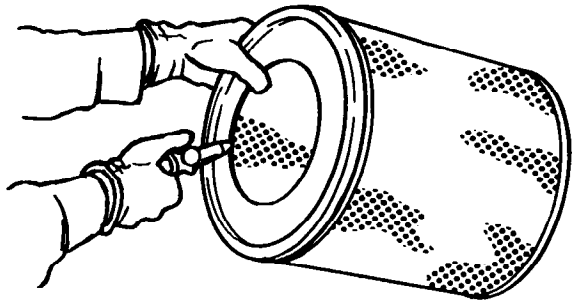

Illustration 231 g00281692

Note: When the primary air filter elements are cleaned, always begin with the clean side (inside) in order to force dirt particles toward the dirty side (outside).

Aim the hose so that the air flows inside the element along the length of the filter in order to help prevent damage to the paper pleats. Do not aim the stream of air directly at the primary air filter element. Dirt could be forced further into the pleats.

Vacuum Cleaning

Vacuum cleaning is another method for cleaning primary air filter elements which require daily cleaning because of a dry, dusty environment. Cleaning with pressurized air is recommended prior to vacuum cleaning. Vacuum cleaning will not remove deposits of carbon and oil.

Inspecting the Primary Air Filter Elements

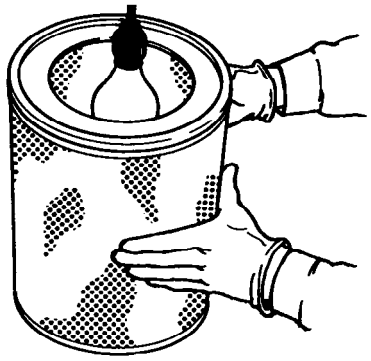

Illustration 232 g00281693

Inspect the clean, dry primary air filter element. Use a 60 watt blue light in a dark room or in a similar facility. Place the blue light in the primary air filter element. Rotate the primary air filter element. Inspect the primary air filter element for tears and/or holes. Inspect the primary air filter element for light that may show through the filter material. If it is necessary in order to confirm the result, compare the primary air filter element to a new primary air filter element that has the same part number.

Do not use a primary air filter element that has any tears and/or holes in the filter material. Do not use a primary air filter element with damaged pleats, gaskets or seals. Discard damaged primary air filter elements.

Storing Primary Air Filter Elements

If a primary air filter element that passes inspection will not be used, the primary air filter element can be stored for future use.

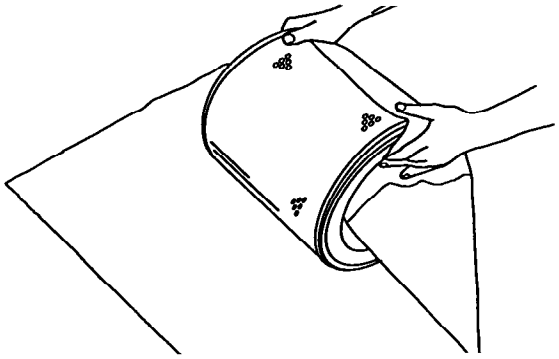

Illustration 233 g00281694

Do not use paint, a waterproof cover, or plastic as a protective covering for storage. An airflow restriction may result. To protect against dirt and damage, wrap the primary air filter elements in volatile corrosion inhibitor (VCI) paper.

Place the primary air filter element into a box for storage. For identification, mark the outside of the box and mark the primary air filter element. Include the following information:

- Date of cleaning
- Number of cleanings

Store the box in a dry location.

Replacing the Air Filter Element

The air filter element should be replaced immediately if the element is damaged.

1. Open the right side access door.

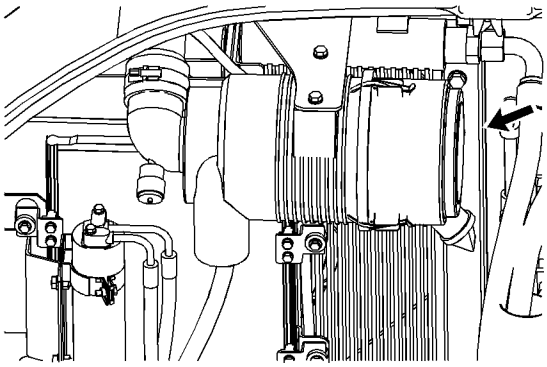

Illustration 234 g01188133

2. Unclamp the access cover and remove the access cover to the air cleaner.

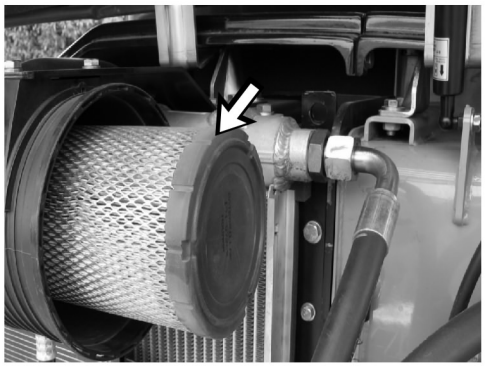

Illustration 235 g01188134

3. Remove the primary filter element from the air cleaner housing.

4. Inspect the filter element. If the pleats, the gaskets or the seals are damaged, discard the filter element. Replace damaged filter elements with new filter elements.

5. Wipe dust from the interior of the air cleaner housing. Remove the cover from the air inlet port. Leave the secondary filter element in place while you clean the air cleaner housing.

6. Put the clean air filter element into the air cleaner housing and push the air filter element into position.

7. Install the access cover.

8. Close the right side access door.

i02015686

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510

NOTICE
Always replace the secondary filter element. Never attempt to reuse the element by cleaning.

The secondary filter element should be replaced at the time the primary element is serviced for the third time.

NOTICE
The filter should be kept in service for no longer than one year.

NOTICE
Always leave the secondary filter element in place while you clean the air cleaner housing.

1. Open the engine access door.

2. Remove the air cleaner housing cover.

3. Remove the primary filter element. Refer to Operation and Maintenance Manual, “Engine Air Filter Primary Element - Clean/Replace”.

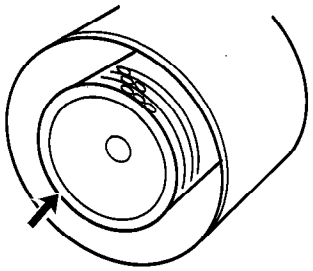

Illustration 236 g00470240

4. Remove the secondary filter element. Pull out in order to remove the element.

5. Cover the air inlet opening. Clean the inside of the air cleaner housing.

6. Install a new secondary filter element. Push the element firmly in order to properly seat the element. Write the date on the element.

7. Install the primary filter element and the air cleaner housing cover.

8. Close the engine access door.

i02379569

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.

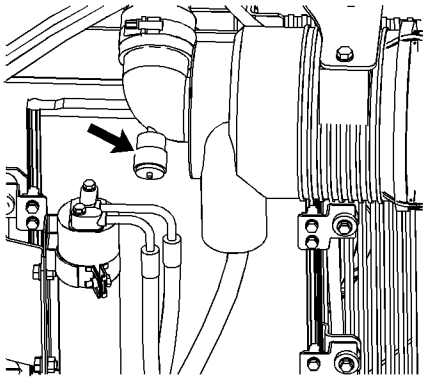

Illustration 237 g01188149

1. Open the right side access door.

2. Start the engine.

3. Run the engine at high idle.

4. If the piston in the engine air filter service indicator enters the red zone, service the air cleaner.

5. Stop the engine.

Note: See the Operation and Maintenance Manual, “Engine Air Filter Element - Clean/Replace”.

6. Close the right side access door.

i02379576

Engine Oil Level - Check

SMCS Code: 1000-535

NOTICE
Do not overfill the crankcase. Engine damage can result.

1. Open the engine access door and lock the door open.

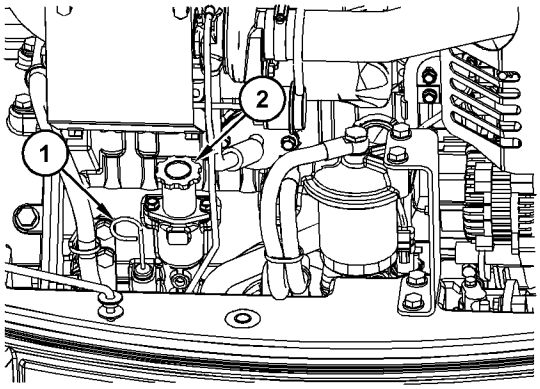

Illustration 238 g01188158

2. Remove the dipstick (1). Wipe the oil off the dipstick and reinsert the dipstick.

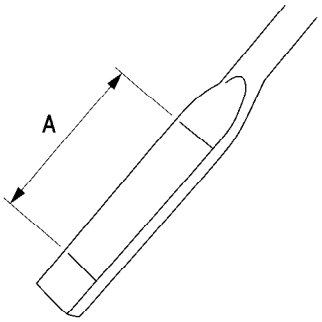

Illustration 239 g00824454

3. Remove the dipstick and check the dipstick. Maintain the oil level in area (A) on the dipstick.

4. If necessary, remove the oil filler cap (2) and add oil. Allow the oil to drain into the crankcase before you check the oil level.

5. Clean the oil filler cap and install the oil filler cap.

6. Close the engine access door.

i03998610

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 1000; 1348-554-SM; 1348-008; 7542-008; 7542-554-OC; 7542-554-SM

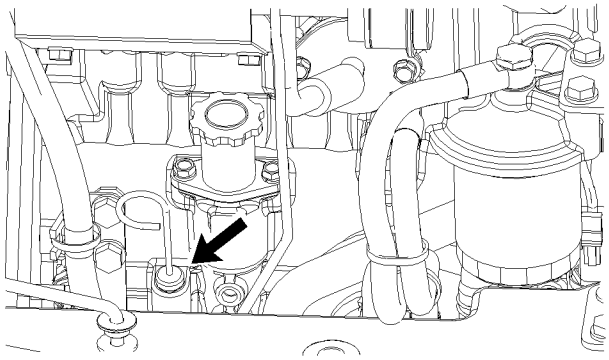

Illustration 240 g01188166

Obtain the oil sample of the engine oil through the opening for the dipstick.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEGJ0047, “How To Take A Good Oil Sample” for more information about obtaining a sample of the engine oil.

i02379585

Engine Oil and Filter - Change

SMCS Code: 1318-510

Note: If the sulfur content in the fuel is greater than 1.5% by weight, use an oil that has a TBN of 30 and reduce the oil change interval by one-half.

