SEBU8475-10 (en-us)
April 2019

Operation and Maintenance Manual

422E, 428E, 432E, 434E, 442E, 444E
Backhoe Loaders

JBA 1-Up (432E)
NBA 1-Up (444E)
EME 1-Up (442E)
SEF 1-Up (434E)
DPH 1-Up (428E)
SJL 1-Up (434E)
MAW 1-Up (422E)

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.

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Foreword

California Proposition 65 Warning

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

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

www.P65Warnings.ca.gov

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

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

www.P65Warnings.ca.gov

Wash hands after handling components that may contain lead.

Literature Information

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

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

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

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

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

Safety

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

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

Operation

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

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

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

Maintenance

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

Maintenance Intervals

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

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

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:

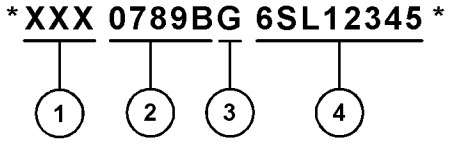

Illustration 1 g03891925

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

i04571109

Safety Messages

SMCS Code: 7000; 7405

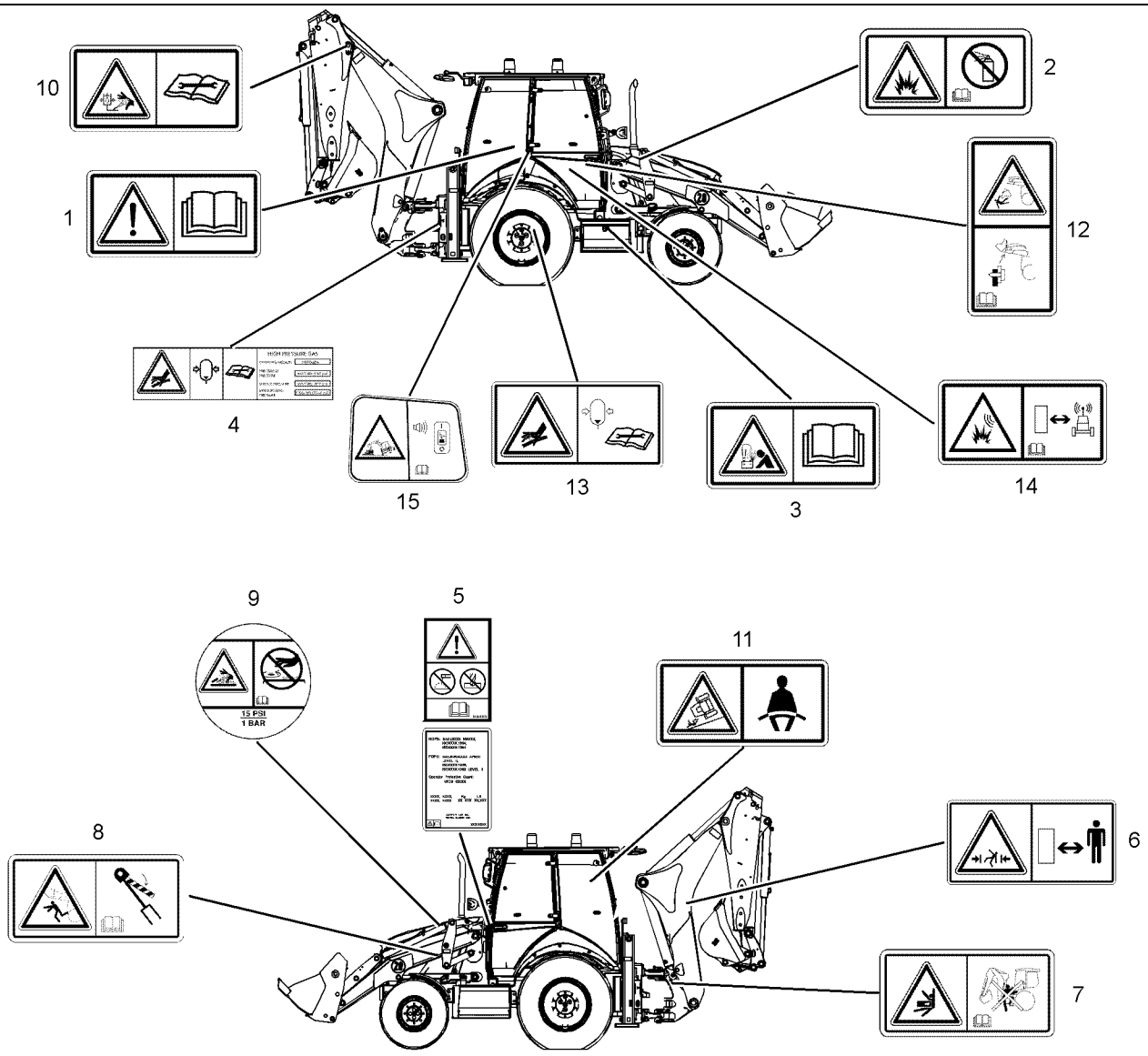

Illustration 2 g01912973

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

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

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

Do Not Operate (1)

Illustration 3 g01370904

This safety message is located under the engine start switch.

⚠ 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 your Cat dealer for replacement manuals. Proper care is your responsibility.

No Ether In Air Inlet (2)

Illustration 4 g01372254

This safety message is located on the air filter cover.

⚠ WARNING

If equipped with an air inlet heater (AIH) for cold weather starting, do not use aerosal types of starting aids such as ether. Such use could result in an explosion and personal injury.

Proper Connections for Jump Start Cables (3)

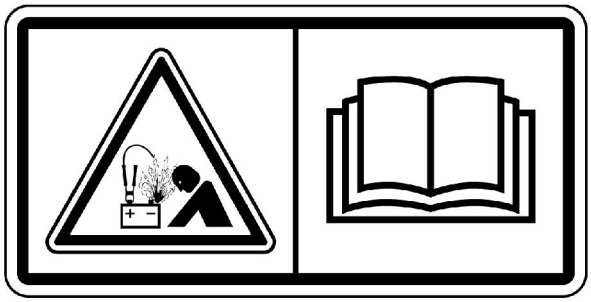

Illustration 5 g01370909

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

⚠ WARNING

Explosion Hazard! Improper jumper cable connections can cause an explosion resulting in serious injury or death. Batteries may be located in separate compartments. When using jump start cables, always connect the positive (+) cable from the source to the positive (+) terminal of the battery that is connected to the starter solenoid. Connect the negative (−) cable from the source to the negative (−) terminal of the starter. If the machine is not equipped with a starter negative terminal, connect the negative (−) cable to the engine block. Follow the procedure in the Operation and Maintenance Manual.

High Pressure Accumulator (4)

This safety message is located on the accumulator for the pilot operated hydraulic controls. This accumulator is located on the frame on the right rear of the machine.

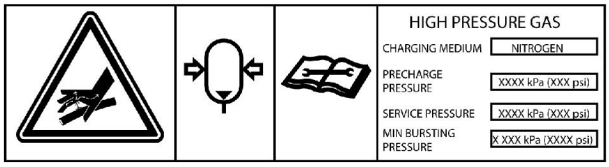

Illustration 6 g01374065

⚠ WARNING

Hydraulic accumulator contains gas and oil under high pressure. Improper removal or repair procedures could cause severe injury. To remove or repair, instructions in the service manual must be followed. Special equipment is required for testing and charging.

ROPS (5)

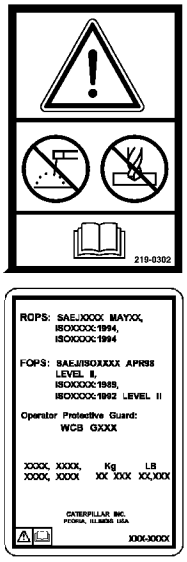

Illustration 7 g01113333

This safety message is located on the cab next to the left side door.

⚠ WARNING

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

Crush Hazard (6)

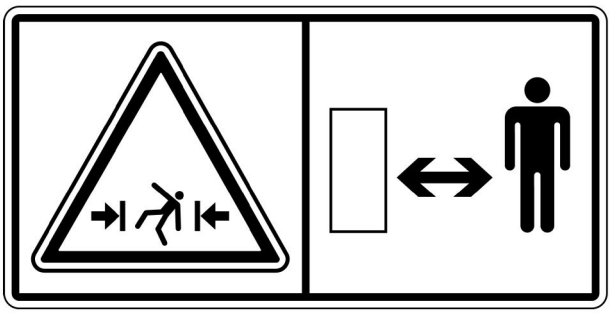

Illustration 8 g01371644

This safety message is located on the boom above the boom foot pin.

⚠ WARNING

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

No Exit (7)

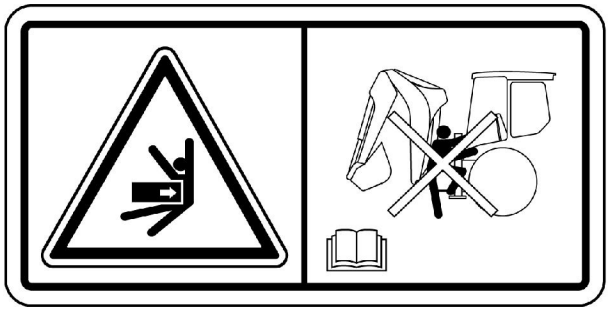

Illustration 9 g01407377

This safety message is located on the rear of the slide frame.

⚠ WARNING

Crush hazard; This is not an entrance or exit. Stay clear of this area when the machine is operating. Start and operate the backhoe from the operator seat only. Failure to follow these warnings could result in injury or death.

Brace The Lift Cylinder (8)

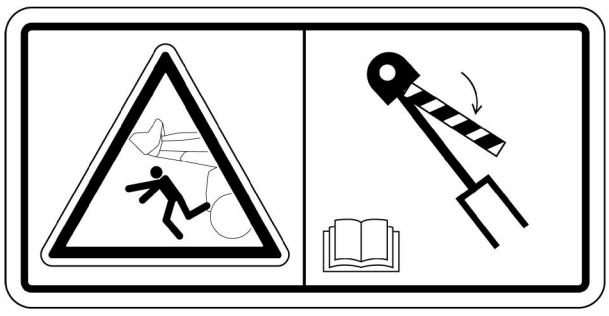

Illustration 10 g01407376

This safety message is located on the brace for the loader lift arm.

⚠ WARNING

When performing any work underneath a raised loader lift arm, the loader lift arm brace must be in place. Install the loader lift arm brace as follows.

1. **Empty loader bucket. Remove pin that secures loader lift arm brace to left loader arm. Raise the loader arms with the bucket in the dump position.**
2. **Position service brace over left lift cylinder with flat end against cylinder end.**
3. **Push pin through holes of loader lift arm brace and install cotter pin.**
4. **Slowly lower loader arms until brace contacts the top of the lift cylinder and bosses on loader arm.**
5. **To remove loader lift arm brace, reverse procedure.**

Failure to follow this procedure can result in death or serious injury if the loader arms are accidentally lowered.

Refer to Operation and Maintenance Manual, “Lift Cylinder Brace - Connect and Disconnect” for more information.

Pressurized System (9)

This safety message is located on the cooling system filler cap.

Illustration 11 g01370913

⚠ WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

High Cylinder Pressure (10)

This safety message is located on both sides of the boom near the connection with the stick.

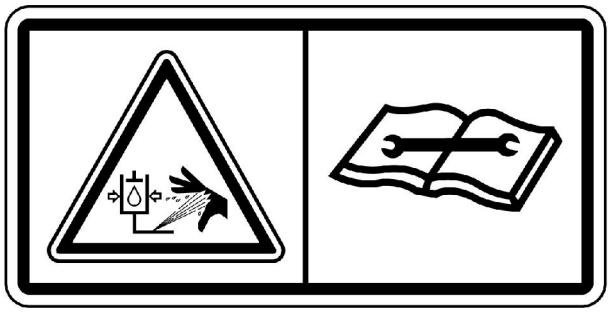

Illustration 12 g01407379

WARNING

High Pressure Cylinder. Failure to read and follow these instructions can cause rapidly discharging gas and/or hydraulic fluid which can result in death, personal injury and property damage.

Seat Belt (11)

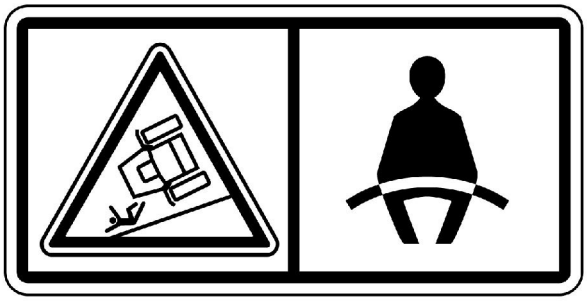

Illustration 13 g01370908

This safety message is located above the engine start switch.

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.

Quick Coupler (12) (If Equipped)

This safety message is located in the front of the cab on the right side.

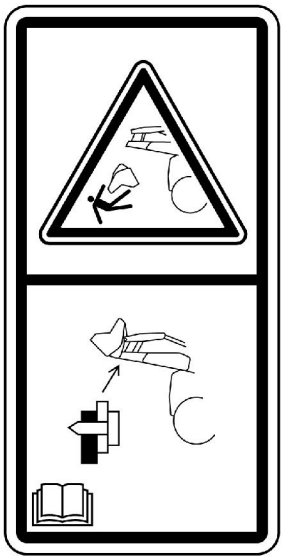

Illustration 14 g01411137

WARNING

CRUSH INJURY. COULD CAUSE SERIOUS INJURY OR DEATH. ALWAYS CONFIRM QUICK COUPLER PINS ARE ENGAGED. REFER TO THE OPERATION AND MAINTENANCE MANUAL

High Pressure Accumulator (13)

This safety message is located next to the accumulator if the machine is equipped with the option for ride control. The accumulator is located behind the battery box.

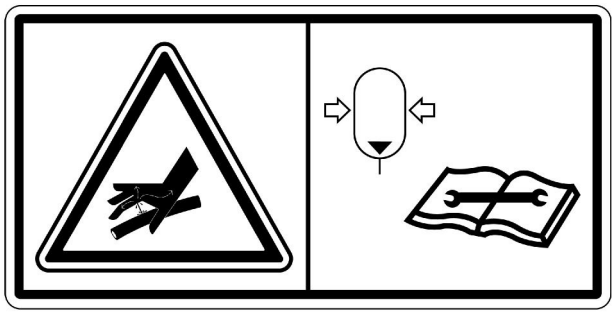

Illustration 15 g01370912

⚠ WARNING

Hydraulic accumulator contains gas and oil under high pressure. Improper removal or repair procedures could cause severe injury. To remove or repair, instructions in the service manual must be followed. Special equipment is required for testing and charging.

Product Link (14) (If Equipped)

This safety message is located in the front of the cab on the left post.

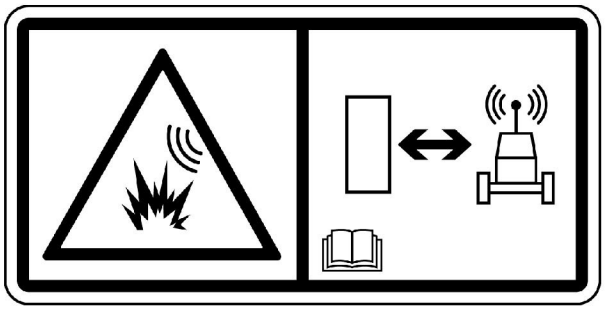

Illustration 16 g01370917

⚠ WARNING

This machine is equipped with a Caterpillar Product Link communication device. When electric detonators are used, this communication device should be deactivated within 12 m (40 ft) of a blast site for satellite-based systems and within 3 m (10 ft) of a blast site for cellular based systems, or within the distance mandated under applicable legal requirements. Failure to do so could cause interference with blasting operations and result in serious injury or death.

In cases where the type of Product Link module cannot be identified, Caterpillar recommends that the device be disabled no less than 12 m (40 ft) from the blast perimeter.

Object Handling Stability (15) (If Equipped)

This safety message is located on the right of the cab on the console.

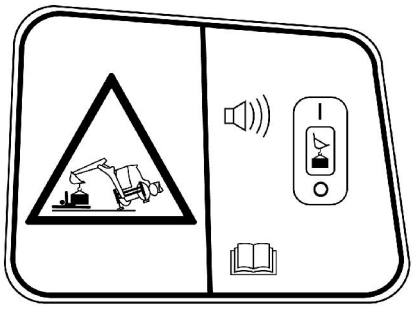

Illustration 17 g01957323

⚠ WARNING

Overloading the machine could impact the machine's stability which could result in a tip over hazard. A tip over hazard could result in serious injury or death. Always activate the stability alarm switch before you handle or lift objects.

i03694560

Additional Messages

SMCS Code: 7000; 7405

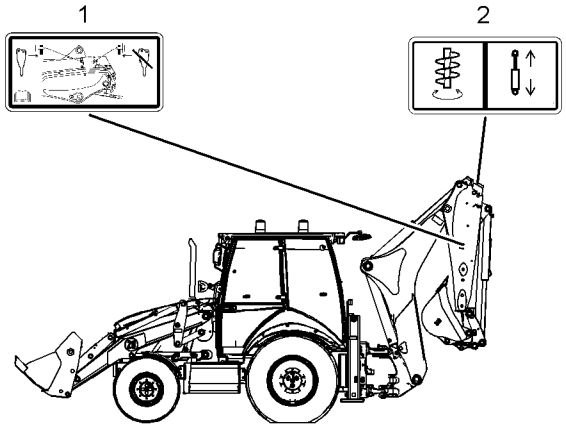

Illustration 18 g01985953

Pin the Extendable Stick (1)

If equipped, this message is located on the stick.

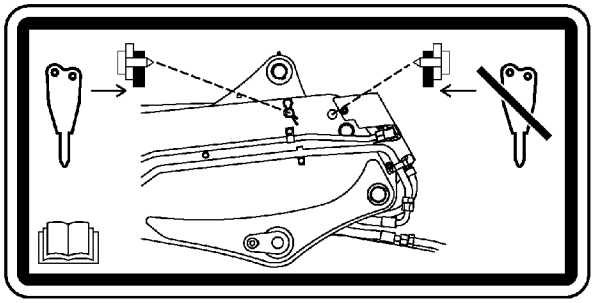

Illustration 19 g01985954

⚠ CAUTION

The E-Stick must be pinned before using attachments, to prevent movement which could cause personal injury.

Two-Way (Combination) Flow Control (2)

This message is located on the cover plate.

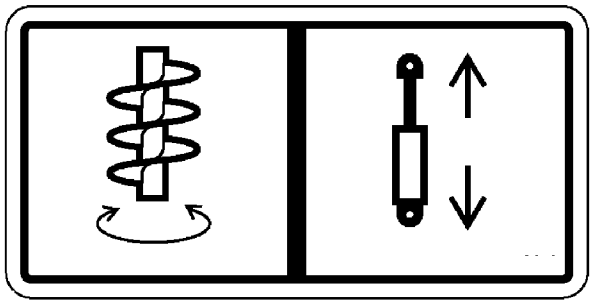

Illustration 20 g01973398

⚠ CAUTION

The flow control handle position will indicate work tool control or the flow control handle position will indicate cylinder control.

i07746355

General Hazard Information

SMCS Code: 7000

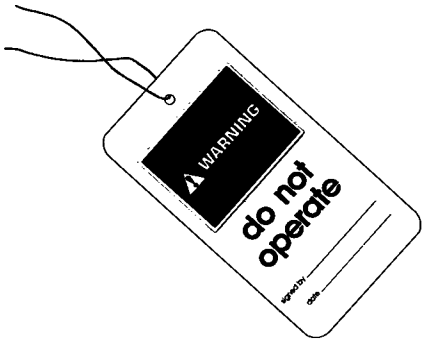

Illustration 21 g00104545

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 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.

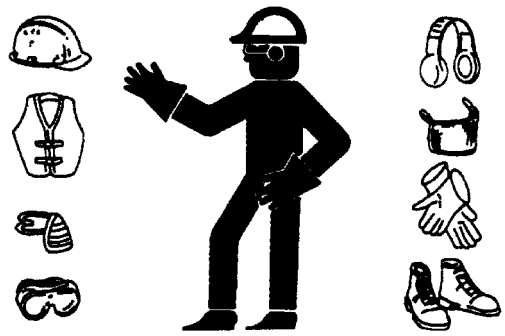

Illustration 22 g00702020

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.

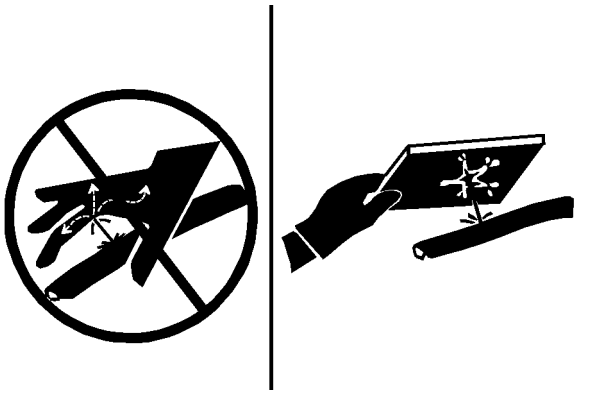

Illustration 23 g00687600

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

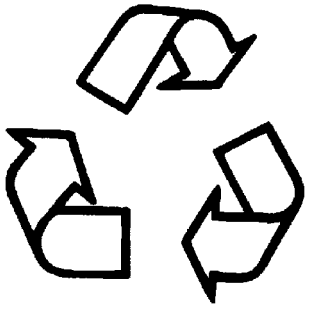

Illustration 25 g00706404

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.

i07746334

Burn Prevention

SMCS Code: 7000

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

Coolant

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

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

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

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

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

Oils

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

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

Batteries

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

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

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

i07746336

Fire Prevention and Explosion Prevention

SMCS Code: 7000

Illustration 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.

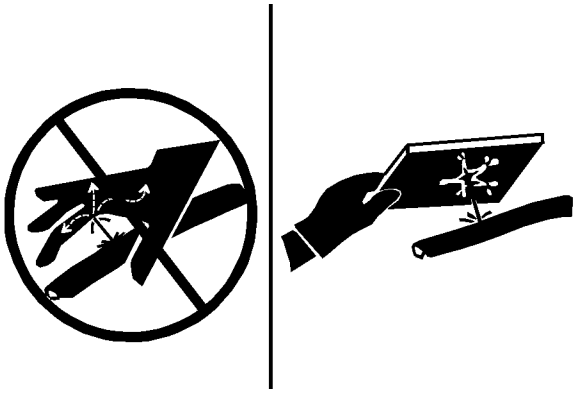

Illustration 29 g00687600

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.

i07041871

Fire Safety

SMCS Code: 7000

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

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

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

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

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

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

Notify emergency personnel of the fire and your location.

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

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

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

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

- Tires on wheeled machines pose a risk of explosion as tires burn. Hot shrapnel and debris can be thrown great distances in an explosion.
- Tanks, accumulators, hoses, and fittings can rupture in a fire, spraying fuels and shrapnel over a large area.
- Remember that nearly all the fluids on the machine are flammable, including coolant and oils. Additionally, plastics, rubbers, fabrics, and resins in fiberglass panels are also flammable.

i00980571

Fire Extinguisher Location

SMCS Code: 7000; 7419

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

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

i06164462

Tire Information

SMCS Code: 7000

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

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

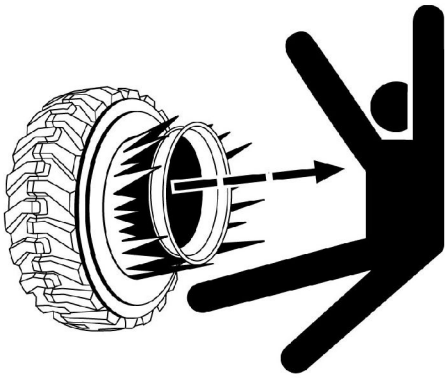

Illustration 30 g02166933

Typical example of tire is shown

Do not approach a hot or an apparently damaged tire.

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

⚠ WARNING

Proper nitrogen inflation equipment, and training in using the equipment, are necessary to avoid over inflation. A tire blowout or rim failure can result from improper or misused equipment and personal injury or death can occur.

A tire blowout and/or rim failure can occur if the inflation equipment is not used correctly, due to the fact that a fully charged nitrogen cylinder's pressure is approximately 15000 kPa (2200 psi).

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

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

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

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

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

i01122596

Electrical Storm Injury Prevention

SMCS Code: 7000

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

- Mount the machine.
- Dismount the machine.

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

i00771840

Before Starting Engine

SMCS Code: 1000; 7000

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

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

Adjust the seat so that full pedal travel can be achieved with the operator's back 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 machine lights are working properly.

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

i03571438

Engine Starting

SMCS Code: 1000; 7000

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

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

Move the transmission direction control lever to the NEUTRAL position.

Engage the parking brake.

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.

i07746368

Visibility Information

SMCS Code: 7000

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

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

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

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

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

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

i03260240

Restricted Visibility

SMCS Code: 7000

The size and the configuration of this machine may result in areas that can not be seen when the operator is seated. Illustration 31 provides an approximate visual indication of areas of significant restricted visibility. Illustration 31 indicates restricted visibility areas at ground level inside a radius of 12.00 m (39.37 ft) from the operator on a machine without the use of optional visual aids. This illustration does not provide areas of restricted visibility for distances outside a radius of 12.00 m (39.37 ft).

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

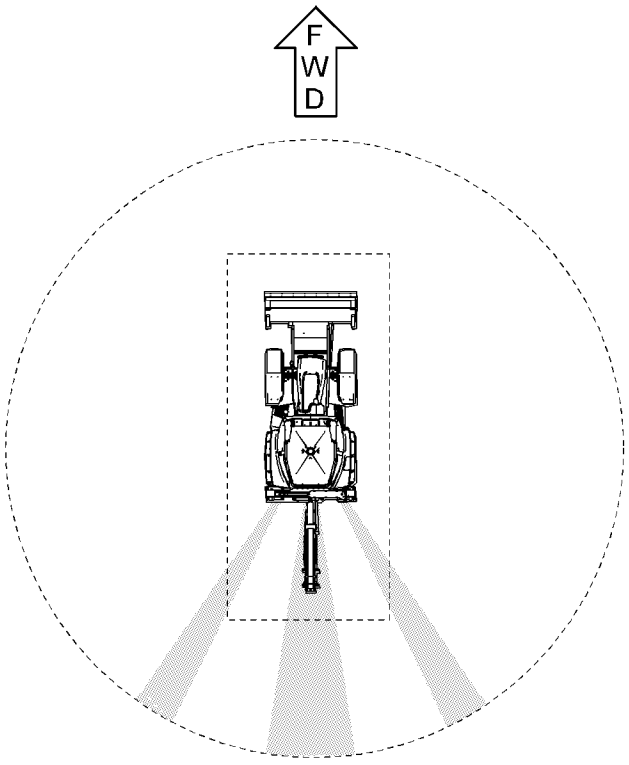

Illustration 31 g01662033
Top view of the machine

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

i03105380

Before Operation

SMCS Code: 7000

Clear all personnel from the machine and from the area.

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

The stabilizers must be in the correct position before you operate the machine. Completely raise the stabilizers for transporting the machine or for loader operation. Lower the stabilizers before you operate the backhoe. **DO NOT DIG UNDER THE STABILIZERS!**

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

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

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

Fasten the seat belt securely.

i07443772

Operation

SMCS Code: 7000

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

While you operate the machine slowly in an open area, check for proper operation of all controls and all protective devices.

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

Do not allow riders on the machine unless the machine has an additional seat with a seat belt. The rider must be seated and the seat belt must be fastened.

Never use the work tool for a work platform.

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

Carry work tools at approximately 40 cm (15 inches) above ground level.

Do not go close to the edge of a cliff, an excavation, or an overhang.

Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes. If the machine begins to sideslip on a downgrade, immediately remove the load and turn the machine downhill.

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

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

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

Know the maximum dimensions of your machine.

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

Fueling Machine

⚠ WARNING

Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations, with a higher Sulfur content, which may result in a fire or explosion. Consult with your fuel or fuel system supplier for details on proper grounding and bonding practices.

⚠ WARNING

To avoid possible injury or death, do not smoke while in an area that contains flammable liquids.

All fuels, most lubricants, and some coolants are flammable.

Keep all fuels and lubricants stored in properly marked containers and away from unauthorized persons.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Store all oily rags or other flammable materials in a protective container in a safe place.

Remove all flammable materials such as fuel, oil, and other debris before they accumulate on the machine.

Do not expose the machine to flames, burning brush, etc., if at all possible.

Locate fuel fill on machine, and remove the fuel cap. When fueling the machine is complete, replace the fuel cap and lock into place.

Fuel cap may be hot. To avoid injury, use personal protective equipment. Allow the cap to cool before fueling the 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.

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.

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.

i03112589

Parking

SMCS Code: 7000

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

Apply the service brake in order to stop the machine. Move the transmission control lever to the NEUTRAL position.

Move the speed control lever to the LOW IDLE position.

Engage the parking brake.

Engage the transmission neutral lock.

Lower all work tools to the ground.

Stop the engine.

Turn the engine start switch key to the OFF position for 4 seconds.

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

Press the hydraulic shutoff switch to the UNLOCKED position.

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

Move the hydraulic control levers to the HOLD position.

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

Stow the steering column if the adjustable steering column is available on the machine.

i07746366

Slope Operation

SMCS Code: 7000

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

i01329161

Equipment Lowering with Engine Stopped

SMCS Code: 7000

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

i03696989

Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

The operator Equivalent Sound Pressure Level (Leq) is 78 dB(A) when “ANSI/SAE J1166 OCT 98” is used to measure the value for an enclosed cab. This is a work cycle sound exposure level. The cab was properly installed and maintained. The test was conducted with the cab doors and the cab windows closed.

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

The average exterior sound pressure level is 80 dB (A) when the “SAE J88Apr95 - Constant Speed Moving Test” procedure is used to measure the value for the standard machine. The measurement was conducted under the following conditions: distance of 15 m (49.2 ft) and “the machine moving forward in an intermediate gear ratio”.

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

The dynamic operator sound pressure level is 78 dB (A) when “ISO 6396:2008” is used to measure the value for an enclosed cab. The cab was properly installed and maintained. The test was conducted with the cab doors and the cab windows closed.

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

Vibration Data for Backhoe Loaders

Information Concerning Hand/Arm Vibration Level

When the machine is operated according to the intended use, the weighted root mean square (RMS) acceleration emission of the machine to which the arms are subjected have been measured as follows:

Table 1

	Weighted RMS Acceleration Emission (Mechanical Machines)
Left Hand/Arm	4.0
Right Hand/Arm	3.8

Table 2

	Weighted RMS Acceleration Emission (Pilot Machines)
Left Hand/Arm	4.3
Right Hand/Arm	1.5

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

Information Concerning Whole Body Vibration Level

This section provides vibration data and a method for estimating the vibration level for backhoe loaders.

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 3 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 3

"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**
Backhoe Loader	excavating	0,28	0,26	0,20	0,09	0,16	0,06

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

The Caterpillar suspension seat meets the criteria of "ISO 7096". This represents vertical vibration level under severe operating conditions. This seat is tested with the input "spectral class EM5". The seat has a transmissibility factor of "SEAT<0.7".

The whole body vibration level of the machine varies. There is a range of values. The low value is 0.5 meter per second squared. The machine meets the short term level for the design of the seat in "ISO 7096". The value is 1.68 meter per second squared for this machine.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

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

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

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

a. Tire pressures

b. Brake and steering systems

c. Controls, hydraulic system and linkages

3. Keep the terrain in good condition.

a. Remove any large rocks or obstacles.

b. Fill any ditches and holes.

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

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

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

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

5. Perform the following operations smoothly.

a. Steer

b. Brake

c. Accelerate.

d. Shift the gears.

6. Move the attachments smoothly.

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

a. Drive around obstacles and rough terrain.

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

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

a. Use machines that are equipped with suspension systems.

b. Use the ride control system on compact backhoe loaders.

c. If no ride control system is available, reduce speed in order to prevent bounce.

d. Haul the machines between workplaces.

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

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

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

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

d. Avoid jumping from the cab.

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

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

Sources

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

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

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

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

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

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

Caterpillar, Inc.
www.cat.com

i07746362

Operator Station

SMCS Code: 7000; 7300

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

Product Information Section

General Information

i03601426

Specifications

SMCS Code: 7000

Intended Use

This machine is classified as a backhoe loader as described in ISO 6165:2006. When the machine is used as a loader, this machine is attached with a front mounted bucket or Caterpillar approved work tools. Work tools are used for digging, loading, lifting, and carrying material such as earth, crushed rock or gravel. When the machine is operating as a backhoe, the intended use of this machine is for excavating with a bucket or working with Caterpillar approved work tools. 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 use approved lifting points and approved lifting devices.

General Machine Specifications

Note: Basic machine specifications are listed below. Actual machine specifications will vary with different work tools.

Table 4

422E BACKHOE LOADER	
Approximate Weight	7641 kg (16845 lb)
Transport Length	5830 mm (19.1 ft)
Width Across Stabilizers	2368 mm (7.8 ft)
Transport Height	3736 mm (12.3 ft)

Table 5

428E BACKHOE LOADER	
Approximate Weight	7807 kg (17211 lb)
Transport Length	5869 mm (19.3 ft)
Width Across Stabilizers	2368 mm (7.8 ft)
Transport Height	3717 mm (12.2 ft)

Table 6

432E BACKHOE LOADER	
Approximate Weight	7932 kg (17487 lb)
Transport Length	5836 mm (19.1 ft)
Width Across Stabilizers	2368 mm (7.8 ft)
Transport Height	3717 mm (12.2 ft)

Table 7

434E BACKHOE LOADER	
Approximate Weight	8460 kg (18651 lb)
Transport Length	6120 mm (20.1 ft)
Width Across Stabilizers	2368 mm (7.8 ft)
Transport Height	3623 mm (11.9 ft)

Table 8

442E BACKHOE LOADER	
Approximate Weight	8692 kg (19163 lb)
Transport Length	5834 mm (19.1 ft)
Width Across Stabilizers	2368 mm (7.8 ft)
Transport Height	3914 mm (12.8 ft)

Table 9

444E BACKHOE LOADER	
Approximate Weight	8898 kg (19617 lb)
Transport Length	6099 mm (20.0 ft)
Width Across Stabilizers	2368 mm (7.8 ft)
Transport Height	3871 mm (12.7 ft)

Backhoe Buckets

Table 10

STANDARD DUTY BUCKETS (HIGH ROTATION)			
Width	**Rated**	**Weight**	**Number of Teeth**
305 mm (12 inches)	78 L (2.75 ft^3)	100 kg (220.46 lb)	3
457 mm (18 inches)	118 L (4.167 ft^3)	114 kg (251 lb)	3
610 mm (24 inches)	175 L (6.18 ft^3)	134 kg (295 lb)	4
762 mm (30 inches)	233 L (8.228 ft^3)	153 kg (337 lb)	5
914 mm (36 inches)	292 L (10.31 ft^3)	172 kg (379 lb)	6

Table 11

HEAVY DUTY BUCKETS			
Width	**Rated**	**Weight**	**Number of Teeth**
305 mm (12 inches)	78 L (2.75 ft^3)	108 kg (238 lb)	3
457 mm (18 inches)	118 L (4.167 ft^3)	126 kg (278 lb)	3
610 mm (24 inches)	175 L (6.18 ft^3)	150 kg (331 lb)	4
762 mm (30 inches)	233 L (8.228 ft^3)	169 kg (372 lb)	5
914 mm (36 inches)	292 L (11.31 ft^3)	193 kg (425 lb)	6

Table 12

EXTREME SERVICE BUCKETS				
Width	**Struck**	**Rated**	**Weight**	**Number of Teeth**
600 mm (24 inches)	230 L (8.1 ft^3)	270 L (9.5 ft^3)	237 kg (521 lb)	4
760 mm (30 inches)	290 L (10.0 ft^3)	370 L (13.0 ft^3)	287 kg (631 lb)	4

Loader Buckets

Table 13

GENERAL PURPOSE CAPACITIES		
Rated	**Width**	**Weight**
1.14 m^3 (1.5 yd^3)	2434 mm (96 inches)	604 kg (1329 lb)

Travel Speeds

Table 14

TRAVEL SPEEDS FOR 422E WITH STANDARD TRANSMISSION				
	First Gear	**Second Gear**	**Third Gear**	**Fourth Gear**
Forward	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	19.9 km/h (12.3 mph)	39.9 km/h (24.8 mph)
Reverse	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	19.9 km/h (12.3 mph)	39.9 km/h (24.8 mph)

Table 15

TRAVEL SPEEDS FOR 428E WITH STANDARD TRANSMISSION				
	First Gear	**Second Gear**	**Third Gear**	**Fourth Gear**
Forward	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	20.0 km/h (12.4 mph)	40.1 km/h (24.9 mph)
Reverse	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	20.0 km/h (12.4 mph)	40.1 km/h (24.9 mph)

Table 16

TRAVEL SPEEDS FOR 432E WITH STANDARD TRANSMISSION				
	First Gear	**Second Gear**	**Third Gear**	**Fourth Gear**
Forward	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	19.9 km/h (12.3 mph)	39.9 km/h (24.7 mph)
Reverse	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	19.9 km/h (12.3 mph)	39.9 km/h (24.7 mph)

Table 17

TRAVEL SPEEDS FOR 432E WITH AUTO SHIFT TRANSMISSION					
	First Gear	**Second Gear**	**Third Gear**	**Fourth Gear**	**Fifth Gear**
Forward	5.9 km/h (3.7 mph)	9.4 km/h (5.8 mph)	19.5 km/h (12.1 mph)	26.9 km/h (16.7 mph)	40.7 km/h (25.2 mph)
Reverse	5.9 km/h (3.7 mph)	12.3 km/h (7.7 mph)	26.6 km/h (16.5 mph)		

Table 18

TRAVEL SPEEDS FOR 434E WITH STANDARD DRIVE TRANSMISSION				
	First Gear	**Second Gear**	**Third Gear**	**Fourth Gear**
Forward	5.5 km/h (3.4 mph)	8.8 km/h (5.5 mph)	18.4 km/h (11.4 mph)	36.8 km/h (22.8 mph)
Reverse	5.5 km/h (3.4 mph)	8.8 km/h (5.5 mph)	18.4 km/h (11.4 mph)	36.8 km/h (22.8 mph)

Table 19

TRAVEL SPEEDS FOR 434E WITH AUTO SHIFT TRANSMISSION					
	First Gear	Second Gear	Third Gear	Fourth Gear	Fifth Gear
Forward	5.4 km/h (3.3 mph)	8.7 km/h (5.4 mph)	18.0 km/h (11.2 mph)	24.8 km/h (15.4 mph)	37.5 km/h (23.3 mph)
Reverse	5.4 km/h (3.3 mph)	11.5 km/h (7.1 mph)	24.8 km/h (15.4 mph)		

Table 20

TRAVEL SPEEDS FOR 442E WITH STANDARD DRIVE TRANSMISSION				
	First Gear	Second Gear	Third Gear	Fourth Gear
Forward	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	19.9 km/h (12.3 mph)	40.5 km/h (25.1 mph)
Reverse	6.0 km/h (3.7 mph)	9.6 km/h (6.0 mph)	19.9 km/h (12.3 mph)	40.5 km/h (25.1 mph)

Table 21

TRAVEL SPEEDS FOR 442E WITH AUTO SHIFT TRANSMISSION					
	First Gear	Second Gear	Third Gear	Fourth Gear	Fifth Gear
Forward	5.9 km/h (3.7 mph)	9.5 km/h (5.9 mph)	19.9 km/h (12.3 mph)	27.4 km/h (17.0 mph)	42.0 km/h (26.0 mph)
Reverse	5.9 km/h (3.7 mph)	12.4 km/h (7.7 mph)	27.0 km/h (16.8 mph)		

Table 22

TRAVEL SPEEDS FOR 444E WITH STANDARD DRIVE TRANSMISSION				
	First Gear	Second Gear	Third Gear	Fourth Gear
Forward	6.1 km/h (3.8 mph)	9.7 km/h (6.0 mph)	20.1 km/h (12.5 mph)	40.4 km/h (25.0 mph)
Reverse	6.1 km/h (3.8 mph)	9.7 km/h (6.0 mph)	20.1 km/h (12.5 mph)	40.4 km/h (25.0 mph)

Table 23

TRAVEL SPEEDS FOR 444E WITH AUTO SHIFT TRANSMISSION					
	First Gear	Second Gear	Third Gear	Fourth Gear	Fifth Gear
Forward	5.9 km/h (3.7 mph)	9.4 km/h (5.8 mph)	19.6 km/h (12.2 mph)	27.1 km/h (16.8 mph)	41.3 km/h (25.6 mph)
Reverse	5.9 km/h (3.7 mph)	12.2 km/h (7.6 mph)	26.6 km/h (16.5 mph)		

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Rated Load

SMCS Code: 6001; 6136; 6542; 7000

WARNING

Failure to comply with the rated load can cause personal injury or attachment damage.

Review the rated load of a particular attachment before performing any operation. Make adjustments to the rated load as necessary for non-standard configurations.

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

- Lubricants
- Full fuel tank
- Enclosed ROPS
- 80 kg (176 lb) operator

Note: A standard machine for backhoe bucket lifting and object handling consists of:multipurpose bucket, recommended counterweight, standard cab and no rear worktool.

Note: A standard machine for loader bucket lifting, fork applications and the material handling arm, consists of:standard stick, 61 cm (24 inch) hoe bucket, standard cab and recommended counterweight.

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

Rated loads 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 rated loads.

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

Note: Incorrect tire pressures can affect the stability of the load. Ensure that the tire pressures are correct before you perform handling or loading operations. Refer to Operation and Maintenance Manual, “Tire Inflation Information” for more information.

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.

Rated Load for Loader Buckets

For European applications, the rated operating load is defined by “EN 474-4:2006 +A1:2009”. The rated operating load is defined as the lesser value of 50% of the static tipping capacity or the hydraulic lift capacity, or as otherwise specified.

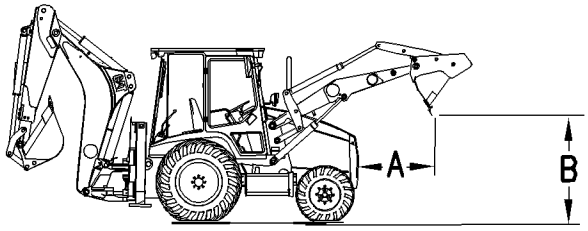


Illustration 32 g00285635

Dump Reach (A) and Dump Height (B)

Rated Load for Pallet Forks

For European applications, the rated operating load is defined by “EN 474-4:2006 +A1:2009”. The rated operating load is defined as the lesser value of 80% of the static tipping capacity or the hydraulic lift capacity over firm and level ground. In rough terrain, the rated operating load is defined as the lesser value of 60% of the static tipping capacity or the hydraulic lift capacity. The intended operating range of the pallet forks starts from the fully racked back position. The range ends at the top face of the pallet forks at 20° below the horizontal at any given lift height.

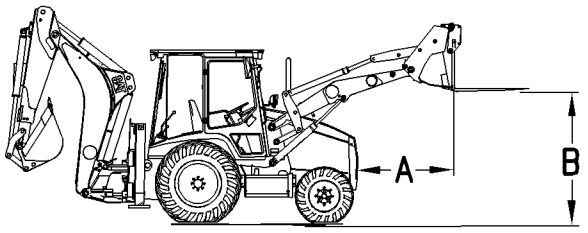


Illustration 33 g00285636

Reach (A) and Placement Height (B)

Rated Load for Material Handling Arm

The rated operating load is defined by “EN 474-4:2006 +A1:2009”. The rated operating load is defined as the lesser value of 50% of the static tipping capacity or the hydraulic lift capacity.

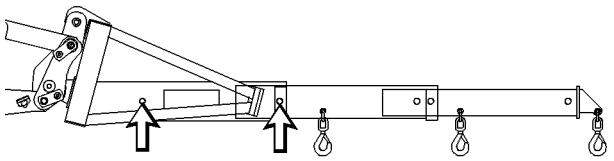


Illustration 34 g00285638

Remove the retainer pins from the arm in order to extend or retract the arm.

Replace the pins after the arm has been extended or retracted in order to lock the arm into position.

Lift the load close to the machine for best stability. Move the machine slowly in order to avoid excessive load swing.

Do not apply side loads on the hook and on the shackle. Check the condition of the hook, of the shackle and of any lifting chains. Replace the parts if any sign of unusual wear is indicated.

Rated Load for Truss Boom

The rated operating load is defined by “EN 474-4:2006 +A1:2009”. The rated operating load is defined as the lesser value of 50% of the static tipping capacity or the hydraulic lift capacity.

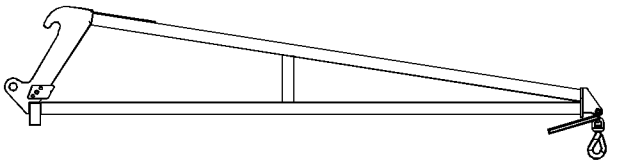


Illustration 35 g02042134

Lift the load close to the machine for best stability. Move the machine slowly in order to avoid excessive load swing.

Do not apply side loads on the hook and on the shackle. Check the condition of the hook, of the shackle and of any lifting chains. Replace the parts if any sign of unusual wear is indicated.

Rated Load for Hook

The rated operating load is defined by “EN 474-4:2006 +A1:2009”. The rated operating load is defined as the lesser value of 50% of the static tipping capacity or the hydraulic lift capacity.

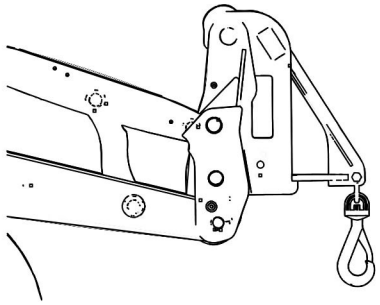


Illustration 36 g02042153

Lift the load close to the machine for best stability. Move the machine slowly in order to avoid excessive load swing.

Do not apply side loads on the hook and on the shackle. Check the condition of the hook, of the shackle and of any lifting chains. Replace the parts if any sign of unusual wear is indicated.

Rated Load for Backhoe Object Handling

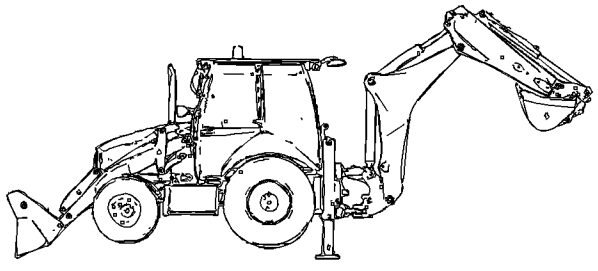


Illustration 37 g01977833

Backhoe Lifting and Object Handling Position

Before lifting and before object handling place the machine on level ground. Lower the stabilizers and lower the bucket to stabilize the machine. Test the object handling stability alarm, refer to Operation and Maintenance Manual, “Operator Controls” for more information.

The rated load for the backhoe lifting applications is defined by “EN 474-4:2006 +A1:2009”. Rated operating loads are given according to this standard.

The rated lift capacity for the backhoe loader used in the bucket application or used in the shovel application is defined as the lesser value of the following conditions at the specified lift point radius:

- 75% of the static tipping load
- The hydraulic lifting capacity
- 75% of the hydraulic holding capacity

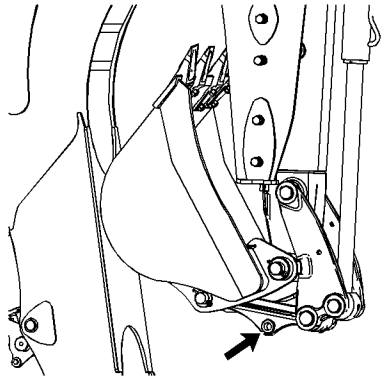


Illustration 38 g01967554

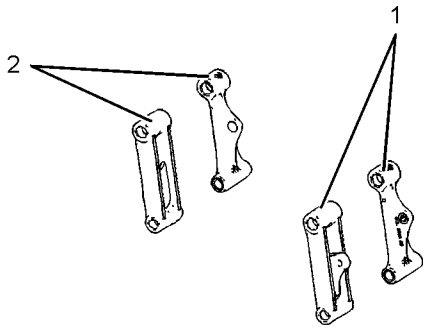


Illustration 39 g01977913

Linkage with lift eye (1).

Linkage without lift eye (2).

The rated operating load for backhoe object handling applications is defined as the lesser value of the following conditions at the specified lift point radius:

Note: You may only perform lifting applications with the correct linkage. The correct linkage will have a lifting eye in the linkage. If there is not a lifting eye in the linkage, lifting applications are not allowed.

- 75% of the static tipping load
- 75% of the hydraulic holding capacity
- 87% of the hydraulic lifting capacity

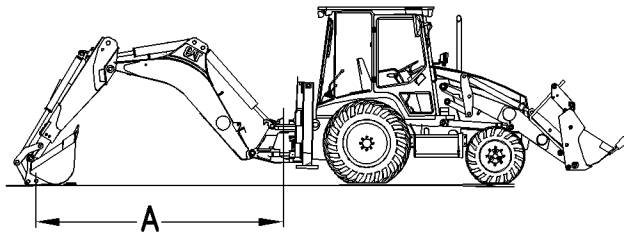


Illustration 40 g00286077

Lift Point Radius (A)

The lift point radius is defined as the distance from the swing pivot center to the bucket hinge pin for the backhoe. The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lift point radius (A). Rated loads do not include the weight of the attachment. The rated operating loads are for the standard machine configuration.