Drain the crankcase while the oil is warm.

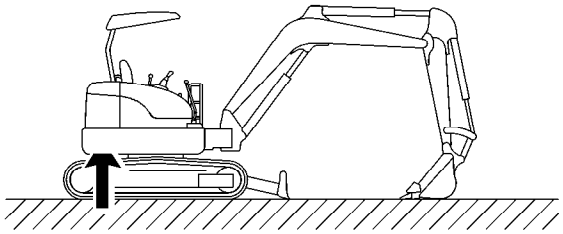

Illustration 241 g00824782

1. Open the crankcase access cover that is under the rear of the machine. Remove the bolts that secure the access cover.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

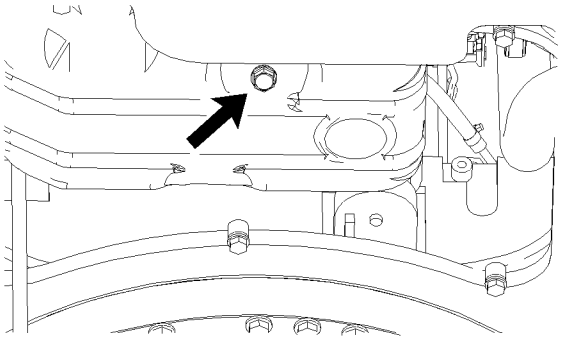

Illustration 242 g01188174

2. Remove the crankcase drain plug. Allow the oil to drain into a suitable container.

Note: Discard any drained fluids according to local regulations.

3. Clean the drain plug and install the drain plug.

4. Install the crankcase access cover.

5. Open the access door.

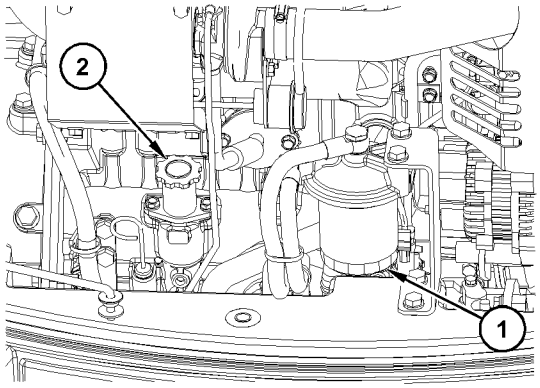

Illustration 243 g01188175

6. Remove the oil filter (1) with a filter wrench. Discard the used oil filter properly.

7. Clean the filter housing base. Make sure that all of the former filter gasket is removed.

Note: Always discard used filters according to local regulations.

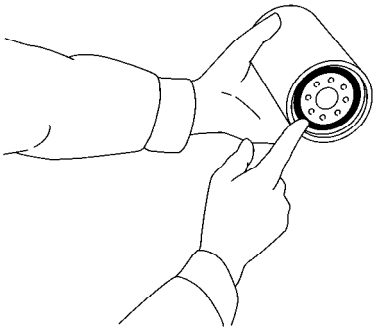

Illustration 244 g00824766

8. Apply a thin coat of clean engine oil to the gasket of the new filter.

9. Install the new oil filter by hand. When the gasket contacts the filter base, tighten the filter for an additional three quarters of a turn.

10. Remove the oil filler cap (2).

11. Fill the crankcase with new oil. Refer to Operation and Maintenance Manual, " Capacities (Refill)" and Operation and Maintenance Manual, "Lubricant Viscosities".

12. Clean the oil filler cap and install the oil filler cap.

13. 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.

14. Stop the engine. Wait for thirty minutes in order to allow the oil to drain back into the crankcase.

15. Remove the dipstick and wipe off the oil.

16. Reinsert the dipstick.

17. Remove the dipstick and check the oil level on the dipstick.

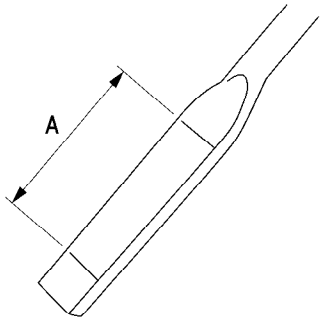

Illustration 245 g00824779

18. Maintain the oil within area (A) on the dipstick.

19. Close the engine access door.

i02865346

Engine Valve Lash - Check

SMCS Code: 1102; 1102-082; 1102-535; 1105-025; 1105-535; 1121-535; 1209; 1209-082; 1209-535; 7527

⚠ WARNING

Ensure that the engine can not 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.

For the serial number BXT1–up and DMY1–up, refer to Service Manual, RENR9640, “Mitsubishi Diesel Engines S3Q, S3Q2-T” in order to perform the complete procedure for the valve lash adjustment.

For the serial number FPK1–up and HWJ1–up, refer to Service Manual, RENR9620, “Mitsubishi Diesel Engines S4Q, S4Q2” in order to perform the complete procedure for the valve lash adjustment.

i07681009

Film (Product Identification) - Clean

SMCS Code: 7405-070; 7557-070

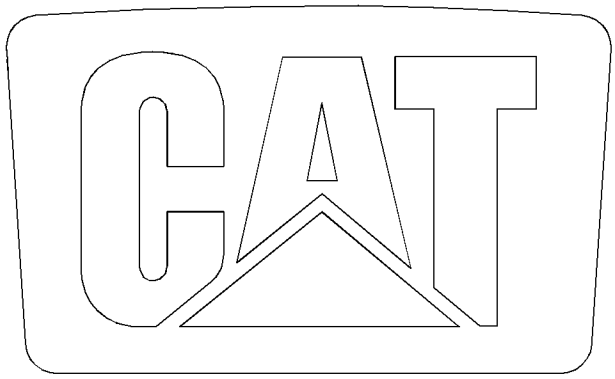

Illustration 246 g02174985

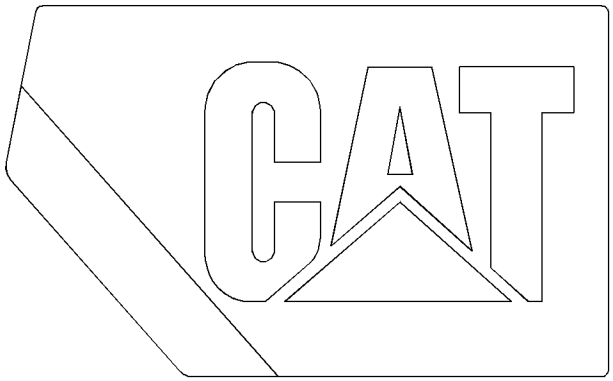

Illustration 247 g02175297

Illustration 248 g06394021

Typical example of the Product Identification Films.

Cleaning of the Films

Make sure that all of the product identification films are legible. Make sure that the recommended procedures are used in order to clean the product identification films. Ensure that all the product identification films are not damaged or missing. Clean the product identification films or replace the films.

Hand Washing

Use a wet solution with no abrasive material that contains no solvents and no alcohol. Use a wet solution with a “pH” value between 3 and 11. Use a soft brush, a rag, or a sponge in order to clean the product identification films. Avoid wearing down the surface of the product identification films with unnecessary scrubbing. Ensure that the surface of the product identification films is flushed with clean water and allow the product identification films to air dry.

Power Washing

Power washing or washing with pressure may be used in order to clean product identification films. However, aggressive washing can damage the product identification films.

Excessive pressure during power washing can damage the product identification films by forcing water underneath the product identification films. Water lessens the adhesion of the product identification film to the product, allowing the product identification film to lift or curl. These problems are magnified by wind. These problems are critical for the perforated film on windows.

To avoid lifting of the edge or other damage to the product identification films, follow these important steps:

- Use a spray nozzle with a wide spray pattern.
- A maximum pressure of 83 bar (1200 psi)
- A maximum water temperature of 50° C (120° F)
- Hold the nozzle perpendicular to the product identification film at a minimum distance of 305 mm (12 inch).
- Do not direct a stream of water at a sharp angle to the edge of the product identification film.

i03149045

Final Drive Oil - Change

SMCS Code: 4050-044-FLV

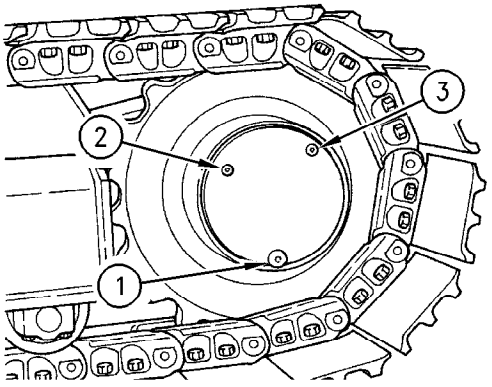

Illustration 249 g00740859

Type 1

(1) Oil drain plug
(2) Oil level plug
(3) Oil filler plug

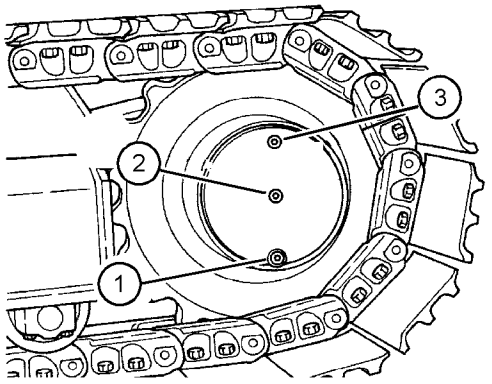

Illustration 250 g01619618

Type 2

(1) Oil drain plug
(2) Oil level plug
(3) Oil filler plug

Note: Your machine may be equipped with a “Type 1” final drive or your machine may be equipped with a “Type 2” final drive.

1. Position one final drive so that oil drain plug (1) is at the bottom.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on containing fluid spillage.

2. Remove oil drain plug (1), level plug (2) and filler plug (3). Allow the oil to drain into a suitable container.

3. Clean the plugs and inspect the plugs. Replace a worn plug or a damaged plug.

4. Apply pipe sealant to oil drain plug (1), level plug (2) and filler plug (3).

5. Install drain plug (1).

6. Add oil through the opening of filler plug (3).

7. Fill the final drive to the bottom of the opening for level plug (2). Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

8. Install level plug (2) and filler plug (3).

9. Perform Step 1 to Step 8 on the other final drive. Do not combine the oil for the final drives in the same container. The oil from the final drives must be kept separate for the check that is performed in Step 15.

10. Completely remove any oil that has spilled.

11. Start the engine and allow the final drives to operate through several cycles.

12. Stop the engine.

13. Check the oil level.

14. Maintain the oil level to the bottom of the opening for level plug (2).

15. Check the drained oil for metal chips or for particles. If there are any chips or particles, consult your Caterpillar dealer.

Note: Dispose of drained fluids according to local regulations.

i04656869

Final Drive Oil Level - Check

SMCS Code: 4050-535-FLV

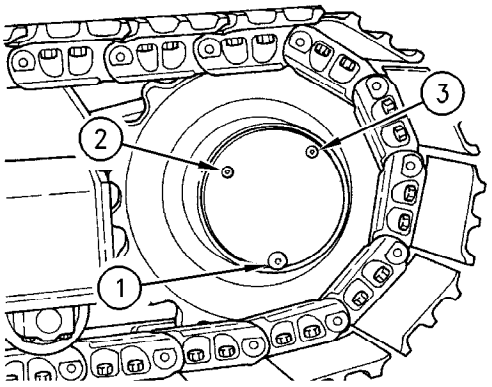

Illustration 251 g00740859

Type 1

(1) Oil drain plug
(2) Oil level plug
(3) Oil filler plug

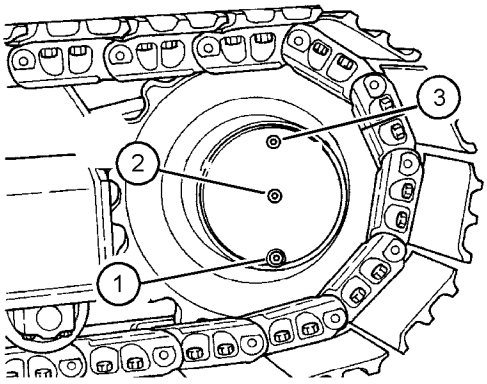

Illustration 252 g01619618

Type 2

(1) Oil drain plug
(2) Oil level plug
(3) Oil filler plug

Note: Your machine may be equipped with a “Type 1” final drive or your machine may be equipped with a “Type 2” final drive.

1. Position one final drive so that oil drain plug (1) is at the bottom.

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

2. Remove oil level plug (2).

3. Check the oil level. The oil should be near the bottom of the opening of level plug (2).

4. Add oil through the opening of filler plug (3), if necessary.

Note: Overfilling the final drive will cause the seals on the travel motor to allow hydraulic oil or water to enter the final drive. This may contaminate the final drive.

5. Clean oil level plug (2) and filler plug (3).

6. Apply pipe sealant to oil level plug (2) and filler plug (3).

7. Install oil level plug (2).

8. Install oil filler plug (3).

9. Repeat the procedure for the other final drive.

i04656910

Final Drive Oil Sample - Obtain

SMCS Code: 4011-008; 4050-008; 4050-SM; 7542-008

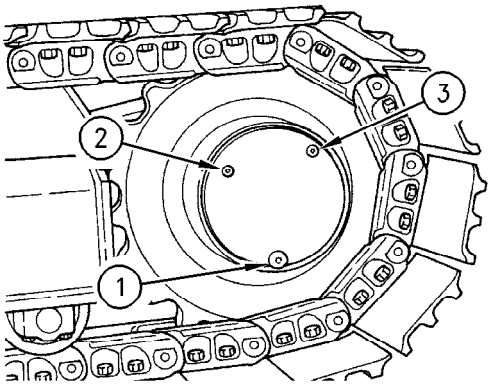

Illustration 253 g00740859

Type 1

(1) Oil drain plug
(2) Oil level plug
(3) Oil filler plug

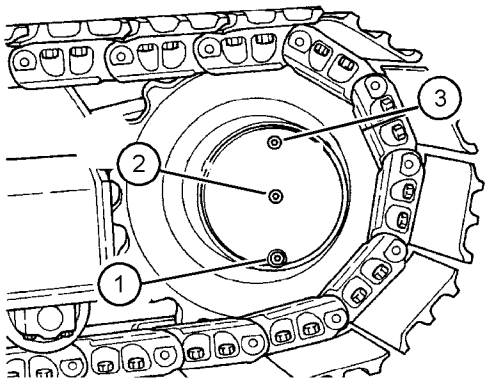

Illustration 254 g01619618

Type 2

(1) Oil drain plug
(2) Oil level plug
(3) Oil filler plug

Note: Your machine may be equipped with a “Type 1” final drive or your machine may be equipped with a “Type 2” final drive.

Remove oil level plug (2) for the final drive. Obtain a sample of the final drive oil by pulling a sample through the opening for oil level plug (2).

Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the final drive oil. Refer to Special Publication, PEGJ0047, “How To Take A Good Oil Sample” for more information about obtaining a sample of the final drive oil.

i02166043

Fuel System - Prime

SMCS Code: 1250-548

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

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

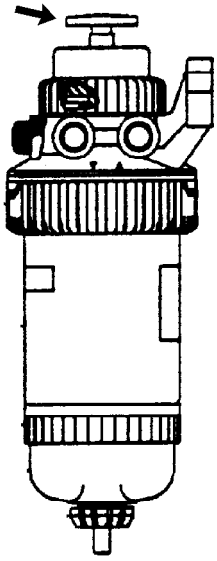

Illustration 255 g01098216

1. Operate the fuel priming pump plunger in order to fill the new filter element with fuel. Continue to pump until a resistance is felt. This resistance will indicate that the filter element is full of fuel.
2. Start the engine. If the engine will not start, further priming is necessary. If the engine starts but the engine continues to misfire, further priming is necessary. If the engine starts but the engine continues to emit smoke, further priming is necessary.
3. If the engine starts but the engine runs rough, continue to run the engine at low idle. Continue to run the engine at low idle until the engine runs smoothly.

i02379262

Fuel System Primary Filter (Water Separator) Element - Replace

SMCS Code: 1263-510-FQ

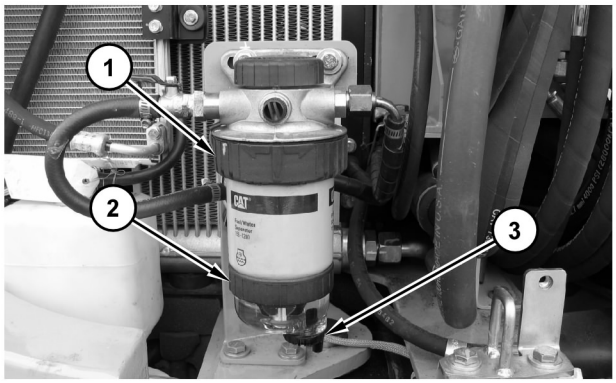

Illustration 256 g01187924

1. Open the right side access door.
2. Open the drain on the water separator bowl (3). Allow the water and fuel to drain into a suitable container.
3. Support the fuel filter/water separator element and rotate the locking ring (1) counterclockwise. Remove the primary filter/water separator.
4. Remove the water separator bowl (2) from the bottom of the fuel filter/water separator.

Note: The water separator bowl is reusable. Do not discard the water separator bowl.

5. Inspect the O-ring seal of the water separator bowl for damage. Replace the O-ring seal, if necessary.
6. Lubricate the O-ring seal with clean diesel fuel or lubricate the O-ring seal with clean motor oil. Place the seal in the water separator bowl.
7. Spin the water separator bowl onto the new element by hand until the fuel filter/water separator is snug. Do not use tools to tighten the fuel filter/water separator element to the bowl.
8. Clean the filter mounting base.
9. Install the new element. Rotate the locking ring clockwise in order to fasten the filter to the mounting base.
10. Close the right side access door.

i02379338

Fuel System Water Separator - Drain

SMCS Code: 1263

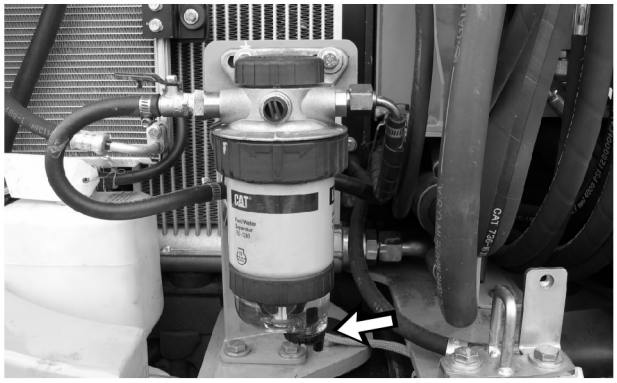

Illustration 257 g01188000

1. Open the right side access door.

2. Loosen the drain valve on the bottom of the water separator. Allow the water and the sediment to drain into a suitable container.