422E Loader Buckets

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

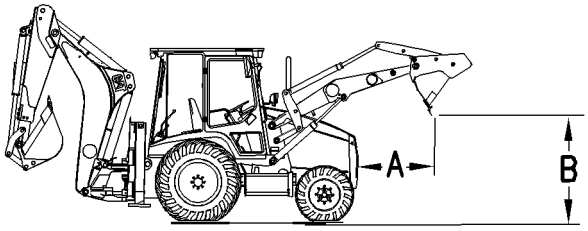


Illustration 41 g00285635

Dump Reach (A) and Dump Height (B)

Table 24

Rated Bucket Load For A 422E With Single Tilt				
Bucket Part Number	**VOLUMETRIC RATING**	**“EN 474-4” and “SAE J818” Rated Operating Load**	**DUMP HEIGHT (B)**	**DUMP REACH (A)**
9R-5202	1.00 m^3 (1.31 yd^3)	2349 kg (5178 lb)	2470 mm (8 ft 1 inch)	753 mm (2 ft 6 inch)
318-7265	1.03 m^3 (1.35 yd^3)	2440 kg (5380 lb)	2508 mm (8 ft 3 inch)	681 mm (2 ft 3 inch)
318-7266	1.03 m^3 (1.35 yd^3)	2364 kg (5212 lb)	2508 mm (8 ft 3 inch)	681 mm (2 ft 3 inch)

422E Pallet Forks

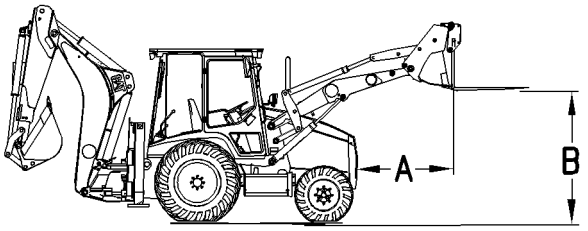


Illustration 42 g00285636

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with the flip over fork and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 25

Rated Load For Flip Over Fork 422E Single Tilt					
BUCKET PART NUMBER	**VOLUMETRIC RATING**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
318-7266	1.03 m^3 (1.35 yd^3)	1174 kg (2589 lb)	1163 kg (2565 lb)	3004 mm (9 ft 10 inch)	1056 mm (3 ft 6 inch)

422E Backhoe Lifting

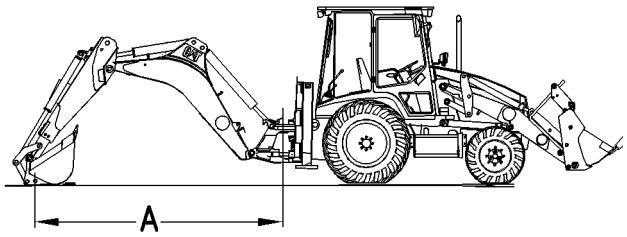


Illustration 43 g00286077

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads do not include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 26

422E Rated Operating Load For Backhoe Bucket Application	
Lift Point Radius	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick	
1.74 m (5 ft 9 in)	4990 kg (11001 lb)(1)
2.95 m (9 ft 8 in)	2801 kg (6175 lb)
3.72 m (12 ft 3 in)	2189 kg (4826 lb)
4.31 m (14 ft 2 in)	1864 kg (4110 lb)
4.81 m (15 ft 9 in)	1604 kg (3537 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick	
1.74 m (5 ft 9 in)	3563 kg (7854 lb)(1)
2.95 m (9 ft 8 in)	1785 kg (3935 lb)(1)
3.72 m (12 ft 3 in)	1304 kg (2874 lb)(1)

(continued)

(Table 26, contd)

422E Rated Operating Load For Backhoe Bucket Application	
4.32 m (14 ft 2 in)	1061 kg (2340 lb)(1)
4.81 m (15 ft 9 in)	906 kg (1998 lb)(1)
Backhoe Straight Back, Retracted E-Stick	
1.75 m (5 ft 9 in)	4702 kg (10365 lb)(1)
2.96 m (9 ft 8 in)	2595 kg (5721 lb)
3.73 m (12 ft 3 in)	2007 kg (4425 lb)
4.32 m (14 ft 2 in)	1693 kg (3732 lb)
4.81 m (15 ft 9 in)	1440 kg (3174 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.75 m (5 ft 9 in)	3243 kg (7150 lb)(1)
2.96 m (9 ft 8 in)	1583 kg (3489 lb)(1)
3.73 m (12 ft 3 in)	1123 kg (2476 lb)(1)
4.32 m (14 ft 2 in)	891 kg (1963 lb)(1)
4.81 m (15 ft 9 in)	742 kg (1637 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.17 m (7 ft 1 in)	1352 kg (2981 lb)
3.26 m (10 ft 8 in)	1635 kg (3604 lb)
4.28 m (14 ft 1 in)	1514 kg (3338 lb)
5.06 m (16 ft 7 in)	1356 kg (2989 lb)
5.73 m (18 ft 10 in)	1054 kg (2324 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.40 m (7 ft 10 in)	1137 kg (2506 lb)
3.26 m (10 ft 8 in)	1437 kg (3169 lb)
4.28 m (14 ft 1 in)	994 kg (2192 lb)(1)
5.06 m (16 ft 7 in)	742 kg (1635 lb)(1)
5.73 m (18 ft 10 in)	584 kg (1288 lb)(1)

(1) Limited by Tipping

Table 27

422E Rated Operating Load For Object Handling Application		
Lift Point Radius	**Rated Operating Load "SAE J31"/ "ISO 10567"**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.31 m (14 ft 2 inch)	1864 kg (4110 lb)	1864 kg (4110 lb)
4.81 m (15 ft 9 inch)	1604 kg (3537 lb)	1604 kg (3537 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	1785 kg (3935 lb)(1)	1785 kg (3935 lb)(1)
3.72 m (12 ft 3 inch)	1304 kg (2875 lb)(1)	1304 kg (2875 lb)(1)
4.31 m (14 ft 2 inch)	1061 kg (2339 lb)(1)	1061 kg (2339 lb)(1)
4.81 m (15 ft 9 inch)	906 kg (1997 lb)(1)	906 kg (1997 lb)(1)
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	1693 kg (3732 lb)	1693 kg (3732 lb)
4.81 m (15 ft 9 inch)	1440 kg (3175 lb)	1440 kg (3175 lb)
Backhoe Side Shifted, Swung to Side, Retracted E-Stick		
1.75 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	1583 kg (3490 lb)(1)	1583 kg (3490 lb)(1)
3.73 m (12 ft 3 inch)	1123 kg (2476 lb)(1)	1123 kg (2476 lb)(1)
4.32 m (14 ft 2 inch)	891 kg (1964 lb)(1)	891 kg (1964 lb)(1)
4.81 m (15 ft 9 inch)	742 kg (1636 lb)(1)	742 kg (1636 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.17 m (7 ft 2 inch)	1352 kg (2981 lb)	1352 kg (2981 lb)
3.26 m (10 ft 8 inch)	1635 kg (3605 lb)	1635 kg (3605 lb)
4.28 m (14 ft 1 inch)	1514 kg (3338 lb)	1514 kg (3338 lb)
5.06 m (16 ft 7 inch)	1356 kg (2989 lb)	1356 kg (2989 lb)
5.73 m (18 ft 9 inch)	999 kg (2202 lb)	999 kg (2202 lb)
Backhoe Side Shifted, Swung to Side, E-Stick		

(continued)

(Table 27, contd)

422E Rated Operating Load For Object Handling Application		
2.40 m (7 ft 10 inch)	1137 kg (2507 lb)	1137 kg (2507 lb)
3.26 m (10 ft 8 inch)	1437 kg (3168 lb)	1437 kg (3168 lb)
4.28 m (14 ft 1 inch)	994 kg (2191 lb)(1)	994 kg (2191 lb)(1)
5.06 m (16 ft 7 inch)	742 kg (1636 lb)(1)	742 kg (1636 lb)(1)
5.73 m (18 ft 9 inch)	584 kg (1287 lb)(1)	584 kg (1287 lb)(1)

(1) Limited by Tipping

428E Loader Buckets (Narrow Frame)

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

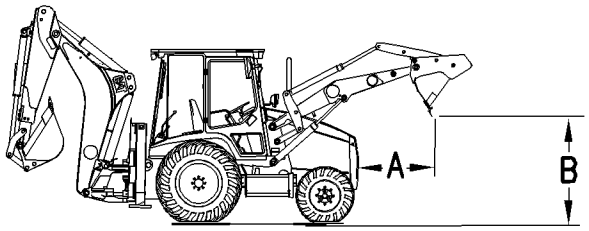


Illustration 44 g00285635

Dump Reach (A) and Dump Height (B)

Table 28

Rated Bucket Load For A 428E Parallel Lift Loader				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
320-9950	1.00 m^3 (1.31 yd^3)	3310 kg (7298 lb)	2355 mm (7 ft 9 inch)	789 mm (2 ft 7 inch)
320-9947	1.03 m^3 (1.35 yd^3)	3147 kg (6938 lb)	2355 mm (7 ft 9 inch)	789 mm (2 ft 7 inch)

428E Pallet Forks (Narrow Frame)

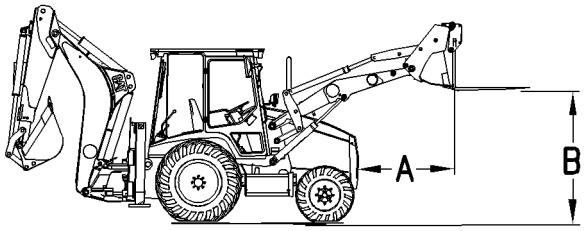


Illustration 45 g00285636

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with flip over forks and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 29

Rated Load For Flip Over Fork 428E Single Tilt					
Part Number	**Volumetric Rating**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
320-9947	0.96 m^3 (1.26 yd^3)	1602 kg (3532 lb)	1568 kg (3458 lb)	2855 mm (9 ft 4 inch)	1231 mm (4 ft 0 inch)

428E Loader Buckets

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

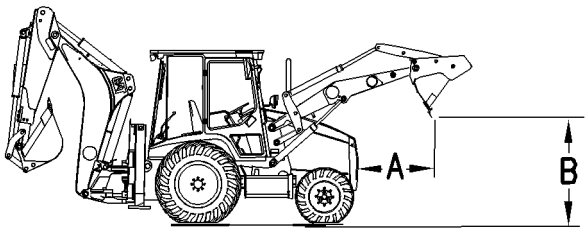


Illustration 46 g00285635

Dump Reach (A) and Dump Height (B)

Table 30

Rated Bucket Load For A 428E Parallel Lift Loader				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
112-1931	1.00 m^3 (1.31 yd^3)	3144 kg (6932 lb)(1)	2574 mm (8 ft 5 inch)	743 mm (2 ft 5 inch)
318-7263	1.03 m^3 (1.35 yd^3)	3124 kg (6888 lb)(1)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)
318-7247	1.03 m^3 (1.35 yd^3)	3102 kg (6839 lb)(1)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)
318-7264	1.03 m^3 (1.35 yd^3)	2981 kg (6537 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)

(1) Limited by Tipping

428E Pallet Forks

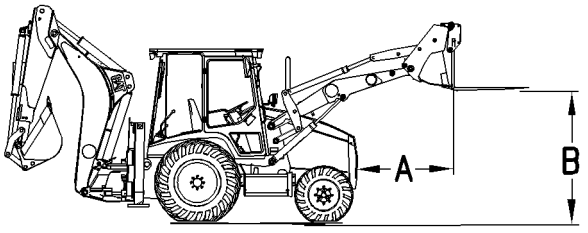


Illustration 47 g00285636

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with flip over forks and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 31

Rated Load For Flip Over Fork 428E Parallel Lift					
Part Number	**Volumetric Rating**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
318-7264	1.03 m^3 (1.35 yd^3)	1563 kg (3446 lb)	1530 kg (3372 lb)	3092 mm (10 ft 2 inch)	1039 mm (3 ft 5 inch)

428E Backhoe Lifting (Narrow Frame)

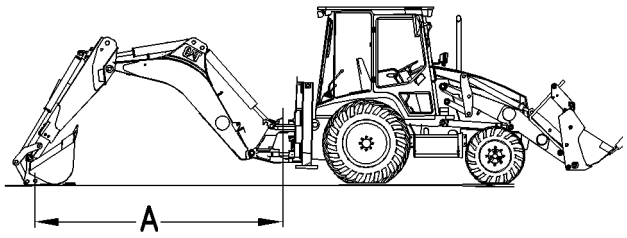


Illustration 48 g00286077

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads do not include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 32

Rated Operating Load For 428E With Backhoe Bucket	
Lift Point Radius	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick	
1.74 m (5 ft 9 inch)	5102 kg (11248 lb)(1)
2.95 m (9 ft 8 inch)	2769 kg (6105 lb)
3.72 m (12 ft 3 inch)	2174 kg (4793 lb)
4.32 m (14 ft 2 inch)	1860 kg (4101 lb)
4.81 m (15 ft 9 inch)	1609 kg (3548 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick	
1.74 m (5 ft 9 inch)	3219 kg (7097 lb)(1)
2.95 m (9 ft 8 inch)	1659 kg (3657 lb)(1)
3.72 m (12 ft 3 inch)	1219 kg (2687 lb)(1)

(continued)

(Table 32, contd)

Rated Operating Load For 428E With Backhoe Bucket	
4.32 m (14 ft 2 inch)	994 kg (2191 lb)(1)
4.81 m (15 ft 9 inch)	849 kg (1873 lb)(1)
Backhoe Straight Back, Retracted E-Stick	
1.75 m (5 ft 9 inch)	5170 kg (11397 lb)(1)
2.96 m (9 ft 8 inch)	2573 kg (5672 lb)
3.73 m (12 ft 3 inch)	2002 kg (4414 lb)
4.32 m (14 ft 2 inch)	1699 kg (3746 lb)
4.81 m (15 ft 9 inch)	1455 kg (3208 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.75 m (5 ft 9 inch)	3036 kg (6693 lb)(1)
2.96 m (9 ft 8 inch)	1530 kg (3373 lb)(1)
3.73 m (12 ft 3 inch)	1097 kg (2418 lb)(1)
4.32 m (14 ft 2 inch)	875 kg (1929 lb)(1)
4.81 m (15 ft 9 inch)	733 kg (1615 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.39 m (7 ft 10 inch)	1147 kg (2529 lb)
3.26 m (10 ft 8 inch)	1448 kg (3192 lb)
4.28 m (14 ft 1 inch)	1432 kg (3157 lb)
5.06 m (16 ft 7 inch)	1327 kg (2925 lb)
5.73 m (18 ft 9 inch)	1062 kg (2340 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.40 m (7 ft 10 inch)	1141 kg (2516 lb)
3.26 m (10 ft 8 inch)	1441 kg (3178 lb)
4.28 m (14 ft 1 inch)	983 kg (2168 lb)(1)
5.06 m (16 ft 7 inch)	739 kg (1629 lb)(1)
5.73 m (18 ft 9 inch)	585 kg (1291 lb)(1)

(1) Limited by Tipping

Table 33

428E Rated Operating Load For Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick		
1.74 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	1860 kg (4101 lb)	1860 kg (4101 lb)
4.81 m (15 ft 9 inch)	1609 kg (3548 lb)	1609 kg (3548 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick		
1.74 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	1659 kg (3657 lb)(1)	1714 kg (3779 lb)(1)
3.72 m (12 ft 2 inch)	1219 kg (2687 lb)(1)	1233 kg (2718 lb)(1)
4.32 m (14 ft 2 inch)	994 kg (2191 lb)(1)	994 kg (2191 lb)(1)
4.81 m (15 ft 9 inch)	849 kg (1873 lb)(1)	849 kg (1873 lb)(1)
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	1699 kg (3746 lb)	1699 kg (3746 lb)
4.81 m (15 ft 9 inch)	1455 kg (3208 lb)	1455 kg (3208 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.75 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	1530 kg (3373 lb)(1)	1530 kg (3373 lb)(1)
3.73 m (12 ft 2 inch)	1097 kg (2418 lb)(1)	1097 kg (2418 lb)(1)
4.32 m (14 ft 2 inch)	875 kg (1929 lb)(1)	875 kg (1929 lb)(1)
4.81 m (15 ft 9 inch)	733 kg (1615 lb)(1)	733 kg (1615 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.39 m (7 ft 10 inch)	1147 kg (2529 lb)	1147 kg (2529 lb)
3.26 m (10 ft 8 inch)	1448 kg (3192 lb)	1448 kg (3192 lb)
4.28 m (14 ft 1 inch)	1432 kg (3157 lb)	1432 kg (3157 lb)
5.06 m (16 ft 7 inch)	1327 kg (2925 lb)	1327 kg (2925 lb)
5.73 m (18 ft 9 inch)	1007 kg (2221 lb)	1007 kg (2221 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.40 m (7 ft 10 inch)	1141 kg (2516 lb)	1141 kg (2516 lb)

(continued)

(Table 33, contd)

428E Rated Operating Load For Object Handling Application		
3.26 m (10 ft 8 inch)	1441 kg (3178 lb)	1441 kg (3178 lb)
4.28 m (14 ft 1 inch)	983 kg (2168 lb)(1)	983 kg (2168 lb)(1)
5.06 m (16 ft 7 inch)	739 kg (1629 lb)(1)	739 kg (1629 lb)(1)
5.73 m (18 ft 9 inch)	585 kg (1291 lb)(1)	585 kg (1291 lb)(1)

(1) Limited by Tipping

428E Backhoe Lifting (Standard Frame)

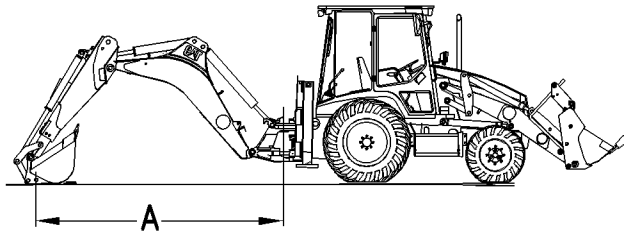


Illustration 49 g00286077

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads do not include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 34

Rated Operating Load For 428E With Backhoe Bucket	
Lift Point Radius	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick	
1.74 m (5 ft 8 inch)	5423 kg (11956 lb)(1)
2.95 m (9 ft 8 inch)	2769 kg (6105 lb)
3.72 m (12 ft 2 inch)	2174 kg (4793 lb)
4.32 m (14 ft 2 inch)	1860 kg (4101 lb)
4.81 m (15 ft 9 inch)	1609 kg (3548 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick	

(continued)

(Table 34, contd)

Rated Operating Load For 428E With Backhoe Bucket	
1.74 m (5 ft 8 inch)	3866 kg (8523 lb)(1)
2.95 m (9 ft 8 inch)	1942 kg (4281 lb)(1)
3.72 m (12 ft 2 inch)	1424 kg (3138 lb)(1)
4.32 m (14 ft 2 inch)	1163 kg (2563 lb)(1)
4.81 m (15 ft 9 inch)	996 kg (2197 lb)(1)
Backhoe Straight Back, Retracted E-Stick	
1.75 m (5 ft 8 inch)	5107 kg (11259 lb)(1)
2.96 m (9 ft 8 inch)	2563 kg (5651 lb)
3.73 m (12 ft 2 inch)	1992 kg (4393 lb)
4.32 m (14 ft 2 inch)	1689 kg (3723 lb)
4.81 m (15 ft 9 inch)	1444 kg (3184 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.75 m (5 ft 8 inch)	3534 kg (7792 lb)(1)
2.96 m (9 ft 8 inch)	1733 kg (3822 lb)(1)
3.73 m (12 ft 2 inch)	1238 kg (2730 lb)(1)
4.32 m (14 ft 2 inch)	988 kg (2197 lb)(1)
4.81 m (15 ft 9 inch)	829 kg (1828 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.36 m (7 ft 9 inch)	1167 kg (2573 lb)
3.26 m (10 ft 8 inch)	1467 kg (3235 lb)
4.28 m (14 ft 1 inch)	1437 kg (3168 lb)
5.06 m (16 ft 7 inch)	1324 kg (2919 lb)
5.73 m (18 ft 9 inch)	1054 kg (2324 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.40 m (7 ft 10 inch)	1134 kg (2499 lb)
3.26 m (10 ft 8 inch)	1433 kg (3160 lb)
4.28 m (14 ft 1 inch)	1099 kg (2423 lb)(1)
5.06 m (16 ft 7 inch)	829 kg (1827 lb)(1)
5.73 m (18 ft 9 inch)	660 kg (1456 lb)(1)

(1) Limited by Tipping

Table 35

428E Rated Operating Load For Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick		
1.74 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	1860 kg (4101 lb)	1860 kg (4101 lb)
4.81 m (15 ft 9 inch)	1609 kg (3547 lb)	1609 kg (3547 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick		
1.74 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	1942 kg (4281 lb) (1)	1942 kg (4281 lb)(1)
3.72 m (12 ft 2 inch)	1424 kg (3139 lb) (1)	1424 kg (3139 lb)(1)
4.32 m (14 ft 2 inch)	1163 kg (2564 lb) (1)	1163 kg (2564 lb)(1)
4.81 m (15 ft 9 inch)	996 kg (2196 lb)(1)	996 kg (2196 lb)(1)
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 2 inch)	1992 kg (4392 lb)	1992 kg (4392 lb)
4.32 m (14 ft 2 inch)	1689 kg (3724 lb)	1689 kg (3724 lb)
4.81 m (15 ft 9 inch)	1444 kg (3183 lb)	1444 kg (3183 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.75 m (5 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	1733 kg (3821 lb) (1)	1733 kg (3821 lb)(1)
3.73 m (12 ft 2 inch)	1238 kg (2729 lb) (1)	1238 kg (2729 lb)(1)
4.32 m (14 ft 2 inch)	988 kg (2178 lb)(1)	988 kg (2178 lb)(1)
4.81 m (15 ft 9 inch)	829 kg (1828 lb)(1)	829 kg (1828 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.36 m (7 ft 9 inch)	1167 kg (2573 lb)	1167 kg (2573 lb)
3.26 m (10 ft 8 inch)	1467 kg (3235 lb)	1467 kg (3235 lb)
4.28 m (14 ft 1 inch)	1437 kg (3168 lb)	1437 kg (3168 lb)
5.06 m (16 ft 7 inch)	1324 kg (2919 lb)	1324 kg (2919 lb)

(continued)

(Table 35, contd)

428E Rated Operating Load For Object Handling Application		
5.73 m (18 ft 9 inch)	1054 kg (2324 lb)	1054 kg (2324 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.40 m (7 ft 10 inch)	1134 kg (2499 lb)	1134 kg (2499 lb)
3.26 m (10 ft 8 inch)	1433 kg (3160 lb)	1433 kg (3160 lb)
4.28 m (14 ft 1 inch)	1099 kg (2423 lb) (1)	1099 kg (2423 lb)(1)
5.06 m (16 ft 7 inch)	829 kg (1827 lb)(1)	829 kg (1827 lb)(1)
5.73 m (18 ft 9 inch)	660 kg (1456 lb)(1)	660 kg (1456 lb)(1)

(1) Limited by Tipping

432E Loader Buckets

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

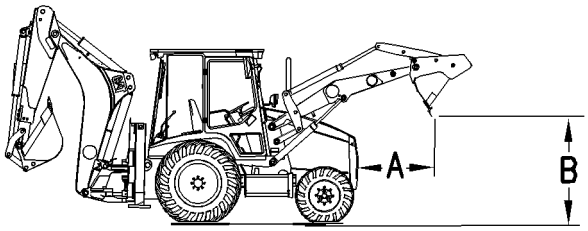


Illustration 50 g00285635

Dump Reach (A) and Dump Height (B)

Table 36

Rated Bucket Load For A 432E Parallel Lift Loader				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
112-1931	1.00 m^3 (1.31 yd^3)	3342 kg (7369 lb)	2575 mm (8 ft 5 inch)	743 mm (2 ft 5 inch)
318-7263	1.03 m^3 (1.35 yd^3)	3229 kg (7119 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)
318-7264	1.03 m^3 (1.35 yd^3)	3102 kg (6840 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)
320-9950	1.03 m^3 (1.35 yd^3)	3132 kg (6904 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)
320-9947	0.96 m^3 (1.26 yd^3)	3082 kg (6795 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)

Table 37

Rated Bucket Load For A 432E Parallel Lift Loader With Quick Coupler				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
118-1984	1.03 m^3 (1.35 yd^3)	3234 kg (7131 lb)(1)	2488 mm (8 ft 2 inch)	775 mm (2 ft 6 inch)
318-7267	1.03 m^3 (1.35 yd^3)	3076 kg (6781 lb)	2540 mm (8 ft 4 inch)	726 mm (2 ft 5 inch)

(1) Limited by Tipping

432E Pallet Forks

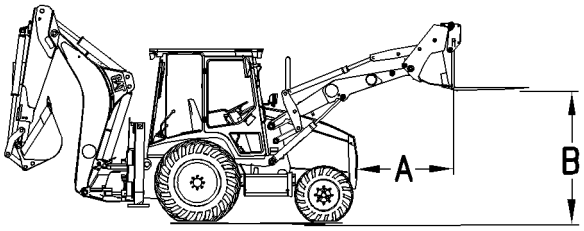


Illustration 51 g00285636

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with flip over forks and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 38

Rated Load For Flip Over Fork 432E Parallel Lift					
Part Number	**Volumetric Rating**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
318-7264	1.03 m^3 (1.35 yd^3)	1608 kg (3545 lb)	1573 kg (3469 lb)	3093 mm (10 ft 2 inch)	1038 mm (3 ft 5 inch)
320-9947	0.96 m^3 (1.26 yd^3)	1565 kg (3449 lb)	1532 kg (3377 lb)	3073 mm (10 ft 1 inch)	1032 mm (3 ft 5 inch)

Table 39

Rated Load For 432E With Pallet Forks And Parallel Lift With Quick Coupler					
Part Number	**Fork Tine Length**	**"CEN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
6W-8933	1050 mm (3 ft 5 inch)	2743 kg (6047 lb)	2285 kg (5037 lb) (1)	3200 mm (10 ft 6 inch)	637 mm (2 ft 1 inch)
6W-8900	1200 mm (3 ft 11 inch)	2741 kg (6043 lb)	2216 kg (4885 lb) (1)	3200 mm (10 ft 6 inch)	637 mm (2 ft 1 inch)
6W-9739	1350 mm (4 ft 5 inch)	2739 kg (6038 lb)	2151 kg (4741 lb) (1)	3200 mm (10 ft 6 inch)	637 mm (2 ft 1 inch)

(1) Limited by Tipping

432E Material Handling Arm

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the material handling arm and for the lowest position of the material handling arm.

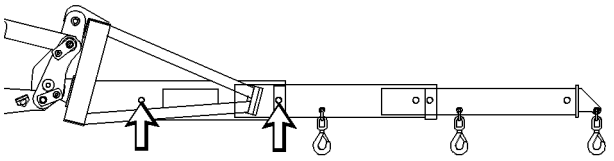


Illustration 52 g00285638

The following table provides the rated operating loads for the standard parallel lift machine configuration with a material handling arm and with a quick coupler.

Table 40

432E Rated Load For Material Handling Arm "EN 474-4"			
	Retracted	**Mid-Position**	**Extended**
Rated Operating Load	1049 kg (2313 lb)	667 kg (1470 lb)	489 kg (1078 lb)
Placement Height at Lowest Position	−2546 mm (−8 ft 4 inch)	−3544 mm (−11 ft 8 inch)	−4543 mm (−14 ft 11 inch)
Reach at Lowest Position	666 mm (2 ft 2 inch)	704 mm (2 ft 3 inch)	742 mm (2 ft 5 inch)

(continued)

(Table 40, contd)

432E Rated Load For Material Handling Arm "EN 474-4"			
	Retracted	**Mid-Position**	**Extended**
Placement Height at Highest Position	4505 mm (14 ft 9 inch)	5355 mm (17 ft 6 inch)	6206 mm (20 ft 4 inch)
Reach at Highest Position	1400 mm (4 ft 7 inch)	1923 mm (6 ft 4 inch)	2449 mm (8 ft 1 inch)

432E Truss Boom

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the truss boom and for the lowest position of the truss boom.

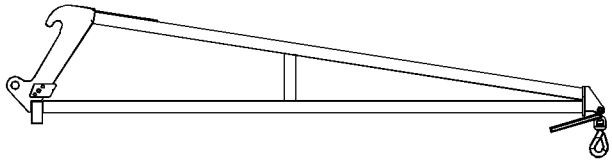


Illustration 53 g02042134

The following table provides the rated operating loads for the standard parallel lift machine configuration with a truss boom.

Table 41

432E Rated Load For Truss Boom“EN 474-4”	
	Fixed Position
Rated Operating Load	501 kg (1105 lb)
Placement Height at Lowest Position	−4033 mm (−13 ft 3 inch)
Reach at Lowest Position	743 mm (2 ft 5 inch)
Placement Height at Highest Position	7219 mm (23 ft 7 inch)
Reach at Highest Position	1337 mm (4 ft 4 inch)
Maximum Horizontal Reach	5142 mm (16 ft 10 inch)
Height at Maximum Reach	1633 mm (5 ft 4 inch)

432E Hook

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the hook and for the lowest position of the hook.

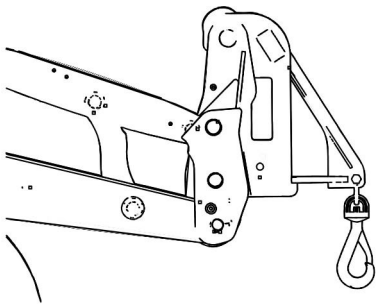


Illustration 54 g02042153

The following table provides the rated operating loads for the standard parallel lift machine configuration with a hook.

Table 42

432E Rated Load For Hook“EN 474-4”	
	Fixed Position
Rated Operating Load	3451 kg (7608 lb)
Placement Height at Lowest Position	−466 mm (−1 ft 6 inch)
Reach at Lowest Position	607 mm (2 ft 0 inch)
Placement Height at Highest Position	3733 mm (12 ft 3 inch)
Reach at Highest Position	557 mm (1 ft 10 inch)

(continued)

(Table 42, contd)

432E Rated Load For Hook“EN 474-4”	
	Fixed Position
Maximum Horizontal Reach	1576 mm (5 ft 2 inch)
Height at Maximum Reach	1589 mm (5 ft 2 inch)

432E Backhoe Lifting (Narrow Frame)

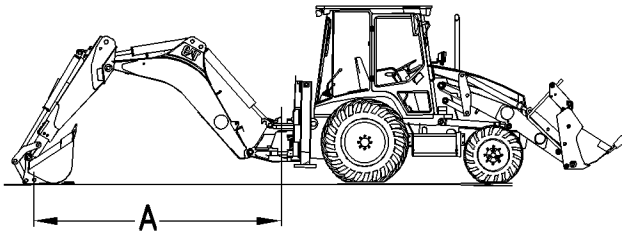


Illustration 55 g00286077

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 43

Rated Operating Load For 432E With Backhoe Bucket	
Lift Point Radius	**Rated Operating Load “EN 474-4”**
Backhoe Straight Back, Standard Stick	
1.74 m (5 ft 9 inch)	5494 kg (12113 lb)(1)
2.95 m (9 ft 8 inch)	3368 kg (7424 lb)(1)
3.72 m (12 ft 3 inch)	2658 kg (5859 lb)
4.32 m (14 ft 2 inch)	2274 kg (5014 lb)(1)
4.81 m (15 ft 9 inch)	1979 kg (4364 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick	
1.74 m (5 ft 9 inch)	3279 kg (7229 lb)(1)
2.95 m (9 ft 8 inch)	1691 kg (3727 lb)(1)

(continued)

(Table 43, contd)

Rated Operating Load For 432E With Backhoe Bucket	
3.72 m (12 ft 3 inch)	1241 kg (2737 lb)(1)
4.32 m (14 ft 2 inch)	1012 kg (2231 lb)(1)
4.81 m (15 ft 9 inch)	864 kg (1905 lb)(1)
Backhoe Straight Back, Retracted E-Stick	
1.75 m (5 ft 9 inch)	5561 kg (12260 lb)(1)
2.96 m (9 ft 8 inch)	3175 kg (7001 lb)
3.73 m (12 ft 3 inch)	2484 kg (5477 lb)
4.32 m (14 ft 2 inch)	2118 kg (4670 lb)
4.81 m (15 ft 9 inch)	1825 kg (4022 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.75 m (5 ft 9 inch)	3095 kg (6824 lb)(1)
2.96 m (9 ft 8 inch)	1562 kg (3443 lb)(1)
3.73 m (12 ft 3 inch)	1119 kg (2468 lb)(1)
4.32 m (14 ft 2 inch)	893 kg (1968 lb)(1)
4.81 m (15 ft 9 inch)	747 kg (1648 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.36 m (7 ft 9 inch)	1457 kg (3212 lb)
3.26 m (10 ft 8 inch)	1831 kg (4036 lb)
4.28 m (14 ft 1 inch)	1800 kg (3969 lb)
5.06 m (16 ft 7 inch)	1668 kg (3677 lb)
5.73 m (18 ft 10 inch)	1440 kg (3176 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.40 m (7 ft 10 inch)	1417 kg (3125 lb)
3.26 m (10 ft 8 inch)	1537 kg (3389 lb)(1)
4.28 m (14 ft 1 inch)	1006 kg (2217 lb)(1)
5.06 m (16 ft 7 inch)	755 kg (1665 lb)(1)
5.73 m (18 ft 10 inch)	598 kg (1319 lb)(1)

(1) Limited by Tipping

Table 44

432E Rated Operating Load For Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)

(continued)

(Table 44, contd)

432E Rated Operating Load For Object Handling Application		
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.81 m (15 ft 9 inch)	1979 kg (4364 lb)	1979 kg (4364 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	1691 kg (3727 lb)(1)	1691 kg (3727 lb)(1)
3.72 m (12 ft 3 inch)	1241 kg (2737 lb)(1)	1241 kg (2737 lb)
4.32 m (14 ft 2 inch)	1012 kg (2231 lb)(1)	1012 kg (2231 lb)(1)
4.81 m (15 ft 9 inch)	864 kg (1905 lb)(1)	864 kg (1905 lb)(1)
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.81 m (15 ft 9 inch)	1825 kg (4022 lb)	1825 kg (4022 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	1562 kg (3443 lb)(1)	1562 kg (3443 lb)(1)
3.73 m (12 ft 3 inch)	1119 kg (2468 lb)(1)	1119 kg (2468 lb)(1)
4.32 m (14 ft 2 inch)	893 kg (1968 lb)(1)	893 kg (1968 lb)(1)
4.81 m (15 ft 9 inch)	747 kg (1648 lb)(1)	747 kg (1648 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.36 m (7 ft 9 inch)	1457 kg (3212 lb)	1457 kg (3212 lb)
3.26 m (10 ft 8 inch)	1831 kg (4036 lb)	1831 kg (4036 lb)
4.28 m (14 ft 1 inch)	1800 kg (3969 lb)	1800 kg (3969 lb)
5.06 m (16 ft 7 inch)	1668 kg (3677 lb)	1668 kg (3677 lb)
5.73 m (18 ft 10 inch)	1440 kg (3167 lb)	1253 kg (2763 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.40 m (7 ft 10 inch)	1417 kg (3125 lb)	1417 kg (3125 lb)
3.26 m (10 ft 8 inch)	1537 kg (3389 lb)(1)	1537 kg (3389 lb)(1)
4.28 m (14 ft 1 inch)	1006 kg (2217 lb)(1)	1006 kg (2217 lb)(1)

(continued)

(Table 44, contd)

432E Rated Operating Load For Object Handling Application		
5.06 m (16 ft 7 inch)	755 kg (1665 lb)(1)	755 kg (1665 lb)(1)
5.73 m (18 ft 10 inch)	598 kg (1319 lb)(1)	598 kg (1319 lb)(1)

(1) Limited by Tipping

432E Backhoe Lifting (Standard Frame)

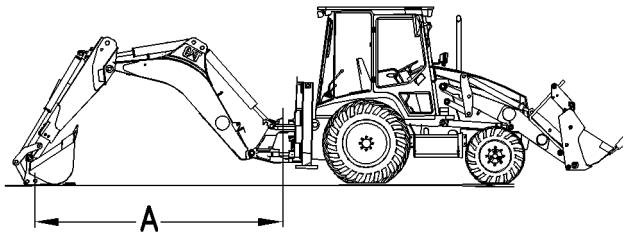


Illustration 56 g00286077

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 45

Rated Operating Load For 432E With Backhoe Bucket	
Lift Point Radius	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick	
1.74 m (5 ft 9 inch)	5957 kg (13134 lb)(1)
2.95 m (9 ft 8 inch)	3374 kg (7439 lb)
3.72 m (12 ft 3 inch)	2658 kg (5859 lb)
4.32 m (14 ft 2 inch)	2280 kg (5027 lb)
4.81 m (15 ft 9 inch)	1979 kg (4364 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick	
1.74 m (5 ft 9 inch)	4076 kg (8987 lb)(1)
2.95 m (9 ft 8 inch)	2079 kg (4582 lb)(1)

(continued)

(Table 45, contd)

Rated Operating Load For 432E With Backhoe Bucket	
3.72 m (12 ft 3 inch)	1532 kg (3377 lb)(1)
4.32 m (14 ft 2 inch)	1256 kg (2768 lb)(1)
4.81 m (15 ft 9 inch)	1079 kg (2379 lb)(1)
Backhoe Straight Back, Retracted E-Stick	
1.75 m (5 ft 9 inch)	5565 kg (12269 lb)(1)
2.96 m (9 ft 8 inch)	3175 kg (7001 lb)
3.73 m (12 ft 3 inch)	2484 kg (5477 lb)
4.32 m (14 ft 2 inch)	2118 kg (4670 lb)
4.81 m (15 ft 9 inch)	1825 kg (4022 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.75 m (5 ft 9 inch)	3630 kg (8002 lb)(1)
2.96 m (9 ft 8 inch)	1814 kg (3998 lb)(1)
3.73 m (12 ft 3 inch)	1306 kg (2880 lb)(1)
4.32 m (14 ft 2 inch)	1049 kg (2312 lb)(1)
4.81 m (15 ft 9 inch)	884 kg (1950 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.36 m (7 ft 9 inch)	1457 kg (3212 lb)
3.26 m (10 ft 8 inch)	1831 kg (4036 lb)
4.28 m (14 ft 1 inch)	1800 kg (3969 lb)
5.06 m (16 ft 7 inch)	1668 kg (3677 lb)
5.73 m (18 ft 10 inch)	1440 kg (3176 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.40 m (7 ft 10 inch)	1417 kg (3125 lb)
3.26 m (10 ft 8 inch)	1759 kg (3879 lb)(1)
4.28 m (14 ft 1 inch)	1163 kg (2563 lb)(1)
5.06 m (16 ft 7 inch)	884 kg (1948 lb)(1)
5.73 m (18 ft 10 inch)	709 kg (1563 lb)(1)

(1) Limited by Tipping

Table 46

432E Rated Operating Load For Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)

(continued)

(Table 46, contd)

432E Rated Operating Load For Object Handling Application		
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.81 m (15 ft 9 inch)	1979 kg (4364 lb)	1979 kg (4364 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	1532 kg (3377 lb)(1)	1532 kg (3377 lb)(1)
4.32 m (14 ft 2 inch)	1256 kg (2768 lb)(1)	1256 kg (2768 lb)(1)
4.81 m (15 ft 9 inch)	1079 kg (2379 lb)(1)	1079 kg (2379 lb)(1)
Backhoe Straight Back, Retracted E-Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.81 m (15 ft 9 inch)	1825 kg (4022 lb)	1825 kg (4022 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	1814 kg (3998 lb)(1)	1814 kg (3998 lb)(1)
3.72 m (12 ft 3 inch)	1306 kg (2880 lb)(1)	1306 kg (2880 lb)(1)
4.32 m (14 ft 2 inch)	1049 kg (2312 lb)(1)	1049 kg (2312 lb)(1)
4.81 m (15 ft 9 inch)	884 kg (1950 lb)(1)	884 kg (1950 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.36 m (7 ft 9 inch)	1457 kg (3212 lb)	1457 kg (3212 lb)
3.26 m (10 ft 8 inch)	1831 kg (4036 lb)	1831 kg (4036 lb)
4.28 m (14 ft 1 inch)	1800 kg (3969 lb)	1800 kg (3969 lb)
5.06 m (16 ft 7 inch)	1668 kg (3677 lb)	1668 kg (3677 lb)
5.73 m (18 ft 10 inch)	1440 kg (3176 lb)	1440 kg (3176 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.40 m (7 ft 10 inch)	1417 kg (3125 lb)	1417 kg (3125 lb)
3.26 m (10 ft 8 inch)	1759 kg (3879 lb)(1)	1759 kg (3879 lb)(1)
4.28 m (14 ft 1 inch)	1163 kg (2563 lb)(1)	1163 kg (2563 lb)(1)
5.06 m (16 ft 7 inch)	884 kg (1948 lb)(1)	884 kg (1948 lb)(1)
5.73 m (18 ft 10 inch)	709 kg (1563 lb)(1)	709 kg (1563 lb)(1)

(continued)

(Table 46, contd)
(1) Limited by Tipping

434E Loader Buckets (Pilot Controls)

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

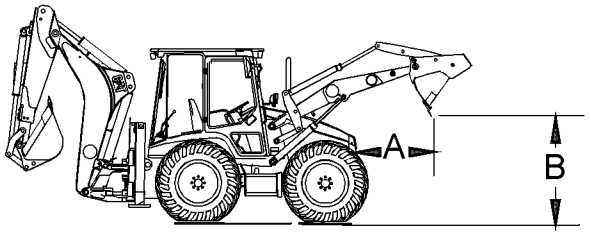


Illustration 57 g01205342
Dump Reach (A) and Dump Height (B)

Table 47

Rated Bucket Load For A 434E Parallel Lift Loader				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
248 - 0960	1.15 m^3 (1.50 yd^3)	3273 kg (7215 lb)	2636 mm (8 ft 8 inch)	905 mm (3 ft 0 inch)
318 - 7260	1.15 m^3 (1.50 yd^3)	3223 kg (7105 lb)	2647 mm (8 ft 8 inch)	886 mm (2 ft 11 inch)
318 - 7261	1.15 m^3 (1.50 yd^3)	3127 kg (6894 lb)	2647 mm (8 ft 8 inch)	886 mm (2 ft 11 inch)
318 - 7258	1.15 m^3 (1.50 yd^3)	2965 kg (6536 lb)	2647 mm (8 ft 8 inch)	886 mm (2 ft 11 inch)

Table 48

Rated Bucket Load For A 434E Parallel Lift Loader With Quick Coupler				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
248 - 0962	1.30 m^3 (1.70 yd^3)	3139 kg (6921 lb)	2558 mm (8 ft 5 inch)	965 mm (3 ft 2 inch)
320 - 9940	1.30 m^3 (1.70 yd^3)	2938 kg (6478 lb)	2546 mm (8 ft 4 inch)	985 mm (3 ft 3 inch)

434E Pallet Forks (Pilot Controls)

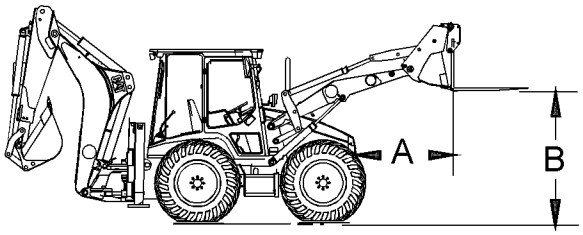


Illustration 58 g01205364

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with flip over forks and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 49

Rated Load For 434E With Flip Over Forks And Parallel Lift					
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
318 - 7258	1.15 m^3 (1.50 yd^3)	1615 kg (3561 lb)	1584 kg (3491 lb)	3196 mm (10 ft 6 inch)	1295 mm (4 ft 3 inch)

Table 50

Rated Load For 434E With Pallet Forks And Parallel Lift With Quick Coupler					
Bucket Part Number	**Fork Tine Length**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
6W-8933	1050 mm (3 ft 5 inch)	2845 kg (6271 lb)(1)	2348 kg (5177 lb)(1)	3322 mm (10 ft 11 inch)	792 mm (2 ft 7 inch)
6W-8900	1200 mm (3 ft 11 inch)	2842 kg (6266 lb)(1)	2282 kg (5030 lb)(1)	3322 mm (10 ft 11 inch)	792 mm (2 ft 7 inch)
6W-9739	1350 mm (4 ft 5 inch)	2839 kg (6260 lb)(1)	2219 kg (4891 lb)(1)	3322 mm (10 ft 11 inch)	792 mm (2 ft 7 inch)

(1) Limited by Tipping

434E Material Handling Arm (Pilot Controls)

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the material handling arm and for the lowest position of the material handling arm.

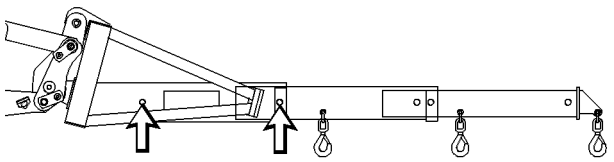


Illustration 59 g00285638

The following table provides the rated operating loads for the standard parallel lift machine configuration with a material handling arm and with a quick coupler.

Table 51

434E Rated Load For Material Handling Arm "EN 474-4"			
	Retracted	**Mid-Position**	**Extended**
Rated Operating Load	1227 kg (2705 lb)	787 kg (1735 lb)	579 kg (1276 lb)
Placement Height at Lowest Position	−2129 mm (−7 ft 0 inch)	−3126 mm (−10 ft 3 inch)	−4126 mm (−13 ft 6 inch)
Reach at Lowest Position	584 mm (1 ft 11 inch)	610 mm (2 ft 0 inch)	635 mm (2 ft 1 inch)

(continued)

(Table 51, contd)

434E Rated Load For Material Handling Arm "EN 474-4"			
	Retracted	**Mid-Position**	**Extended**
Placement Height at Highest Position	5036 mm (16 ft 6 inch)	5839 mm (19 ft 2 inch)	6642 mm (21 ft 9 inch)
Reach at Highest Position	1656 mm (5 ft 5 inch)	2228 mm (7 ft 4 inch)	2802 mm (9 ft 2 inch)

434E Truss Boom

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the truss boom and for the lowest position of the truss boom.

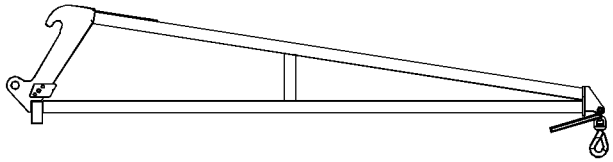


Illustration 60 g02042134

The following table provides the rated operating loads for the standard parallel lift machine configuration with a truss boom.

Table 52

434E Rated Load For Truss Boom“EN 474-4”	
	Fixed Position
Rated Operating Load	589 kg (1298 lb)
Placement Height at Lowest Position	−4146 mm (−13 ft 7 inch)
Reach at Lowest Position	578 mm (1 ft 10 inch)
Placement Height at Highest Position	7240 mm (23 ft 9 inch)
Reach at Highest Position	1722 mm (5 ft 8 inch)
Maximum Horizontal Reach	5210 mm (17 ft 1 inch)
Height at Maximum Reach	1570 mm (5 ft 2 inch)

434E Hook

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the hook and for the lowest position of the hook.

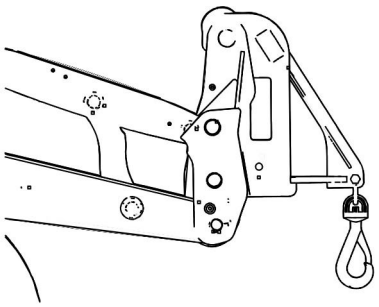


Illustration 61 g02042153

The following table provides the rated operating loads for the standard parallel lift machine configuration with a hook.

Table 53

434E Rated Load For Hook“EN 474-4”	
	Fixed Position
Rated Operating Load	3459 kg (7625 lb)
Placement Height at Lowest Position	−580 mm (−1 ft 10 inch)
Reach at Lowest Position	537 mm (1 ft 9 inch)
Placement Height at Highest Position	3811 mm (12 ft 5 inch)
Reach at Highest Position	739 mm (2 ft 5 inch)

(continued)

(Table 53, contd)

434E Rated Load For Hook“EN 474-4”	
	Fixed Position
Maximum Horizontal Reach	1642 mm (5 ft 4 inch)
Height at Maximum Reach	1620 mm (5 ft 3 inch)

434E Backhoe Lifting (Pilot Controls)

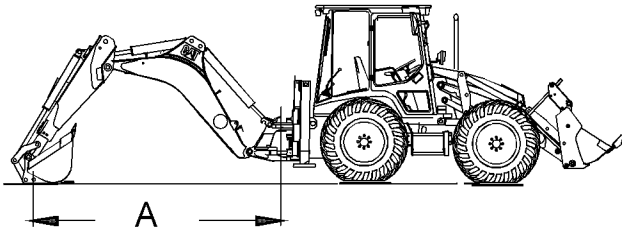


Illustration 62 g01205365

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 54

Rated Load For 434E Backhoe Bucket	
Lift Point Radius	**Rated Operating Load “EN 474-4”**
Backhoe Straight Back, Standard Stick	
1.74 m (5 ft 9 inch)	6771 kg (14928 lb)
2.95 m (9 ft 8 inch)	3332 kg (7346 lb)
3.72 m (12 ft 3 inch)	2629 kg (5759 lb)
4.32 m (14 ft 2 inch)	2259 kg (4981 lb)
4.81 m (15 ft 9 inch)	1965 kg (4332 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick	
1.74 m (5 ft 9 inch)	5085 kg (11210 lb)(1)
2.95 m (9 ft 8 inch)	2561 kg (5646 lb)(1)

(continued)

(Table 54, contd)

Rated Load For 434E Backhoe Bucket	
3.72 m (12 ft 3 inch)	1890 kg (4166 lb)(1)
4.32 m (14 ft 2 inch)	1554 kg (3426 lb)(1)
4.81 m (15 ft 9 inch)	1341 kg (2956 lb)(1)
Backhoe Straight Back, Retracted E-Stick	
1.74 m (5 ft 9 inch)	6413 kg (14137 lb)
2.95 m (9 ft 8 inch)	3124 kg (6888 lb)
3.72 m (12 ft 3 inch)	2446 kg (5392 lb)
4.32 m (14 ft 2 inch)	2087 kg (4601 lb)
4.81 m (15 ft 9 inch)	1799 kg (3967 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.74 m (5 ft 9 inch)	4745 kg (10461 lb)(1)
2.96 m (9 ft 8 inch)	2350 kg (5180 lb)(1)
3.73 m (12 ft 3 inch)	1703 kg (3755 lb)(1)
4.32 m (14 ft 2 inch)	1379 kg (3039 lb)(1)
4.81 m (15 ft 9 inch)	1173 kg (2586 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.28 m (7 ft 6 inch)	1518 kg (3347 lb)
3.26 m (10 ft 8 inch)	1887 kg (4160 lb)
4.28 m (14 ft 1 inch)	1813 kg (3997 lb)
5.06 m (16 ft 7 inch)	1659 kg (3657 lb)
5.73 m (18 ft 10 inch)	1416 kg (3123 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.40 m (7 ft 10 inch)	1397 kg (3080 lb)
3.26 m (10 ft 8 inch)	1766 kg (3894 lb)
4.28 m (14 ft 1 inch)	1493 kg (3291 lb)(1)
5.06 m (16 ft 7 inch)	1151 kg (2537 lb)(1)
5.73 m (18 ft 10 inch)	938 kg (2068 lb)(1)

(1) Limited by Tipping

Table 55

Rated Load For 434E Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)

(continued)

(Table 55, contd)

Rated Load For 434E Object Handling Application		
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.81 m (15 ft 9 inch)	1965 kg (4332 lb)	1965 kg (4332 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	1890 kg (4166 lb)(1)	1890 kg (4166 lb)(1)
4.32 m (14 ft 2 inch)	1554 kg (3426 lb)(1)	1554 kg (3426 lb)(1)
4.81 m (15 ft 9 inch)	1341 kg (2956 lb)(1)	1341 kg (2956 lb)(1)
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.81 m (15 ft 9 inch)	1799 kg (3967 lb)	1799 kg (3967 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 3 inch)	1703 kg (3755 lb)(1)	1703 kg (3755 lb)(1)
4.32 m (14 ft 2 inch)	1379 kg (3039 lb)(1)	1379 kg (3039 lb)(1)
4.81 m (15 ft 9 inch)	1173 kg (2586 lb)(1)	1173 kg (2586 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.28 m (7 ft 6 inch)	1518 kg (3347 lb)	1518 kg (3347 lb)
3.26 m (10 ft 8 inch)	1887 kg (4160 lb)	1887 kg (4160 lb)
4.28 m (14 ft 1 inch)	1813 kg (3997 lb)	1813 kg (3997 lb)
5.06 m (16 ft 7 inch)	1659 kg (3657 lb)	1659 kg (3657 lb)
5.73 m (18 ft 10 inch)	1416 kg (3123 lb)	1232 kg (2717 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.40 m (7 ft 10 inch)	1397 kg (3080 lb)	1397 kg (3080 lb)
3.26 m (10 ft 8 inch)	1766 kg (3894 lb)	1766 kg (3894 lb)
4.28 m (14 ft 1 inch)	1493 kg (3291 lb)(1)	1493 kg (3291 lb)(1)

(continued)

(Table 55, contd)

Rated Load For 434E Object Handling Application		
5.06 m (16 ft 7 inch)	1151 kg (2537 lb)(1)	1151 kg (2537 lb)(1)
5.73 m (18 ft 10 inch)	938 kg (2068 lb)(1)	938 kg (2068 lb)(1)

(1) Limited by Tipping

434E Loader Buckets (Mechanical Controls)

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

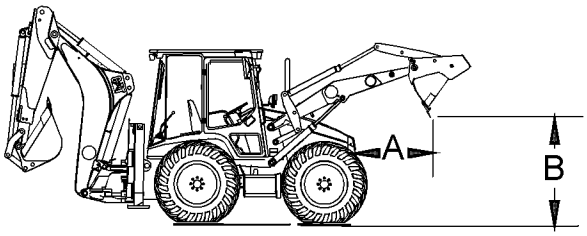


Illustration 63 g01205342

Dump Reach (A) and Dump Height (B)

Table 56

Rated Bucket Load For A 434E Parallel Lift Loader				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
248-0960	1.15 m^3 (1.50 yd^3)	3206 kg (7067 lb)	2636 mm (8 ft 8 inch)	905 mm (3 ft 0 inch)
318-7260	1.15 m^3 (1.50 yd^3)	3154 kg (6953 lb)	2647 mm (8 ft 8 inch)	886 mm (2 ft 11 inch)
318-7261	1.15 m^3 (1.50 yd^3)	3146 kg (6935 lb)	2647 mm (8 ft 8 inch)	886 mm (2 ft 11 inch)

434E Pallet Forks (Mechanical Controls)

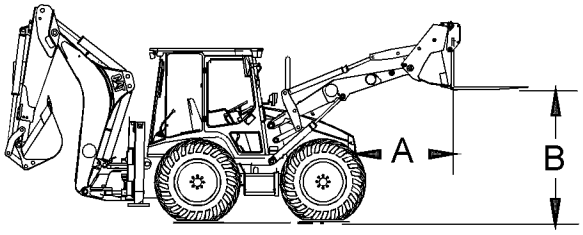


Illustration 64 g01205364

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with flip over forks and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 57

Rated Load For 434E With Flip Over Forks And Parallel Lift					
Bucket Part Number	**Volumetric Rating**	**"CEN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
318-7258	1.15 m^3 (1.50 yd^3)	1615 kg (3561 lb)	1584 kg (3491 lb)	3196 mm (10 ft 6 inch)	1295 mm (4 ft 3 inch)

434E Backhoe Lifting (Mechanical Controls)

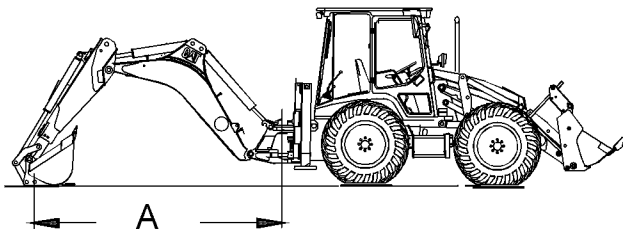


Illustration 65 g01205365

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 58

Rated Load For 434E Backhoe Bucket	
Lift Point Radius	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick	
1.74 m (5 ft 9 inch)	5608 kg (12364 lb)
2.95 m (9 ft 8 inch)	2753 kg (6070 lb)
3.72 m (12 ft 3 inch)	2167 kg (4777 lb)
4.32 m (14 ft 2 inch)	1858 kg (4096 lb)

(continued)

(Table 58, contd)

Rated Load For 434E Backhoe Bucket	
4.81 m (15 ft 9 inch)	1611 kg (3552 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick	
1.74 m (5 ft 9 inch)	5137 kg (11324 lb)(1)
2.95 m (9 ft 8 inch)	2591 kg (5713 lb)(1)
3.72 m (12 ft 3 inch)	1917 kg (4266 lb)(1)
4.32 m (14 ft 2 inch)	1580 kg (3483 lb)(1)
4.81 m (15 ft 9 inch)	1366 kg (3012 lb)(1)
Backhoe Straight Back, Retracted E-Stick	
1.74 m (5 ft 9 inch)	5259 kg (11594 lb)
2.95 m (9 ft 8 inch)	2548 kg (5616 lb)
3.72 m (12 ft 3 inch)	1985 kg (4376 lb)
4.32 m (14 ft 2 inch)	1686 kg (3718 lb)
4.81 m (15 ft 9 inch)	1447 kg (3189 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.74 m (5 ft 9 inch)	4796 kg (10574 lb)(1)
2.96 m (9 ft 8 inch)	2380 kg (5247 lb)(1)
3.73 m (12 ft 3 inch)	1731 kg (3815 lb)(1)
4.32 m (14 ft 2 inch)	1405 kg (3097 lb)(1)
4.81 m (15 ft 9 inch)	1199 kg (2642 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.28 m (7 ft 6 inch)	1238 kg (2729 lb)
3.26 m (10 ft 8 inch)	1535 kg (3383 lb)
4.28 m (14 ft 1 inch)	1468 kg (3237 lb)
5.06 m (16 ft 7 inch)	1337 kg (2948 lb)
5.73 m (18 ft 10 inch)	1054 kg (2324 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.40 m (7 ft 10 inch)	1134 kg (2501 lb)
3.26 m (10 ft 8 inch)	1434 kg (3162 lb)
4.28 m (14 ft 1 inch)	1422 kg (3134 lb)
5.06 m (16 ft 7 inch)	1173 kg (2586 lb)(1)
5.73 m (18 ft 10 inch)	961 kg (2118 lb)(1)

(1) Limited by Tipping

Table 59

Rated Load For 434E Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.32 m (14 ft 2 inch)	1858 kg (4096 lb)	1858 kg (4096 lb)
4.81 m (15 ft 9 inch)	1611 kg (3552 lb)	1611 kg (3552 lb)
Backhoe Side Shifted, Swung to Side, Standard Stick		
1.74 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.95 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.72 m (12 ft 3 inch)	1917 kg (4226 lb) (1)	1917 kg (4226 lb)(1)
4.32 m (14 ft 2 inch)	1580 kg (3483 lb) (1)	1580 kg (3483 lb)(1)
4.81 m (15 ft 9 inch)	1366 kg (3012 lb) (1)	1366 kg (3012 lb)(1)
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 3 inch)	1985 kg (4376 lb)	1985 kg (4376 lb)
4.32 m (14 ft 2 inch)	1686 kg (3718 lb)	1686 kg (3718 lb)
4.81 m (15 ft 9 inch)	1447 kg (3189 lb)	1447 kg (3189 lb)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
2.96 m (9 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.73 m (12 ft 3 inch)	1731 kg (3815 lb) (1)	1731 kg (3815 lb)(1)
4.32 m (14 ft 2 inch)	1405 kg (3097 lb) (1)	1405 kg (3097 lb)(1)
4.81 m (15 ft 9 inch)	1199 kg (2642 lb) (1)	1199 kg (2642 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.28 m (7 ft 6 inch)	1238 kg (2729 lb)	1238 kg (2729 lb)
3.26 m (10 ft 8 inch)	1535 kg (3383 lb)	1535 kg (3383 lb)
4.28 m (14 ft 1 inch)	1468 kg (3237 lb)	1468 kg (3237 lb)
5.06 m (16 ft 7 inch)	1337 kg (2948 lb)	1337 kg (2948 lb)

(continued)

(Table 59, contd)

Rated Load For 434E Object Handling Application		
5.73 m (18 ft 10 inch)	999 kg (2201 lb)	999 kg (2201 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.40 m (7 ft 10 inch)	1134 kg (2501 lb)	1134 kg (2501 lb)
3.26 m (10 ft 8 inch)	1434 kg (3162 lb)	1434 kg (3162 lb)
4.28 m (14 ft 1 inch)	1422 kg (3134 lb)	1422 kg (3134 lb)
5.06 m (16 ft 7 inch)	1173 kg (2586 lb) (1)	1173 kg (2586 lb)(1)
5.73 m (18 ft 10 inch)	961 kg (2118 lb)(1)	961 kg (2118 lb)(1)

(1) Limited by Tipping

442E Loader Buckets

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

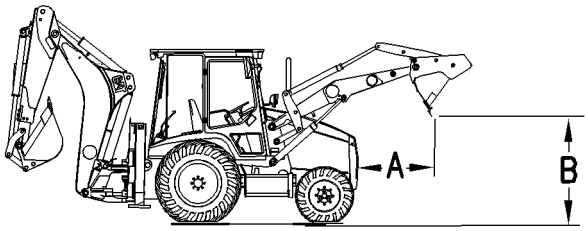


Illustration 66 g00285635

Dump Reach (A) and Dump Height (B)

Table 60

Rated Bucket Load For A 442E Parallel Lift Loader				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
112-1931	1.00 m^3 (1.31 yd^3)	3406 kg (7509 lb)	2575 mm (8 ft 5 inch)	743 mm (2 ft 5 inch)
318-7263	1.03 m^3 (1.35 yd^3)	3181 kg (7014 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)
318-7247	1.03 m^3 (1.35 yd^3)	3131 kg (6902 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)
318-7264	1.03 m^3 (1.35 yd^3)	2981 kg (6573 lb)	2610 mm (8 ft 7 inch)	671 mm (2 ft 2 inch)

Table 61

Rated Bucket Load For A 442E Parallel Lift Loader With Quick Coupler				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
118-1984	1.03 m^3 (1.35 yd^3)	3212 kg (7082 lb)	2488 mm (8 ft 2 inch)	775 mm (2 ft 6 inch)
318-7267	1.03 m^3 (1.35 yd^3)	2990 kg (6591 lb)	2540 mm (8 ft 4 inch)	726 mm (2 ft 5 inch)

442E Pallet Forks

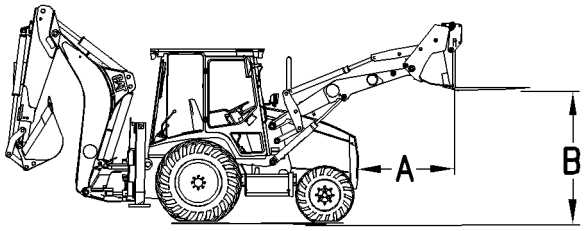


Illustration 67 g00285636

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with flip over forks and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 62

Rated Load For 442E With Flip Over Forks And Parallel Lift					
Part Number	**Volumetric Rating**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
318-7264	1.03 m^3 (1.35 yd^3)	1563 kg (3446 lb)	1530 kg (3372 lb)	3093 mm (10 ft 2 inch)	1038 mm (3 ft 5 inch)

Table 63

Rated Load For 442E With Pallet Forks And Parallel Lift With Quick Coupler					
Part Number	**Fork Tine Length**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
6W-8933	1050 mm (3 ft 5 inch)	2682 kg (5914 lb)	2617 kg (5769 lb)	3200 mm (10 ft 6 inch)	637 mm (2 ft 1 inch)

(continued)

(Table 63, contd)

Rated Load For 442E With Pallet Forks And Parallel Lift With Quick Coupler					
6W-8900	1200 mm (3 ft 11 inch)	2680 kg (5909 lb)	2436 kg (5371 lb)	3200 mm (10 ft 6 inch)	637 mm (2 ft 1 inch)
6W-9739	1350 mm (4 ft 5 inch)	2678 kg (5904 lb)	2279 kg (5023 lb)	3200 mm (10 ft 6 inch)	637 mm (2 ft 1 inch)

442E Material Handling Arm

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the material handling arm and for the lowest position of the material handling arm.