3. Tighten the drain valve.

4. Close the right side access door.

i02379771

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR

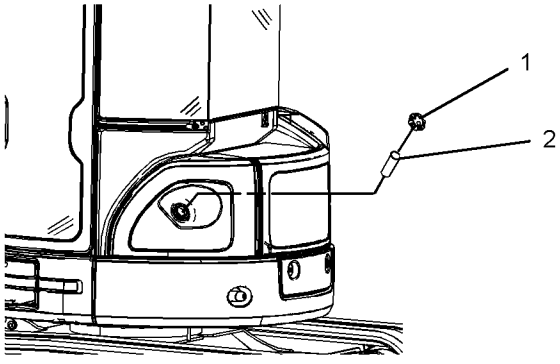

Illustration 258 g01188331

1. Remove the fuel cap (1) and the fuel fill screen (2).

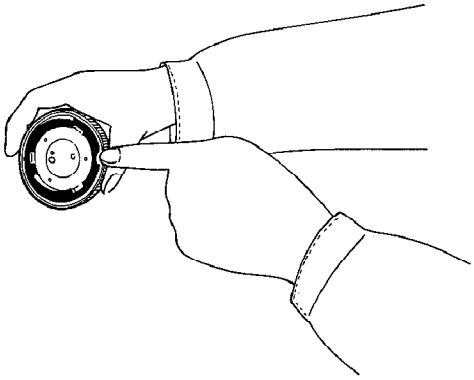

Illustration 259 g00104238

2. Inspect the cap. Replace the cap if the cap is damaged.

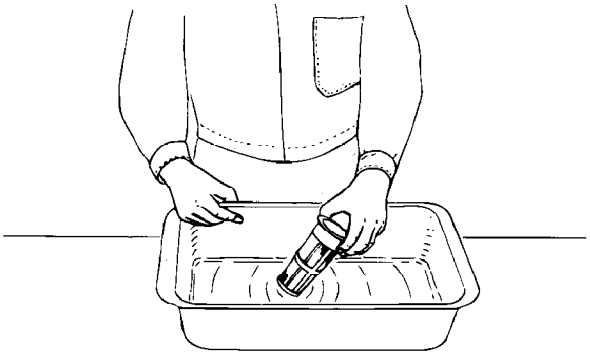

Illustration 260 g00104239

3. Wash the fuel fill screen in a clean, nonflammable solvent and dry the fuel fill screen.

4. Install the fuel fill screen.

5. Put a light coating of fuel oil on the cap gasket.

6. Install the fuel cap.

i02386891

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543

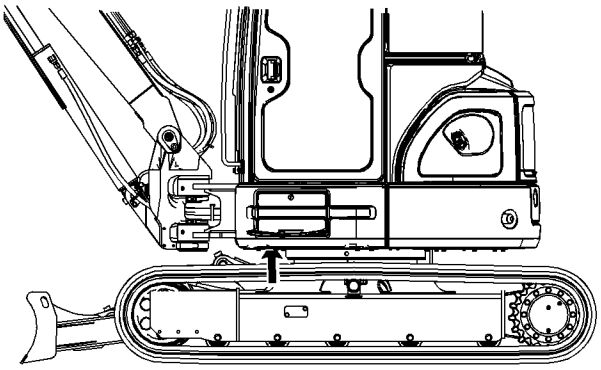

Illustration 261 g01191079

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

1. Open the drain valve that is located under the fuel tank. Allow the water and the sediment to drain into a suitable container.

Note: Discard the drained fluids according to local regulations.

2. Close the drain valve.

i02429405

Fuses - Replace

SMCS Code: 1417-510

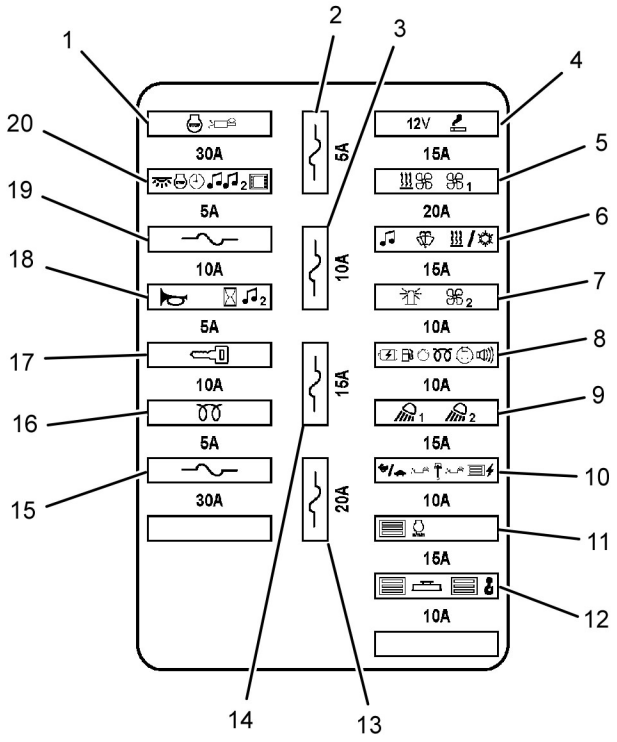

Illustration 262 g01213878

The fuse panel is located inside the access cover below the operator's seat. Open the access cover for fuse access.

Fuses – Fuses protect the electrical system from damage that is caused by overloaded circuits. Change a fuse if the element separates. If the element of a new fuse separates, check the circuit and/or repair the circuit.

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 Caterpillar dealer.

To replace a fuse, use a puller that is stored in the fuse panel. The following spare fuses are contained in the fuse panel:

- 5 Amperes
- 10 Amperes
- 15 Amperes
- 20 Amperes
- 30 Amperes

The following list identifies the circuits that are protected by each fuse. The amperage for each fuse is included with each circuit.

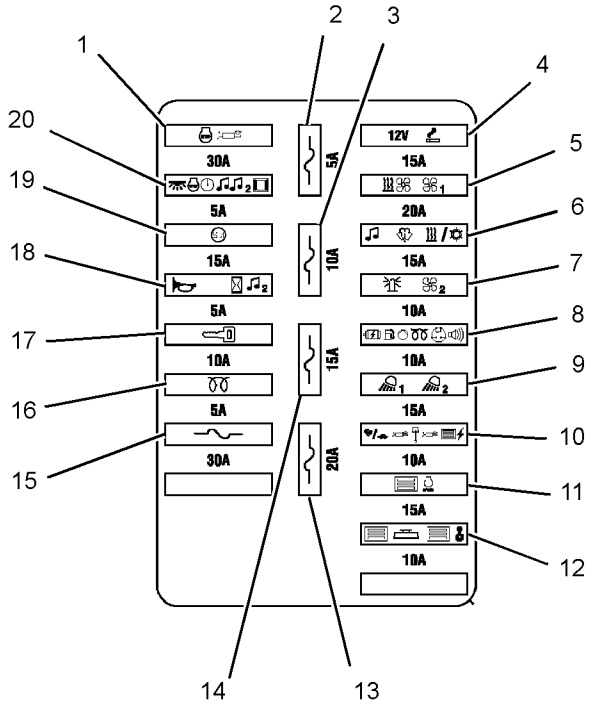

Illustration 263 g01191716

(1) Engine Stop Solenoid – 30 Amp

(2) Spare – 5 Amp

(3) Spare – 10 Amp

(4) Cigar Lighter – 15 Amp

(5) Heater and Air Conditioner Blower – 20 Amp

(6) Radio, Window Wiper, Window Washer, and Air Conditioner – 15 Amp

(7) Beacon and Cab Fan – 10 Amp

(8) Alternator, Fuel Pump, Glow Plug, and Travel Alarm – 10 Amp

(9) Work Lights – 15 Amp

(10) Travel Speed, Boom Swing, and Auxiliary Controller – 10 Amp

(11) Engine Speed – 15 Amp

(12) PAT Controller and Crane Controller – 10 Amp

(13) Spare – 20 Amp

(14) Spare – 15 Amp

(15) Spare – 30 Amp

(16) Glow Indicator – 5 Amp

(17) Engine Start Switch – 10 Amp

(18) Horn and Service Hour Meter – 5 Amp

(19) Spare – 10 Amp

(20) Dome Lamp, Engine Shutoff Timer, Radio Memory, and Monitor – 5 Amp

i03653097

Hydraulic System Oil - Change

SMCS Code: 5056-044

Cat HYDO Oil Change Interval

The standard Cat HYDO oil change interval is every 2000 service hours or 1 year.

A maintenance interval of 4000 service hours or 2 years for changing the hydraulic oil is available. The extended interval requires S·O·S monitoring of the hydraulic oil. The interval for S·O·S monitoring is every 500 hours. The maintenance interval for the hydraulic oil filter is not changed.

Machines with hammers are not included in the maintenance interval 4000 service hours or 2 years . Machines with hammers must use the intervals that are listed in the Maintenance Interval Schedule. Machines that are used in severe conditions are not included in the maintenance interval of 4000 service hours or 2 years . Machines that are used in severe conditions must use the interval in the Maintenance Interval Schedule.

Cat HYDO Advanced 10 Oil Change Interval

The standard Cat HYDO Advanced 10 oil change interval is every 3000 service hours or 18 months.

A maintenance interval of 6000 service hours or 3 years for changing the hydraulic oil is available. The extended interval requires S·O·S monitoring of the hydraulic oil. The interval for S·O·S monitoring is every 500 hours. The maintenance interval for the hydraulic oil filter is not changed.

Machines with hammers are not included in the maintenance interval of 6000 service hours or 3 years. Machines with hammers must use the intervals that are listed in the Maintenance Interval Schedule. Machines that are used in severe conditions are not included in the maintenance interval of 6000 service hours or 3 years. Machines that are used in severe conditions must use the interval in the Maintenance Interval Schedule.

Procedure to Change the Hydraulic Oil

⚠ WARNING

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

1. Park the machine on level ground.

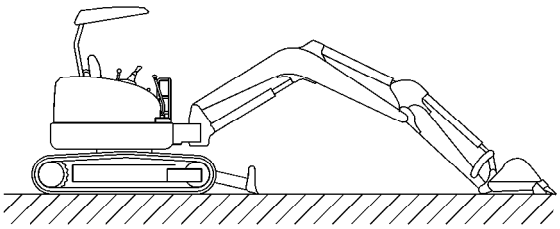

Illustration 264 g00825578

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. The hydraulic tank is located under the access cover on the right side of the machine. Open the access cover for the hydraulic tank. Clean the area around the hydraulic oil filler cap in order to prevent dirt from entering the hydraulic tank.