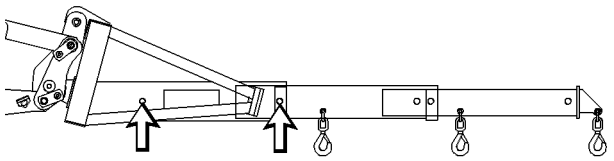


Illustration 68 g00285638

The following table provides the rated operating loads for the standard parallel lift machine configuration with a material handling arm and with a quick coupler.

Table 64

442E Rated Load For Material Handling Arm “EN 474-4”			
	Retracted	**Mid-Position**	**Extended**
Rated Operating Load	1024 kg (2258 lb)	650 kg (1433 lb)	476 kg (1049 lb)
Placement Height at Lowest Position	−2015 mm (−6 ft 7 inch)	−3012 mm (−9 ft 10 inch)	−4012 mm (−13 ft 2 inch)
Reach at Lowest Position	666 mm (2 ft 2 inch)	704 mm (2 ft 4 inch)	742 mm (2 ft 5 inch)

(continued)

(Table 64, contd)

442E Rated Load For Material Handling Arm “EN 474-4”			
	Retracted	**Mid-Position**	**Extended**
Placement Height at Highest Position	5012 mm (16 ft 5 inch)	5848 mm (19 ft 2 inch)	6684 mm (21 ft 11 inch)
Reach at Highest Position	1400 mm (4 ft 7 inch)	1923 mm (6 ft 4 inch)	2449 mm (8 ft 1 inch)

442E Truss Boom

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the truss boom and for the lowest position of the truss boom.

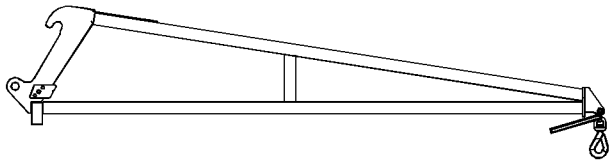


Illustration 69 g02042134

The following table provides the rated operating loads for the standard parallel lift machine configuration with a truss boom.

Table 65

442E Rated Load For Truss Boom“EN 474-4”	
	Fixed Position
Rated Operating Load	501 kg (1105 lb)
Placement Height at Lowest Position	−4033 mm (−13 ft 3 inch)
Reach at Lowest Position	743 mm (2 ft 5 inch)

(continued)

(Table 65, contd)

442E Rated Load For Truss Boom“EN 474-4”	
	Fixed Position
Placement Height at Highest Position	7219 mm (23 ft 7 inch)
Reach at Highest Position	1337 mm (4 ft 4 inch)
Maximum Horizontal Reach	5142 mm (16 ft 10 inch)
Height at Maximum Reach	1633 mm (5 ft 4 inch)

442E Hook

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the hook and for the lowest position of the hook.

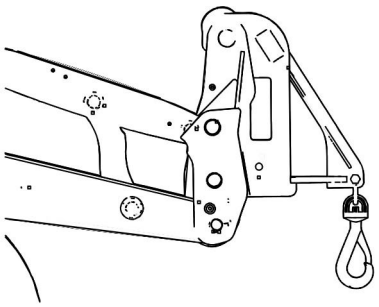


Illustration 70 g02042153

The following table provides the rated operating loads for the standard parallel lift machine configuration with a hook.

Table 66

442E Rated Load For Hook“EN 474-4”	
	Fixed Position
Rated Operating Load	3484 kg (7681 lb)
Placement Height at Lowest Position	−466 mm (−1 ft 6 inch)
Reach at Lowest Position	607 mm (2 ft 0 inch)
Placement Height at Highest Position	3733 mm (12 ft 3 inch)
Reach at Highest Position	557 mm (1 ft 10 inch)

(continued)

(Table 66, contd)

442E Rated Load For Hook“EN 474-4”	
	Fixed Position
Maximum Horizontal Reach	1576 mm (5 ft 2 inch)
Height at Maximum Reach	1589 mm (5 ft 3 inch)

442E Backhoe Lifting

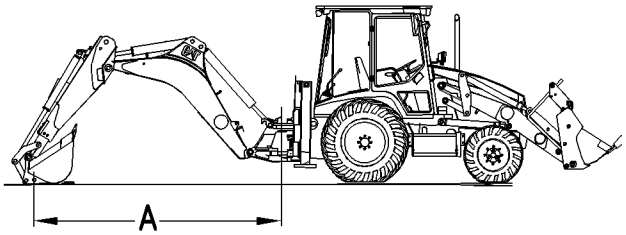


Illustration 71 g00286077

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 67

Rated Operating Load For 442E Backhoe Bucket	
Lift Point Radius	**Rated Operating Load “EN 474-4”**
Backhoe Straight Back, Retracted E-Stick	
1.75 m (5 ft 9 inch)	5228 kg (11526 lb)(1)
3.29 m (10 ft 9 inch)	2846 kg (6275 lb)(1)
4.16 m (13 ft 8 inch)	2196 kg (4841 lb)(1)
4.79 m (15 ft 9 inch)	1861 kg (4102 lb)(1)
5.28 m (17 ft 4 inch)	1651 kg (3639 lb)(1)
Backhoe Side Shifted Swung to Side, Retracted E-Stick	
1.75 m (5 ft 9 inch)	3766 kg (8302 lb)(1)
3.29 m (10 ft 9 inch)	1600 kg (3528 lb)(1)
4.16 m (13 ft 8 inch)	1123 kg (2475 lb)(1)
4.79 m (15 ft 9 inch)	890 kg (1963 lb)(1)

(continued)

(Table 67, contd)

Rated Operating Load For 442E Backhoe Bucket	
5.28 m (17 ft 4 inch)	749 kg (1652 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.30 m (7 ft 7 inch)	1363 kg (3004 lb)
3.64 m (11 ft 11 inch)	2177 kg (4800 lb)
4.76 m (15 ft 7 inch)	1881 kg (4147 lb)(1)
5.57 m (18 ft 3 inch)	1538 kg (3390 lb)(1)
6.22 m (20 ft 5 inch)	1324 kg (2919 lb)(1)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.34 m (7 ft 8 inch)	1323 kg (2917 lb)
3.64 m (11 ft 11 inch)	1552 kg (3422 lb)(1)
4.76 m (15 ft 7 inch)	1001 kg (2206 lb)(1)
5.57 m (18 ft 3 inch)	750 kg (1654 lb)(1)
6.22 m (20 ft 5 inch)	599 kg (1321 lb)(1)

(1) Limited by Tipping

Table 68

442E Rated Operating Load For Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.29 m (10 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.16 m (13 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.79 m (15 ft 9 inch)	1861 kg (4102 lb) (1)	1861 kg (4102 lb)(1)
5.28 m (17 ft 4 inch)	1651 kg (3639 lb) (1)	1651 kg (3639 lb)(1)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.29 m (10 ft 9 inch)	1600 kg (3528 lb) (1)	1600 kg (3528 lb)(1)
4.16 m (13 ft 8 inch)	1123 kg (2475 lb)(1)	1123 kg (2475 lb)(1)
4.79 m (15 ft 9 inch)	890 kg (1963 lb)(1)	890 kg (1963 lb)(1)
5.28 m (17 ft 4 inch)	749 kg (1652 lb)(1)	749 kg (1652 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.30 m (7 ft 7 inch)	1363 kg (3004 lb)	1363 kg (3004 lb)

(continued)

(Table 68, contd)

442E Rated Operating Load For Object Handling Application		
3.64 m (11 ft 11 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.76 m (15 ft 7 inch)	1881 kg (4147 lb) (1)	1881 kg (4147 lb)(1)
5.57 m (18 ft 3 inch)	1538 kg (3390 lb) (1)	1538 kg (3390 lb)(1)
6.22 m (20 ft 5 inch)	1324 kg (2919 lb) (1)	1324 kg (2919 lb)(1)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.34 m (7 ft 8 inch)	1323 kg (2917 lb)	1323 kg (2917 lb)
3.64 m (11 ft 11 inch)	1552 kg (3422 lb) (1)	1552 kg (3422 lb)(1)
4.76 m (15 ft 7 inch)	1001 kg (2206 lb) (1)	1001 kg (2206 lb)(1)
5.57 m (18 ft 3 inch)	750 kg (1654 lb)(1)	750 kg (1654 lb)(1)
6.22 m (20 ft 5 inch)	599 kg (1321 lb)(1)	599 kg (1321 lb)(1)

(1) Limited by Tipping

444E Loader Buckets

The following tables provide the rated operating loads for the standard machine that is equipped with the given bucket. The corresponding dump clearance is given for each bucket at maximum lift height and at the full dump angle. The reach is given for each bucket at maximum lift height and at the full dump angle. Clearance is measured from the ground to the bucket edge in order to dump the load. The reach is measured from the front grill to the bucket edge.

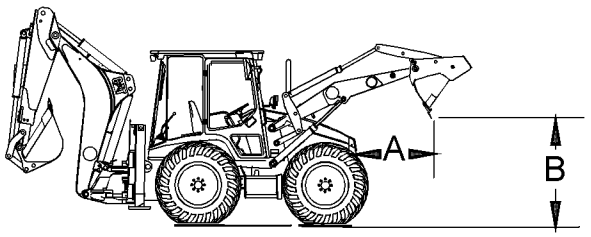


Illustration 72 g01205342

Dump Reach (A) and Dump Height (B)

Table 69

Rated Bucket Load For A 444E Parallel Lift Loader				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
248-0961	1.30 m^3 (1.70 yd^3)	3676 kg (8105 lb)(1)	2758 mm (9 ft 1 inch)	888 mm (2 ft 11 inch)
318-7256	1.30 m^3 (1.70 yd^3)	3413 kg (7524 lb)(1)	2793 mm (9 ft 2 inch)	817 mm (2 ft 8 inch)
318-7262	1.30 m^3 (1.70 yd^3)	3379 kg (7450 lb)(1)	2793 mm (9 ft 2 inch)	817 mm (2 ft 8 inch)
318-7254	1.30 m^3 (1.70 yd^3)	3327 kg (7334 lb)(1)	2699 mm (8 ft 10 inch)	817 mm (2 ft 8 inch)

(1) Limited by Tipping

Table 70

Rated Bucket Load For A 444E Parallel Lift Loader With Quick Coupler				
Bucket Part Number	**Volumetric Rating**	**"EN 474-4" and "SAE J818" Rated Operating Load**	**Dump Height (B)**	**Dump Reach (A)**
248-0962	1.30 m^3 (1.70 yd^3)	3517 kg (7754 lb)(1)	2615 mm (8 ft 7 inch)	965 mm (3 ft 3 inch)
320-9940	1.30 m^3 (1.70 yd^3)	3312 kg (7301 lb)(1)	2603 mm (8 ft 6 inch)	985 mm (3 ft 3 inch)

(1) Limited by Tipping

444E Pallet Forks

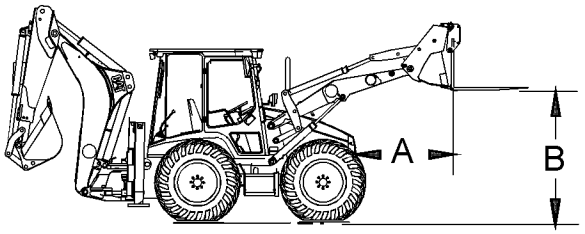


Illustration 73 g01205364

Reach (A) and Placement Height (B)

The following tables provide the rated operating loads for the standard machine configuration with the given loader type (Single Tilt, Parallel Lift, or Parallel Lift with Quick Coupler). The rated loads are provided for multipurpose buckets with flip over forks and for quick coupler type pallet forks that are associated with the quick coupler carriage.

Table 71

Rated Load For 444E With Flip Over Forks And Parallel Lift					
Part Number	**Volumetric Rating**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
318-7254	1.30 m^3 (1.70 yd^3)	1895 kg (4178 lb)	1851 kg (4081 lb)	3252 mm (10 ft 8 inch)	1184 mm (3 ft 11 inch)

Table 72

Rated Load For 444E With Pallet Forks And Parallel Lift With Quick Coupler					
Part Number	**Fork Tine Length**	**"EN 474-4" Rated Operating Load**	**"SAE J1197" Rated Operating Load**	**Placement Height (B)**	**Reach (A)**
6W-8933	1070 mm (3 ft 6 inch)	3190 kg (7034 lb)(1)	2634 kg (5806 lb)(1)	3379 mm (11 ft 1 inch)	792 mm (2 ft 7 inch)
6W-8900	1220 mm (4 ft 0 inch)	3188 kg (7028 lb)(1)	2559 kg (5642 lb)(1)	3379 mm (11 ft 1 inch)	792 mm (2 ft 7 inch)
6W-9739	1370 mm (4 ft 6 inch)	3185 kg (7022 lb)(1)	2489 kg (5487 lb)(1)	3379 mm (11 ft 1 inch)	792 mm (2 ft 7 inch)

(1) Limited by Tipping

444E Material Handling Arm

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the material handling arm and for the lowest position of the material handling arm.

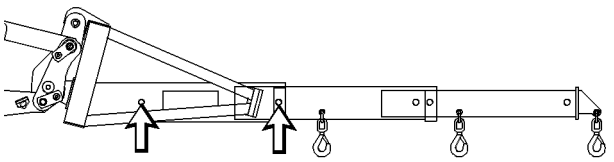


Illustration 74 g00285638

The following table provides the rated operating loads for the standard parallel lift machine configuration with a material handling arm and with a quick coupler.

Table 73

444E Rated Load For Material Handling Arm "EN 474-4"			
	Retracted	**Mid-Position**	**Extended**
Rated Operating Load	1514 kg (3338 lb)	980 kg (2161 lb)	725 kg (1598 lb)
Placement Height at Lowest Position	−2042 mm (−6 ft 8 inch)	−3040 mm (−10 ft 0 inch)	−4039 mm (−13 ft 3 inch)
Reach at Lowest Position	555 mm (1 ft 10 inch)	566 mm (1 ft 10 inch)	578 mm (1 ft 10 inch)

(continued)

(Table 73, contd)

444E Rated Load For Material Handling Arm "EN 474-4"			
	Retracted	**Mid-Position**	**Extended**
Placement Height at Highest Position	5155 mm (16 ft 11 inch)	5973 mm (19 ft 6 inch)	6792 mm (22 ft 3 inch)
Reach at Highest Position	1656 mm (5 ft 5 inch)	2228 mm (7 ft 3 inch)	2802 mm (9 ft 2 inch)

444E Truss Boom

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the truss boom and for the lowest position of the truss boom.

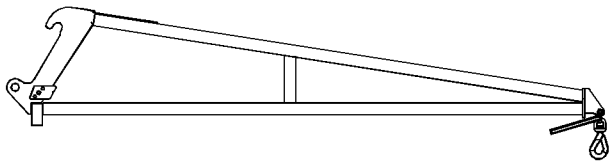


Illustration 75 g02042134

The following table provides the rated operating loads for the standard parallel lift machine configuration with a truss boom.

Table 74

444E Rated Load For Truss Boom“EN 474-4”	
	Fixed Position
Rated Operating Load	727 kg (1603 lb)
Placement Height at Lowest Position	−4060 mm (−13 ft 4 inch)
Reach at Lowest Position	578 mm (1 ft 10 inch)
Placement Height at Highest Position	7362 mm (24 ft 2 inch)
Reach at Highest Position	1722 mm (5 ft 8 inch)
Maximum Horizontal Reach	5210 mm (17 ft 1 inch)
Height at Maximum Reach	1779 mm (5 ft 10 inch)

444E Hook

The placement height (ground line to the chain hook) and reach (front grill to the chain hook) are given for the highest position of the hook and for the lowest position of the hook.

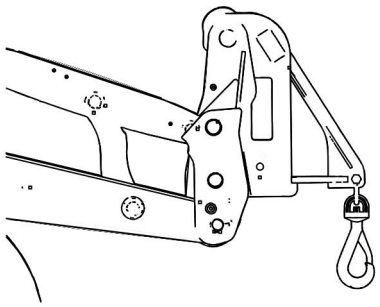


Illustration 76 g02042153

The following table provides the rated operating loads for the standard parallel lift machine configuration with a hook.

Table 75

444E Rated Load For Hook“EN 474-4”	
	Fixed Position
Rated Operating Load	3992 kg (8801 lb)
Placement Height at Lowest Position	−493 mm (−1 ft 7 inch)
Reach at Lowest Position	537 mm (1 ft 9 inch)
Placement Height at Highest Position	3905 mm (12 ft 10 inch)
Reach at Highest Position	739 mm (2 ft 5 inch)

(continued)

(Table 75, contd)

444E Rated Load For Hook“EN 474-4”	
	Fixed Position
Maximum Horizontal Reach	1642 mm (5 ft 4 inch)
Height at Maximum Reach	1737 mm (5 ft 8 inch)

444E Backhoe Lifting

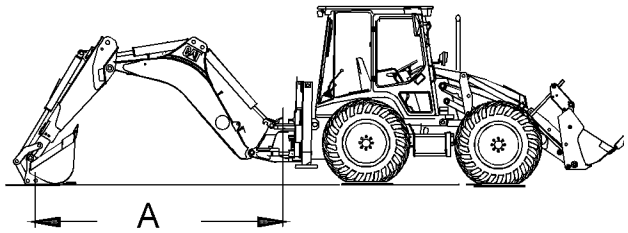


Illustration 77 g01205365

Lift Point Radius (A)

The bucket hinge pin for the backhoe is level with the lower boom hinge pin at each lifting point in the following tables. Rated loads include the weight of the attachment. The following tables provide the operating loads for the standard machine configuration.

Table 76

Rated Operating Load For 444E Backhoe Bucket	
Lift Point Radius	**Rated Operating Load “EN 474-4”**
Backhoe Straight Back, Retracted E-Stick	
1.75 m (5 ft 9 inch)	7989 kg (17614 lb)(1)
3.29 m (10 ft 9 inch)	4403 kg (9708 lb)(1)
4.16 m (13 ft 8 inch)	3427 kg (7554 lb)(1)
4.79 m (15 ft 9 inch)	2923 kg (6444 lb)(1)
5.28 m (17 ft 4 inch)	2580 kg (5687 lb)
Backhoe Side Shifted, Swung to Side, Retracted E-Stick	
1.75 m (5 ft 9 inch)	5443 kg (12000 lb)(1)
3.29 m (10 ft 9 inch)	2416 kg (5326 lb)(1)
4.16 m (13 ft 8 inch)	1733 kg (3820 lb)(1)

(continued)

(Table 76, contd)

Rated Operating Load For 444E Backhoe Bucket	
4.79 m (15 ft 9 inch)	1399 kg (3084 lb)(1)
5.28 m (17 ft 4 inch)	1196 kg (2637 lb)(1)
Backhoe Straight Back, Extended E-Stick	
2.33 m (7 ft 8 inch)	1771 kg (3905 lb)
3.64 m (11 ft 11 inch)	2863 kg (6312 lb)
4.76 m (15 ft 7 inch)	2827 kg (6234 lb)
5.57 m (18 ft 3 inch)	2519 kg (5553 lb)(1)
6.22 m (20 ft 5 inch)	1615 kg (3561 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick	
2.34 m (7 ft 8 inch)	1753 kg (3864 lb)
3.64 m (11 ft 11 inch)	2308 kg (5088 lb)(1)
4.76 m (15 ft 7 inch)	1530 kg (3373 lb)(1)
5.57 m (18 ft 3 inch)	1174 kg (2589 lb)(1)
6.22 m (20 ft 5 inch)	960 kg (2116 lb)(1)

(1) Limited by Tipping

Table 77

444E Rated Operating Load For Object Handling Application		
Lift Point Radius	**"SAE J31"/"ISO 10567" Rated Operating Load**	**Rated Operating Load "EN 474-4"**
Backhoe Straight Back, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.29 m (10 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.16 m (13 ft 8 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
4.79 m (15 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
5.28 m (17 ft 4 inch)	1957 kg (4314 lb)(1)	1957 kg (4314 lb)(1)
Backhoe Side Shifted Swung to Side, Retracted E-Stick		
1.75 m (5 ft 9 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)
3.29 m (10 ft 9 inch)	1812 kg (3995 lb)(1)	1812 kg (3995 lb)(1)
4.16 m (13 ft 8 inch)	1299 kg (2865 lb)(1)	1299 kg (2865 lb)(1)
4.79 m (15 ft 9 inch)	1049 kg (2313 lb)(1)	1049 kg (2313 lb)(1)
5.28 m (17 ft 4 inch)	897 kg (1978 lb)(1)	897 kg (1978 lb)(1)
Backhoe Straight Back, Extended E-Stick		
2.33 m (7 ft 8 inch)	1328 kg (2929 lb)	1328 kg (2929 lb)
3.64 m (11 ft 11 inch)	2000 kg (4409 lb)	2000 kg (4409 lb)

(continued)

(Table 77, contd)

444E Rated Operating Load For Object Handling Application		
4.76 m (15 ft 7 inch)	2000 kg (4165 lb)	2000 kg (4409 lb)
5.57 m (18 ft 3 inch)	1889 kg (4334 lb)(1)	1889 kg (4334 lb)(1)
6.22 m (20 ft 5 inch)	1405 kg (3098 lb)	1405 kg (3098 lb)
Backhoe Side Shifted, Swung to Side, Extended E-Stick		
2.34 m (7 ft 8 inch)	1315 kg (2898 lb)	1315 kg (2898 lb)
3.64 m (11 ft 11 inch)	1731 kg (3816 lb)(1)	1731 kg (3816 lb)(1)
4.76 m (15 ft 7 inch)	1147 kg (2530 lb)(1)	1147 kg (2530 lb)(1)
5.57 m (18 ft 3 inch)	881 kg (1941 lb)(1)	881 kg (1941 lb)(1)
6.22 m (20 ft 5 inch)	720 kg (1587 lb)(1)	720 kg (1587 lb)(1)

(1) Limited by Tipping

Identification Information

i04571173

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.

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

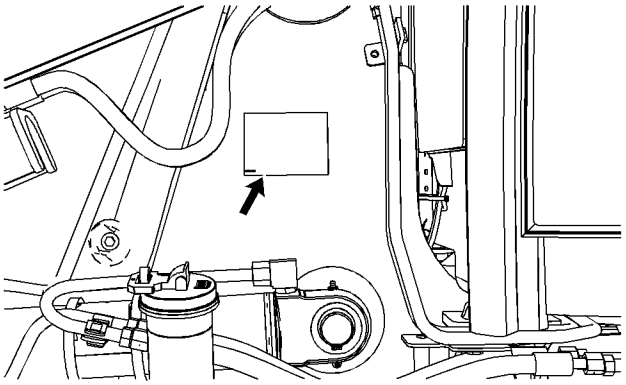


Illustration 78 g01204641

Note: The letter “Z” may be stamped in the block that is identified as “Parts Order” . This block is located on the plate for the Product Identification Number (PIN). This stamp indicates some customization to the machine which will require special handling when parts are ordered.

Machine PIN _____

Service Information Number Plate (SIN) _____

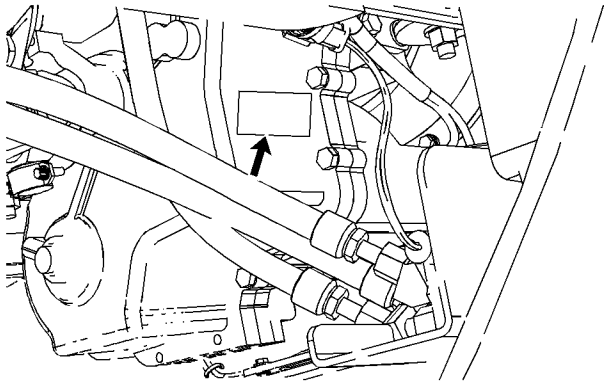


Illustration 79 g01204809

Direct Drive Transmission

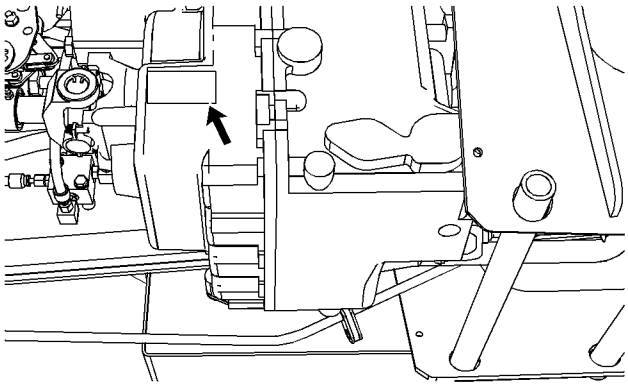


Illustration 80 g01204811

Power Shift Transmission

Transmission Serial Number _____

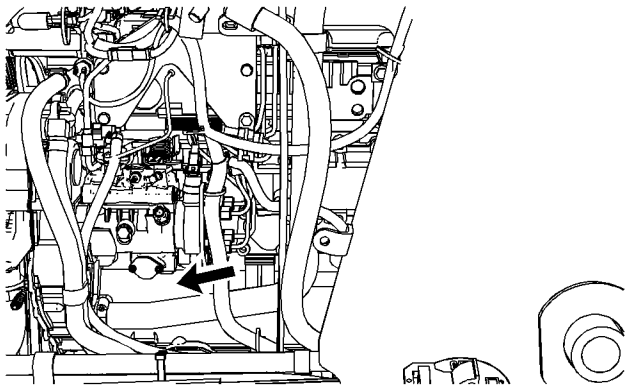


Illustration 81 g01939594

Engine Serial Number _____

Certification

ROPS/FOPS Structure

This message is positioned on the ROPS on the left side of the machine above the door.

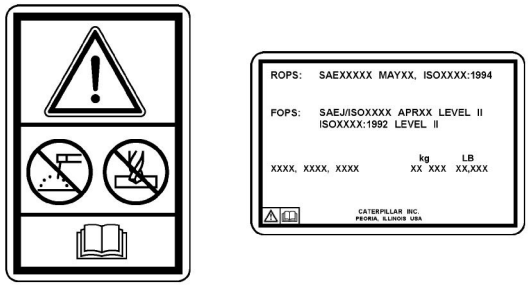


Illustration 82 g01211894

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 your Cat 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.

European Union

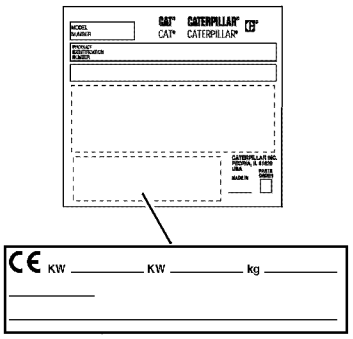


Illustration 83 g01880193

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

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

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

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

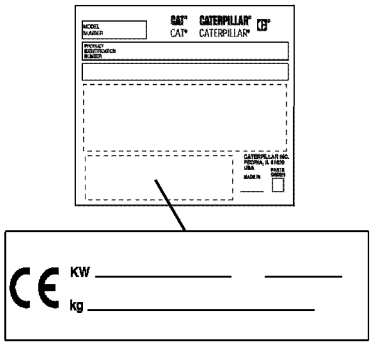


Illustration 84 g01120192

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

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

For machines compliant to 98/37/EC and 89/392/EEC, the following information is stamped onto the CE plate. For quick reference, record this information in the spaces that are provided below.

- Engine Power Primary Engine (kW)_____
- Typical Machine Operating Weight for European Market (kg)_____
- Year_____

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

Sound

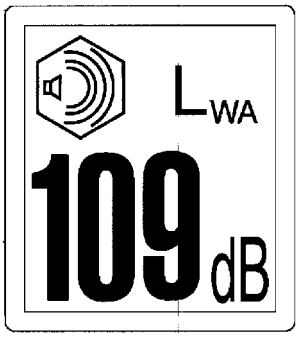


Illustration 85 g00933634

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

If equipped, the certification film is used to verify the environmental sound certification of the machine to the requirements of the European Union. The value that is listed on the film indicates the guaranteed exterior sound power level L_{WA} at the time of manufacture for the conditions that are specified in “ISO 6395” and “EU 2000/14/EC Annex III A2.1b”.

Product Link

If equipped, this message is used to verify the certification of the Product Link as an RF transmitter. The following specifications are provided to aid in ensuring compliance with all local regulations:

Table 78

Operating frequency range	148 to 150 MHz
Transmitter power	5-10 w

This message is located on the control group for the Product Link. The control group is located on the top of the cab.

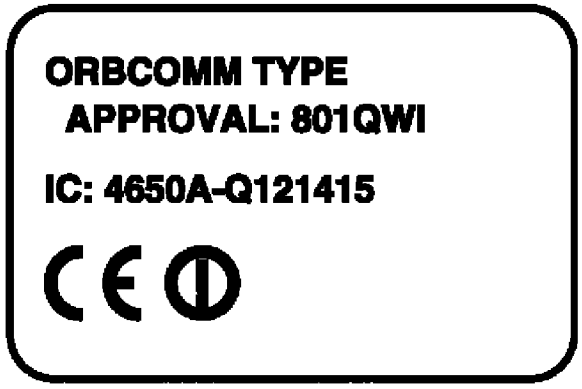


Illustration 86 g01261742

⚠ WARNING

This machine is equipped with a Caterpillar Product Link communication device. When electric detonators are used, this communication device should be deactivated within 12 m (40 ft) of a blast site for satellite-based systems and within 3 m (10 ft) of a blast site for cellular based systems, or within the distance mandated under applicable legal requirements. Failure to do so could cause interference with blasting operations and result in serious injury or death.

In cases where the type of Product Link module cannot be identified, Caterpillar recommends that the device be disabled no less than 12 m (40 ft) from the blast perimeter.

If the machine is required to work within 12 m (40 ft) of a blast area, power to the Product Link module must be disconnected.

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

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 79

Note: The extract from the EC Declaration of Conformity shown below applies only to those machines originally “CE” marked by the manufacturer listed and have not since been modified. This declaration is applicable for machines with serial number **DPH1–up, EME1–up, NBA1–up, SJL1–up, MAW1–up, JBA1–up and SEF1–up**

EC DECLARATION OF CONFORMITY OF MACHINERY

Manufacturer: Caterpillar (UK) Limited, Peckleton Lane, Desford, Leicester, England, Great Britain LE9 9JT

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:	**Backhoe**
	Model/Type:	**422E, 428E, 432E, 434E, 442E, 444E**
	Serial Number:	
	Commercial Name:	**Caterpillar**

Fulfils all the relevant provisions of the following Directives

Directives	Notified Body	Document No.
2006/42/EC		
2000/14/EC amended by 2005/88/EC, Note (1)		
2004/108/EC	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 **September 2009**, but may be subject to change, please refer to the individual declaration of conformity issued with the machine for exact details.

Declaration of Conformity

SMCS Code: 1000; 7000

Table 80

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

Original EC or EU DECLARATION OF CONFORMITY

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

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

Standards & Regulations Manager, Caterpillar France SAS
40 Avenue Leon-Blum 38000 Grenoble, France

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

Description:	Generic Denomination:	Earth-moving Equipment
	Function:	Multipurpose Bucket
	Model/Type:	Multipurpose (MP) Bucket
	Serial Number:	
	Commercial Name:	Caterpillar

Fulfills all the relevant provisions of the following Directives

Directives	Notified Body	Document No.
2006/42/EC	N/A	
2014/30/EU	N/A	

Note (1) 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 February 2016, 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: 7000

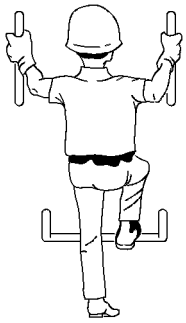


Illustration 87 g00037860

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”.

i03463214

Daily Inspection

SMCS Code: 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.

Note: For maximum service life of the machine, make a thorough walk-around inspection before you operate the machine. Inspect the machine for leaks. Remove any debris from the engine compartment and the undercarriage. Remove any debris from the stabilizers and all working cylinders in order to prevent damage to the machine. Ensure that all guards, covers, and caps are secured. Inspect all hoses and belts for damage. Make the needed repairs before you operate the machine.

Perform the following procedures on a daily basis.

- Operation and Maintenance Manual, “Backhoe Boom, Stick, Bucket, and Cylinder Bearings - Lubricate”
- Operation and Maintenance Manual, “Backup Alarm - Test”
- Operation and Maintenance Manual, “Braking System - Test”
- Operation and Maintenance Manual, “Cooling System Level - Check”
- Operation and Maintenance Manual, “Engine Air Filter Service Indicator - Inspect”
- Operation and Maintenance Manual, “Engine Oil Level - Check”

- Operation and Maintenance Manual, “Fuel System Water Seperator - Drain”
- Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”
- Operation and Maintenance Manual, “Loader Bucket, Cylinder, and Linkage Bearings - Lubricate”
- Operation and Maintenance Manual, “Seat Belt - Inspect”
- Operation and Maintenance Manual, “Stabilizer - Clean/Inspect”
- Operation and Maintenance Manual, “Stabilizer and Cylinder Bearings - Lubricate”
- Operation and Maintenance Manual, “Swing Frame and Cylinder Bearings - Lubricate”
- Operation and Maintenance Manual, “Tire Inflation - Check”
- Operation and Maintenance Manual, “Transmission Oil Level - Check”

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

Machine Operation

i03105400

Alternate Exit

SMCS Code: 7310

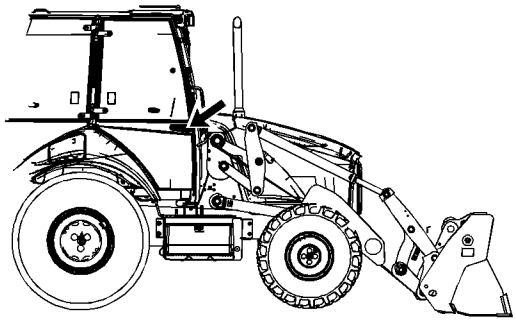


Illustration 88 g01586048

The cab door on the right side of the machine serves as an alternate exit. The cab door can be opened from the inside or from the outside. Pull the door latch on the outside of the cab door in order to open the cab door from the outside.

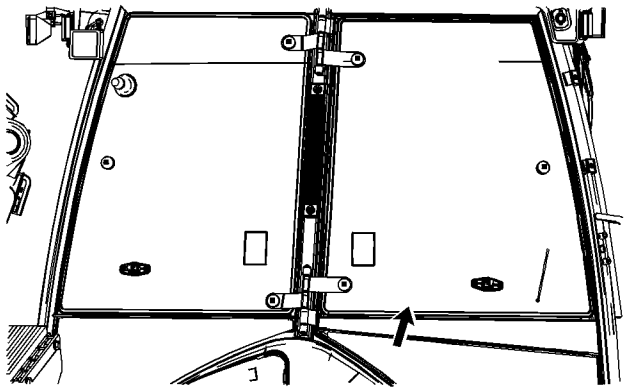


Illustration 89 g01216702

If the machine is not equipped with a cab door on the right side of the machine, use the front side window of the machine as an alternate exit. Move the levers for the window in order to open the front side window.

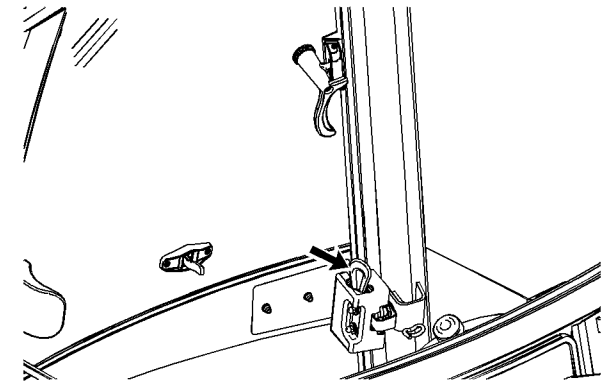


Illustration 90 g01098892

Move the lever on the inside of cab door in order to unlatch the cab door and open the cab door from the inside.

i07601347

Seat

SMCS Code: 7312

The operator's seat that is provided with this machine is in compliance with the appropriate class of “ISO 7096”.

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

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

Mechanical Suspension

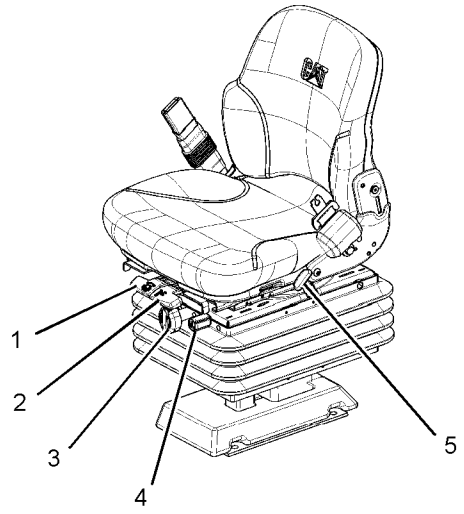


Illustration 91 g01541515

Typical example

Pull up on the rotate lever (1). The seat will rotate to the rear of the machine to operate the backhoe.

Fore/Aft Lever (2) – Pull up on the fore/aft lever to move the seat forward or backward. Adjust the seat to the desired position. Release the fore/aft lever to lock the seat in position.

Weight Adjustment Knob (3) – Use the handle on the knob to adjust the seat to the weight of the operator. Turn the handle clockwise to increase the suspension stiffness of the seat. Turn the handle counterclockwise to decrease the suspension stiffness of the seat.

Seat Height Limiter Knob (4) – Turn the seat height limiter knob clockwise to decrease the maximum seat height. Turn the knob counterclockwise to increase the maximum seat height.

Backrest Adjustment Lever (5) – Push down on the lever for the seat backrest to adjust the angle of the seat backrest. Adjust the seat backrest to the desired position. Release the lever for the seat backrest to lock the seat backrest in position.

Air Suspension

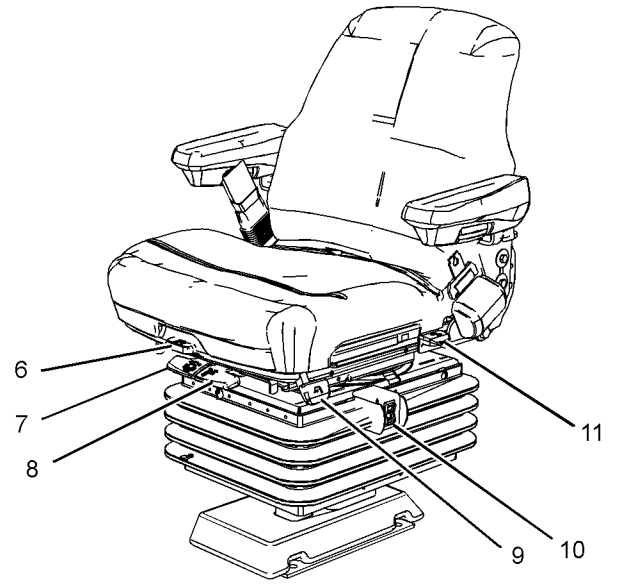


Illustration 92 g01541516

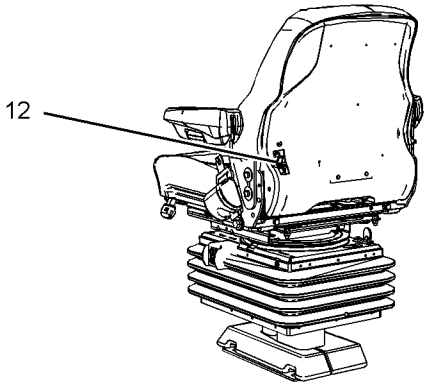


Illustration 93 g01624202

The air suspension seat has an air bag that controls the height of the seat and the weight adjustment of the seat. The amount of air that is in the air bag is determined by the operator. The pressure in the air bag is determined by the weight of the operator. This provides automatic weight adjustment.

Front Seat Cushion Tilt Lever (6) – To adjust the seat cushion to the desired angle and height, pull up the front seat cushion tilt lever. Release the lever to lock the seat cushion.

Pull up on the rotate lever (7). The seat will rotate to the rear of the machine to operate the backhoe.

Fore/Aft Lever (8) – Pull up on the fore/aft lever to move the seat forward or backward. Adjust the seat to the desired position. Release the fore/aft lever to lock the seat in position.

Front Seat Cushion Slide Lever (9) – To slide the seat cushion to the desired location, pull up front seat cushion slide lever. Release the lever to lock the seat cushion.

Height Adjustment Switch (10) – To raise the seat, push the top of the switch. To lower the seat, push the bottom of the switch.

Note: The operator must not change the height of the suspension so that the stroke is inadequate for the particular application. The suspension height must be changed if the seat bottoms out excessively or if the seat bounces too much to the maximum height.

Backrest Adjustment Lever (11) – Pull up on the lever for the seat backrest to adjust the angle of the seat backrest. Adjust the seat backrest to the desired position. Release the lever for the seat backrest to lock the seat backrest in position.

Lumbar Support Knob (12) – The lumbar support knob is on the left rear side of the seat. Turn the lumbar support knob counterclockwise to increase the stiffness of the lumbar support. Turn the lumbar support knob clockwise to decrease the stiffness of the lumbar support.

i03105875

Seat Belt

SMCS Code: 7327

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

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

Seat Belt Adjustment for Retractable Seat Belts

Fastening The Seat Belt

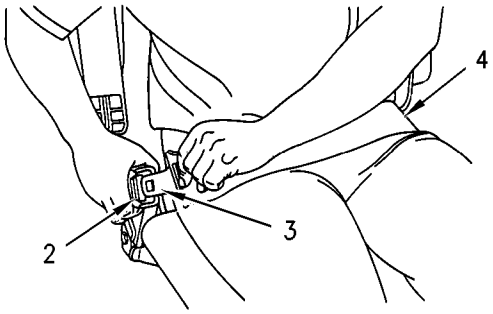


Illustration 94 g00867598

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

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

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

Releasing The Seat Belt

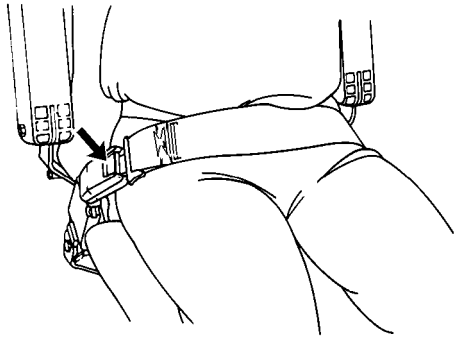


Illustration 95 g00039113

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

Extension of the Seat Belt

⚠ WARNING

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

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

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

i03260480

Mirror

SMCS Code: 7319

⚠ WARNING

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

⚠ WARNING

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

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

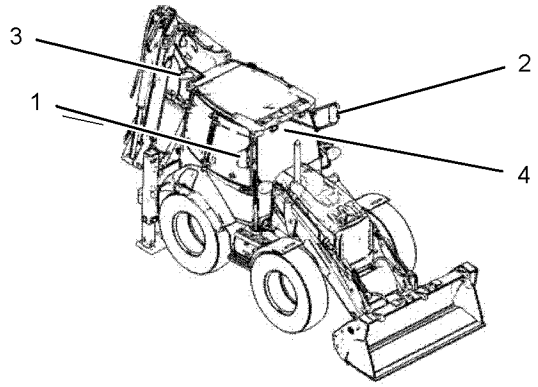


Illustration 96 g01662233

(1) Right Side Mirror
(2) Left Side Mirror
(3) Rear Mirror (If Equipped)
(4) Cab Mirror

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

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

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

Mirror Adjustment

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Stop the engine.

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

Right Side Mirror (1)

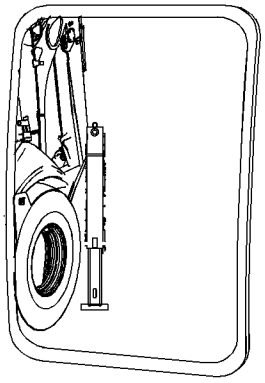


Illustration 97 g01623418

Adjust the right side rear view mirror (1) so 1 m (3.3 ft) from the side of the machine can be seen. Refer to illustration 97 . Also adjust the right side rear view mirror in order to see the following:

- a point on the ground behind the machine at a maximum distance of 30 m (98 ft) from the rear corners of the machine

Left Side Mirror (2)

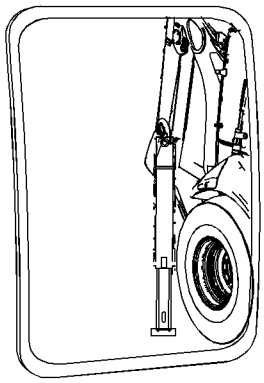


Illustration 98 g01623420

Adjust the left side rear view mirror (1) so 1 m (3.3 ft) from the side of the machine can be seen. Refer to illustration 98 . Also adjust the left side rear view mirror in order to see the following:

- a point on the ground behind the machine at a maximum distance of 30 m (98 ft) from the rear corners of the machine

Rear Mirror (3) (If Equipped)

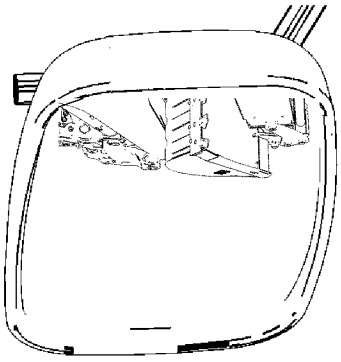


Illustration 99 g01624100

If equipped, adjust the rear view mirror (3) so that an area of at least 1 m (3.3 ft) from the rear of the machine can be seen from the operator seat. Additionally, provide as much visibility to the rear as possible.

Cab Mirror

The cab mirror (4) can be adjusted to a position in order to allow the operator to see preferred areas on the machine during operations.

i04501391

Operator Controls
(422E, 428E, 434E Mechanical Control)

SMCS Code: 7300; 7451

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

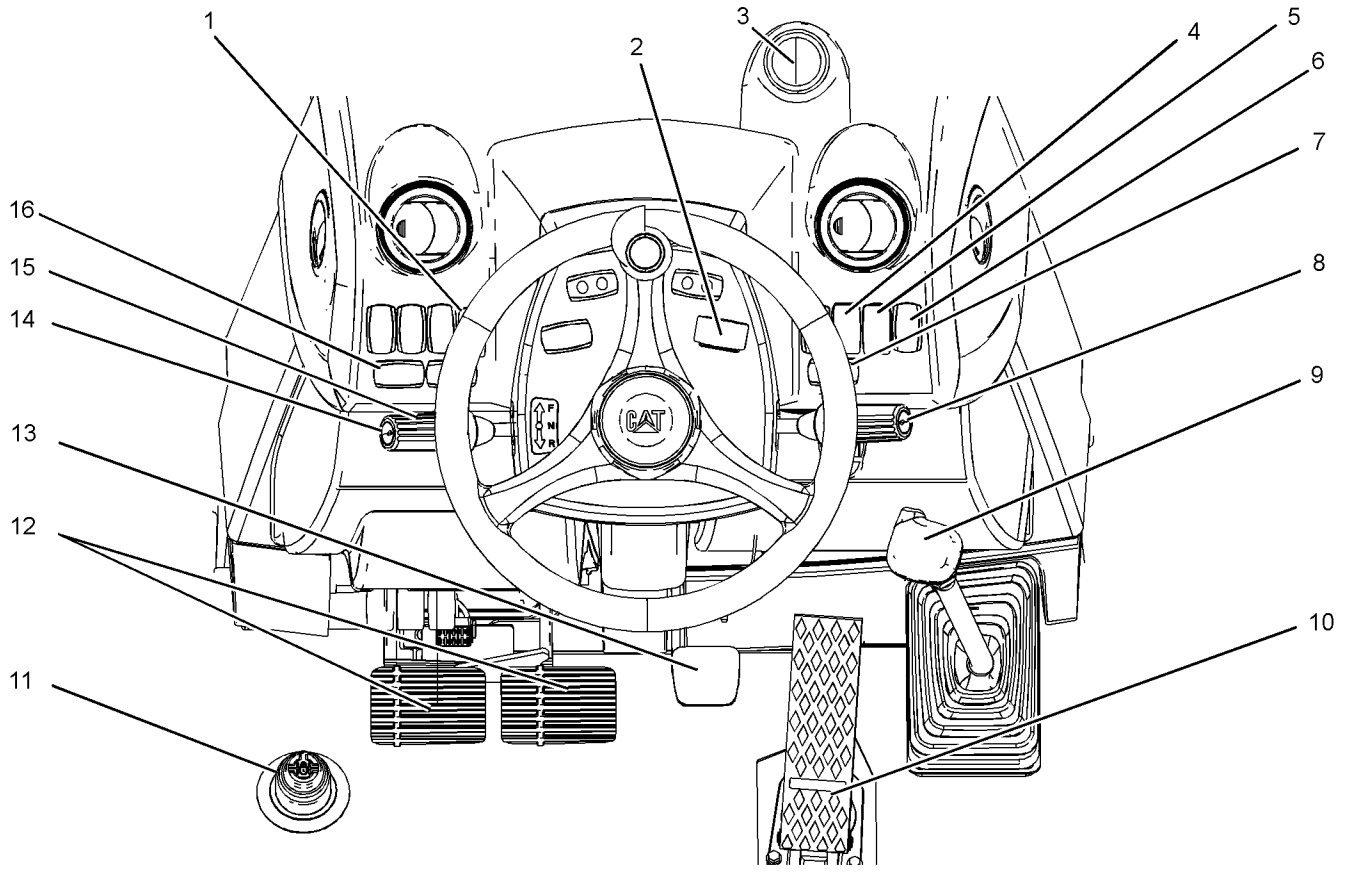


Illustration 100 g01967193

(1) Transmission Neutral Lock
(2) Hazard Flashers
(3) All Wheel Steer Position Gauge (If Equipped)
(4) Ride Control (If Equipped)
(5) Roading Lights
(6) Two Wheel Steer/Four Wheel Steer (If Equipped)
(7) All Wheel Steer Control (If Equipped)
(8) Turn Signal Control and Front Window Wiper
(9) Transmission Speed Control
(10) Throttle Control
(11) Differential Lock Control
(12) Service Brakes
(13) Steering Wheel Tilt Control (If Equipped)
(14) Horn
(15) Transmission Direction Control
(16) All Wheel Drive Control (If Equipped)

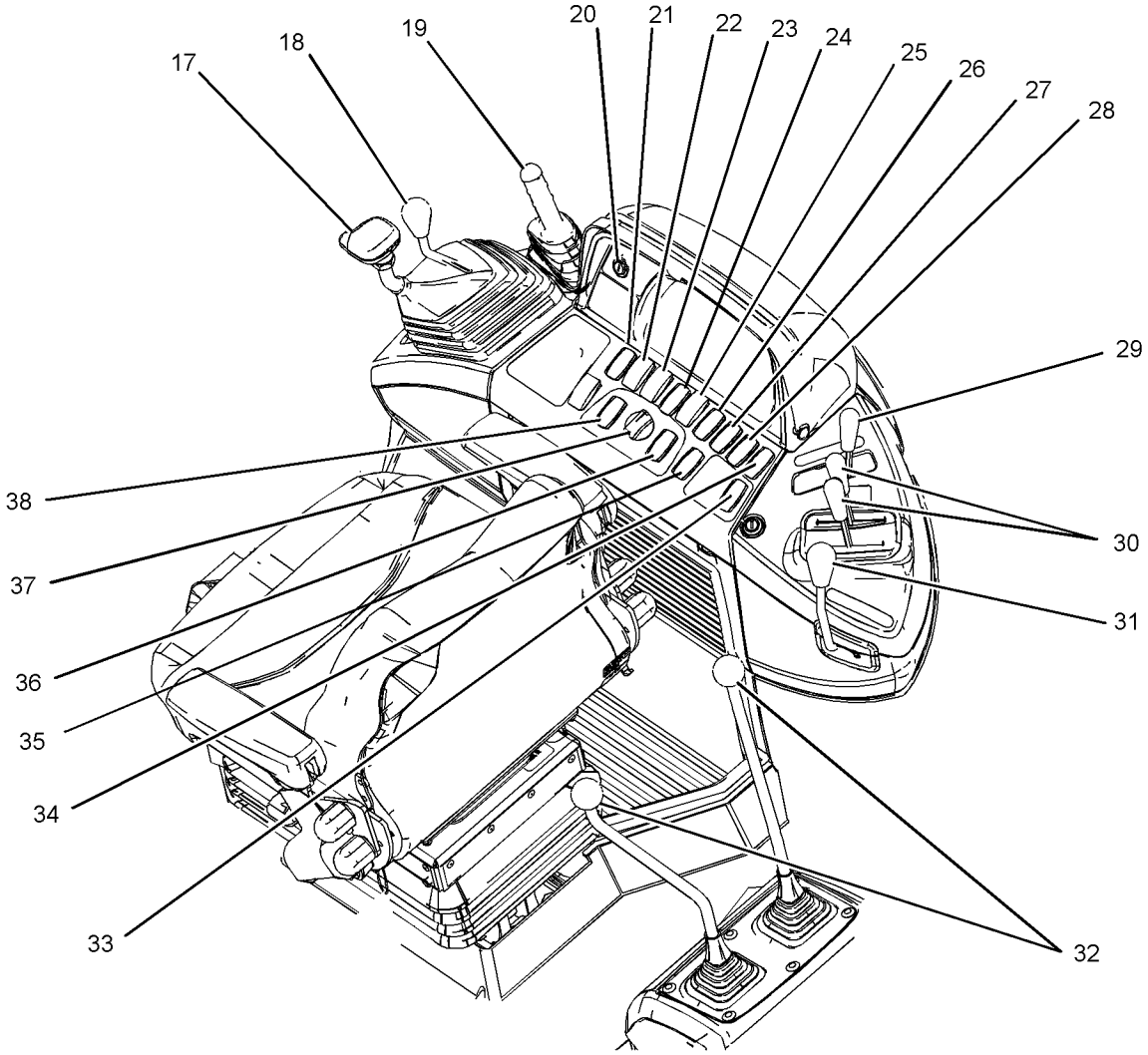


Illustration 101 g02681263

(17) Loader Control
(18) Multipurpose Control
(19) Parking Brake Control
(20) Engine Start Switch
(21) Starting Aid Switch
(22) Rotating Beacon
(23) Front Floodlights
(24) Rear Floodlights
(25) Rear Fog Light (If Equipped)
(26) Sideshift Control
(27) Rear Wiper/Washer Switch
(28) Horn (If Equipped)
(29) Throttle Control
(30) Stabilizer Control
(31) Boom Lock
(32) Backhoe Controls
(33) Quick Coupler Lock/Unlock (Rear Pin) (If Equipped)
(34) Quick Coupler Unlock (Front Pin) (If Equipped)
(35) Object Handling Stability Alarm Switch (If Equipped)
(36) Fan Switch
(37) Variable Temperature Control
(38) Heating and Cooling Control

Transmission Neutral Lock (1)

⚠ WARNING

Always engage the parking brake and transmission neutral lock before dismounting the machine, operating the backhoe or engaging the boom lock for the transport position. Failure to do so could allow unexpected machine movement, resulting in personal injury or death.

TRANSMISSION NEUTRAL LOCK – The transmission neutral lock is located on the left side of the front console.

LOCKED – Press the top of the switch in order to lock the transmission direction control lever into the NEUTRAL position.

UNLOCKED – Press the bottom of the switch in order to deactivate the transmission neutral lock.

Note: If the transmission neutral lock has been activated, shift the direction control lever into the NEUTRAL position before you shift the direction control lever into the FORWARD position. If the transmission neutral lock has been activated, shift the direction control lever into the NEUTRAL position before you shift the direction control lever into the REVERSE position. The direction control lever must first be shifted into the NEUTRAL position in order to allow movement of the machine.

Note: When you exit the machine push the top of the transmission neutral lock switch in order to prevent the machine from moving out of the NEUTRAL position. Engage the parking brake in order to prevent machine movement when the transmission is in neutral. Refer to the Operation and Maintenance Manual, “Transport Positions”.

Hazard Flashers (2)

Hazard Flashers – The hazard switch is located on the right-hand side of the front console. Push the left side of the switch in order to activate the hazard flashers. Both turn signal lights will flash. Push the right side of the switch in order to deactivate the hazard flashers.

All Wheel Steer Position Gauge (3) (If Equipped)

The all wheel steer position gauge will indicate the position of the rear wheels.

Ride Control (4)

Ride Control – Travel at high speeds over rough terrain causes bucket movement and a swinging motion. The system for ride control acts as a shock absorber by absorbing forces from the bucket and by dampening forces from the bucket. This system also stabilizes the entire machine.

⚠ WARNING

Ride control can cause inadvertent movement of the loader arms if not used correctly. Don't use when using loader or backhoe.

The ride control must be turned off in order to raise the front tires off the ground with the loader bucket.

Note: In some countries that require lock valves for material handling operations, the ride control must be turned off so that the lock valves can function properly. Lock valves and ride control cannot function at the same time.

OFF – Put the switch in the center position in order to turn off the ride control.

ON – Push the bottom of the switch in order to turn on the system for ride control.

The ride control will smooth the ride of the machine during travel.

Roading Lights (5)

Front Running Lights – The front running light switch is located on the right side of the front console. Push the bottom of the switch for the OFF position. The middle position is for the panel lights, for the tail lights, and for the position lights. The top position adds running lights to the following lighting groups: panel lights, tail lights and position lights. If the lights are left in the ON position when the engine start switch is in the OFF position an alarm will sound.

Two-Wheel Steer Mode/Four-Wheel Steer Mode (6) (If Equipped)

Two-Wheel Steer – Press the bottom of switch (6) to activate the Two-Wheel Steer mode. The Two-Wheel Steer mode offers the capability to operate the machine on the road. The Two-Wheel Steer mode is used when additional maneuvering capability is not needed. Only the front axle is used to steer the machine. Use this mode when you are roading the machine. When you are operating the machine in this mode the indicator light will not be on.

Four-Wheel Steer – Slide down the red button located on switch (6) and then depress the top of switch (6). The machine will now be in circle steer mode or the machine now will be in crab steer mode. This is dependent upon the placement of the All Wheel Steer control (7).

All Wheel Steer Control (7) (If Equipped)

⚠ WARNING

Personal injury or death can result if the machine is roaded in any mode other than front wheel steer.

Always road the machine with the rear wheels centered and the machine in the front wheel steer mode.

The All Wheel Steer (AWS) has three steering modes: Two-Wheel Steer, Circle Steer, and crab steer. When you operate the machine for the first time, become familiar with the three modes by trying each one. This should be done in an area that is clear of personnel and of obstacles.

The All Wheel Steer mode consists of the following components:

- A Two-Wheel Steer/Four-Wheel Steer Mode switch.
- An All Wheel Steer Control switch that allows the operator to choose from circle steer or crab steer
- A rear axle position gauge

Three modes provide maximum machine performance under various conditions at the job site.

Two-Wheel Steer – The Two-Wheel Steer mode offers the capability to operate the machine on the road. The Two-Wheel Steer mode is used when additional maneuvering capability is not needed. Only the front axle is used to steer the machine. Use this mode when you are roading the machine. When you are operating the machine in this mode the indicator light will not be on.

Circle Steer Mode – The Circle Steer Mode provides reduced turning radii and tighter operation in confined spaces. The front and rear axles are used to steer the machine. When you are operating the machine in the Circle Steer mode, the indicator light will come on.

Crab Steer Mode – The crab steer mode allows the rear wheels to turn in the same direction as the front wheels which will allow the machine to move in a diagonal direction. The front and rear axles are used to steer the machine

NOTICE
Before changing from one steering mode to another, always center both the front and rear wheels.

Before you return to the Two-Wheel Steer mode or to the Circle Steer mode, the front wheels and rear wheels must be centered. Observe the rear axle position gauge on the front console. Then, move the All Wheel Steer switch to the desired mode.

NOTICE
Failure to recenter the steering system at least once per day may result in a reduction in steering effectiveness.

The steering must be realigned under the following conditions:

- The start of each work shift
- One time during the work shift
- Steering difficulty occurs.

- The machine will be roaded.
- The machine has traveled 24 km (15 miles) on a public road in Two-Wheel Steer mode.

Note: If the all wheel steer position gauge (3) is positioned in the green shaded area the steering does not need to be realigned.

Synchronizing the Wheels

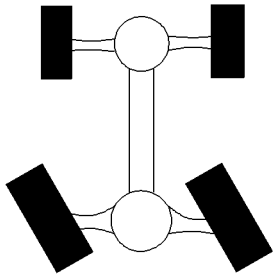


Illustration 102 g00830965

In a static position, select the circle steer mode and turn the steering wheel so that the rear wheels are turned to full lock.

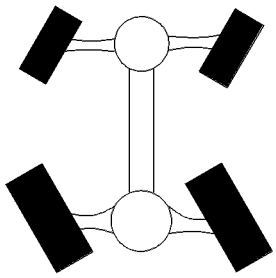


Illustration 103 g00282686

Select the Two-Wheel steer mode and turn the front wheels to the opposite full lock.

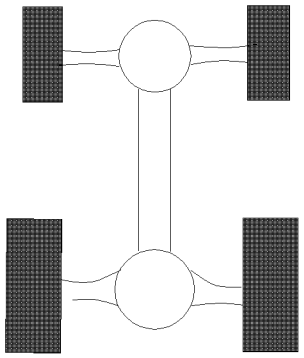


Illustration 104 g01967073

Select the circle steer mode and turn the steering wheel until the front wheels are facing straight ahead.

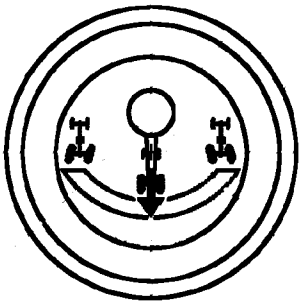


Illustration 105 g01967574

The rear wheels should also be facing straight ahead. The all wheel steer position gauge should be positioned in the green shaded area.

Turn Signal Control and Front Window Wiper (8)

Directional Turn Signals

Directional Turn Signals – The directional turn signal lever is on the right side of the steering column.

Left Directional Signal Lights – Push the lever away from the operator in order to activate the left turn signals. When the lever is pushed forward away from the operator, an indicator light will illuminate on the front dash. The left turn signal will flash until the lever is manually returned to the OFF position.

OFF Position – In the OFF position, the directional signal lights will not flash.

Right Directional Signal Lights – Pull the lever toward the operator in order to activate the Right turn signals. When the lever is pulled back toward the operator, an indicator light will illuminate on the front dash. The right turn signal will flash until the lever is manually returned to the OFF position.

Note: The directional turn signals will automatically be returned to the OFF if your machine is equipped with the steering column tilt.

Front Window Wiper/Washer

Window Wipers – Rotate the handle away from the operator in order to activate the window wipers. There are four positions for the window wipers.

OFF – When the handle is in the OFF position, the wipers will be off.

INTERMITTENT POSITION – The wipers will operate intermittently.

CONTINUOUS POSITION 1 – The wipers will operate continuously. This is the slow continuous speed.

CONTINUOUS POSITION 2 – The wipers will operate continuously. This is the fast continuous speed.

Window Washer – Push the button at the end of the handle in order to activate the window washer.

High/Low Beam Switch

High/Low Beam Switch (If Equipped) – The high/low beam switch is located on the right side of the steering column. Pull the high/low beam switch in order to activate the high beams momentarily. Push the switch backward in order to activate the high beams of the front running lights. The alert indicator for the high beams will come on.

Note: The high/low beam switch is functional only while the running lights are on.

Transmission Speed Control (9)

Transmission Speed Shift Lever – Push the transmission neutralizer button and hold the transmission neutralizer button in order to neutralize the transmission. Then, move the lever to one of the four desired travel speeds. Speed changes are possible when you are moving and when the machine is at full engine speed.

Move the transmission speed lever according to the shift pattern on the machine.

Decelerating the machine and/or applying the brakes is recommended when you are changing speeds. This permits operator comfort and maximum service life of the power train components.

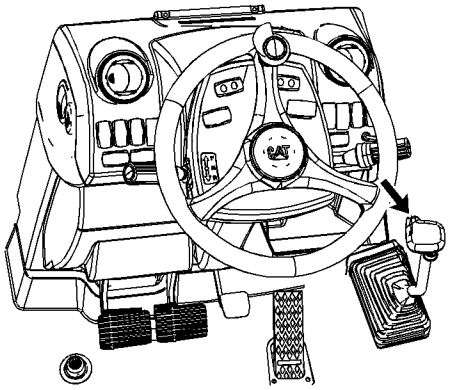


Illustration 106 g01588235

Transmission Neutralizer Button – Push the button and hold the button when you are changing speed ranges. This will disengage the transmission from the driving wheels.

When all available engine power is desired for the loader hydraulics, push the transmission neutralizer button that is located on the loader control lever.

Throttle Control (10)

Accelerator Pedal – Push down the pedal in order to increase travel speed. Release the pedal in order to decrease travel speed. The accelerator pedal will return to the low idle setting.

Use the pedal to reduce engine rpm for directional shifts when you use the loader.

Differential Lock Control (11)

NOTICE
Do not engage the differential lock if the machine is in third gear or above. Machine damage may occur.

Differential Lock Control – Push down the switch in order to engage the differential lock. The differential lock can prevent wheel slippage. Use the differential lock control when the machine is moving on soft ground or on wet ground. Apply the differential lock when the wheel is slipping. This will ensure positive engagement. Reduce the engine speed to the idle speed range before you engage the differential lock in order to minimize shock loads on the rear axle.

Release the differential lock after engagement is noticed. The differential will automatically disengage when the torque allows the differential to disengage.

Use the differential lock to prevent one wheel from slipping. If the wheels continue to slip in soft material, reduce the engine speed.

When the differential lock is engaged, the differential is locked. Both rear wheels will turn at the same speed.

Note: The differential lock will only function in the two-wheel steer mode if the machine is equipped with All Wheel Steer. The differential lock will become disabled when circle steer mode is selected or crab steer mode is selected.

Service Brakes (12)

⚠ WARNING

Personal injury or death could result if brake pedal lock bar is not engaged when recommended. Machine can swerve out of control if only one brake is applied for a quick stop. Follow the recommendations below for proper braking.

⚠ WARNING

Do not apply the brake continuously or use the brake as a footrest as this may cause excessive heat in the brake circuit. When you drive downhill for a long distance use a lower gear and use engine braking. Excessive heat in the brake circuit can lead to brake failure. Failure of the brakes could cause serious injury or death.

NOTICE
Some areas may have a legal requirement to have the pedals locked when roading. Check state and local laws.

Brake Pedals – Push both pedals downward in order to slow down the machine. Push both pedals downward in order to stop the machine. Use the brake pedals while you are operating on a downgrade in order to prevent the engine from overspeeding.

The rear brake lights must come on when you apply the brakes. If the rear brake lights are not functioning, repair the brake lights. Repair the brake lights before you operate the machine.

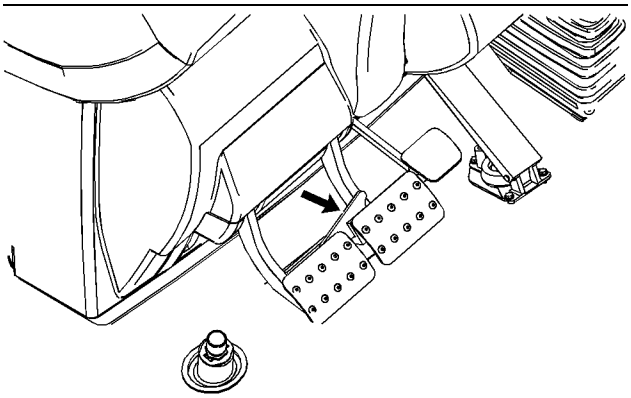


Illustration 107 g01090661

As shown, connect the left pedal and the right pedal together. Move the lock bar between both of the pedals. If the machine is operating in second gear, in third gear, and in fourth gear, connect the lock bar.

Only disengage the lock bar when the machine is not moving. If the lock bar is disengaged, only operate the machine at low speeds and in first gear. Use the left pedal or the right pedal to aid in maneuvering in tight quarters.

Use the pedals with the steering wheel in order to make sharp turns. Use the left pedal to help with sharp left turns. Use the right pedal to help with sharp right turns.

Steering Wheel Tilt Control (13) (If Equipped)

Steering Wheel Tilt Control – In order to adjust the steering wheel, push down on steering wheel tilt control (13) and move the steering wheel to the desired position. Release the steering wheel tilt control. The steering wheel will remain in the desired position.

Horn (14)

Horn – Press the end of the transmission direction control (15) in order to sound the horn. Use the horn for alerting personnel or for signaling personnel.

Transmission Direction Control (15)

F

FORWARD – Move the transmission lever upward. The machine will move forward.

NEUTRAL – Move the transmission lever to the middle position for the NEUTRAL position. The machine should not move when the transmission lever is in the neutral position.

REVERSE – Move the transmission lever downward. The machine will move in reverse.

Forward directional changes and reverse directional changes are possible while the machine is moving. However, reducing the engine speed is recommended, when directional changes are being made. Reducing the machine ground speed and/or braking is recommended, when directional changes are being made. This permits operator comfort and maximum service life of the power train components.

To avoid an unstable machine, the machine should be stopped before any directional changes are made with a raised load.

The lever should be moved to the NEUTRAL position when you are using the backhoe or when you are leaving the machine. The transmission neutral lock should be engaged when you are using the backhoe or when you are leaving the machine.

Note: The alarm (if equipped) will sound when the stabilizers are being raised and the machine is shifted to FORWARD or REVERSE position.

Speed Selector

Powershift Transmissions Only

The transmission has a maximum of four forward speeds and three reverse speeds. Rotate the transmission lever to the desired gear speed:

"1" – First Speed

"2" – Second Speed

"3" – Third Speed

"4" – Fourth Speed

If the transmission is in fourth gear and the direction control is in the FORWARD position, the transmission will upshift into fifth gear automatically once the correct ground speed has been achieved and back down to fourth gear once the ground speed has been reduced appropriately. If the transmission is in fourth gear and the direction control is in the REVERSE position, the transmission will only shift into the third gear.

All Wheel Drive Control (16) (If Equipped)

Three-Position Switch

All Wheel Drive – Push the left side of the switch to the ON position in order to activate all wheel drive.

All Wheel Drive can be activated anytime when additional traction is desired.

All Wheel Drive should always be activated when you are operating the machine on a slope.

All Wheel Drive Braking – Place the switch in the middle position in order to enable the All Wheel Drive Braking. The machine will operate in two-wheel drive until you push on the brake pedals. Pushing the brake pedals will activate the All Wheel Drive.

Note: For machines that are equipped with two wheel steer, press both of the brake pedals at the same time in order to enable the All Wheel Drive Braking. Steering using the brakes is still possible for two-wheel steer machines, when you press one brake pedal.

All Wheel Drive Braking should always be activated when you are roading the machine.

OFF – Push the right side of the switch to the OFF position for two-wheel drive. The All Wheel Drive Braking is deactivated when the switch is in this position.

Two-Position Switch

All Wheel Drive – Push the top of the switch in order to activate all wheel drive.

All Wheel Drive can be activated anytime when additional traction is desired.

All Wheel Drive should always be activated when you are operating the machine on a slope.

All Wheel Drive Braking – Push the bottom of the switch in order to enable the All Wheel Drive Braking. The machine will operate in two-wheel drive until you push the brake pedals. Pushing the brake pedals will activate the All Wheel Drive.

Note: For machines that are equipped with two wheel steer, press both of the brake pedals at the same time in order to enable the All Wheel Drive Braking. Steering using the brakes is still possible for two-wheel steer machines, when you press one brake pedal.

Loader Control (17)

Refer to Operation and Maintenance Manual, “Joystick Control (Loader)” for more information.

Multipurpose Control (18)

Refer to Operation and Maintenance Manual, “Joystick Control (Loader)” for more information.

Parking Brake Control (19)

⚠ WARNING

Always engage the parking brake and transmission neutral lock before dismounting the machine, operating the backhoe or engaging the boom lock for the transport position. Failure to do so could allow unexpected machine movement, resulting in personal injury or death.

Parking Brake – The parking brake lever is located on the right side of the seat. Always stop the engine and engage the parking brake before you get off the machine.

If the parking brake is engaged, the action alarm will sound when the transmission direction control lever is in the FORWARD position or in the REVERSE position.

Note: Switching the direction control lever from either direction to NEUTRAL then back to either direction may cause the machine to move while the parking brake lever is engaged.

Parking Brake Engaged – Pull up the parking brake lever in order to engage the parking brake. The parking brake indicator light on the front console will come on when the engine start switch is turned on and when the parking brake is engaged.

Parking Brake disengaged – Push down the parking brake lever in order to disengage the parking brake. Slightly raise the parking brake lever and pull in the release lever before you disengage the parking brake.

Secondary Brake – The secondary brake uses the same lever as the parking brake. The secondary brake should be used if the service brakes fail to stop the machine.

Engine Start Switch (20)

OFF – Turn the engine start switch key to the OFF position in order to stop the engine. Insert the engine start switch key only while the start switch is in the OFF position. Remove the engine start switch key only while the start switch is in the OFF position. If the engine is not running, turn the engine start switch key to the OFF position in order to prevent the fault alarm from sounding.

ON – The engine start switch will return to the ON position when the engine start switch key is released from the START position. When the engine is not running, the indicator lights and the fault alarm will remain on until the engine start switch is turned to the OFF position.

START – Turn the engine start switch key to the START position in order to start the engine. Release the engine start switch key after the engine starts. The fault alarm should shut off after the engine oil pressure rises.

The transmission control lever must be in the NEUTRAL position and the hydraulic control levers must be in the HOLD position before you turn the engine start switch and before you start the engine.

Note: The engine may fail to start after the key is turned to the start position. If this happens, the key must be returned to the OFF position. Attempt to start the engine again.

When you are not operating the machine, remove the key.

Starting Aid Switch (21)

⚠ WARNING

Do not spray ether into engine when using thermal starting aid to start engine. Personal injury and machine damage could result. Follow the procedures in this manual.

Starting Aid Switch – The starting aid switch is located on the right side console.

If the machine fails to start due to cold ambient temperatures, the glow plugs can be activated in order to provide heated fuel to the inlet manifold. Refer to Operation and Maintenance Manual, “Starting Below 0°C (32°F)” for the starting procedure with the glow plugs.

Rotating Beacon (22)

Rotating Beacon Light (If Equipped) – Press the top of the switch in order to turn on the rotating beacon light. Press the bottom of the switch in order to turn off the rotating beacon light. The rotating beacon light is used to alert other vehicles when the machine is being roaded from one job to another job.

Front Floodlights (23)

Front Floodlights (If Equipped) – The switch is a two-position switch (If Equipped).

Push the bottom of the switch for the front running lights (If Equipped) or the OFF position if the machine is not equipped with front running lights. Push the top of the switch for the two front floodlights.

Front Floodlights (If Equipped) – The switch is a three-position switch (If Equipped).

Push the bottom of the switch for the Front Running Lights. Push the switch to the middle position for the two front floodlights. Push the top of the switch in order to turn on all four front floodlights.

Rear Floodlights (24)

Rear Floodlights (If Equipped) – The switch is a two-position switch (If Equipped).

Press the bottom of the switch for the OFF position in order to turn off the rear floodlights. Press the top of the switch in order to turn on the rear floodlights.

Rear Floodlights (If Equipped) – The switch is a three-position switch (If Equipped).

Push the bottom of the switch to the OFF position in order to turn off the rear floodlights. Press the switch to the middle position for the two rear floodlights. Press the top of the switch in order to turn on all four rear floodlights.

Rear Fog Light (25)

Rear Fog Lamp (If Equipped) – Press the top of the switch in order to turn on the rear fog lamp. Press the bottom of the switch in order to turn off the rear fog lamp.

The rear fog lamp will only operate when the headlights are being used.

Sideshift Control (26)

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

Rear Wiper/Washer Switch (27)

Rear Window Wiper – Place the switch in the middle position in order to activate the rear window wiper. Push the bottom of the switch in order to shut off the window wiper.

Rear Window Washer – Push the top of the switch and hold in order to activate the rear window washer.

Horn (28) (If Equipped)

Horn – Press the top of the switch in order to sound the horn. Use the horn for alerting personnel or for signaling personnel.

Throttle Control (29)

Accelerator Lever – This lever controls the engine speed for backhoe operation.

Operate the machine in the green operating range on the tachometer.

High Idle – Move the lever away from the operator for a faster idle speed.

Low Idle – Move the lever toward the operator for a lower idle speed.

For roading or loader operation, keep the lever in the low idle position. Use the accelerator pedal to change the engine speed.

Note: When you are digging with the backhoe, the maximum recommended engine speed is 1800 rpm.

Stabilizer Controls (30)

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

Boom Lock (31)

NOTICE
Objects may be lifted while the boom transport lock is engaged. However, machine damage can result if both hooks are not fully engaged with the boom transport lock pins prior to lifting objects.

Boom Lock

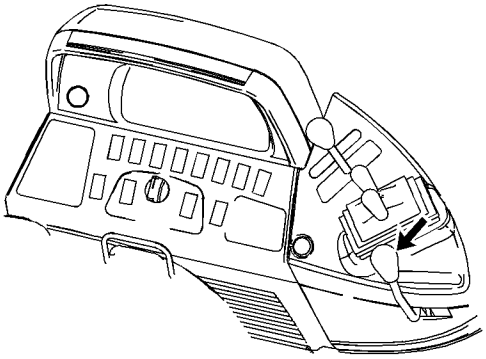


Illustration 108 g01925739

1. Close the bucket and completely move in the stick. Slowly move the boom upward until the boom is inward.

2. Move the boom lock lever toward the rear of the machine to the lock position.

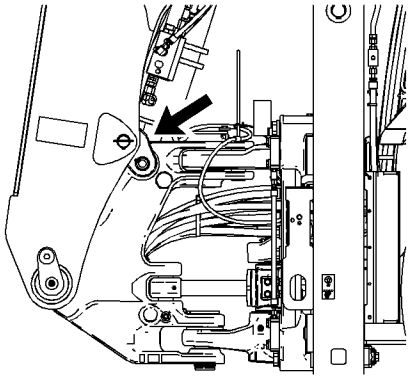


Illustration 109 g01925718

3. Make sure that the hook engages over the lock in order to secure the boom into the LOCK position. Activate the boom downward in order to force the boom against the boom transport lock. This will improve the ride of the machine.

Boom Release

1. Slowly move the boom upward until the boom is inward.

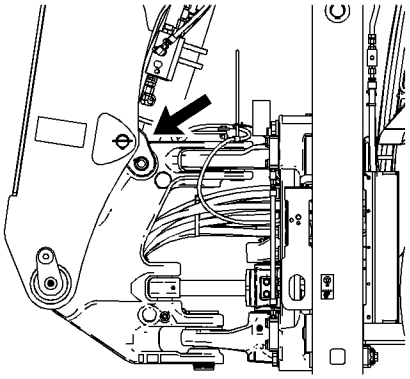


Illustration 110 g01925718

2. Pull the boom lock lever toward the front of the machine in order to disengage the boom lock. This will allow movement of the backhoe for operation.

Backhoe Controls (32)

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

Quick Coupler (33, 34) (If Equipped)

Two electrical switches are located inside the cab. Use of both switches is required in order to release the work tool. Switch (33) is a two-position switch used to unlock the work tool rear pin locking mechanism. Switch (34) is a momentary switch used to unlock the work tool front pin locking mechanism. Switch (34) will function only when switch (33) is in the unlock position.

For more information, refer to Operation and Maintenance Manual, “Quick Coupler Operation (Hydraulic Pin Grabber Quick Coupler)”.

Object Handling Stability Alarm Switch (35) (If Equipped)

Stability Alarm Switch – Press the top of switch (35) to activate the stability alarm. The stability alarm must be activated when you perform an object handling operation. When you lift a load that exceeds the maximum rated load the stability alarm will sound and an action light will illuminate on the right side console, refer to Operation and Maintenance Manual, “Monitoring System” for more information. To disengage the stability alarm press the bottom of switch (35).

Note: To ensure that the stability alarm is working properly before use, press the top of switch (35) to activate the stability alarm. Fully raise the boom and stall the boom against the stops. The stability alarm should sound and the action light should illuminate.

Note: The stability alarm switch should not be activated during normal digging.

Fan Switch (36)

Heater Fan Switch – This switch controls the three-speed blower fan motor.

Press the bottom of the switch for the LOW position of the fan.

Press the switch to the middle position for the MEDIUM fan speed.

Press the top of the switch for the HIGH fan speed.

Variable Temperature Control (37)

Heating Variable – Turn the knob between COOL (left) and WARM (right).

Heating and Cooling Control (38)

Heating – Press the top of the switch to the ON position. Turn the blower fan switch control to the desired speed (LOW, MEDIUM, or HIGH). Adjust the temperature control knob for the desired temperature.

Press the switch to the middle position for the blower OFF position.

Cooling (If Equipped) – Press the bottom of the switch to the air conditioning ON position. Turn the blower fan switch control to the desired speed (LOW, MEDIUM, or HIGH). Adjust the temperature control knob for the desired temperature.

Note: When you are using the cooling system, close all unused vents in order to provide maximum cooling.

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

To produce the volume of air that is needed to keep out dust, set the blower fan switch control to LOW, to MEDIUM, or to HIGH. Adjust the temperature control knob to the desired temperature.

Defogging – Use the cooling system to remove moisture from the air in the cab. This will prevent moisture from forming on the windows.

Press the switch to the air conditioning ON position. Turn the blower fan switch control to the desired speed (LOW, MEDIUM, or HIGH). Adjust both control knobs until the moisture level is lowered and the windows are free of moisture.

VENTILATION – When heating, cooling, or defogging is not desired, the system can be used in order to provide ventilation. Turn the blower fan switch to the desired speed (LOW, MEDIUM, or HIGH). Adjust the temperature control knob to the desired temperature.

Cab Door

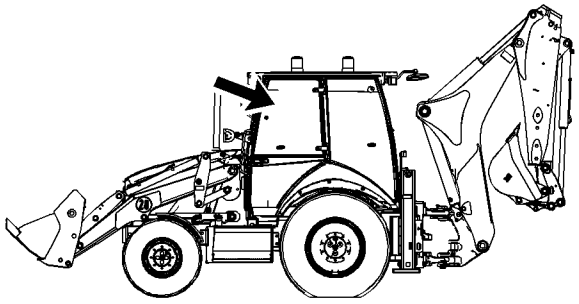


Illustration 111 g01925722

Cab Doors – Pull the door latch in order to open the door. Open the door all the way to the fully open position. The door will remain in this position. Both doors operate the same way.

The doors should be closed while you operate the machine. While the doors are shut, the windows can be opened for better cab air flow.

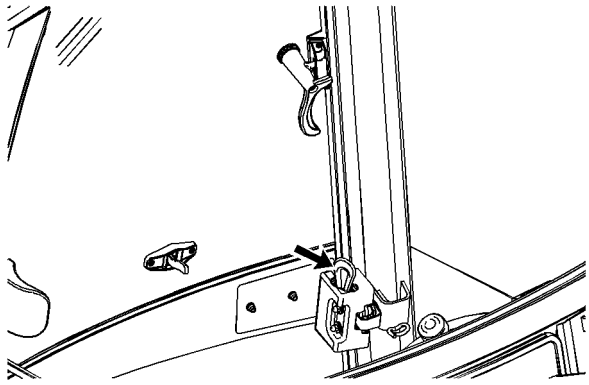


Illustration 112 g01098892

Cab Door Release Lever – Move the lever in order to unlatch the door and open the door.

Windows

Door Windows

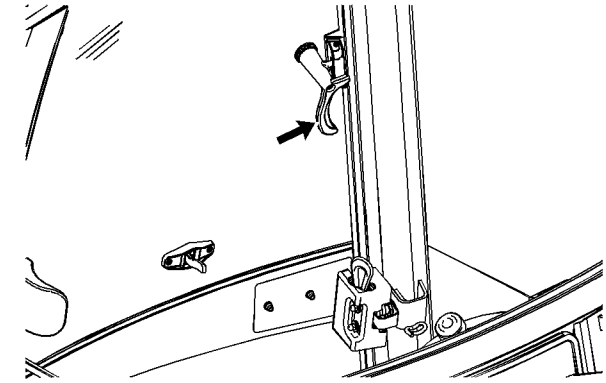


Illustration 113 g01098902

Move the window latch in order to open the window.

Rear Window

Note: The rear window must be closed when the machine is operated with a work tool that may discharge debris. If the machine is not equipped with the rear window, a polycarbonate shield must be used when the machine is operated with a work tool that may discharge debris.

The cab rear window has several operational features from the inside of the cab by the operator.

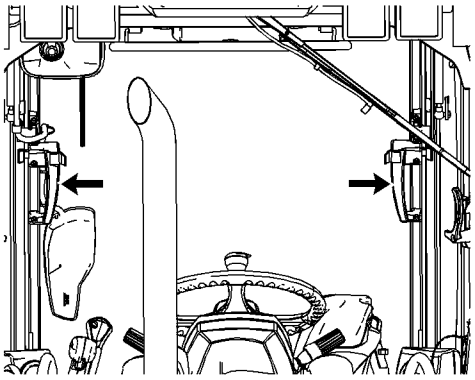


Illustration 114 g01530735

Move the latches above the plastic handles in order to release the window from the LOCKED position. Pull the handles toward the seat and then push the handles upward until the latches engage in order to stow the window.

To lower the window from the stowed position, move the latches by the plastic handles. Pull the handles downward, and push the handles toward the rear of the machine until the latches lock into position.

Note: Make sure that the rear window is free from obstructions before you open or before you close the rear window.

Interior Dome Light

Interior Dome Light – Push the top of the light in order to turn on the interior dome light. Push the bottom of the light in order to turn off the interior dome light.

i05215115

Operator Controls
(432E, 434E Pilot Control, 442E, 444E)

SMCS Code: 7300; 7451

S/N: JBA1–Up

S/N: NBA1–Up

S/N: EME1–Up

S/N: SJL1–Up

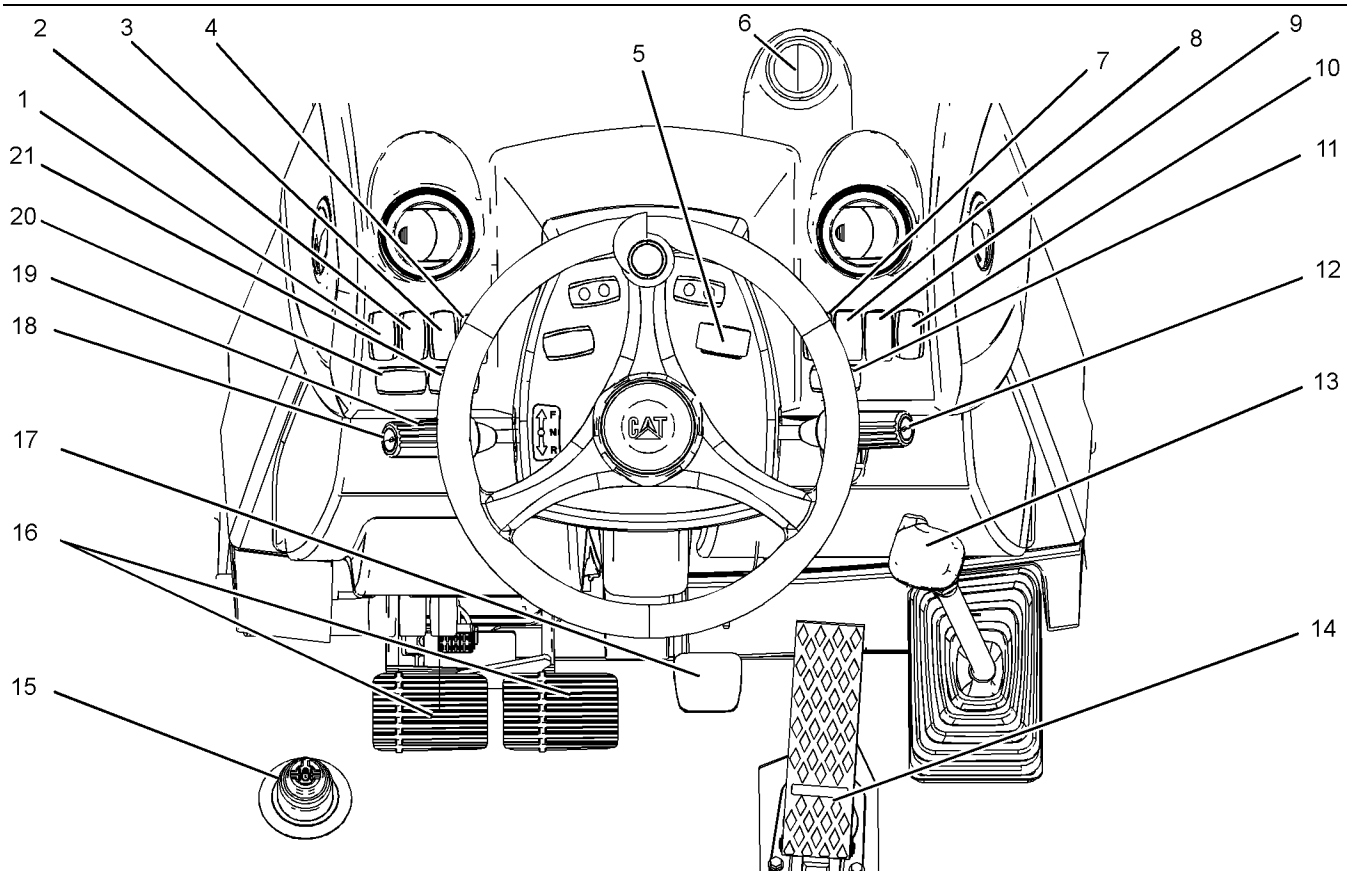


Illustration 115 g01924659

(1) Quick Coupler Control (If Equipped)
(2) Continuous Flow Control (Loader)
(3) Auxiliary Circuit Control (If Equipped)
(4) Transmission Neutral Lock
(5) Hazard Flashers
(6) All Wheel Steer Position Gauge (If Equipped)
(7) Autoshift Control (If Equipped)
(8) Ride Control (If Equipped)
(9) Roading Lights
(10) Two Wheel Steer/Four Wheel Steer (If Equipped)
(11) All Wheel Steer Control (If Equipped)
(12) Turn Signal Control and Front Window Wiper
(13) Transmission Speed Control (If Equipped)
(14) Throttle Control
(15) Differential Lock Control
(16) Service Brakes
(17) Steering Wheel Tilt Control (If Equipped)
(18) Horn
(19) Transmission Direction Control
(20) All Wheel Drive Control (If Equipped)
(21) Work Tool Control (If Equipped)

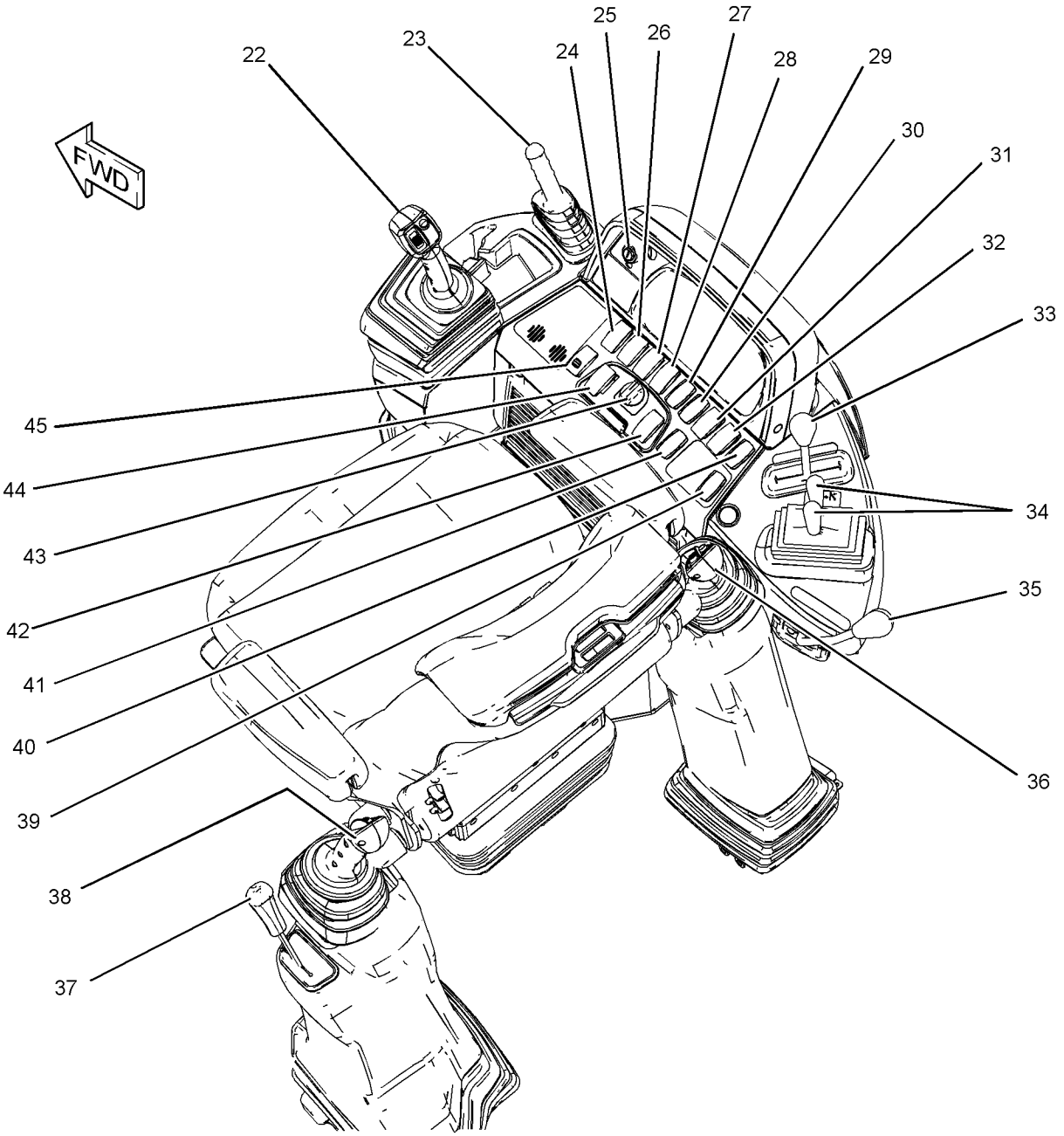


Illustration 116 g02681336

(22) Loader Control
(23) Parking Brake Control
(24) Starting Aid Switch
(25) Engine Start Switch
(26) Rotating Beacon
(27) Front Floodlights
(28) Rear Floodlights
(29) Rear Fog Light (If Equipped)
(30) Sideshift Control
(31) Rear Wiper/Washer Switch
(32) Continuous Flow Control (Backhoe)
(33) Throttle Control
(34) Stabilizer Controls
(35) Boom Lock
(36) Joystick Control
(37) Console Latch
(38) Joystick Control
(39) Quick Coupler Lock/Unlock (Rear Pin) (If Equipped)
(40) Quick Coupler Unlock (Front Pin) (If Equipped)
(41) Object Handling Stability Alarm Switch (If Equipped)
(42) Fan Switch
(43) Variable Temperature Control
(44) Heating and Cooling Control
(45) Hydraulic Lockout

Quick Coupler Control (1) (If Equipped)

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. Tilt the work tool down.

2. Put downward pressure on the work tool.

3. Back the machine up and make sure there is not any movement between the work tool and the quick coupler assembly.

The quick coupler pin switch with the red lock button is used to engage the pins. The quick coupler pin switch is also used to disengage the quick coupler pins.

NOTICE
Auxiliary hoses for work tools must be removed before the quick coupler pins are disengaged.

Pulling the work tools with the auxiliary hoses could result in machine damage.

Disengage – Pull the red button downward and push down on the top of the quick coupler pin switch to the unlocked position. When the quick coupler pin switch is in the UNLOCKED position, hold the switch for approximately 5 seconds until the coupler pins disengage.

Engage – Press the bottom of the quick coupler pin switch in order to engage the quick coupler pins. The quick coupler pin switch should be in the LOCKED position when you are not disengaging the quick coupler pins.

NOTICE
Auxiliary hoses for work tools must be attached after the quick coupler pins are engaged.

Operating the work tool without the hoses properly attached may result in damage to the work tool.

Note: Operating the quick coupler switch will deactivate the ride control system for a short time. Deactivating the ride control systems enables easier changing of work tools.

Continuous Flow Control (Loader) (2)

Continuous Flow Switch – The momentary switch is located on the front console on the left-hand side. This switch works with the thumb wheel on the loader control. Once the operator selects the desired flow rate with the thumb wheel press the momentary switch in order to maintain the desired flow. Press the switch again in order to return flow control to the thumb wheel on the loader control.

Auxiliary Circuit Control (3) (If Equipped)

AUXILIARY – The switch allows the operator to activate a 12 V auxiliary circuit. Press the top of the switch in order to energize the auxiliary function. Press the bottom of the switch in order to turn off the auxiliary function. The auxiliary circuit can control a separate function such as a water sprayer for a broom.

Transmission Neutral Lock (4)

WARNING

Always engage the parking brake and transmission neutral lock before dismounting the machine, operating the backhoe or engaging the boom lock for the transport position. Failure to do so could allow unexpected machine movement, resulting in personal injury or death.

Transmission Neutral Lock – The transmission neutral lock is located on the left side of the front console.

Locked – Press the top of the switch in order to lock the transmission direction control lever into the NEUTRAL position.

Unlocked – Press the bottom of the switch in order to deactivate the transmission neutral lock.

Note: If the transmission neutral lock has been activated, shift the direction control lever into the NEUTRAL position before you shift the direction control lever into the FORWARD position. If the transmission neutral lock has been activated, shift the direction control lever into the NEUTRAL position before you shift the direction control lever into the REVERSE position. The direction control lever must first be shifted into the NEUTRAL position in order to allow movement of the machine.

Note: When you exit the machine push the top of the transmission neutral lock switch in order to prevent the machine from moving out of the NEUTRAL position. Engage the parking brake in order to prevent machine movement when the transmission is in neutral. Refer to the Operation and Maintenance Manual, “Transport Positions”.

Hazard Flashers (5)

Hazard Flashers – The hazard switch is located on the right-hand side of the front console. Push the left side of the switch in order to activate the hazard flashers. Both turn signal lights will flash. Push the right side of the switch in order to deactivate the hazard flashers.

All Wheel Steer Position Gauge (6) (If Equipped)

The all wheel steer position gauge will indicate the position of the rear wheels.

Autoshift Control (7) (If Equipped)

Automatic Mode – Press the top of the switch in order to activate the autoshift.

The operator selects the highest desired gear for the transmission with the transmission shift lever. When the autoshift control is activated, the transmission will not shift higher than the gear that is selected. The transmission will only shift into fifth gear when fourth gear is selected. When fourth gear is selected, the transmission will shift between second gear, third gear, fourth gear, and fifth gear. The autoshift control will select the proper transmission gear according to the ground speed of the machine.

Note: Fifth gear is only available when the autoshift control is enabled. When the transmission is in manual mode, the maximum forward gear is fourth gear.

The kickdown function is activated by momentarily pressing the transmission neutralizer button. The transmission neutralizer button is located on the loader control. The transmission will kick down only if the current ground speed is within the working range of the next lower gear. If the ground speed is above the working range of the next lower gear, the transmission will wait until the ground speed decreases. If the ground speed does not decrease, the transmission control will not kick down.

Push the top of the switch for the autoshift function in the automatic mode. Push the top of the switch prior to shifting the transmission into forward or reverse in order to activate the autoshift function.

Manual Mode – Press the bottom of the switch in order to disable the autoshift control.

The manual mode allows the operator to select the desired speed and the desired direction of the machine.

Ride Control (8) (If Equipped)

Ride Control – Travel at high speeds over rough terrain causes bucket movement and a swinging motion. The system for ride control acts as a shock absorber by absorbing forces from the bucket and by dampening forces from the bucket. This system also stabilizes the entire machine.

⚠ WARNING

Ride control can cause inadvertent movement of the loader arms if not used correctly. Don't use when using loader or backhoe.

The ride control must be turned off in order to raise the front tires off the ground with the loader bucket.

Note: In some countries that require lock valves for material handling applications, the ride control must be turned off so that the lock valves can function properly. Lock valves and ride control cannot function at the same time.

Automatic Ride Control – Push the top of the switch in order to turn on the automatic ride control.

The automatic ride control automatically turns on when the ground speed exceeds a preset speed of approximately 9.5 km/h (5.9 mph). The automatic ride control automatically shuts off during low speed travel mode.

OFF – Put the switch in the CENTER position in order to turn off the ride control.

ON – Push the bottom of the switch in order to turn on the system for ride control.

The ride control will smooth the ride of the machine during travel.

Roading Lights (9)

Front Running Lights – The front running light switch is located on the right side of the front console. Push the bottom of the switch for the OFF position. The middle position is for the panel lights, for the tail lights, and for the position lights. The top position adds running lights to the following lighting groups: panel lights, tail lights and position lights. If the lights are left in the ON position when the engine start switch is in the OFF position an alarm will sound.

Two-Wheel Steer Mode/Four-Wheel Steer Mode (10)

Two-Wheel Steer – Press the bottom of switch (10) to activate the Two-Wheel Steer mode. The Two-Wheel Steer mode offers the capability to operate the machine on the road. The Two-Wheel Steer mode is used when additional maneuvering capability is not needed. Only the front axle is used to steer the machine. Use this mode when you are roading the machine. When you are operating the machine in this mode the indicator light will not be on.

Four-Wheel Steer – Slide down the red button located on switch (10) and then depress the top of switch (10). The machine will now be in circle steer mode or the machine now will be in crab steer mode. This is dependent upon the placement of the All Wheel Steer control (11).

All Wheel Steer Control (11) (If Equipped)

⚠ WARNING

Personal injury or death can result if the machine is roaded in any mode other than front wheel steer.

Always road the machine with the rear wheels centered and the machine in the front wheel steer mode.

The All Wheel Steer (AWS) has three steering modes: Two-Wheel Steer, Circle Steer, and crab steer. When you operate the machine for the first time, become familiar with the three modes by trying each one. This should be done in an area that is clear of personnel and of obstacles.

The All Wheel Steer mode consists of the following components:

- A Two-Wheel Steer/Four-Wheel Steer Mode switch.
- An All Wheel Steer Control switch that allows the operator to choose from circle steer or crab steer
- A rear axle position gauge

Three modes provide maximum machine performance under various conditions at the job site.

Two-Wheel Steer – The Two-Wheel Steer mode offers the capability to operate the machine on the road. The Two-Wheel Steer mode is used when additional maneuvering capability is not needed. Only the front axle is used to steer the machine. Use this mode when you are roading the machine. When you are operating the machine in this mode the indicator light will not be on.

Circle Steer Mode – The Circle Steer Mode (1) provides reduced turning radii and tighter operation in confined spaces. The front and rear axles are used to steer the machine. When you are operating the machine in the Circle Steer mode, the indicator light will come on.

Crab Steer Mode – The crab steer mode allows the rear wheels to turn in the same direction as the front wheels which will allow the machine to move in a diagonal direction. The front and rear axles are used to steer the machine

NOTICE
Before changing from one steering mode to another, always center both the front and rear wheels.

Before you return to the Two-Wheel Steer mode or to the Circle Steer mode, the front wheels and rear wheels must be centered. Observe the rear axle position gauge on the front console. Then, move the All Wheel Steer switch to the desired mode.

NOTICE
Failure to recenter the steering system at least once per day may result in a reduction in steering effectiveness.

The steering must be realigned under the following conditions:

- The start of each work shift
- One time during the work shift
- Steering difficulty occurs.
- The machine will be roaded.
- The machine has Traveled 24 km (15 mi) on a public road in Two-Wheel Steer mode.

Note: If the all wheel steer position gauge (6) is positioned in the green shaded area the steering does not need to be realigned.

Synchronizing the Wheels

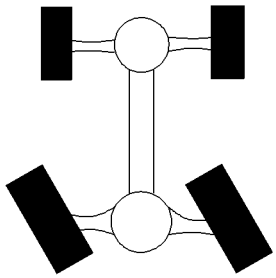


Illustration 117 g00830965

In a static position, select the circle steer mode and turn the steering wheel so that the rear wheels are turned to full lock.

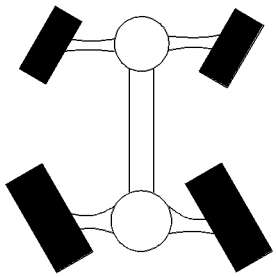


Illustration 118 g00282686

Select the Two-Wheel steer mode and turn the front wheels to the opposite full lock.

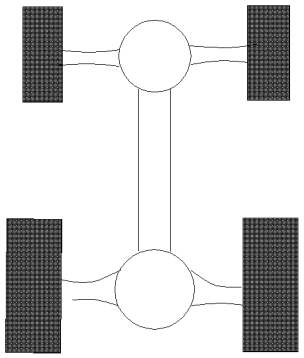


Illustration 119 g01967073

Select the circle steer mode and turn the steering wheel until the front wheels are facing straight ahead.

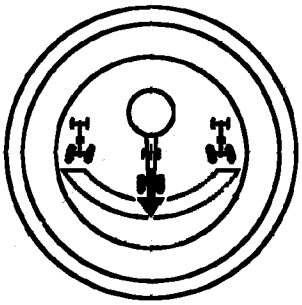


Illustration 120 g01967574

The rear wheels should also be facing straight ahead. The all wheel steer position gauge should be positioned in the green shaded area.

Turn Signal Control and Front Window Wiper (12)

Directional Turn Signals

Directional Turn Signals – The directional turn signal lever is on the right side of the steering column.

Left Directional Signal Lights – Push the lever away from the operator in order to activate the left turn signals. When the lever is pushed forward away from the operator, an indicator light will illuminate on the front dash. The left turn signal will flash until the lever is manually returned to the OFF position.

OFF Position – In the OFF position, the directional signal lights will not flash.

Right Directional Signal Lights – Pull the lever toward the operator in order to activate the Right turn signals. When the lever is pulled back toward the operator, an indicator light will illuminate on the front dash. The right turn signal will flash until the lever is manually returned to the OFF position.

Note: The directional turn signals will automatically be returned to the OFF if your machine is equipped with the steering column tilt.

Front Window Wiper/Washer

Window Wipers – Rotate the handle away from the operator in order to activate the window wipers. There are four positions for the window wipers.

OFF – When the handle is in the OFF position, the wipers will be off.

INTERMITTENT POSITION – The wipers will operate intermittently.

CONTINUOUS POSITION 1 – The wipers will operate continuously. This is the slow continuous speed.

CONTINUOUS POSITION 2 – The wipers will operate continuously. This is the fast continuous speed.

Window Washer – Push the button at the end of the handle in order to activate the window washer.

High/Low Beam Switch

High/Low Beam Switch (If Equipped) – The high/low beam switch is located on the right side of the steering column. Pull the high/low beam switch in order to activate the high beams momentarily. Push the switch backward in order to activate the high beams of the front running lights. The alert indicator for the high beams will come on.

Note: The high/low beam switch is functional only while the running lights are on.