4. Relieve the internal pressure from the hydraulic tank by loosening the hydraulic oil filler cap. After the pressure is relieved, remove the hydraulic oil filler cap.

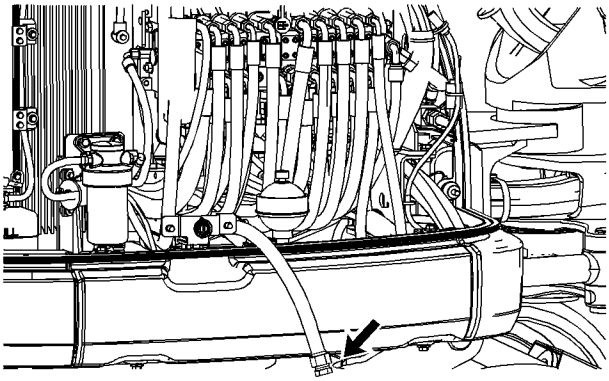

Illustration 265 g01188740

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

5. Remove the hydraulic oil drain plug. Allow the oil to drain into a suitable container.

6. Clean the drain plug and inspect the drain plug. Replace the drain plug if the drain plug is damaged or worn. Reinstall the plug.

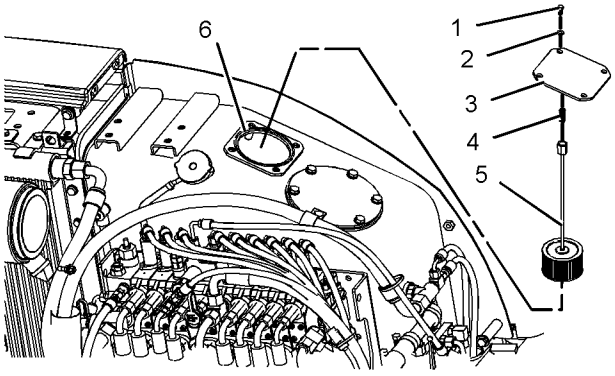

Illustration 266 g01188745

7. Remove bolt (1), washer (2), and left cover (3).

8. Remove spring (4) and screen (5).

Note: Do not allow spring (4) to fall into the hydraulic tank.

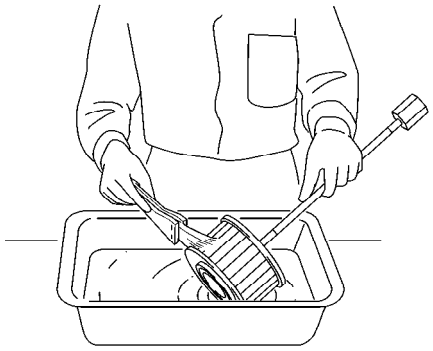

Illustration 267 g00825626

9. Clean screen (5) and inspect screen (5). Replace the screen if the screen is damaged or badly contaminated.

10. Inspect O-ring seal (6). Replace the O-ring seal if it is necessary.

11. Install the screen by reversing step 7 and step 8.

Note: Make sure that the O-ring seal and the spring are properly positioned during installation.

12. Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, “Capacities (Refill)”.

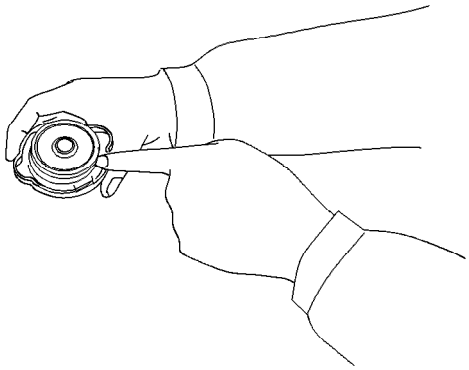

Illustration 268 g00101462

13. Inspect the pressure cap. Clean the pressure cap. Replace the pressure cap if damage is evident.

14. Install the pressure cap.

15. Start the engine and run the engine for a few minutes. Slowly operate the control levers in order to cause the hydraulic oil to flow through the circuits.

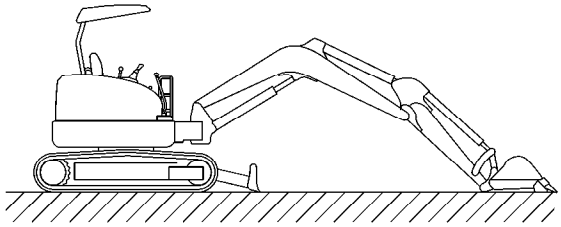

Illustration 269 g00825578

16. 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.

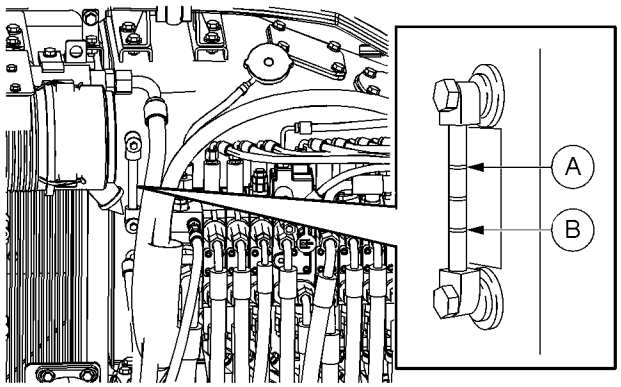

Illustration 270 g01188773

17. Maintain the hydraulic oil level between mark (A) and mark (B) of the sight gauge.

18. Close the right side access door.

i02385140

Hydraulic System Oil Filter (Return) - Replace

SMCS Code: 5068-510-RJ

S/N: HWJ1–Up

S/N: FPK1–Up

NOTICE
Hot oil can cause personal injury. Remove the hydraulic oil filler cap only when the engine is stopped. Allow time for the hydraulic system to cool. Remove hydraulic oil filler cap slowly in order to relieve pressure.

The hydraulic oil tank is located under the access cover on the right side of the machine.

1. Open the right side access cover.

2. Clean the area thoroughly in order to prevent dirt from entering the hydraulic oil tank.

3. Slowly loosen the hydraulic oil filler cap in order to relieve the pressure in the hydraulic oil tank.

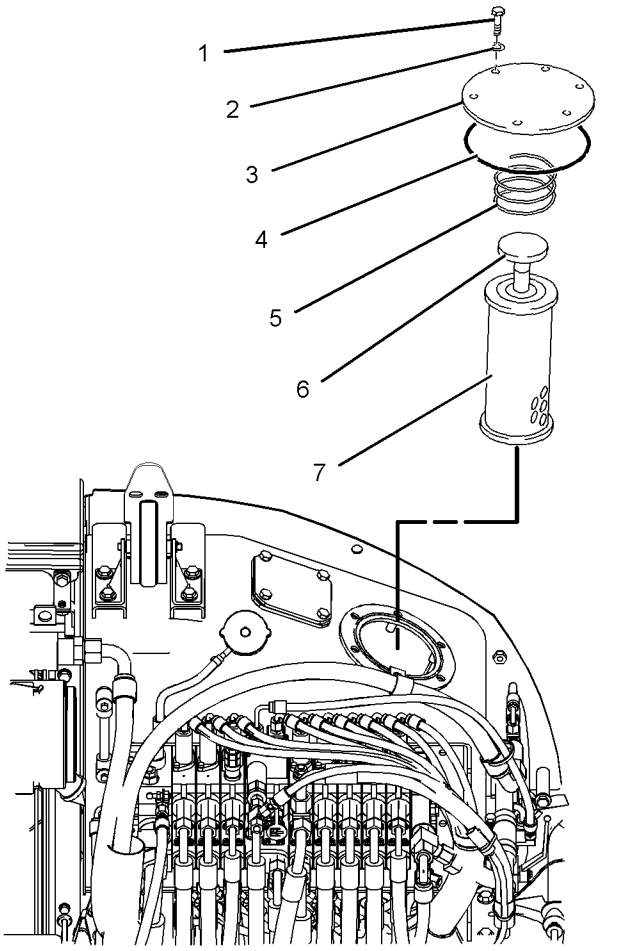

Illustration 271 g01189656

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

4. Remove bolt (1), washer (2), and right cover (3).

5. Remove spring (5), valve (6), and element (7) from the case.

6. Inspect O-ring (4). Replace the O-ring if the O-ring is worn or damaged.

7. Reverse steps 4 and 5 in order to install the new element.

8. Tighten the hydraulic oil filler cap.

9. Close the right side access cover.

i06014557

Hydraulic System Oil Filter (Return) - Replace

SMCS Code: 5068-510-RJ

S/N: BXT1–Up

S/N: DMY1–Up

NOTICE
Hot oil can cause personal injury. Remove the hydraulic oil filler cap only when the engine is stopped. Allow time for the hydraulic system to cool. Remove hydraulic oil filler cap slowly in order to relieve pressure.

The hydraulic oil tank is located under the access cover on the right side of the machine.

1. Open the right side access cover.

2. Clean the area thoroughly in order to prevent dirt from entering the hydraulic oil tank.

3. Slowly loosen the hydraulic oil filler cap in order to relieve the pressure in the hydraulic oil tank.

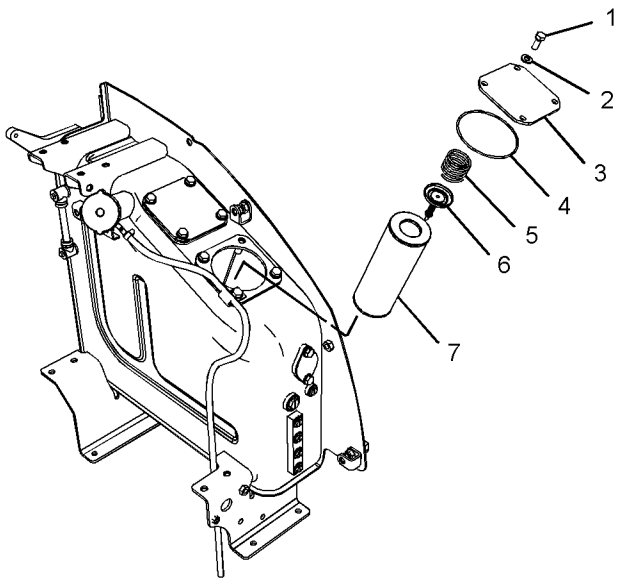

Illustration 272 g03773239

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information on Containing Fluid Spillage.

4. Remove bolt (1), washer (2), and right cover (3).

5. Remove spring (5), valve (6), and element (7) from the case.

6. Inspect O-ring (4). Replace the O-ring if the O-ring is worn or damaged.

7. Reverse steps 4 and 5 in order to install the new element.

8. Tighten the hydraulic oil filler cap.

9. Close the right side access cover.

i02384736

Hydraulic System Oil Level - Check

SMCS Code: 5050-535

Note: Check the hydraulic system oil level with the machine on a level surface.

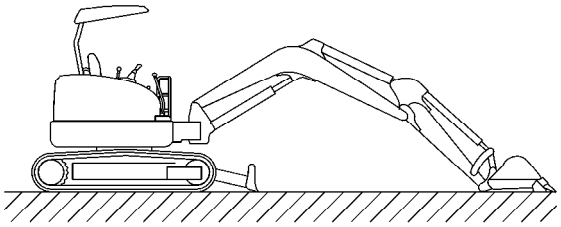

Illustration 273 g00825529

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.

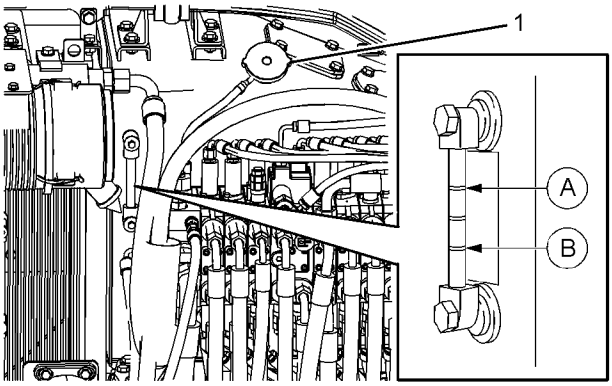

Illustration 274 g01189326

2. The sight gauge is located on the side of the hydraulic tank.

3. Maintain the hydraulic system oil level between top mark (A) and bottom mark (B) on the sight gauge.

4. If additional hydraulic oil is needed, the hydraulic oil filler cap is located on top of the hydraulic tank under the access door on the right side of the machine.

NOTICE
Never remove the hydraulic tank filler cap from the hydraulic tank if the oil is hot. Hot oil can cause burns.

Air can enter the system. Air in the system can cause pump damage.

5. Remove the hydraulic tank filler cap (1) slowly in order to relieve any pressure. Add hydraulic oil, if necessary.

6. Inspect the gasket on the hydraulic tank filler cap. If the gasket is damaged replace the hydraulic tank filler cap.

7. Install the hydraulic tank filler cap.

i03998619

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008-OC; 5095-SM; 5095-008; 7542-008; 7542

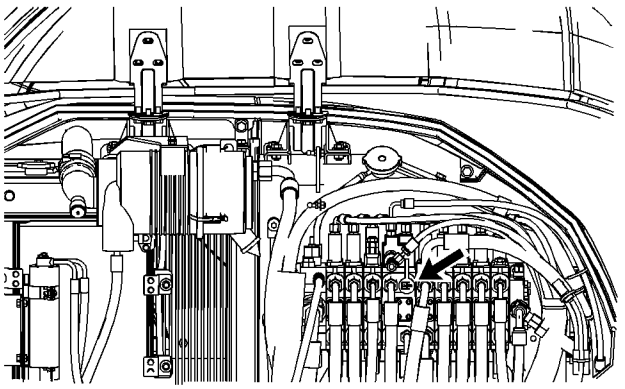

Illustration 275 g01189323

Park the machine on level ground. Lower the bucket to the ground with the stick in the vertical position.

Obtain a sample of the hydraulic oil through the sampling valve. The sampling valve for the hydraulic oil is located on the main control valve.

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.

i02106227

Oil Filter - Inspect

SMCS Code: 1308-507; 5068-507

Inspect a Used Filter for Debris

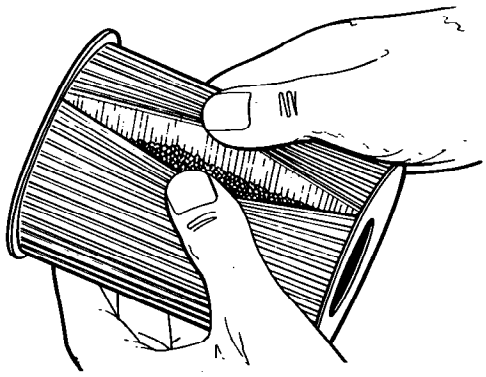

Illustration 276 g00100013

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.

i04673589

Quick Coupler - Clean

SMCS Code: 6129-070

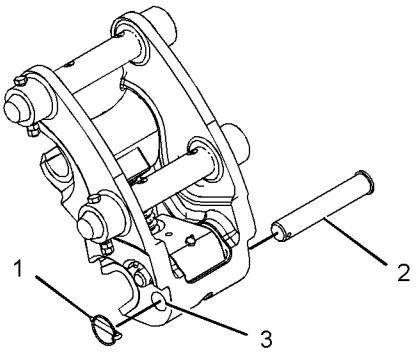

Illustration 277 g01155173
Typical example

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.

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.

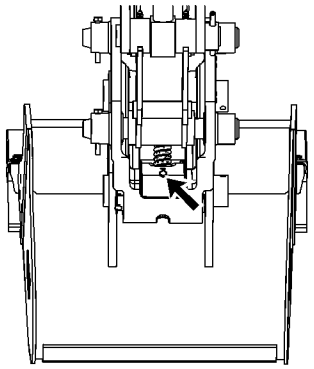

Illustration 278 g01167510
Typical example

3. Apply grease to the fittings of the quick coupler.

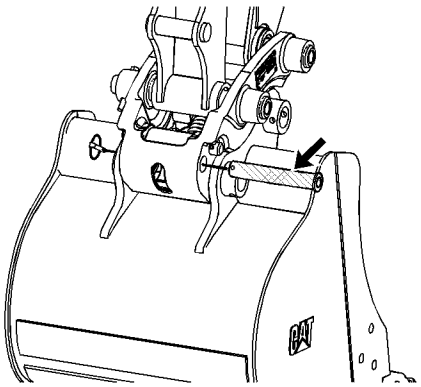

Illustration 279 g01167518
Typical example

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.

i04587970

Quick Coupler - Lubricate (Hydraulic Pin Grabber Quick Coupler (If Equipped))

SMCS Code: 6129-086

1. 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 - Hydraulic Pin Grabber Quick Coupler” for the proper procedure.

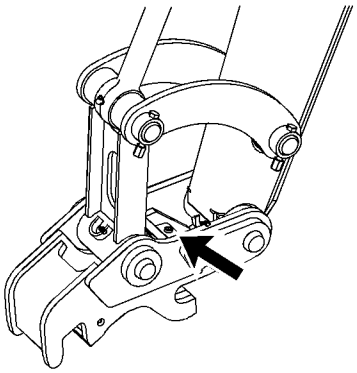

Illustration 280 g02741682

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, including the hydraulic cylinder mounting bolts.

5. Check the hydraulic hoses and fittings for any leaks, damage, or wear. Replace immediately if required.

6. Check the full operation of all the moving parts within the quick coupler. Repair or replace immediately if required.

7. Check that there is no material buildup around the rear locking mechanism, cylinder, or wedge plate. Check that there is no material buildup around the front locking mechanism.

8. Check the quick coupler for cracks, bent components, or wear.

i02384754

Radiator Core - Clean

SMCS Code: 1353-070

1. Open the right side access cover.

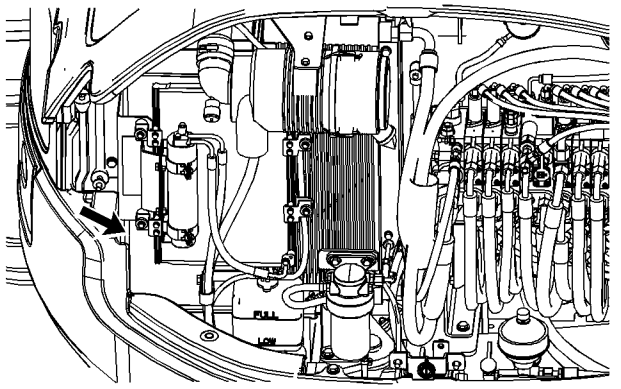

Illustration 281 g01189335

2. Inspect the radiator core for dust or debris.

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

4. Close the right side access cover.

i05805860

Receiver Dryer (Refrigerant) - Replace

SMCS Code: 7322-710; 7322-510

⚠ WARNING

Personal injury can result from contact with refrigerant.

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

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

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

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

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

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

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

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

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

i04423622

Seat Belt - Inspect

SMCS Code: 7327-040

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

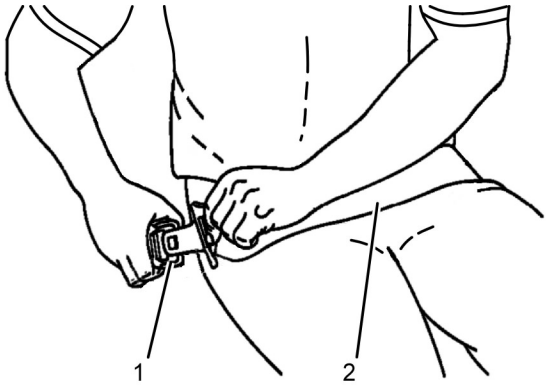

Illustration 282 g02620101
Typical example

Inspect buckle (1) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect seat belt (2) for webbing that is worn or frayed. Replace the seat belt if the webbing is worn or frayed.