Transmission Speed Control (13)

Transmission Speed Control – Push the transmission neutralizer button and hold the transmission neutralizer button in order to neutralize the transmission. Then, move the lever to one of the four desired travel speeds. Speed changes are possible when you are moving and when the machine is at full engine speed.

Move the transmission speed lever according to the shift pattern on the machine.

Decelerating the machine and/or applying the brakes is recommended when you are changing speeds. This permits operator comfort and maximum service life of the power train components.

Illustration 121 g01200208

Transmission Neutralizer Button – Push the button and hold the button when you are changing speed ranges. This will disengage the transmission from the driving wheels.

When all available engine power is desired for the loader hydraulics, push the transmission neutralizer button that is located on the loader control lever.

Throttle Control (14)

Accelerator Pedal – Push down the pedal in order to increase travel speed. Release the pedal in order to decrease travel speed. The accelerator pedal will return to the low idle setting.

Use the pedal to reduce engine rpm for directional shifts when you use the loader.

Differential Lock Control (15)

NOTICE
Do not engage the differential lock if the machine is in third gear or above. Machine damage may occur.

Differential Lock Pedal – Push down the pedal in order to engage the differential lock. The differential lock can prevent wheel slippage. Use the differential lock pedal when the machine is moving on soft ground or on wet ground. Apply the differential lock when the wheel is slipping. This will ensure positive engagement. Reduce the engine speed to the idle speed range before you engage the differential lock in order to minimize shock loads on the rear axle.

Release the differential lock after engagement is noticed. The differential will automatically disengage when the torque allows the differential to disengage.

Use the differential lock to prevent one wheel from slipping. If the wheels continue to slip in soft material, reduce the engine speed.

When the differential lock is engaged, the differential is locked. Both rear wheels will turn at the same speed.

Note: The differential lock will only function in the two-wheel steer mode if the machine is equipped with All Wheel Steer. The differential lock will become disabled when circle steer mode is selected or crab steer mode is selected.

Service Brakes (16)

⚠ WARNING

Personal injury or death could result if brake pedal lock bar is not engaged when recommended. Machine can swerve out of control if only one brake is applied for a quick stop. Follow the recommendations below for proper braking.

⚠ WARNING

Do not apply the brake continuously or use the brake as a footrest as this may cause excessive heat in the brake circuit. When you drive downhill for a long distance use a lower gear and use engine braking. Excessive heat in the brake circuit can lead to brake failure. Failure of the brakes could cause serious injury or death.

NOTICE
Some areas may have a legal requirement to have the pedals locked when roading. Check state and local laws.

Brake Pedals – Push both pedals downward in order to slow down the machine. Push both pedals downward in order to stop the machine. Use the brake pedals while you are operating on a downgrade in order to prevent the engine from overspeeding.

The rear brake lights must come on when you apply the brakes. If the rear brake lights are not functioning, repair the brake lights. Repair the brake lights before you operate the machine.

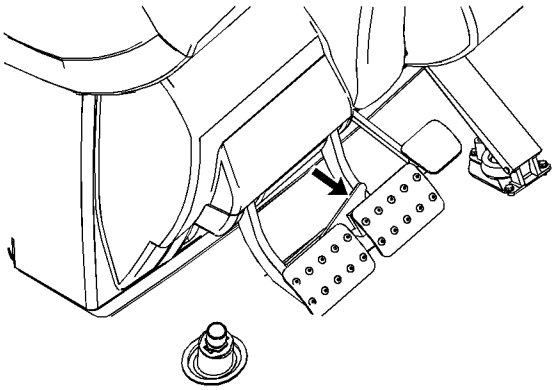


Illustration 122 g01098657

As shown, connect the left pedal and the right pedal together. Move the lock bar between both of the pedals. If the machine is operating in second gear, in third gear, and in fourth gear, connect the lock bar.

Only disengage the lock bar when the machine is not moving. If the lock bar is disengaged, only operate the machine at low speeds and only operate the machine in first gear. Use the left pedal or the right pedal to aid in maneuvering in tight quarters.

Use the pedals with the steering wheel in order to make sharp turns. Use the left pedal to help with sharp left turns. Use the right pedal to help with sharp right turns.

Steering Wheel Tilt Control (17) (If Equipped)

Steering Wheel Tilt Control – In order to adjust the steering wheel, push down on steering wheel tilt control (17) and move the steering wheel to the desired position. Release the steering wheel tilt control. The steering wheel will remain in the desired position. In order to move the steering wheel to the stowed position, release the steering wheel and push down on the steering wheel tilt control. The steering wheel will automatically move to the stowed position.

Horn (18)

Horn – Press the end of the transmission direction control (18) in order to sound the horn. Use the horn for alerting personnel or for signaling personnel.

Transmission Direction Control (19)

Direction Selector

FORWARD – Move the transmission lever upward. The machine will move forward.

NEUTRAL – Move the transmission lever to the middle position for the NEUTRAL position. The machine should not move when the transmission lever is in NEUTRAL.

REVERSE – Move the transmission lever downward. The machine will move in reverse.

Forward directional changes and reverse directional changes are possible while the machine is moving. However, reducing the engine speed is recommended, when directional changes are being made. Reducing the machine ground speed and/or braking is recommended, when directional changes are being made. This permits operator comfort and maximum service life of the power train components.

Speed Selector

Autoshift Transmissions Only

The transmission has a maximum of four forward speeds and three reverse speeds. Rotate the transmission lever to the desired gear speed:

"1" – First Speed

"2" – Second Speed

"3" – Third Speed

"4" – Fourth Speed

If the transmission is in fourth gear and the direction control is in the FORWARD position, the transmission will upshift into fifth gear automatically once the correct ground speed has been achieved and back down to fourth gear once the ground speed has been reduced appropriately. If the transmission is in fourth gear and the direction control is in the REVERSE position, the transmission will only shift into the third gear.

Note: The transmission will only shift into fifth gear if the autoshift control is in automatic mode.

The transmission can be manually downshifted by using the neutralizer/downshift switch that is located on the loader control.

All Wheel Drive Control (20) (If Equipped)

Three-Position Switch

All Wheel Drive – Push the left side of the switch to the ON position in order to activate all wheel drive.

All Wheel Drive can be activated anytime when additional traction is desired.

All Wheel Drive should always be activated when you are operating the machine on a slope.

All Wheel Drive Braking – Place the switch in the middle position in order to enable the All Wheel Drive Braking. The machine will operate in two-wheel drive until you push the brake pedals. Pushing the brake pedals will activate the All Wheel Drive.

Note: For machines that are equipped with two wheel steer, press both of the brake pedals at the same time in order to enable the All Wheel Drive Braking. Steering using the brakes is still possible for two-wheel steer machines, when you press one brake pedal.

All Wheel Drive Braking should always be activated when you are roading the machine.

OFF – Push the right side of the switch to the OFF position for two-wheel drive. The All Wheel Drive Braking is deactivated when the switch is in this position.

Two-Position Switch

All Wheel Drive – Push the top of the switch in order to activate all wheel drive.

Note: All Wheel Drive must be deactivated when you road the machine. Use only All Wheel Drive Braking when you road the machine.

All Wheel Drive can be activated anytime when additional traction is desired.

All Wheel Drive should always be activated when you are operating the machine on a slope.

All Wheel Drive Braking – Push the bottom of the switch in order to enable the All Wheel Drive Braking. The machine will operate in two-wheel drive until you push the brake pedals. Pushing the brake pedals will activate the All Wheel Drive.

Note: For machines that are equipped with two wheel steer, press both of the brake pedals at the same time in order to enable the All Wheel Drive Braking. Steering using the brakes is still possible for two-wheel steer machines, when you press one brake pedal.

Work Tool Control (21)

Refer to the Operation and Maintenance Manual for the specific work tool.

Loader Control (22)

Refer to Operation and Maintenance Manual, “Joystick Control (Loader)” for more information.

Parking Brake Control (23)

⚠ WARNING

Always engage the parking brake and transmission neutral lock before dismounting the machine, operating the backhoe or engaging the boom lock for the transport position. Failure to do so could allow unexpected machine movement, resulting in personal injury or death.

Parking Brake – The parking brake lever is located on the right side of the seat. Always stop the engine and engage the parking brake before you leave the seat.

If the parking brake is engaged, the action alarm will sound when the transmission direction control lever is moved from NEUTRAL to FORWARD or REVERSE, then to NEUTRAL, then to FORWARD or REVERSE within 3 seconds.

Note: Switching the direction control lever from either direction to NEUTRAL then back to either direction may cause the machine to move while the parking brake lever is engaged. Refer to Operation and Maintenance Manual, “Braking System - Test” for more information.

Parking Brake Engaged – Pull up the parking brake lever in order to engage the parking brake. The parking brake indicator light on the side console will come on when the engine start switch is turned on and when the parking brake is engaged.

Parking Brake Disengaged – Push down the parking brake lever in order to disengage the parking brake. Slightly raise the parking brake lever and pull in the release lever before you disengage the parking brake.

Secondary Brake – The secondary brake uses the same lever as the parking brake. The secondary brake should be used if the service brakes fail to stop the machine.

Starting Aid Switch (24)

⚠ WARNING

Do not spray ether into engine when using thermal starting aid to start engine. Personal injury and machine damage could result. Follow the procedures in this manual.

Starting Aid Switch – The starting aid switch is located on the right side console.

If the machine fails to start due to cold ambient temperatures, the glow plugs can be activated in order to provide heated fuel to the inlet manifold. Refer to Operation and Maintenance Manual, “Engine Starting with Starting Aid” for the starting procedure with the glow plugs.

Engine Start Switch (25)

OFF (1) – Turn the engine start switch key to the OFF position in order to stop the engine. Insert the engine start switch key only while the start switch is in the OFF position. Remove the engine start switch key only while the start switch is in the OFF position. If the engine is not running, turn the engine start switch key to the OFF position in order to prevent the fault alarm from sounding.

ON (2) – The engine start switch will return to the ON position when the engine start switch key is released from the START position. When the engine is not running, the indicator lights and the fault alarm will remain on until the engine start switch is turned to the OFF position.

START (3) – Turn the engine start switch key to the START position in order to start the engine. Release the engine start switch key after the engine starts. The fault alarm should shut off after the engine oil pressure rises.

The transmission control lever must be in the NEUTRAL position and the hydraulic control levers must be in the HOLD position before you turn the engine start switch and before you start the engine.

Note: The engine may fail to start after the key is turned to the start position. If this happens, the key must be returned to the OFF position. Attempt to start the engine again.

When you are not operating the machine, remove the key.

Rotating Beacon (26)

Rotating Beacon Light (If Equipped) – Press the top of the switch in order to turn on the rotating beacon light. Press the bottom of the switch in order to turn off the rotating beacon light. The rotating beacon light is used to alert other vehicles when the machine is being roaded from one job to another job.

Front Floodlights (27)

Front Floodlights (If Equipped) – The switch is a two-position switch (If Equipped).

Front Floodlights (If Equipped) – The switch is a three-position switch (If Equipped).

Rear Floodlights (28)

Rear Floodlights (If Equipped) – The switch is a two-position switch.

Press the bottom of the switch for the OFF position in order to turn off the rear floodlights. Press the top of the switch in order to turn on the rear floodlights.

Rear Floodlights (If Equipped) – The switch is a three-position switch.

Push the bottom of the switch to the OFF position in order to turn off the rear floodlights. Press the switch to the middle position for the two rear floodlights. Press the top of the switch in order to turn on all four rear floodlights.

Rear Fog Light (29) (If Equipped)

Rear Fog Lamp (29) (If Equipped) – Press the top of the switch in order to turn on the rear fog lamp. Press the bottom of the switch in order to turn off the rear fog lamp.

The fog lamp will only operate when the headlights are being used.

Sideshift Control (30)

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

Rear Wiper/Washer Switch (31)

Rear Window Wiper – Place the switch in the middle position in order to activate the rear window wiper. Push the bottom of the switch in order to shut off the window wiper.

Rear Window Washer – Push the top of the switch and hold in order to activate the rear window washer.

Continuous Flow Control (Backhoe) (32)

Continuous Flow Switch – This switch works with the thumb wheel on the joystick control for the backhoe. Once the operator selects the desired flow rate with the thumb wheel press the momentary switch in order to maintain the desired flow. Press the switch again in order to return flow control to the thumb wheel on the joystick control.

Throttle Control (33)

Accelerator Lever – This lever controls the engine speed for backhoe operation.

Operate the machine in the green operating range on the tachometer.

High Idle – Move the lever away from the operator for a faster idle speed.

Low Idle – Move the lever toward the operator for a lower idle speed.

For roading or loader operation, keep the lever in the LOW IDLE position. Use the accelerator pedal to change the engine speed.

Note: When you are digging with the backhoe, the maximum recommended engine speed is 1800 rpm.

Stabilizer Controls (34)

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

Boom Lock (35)

Boom Lock

1. Close the bucket and completely move in the stick. Slowly move the boom upward until the boom is completely inward.

2. Move the boom lock lever toward the rear of the machine to the lock position.

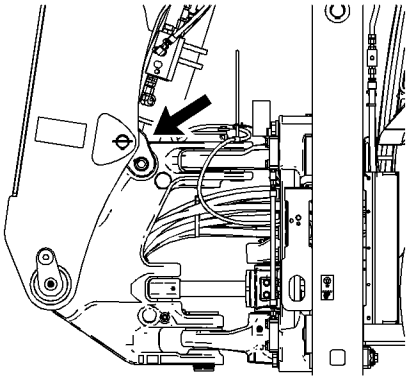


Illustration 123 g01925718

3. Make sure that the hook engages over the lock in order to secure the boom into the LOCK position. Activate the boom downward in order to force the boom against the boom transport lock. This will improve the ride of the machine.

Boom Release

1. Slowly move the boom upward until the boom is completely inward.

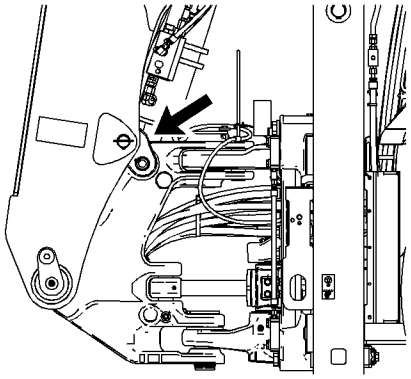


Illustration 124 g01925718

2. Pull the boom lock lever toward the front of the machine in order to disengage the boom lock. This will allow movement of the backhoe for operation.

Joystick Control (36, 38)

Refer to Operation and Maintenance Manual, “Joystick Control (Backhoe)” for more information.

Console Latch (37)

Console Latch – Pull the console latch toward the operator in order to move the joystick controls toward the operator. Release the console latch. The joystick controls will remain in the desired position. In order to return the joysticks to the stowed position, push the console latch away from the operator, and push the joysticks forward. Release the console latch once the joystick controls are in the stowed position.

Quick Coupler (39, 40) (If Equipped)

Two electrical switches are located inside the cab. Use of both switches is required in order to release the work tool. Switch (39) is a two-position switch used to unlock the work tool rear pin locking mechanism. Switch (40) is a momentary switch used to unlock the work tool front pin locking mechanism. Switch (40) will function only when switch (39) is in the unlock position.

For more information, refer to Operation and Maintenance Manual, “Quick Coupler Operation (Hydraulic Pin Grabber Quick Coupler)”.

Object Handling Stability Alarm Switch (41) (If Equipped)

Stability Alarm Switch – Press the top of switch (41) to activate the stability alarm. The stability alarm must be activated when you perform an object handling operation. When you lift a load that exceeds the maximum rated load the stability alarm will sound and an action light will illuminate on the right side console, refer to Operation and Maintenance Manual, “Monitoring System” for more information. To disengage the stability alarm press the bottom of switch (41).

Note: To ensure that the stability alarm is working properly before use press the top of switch (41) to activate the stability alarm. Fully raise the boom and stall the boom against the stops. The stability alarm should sound and the action light should illuminate.

Note: The stability alarm switch should not be activated during normal digging.

Fan Switch (42)

Heater Fan Switch – This switch controls the three-speed blower fan motor.

Press the bottom of the switch for the low position of the fan.

Press the switch to the middle position for the medium fan speed.

Press the top of the switch for the high fan speed.

Variable Temperature Control (43)

Heating Variable – Turn the knob between COOL (left) and WARM (right).

Heating and Cooling Control (44)

Heating – Press the top of the switch to the ON position. Turn the blower fan switch control to the desired position (LOW, MEDIUM, or HIGH). Adjust the temperature control knob for the desired temperature.

Press the switch to the middle position for the blower OFF position.

Cooling (If Equipped) – Press the bottom of the switch to the air conditioning ON position. Turn the blower fan switch control to the desired position (LOW, MEDIUM, or HIGH). Adjust the temperature control knob for the desired temperature.

Note: In order to provide maximum cooling, close all unused vents when you are using the cooling system.

Note: The air conditioning will automatically shut off when the engine RPM falls below 800 RPM.

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

To produce the volume of air that is needed to keep out dust, set the blower fan switch control to LOW, to MEDIUM, or to HIGH. Adjust the temperature control knob to the desired temperature.

Defogging – Use the cooling system to remove moisture from the air in the cab. This will prevent moisture from forming on the window and on the windows.

Press the switch to the air conditioning ON position. Turn the blower fan switch control to the desired position (LOW, MEDIUM, or HIGH). Adjust both control knobs until the moisture level is lowered and the window and side windows are free of moisture.

VENTILATION – When heating, cooling, or defogging is not desired, the system can be used in order to provide ventilation. Turn the blower fan switch to the desired position (LOW, MEDIUM, or HIGH). Adjust the temperature control knob to the desired temperature.

Hydraulic Lockout (45)

Hydraulic Lock Switch – The switch allows the operator to lock the hydraulic controls. Press the switch in order to prevent movement of the pilot operated hydraulic controls.

Cab Door

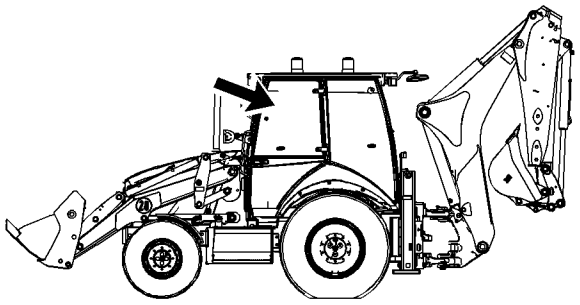


Illustration 125 g01925722

Cab Doors – Pull the door latch in order to open the door. Open the door all the way to the fully open position. The door will remain in this position. Both doors operate the same way.

The doors should be closed while you operate the machine. While the doors are shut, the windows can be opened for better cab air flow.

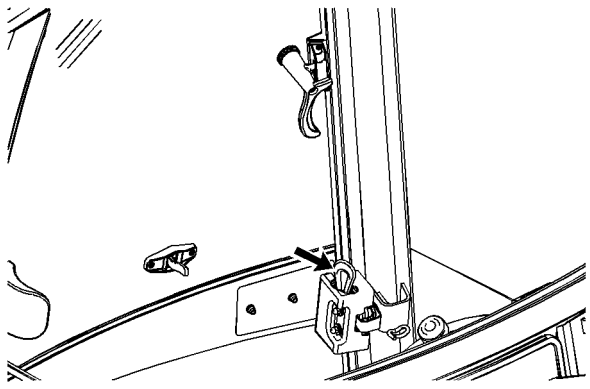


Illustration 126 g01098892

Cab Door Release Lever – Move the lever in order to unlatch the door and open the door.

Windows

Door Windows

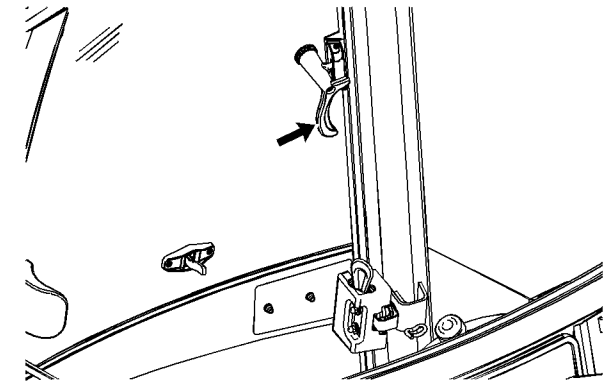


Illustration 127 g01098902

Move the window latch in order to open the window.

Rear Window

Note: The rear window must be closed when the machine is operated with a work tool that may discharge debris. If the machine is not equipped with the rear window, a polycarbonate shield must be used when the machine is operated with a work tool that may discharge debris.

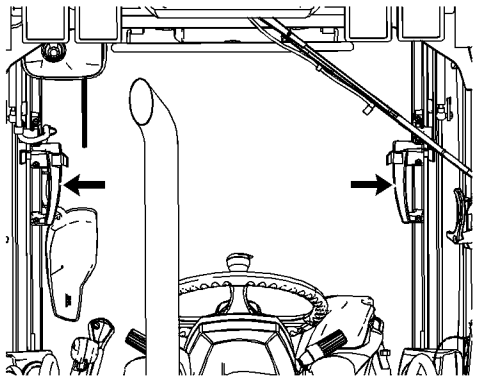


Illustration 128 g01530735

Move the latches above the plastic handles in order to release the window from the LOCKED position. Pull the handles toward the seat and then push the handles upward until the latches engage in order to stow the window.

To lower the window from the stowed position, move the latches by the plastic handles. Pull the handles downward, and push the handles toward the rear of the machine until the latches lock into position.

Note: Make sure that the rear window is free from obstructions before you open or before you close the rear window.

Interior Dome Light

Interior Dome Light – Push the top of the light in order to turn on the interior dome light. Push the bottom of the light in order to turn off the interior dome light.

i03586103

Battery Disconnect

SMCS Code: 1401; 1402

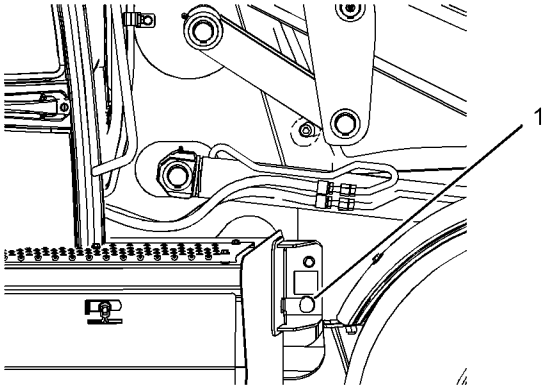


Illustration 129 g01914198

Battery Disconnect – The battery disconnect is located on the side of the battery box.

1. Move boot (1) in order to access the bolt that secures the battery cable to the frame.

2. Remove the bolt that secures the battery cable to the frame.

3. Rotate boot (1) by 180 degrees in order to keep the battery cable from contacting the machine.

Note: If the machine is equipped with two batteries, ensure that both negative battery cables are disconnected.

i03664191

Backup Alarm

SMCS Code: 7406

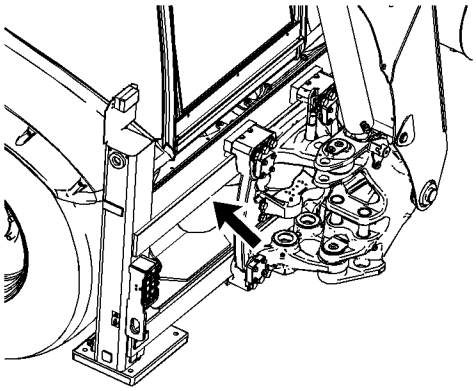


Illustration 130 g01966173

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

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

i05084194

Monitoring System

SMCS Code: 7450; 7451

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

When the machine is keyed on the Monitoring System performs a self test where the indicators illuminate and an audible alarm will sound. If any of the indicators fail to illuminate and/or the audible alarm fails to sound during key on, the Monitoring System has failed. Pay close attention to the Monitoring System each time the machine is keyed on to ensure that all indicators illuminate and the alarm generates an audible tone.

Note: If the Monitoring System is not fully functional you may not receive alerts of immediate or impending problems.

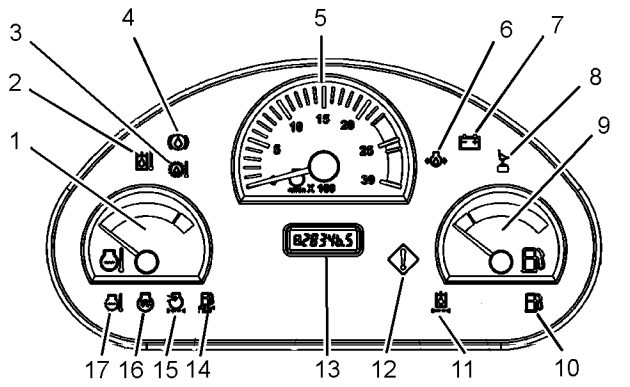


Illustration 131 g01915117

Engine Coolant (1) – The engine coolant gauge will indicate in the red zone and the action light will flash when the engine coolant temperature is too high. Stop the machine at a convenient location and investigate the cause.

Hydraulic Oil Temperature Indicator (2) (If Equipped) – The hydraulic oil temperature indicator will illuminate when the hydraulic oil reaches 110° C (230° F). Action light (12) will also illuminate. Operation of the hydraulic functions must be reduced in order to allow the hydraulic fluid to cool.

Torque Converter Temperature Indicator (3) – The torque converter temperature indicator will illuminate when the torque converter temperature exceeds121° C (250° F). Action light (12) will also illuminate and the action alarm will sound. Stop the machine at a convenient location and investigate the cause. The torque converter temperature indicator will flash when there is a fault with the torque converter temperature sensor.

Brake System Indicator (4) – On the 422E and the 428E the brake system indicator will illuminate to indicate low brake fluid in the brake reservoir. Stop the machine at a convenient location and investigate the cause. On the 432E, 434E, and 444E, if installed, the brake system indicator will illuminate when there is low brake boost pressure. If installed, the indicator will illuminate when the engine is not running. When the engine is running and there is a fault the indicator will illuminate and the action light (12) will illuminate and the action alarm will sound. Stop the machine at a convenient location and investigate the cause.

Tachometer (5) – The tachometer will indicate the engine RPM.

Engine Oil Pressure Indicator (6) – When the engine oil pressure is low, the following will happen: the alert indicator will illuminate, action light (12) will flash and an audible alarm will sound. If this alert indicator illuminates, stop the machine immediately. Stop the engine, engage the parking brake and investigate the cause.

Charging System Indicator (7) – The alert indicator illuminates if there is a malfunction in the electrical charging system. If this alert indicator illuminates, the system voltage is too low for normal machine operation.

Object Handling Stability Indicator (8) – The alert indicator illuminates when the machine reaches the lifting capacity. Action light (12) will also illuminate and an audible alarm will sound.

Fuel Level (9) – The fuel level gauge will indicate in the red zone when the fuel level is 12.5% of the tank capacity.

Low Fuel Indicator (10) – The low fuel indicator will illuminate when the fuel level is at 12.5% of the tank capacity. The indicator will flash when there is a fault with the fuel level sender.

Hydraulic Oil Filter Bypass Indicator (11) (If Equipped) – The hydraulic filter bypass indicator will illuminate when the hydraulic oil temperature is above 42° C (108° F) and hydraulic oil is bypassing the hydraulic filter. Action light (12) will also illuminate.

Action Light (12) – Malfunction in a machine system.

LCD (13) – The LCD will display the hour meter. The LCD will also display a fault when a fault is present. The fault code list is as follows:

- 271-05 Action alarm current below normal
- 271-06 Action alarm current above normal

Fuel System Water Separator Indicator (14) – The alert indicator indicates a plugged fuel/water separator. Action light (12) will also illuminate. Stop the engine and investigate the cause of the fault.

Air Filter Indicator (15) – The alert indicator will light when the air filter becomes clogged. If this alert indicator comes on, stop the machine and investigate the cause.

Glow Plug Indicator (16) – The glow plug indicator will illuminate when the glow plugs are active.

Engine Coolant Indicator (17) – The engine coolant indicator will illuminate when the engine coolant temperature is too high. Action light (12) will also illuminate. Stop the machine at a convenient location and investigate the cause.

i05826973

Operation Information

SMCS Code: 7000

The machine must be under control at all times.

Do not place the transmission in NEUTRAL in order to allow the machine to coast.

Select the gear speed that is necessary before you start down a grade. Do not change the gears while you are going down a hill.

When you go downgrade, use the same gear speed that would be used to go upgrade.

Do not allow the engine to overspeed when you go downhill. Use the brake pedals in order to reduce engine overspeed when you are going downhill.

When the load will be pushing the machine, put the transmission lever in FIRST SPEED before you start downhill.

Engage the All Wheel Drive (if equipped).

To avoid early brake wear or early brake damage, do not use the brake pedals as foot rests.

1. Adjust the operator seat.

2. Fasten the seat belt.

3. Raise all of the lowered work tools enough to clear any unexpected obstacles.

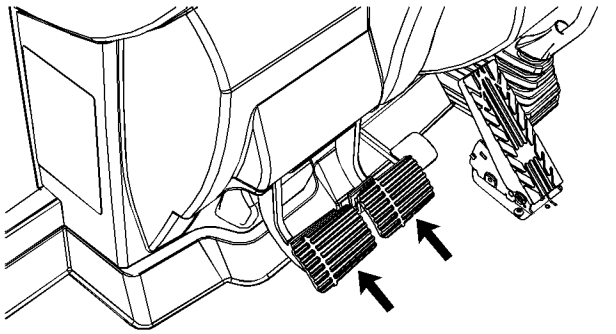


Illustration 132 g03687215

4. Push the brake pedals downward in order to stop the machine from moving.

Install the brake pedal lock bar between the brake pedals if the machine is not operating in FIRST gear.

5. Release the parking brake.

6. Disengage the transmission neutral lock and move the transmission control levers to the desired direction and to the desired speed.

7. Release the brake pedals in order to move the machine.

8. Move the accelerator pedal to the desired engine speed.

9. Move the machine forward for best visibility and for best control.

i04587991

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

SMCS Code: 6129; 6522; 7000

S/N: JBA150–Up

S/N: NBA150–Up

S/N: EME150–Up

S/N: SEF150–Up

S/N: DPH150–Up

S/N: SJL150–Up

S/N: MAW150–Up

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. 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.

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.

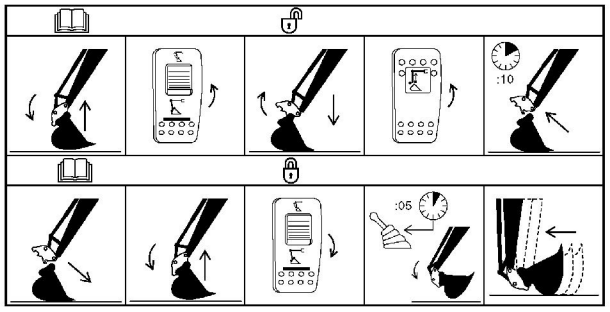


Illustration 133 g02165534
Instruction film

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.

⚠ 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

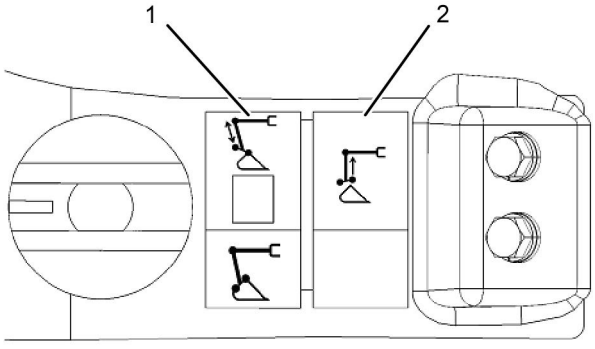


Illustration 134 g02163264

Mini Hydraulic Excavators

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

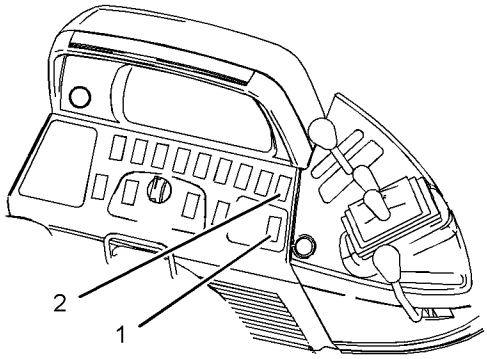


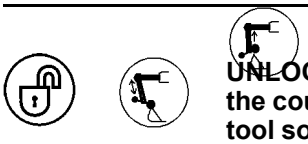
Illustration 135 g02681457

Backhoe Loaders

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

Two electrical switches are located inside the cab. Use of both switches is required in order 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 – In order 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 – In order 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. In order 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.

Coupling the Work Tool

⚠ WARNING

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

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

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

⚠ WARNING

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

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

⚠ WARNING

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

NOTICE
The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm the coupler pins are engaged. A physical test is required by dragging the work tool on the ground to confirm 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.

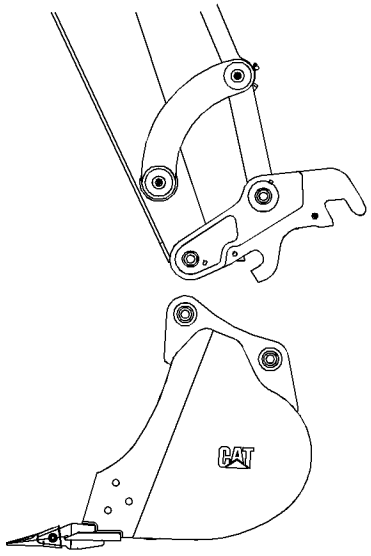


Illustration 136 g02163290

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.

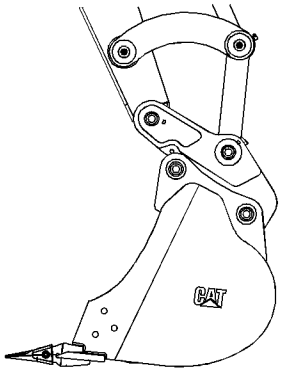


Illustration 137 g02163292

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. 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.

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 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.

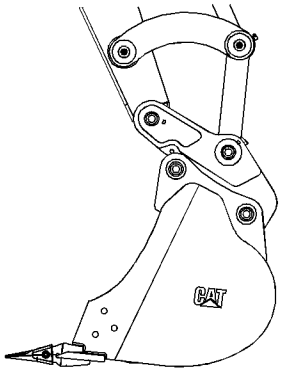


Illustration 138 g02163292

1. In order 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.

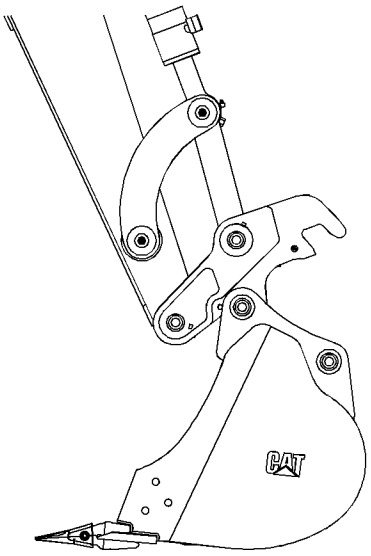


Illustration 139 g02163415

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.

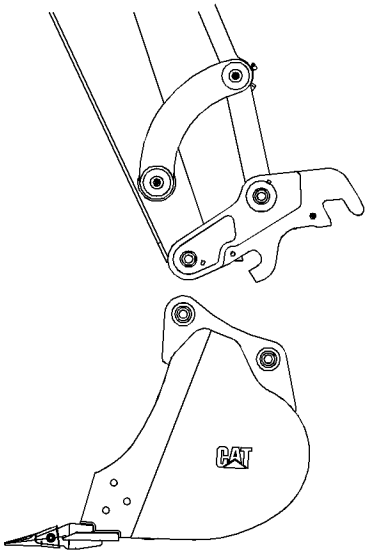


Illustration 140 g02163290

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 (Mini Hydraulic Excavators Only)

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.

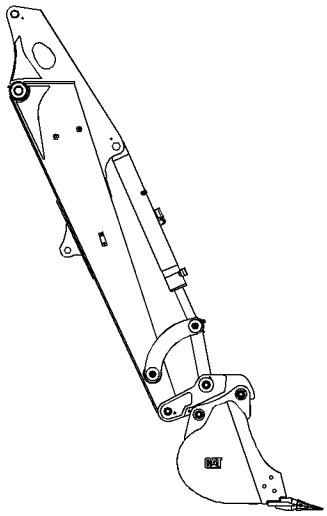


Illustration 141 g02163425

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.

i07107220

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. 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.

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.

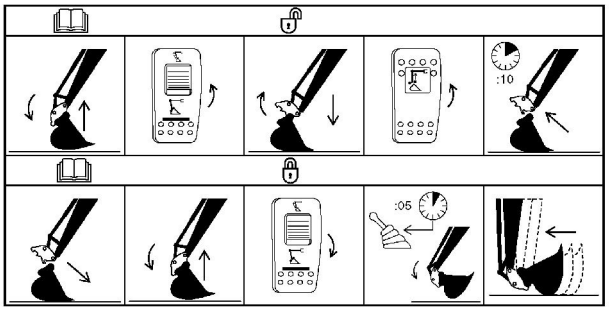


Illustration 142 g02165534
Instruction film

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. If equipped, visually confirm positive indication of the ISO Engagement indicator (3).

⚠ 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

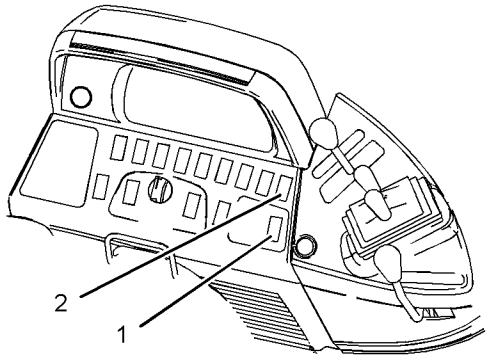


Illustration 143 g02681457

(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. If equipped, visually confirm positive indication of the ISO Engagement indicator (3).

Coupling the Work Tool

⚠ WARNING

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

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

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

⚠ WARNING

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

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

⚠ WARNING

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

NOTICE
The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm the coupler pins are engaged. A physical test is required by dragging the work tool on the ground to confirm 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.

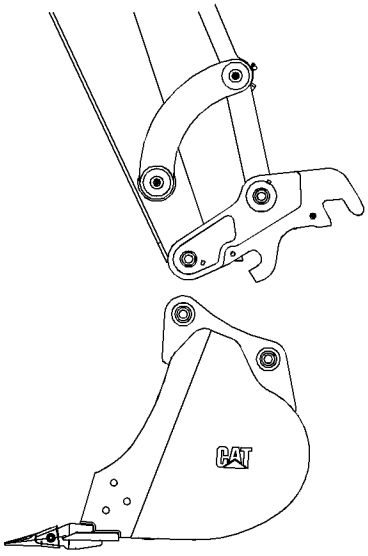


Illustration 144 g02163290

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.

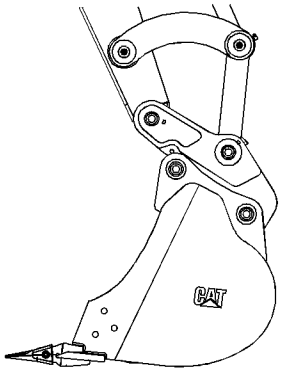


Illustration 145 g02163292

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:

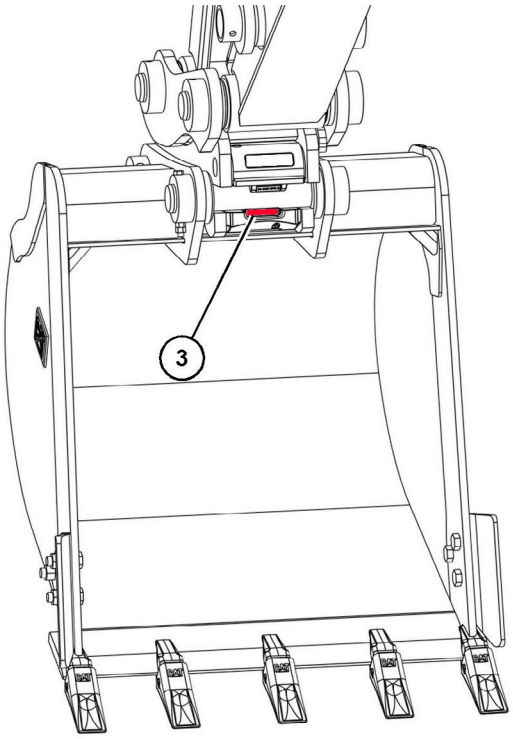


Illustration 146 g06222081

a. 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.

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 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.

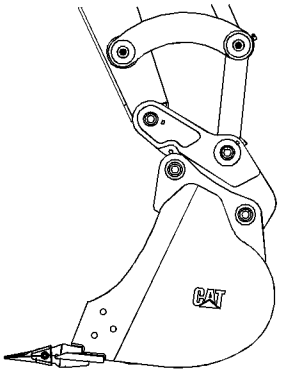


Illustration 147 g02163292

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.

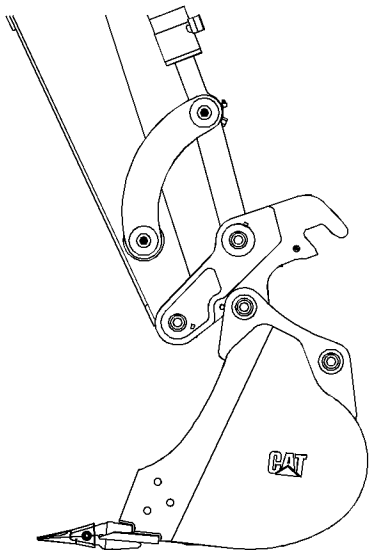


Illustration 148 g02163415

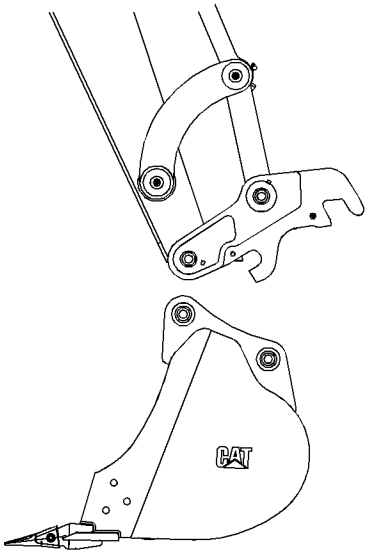


Illustration 149 g02163290

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.

i04769557

Quick Coupler Operation (Backhoe)

(Mechanical Dual Locking Quick Coupler (If Equipped))

SMCS Code: 6129

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

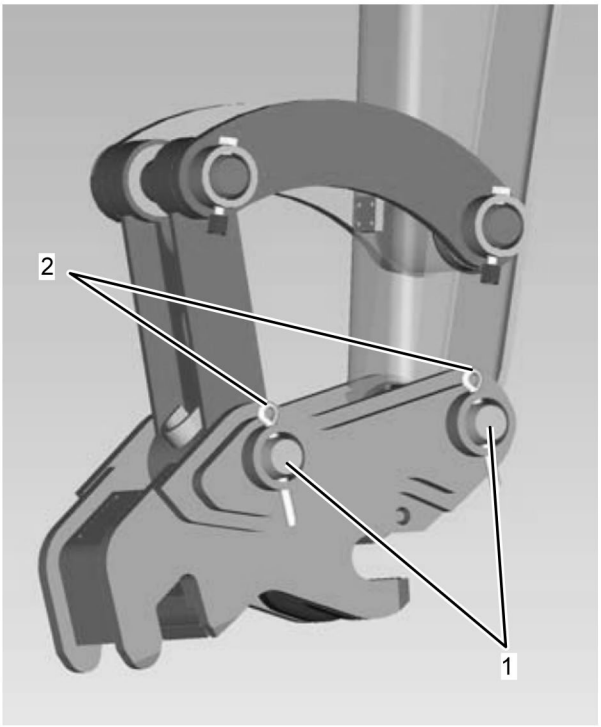


Illustration 150 g02869245

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:

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

⚠ WARNING

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

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

⚠ WARNING

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

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

Note:

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

Illustration 151 g02342559

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 152 g02342560

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 153 g02342561

4. Using the supplied wrench, 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 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 154 g02342560

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 155 g02342561

2. Using the supplied wrench, 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 156 g02342576

3. Using the supplied wrench, 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.

i07078161

Quick Coupler Operation (Backhoe)

(Pin Grabber Quick Coupler (If Equipped))

SMCS Code: 6129

Securing the Work Tool

⚠ WARNING

Inspect quick coupler engagement before operating the backhoe.

Serious injury or death may result from improperly engaged coupler.

Note: Caterpillar offers an assortment of coupler and bucket combinations. Refer to the Parts Manual for your machine. The illustrations give accurate views of the couplers and the captions can help resolve problems with compatibility. Also, your Caterpillar Dealer can help you determine the proper combinations.

Illustration 157 and illustration 158 may help the operator to identify the coupler that is on the machine.

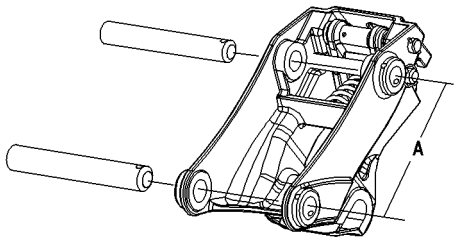


Illustration 157 g00988298

This Quick Coupler is used with High Rotation Linkage and older buckets.

(A) 400 mm (15.75 inch)

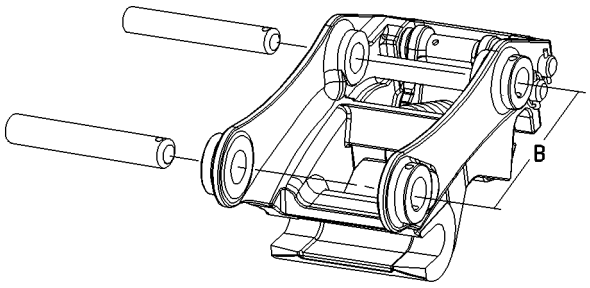


Illustration 158 g00988327

This Quick Coupler is used with High Rotation Linkage and newer buckets.

(B) 345 mm (13.50 inch)

1. Position the work tool on a level surface.

2. Retract the bucket cylinder. Position the quick coupler in alignment between the bosses of the work tool.

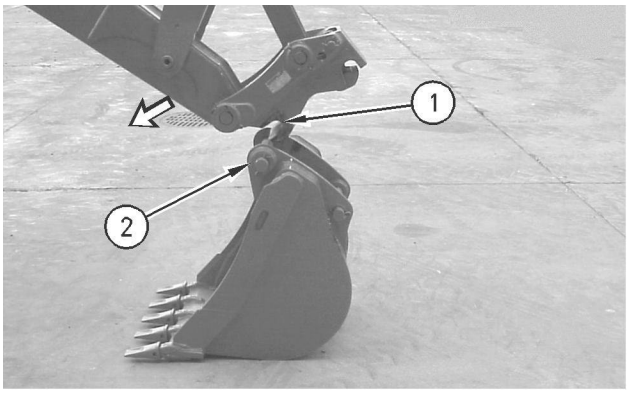


Illustration 159 g00739365

3. Move the stick inward and lower the stick until the lower boss (1) engages the pivot pin (2) of the work tool.

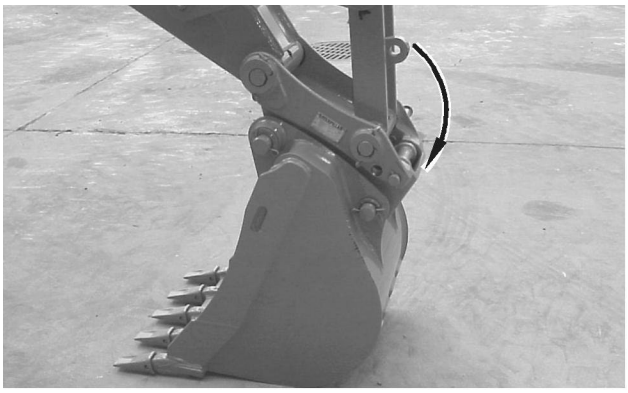


Illustration 160 g00739369

4. Extend the bucket cylinder to rotate the quick coupler toward the work tool until the upper boss engages the linkage pin of the work tool.

Illustration 161 g00739373

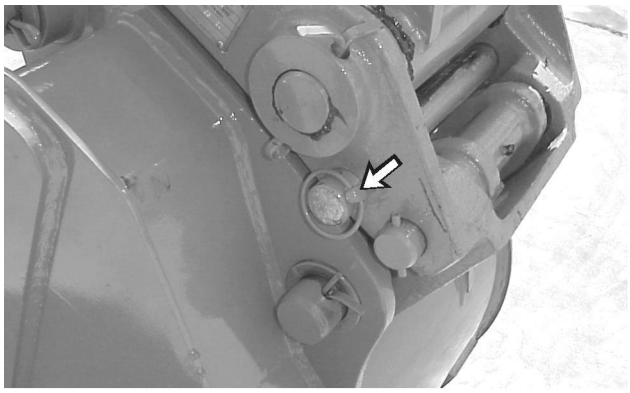


Illustration 162 g00739418

5. Install the lock pin on the quick coupler. Install the lynch pin to secure the lock pin.

6. Raise the boom or raise the stick. The work tool is locked in place. The work tool is ready to use.

Securing a Work Tool to a Caterpillar / Case Coupler

Caterpillar offers an assortment of couplers that fit work tools that are produced by other manufacturers . Use the correct coupler and pins for your work tool. Contact your Caterpillar Dealer for the correct mounting hardware.

Perform steps 1 through 3 to install either a Caterpillar bucket or certain Case buckets onto the quick coupler.

Extend the bucket cylinder to rotate the quick coupler toward the work tool until the pin hole aligns with the appropriate hole for your bucket.

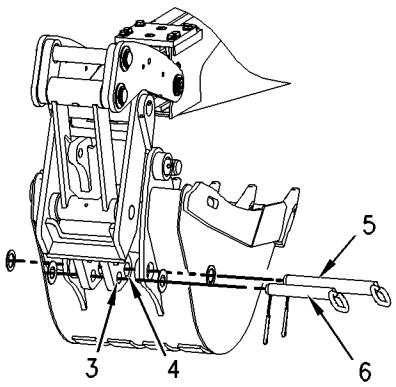


Illustration 163 g00831042

Install longer pin (5) into hole (4) for a Caterpillar bucket. Install shorter pin (6) into hole (3) for a Case bucket.

Securing a Work Tool to a Caterpillar / Deere Coupler

Caterpillar offers an assortment of couplers that fit work tools that are produced by other manufacturers . Use the correct coupler and pins for your work tool. Contact your Caterpillar Dealer for the correct mounting hardware.

Perform steps 1 through 3 to install either a Caterpillar bucket or certain Deere buckets onto the quick coupler.

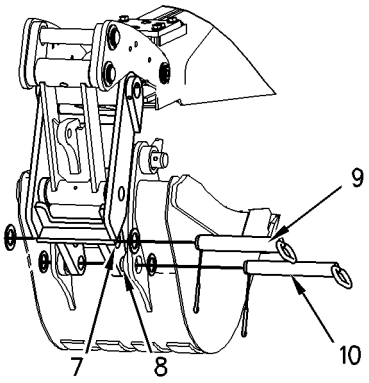


Illustration 164 g00831043

Install longer pin (9) into hole (7) for a Caterpillar bucket. Install shorter pin (10) into hole (8) for a Deere bucket.

Releasing 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.

1. Level the work tool on the ground.

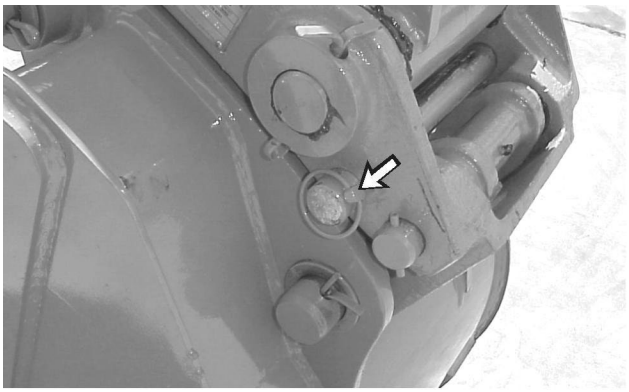


Illustration 165 g00739418

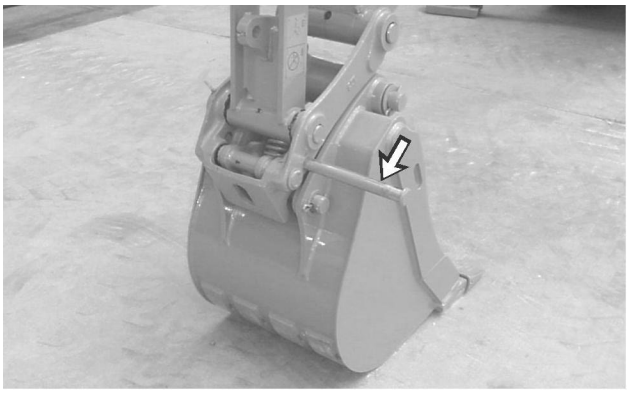


Illustration 166 g00739373

2. Remove the lynch pin from the lock pin and remove the lock pin.

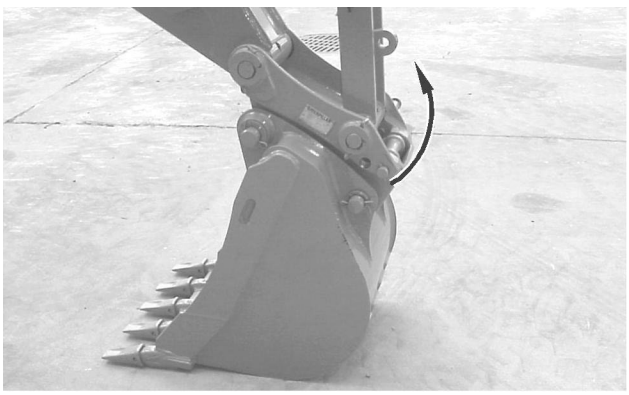


Illustration 167 g00739377

3. Retract the bucket cylinder to remove the quick coupler from the linkage pin.

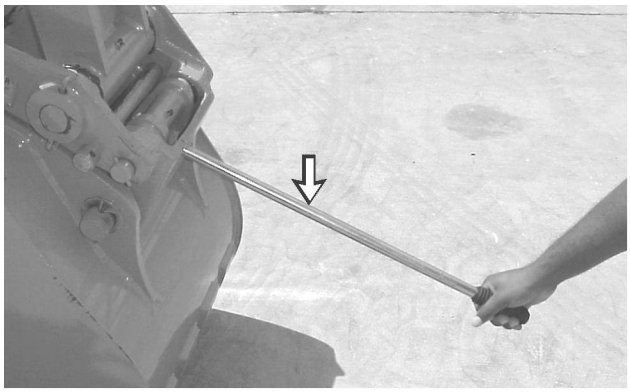


Illustration 168 g00739384

Note: If the quick coupler does not release the linkage pin, use the 132-3821 Actuating Lever to release the linkage pin. Push down on the lever to release the linkage pin.

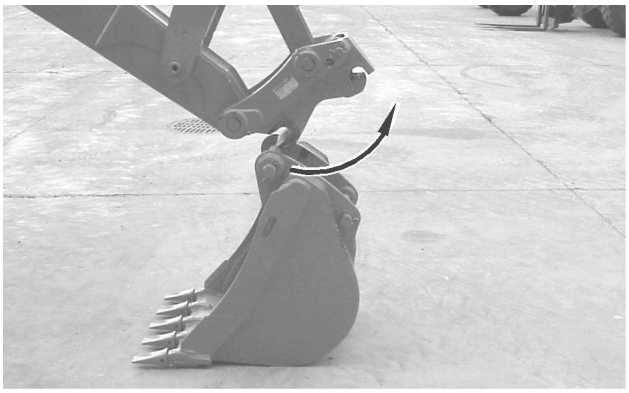


Illustration 169 g00739367

4. Raise the stick and move the stick away from the machine to release the quick coupler from the pivot pin of the work tool.

i04670896

Lift Fork Operation

SMCS Code: 6104; 6136

Preparing to Use Lift Forks

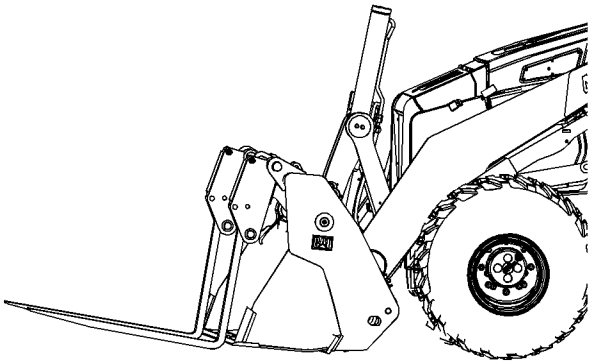


Illustration 170 g02796983

Note: Make sure that the multi purpose bucket is closed while using the lift forks. Opening the bucket while using the forks may overload the fork causing the fork to bend.

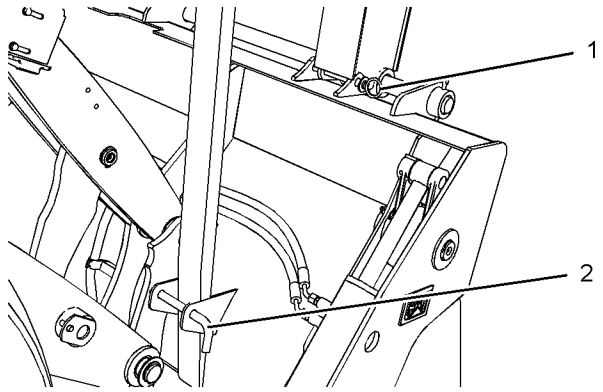


Illustration 171 g01215979

1. Remove pin (1) and pin (2). Repeat for the other fork.

2. Flip the forks over the bucket.

3. Reinstall two pins (2).

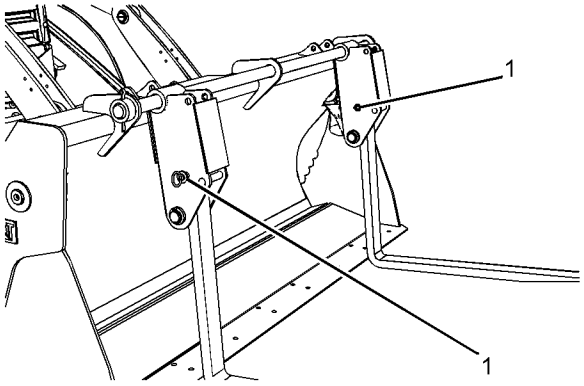


Illustration 172 g01216162

4. Install pins (1) in the lower holes in order to secure the forks in place.

i00596994

Changing Direction and Speed

SMCS Code: 1000; 7000

Changing from low speed to high speed at full engine speed is possible. Directional changes at full engine speed are possible. However, if you are changing direction, reducing the machine speed and/or braking the machine is recommended. This will provide operator comfort and the maximum service life of the power train components. Keep a loaded bucket low to the ground. Stop the machine in order to avoid an unstable machine.

1. Lower the engine speed with the accelerator pedal.

2. Push the brake pedals downward in order to slow the machine. Push the brake pedals downward in order to stop the machine.

3. Move the transmission direction control lever to the desired speed and to the desired direction.

4. Release the brake pedals.

5. Increase the engine speed with the accelerator pedal.

i02756905

Machine Immobilizer System (If Equipped)

SMCS Code: 1000; 7000

NOTICE
This machine is equipped with a machine immobilizer and may not start under certain conditions. Read the following information and know your machine's settings. Your Caterpillar Dealer can identify your machine settings.

Machine Immobilizer – Machines that are equipped with a machine immobilizer can be identified by a decal in the operator station. Machine immobilizer is designed to prevent theft of the machine or unauthorized operation.

Basic Operation

The operator interface for the machine security system consists of the following components:

- touch pad
- key fob

The center of the touch pad contains a LED light. The light will flash red when the system is active. The system must be deactivated before the machine will start. The sequence to deactivate the system can be performed with the engine start switch in the ON position or the OFF position. In order to deactivate the system, perform the following procedure:

1. Touch the key fob to the touch pad. The system will deactivate.

When the system is deactivated, the light in the touch pad will stop flashing.

2. Turn the engine start switch to the ON position within 30 seconds of deactivating the system. If the engine start switch is not turned to the ON position within 30 seconds, the system will reactivate.

The system will reactivate within 30 seconds of the engine start switch being turned to the OFF position.

Security Management

Additional black key fobs can be programmed into the system. In order to program additional key fobs, perform the following steps:

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

2. Touch the metal button on a master key fob against the reader. The red LED light will go out. The system has now been disarmed.

3. Within five seconds, touch the user key fob that is to be programmed against the reader.

Note: There will be no indication that the system has registered the new key fob.

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

Note: In order to program additional keys, repeat steps 1 through 4. A maximum of seven key fobs can be programmed into the system, which includes the two master key fobs. Only master key fobs can be used in order to program additional key fobs into the system. Additional master key fobs cannot be added to the system.

i07742538

Product Link

SMCS Code: 7490; 7606

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

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

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

Data Broadcasts

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

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

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

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

Operation in a Blast Site for Product Link Radios

⚠ WARNING

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

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

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

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

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

- Special Instruction, REHS7339, “Installation Procedure for Product Link PLE640 Systems”
- Special Instruction, REHS8850, “Installation Procedure for the Elite Product Link PLE601, PLE641, and PLE631 Systems”
- Special Instruction, SEHS0377, “Installation Procedure for the Product Link PL131, PL141, and PL161 Systems”
- Special Instruction, REHS9111, “Installation Procedure for the Pro Product Link PL641 and PL631 Systems”

Controls

i03106050

Joystick Control
(Backhoe)

SMCS Code: 5059; 5705

S/N: JBA1–Up

S/N: NBA1–Up

S/N: EME1–Up

S/N: SJL1–Up

Joystick Control (Excavator Pattern)

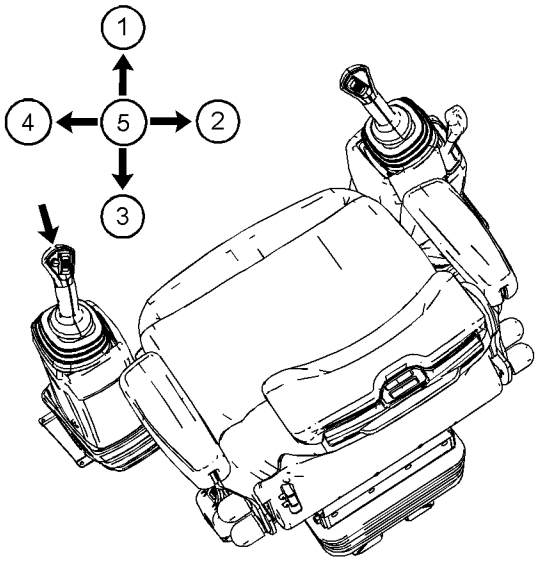


Illustration 173 g01188993

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

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

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

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

HOLD (5) – When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

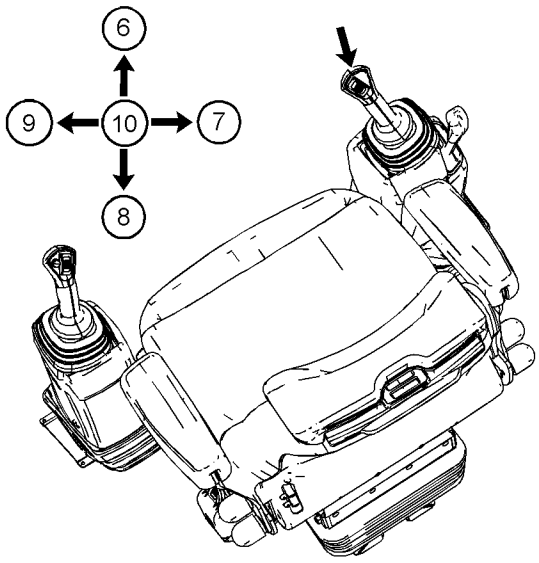


Illustration 174 g01189082

BOOM LOWER (6) – Move the joystick to this position in order to lower the boom.

BUCKET DUMP (7) – Move the joystick to this position in order to dump the bucket or the work tool.

BOOM RAISE (8) – Move the joystick to this position in order to raise the boom.

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

HOLD (10) – 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.

Joystick Pattern Switch

⚠ WARNING

Verify control pattern selection (1 or 2) before operating. Check switching valve indicator behind left rear wheel. Failure to understand control function could result in injury or death.

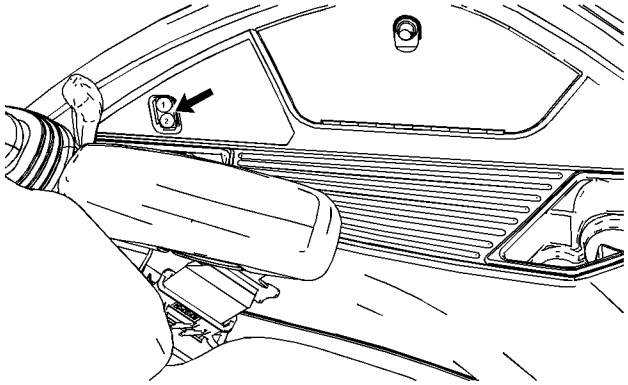


Illustration 175 g01189165

Joystick Pattern Switch

The machine is equipped with a joystick pattern switch. The machine control pattern can be varied by moving the switch. Position (1) of the joystick control selector allows the functionality of the joysticks to be in the excavator style control. The alternate position (2) allows the operator to change the functionality of the joysticks to the backhoe style control.

Alternate Joystick Control (Backhoe Control)

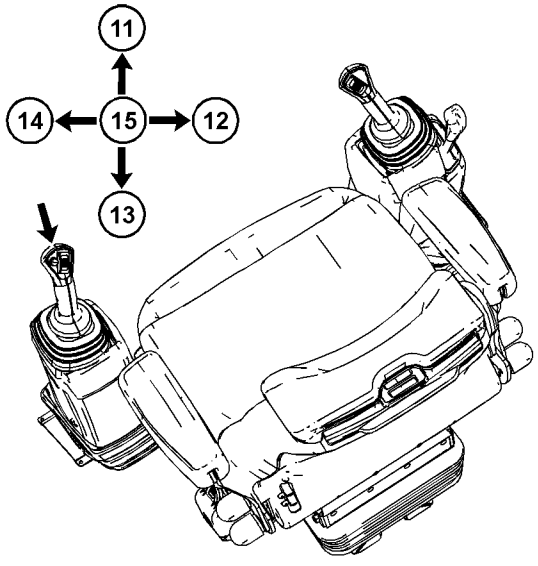


Illustration 176 g01189186

BOOM LOWER (11) – Move the joystick to this position in order to lower the boom.

Swing Right (12) – Move the joystick to this position in order to swing the upper structure to the right.

BOOM RAISE (13) – Move the joystick to this position in order to raise the boom.

Swing Left (14) – Move the joystick to this position in order to swing the upper structure to the left.

HOLD (15) – When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

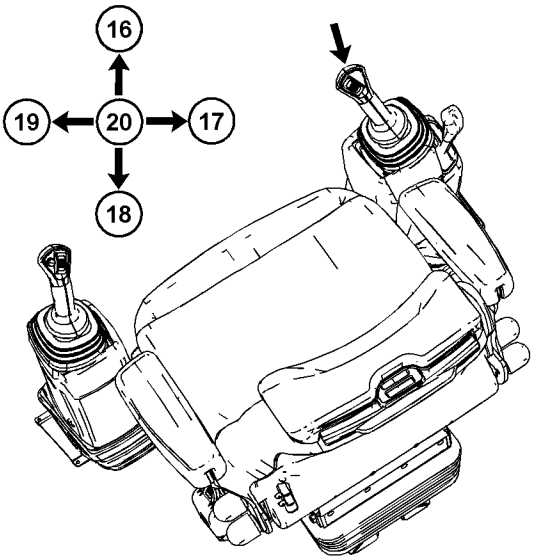


Illustration 177 g01189187

STICK OUT (16) – Move the joystick to this position in order to move the stick outward.

BUCKET DUMP (17) – Move the joystick to this position in order to dump the bucket or the work tool.

STICK IN (18) – Move the joystick to this position in order to move the stick inward.

BUCKET CLOSE (19) – Move the joystick to this position in order to close the bucket or the work tool.

HOLD (20) – 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.

Extendable Stick (If Equipped)

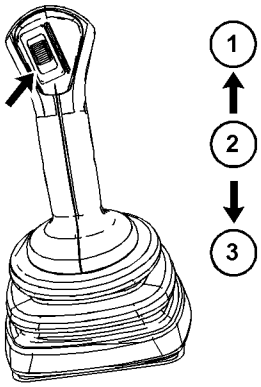


Illustration 178 g01205535

Right joystick for the backhoe

STICK EXTEND (1) – Move the switch to this position in order to extend the stick.

HOLD (2) – The switch will return to the HOLD position when the switch is released from the STICK EXTEND position or from the STICK RETRACT position. Stick movement will stop.

STICK RETRACT (3) – Move the switch to this position in order to retract the stick.

Auxiliary Control (If Equipped)

Sideshift

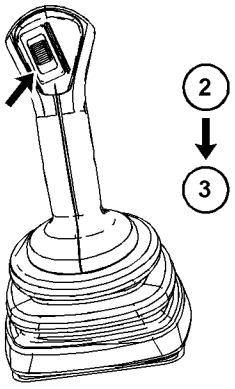


Illustration 179 g01221242

Right joystick for the backhoe

Note: If the machine is equipped with an extendable stick, you must pin the extendable stick in the transport position before operating the auxiliary control.

OFF (2) – Move the switch to this position in order to turn off the hydraulic lines.

ON (3) – Move the switch to this position in order to pressurize the hydraulic line on the left side of the machine.

Secondary Auxiliary Control (If Equipped)

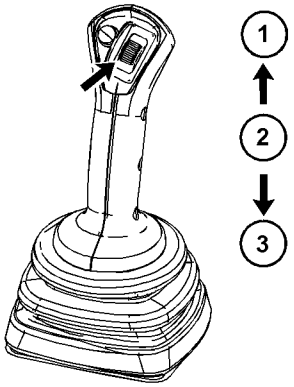


Illustration 180 g01205489

Left joystick for the backhoe

The thumb slider switch controls the function of the secondary auxiliary control.

OPEN (1) – Move the switch to this position in order to open the secondary auxiliary control.

HOLD (2) – When you release the switch from any position, the switch will return to the HOLD position. Movement of the secondary auxiliary control will stop.

CLOSE (3) – Move the switch to this position in order to close the secondary auxiliary control.

Note: The operation of the controls will vary depending on the work tool. While you operate the machine and the work tool slowly in an open area, check the operation of all controls for the work tool.

i03106192

Joystick Control (Loader)

SMCS Code: 5059; 5705

S/N: JBA1–Up

S/N: NBA1–Up

S/N: EME1–Up

S/N: SJL1–Up

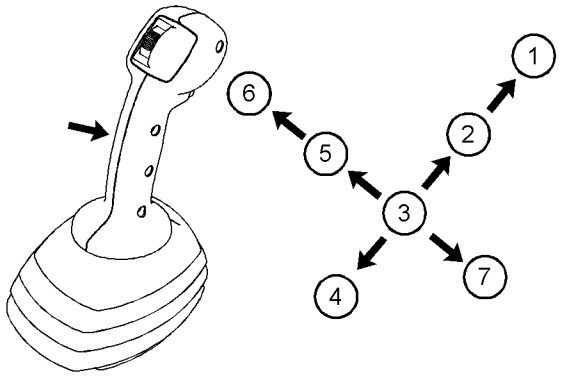


Illustration 181 g01450784

Pilot Control

FLOAT (1) – Move the lever forward to position (1). This position will allow the loader bucket to move along the ground contour.

Do not use this position to lower the loader bucket. The lever will stay in the FLOAT position until the lever is moved back to the HOLD position or to another position.

LOWER (2) – Move the lever to position (2) in order to lower the loader bucket.

HOLD (3) – Move the lever to position (3) in order to stop movement of the loader bucket. When you release the lever from any position except for the FLOAT position, the lever will return to the HOLD position.

RAISE (4) – Move the lever to position (4) in order to raise the loader bucket.

TILT BACK (5) – Move the lever to position (5) in order to rack back the loader bucket.

RETURN-TO-DIG (6) – Move the lever to position (6) in order to return the loader bucket to the dig position. The lever will stay in this position until the bucket is level. Then, the lever will automatically return to the HOLD position.

DUMP (7) – Move the lever to position (7) in order to empty the loader bucket.

Multipurpose Bucket Function

Pilot Control

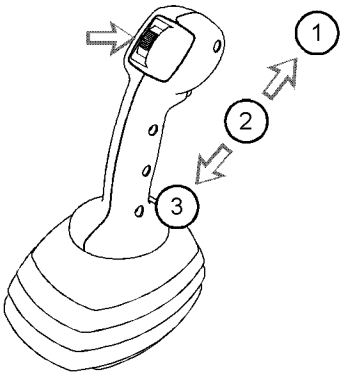


Illustration 182 g01450786

OPEN BUCKET CLAM (1) – Move the switch to this position in order to open the bucket clam.

HOLD (2) – Move the switch to this position in order to stop the movement of the bucket clam. The switch will return to the HOLD position when you release the switch from any position.

CLOSE BUCKET CLAM (3) – Move the switch to this position in order to close the bucket clam.

Auxiliary Functions

Pilot Control

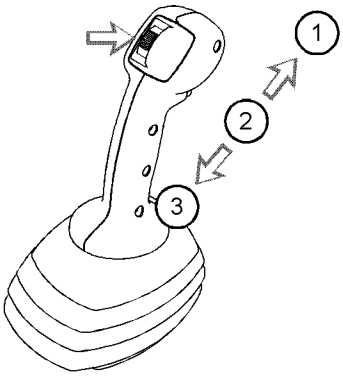


Illustration 183 g01450789

The multipurpose switch controls the function of a work tool.

ON (1) – Move the switch to this position in order to pressurize the hydraulic line on the right side of the machine.

OFF (2) – Move the switch to this position in order to turn off the hydraulic lines.

ON (3) – Move the switch to this position in order to pressurize the hydraulic line on the left side of the machine.

Note: The operation of the controls will vary depending on the work tool. While you operate the machine and the work tool slowly in an open area, check the operation of all controls for the work tool.

Transmission Neutralizer Button

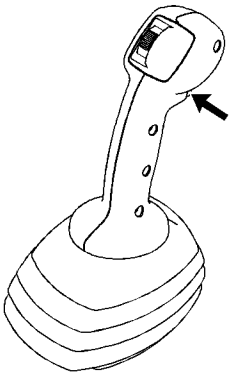


Illustration 184 g01450792

Transmission Neutralizer Button for the pilot loader control

Transmission Neutralizer Button – Push the button and hold the button when all available engine power is desired for the loader hydraulics. This will disengage the transmission from the driving wheels. Each momentary depression downshifts the transmission by one gear.

i03592100

Two Lever Control (Backhoe) (Excavator Pattern)
(If Equipped)

SMCS Code: 5063; 5450

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

Backhoe Boom and Bucket

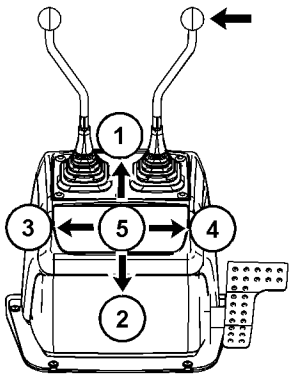


Illustration 185 g01917753

Note: The stabilizers should be in the full up position or in the full down position when the boom is swinging 90 degrees to either side.

Lower Boom (1) – Move the lever to this position in order to lower the boom.

Raise Boom (2) – Move the lever to this position in order to raise the boom.

Bucket Load (3) – Move the lever to this position in order to dig with the bucket.

Bucket Dump (4) – Move the lever to this position in order to empty the bucket.

Hold (5) – Move the lever to this position in order to stop the movement of the boom. Release the lever from any of the positions. The lever will return to the HOLD position.

Backhoe Stick and Swing

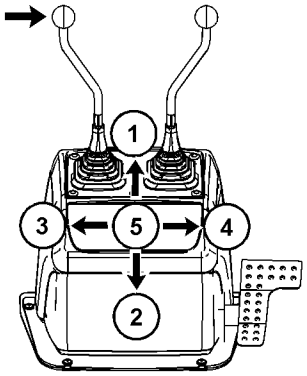


Illustration 186 g01917713

Stick Out (1) – Move the lever to this position in order to move the stick outward.

Stick In (2) – Move the lever to this position in order to move the stick inward.

Swing Left (3) – Move the lever to this position in order to move the boom to the left. The boom should move in the same direction as the lever.

Swing Right (4) – Move the lever to this position in order to move the boom to the right. The boom should move in the same direction as the lever.

Hold (5) – Move the lever to this position in order to stop the movement of the stick and of the bucket. Release the lever from any of the positions. The lever will return to the HOLD position.

i02573044

Two Lever Control (Backhoe) (Universal Pattern)

SMCS Code: 5063; 5450

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

Standard Pattern (If Equipped)

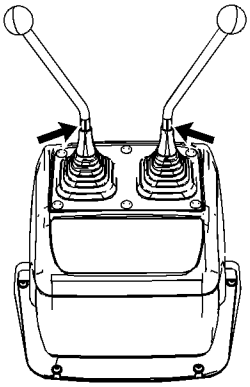


Illustration 187 g01213058

Standard Pattern – When the controls are in this position, the functionality of the controls are in the standard pattern.

Backhoe Boom and Swing

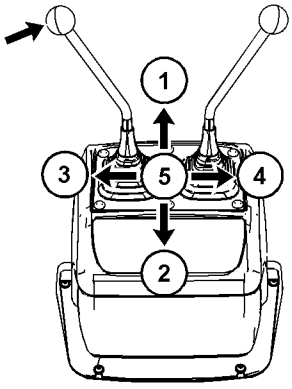


Illustration 188 g01213128

Note: The stabilizers should be in the full up position or in the full down position when the boom is swinging 90 degrees to either side.

Lower Boom (1) – Move the lever to this position in order to lower the boom.

Raise Boom (2) – Move the lever to this position in order to raise the boom.

Swing Left (3) – Move the lever to this position in order to move the boom to the left. The boom should move in the same direction as the lever.

Swing Right (4) – Move the lever to this position in order to move the boom to the right. The boom should move in the same direction as the lever.

Hold (5) – Move the lever to this position in order to stop the movement of the boom. Release the lever from any of the positions. The lever will return to the HOLD position.

Backhoe Stick and Bucket

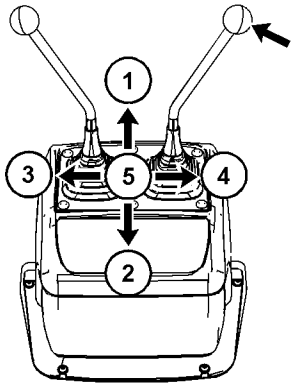


Illustration 189 g01213133

Stick Out (1) – Move the lever to this position in order to move the stick outward.

Stick In (2) – Move the lever to this position in order to move the stick inward..

Bucket Load (3) – Move the lever to this position in order to dig with the bucket.

Bucket Dump (4) – Move the lever to this position in order to empty the bucket.

Hold (5) – Move the lever to this position in order to stop the movement of the stick and of the bucket. Release the lever from any of the positions. The lever will return to the HOLD position.

Cross Pattern (If Equipped)

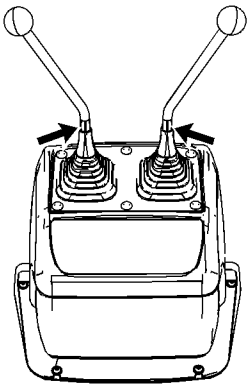


Illustration 190 g01213058

Cross Pattern – When the controls are in this position, the functionality of the controls are in the cross pattern.

Backhoe Boom and Swing

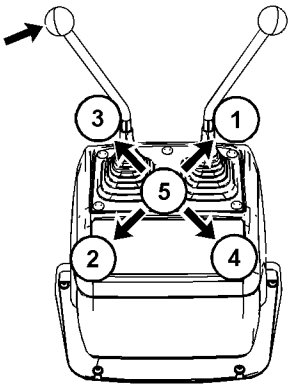


Illustration 191 g01213139

Note: The stabilizers should be in the full up position or in the full down position when the boom is swinging 90 degrees to either side.

Lower Boom (1) – Move the lever to this position in order to lower the boom.

Raise Boom (2) – Move the lever to this position in order to raise the boom.

Swing Left (3) – Move the lever to this position in order to move the boom to the left. The boom should move in the same direction as the lever.

Swing Right (4) – Move the lever to this position in order to move the boom to the right. The boom should move in the same direction as the lever.

Hold (5) – Move the lever to this position in order to stop the movement of the boom. Release the lever from any of the positions. The lever will return to the HOLD position.

Backhoe Stick and Bucket

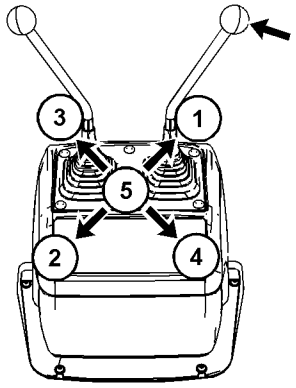


Illustration 192 g01213217

Bucket Dump (1) – Move the lever to this position in order to empty the bucket.

Bucket Load (2) – Move the lever to this position in order to dig with the bucket.

Stick Out (3) – Move the lever to this position in order to move the stick outward.

Stick In (4) – Move the lever to this position in order to move the stick inward..

Hold (5) – Move the lever to this position in order to stop the movement of the stick and of the bucket. Release the lever from any of the positions. The lever will return to the HOLD position.

i03592120

Backhoe Extendable Stick Control (Foot Operated)
(If Equipped)

SMCS Code: 5063; 5474

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

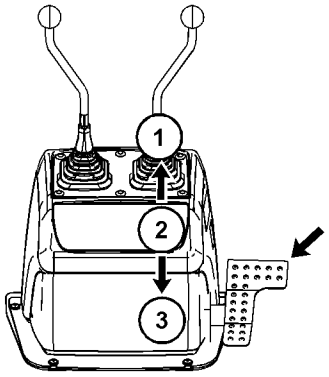


Illustration 193 g01917773

STICK EXTEND (1) – Push down on the toe end of the pedal in order to extend the stick. Push down on the toe end of the pedal for additional reach with the stick.

HOLD (2) – The pedal will return to the HOLD position when the pedal is released from the STICK EXTEND position or from the STICK RETRACT position. Stick movement will stop.

STICK RETRACT (3) – Push down on the heel of the pedal in order to retract the stick.

i03592142

Backhoe Auxiliary Control (Foot Operated)
(If Equipped)

SMCS Code: 5063

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

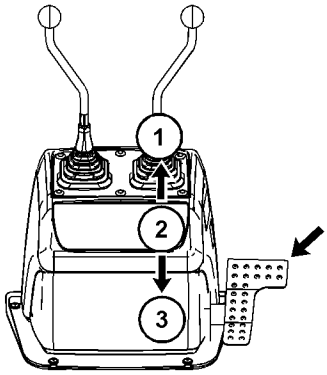


Illustration 194 g01917773

Note: If the machine is equipped with an extendable stick, you must pin the extendable stick in the transport position before operating the auxiliary control.

Use the auxiliary pedal in order to pressurize the hydraulic lines of a work tool.

Push down on the toe end of the pedal to position (1) in order to pressurize the hydraulic line on the right side of the stick.

HOLD (2) – The pedal will return to the HOLD position when the pedal is released from position (1) or released from position (3).

Push down on the heel end of the pedal to position (3) in order to pressurize the hydraulic line on the left side of the stick.

i03592160

Joystick Control (Loader)

SMCS Code: 5063; 6107

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

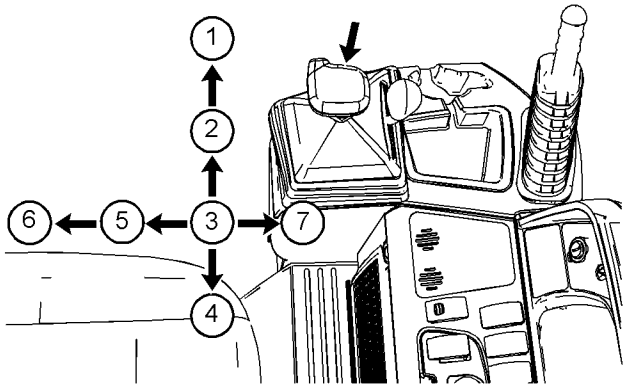


Illustration 195 g01917813

FLOAT (1) – Move the lever forward to position (1). This position will allow the loader bucket to move along the ground contour.

Do not use this position to lower the loader bucket. The lever will stay in the FLOAT position until the lever is moved back to the HOLD position or to another position.

LOWER (2) – Move the lever to position (2) in order to lower the loader bucket.

HOLD (3) – Move the lever to position (3) in order to stop movement of the loader bucket. When you release the lever from any position except for the FLOAT position, the lever will return to the HOLD position.

RAISE (4) – Move the lever to position (4) in order to raise the loader bucket.

TILT BACK (5) – Move the lever to position (5) in order to rack back the loader bucket.

RETURN-TO-DIG (6) – Move the lever to position (6) in order to return the loader bucket to the dig position. The lever will stay in this position until the bucket is level. Then, the lever will automatically return to the HOLD position.

DUMP (7) – Move the lever to position (7) in order to empty the loader bucket.

i03591220

Stabilizer Control

SMCS Code: 7222

The instructions for the backhoe stabilizer and for the bucket operation are viewed from the operator's seat. You will be looking at the backhoe bucket.

Sideshift Frame

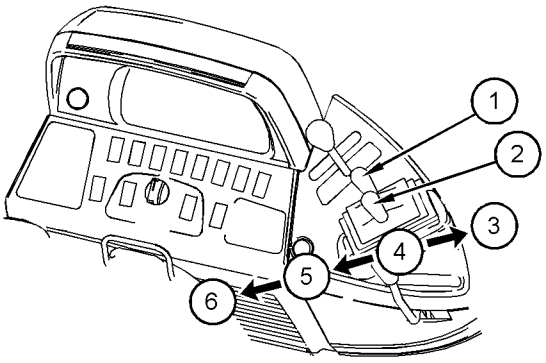


Illustration 196 g01979713

Move lever (1) in order to control the stabilizer on the left side of the machine.

Move lever (2) in order to control the stabilizer on the right side of the machine.

Note: If equipped, remove the chain that is used for transporting from the base of each stabilizer leg.

STABILIZER DOWN (3) – Move the lever to this position in order to lower the stabilizer. This will raise the rear of the machine.

HOLD (4) – Release the lever from the STABILIZER DOWN position or from the STABILIZER UP position in order to stop the stabilizer movement.

STABILIZER UP (5) – Move the lever to this position in order to raise the stabilizer. This will lower the machine.

Auto Up Mode (6) (If Equipped) – Move the lever to this position in order to automatically raise the stabilizer. The lever will remain in this position for 10 seconds.

Note: Be careful when you raise the stabilizers. The stabilizers can be the only restraint that is preventing the machine from falling into the area that is being excavated. When you operate on a slope, engage the parking brake before you raise the stabilizers.

Before you operate the backhoe, use the stabilizers in order to lift the machine and use the stabilizers in order to level the machine.

Note: The action alarm (if equipped) will sound when you raise one or both stabilizers in order to lower the machine to the ground and the transmission direction control lever is in the FORWARD position or in the REVERSE position.

i03615749

Sideshift Control

SMCS Code: 5808

Mechanical Sideshift

1. Set the machine level with the stabilizers.

2. Position the backhoe behind the machine. Place the bucket on the ground.

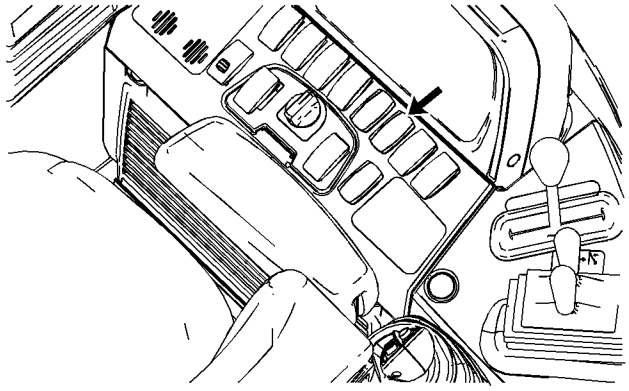


Illustration 197 g01939533

3. Press the top of the sideshift lock switch in order to release the clamps for the sideshift. Operate the boom in order to loosen the slide frame.

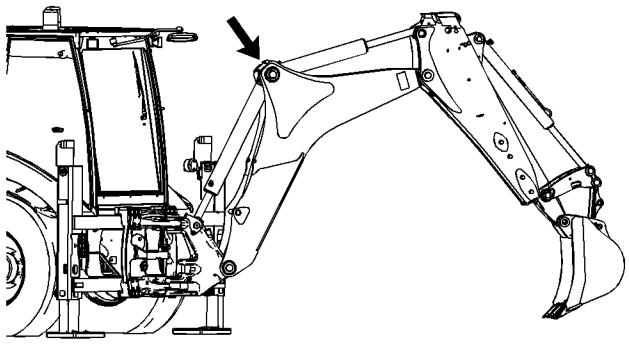


Illustration 198 g01939513

4. Swing the backhoe to the right or left.

Note: Swing the backhoe to the right in order to shift the backhoe to the left. Swing the backhoe to the left in order to shift the backhoe to the right.

5. Open the bucket in order to shift the backhoe. As the bucket opens, the slide frame will be pushed across the back of the machine. Move the backhoe into the desired position.

Note: If the slide frame does not slide freely, move the boom in order to keep the slide frame level.

6. Tighten the clamps by operating the sideshift lock switch.

In order to ensure that the clamps are tight, hold the joystick in the BOOM UP position for a minimum of 5 seconds.

Powered Sideshift (If Equipped)

1. Set the machine level with the stabilizers.

2. Raise the boom. Move the stick in.

3. Position the boom to the right in order to sideshift the carriage to the left. Position the boom to the left in order to sideshift the carriage to the right.

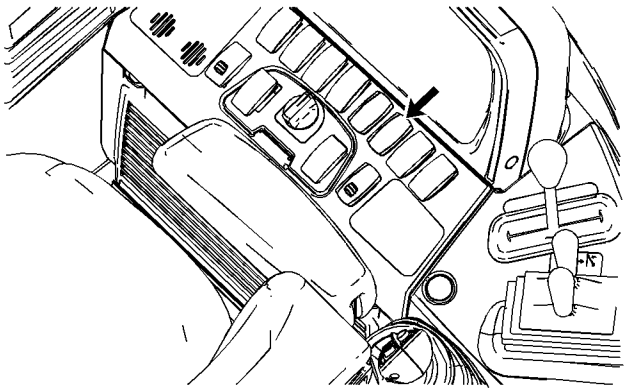


Illustration 199 g01939534

4. Depress the locking tab and press the top of the sideshift switch in order to sideshift the frame to the left. Depress the locking tab and press the bottom of the sideshift switch in order to sideshift the frame to the right.

5. Ensure that the clamps are pressurized by holding the joystick in the BOOM UP position for a minimum of 5 seconds.

Note: When the machine is equipped with a heavy work tool, the sideshift may operate slowly. Place the work tool on the ground in order to allow the sideshift to operate more rapidly.

i05288854

Extendable Stick Lock Control (If Equipped)

SMCS Code: 6533

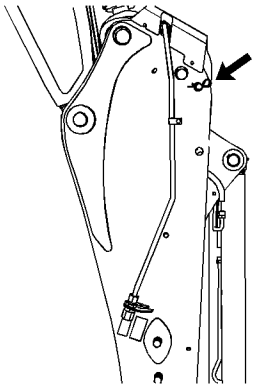


Illustration 200 g01960337

Place the extendable stick lock in the operating position when use of the extendable stick is desired.

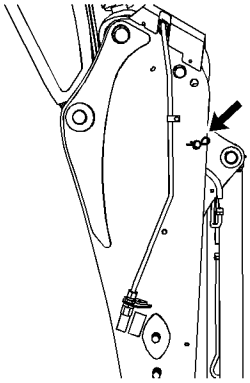


Illustration 201 g01960338

Place the extendable stick lock in the transport position when you are transporting the machine. Place the extendable stick lock in the transport position when you are using a powered work tool on the backhoe.

Note: When the stabilizers are not in the fully raised position, the backhoe may contact the stabilizers, which could damage the machine.

i06880199

Swing Lock Pin Control

SMCS Code: 6506

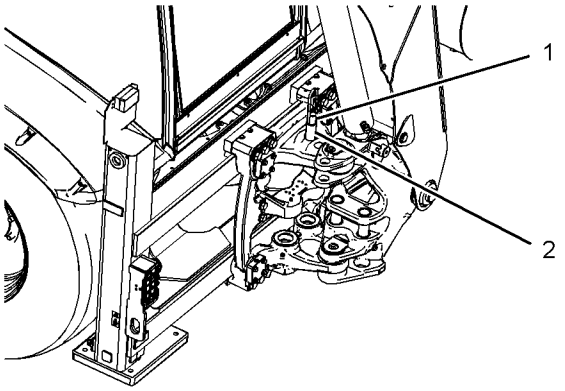


Illustration 202 g01923275

Remove the swing lock pin (1) when you operate the backhoe or when the swing lock pin is not required. Place the swing lock pin in the storage bracket (2) on the back of the machine.

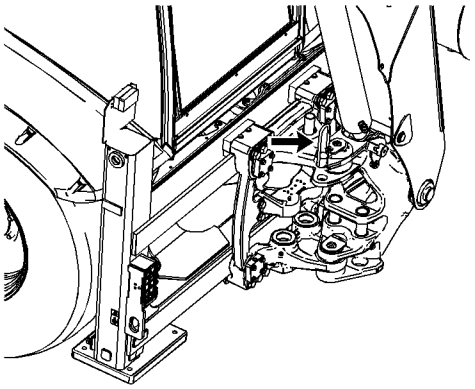


Illustration 203 g01923277

Install the swing lock pin in order to ensure that the backhoe will not move. This will also ensure that the backhoe will not swing into objects or into traffic. **Ensure that the swing lock pin is installed when the boom and the stick are not being used.**

- roading the machine
- using the loader bucket
- transporting the machine

Note: Ensure that the swing lock pin is fully engaged through both the top and bottom bores of the swing frame. The upper section of the swing frame may break if the pin is not fully installed.

Note: Do not operate the backhoe hydraulics while the swing lock pin is engaged.

i03607599

Work Tool Flow Control (If Equipped)

SMCS Code: 1329; 5057-AX; 5137

The auxiliary lines are capable of providing one-way flow or two-way flow.

The one-way flow is used with attachments such as hydraulic hammers. The two-way flow is used with attachments such as augers.

Before you change the flow mode of the hydraulic auxiliary circuit, ensure that the following criteria have been met:

- machine on level ground
- all implement and all attachments lowered to the ground.
- parking brake engaged
- hydraulic pressure released
- swing lock pin is installed.
- engine shutoff

⚠ WARNING

Make sure that the machine and all attachments are in the recommended servicing position. Install the swing lock pin and shut off the engine. Make sure that all personnel are clear of the attachment before the manual lever on the ball valve is moved. Changing the valve position may cause the attachment to move unexpectedly. Serious injury or death may result.

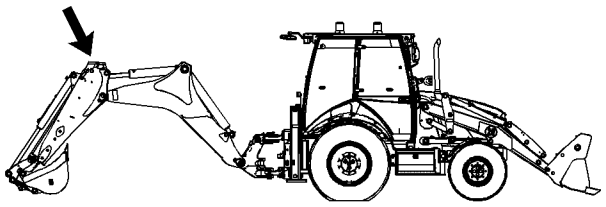


Illustration 204 g01933134

The machine is shown in the servicing position.

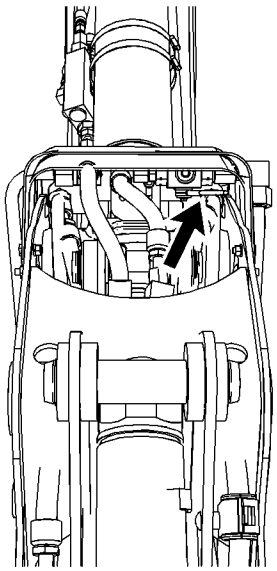


Illustration 205 g01933257

Turn the valve into the position that is shown above in order to perform the following functions:

- Extendable Stick Operation
- Work tools that require one-way flow

Turn the valve by 90 degrees in order to use work tools that require two-way flow.

Note: Before turning the valve for two-way flow, you must pin the extendable stick.

Engine Starting

i03479322

Engine Starting

SMCS Code: 1000; 7000

1. Engage the parking brake.

2. Lower any raised work tools to the ground and move the hydraulic controls to the HOLD position.

3. Move the direction control lever to NEUTRAL. Push the top of the transmission neutral lock switch in order to engage the transmission neutral lock.

Note: The engine will not start unless the direction control lever is in NEUTRAL.

4. Hold the throttle control at the LOW IDLE position before you start the engine.

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

Note: In applications for cold weather, pause until the indicator lamp for the Starting Aid turns off. When the engine start switch is in the ON position, this indicates the activation of the glow plugs. Once the indicator light for the Starting Aid goes off you may start the engine.

Note: If the machine is equipped with the Machine Security System turn the engine start switch key to the ON position for three seconds before you start the machine. This reduces the amount of cranking.

NOTICE
Do not crank the engine for more than 30 seconds. Allow the starter to cool for two minutes before cranking again.

Turbocharger (if equipped) damage can result, if the engine speed is not kept low until the engine oil light/gauge verifies the oil pressure is sufficient.

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

i05963929

Engine Starting with Starting Aid

SMCS Code: 1000; 7000

⚠ WARNING

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

1. Engage the parking brake.

2. Lower any raised work tools to the ground and move the hydraulic controls to the HOLD position.

3. Move the direction control lever to NEUTRAL. Push the top of the transmission neutral lock switch in order to engage the transmission neutral lock.

Note: The engine will not start unless the directional control lever is in NEUTRAL.

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

5. Depress the thermal starting aid switch for 20 seconds.

6. Continue to depress the thermal starting aid switch and turn the engine start switch key to the START position in order to start the engine.

7. When the engine starts, release the engine start switch key. Continue to depress the thermal starting aid switch until the engine runs smoothly up to high idle speed.

8. If the engine does not start within 30 seconds, release the engine start switch key. Wait for 2 minutes before attempting to start the engine again.

9. After the engine has started, release the throttle control.

For starting below −18°C (0°F), the use of additional cold weather starting aids is recommended. Any of the following may be required:

- a coolant heater
- a fuel heater
- an oil heater
- an extra capacity battery

At temperatures below −23°C (−10°F), consult your Caterpillar dealer. Also, refer to Special Publications, SEBU5898, “Cold Weather Recommendations”. This publication is available from your Caterpillar dealer.

Cold Weather Starting Capabilities

⚠ WARNING

Do not spray ether into engine when using Thermal-Starting Aid to start engine.

Personal injury and machine damage could result.

Follow the procedures in this manual.

The starting capabilities of the backhoe loaders at different cold temperatures are listed in the following chart. The temperatures that are listed are the minimum starting temperatures for the given machine criteria. Engine oil viscosity is VERY important to the cold weather starting capability of the engine.

The minimum engine starting speed is 650 rpm. The engine starting speed can be achieved if the batteries are capable of delivering a minimum of 485 amperes, and the correct fuel and the correct engine oil are used for the given starting ambient conditions.

Table 81

Coldest Ambient Temperature °C (°F)	Engine Oil Viscosity	Fuel Type	Battery	Starting Aid
0°C (32°F)	10W30	No. 2 Diesel	Single	Starting Aid is not required.

(continued)

(Table 81, contd)

−18°C (0°F)	10W30	No. 1 Diesel	Double	Thermal Starting Aid
−29°C (−20°F)	0W30	No. 1 Diesel	Double	Thermal Starting Aid and Block Heater

i05956461

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

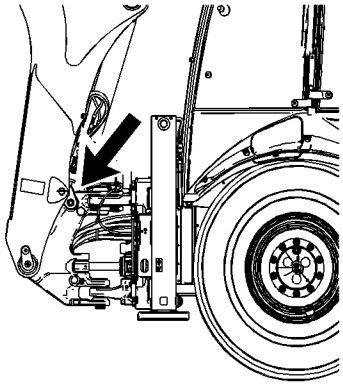


Illustration 206 g01916353

NOTICE
Keep the engine speed low until the engine oil fault alarm shuts off and the indicator light shuts off. Wait for ten seconds. If the indicator light stays on, stop the engine. Investigate the cause of the problem before you start the engine again.

1. Warm up the engine at low idle for 5 minutes. With the boom in the LOCKED position, cycle the hydraulic cylinders in order to circulate the oil. Move the control for the boom to the BOOM DOWN position for 1 minute. Release the control for the boom for 1 minute. Repeat this procedure until the hydraulic system is warm enough to operate the attachments.
2. Monitor the gauges while you operate the machine controls.
3. The parking brake indicator will remain on until you release the parking brake.

While you idle the engine for warm-up, observe the following recommendations:

- If the temperature is greater than 0° C (32° F), warm up the engine for approximately 5 minutes.

- If the temperature is less than 0° C (32° F), warm up the engine for approximately 15 minutes.
- If the temperature is less than − 18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

Parking

i02108808

Stopping the Machine

SMCS Code: 7000

1. Reduce the engine speed slightly.

2. Apply the service brakes in order to stop the machine.

Stop the machine on level ground, when possible.

3. Move the transmission control to NEUTRAL.

4. Engage the transmission neutral lock.

5. Engage the parking brake.

6. Lower all raised work tools to the ground and apply slight downward pressure.

7. Move all hydraulic control levers into the HOLD position.

i01174829

Stopping the Engine

SMCS Code: 1000; 7000

NOTICE
Stopping the engine immediately after it has been working under load can result in overheating and accelerated wear of the engine components.

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

1. Stop the machine and run the engine at low idle for five minutes. Do not stop the engine immediately after the engine has been working under load. This can result in overheating and in accelerated wear of the engine components.

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

i03042320

Stopping the Engine if an Electrical Malfunction Occurs

SMCS Code: 1000; 7000

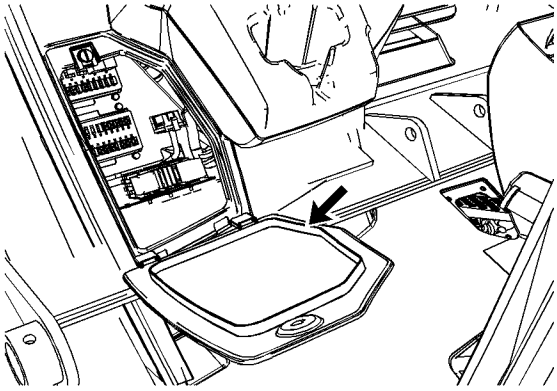


Illustration 207 g01545233

1. Open the access panel for the fuse panel.

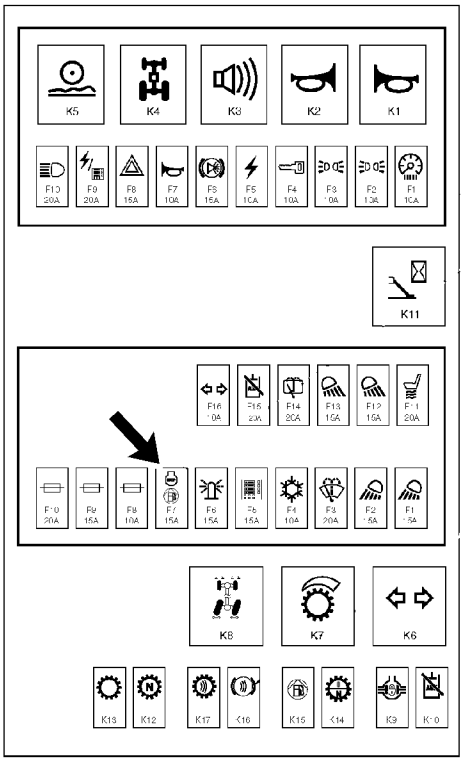


Illustration 208 g01545234

2. Remove the fuse for the fuel pump.

This will cause the engine to shutdown.

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

i02427614

Equipment Lowering with Engine Stopped

SMCS Code: 7000

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

Lowering the Loader Bucket

⚠ WARNING

Personal injury or death can result from a bucket falling.

Keep personnel away from the front of the machine when lowering the bucket.

Two lift load control valves are used. The control valve (if equipped) is used to hold the lift arms in place in case of a hose failure in the lift circuit.

One lift load control valve is located on each lift cylinder.

If there is a loss of hydraulic power, perform the following procedure to lower the lift arms to the ground.

1. Turn the engine start switch key to the ON position.
2. Slowly tap the loader control lever into the FLOAT position in order to lower the bucket to the ground.

Lowering the Boom

⚠ WARNING

Personal injury or death can result from the boom falling.

Keep personnel away from the rear of the machine when lowering the boom.

If there is a loss of hydraulic power, perform the following procedure to lower the boom to the ground.

1. Turn the engine start switch key to the ON position.
2. Slowly tap the boom control lever into the “Boom Lower” position in order to lower the backhoe bucket to the ground.

i02818899

Equipment Lowering with Engine Stopped

SMCS Code: 7000

S/N: JBA1–Up

S/N: NBA1–Up

S/N: EME1–Up

S/N: SJL1–Up

Lowering the Loader Bucket

⚠ WARNING

Personal injury or death can result from a bucket falling.

Keep personnel away from the front of the machine when lowering the bucket.

Lowering the Loader with Electrical Power

If there is a loss of hydraulic power, perform the following procedure in order to lower the lift arms to the ground.

1. Place the hydraulic lockout switch in the UNLOCK position.
2. Turn the engine start switch key to the ON position and crank for five seconds.
3. Leave the key in the ON position.

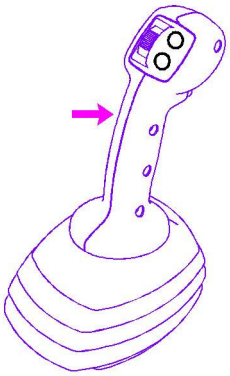


Illustration 209 g01031770

4. Slowly tap the joystick control for the loader into the LOWER position in order to lower the bucket to the ground.

Lowering the Loader without Electrical Power

If there is no electrical power or the accumulator is not charged, the loader cannot be lowered with the joystick control. The loader must be lowered manually.

Note: Two people are needed in order to manually lower the boom. One person should be used in order to ensure that all personnel are clear of the machine while the boom is being lowered.

1. Turn the engine start switch key to the ON position.
2. Ensure that the parking brake is engaged.
3. Ensure that the hydraulic lockout switch is in the UNLOCKED position.
4. Turn the ride control switch to the OFF position.

Note: If your machine is not equipped with a ride control switch, a dead engine lower switch will be installed. A second person will be required in order to hold the dead engine lower switch.

Note: The loader control valve is located under the machine on the right side of the machine.

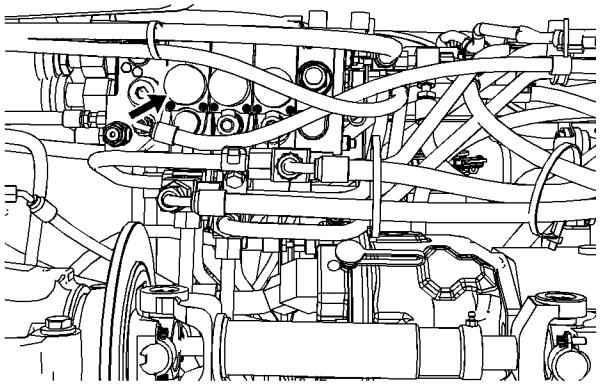


Illustration 210 g01381769

5. Remove the pilot control line and remove the fitting from the bottom of the lift valve on the loader control valve.
6. Fully install the 308-4547 Valve Adjuster.
7. Turn in by hand the screw of the 308-4547 Valve Adjuster until the tool contacts the spool.
8. Use a suitable tool in order to turn the center of the 308-4547 Valve Adjuster by 90 degrees increments. Allow the loader to lower slowly in order to ensure the loader is under control.
9. When the loader has been fully lowered, remove the 308-4547 Valve Adjuster. Reconnect the pilot control line to the valve section.
10. Make the necessary repairs before you operate the machine.

Lowering the Boom

⚠ WARNING

Personal injury or death can result from the boom falling.

Keep personnel away from the rear of the machine when lowering the boom.

Lowering the Boom with Electrical Power

If there is a loss of hydraulic power, perform the following procedure to lower the boom to the ground.

1. Place the hydraulic lockout switch in the UNLOCK position.
2. Turn the engine start switch key to the ON position and crank for five seconds.
3. Leave the key in the ON position.

4. Slowly tap the joystick control for the boom into the DOWN position in order to lower the boom to the ground.

Lowering the Boom without Electrical Power

If there is not electrical power or the accumulator is not charged, the boom cannot be lowered with the joystick control. The boom must be lowered manually.

Note: Two people are needed in order to manually lower the boom. One person should be used in order to ensure that all personnel are clear of the machine while the boom is being lowered.

1. Ensure that the parking brake is engaged.

2. Locate the backhoe control valve underneath the rear of the machine.

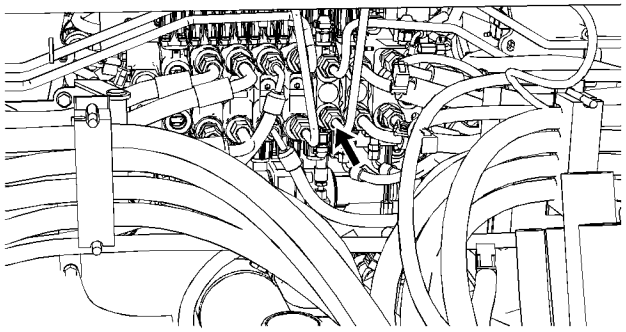


Illustration 211 g01383916

3. Remove the pilot control line and remove the fitting from the bottom of the boom control valve.

4. Fully install the 308-4547 Valve Adjuster.

5. Turn in by hand the screw in the center of the 308-4547 Valve Adjuster, until it contacts the spool.

6. Use a suitable tool in order to turn the center of the 308-4547 Valve Adjuster in by 90 degree increments. Allow the boom to lower slowly in order to ensure the boom is under control.