Inspect all seat belt mounting hardware for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

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

Contact your Cat dealer for the replacement of the seat belt and the mounting hardware.

Note: The seat belt should be replaced within 3 years of the date of installation. A date of installation label is attached to the seat belt retractor and buckle. If the date of installation label is missing, replace belt within 3 years from the year of manufacture as indicated on belt webbing label, buckle housing, or installation tags (non-retractable belts).

i06891605

Seat Belt - Replace

SMCS Code: 7327-510

The seat belt should be replaced within 3 years of the date of installation. A date of installation label is attached to the seat belt retractor and buckle. If the date of installation label is missing, replace belt within 3 years from the year of manufacture as indicated on belt webbing label, buckle housing, or installation tags (non-retractable belts).

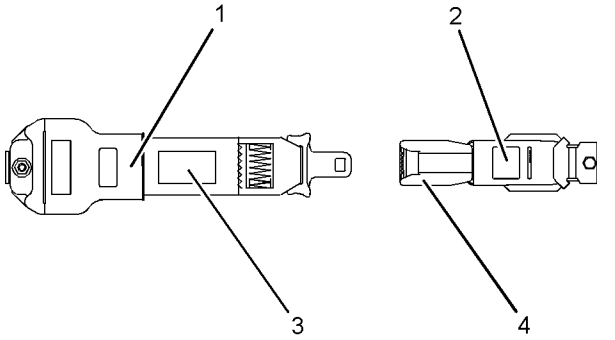

Illustration 283 g01152685

Typical Example

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

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

Determine age of new seat belt before installing on seat. A manufacture label is on belt webbing and imprinted on belt buckle. Do not exceed install by date on label.

Complete seat belt system should be installed with new mounting hardware.

Date of installation labels should be marked and affixed to the seat belt retractor and buckle.

Note: Date of installation labels should be permanently marked by punch (retractable belt) or stamp (non-retractable belt).

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

i02880113

Swing Frame and Cylinder Bearings - Lubricate

SMCS Code: 5105-086-BD; 6506-086-BD; 6507-086-BD

1. Lower all work tools to the ground.

2. Wipe all grease fittings before you lubricate the grease fittings.

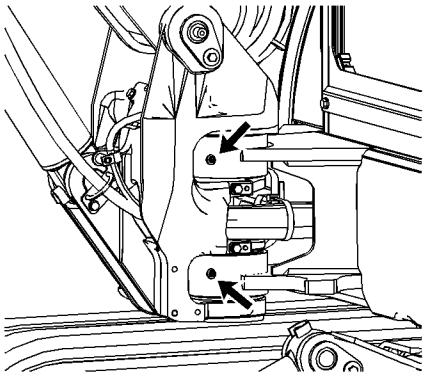

Illustration 284 g01190032

3. Apply lubricant to the grease fittings for the swing frame.

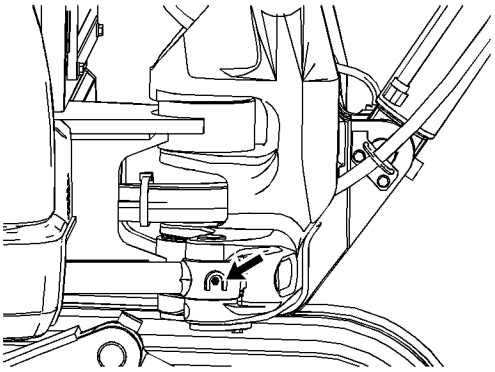

Illustration 285 g01191058

4. Apply lubricant to the grease fitting for the rod end of the swing cylinder.

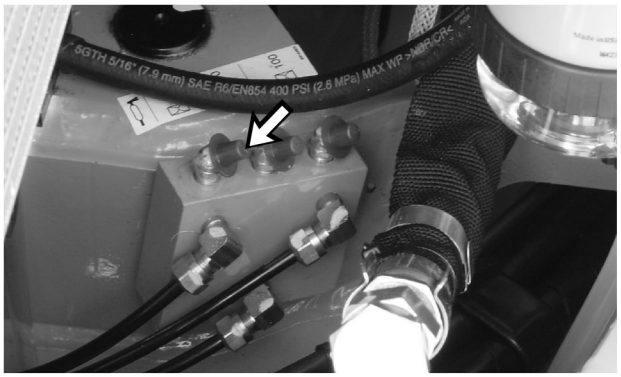

Illustration 286 g01433588

303C CR and 303.5C CR

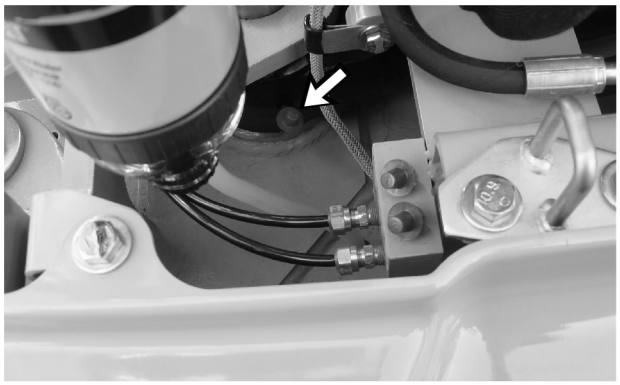

Illustration 287 g01249957

304C CR and 305C CR

5. Apply lubricant to the grease fitting for the head end of the swing cylinder.

i02496857

Swing Gear and Bearing - Lubricate

SMCS Code: 7063-086

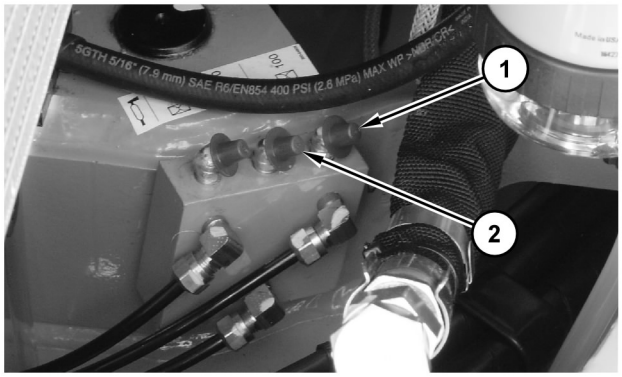

Illustration 288 g01248601

303C CR and 303.5C CR

(1) Swing bearing
(2) Swing gear

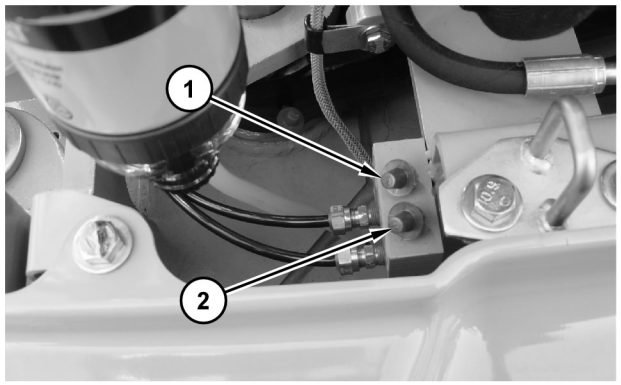

Illustration 289 g01249948

304C CR and 305C CR

(1) Swing bearing
(2) Swing gear

The grease fittings for the swing gear and for the swing bearing are located on the right side of the machine.

1. Lower all work tools to the ground.

2. Open the right side access door.

3. Wipe all grease fittings before you lubricate the grease fittings.

4. Apply lubricant through fitting (1) until the old lubricant is pushed out from the seal surface.

5. Apply lubricant through fitting (2).

6. Rotate the upper structure for 90°.

7. Repeat Step 5 and Step 6 until the upper structure has rotated 360°.

8. Close the right side access door.

i01592596

Track Adjustment - Adjust

SMCS Code: 4170-025

⚠ 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.

Tightening the Tracks

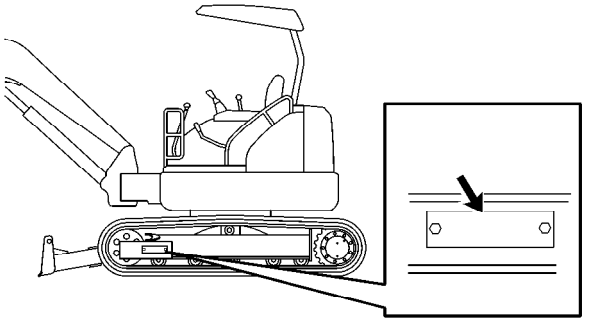

Illustration 290 g00825999

1. Remove the cover plate for the track adjustment valve.

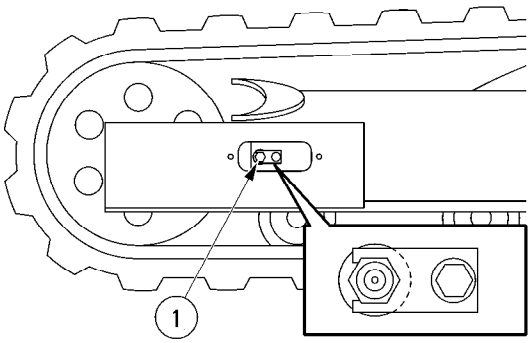

Illustration 291 g00825994

2. Wipe fitting (1) before you add grease.

3. Add grease through fitting (1) until the correct tension is reached.

4. Operate the track back and forth in order to equalize the pressure.

5. Check the amount of sag. Adjust the track, as needed.

6. Replace the cover plate for the track adjustment valve.

7. Repeat the same procedure for the other track.

Loosening the Track

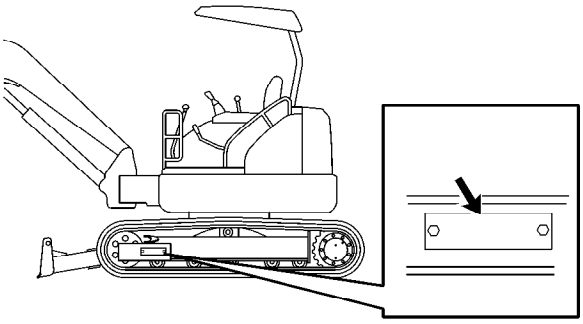

Illustration 292 g00825999

1. Remove the cover plate for the track adjustment valve.

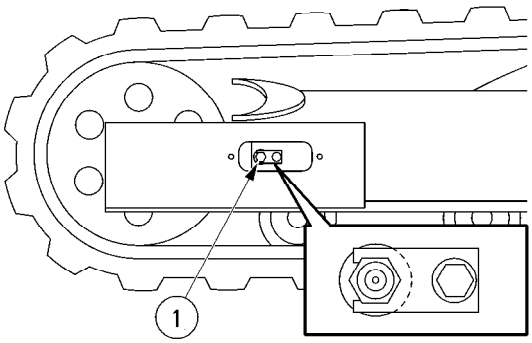

Illustration 293 g00825994

2. Loosen fitting (1) carefully until the track begins to loosen. One turn should be the maximum.

3. Tighten fitting (1) to 34 N·m (25 lb ft) when the desired track tension is reached.

4. Operate the track back and forth in order to equalize pressure.

5. Check the amount of sag in the track. Adjust the track, as needed.

6. Replace the cover plate for the track adjustment valve.

7. Repeat the same procedure for the other track.

i05265879

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 belt.