7. When the boom has been fully lowered, remove the service tool and reconnect the pilot control line to the valve section.

i03790070

Equipment Lowering with Engine Stopped
(Machines With Lock Valves)

SMCS Code: 7000

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

Lowering the Loader

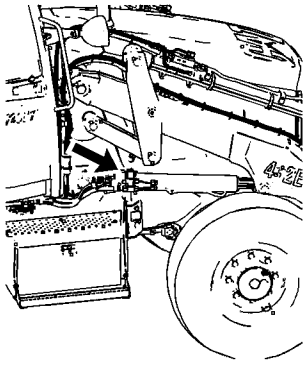


Illustration 212 g02047754

The load control valve (if equipped) for the loader is located on each lift cylinder.

The load control valve for the loader is used to hold the loader in place in case of a hose failure in the lift circuit.

To lower the loader to the ground, perform the following procedure.

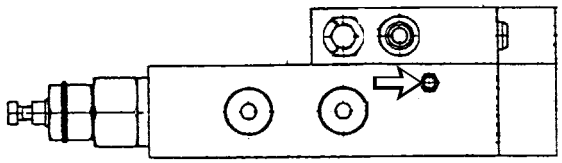


Illustration 213 g00514917

1. Install a 6 mm (0.25 inch) hose onto the purging screw. Route the other end of the hose into a suitable container in order to drain the oil.
2. Loosen the purging screw slightly and allow the oil to drain until the loader lowers to the ground. Tighten the purging screw after the loader is on the ground.

Lowering the Boom

⚠ WARNING

Personal injury or death can result from the boom falling.

Keep personnel away from the rear of the machine when lowering the boom.

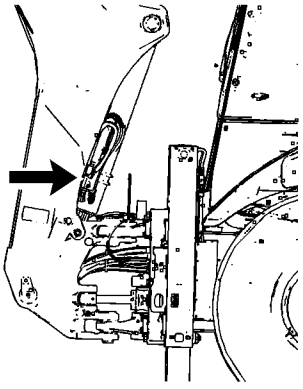


Illustration 214 g02047755

The boom load control valve (if equipped) is located on the boom cylinder.

The boom load control valve is used to hold the boom in place in case of a hose failure in the boom circuit.

To lower the boom to the ground, perform the following procedure.

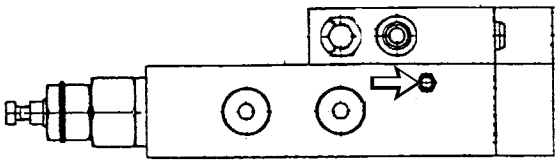


Illustration 215 g00514917

1. Install a 6 mm (0.25 inch) hose onto the purging screw. Route the other end of the hose into a suitable container in order to drain the oil.
2. Loosen the purging screw slightly and allow the oil to drain until the boom lowers to the ground. Tighten the purging screw after the boom is on the ground.

i03790172

Equipment Lowering with Engine Stopped
(Machines With Lock Valves)

SMCS Code: 7000

S/N: JBA1–Up

S/N: NBA1–Up

S/N: EME1–Up

S/N: SJL1–Up

Lowering the Loader Bucket

⚠ WARNING

Personal injury or death can result from a bucket falling.

Keep personnel away from the front of the machine when lowering the bucket.

Lowering the Loader without Electrical Power

If there is no electrical power, the loader cannot be lowered to the ground with the control lever. Perform the following steps in order to manually lower the loader:

Note: Two people are needed in order to manually lower the loader. One person should be used in order to ensure that all personnel are clear of the machine while the loader is being lowered.

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

2. Ensure that the parking brake is engaged.

3. Ensure that the hydraulic lockout switch is in the UNLOCKED position.

4. Turn the ride control switch to the OFF position.

Note: If your machine is not equipped with a ride control switch, a dead engine lower switch will be installed. A second person will be required in order to hold the dead engine lower switch.

Note: The loader control valve is located under the machine on the right side of the machine.

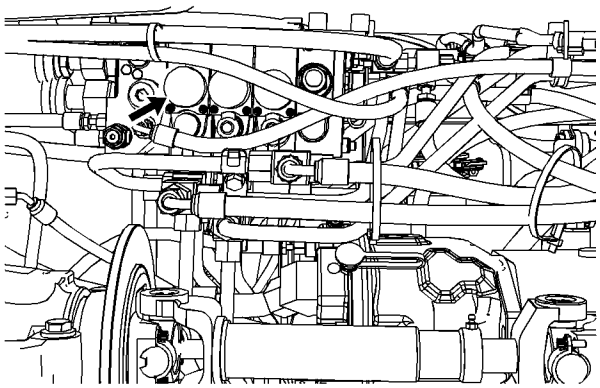


Illustration 216 g01381769

5. Remove the pilot control line and remove the fitting from the bottom of the lift valve on the loader control valve.

6. Fully install the 308-4547 Valve Adjuster.

7. Turn in by hand the screw of the 308-4547 Valve Adjuster, until the tool contacts the spool.

8. Use a suitable tool in order to turn the center of the 308-4547 Valve Adjuster by 90 degrees increments. When the loader begins to lower, allow the loader to lower slowly, in order to ensure the loader is under control.

9. When the loader has been fully lowered, remove the 308-4547 Valve Adjuster. Reconnect the pilot control line to the valve section.

10. Make the necessary repairs before you operate the machine.

Lowering the Loader with a Hydraulic Component Failure

If a break in a hydraulic line has occurred, perform the following steps in order to lower the lift arms to the ground.

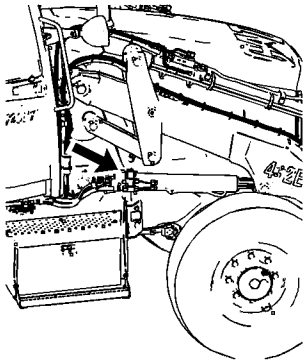


Illustration 217 g02047754

The load control valve for the loader is located on each lift cylinder.

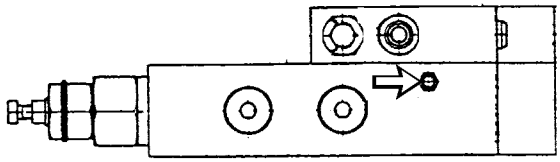


Illustration 218 g00514917

1. Install a 6 mm (0.25 inch) hose onto the purging screw. Route the other end of the hose into a suitable container in order to drain the oil.

2. Loosen the purging screw slightly and allow the oil to drain until the loader lowers to the ground. Tighten the purging screw after the loader is on the ground.

Lowering the Boom

⚠ WARNING

Personal injury or death can result from the boom falling.

Keep personnel away from the rear of the machine when lowering the boom.

Lowering the Boom with Electrical Power

If there is a loss of hydraulic power, and the machine meets the following conditions, perform the following procedure to lower the boom to the ground.

- Electrical power is available.
- There is not a break in a hydraulic line.

1. Place the hydraulic lockout switch in the UNLOCK position.

2. Turn the engine start switch key to the ON position and crank for five seconds.

3. Leave the key in the ON position.

4. Slowly tap the joystick control for the boom into the DOWN position in order to lower the boom to the ground.

Lowering the Boom without Electrical Power

If there is not electrical power and there is not a break in a hydraulic line, perform the following procedure to lower the boom to the ground.

Note: Two people are needed in order to manually lower the loader. One person should be used in order to ensure that all personnel are clear of the machine while the loader is being lowered.

1. Ensure that the parking brake is engaged.

2. Locate the backhoe control valve underneath the rear of the machine.

3. Remove the pilot control line and remove the fitting from the bottom of the boom control valve.

4. Fully install the 308-4547 Valve Adjuster.

5. Turn in by hand the screw in the center of the 308-4547 Valve Adjuster, until it contacts the spool.

6. Use a suitable tool in order to turn the center of the 308-4547 Valve Adjuster fully in.

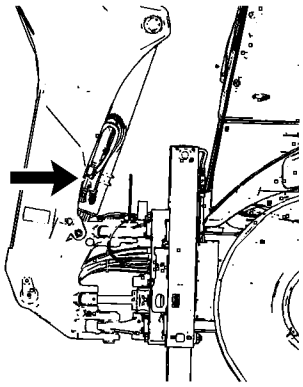


Illustration 219 g02047755
Boom Lock Valve

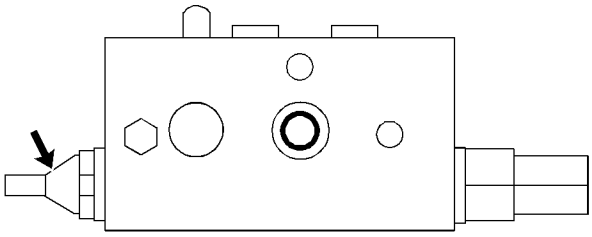


Illustration 220 g01207006

7. Remove the tamperproof cap on the boom lock valve.

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.

8. Loosen the locknut. Slowly, turn the screw clockwise by 90 degrees until the boom begins to lower. This will open the lock valve which will allow the boom to lower. Allow the boom to lower slowly in order to ensure the boom is under control.

9. Once the boom has been lowered, return the screw to the original position. Tighten the locknut.

10. When the boom has been fully lowered, remove the service tool and reconnect the pilot control line to the valve section.

Lowering the Boom with a Hydraulic Component Failure

If a hydraulic component has failed, perform the following procedure to lower the boom to the ground.

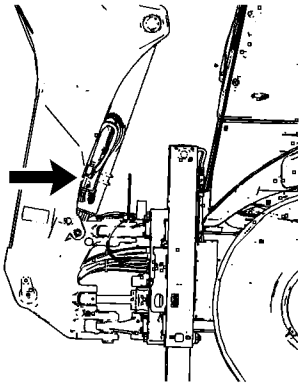


Illustration 221 g02047755
Boom Lock Valve

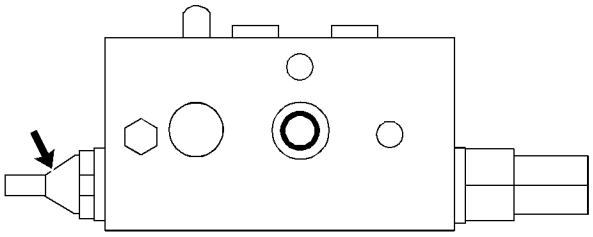


Illustration 222 g01207006

1. Remove the tamperproof cap on the boom lock valve.

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.

2. Loosen the locknut. Slowly, turn the screw clockwise by 90 degrees until the boom begins to lower. This will open the lock valve which will allow the boom to lower. Allow the boom to lower slowly in order to ensure the boom is under control.

3. Once the boom has been lowered, return the screw to the original position. Tighten the locknut.

i03112201

Leaving the Machine

SMCS Code: 7000

1. Park on a level surface. If you must park on a grade, chock the machine.

2. Apply the service brake in order to stop the machine. Move the transmission control lever to the NEUTRAL position.

3. Move the speed control lever to the LOW IDLE position.

4. Engage the parking brake.

5. Engage the transmission neutral lock.

6. Lower all work tools to the ground.

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

8. Move all hydraulic control levers back and forth in order to relieve hydraulic pressure.

9. Move all hydraulic control levers into the HOLD position.

Note: Refer to steps 10 through 14 for pilot controlled machines.

10. Turn the engine start switch key to the OFF position for 4 seconds. Turn the engine start switch key back to the ON position.

11. Place the hydraulic lockout switch into the UNLOCK position.

12. Move all hydraulic control levers back and forth in order to relieve hydraulic pressure.

13. Move all hydraulic control levers into the HOLD position.

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

15. Remove the engine start switch key.

This will prevent unauthorized persons from starting the engine or from turning on the lights.

16. When you exit the machine, close the windows and lock the cab doors, if equipped.

17. Install all vandalism protection locks and all vandalism covers, if equipped.

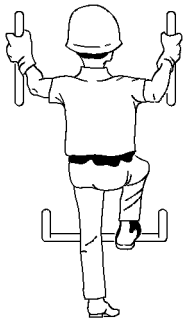


Illustration 223 g00037860

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

19. Ensure that all lights are shut off.

Transportation Information

i03626792

Transport Position

SMCS Code: 6506; 7505

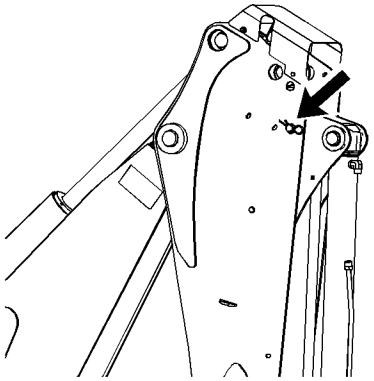


Illustration 224 g01945593

Roading pin in the installed position

Machines that are equipped with an extendable stick must have the transport pin in place for roading.

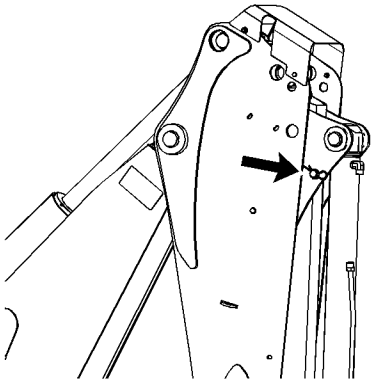


Illustration 225 g01945613

Roading pin in the stowed position

Machines that are equipped with an extendable stick must remove the transport pin and place it in the stowed position in order to operate the extendable stick.

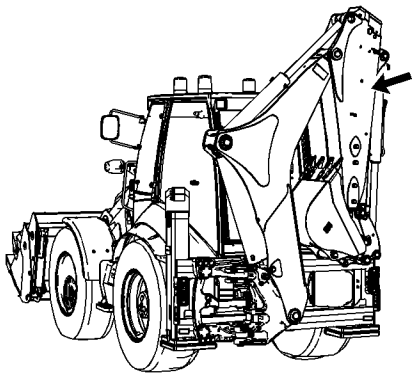


Illustration 226 g01945535

Move the backhoe to the transport position in the following situations:

- You are using the loader.
- You are loading the machine on a truck or on a trailer.
- You are roading the machine.

NOTICE
The bucket may hit the stabilizers of the machine or the rear of the cab with certain boom and stick combinations. Always check for interference when first operating a new work tool.

Boom Transport Lock – Close the bucket and move in the stick completely. Move the boom upward until the boom is completely retracted.

1. Raise the boom to the full UP position.
2. Raise the boom lock lever in order to engage the boom lock.
3. Move the boom lever to the DOWN position in order to force the boom against the boom lock hook.

Boom Swing Lock Pin – Install the pin when you are roading the machine or when you haul the machine on a truck or on a trailer.

For machines that are equipped with All Wheel Steer, center the front wheels and rear wheels and place the steering mode select switch in the two-wheel steer position before you transport the machine.

Additional locking devices for work tools are required in some countries. Remove locking devices before you operate the machine.

i07034950

Shipping the Machine

SMCS Code: 1000; 7000; 7500

Investigate the travel route for overpass clearances. Make sure that there will be adequate clearance if the machine that is transported is equipped with a ROPS, with a cab, or with a canopy.

Before you load the machine, remove ice, snow, or other slippery material from the loading dock and from the truck bed. Remove the slippery material in order to prevent the slipping of the machine. This should also be done in order to prevent a shift while the machine is 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.

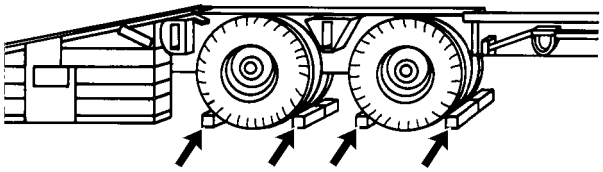


Illustration 227 g00040011

1. Chock the trailer or rail car wheels before you load the machine. (The trailer is shown.)

2. Put the machine in the transport position and load the machine.

3. Move the transmission direction control lever to NEUTRAL. Engage the transmission neutral lock.

4. Engage the parking brake.

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

6. Place the boom swing lock pin in the LOCKED position.

7. Engage the boom lock switch (if equipped) in order to prevent the boom from moving.

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

9. Lock the doors and the access covers and attach any vandalism protection.

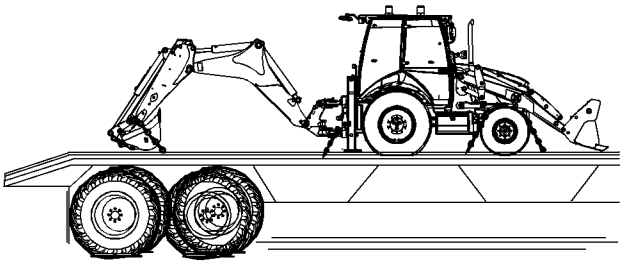


Illustration 228 g01918634
Typical example

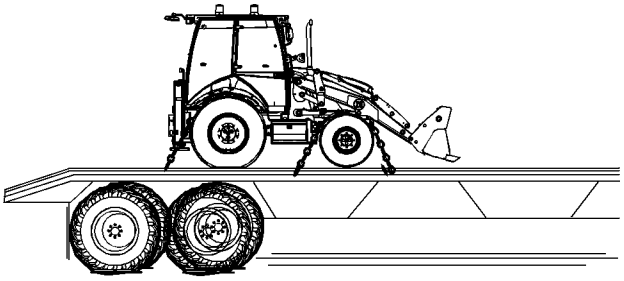


Illustration 229 g01918628
Typical example
Without Backhoe

10. Release the boom lock lever and lower the backhoe bucket to the floor of the trailer or railcar. Secure the machine with tie-downs when you are transporting the machine on a rail car or on the tractor-trailer. Secure the bucket to the floor of the trailer or railcar in order to prevent the bucket from moving.

11. Cover the exhaust opening. The turbocharger (if equipped) should not rotate when the engine is not operating. Damage to the turbocharger can result.

i03627057

Before Roading the Machine

SMCS Code: 7000

Local laws may specify the position of the loader bucket while roading the machine. When no law is present, road the machine with the loader bucket in the following position: Raised 250 mm (10 in) and racked fully back.

Before you road a machine, consult your tire dealer for recommended tire pressures and for speed limitations.

Limitations on speed/load rating must be obeyed.

When you travel for long distances, schedule stops in order to allow the tires and the components to cool. Stop for 30 minutes after every 40 km (25 miles) or stop for 30 minutes after every hour.

Inflate the tires to the correct air pressure.

Use a self-attaching inflation chuck and stand behind the tire tread during the inflation. Refer to Operation and Maintenance Manual, “Tire Inflation - Check”.

Perform a Walk-Around Inspection and measure the fluid levels in the various compartments.

Check with the proper officials in order to obtain the required licenses and other similar items.

Travel at a moderate speed. Observe all speed limitations when you road the machine.

Place the machine in the transport position before you road the machine.

Note: All of the following equipment may not be legal requirements in your country. Check local laws in order to determine the equipment that is required in your area.

General Information for Roading

Learn and obey all traffic regulations when you are roading the machine. Travel at a moderate speed. Observe all speed limitations when you road the machine. Ensure that the hydraulic system is locked out. Ensure that all work tools remain securely attached to the work tool coupler. Ensure that appropriate locking pins remain in position. Ensure that the machine meets all local requirements. Ensure that all roading decals are visible. Replace any decal that is damaged. Ensure that all necessary equipment for roading the machine is installed. The necessary equipment can be obtained from your local Caterpillar Dealer.

Transport Lock Group (Bucket) (If Required)

1. Enter the machine. Fasten the seat belt. Start the engine.
2. Set the parking brake.
3. Raise the loader 305 mm (12 inch). Fully rack back the bucket.

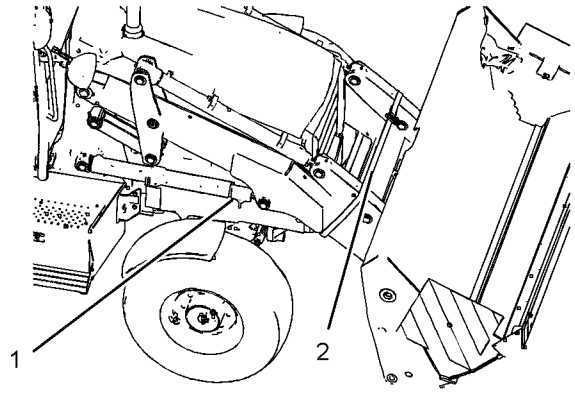


Illustration 230 g01945819

4. Insert the lift arm brace (1) on the rod end of the lift cylinder. Insert the pin and secure the pin with the clip.

Note: The flange on the brace must face the rear of the machine.

Note: The lift arm brace is only used in Italian roading arrangements.

5. Install the strap (2) for the bucket onto the bracket on the loader lift arm.
6. Enter the machine. Fasten the seat belt. Turn the ignition key to the ON position. Do not start the engine.

7. Slowly lower the lift arm onto the brace.

Bucket Guard Group (If Required)

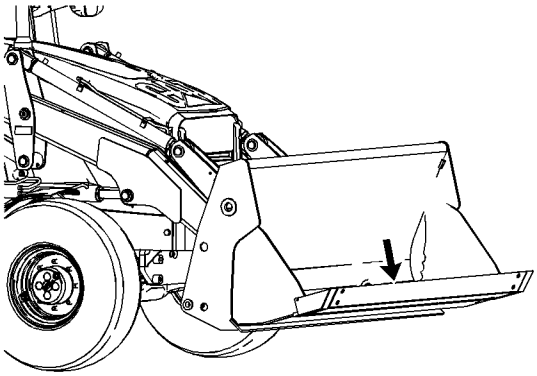


Illustration 231 g01945817

Install the bucket guard over the cutting edge of the loader bucket. Secure the guard with the chains and clips.

Transport Lock Group (Backhoe) (If Required)

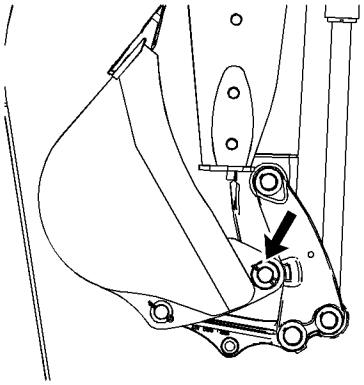


Illustration 232 g01945816

Install the transport lock between the bucket linkage and the stick. The transport lock prevents movement of the backhoe bucket.

Reflective Plate (If Required)

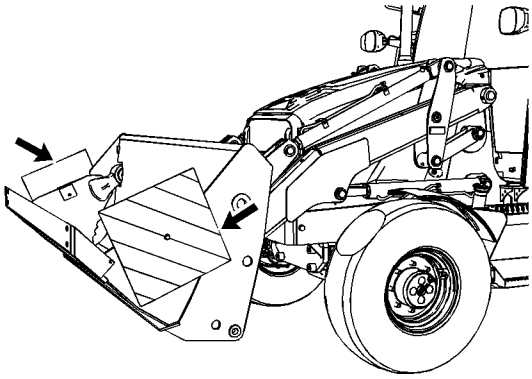


Illustration 233 g01945815

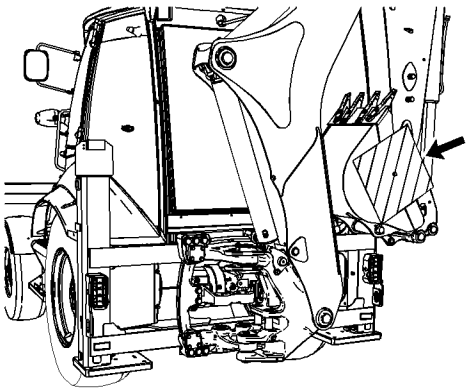


Illustration 234 g01945813

Mount a side reflective plate on both sides of the loader bucket. Mount the reflective plate on the backhoe bucket. Secure the plates in place with the thumb screws.

Work Light Cover (If Required)

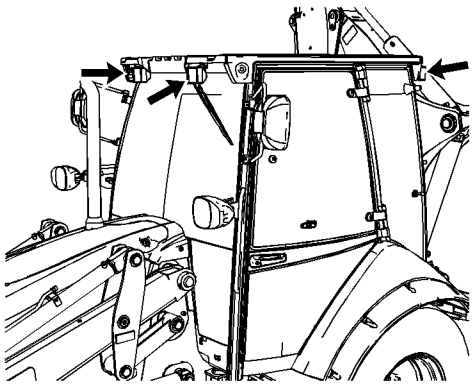


Illustration 235 g01945812

1. Turn off all of the work lights.

2. If required, cover all of the work lights before roading the machine.

Backhoe Restraint (If Required)

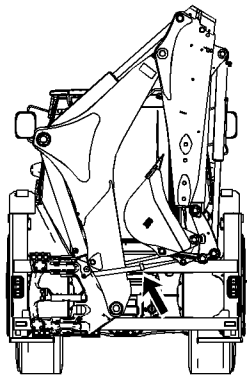


Illustration 236 g01945811

1. Position the backhoe into the travelling position.

2. Position the strap around the base of the boom and around the bucket linkage.

3. Tighten the strap with the ratchet.

Traffic Regulations

Learn and obey all of the traffic regulations when you are roading the machine.

Leaving the Machine

Refer to Operation and Maintenance Manual, “Parking” for details about stopping the engine and lowering the equipment.

The use of a wheel chock may be required when you leave the machine at the side of the road. The wheel chock is stored behind the steps on the right side of the machine.

The use of warning triangles may be required when you leave the machine at the side of the road.

Hydraulic Shutoff

Pilot Control

If equipped, disable the hydraulic controls. Refer to Operation and Maintenance Manual, “Operator Controls” for more information.

Mechanical Control

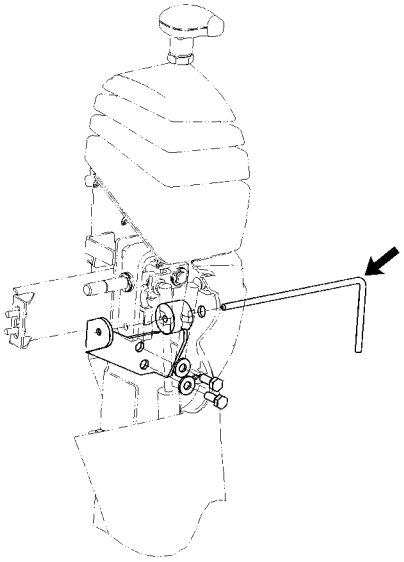


Illustration 237 g01596189

Insert the pin in order to disable the loader control.

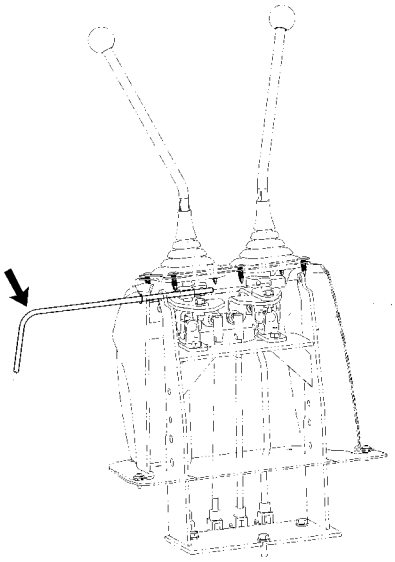


Illustration 238 g01596278

Insert the pin in order to disable the backhoe controls.

i00611595

Roading the Machine

SMCS Code: 7000

Before you road a machine, consult your tire dealer for recommended tire pressures and for speed limitations.

Limitations for TON-kilometers per hour (TON-miles per hour) must be obeyed. Consult your tire dealer for the speed limit of the tires that are used.

When you travel for long distances, schedule stops in order to allow the tires and the components to cool. Stop for 30 minutes after every 40 km (25 miles) or stop for 30 minutes after every hour.

Inflate the tires to the correct air pressure.

Use a self-attaching inflation chuck and stand behind the tire tread during the inflation. Refer to Operation and Maintenance Manual, “Tire Inflation - Check”.

Perform a Walk-Around Inspection and measure the fluid levels in the various compartments.

Check with the proper officials in order to obtain the required licenses and other similar items.

Travel at a moderate speed. Observe all speed limitations when you road the machine.

Place the machine in the transport position before you road the machine.

i04802050

Lifting and Tying Down the Machine

SMCS Code: 7000; 7500

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

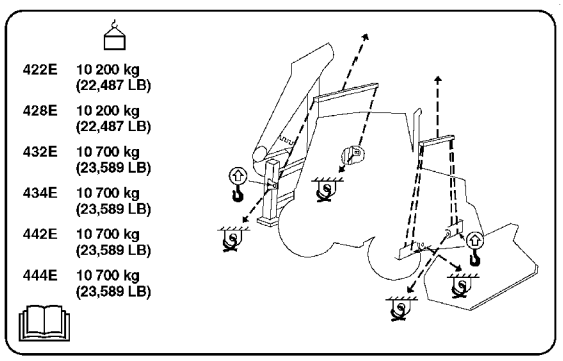


Illustration 239 g01951867

Proper lifting points are marked on the machine by this decal.

Proper tie-down points are marked on the machine by this decal.

Reference: Refer to Operation and Maintenance Manual, “Specifications” for the dimensions of the machine.

Note: Weights may vary with different work tools.

1. For lifting objects, use properly rated cables and properly rated slings. Position the crane for a level machine lift.
2. Spreader bar widths should be sufficient for preventing contact with the machine.
3. Two rear holes and two front holes are provided for tie-downs. Use these holes.

Install the tie-downs at several locations. Install the tie-downs for the backhoe and for the bucket. Place blocks under the front wheels and under the rear wheels.

Check the appropriate laws that govern the weight of the load. Check the appropriate laws that govern the width of the load and the length of the load.

Consult your Caterpillar dealer for shipping instructions for your machine.

Towing Information

i03683444

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 releasing the brakes. The machine can roll free if it is not blocked.

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

Follow the recommendations that are listed below in order to properly perform the towing procedure.

This machine is equipped with hydraulically applied wet disc brakes.

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. These instructions are only for emergencies. Always haul the machine if long distance moving is required.

Shielding 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 unless the operator can control the steering and/or the braking.

Before towing, make sure that the tow line or the tow bar is in good condition. Make sure that the tow line or the tow bar has enough strength for the towing procedure that is involved. The strength of the towing line or of the tow bar should be at least 150 percent of the gross weight of the towing machine. This is true for a disabled machine that is stuck in the mud and for towing on a grade.

Keep the tow line angle to a minimum. Do not exceed a 30 degree angle from the straight ahead position.

Quick machine movement could overload the tow line or the tow bar. This could cause the tow line or the tow bar to break. Gradual, steady machine movement will be more effective.

Normally, the towing machine should be as large as the disabled machine. Make sure that the towing machine has enough brake capacity, enough weight, and enough power. The towing machine must be able to control both machines for the grade that is involved and for the distance that is involved.

You must provide sufficient control and sufficient braking when you are moving a disabled machine downhill. This may require a larger towing machine or additional machines that are connected to the rear. 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 inclines or on surfaces in poor condition.

Attach the towing device and the machine before you release the brakes. If equipped, disengage the front wheel drive.

Consult your Caterpillar dealer for towing a disabled machine.

Running Engine

If the engine is running, the machine can be towed for a short distance under certain conditions. The power train and the steering system must be operable. **Tow the machine for a short distance only.** For example, pull the machine out of mud or pull the machine to the side of the road.

1. Move the transmission control lever to the NEUTRAL position.
2. Engage the transmission neutral lock.
3. Raise the work tools off the ground.
4. Release the parking brake in order to allow the machine to move.

The Engine Stopped

Perform the following steps before you tow the machine with a stopped engine.

1. Engage the parking brake.
2. Move the transmission control levers to the NEUTRAL position.
3. Engage the transmission neutral lock.
4. Raise all of the work tools off the ground. If necessary, use a hoist in order to lift the work tools. Lift the work tools while you move the control levers to the RAISE position.

Note: The work tools must be blocked up in the raised position. Release the levers after you raise the work tools and after you block up the work tools.

5. Remove the universal joint before the machine is moved. Refer to the Service Manual for the correct procedure.
6. Release the parking brake in order to allow the machine to move.

⚠ WARNING

Be sure all necessary repairs and adjustments have been made before a machine that has been towed to a service area is put back into operation.

Towing from the Front

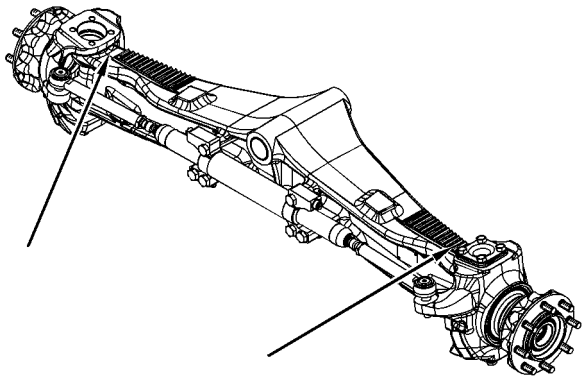


Illustration 240 g01032142

Wrap the tow strap around each side of the front axle just inside the kingpins.

Note: Do not allow the tow strap to contact the steering linkages.

Towing from the Rear

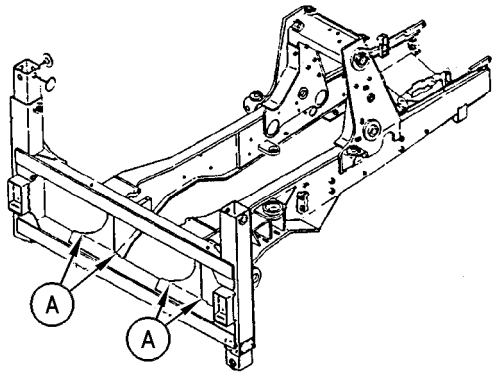


Illustration 241 g00287725

Wrap the tow strap around tow points (A).

Engine Starting (Alternate Methods)

i01872452

Engine Starting with Jump Start Cables

SMCS Code: 1000; 1401; 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 starting from 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.

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

Refer to Special Instruction, Battery Test Procedure, SEHS7633, available from your Caterpillar dealer, for complete testing and charging information.

Use of Jump Start Cables

When the auxiliary starting receptacles are not available, use the following procedure.

1. Determine the failure of the engine to start.
2. Place the transmission direction control lever in the NEUTRAL position on the stalled machine. Engage the parking brake. Lower all attachments to the ground. Move all controls to the HOLD position.
3. On a stalled machine, turn the start switch key to the OFF position. Turn off the accessories.
4. Move the machines together in order for the cables to reach. **DO NOT ALLOW THE MACHINES TO CONTACT.**
5. Stop the engine on the machine that is the electrical source. When you use an auxiliary power source, turn off the charging system.
6. Check the battery caps for correct placement and for correct tightness. Make these checks on both machines. Make sure that the batteries in the stalled machine are not frozen. Check the batteries for low electrolyte.
7. Connect the positive jump start cable to the positive cable terminal of the discharged battery.

   Do not allow positive cable clamps to contact any metal except for battery terminals.
8. Connect the positive jump start cable to the positive terminal of the electrical source. Use the procedure from Step 7 in order to determine the correct terminal.
9. Connect one end of the negative jump start cable to the negative terminal of the electrical source.
10. Make the final connection. Connect the negative cable to the frame of the stalled machine. Make this connection away from the battery, the fuel, the hydraulic lines, or moving parts.
11. Start the engine on the machine that is the electrical source. Also, you can energize the charging system on the auxiliary power source.
12. Allow the electrical source to charge the batteries for two minutes.
13. Attempt to start the stalled engine. Refer to Operation and Maintenance Manual, “Engine Starting”.
14. Immediately after the stalled engine starts, disconnect the jump start cables in reverse order.

15. Conclude with a failure analysis on the starting charging system. Check the stalled machine, as required. Check the machine when the engine is running and the charging system is in operation.

Maintenance Section

Tire Inflation Information

i00095080

Tire Inflation with Air

SMCS Code: 4203

⚠ WARNING

Use a self-attaching inflation chuck and stand behind the tread when inflating a tire.

Proper inflation equipment, and training in using the equipment, are necessary to avoid overinflation. A tire blowout or rim failure can result from improper or misused equipment.

Before inflating tire, install on the machine or put tire in restraining device.

NOTICE
Set the tire inflation equipment regulator at no more than 140 kPa (20 psi) over the recommended tire pressure.

Consult your Caterpillar dealer for operating pressures.

i05435126

Tire Shipping Pressure

SMCS Code: 4203; 7500

The tire inflation pressures that are shown in the following table are cold inflation pressures for tires on Caterpillar machines and shipping pressures for tires on Caterpillar machines.

Note: The weights that are provided in the tables below include the weight of the machine and any work tools that are attached. The maximum load is for each tire at 40 km/h (25 mph) roading speed.

Table 82

Front Tire Operating Pressure			
Size	**Ply Rating or Strength Index**	**Operating Pressure**	**Maximum Load**
11L - 16	12	440 kPa (64 psi)	1305 kg (2880 lb)
12.5/80-18	10	320 kPa (46 psi)	2135 kg (4710 lb)

(continued)

(Table 82, contd)

340/80R18 XMCL	Radial A8 143	320 kPa (46 psi)	2240 kg (4940 lb)
12.5/80-18 SGL	14	380 kPa (54 psi)	2440 kg (5380 lb)
340/80R20 IT520	Radial A8 144	320 kPa (46 psi)	2360 kg (5203 lb)
340/80 - R18 IT520/530	Radial A8 136	320 kPa (46 psi)	2240 kg (4940 lb)
340/80R20 XMCL	Radial A8 144	320 kPa (46 psi)	2300 kg (5070 lb)
340/80 - 18 CL	12	400 kPa (58 psi)	2730 kg (6019 lb)
340/80 - 20 CL	12	400 kPa (58 psi)	2800 kg (6173 lb)

Table 83

Rear Tire Operating Pressure			
Size	**Ply Rating or Strength Index**	**Operating Pressure**	**Maximum Load**
18.4 - 26	12	250 kPa (36 psi)	3990 kg (8796 lb)
18.4 - 26 SGI	12 A8 156	250 kPa (36 psi)	4000 kg (8820 lb)
16.9 - 28	12	262 kPa (38 psi)	3445 kg (7590 lb)
480/80R26 XMCL	A8 160	320 kPa (46 psi)	4500 kg (9900 lb)
440/80R28 IT520/530	Radial A8 156	320 kPa (46 psi)	4000 kg (8820 lb)
440/80R28 XMCL	A8 156	320 kPa (46 psi)	4000 kg (8820 lb)
16.9 - 28 ISG/ SGI	12 A8 152	260 kPa (38 psi)	3550 kg (7850 lb)
440/80R24 XMCL	A8 161	320 kPa (46 psi)	4000 kg (8820 lb)
440/80R26 IT520/530	A8 160	320 kPa (46 psi)	4500 kg (9900 lb)
440/80R24 IT520/530	A8 154	320 kPa (46 psi)	3750 kg (8267 lb)
480/80-26CL	12	320 kPa (46 psi)	4500 kg (9900 lb)
440/80-28CL	12	320 kPa (46 psi)	4000 kg (8820 lb)

The operating inflation pressure is based on the following conditions.

- The weight and the distribution of weight on a ready-to-work machine

- The operational payload
- Average operating conditions.

Tire inflation pressures for each application may vary. These tire inflation pressures should be obtained from your tire supplier.

Contact your tire supplier if your machine is experiencing tire slippage. Tire wear may cause tire slippage.

i02610518

Tire Inflation Pressure Adjustment

SMCS Code: 4203

Always obtain the proper tire inflation pressures and maintenance recommendations for the tires on your machine from your tire supplier. The tire pressure in a warm shop area 18° to 21°C (65° to 70°F) will significantly change when you move the machine into freezing temperatures. If you inflate the tire to the correct pressure in a warm shop, the tire will be underinflated in freezing temperatures. Low pressure shortens the life of a tire.

Reference: When you operate the machine in freezing temperatures, refer to Special Publication, SEBU5898, “Cold Weather Recommendations for All Caterpillar Machines” in order to adjust tire inflation pressures.

Lubricant Viscosities and Refill Capacities

i05242991

Lubricant Viscosities (Fluids Recommendations)

SMCS Code: 1000; 7000

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.

For cold-weather applications where transmission oil SAE 0W-20 is recommended, Cat TDTO Cold Weather is recommended.

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

The footnotes are a key part of the tables. Read ALL footnotes that pertain to the machine compartment in question.

Selecting the Viscosity

In order to select the proper oil for each machine compartment, refer to the "Lubricant Viscosity for Ambient Temperature" table. Use the oil type AND oil viscosity for the specific compartment at the proper ambient temperature.

The proper lubricant viscosity grade is determined by the minimum outside temperature when the machine is started. The proper lubricant viscosity grade is also determined by the maximum outside temperature while the machine is operated. Use the column on the table that is designated “Min” in order to determine the lubricant viscosity grade that is required when you start a cold machine and when you operate a cold machine. Use the column on the table that is designated “Max” to select the lubricant viscosity grade when you operate the machine at the highest temperature that is anticipated. When you start the machine, use the oil with the highest lubricant viscosity that is allowed for the temperature.

Machines that are continuously operated should use the oils with a higher viscosity in the final drives and differentials in order to maintain the highest possible oil film thickness. Refer to “General Information for Lubricants” article, “Lubricant Viscosities” tables, and any associated footnotes. Consult your Cat dealer if additional information is needed.

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

Engine Oil

Cat oils have been developed and tested in order to provide the full performance and life that has been designed and built into Cat engines.

Cat DEO-ULS multigrade and Cat DEO multigrade oils are formulated with the correct amounts of detergents, dispersants, and alkalinity in order to provide superior performance in Cat diesel engines where recommended for use.

Table 84

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance Requirements	Oil Viscosities	°C		°F	
			Min	Max	Min	Max
Engine Crankcase for all Machines	Cat DEO-ULS Cold Weather	SAE 0W-40	−40	40	−40	104
	Cat DEO-ULS SYN Cat DEO SYN	SAE 5W-40	−30	50	−22	122
	Cat DEO-ULS Cat DEO	SAE 10W-30	−18	40	0	104
	Cat DEO-ULS Cat DEO	SAE 15W-40	−9.5	50	15	122

When fuels of sulfur level 0.1 percent (1000 ppm) or higher are used, Cat DEO-ULS may be used if an oil analysis program is followed. Base the oil change interval on the oil analysis.

Other Oil Applications

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.

Cat HYDO Advanced fluids are the preferred oils for use in Cat machines hydraulic systems.

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%.

Note: For machines equipped with hydraulic hammers, do not use viscosity grades SAE 0W or SAE 5W oils. Refer to the “Special Applications” section in this article.

Table 85

Backhoe Loaders Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Specification	Oil Viscosity Grade	°C		°F	
			Min	Max	Min	Max
Direct Drive Transmissions Power Shift Transmissions	Cat TDTO Cold Weather	SAE 0W-20	−40	35	−40	95
	Cat TDTO	SAE 10W(1)	−20	35	−4	95
		SAE 30	25	50	77	122

(continued)

(Table 85, contd)

Backhoe Loaders Lubricant Viscosities for Ambient Temperatures						
	Cat TDTO-TMS	Multi-Grade	10	50	50	122
Front All Wheel Drive Axle Final Drives (2)	**Cat TDTO Cold Weather**	SAE 0W-20	−40	10	−40	50
	Cat TDTO	SAE 10W	−20	10	−4	50
		SAE 30(1)	-10	50	14	122
		SAE 50	10	50	50	122
	Cat TDTO-TMS	Cat TDTO-TMS	−20	43	−4	110
Hydraulic Systems	**Cat HYDO Advanced 10**	SAE 10W(1)	−20	50	−4	122
	Cat HYDO Advanced 30 Cat TDTO	SAE 30	0	50	32	122
	Cat Bio HYDO Advanced	“ISO 46” Multi-Grade	−20	40	−4	104
	Cat DEO-ULS Cat DEO	SAE 15W-40	-15	50	5	122
	Cat TDTO Cold Weather	SAE 0W-20	−40	40	−40	104
	Cat ECF-1a, Cat ECF-2, Cat ECF-3	SAE 0W-30	-40	20	−40	68
Brake Reservoir (3)	**Cat HYDO Advanced 10**	SAE 10W	−20	50	−4	122

(1) Factory fill oil for standard configuration machines.
(2) Refer to table 86 .
(3) Machines with power brakes use hydraulic system oil and do not have a brake reservoir.

Backhoe Loader Rear Axles

Additional 197-0017 may be used in order to reduce brake noise.

Do not use Cat MTO or commercial M2C134-D specification oil with the 230-4017 brake disks. Do not use Cat MTO or commercial M2C134-D specification oil in any E Series Backhoe Loader rear axle.

Table 86

Lubricant Viscosities for Ambient Temperatures for Backhoe Loader Rear Axles								
Backhoe Loaders	**Brake Disk Part Number**	**197-0017 Additive Volume**	**Oil Type and Performance Requirements for Rear Axle**	**Oil Viscosity Grade**	**°C**		**°F**	
					Min	**Max**	**Min**	**Max**
B, C, D Series	133-7234	1L (1.1qt)(1)	Cat MTO or M2C134-D	SAE 30	−25	40	−13	104
B, C, D Series	133-7234	1L (1.1qt)(1)	Cat TDTO 30 or Cat TO-4 30					
B, C, D Series	230-4017	150mL (5.1oz)(2)	Cat TDTO 30 or Cat TO-4 30					
416E 420E 422E 428E 430E 432E 434E 444E	238-5291	500 mL (17.0 oz)(3)	Cat TDTO 30 or Cat TO-4 30					
450E	288-7303	200mL (6.8oz)(4)	Cat TDTO 30 or Cat TO-4 30					

(1) The maximum amount of 197-0017 for this brake is 2 L (2.1 qt).
(2) The maximum amount of 197-0017 for this brake is 300 mL (10.2 oz).
(3) The maximum amount of 197-0017 for this brake is 550 mL (18.7 oz).
(4) The maximum amount of 197-0017 for this brake is 250 mL (8.5 oz).

Grease Applications

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 87

Type of Caterpillar Grease by Machine Category									
Vehicle	Application Point	Typical Load and Speed	Load Factor	Ambient Temperature Range				NLGI Grade	Grease Type
				° C		° F			
				Min	Max	Min	Max		
Backhoe Loaders	All Points	High	Production work with long cycles and/or constant flow implements.	−35	40	−31	104	1	Ultra 5Moly Grease
				−30	50	−22	122	2	
		Medium	General work with regular cycles in medium applications.	−20	40	−4	104	2	Advanced 3Moly Grease
		Low	Utility work with intermittent cycles in light to medium applications.	−30	40	−22	104	2	Multipurpose Grease

Biodiesel

Biodiesel is a fuel that can be made from various renewable resources that include vegetable oils, animal fat, and waste cooking oil. Soybean oil and rapeseed oil are the primary vegetable oil sources. In order to use any of these oils or fats as fuel, the oils or fats are chemically processed (esterified). The water and contaminants are removed.

U.S. distillate diesel fuel specification “ASTM D975-09a” includes up to B5 (5 percent) biodiesel. Currently, any diesel fuel in the U.S. may contain up to B5 biodiesel fuel.

European distillate diesel fuel specification “EN 590” includes up to B5 (5 percent) and in some regions up to B7 (7 percent) biodiesel. Any diesel fuel in Europe may contain up to B5 or in some regions up to B7 biodiesel fuel.

Note: The diesel portion used in the biodiesel blend must be Ultra Low Sulfur Diesel (15 ppm sulfur or less, per “ASTM D975”). In Europe the diesel fuel portion used in the biodiesel blend must be sulfur free diesel (10 ppm sulfur or less, per “EN 590”). The final blend must have 15 ppm sulfur or less.

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.

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.

i04775618

Capacities (Refill)

SMCS Code: 1000; 7000; 7560

Table 88

APPROXIMATE REFILL CAPACITIES 432E,434E,442E,444E			
Compartment or System	**Liters**	**US Gallons**	**Imperial Gallons**
Engine Crankcase	7.6	2.0	1.7
Hydraulic Tank	40	10.6	8.8
Hydraulic System (Minimum)	79	20.9	17.4
Hydraulic System (Maximum)	99	26.1	21.8
Direct Drive Transmission	18.5	4.9	4.1
Power Shift Transmission	19.0	5.0	4.2
Cooling System with Heater	25.3	6.7	5.6
Cooling System without Heater	23.1	6.1	5.1
Cooling System with Heater (Tier III Engine)	21.4	5.6	4.7
Cooling System without Heater (Tier III Engine)	19.5	5.1	4.3
Fuel Tank	160	42.2	35.2
Fuel Tank (EST)	187	49.4	41.1
Rear Axle(1)	16.5	4.4	3.6
Rear Axle (All Wheel Steer)(1)	16	4.2	3.5
Final Drive for the Rear Axle (each side)	1.7	0.45	0.37
Front Powered Axle	11	2.9	2.4
Front Powered Axle (EST)	14	3.7	3.1

(continued)

(Table 88, contd)

Final Drive for the Front Powered Axle (Each Side)	0.7	0.2	0.2
Final Drive for the Front/Rear Powered Axle (Each Side) (EST)	1.7	.45	.37

(1) Add 0.5 L (0.5 qt) of 197-0017 Axle and Brake Oil Additive to the rear axle. Do not add to the final drives.

Table 89

APPROXIMATE REFILL CAPACITIES 422E and 428E			
Compartment or System	**Liters**	**US Gallons**	**Imperial Gallons**
Engine Crankcase	7.6	2.0	1.7
Hydraulic Tank	40	10.6	8.8
Hydraulic System (Minimum)	79	20.9	17.4
Hydraulic System (Maximum)	99	26.1	21.8
Transmission	18.5	4.9	4.1
Cooling System with Heater	25.5	6.7	5.6
Cooling System without Heater	23.6	6.2	5.2
Cooling System with Heater (Tier III Engine)	21.4	5.6	4.7
Cooling System without Heater (Tier III Engine)	19.5	5.1	4.3
Fuel Tank	160	42.2	35.2
Rear Axle(1)	16.5	4.4	3.6
Final Drive for the Rear Axle (each side)	1.7	0.45	0.37
Front Powered Axle	11	2.9	2.4
Final Drive for the Front Powered Axle (Each Side)	0.7	0.2	0.2
Brake Reservoir	0.7	0.2	0.2

(1) Add 0.5 L (0.5 qt) of 197-0017 Axle and Brake Oil Additive to the rear axle. Do not add to the final drives.

Note: When you work on extreme slopes, consult your Caterpillar dealer for the correct fluid levels.

i07445339

S·O·S Information

SMCS Code: 1000; 3080; 4070; 4250; 4300; 5050; 7000; 7542

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

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

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

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

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

Maintenance Support

i05965049

System Pressure Release

SMCS Code: 1250-553-PX; 1300-553-PX; 1350-553-PX; 3000-553-PX; 4250-553-PX; 4300-553-PX; 5050-553-PX; 5612-553-PX; 6700-553-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. Park on a level surface. If you must park on a grade, chock the machine.
2. Apply the service brake in order to stop the machine. Move the transmission control lever to the NEUTRAL position.
3. Reduce engine speed to low idle.
4. Engage the parking brake.
5. Engage the transmission neutral lock.
6. Lower all attachments to the ground.
7. Stop the engine.
8. Turn the engine start switch key to OFF position for 4 seconds.
9. Turn the engine start switch key back to ON position.
10. Press the hydraulic shutoff switch to the ON position.
11. Operate all hydraulic controls through all positions in order to relieve hydraulic pressure. Repeat this step until all hydraulic pressure is released.
12. Move the hydraulic control levers to the HOLD position.
13. Turn the engine start switch to OFF position and remove the key.

i01821998

Welding on Machines and Engines with Electronic Controls

SMCS Code: 1000; 7000

Proper welding procedures are necessary in order to avoid damage to the electronic controls and to the bearings. The following steps should be followed in order to weld on a machine or an engine with electronic controls.

1. Turn off the engine.
2. Turn the battery disconnect switch to the OFF position. If there is no battery disconnect switch, remove the negative battery cable at the battery.
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

NOTICE
Do NOT use electrical components (ECM or sensors) or electronic component grounding points for grounding the welder.

4. Protect any wiring harnesses from the debris which is created from welding. Protect any wiring harnesses from the splatter which is created from welding.
5. Use standard welding procedures in order to weld the materials together.

i03623811

Lift Cylinder Brace - Connect and Disconnect

SMCS Code: 7507

Single Tilt Machines

1. Empty the bucket.
2. Raise the loader lift arms.

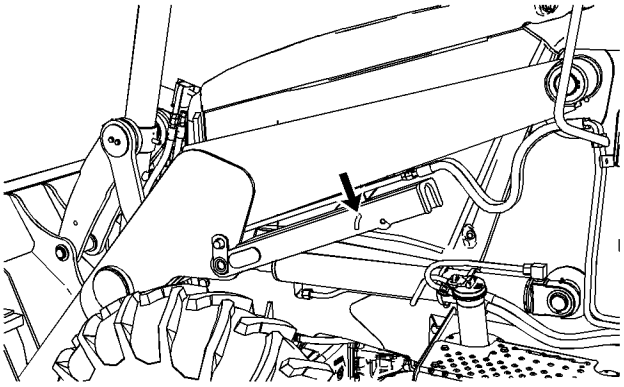


Illustration 242 g01256755

3. Remove the pin that secures the lift cylinder brace to the loader lift arm. Allow the lift cylinder brace to contact the lift cylinder rod.
4. Push the pin through the lower holes on the lift cylinder brace and install the cotter pin.
5. Slowly lower the loader arms until the lift cylinder brace contacts the top of the lift cylinder.
6. Stop the engine.

Parallel Lift Machines

1. Empty the bucket.

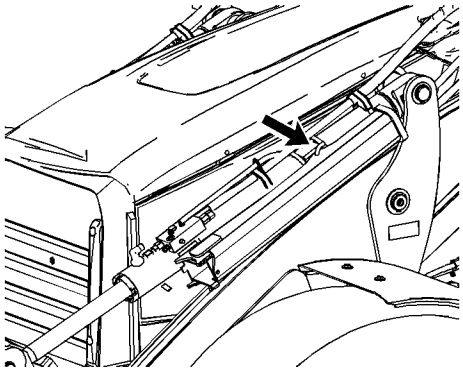


Illustration 243 g01960195

2. Remove the pin that secures the lift cylinder brace to the loader lift arm and remove the brace from the storage position.
3. Raise the loader lift arms.

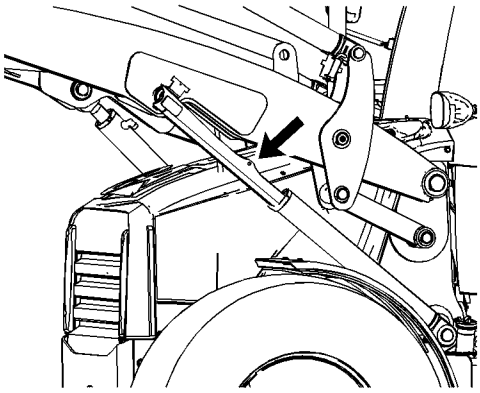


Illustration 244 g01970801

4. Position the lift cylinder brace **over** the lift cylinder rod with the flat end against the cylinder end.
5. Push the pin through the holes of the brace and install the cotter pin.
6. Slowly lower the loader arms until the lift cylinder brace contacts the top of the lift cylinder and the bosses on the loader arm.
7. Stop the engine.