Measuring Rubber Track Tension

1. Park the machine on a level surface.

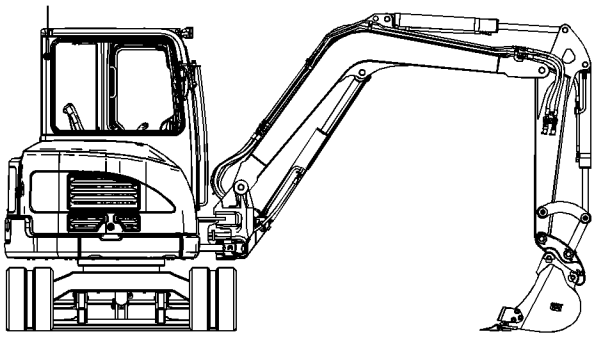

Illustration 294 g01190135

2. Position the upper frame over the tracks at a 90° angle.

3. Lower the bucket to the ground with the stick in a vertical position.

4. Chock the track that is not being lifted off the ground.

5. Apply boom down pressure until the track that is on the same side as the bucket has cleared the ground.

6. Chock the lower frame of the machine in this position.

7. Clean the track rollers and the area around the skid plate.

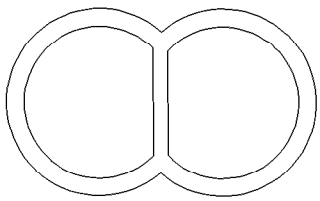

Illustration 295 g00484245

8. For a machine that is equipped with the rubber tracks, locate the “omega” mark on the inside flat of the track.

9. Locate the “omega” mark under the center track roller.

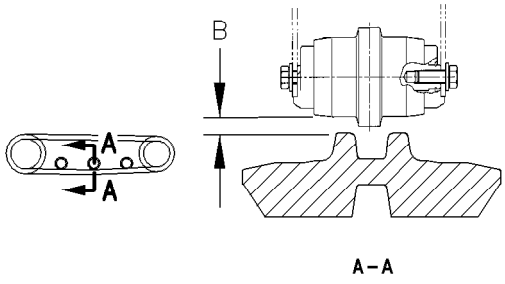

Illustration 296 g00522663

The distance (B) is the amount of track sag.

10. Measure the sag in the track. The sag is measured from the bottom of the center roller to the surface on the top of the track.

Table 49

Track Sag	
303, 303.5, and 304	10 to15 mm (0.40 to 0.60 inch)
305 and 305.5	15 to 20 mm (0.60 to 80 inch)

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 25 to 35 mm (1.0 to 1.4 inch).

If the correct adjustment cannot be achieved consult your Cat dealer.

i02378200

Travel Alarm - Test
(If Equipped)

SMCS Code: 7429-081

The travel alarm will sound when the machine is moved forward or backward. You must move the machine in order to test the travel alarm.

1. Start the engine. Move the hydraulic lockout control to the LOWERED position.

2. Raise the work tool. Make sure that there is adequate overhead clearance.

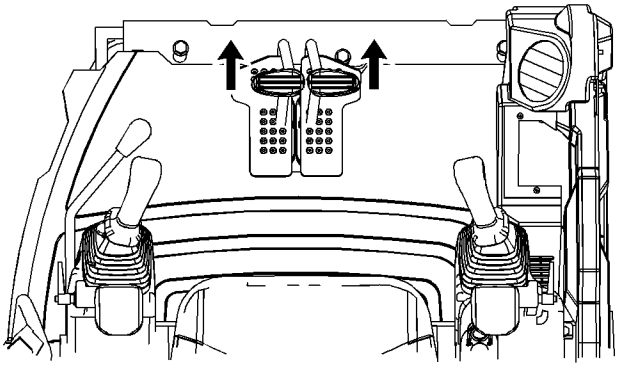

Illustration 297 g01187193

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 controls by placing the hydraulic lockout control in the RAISED position. Stop the engine.

i01722112

Undercarriage - Check

SMCS Code: 4150-535

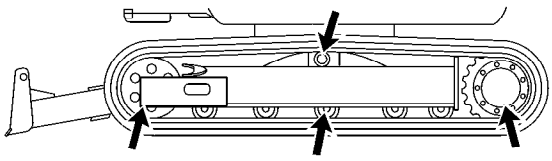

Illustration 298 g00885424

1. Check the carrier rollers, the track rollers, and the idler wheels for possible leakage.

2. Check the surface of the track, the carrier rollers, the track rollers, the idler wheels, the track shoes, 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 Caterpillar dealer.

i01021011

Window Washer Reservoir - Fill

SMCS Code: 7306-544-KE

NOTICE
When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.

The washer fluid bottle is located in the engine compartment.

1. Open the engine access door.

2. Remove the filler cap.

3. Fill the washer fluid bottle with washer fluid through the filler opening.

4. Replace the filler cap.

5. Close the engine access door.

i01223970

Window Wiper - Inspect/ Replace

SMCS Code: 7305-510; 7305-040

Inspect the wiper blade on the front window. Replace the wiper blade if the wiper blade is worn or damaged. Replace the wiper blade if the front window is streaked after use.

i01592019

Windows - Clean

SMCS Code: 7310-070; 7340-070

Use commercially available window cleaning solutions in order to clean the windows.

Note: When you are cleaning the window above the front window, you should use a soft cloth that is not abrasive. This window can be easily scratched.

⚠ WARNING

Wash polycarbonate windows with a mild soap and water. Never use a cleaning solvent on polycarbonate windows.

Cleaning Methods

Aircraft Windshield Cleaner

Apply the cleaner with a soft cloth. Rub the window with moderate pressure until all the dirt is removed. Allow the cleaner to dry. Wipe off the cleaner with a clean soft cloth.

Soap and Water

Use a clean sponge or a soft cloth. Wash the windows with a mild soap or with a mild detergent. Also use plenty of lukewarm water. Rinse the windows thoroughly. Dry the windows with a moist chamois or with a moist cellulose sponge.

Stubborn Dirt and Grease

Wash the windows with a good grade of naphtha, or isopropyl alcohol, or of Butyl Cellosolve. Then, wash the windows with soap and with water.

Reference Information Section

Reference Materials

i07422648

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

i03989612

Decommissioning and Disposal

SMCS Code: 1000; 7000

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

i07175070

Caterpillar Approved Work Tools

SMCS Code: 6700; 7007

The following work tools have been approved by Caterpillar. Refer to the Operation and Maintenance Manual and the service manual for each work tool for proper operation, maintenance, and servicing of the work tools.

Table 50

Caterpillar Approved Work Tools for Mini Hydraulic Excavators				
Work Tool	**Machine**			
	303C CR	**303.5C CR**	**304C CR**	**305C CR**
A14B Auger	218-3198	218-3198		
A19B Auger	220-7137	220-7137	275-1000	
A26B Auger				275-1001
H50 Hammer	205-7568(1) 205-7569(2)	205-7568(1) 205-7569(2)		

(continued)

(Table 50, contd)

H50s Hammer	205-7573(1) 205-7574(2)	205-7573(1) 205-7574(2)		
H55Ds Hammer	271-8133(1) 271-8134(2)	271-8133(1) 271-8134(2)		
H63 Hammer	205-7556(1) (3) 205-7557(2) (3)	205-7556(1) (3) 205-7557(2) (3)	205-7558(1) 205-7559(2)	205-7558(1) 205-7559(2)
H63s Hammer	205-7561(1) (3) 205-7562(2) (3)	205-7561(1) (3) 205-7562(2) (3)	205-7563(1) 205-7564(2)	205-7563(1) 205-7564(2)
Quick Coupler	Hydraulic Dual Lock Pin Grabber Quick Coupler	Hydraulic Dual Lock Pin Grabber Quick Coupler	Hydraulic Dual Lock Pin Grabber Quick Coupler	Hydraulic Dual Lock Pin Grabber Quick Coupler
	Manual Dual Lock Pin Grabber Quick Coupler	Manual Dual Lock Pin Grabber Quick Coupler	Manual Dual Lock Pin Grabber Quick Coupler	Manual Dual Lock Pin Grabber Quick Coupler
			Hydraulic Dual Lock Pin Grabber **Tilting** Coupler	Hydraulic Dual Lock Pin Grabber **Tilting** Coupler

(1) Standard Stick
(2) Long Stick
(3) Installation of optional counterweight to machine is required.

Consult your Cat dealer to match a quick coupler to the approved host machine.

The use of hammers shortens the life of hydraulic oil. If a hammer is used, the following measures should be taken:

- Shorten the interval for changing the hydraulic oil to 1500 service meter hours.
- Use SAE 30 hydraulic oil or 15w40 hydraulic oil to sustain seal life.

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:	_____	_____	_____