Equal Size Tire (EST) Machines

1. Empty the bucket.

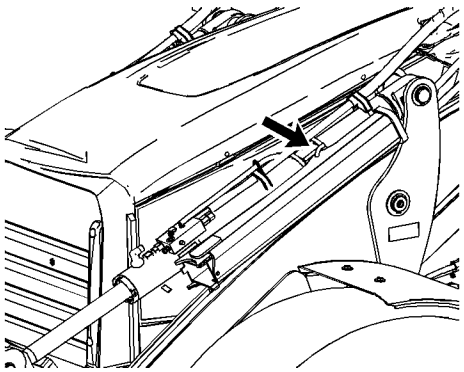


Illustration 245 g01960195

2. Remove the pin that secures the lift cylinder brace to the loader lift arm and remove the brace from the storage position.

3. Raise the loader lift arms.

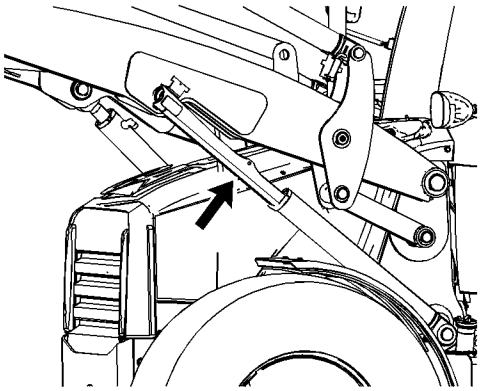


Illustration 246 g01960324

4. Position the lift cylinder brace **under** the lift cylinder rod with the flat end against the cylinder end.

5. Push the pin through the holes of the brace and install the cotter pin.

6. Slowly lower the loader arms until the lift cylinder brace contacts the top of the lift cylinder and the bosses on the loader arm.

7. Stop the engine.

i07748535

Maintenance Interval Schedule

SMCS Code: 7000

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

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

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

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

Note: If Cat HYDO Advanced hydraulic oils are used, the hydraulic oil change interval is extended to 3000 hours. S·O·S services may extend the oil change even longer. Consult your Cat dealer for details.

When Required

“ Battery - Recycle” 185
“ Battery or Battery Cable - Inspect/Replace”. . . . 185
“ Bucket Cutting Edges - Inspect/Replace” 187
“ Bucket Tips - Inspect/Replace”. 187
“ Cab Interior - Clean” 189
“ Engine Air Filter Primary Element - Replace” . . 195
“ Engine Air Filter Secondary Element - Replace”. 196
“ Engine Air Precleaner - Clean”. 197
“ Engine Compartment - Clean” 197
“ Film (Product Identification) - Clean” 202
“ Fuel System - Prime”. 205
“ Fuses - Replace” 209
“ Oil Filter - Inspect” 217
“ Radiator Core - Clean” 221
“ Window Washer Reservoir - Fill” 230
“ Window Wipers - Inspect/Replace” 230
“ Windows - Clean”. 230

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“ Backhoe Boom, Stick, Bucket, and Cylinder Bearings - Lubricate” 183
“ Backup Alarm - Test” 185
“ Brake Reservoir Oil Level - Check” 185
“ Braking System - Test” 186
“ Cooling System Coolant Level - Check”. 190
“ Engine Air Filter Service Indicator - Inspect” . . . 196
“ Engine Oil Level - Check” 199
“ Fuel System Water Separator - Drain” 208
“ Hydraulic System Oil Level - Check ” 214
“ Indicators and Gauges - Test”. 215
“ Loader Bucket, Cylinder, and Linkage Bearings - Lubricate” 215
“ Quick Coupler - Clean” 219
“ Quick Coupler - Lubricate” 220
“ Seat Belt - Inspect” 222
“ Swing Frame and Cylinder Bearings - Lubricate/ Inspect”. 225
“ Tire Inflation - Check” 226
“ Transmission Oil Level - Check”. 228
“ Wheel Nut Torque - Check”. 230

Every 50 Service Hours

“ Quick Coupler - Lubricate” 219

Every 50 Service Hours or Weekly

“ Cab Filter (Fresh Air) - Clean/Inspect/ Replace” 188
“ Cab Filter (Recirculation) - Clean/Inspect/ Replace” 188
“ Fuel Tank Water and Sediment - Drain” 209

“ Parking Brake - Check/Adjust” 218
“ Stabilizer - Clean/Inspect” 224

Every 250 Service Hours

“ Engine Oil Sample - Obtain” 199

Every 250 Service Hours or Monthly

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“ Belts - Inspect/Adjust/Replace” 185
“ Differential Oil Level (Front) - Check” 193
“ Differential Oil Level (Rear) - Check” 194
“ Extendable Stick Pads - Inspect/Adjust” 201
“ Final Drive Oil Level (Front) - Check” 204
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Initial 500 Hours (for New Systems, Refilled Systems, and Converted Systems)

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Every 500 Service Hours or 3 Months

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“ Fuel System Secondary Filter - Replace” 208
“ Hydraulic Oil Sample - Obtain” 211
“ Hydraulic System Oil Filter - Replace” 213
“ Transmission Oil Filter - Replace” 228
“ Transmission Oil Sample - Obtain” 229

Every 1000 Service Hours

“ Engine Valve Lash - Check” 200

Every 1000 Service Hours or 6 Months

“ Differential Oil (Front) - Change” 193
“ Differential Oil (Rear) - Change” 193
“ Final Drive Oil (Front) - Change” 203
“ Final Drive Oil (Rear) - Change” 203
“ Rollover Protective Structure (ROPS) - Inspect” 222
“ Transmission Magnetic Screen - Clean” 226
“ Transmission Oil - Change” 226
“ Wheel Bearings (Front) - Lubricate” 229

Every 2000 Service Hours

“ Engine Crankcase Breather - Replace” 198

Every 2000 Service Hours or 1 Year

“ Hydraulic System Oil - Change” 212
“ Receiver Dryer (Refrigerant) - Replace” 222

Every Year

“Cooling System Coolant Sample (Level 2) - Obtain” 191

Every 3000 Service Hours or 2 Years

“ Cooling System Water Temperature Regulator - Clean/Replace” 192

Every 3 Years

“ Seat Belt - Replace” 223

i02436158

Axle Breathers - Clean/ Replace

SMCS Code: 3278-070-BRE; 3278-510-BRE

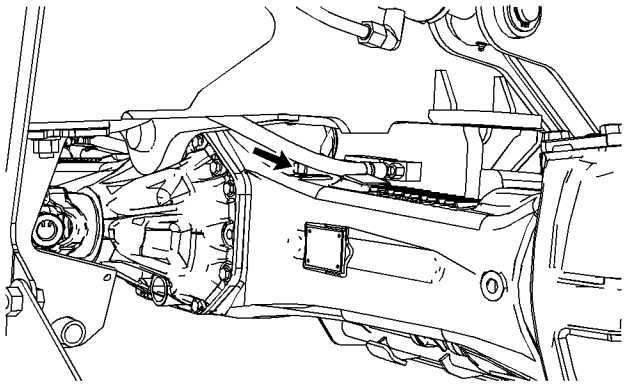

Illustration 247 g01216797

The front axle breather is located on the top right side of the differential housing.

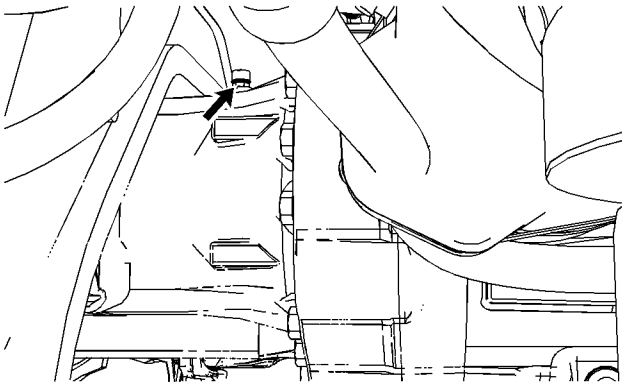

Illustration 248 g01216798

The rear axle breather is located to the left of the differential housing.

1. Clean the area around the breathers. Remove the breather from the front axle.

2. Wash the breather in clean nonflammable solvent. Wipe the breather dry and check the breather for damage.

3. Install the clean breather back into the axle. Replace the breather if the breather is damaged.

Note: Make sure that the slot in the breather is parallel to the axle housing.

i03612024

Backhoe Boom, Stick, Bucket, and Cylinder Bearings - Lubricate

SMCS Code: 6501-086-BD; 6502-086-BD; 6503-086-BD; 6511-086-BD; 6512-086-BD; 6533-086-BD; 7562-086-BD

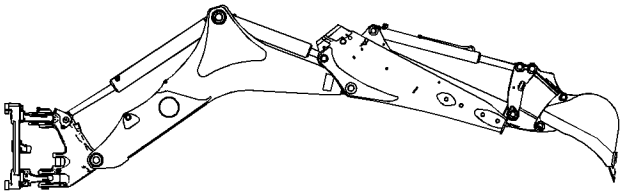

Illustration 249 g01936699

Position the backhoe into the service position that is shown above. Lower the bucket to the ground. Relieve the hydraulic pressure and remove the load from the greased joints.

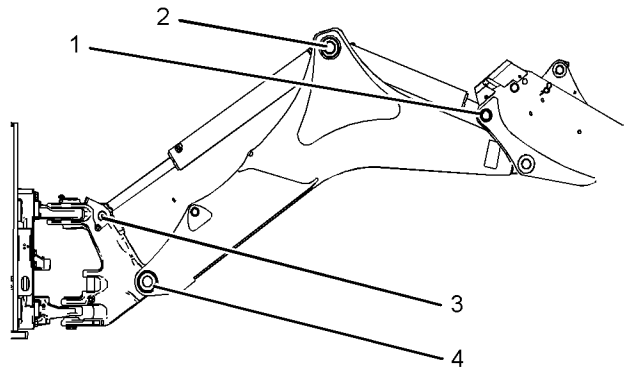

Illustration 250 g01936701

Apply lubricant to the grease fitting (1) for the rod end of the stick cylinder.

Apply lubricant to the grease fitting (2) for the head end of the boom cylinder and the head end of the stick cylinder.

Apply lubricant to the grease fitting (3) for the rod end of the boom cylinder.

Apply lubricant to the grease fitting (4) for the boom pivot. There is one grease fitting on each side of the machine.

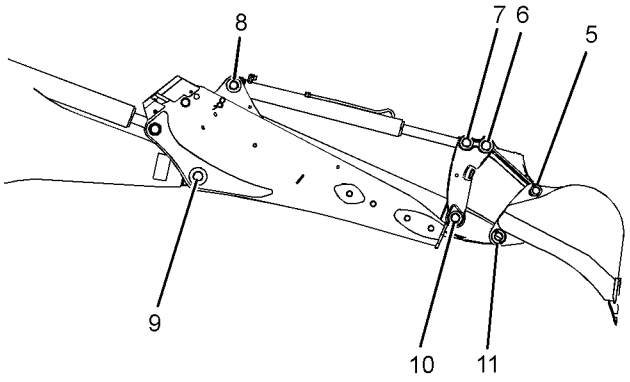

Illustration 251 g01936702

Apply lubricant to the grease fitting (5) for the bucket pivot pin.

Apply lubricant to the grease fitting (6) for the link.

Apply lubricant to the grease fitting (7) for the rod end of the bucket cylinder.

Apply lubricant to the grease fitting (8) for the head end of the bucket cylinder.

Apply lubricant to the grease fitting (9) for the pivot pin for the stick.

Apply lubricant to the grease fitting (10) for the pivot pin. There is one grease fitting on each side of the machine.

Apply lubricant to the grease fitting (11) for the pivot pin.

There is a total of 17 grease fittings.

i02915316

Backhoe Control Console Latch - Lubricate

SMCS Code: 5258-086-LX

S/N: JBA1–Up

S/N: NBA1–Up

S/N: EME1–Up

S/N: SJL1–Up

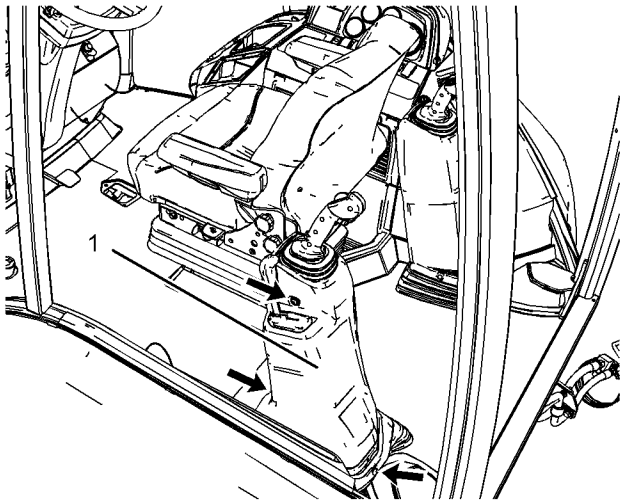

Illustration 252 g01450004

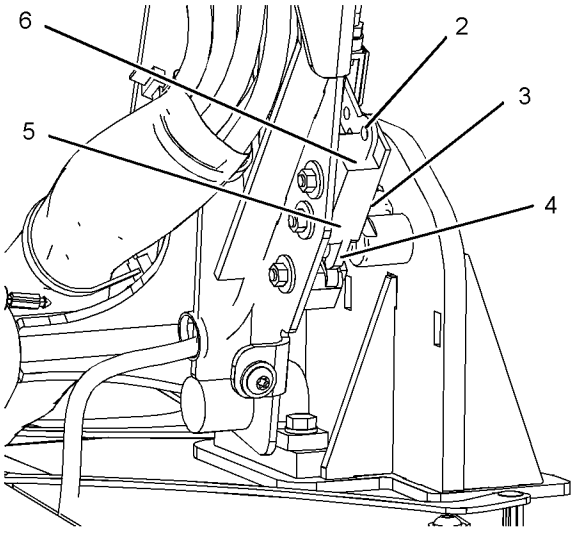

Illustration 253 g01450005

1. Remove the three bolts and remove the console (1).

2. Place the latch in the closed position.

3. Apply 242 - 6990 Lubricant onto the following:

- Pivot for the release lever (2)
- Axle for the catch (3)
- Rotor axle (4)
- Notches and catch for the rotor (5)

- Contact for the release lever (6)

4. Cycle the latch two times.

5. Repeat steps 1 through 4.

i00080741

Backup Alarm - Test

SMCS Code: 7406-081

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

Apply the service brake. Move the transmission direction control lever to REVERSE position.

The backup alarm should immediately sound. The backup alarm will continue to sound until the transmission direction control lever is moved to the NEUTRAL position or to the FORWARD position.

i07746330

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

i03114985

Battery or Battery Cable - Inspect/Replace

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

1. Turn the engine start switch to the OFF position. Turn all switches to the OFF position.

2. Disconnect the negative battery cable from the frame.

Note: Do not allow the disconnected battery cable to contact the frame of the machine.

3. Disconnect the negative battery cable at the battery.

4. Inspect the battery terminals and inspect the battery cables. Keep the terminals clean and keep the terminals coated with petroleum jelly.

5. Perform the necessary repairs. Replace the cable or the battery, as needed.

6. Connect the negative battery cable at the battery.

7. Connect the battery cable to the frame of the machine.

8. Install the engine start switch key.

Note: When you inspect the battery also inspect the battery box vents for debris.

i05537768

Belts - Inspect/Adjust/Replace

SMCS Code: 1357-040; 1357-025; 1357-510

If new belts are installed, check belt adjustment after 30 minutes of operation. For multiple belt drive applications, always replace the belts in matched sets. Replacing only one belt of a matched set will cause the new belt to carry more load because the older belts are stretched. The additional load on the new belt could cause the new belt to break.

1. Open the hood.

2. Inspect the condition of the serpentine belt. If the belt is worn or frayed, replace the belt.

Note: The serpentine belt is the self-adjusting type. There is no adjustment of the tension.

3. Close the hood.

i03565009

Brake Reservoir Oil Level - Check

SMCS Code: 4291-535

S/N: SEF1–Up

S/N: DPH1–Up

S/N: MAW1–Up

Open the engine access door on the top of the machine.

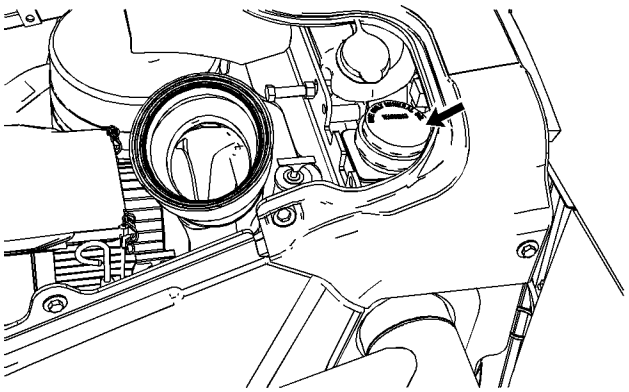

Illustration 254 g01203566

⚠ WARNING

The use of a pressure washer on the engine compartment can force water into the brake reservoir. Water that enters the brake reservoir can result in a reduced braking ability. A reduced braking ability could result in personal injury or death. Do not use a pressure washer to wash the brake reservoir.

Maintain the oil level between the “MIN” mark and “MAX” mark on the brake reservoir. Add oil, if necessary.

Note: Ensure that the filler cap is clean before removing the cap from the reservoir.

Note: Do not clean the area near the brake reservoir with high pressure water. If water entered the reservoir contact your local Caterpillar dealer.

i04002955

Braking System - Test

SMCS Code: 4251-081; 4267-081

Service Brake Holding Ability Test

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

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

The following tests are used to determine if the service brake is functional. These tests are not intended to measure the maximum brake holding effort. The brake holding effort that is required to sustain a machine at a specific engine rpm varies depending on the machine. The variations are the differences in the engine setting, in the power train efficiency, and in the brake holding ability, etc.

1. Start the engine. Raise the bucket slightly.
2. Apply the service brake. Release the parking brake.
3. Move the transmission control lever to THIRD SPEED FORWARD.
4. Gradually increase the engine speed to high idle. The machine should not move.

⚠ WARNING

If the machine begins to move, reduce the engine speed immediately and engage the parking brake.

5. Reduce the engine speed to low idle. Move the transmission to NEUTRAL. Engage the parking brake. Lower the bucket to the ground. Stop the engine.

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

Secondary Brake Holding Ability Test

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

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

The following tests are used to determine if the parking brake is functional. These tests are not intended to measure the maximum brake holding effort. The brake holding effort that is required to sustain a machine at a specific engine rpm varies depending on the machine. The variations are the differences in the engine setting, in the power train efficiency, and in the brake holding ability, etc.

1. Start the engine. Raise the bucket slightly.
2. Engage the parking brake.
3. Move the transmission control lever to THIRD SPEED FORWARD, then to NEUTRAL, then back to THIRD SPEED FORWARD.

Note: The parking brake indicator light should come on and the parking brake alarm should sound.

4. Gradually increase the engine speed to high idle. The machine should not move.

⚠ WARNING

If the machine begins to move, reduce the engine speed immediately and apply the service brake pedal.

5. Reduce the engine speed. Move the transmission to NEUTRAL. Lower the bucket to the ground. Stop the engine.

NOTICE
If the machine moved while testing the brakes, contact your Caterpillar dealer.

Have the dealer inspect and, if necessary, repair the parking brakes before returning the machine to operation.

i01920076

Bucket Cutting Edges - Inspect/Replace

SMCS Code: 6801-040; 6801-510

⚠ WARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket cutting edges.

1. Raise the bucket. Place a block under the bucket.

2. Lower the bucket to the blocking.

Do not block up the bucket too high. Block up the bucket so that the bucket is high enough to remove the cutting edges and the end bits.

3. Remove the bolts. Remove the cutting edge and the end bits.

4. Clean the contact surfaces.

5. Use the opposite side of the cutting edge, if this side is not worn.

6. Install a new cutting edge, if both edges are worn.

7. Install the bolts. Tighten the bolts to the specified torque.

8. Raise the bucket. Remove the blocks.

9. Lower the bucket to the ground.

10. After a few hours of operation, check the bolts for proper torque.

i03115420

Bucket Tips - Inspect/Replace

SMCS Code: 6805-040; 6805-510

⚠ WARNING

Personal injury or death can result from the bucket falling.

Block the bucket before changing bucket tips.

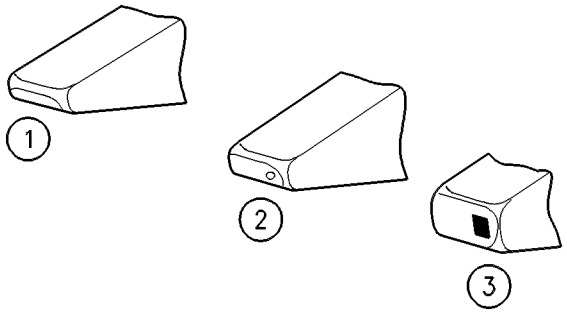

Illustration 255 g00101352

(1) This tip is usable. (2) This tip should be replaced. (3) This tip has been overworn.

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

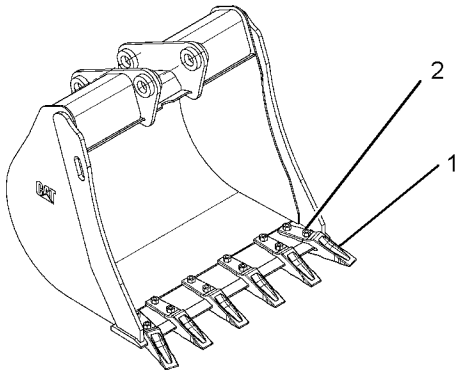

Illustration 256 g01593258

1. Remove the two nuts from the bolt (2).

2. Remove the bolt (2).

3. Install the new bucket tip.

4. Replace the bolt (2) and replace the two nuts.

5. Repeat steps 1 through 4 for all bucket tips.

i02502577

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

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

NOTICE
Do not clean the elements by bumping or tapping them.

Inspect the elements after cleaning. Do not use an element with damaged pleats, gaskets or seals.

When cleaning with pressure air, use 205 kPa (30 psi) maximum to prevent element damage by too much air pressure.

When cleaning with pressure water, use 280 kPa (40 psi) maximum to prevent element damage.

Clean the filter element weekly, but clean the filter element daily when there is a reduction of air circulation.

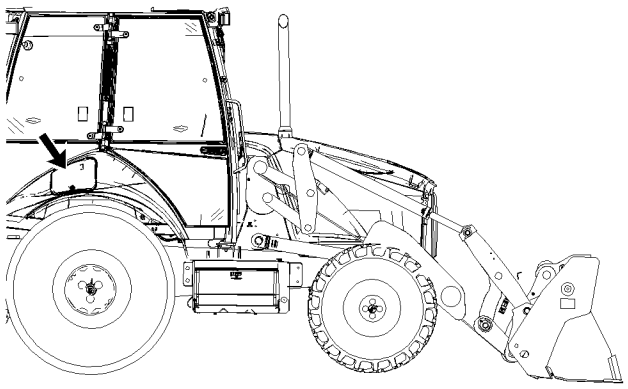

Illustration 257 g01257728

1. Open the filter cover that is located on the right fender.

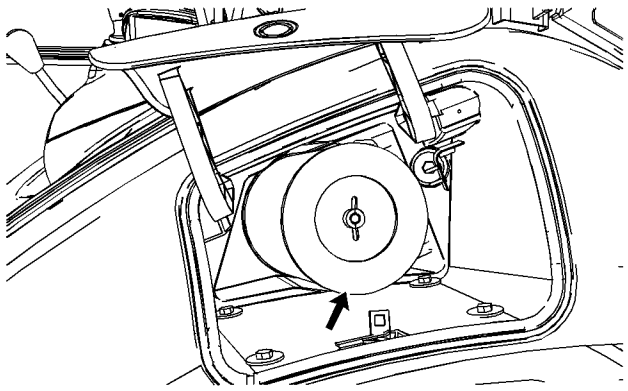

Illustration 258 g01200815

2. Remove the filter element.

3. Clean the filter element with compressed air or pressure water. Direct the air or the water along the pleats of the element. You can also wash the element with clean water and nonsudsing household detergent.

4. Rinse the filter element thoroughly with clear water.

5. Allow the filter element to air dry. Inspect the element for damage. If the filter element is damaged, replace the filter element.

6. Install the filter element.

7. Install the filter cover.

i03608100

Cab Filter (Recirculation) - Clean/Inspect/Replace

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

The recirculation filter is located to the left of the operator's seat.

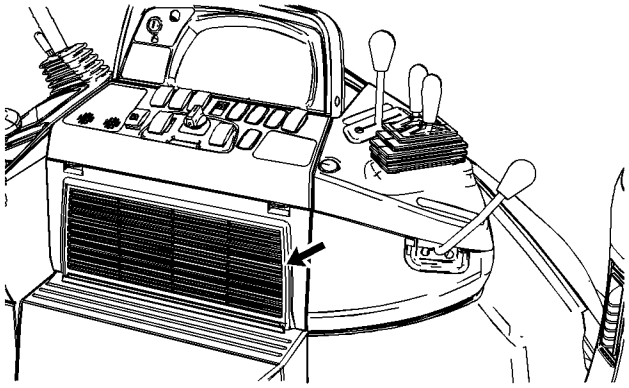

Illustration 259 g01933496

1. Remove the cover that is over the recirculation filter. Remove the filter element.

2. The filter element can be cleaned by using compressed air. Use a maximum air pressure of 205 kPa (30 psi). Direct the air from the clean side to the dirty side.

3. Look through the filter toward a bright light. Inspect the element for damage. Inspect the gaskets for damage. Replace damaged filters.

4. Install the filter element.

Note: Clean the filters more often in dusty conditions.

i01404606

Cab Interior - Clean

SMCS Code: 7301-070

1. Use high pressure air in order to clean the entire cab and the main electrical box.
2. Wash off any remaining dirt and debris. Use caution and minimize the water around electrical connections and the cab roof.
3. Scrub the floormat, the instrument panel, the windows, and the mirrors. Wipe the cab dry.

i03624684

Cooling System Coolant (ELC) - Change

SMCS Code: 1353-044-CLT; 1395-044

⚠ 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.

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 is shipped with Extended Life Coolant. Extended Life Coolant is recommended for use.

For information about the addition of Extender to your cooling system, see the Operation and Maintenance Manual, “Cooling System Coolant Extender (ELC) - Add” or consult your Caterpillar dealer.

Flushing the Extended Life Coolant From the Cooling System

Some engines utilize Extended Life Coolant. See the Operation and Maintenance Manual, “Maintenance Interval Schedule” in order to determine the service interval. If a Extended Life Coolant was previously used, flush the cooling system with clean water. No other cleaning agents are required.

Flushing a Standard Coolant From the Cooling System

If you change the coolant of a machine to Extended Life Coolant from another type of coolant, use a Caterpillar cleaning agent to flush the cooling system. After you drain the cooling system, thoroughly flush the cooling system with clean water. **All of the cleaning agent must be removed from the cooling system.**

Changing the Coolant

⚠ 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.

NOTICE
Do not change the coolant until you read and understand the material in the Cooling System Specifications section.

Drain the coolant whenever the coolant is dirty or whenever foaming is observed.

1. Install the lift cylinder brace. Refer to Operation and Maintenance Manual, “Lift Cylinder Brace - Connect and Disconnect” for more information.
2. Open the engine access door on the top of the machine.

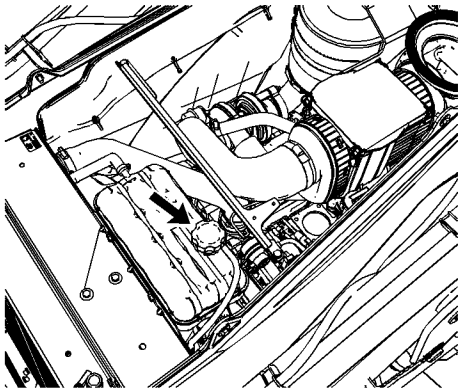

Illustration 260 g01593154

3. Slowly loosen the radiator cap in order to relieve system pressure. Remove the radiator cap slowly.

4. Open the drain valve. The drain valve is located on the bottom of the radiator on the right side of the machine. Face the end of the hose into a suitable container.

5. Close the drain valve. Fill the system with a solution which consists of clean water and of cooling system cleaner. The concentration of the cooling system cleaner in the solution should be between 6 percent and 10 percent.

6. Start the engine. Run the engine for 90 minutes. Stop the engine. Drain the cleaning solution into a suitable container.

7. While the engine is stopped, flush the system with water. Flush the system until the draining water is transparent.

8. Close the drain valve.

9. Add the coolant solution. See the following topics:

- Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” “Cooling System Specifications”
- Operation and Maintenance Manual, “Capacities (Refill)”

Note: If you are using Caterpillar antifreeze, do not add the supplemental coolant additive at this time and/or change the element at this time.

10. Start the engine. Run the engine without the radiator cap until the thermostat opens and the coolant level stabilizes.

11. Maintain the coolant level within 13 mm (0.5 inch) of the bottom of the filler pipe.

12. Install the radiator cap. Lower the tab on the radiator cap. Replace the radiator cap if the gasket is damaged.

13. Stop the engine.

14. Replace the access panel. Close the access door.

i03114922

Cooling System Coolant Level - Check

SMCS Code: 1350-535-FLV

⚠ WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

Open the hood.

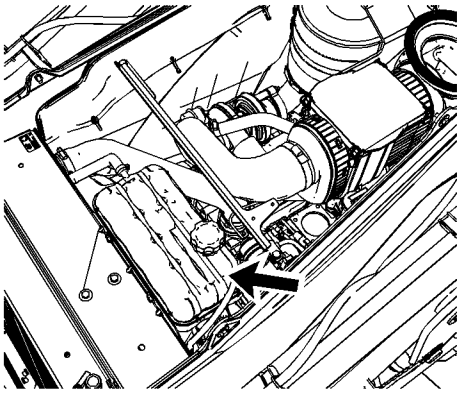

Illustration 261 g01609239

1. The coolant tank is located on the left side of the machine. Move the backhoe to the transport position and lower the loader bucket to the ground.

2. Turn off the engine. Wait about five minutes before you check the cooling system coolant level.

3. Maintain the coolant level between the “MIN” mark and the “MAX” mark.

i03114926

Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1350-008; 1395-008

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: Level 1 results may indicate a need for Level 2 Analysis.

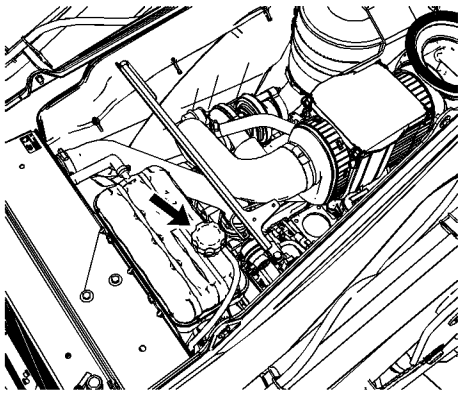

Illustration 262 g01593154

Obtain the sample of the coolant as close as possible to the recommended sampling interval. In order to receive the full effect of S·O·S analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

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

Submit the sample for Level 1 analysis.

For additional information about coolant analysis, see Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i03114941

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1350-008; 1395-008

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.

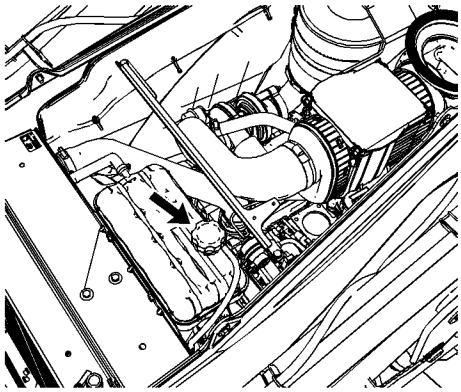

Illustration 263 g01593154

Obtain the sample of the coolant as close as possible to the recommended sampling interval. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Refer to Operation and Maintenance Manual, “Cooling System Coolant Sample (Level 1) - Obtain” for the guidelines for proper sampling of the coolant.

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 Caterpillar dealer.

i03608240

Cooling System Water Temperature Regulator - Clean/Replace

SMCS Code: 1355-070; 1355-510; 1393-070

Replace the thermostat on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system. Failure to replace the engine's thermostat on a regularly scheduled basis could cause severe engine damage.

The thermostat should be replaced after the cooling system has been cleaned. Replace the thermostat while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

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

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

1. Install the lift cylinder brace. Refer to Operation and Maintenance Manual, “Lift Cylinder Brace - Connect and Disconnect” for more information.
2. Open the hood.

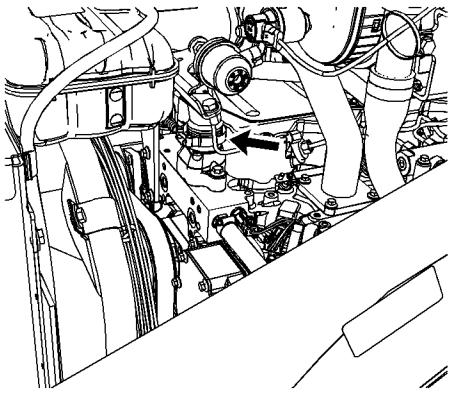

Illustration 264 g01480912

3. Loosen the hose clamp and remove the hose from the thermostat housing assembly.
4. Remove the bolts from the thermostat housing assembly. Remove the thermostat housing assembly.
5. Remove the gasket, the thermostat, and the seal from the thermostat housing assembly.
6. Install a new seal in the thermostat housing assembly. Install a new thermostat and a new gasket. Install the thermostat housing assembly on the engine cylinder head.

   The thermostats can be reused under the following conditions.

   - The thermostat is tested and the thermostat meets test specifications.
   - The thermostat is not damaged.
   - The thermostat does not have excessive buildup of deposits.

7. Install the hose. Tighten the hose clamp.
8. Refill the cooling system. Refer to Special Publication, “Cooling System Specifications” and Operation and Maintenance Manual, “Capacities (Refill)”.

i02567860

Differential Oil (Front) - Change

SMCS Code: 3258-044-OC

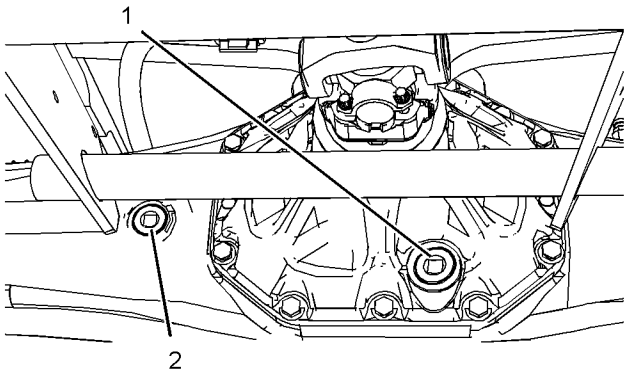

Illustration 265 g01286266

1. Remove oil drain plug (1) and drain the oil into a suitable container.

2. The drain plug is magnetic. Check the plug for metal.

3. Clean the drain plug and install the drain plug.

4. Remove oil level/fill plug (2).

5. Add oil until the oil is level with the threads for the filler plug. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)” for oil.

6. Clean the filler plug and install the filler plug.

i02419881

Differential Oil (Rear) - Change

SMCS Code: 3258-044-OC

The oil change interval should be decreased to 500 hours if more than 50% of the service hours is used for roading and loading.

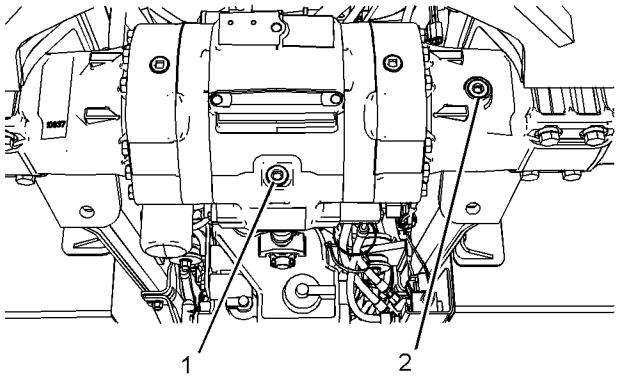

Illustration 266 g01209215

1. Remove oil drain plug (1) and drain the oil into a suitable container.

2. Clean the drain plug and install the drain plug.

3. Remove oil level/fill plug (2).

4. Add oil until the oil is level with the threads for the filler plug. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)” for oil.

5. Clean the filler plug and install the filler plug.

i02363607

Differential Oil Level (Front) - Check

SMCS Code: 3258-535-OC

The oil level/fill plug is located near the middle of the front axle.

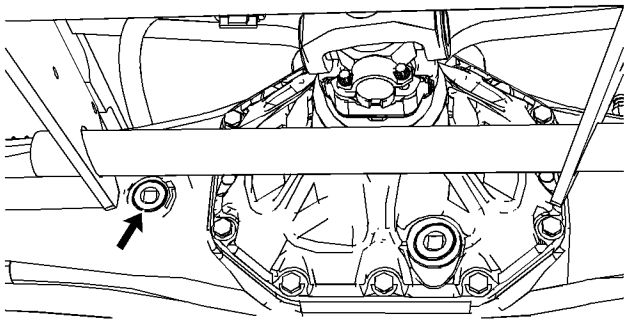

Illustration 267 g01180551

1. Remove the oil level/fill plug in order to check the oil.

2. The oil level should be at the bottom of the plug threads.

3. Clean the oil level/fill plug and install the oil level/fill plug.

i02419882

Differential Oil Level (Rear) - Check

SMCS Code: 3258-044-OC

The oil level/fill plug is located near the middle of the rear axle.

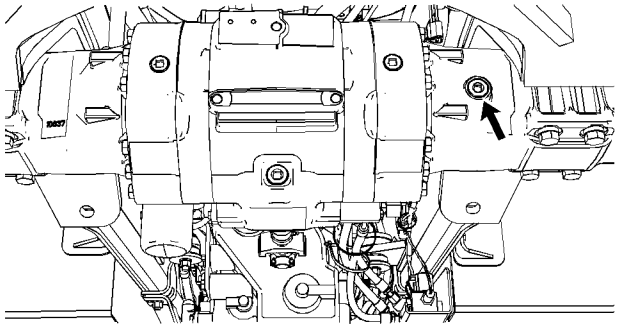

Illustration 268 g01209217

Filler plug on standard rear differential

1. Remove the oil plug in order to check the oil.

2. The oil level should be at the bottom of the plug threads.

3. Clean the oil plug and install the oil plug.

i02363692

Differential Oil Sample (Front) - Obtain

SMCS Code: 3258-008; 7542-008

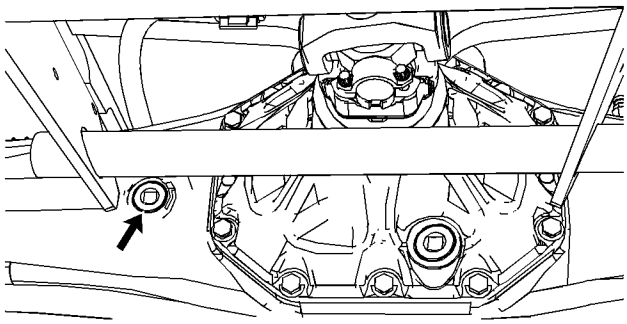

Illustration 269 g01180551

Obtain the oil sample according to the Operation and Maintenance Manual, “Maintenance Interval Schedule”.

Refer to the Operation and Maintenance Manual, “General Hazard Information” for information that pertains to containing fluid spillage.

Refer to the Special Publication, SEBU6250, “S·O·S Oil Analysis” for more information.

i02436482

Differential Oil Sample (Rear) - Obtain

SMCS Code: 3258-008; 7542-008

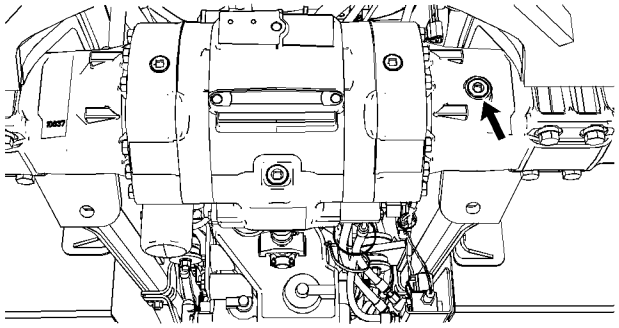

Illustration 270 g01209217

Obtain the oil sample according to the Operation and Maintenance Manual, “Maintenance Interval Schedule”.

Refer to the Operation and Maintenance Manual, “General Hazard Information” for information that pertains to containing fluid spillage.

Refer to the Special Publication, SEBU6250, “S·O·S Oil Analysis” for more information.

i02363714

Drive Shaft Spline - Lubricate

SMCS Code: 3253-086-SN

Access the grease fittings for the drive shaft spline from the bottom of the machine.

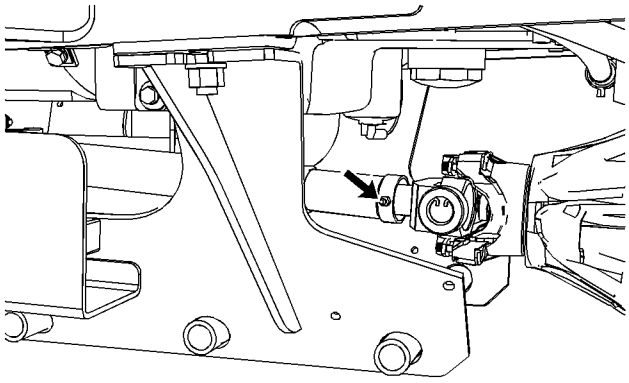

Illustration 271 g01180607

Apply lubricant to the grease fitting for the drive shaft spline of the front drive shaft.

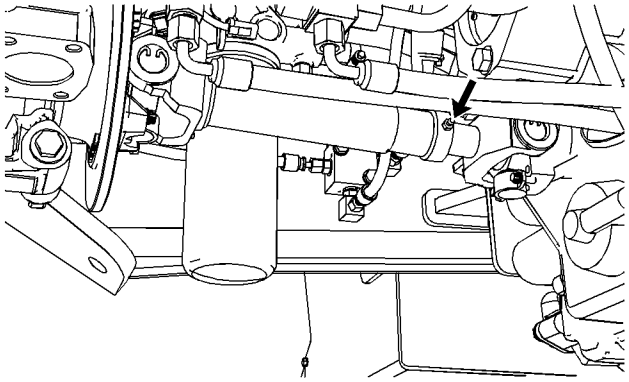

Illustration 272 g01180608

Apply lubricant to the grease fitting for the drive shaft spline of the rear drive shaft.

i05952893

Engine Air Filter Primary Element - Replace

SMCS Code: 1054-510; 1054-510-PY

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

1. Open the engine access door on the top of the machine.

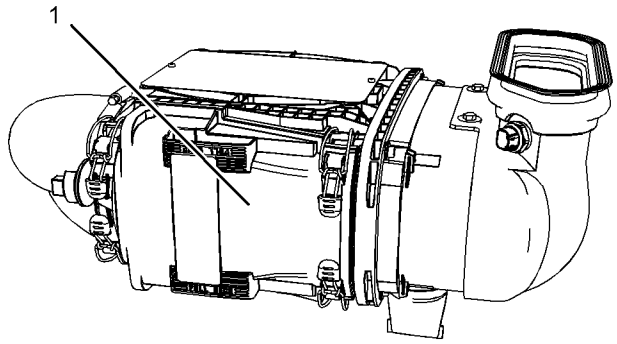

Illustration 273 g02792578

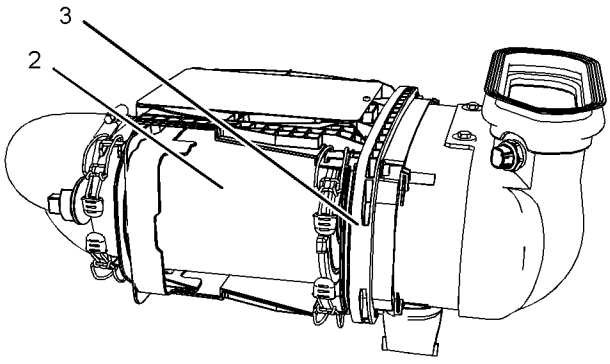

Illustration 274 g02792579

2. Remove cover (1) for the air filter housing .

3. Remove primary filter element (2) from the air filter housing.

4. Slide the primary filter element out of the filter base (3).

5. Clean the inside of the air filter housing.

6. Slide a new primary air filter element into the filter base. Install the new filter into the air filter housing. Install the cover for the air filter housing.

7. Reset the engine air filter service indicator.

8. Close the access door.

If the yellow piston in the indicator moves into the red zone after starting the engine or the exhaust smoke is still black after installation of a clean primary filter element, install a new primary filter element. If the piston remains in the red zone, replace the secondary element.

i01991300

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

NOTICE
Always replace the secondary filter element. Never attempt to reuse it by cleaning.

The secondary filter element should be replaced at the time the primary element is serviced for the third time. The secondary filter element should be replaced everytime the primary element is replaced.

The secondary filter element should also be replaced if the yellow piston in the filter element indicator enters the red zone after installation of a clean primary element, or if the exhaust smoke is still black.

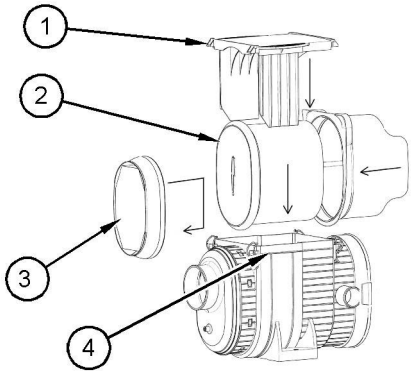

Illustration 275 g01031378

1. Remove the air cleaner housing cover (1).

2. Remove the primary filter element (2) from the air cleaner housing.

3. Clean the inside of the air cleaner housing (4) with a wet rag before the secondary filter element (3) is removed.

4. Inspect the gasket between the air inlet pipe and the air cleaner housing. Replace the gasket if the gasket is damaged.

5. Install a new secondary element.

6. Install the primary element and the air cleaner housing cover. Fasten the clips in order to secure the air cleaner housing cover.

7. Reset the filter element indicator.

8. Close the engine access door.

i03108404

Engine Air Filter Service Indicator - Inspect

SMCS Code: 7452-040

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

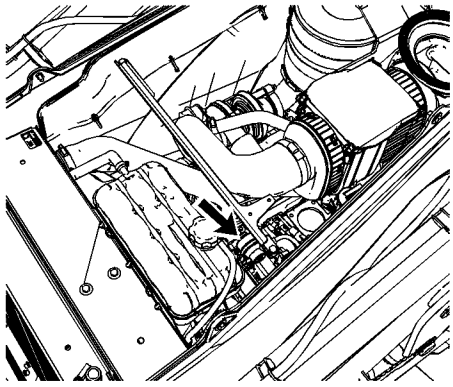

Illustration 276 g01588094

The filter service indicator is located under the engine access door in front of the housing for the air filter.

Start the engine. Run the engine at high idle. If the yellow piston in the filter service indicator enters the red zone, service the air cleaner. Stop the engine.

i02939202

Engine Air Precleaner - Clean

SMCS Code: 1055-070

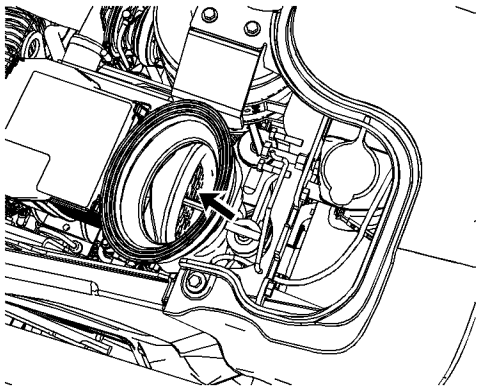

Illustration 277 g01456653

1. Inspect the engine air precleaner for dirt and for trash.

2. Remove the precleaner in order to clean the precleaner.

3. Use pressurized air to clean the tubes. Put the tubes on a flat surface. Direct the pressurized air into the tubes from the top. This loosens up the dirt.

a. Loosen hard deposits of dust on the precleaner body by soaking in an appropriate cleaning agent. Then, wash the precleaner body with a spray of water.

b. Blow dry the precleaner body completely.

4. Install the precleaner.

5. Install T-bolt (1). Hand tighten the T-bolt only.

6. Close the left engine access door.

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

i01404793

Engine Compartment - Clean

SMCS Code: 1000-070-CPA

NOTICE
Before spraying the engine compartment with high pressure water turn off the engine and allow the engine to cool. Do not spray water directly on a hot fuel injection pump or damage may occur.

Use a commercially available engine degreaser in order to clean the engine compartment. Use caution and minimize the water around bearings and electrical connections.

i03033423

Engine Crankcase Breather - Replace

SMCS Code: 1317-510

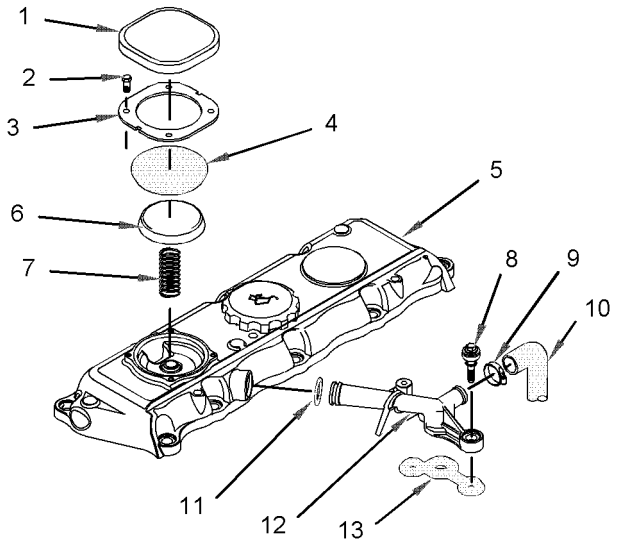

Illustration 278 g01149576

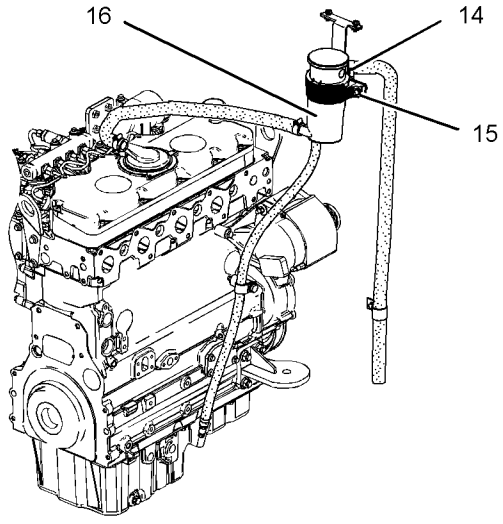

Illustration 279 g01536673

1. Loosen the clamp (9) and remove the hose (10) from the connector (12).

2. Remove the setscrews (8) and remove the connector (12) from the cylinder head. Remove the gasket (13). Remove the O-ring seal (11) from the connector. Discard the gasket (13) and the O-ring seal (11).

3. Remove the cover (1) from the valve mechanism cover (5).

WARNING

Personal injury can result from parts and/or covers under spring pressure.

Spring force will be released when covers are removed.

Be prepared to hold spring loaded covers as the bolts are loosened.

4. Remove the screws (2). Remove the plate (3).

5. Remove the diaphragm (4) and the cap (6). Remove the spring (7). Discard diaphragm (4).

WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

6. Install the spring (7), the cap (6), and a new diaphragm (4).

7. Install the plate (3). Install the screws (2).

8. Install the cover (1) on the valve mechanism cover.

9. Install a new O-ring seal (11) on the connector (12). Install a new gasket (13) on the connector (12). Position the connector in the valve mechanism cover.

10. Install the setscrews (8). Tighten the setscrews to a torque of 9 N·m (80 lb in).

11. Install the hose (10) on the connector (12). Tighten the clamp (9) to a torque of 5 N·m (44 lb in).

12. Loosen the clamp (14).

13. Remove the screw (15). Replace canister (16).

14. Install screw (15) and install clamp (14).

i02939213

Engine Oil Level - Check

SMCS Code: 1326-535

NOTICE
Do not overfill the crankcase. Engine damage can result.

1. Open the engine access door on the top of the machine.

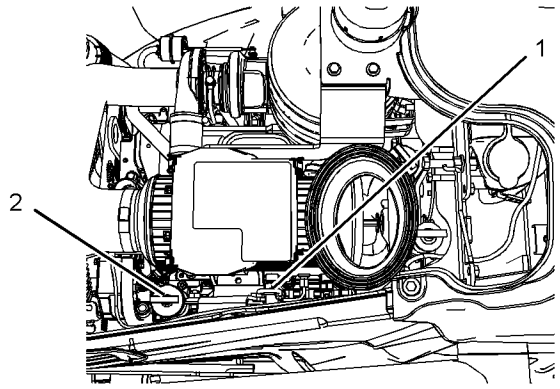

Illustration 280 g01457436

2. While the engine is stopped, maintain the oil level between the “ADD” mark and the “FULL” mark on the engine oil dipstick (1).

3. If necessary, remove the oil filler cap (2) and add oil.

4. Clean the oil filler cap and install the oil filler cap.

5. Close the engine access door.

i04407638

Engine Oil Sample - Obtain

SMCS Code: 1348-008; 7542-008

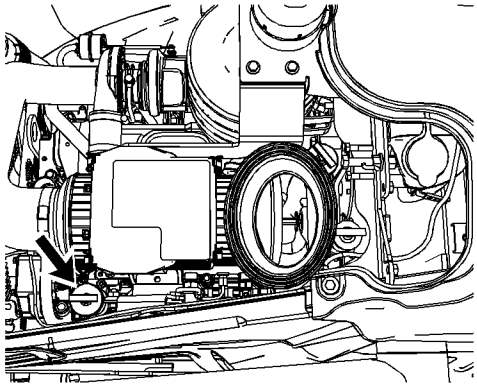

Illustration 281 g01457444

Remove the oil filler cap in order to obtain a sample of the engine oil. 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, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of the engine oil.

i03617462

Engine Oil and Filter - Change

SMCS Code: 1318-044-OC; 1318-510-FI

Note: If the sulfur content in the fuel is greater than 1.5% by weight, use an oil with a TBN of 30. With the high sulfur fuel, change the oil and the filter element after every 250 hours or after every month. If the API category is CF-4 or less, change the oil and change the filter element after every 250 hours or after every month. Otherwise, change the oil and the filter element after every 500 hours or after every three months.

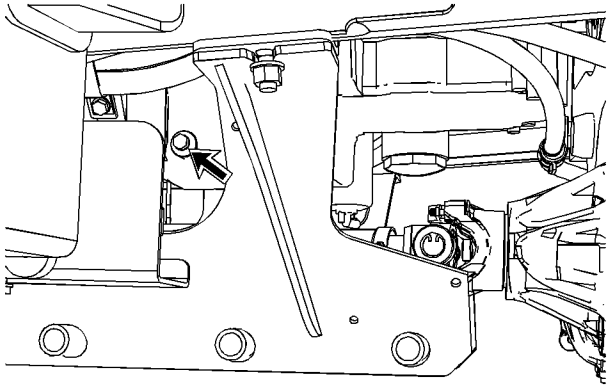

Illustration 282 g01180759

1. Remove the crankcase drain plug and drain the oil into a suitable container. Clean the crankcase drain plug and replace the crankcase drain plug.

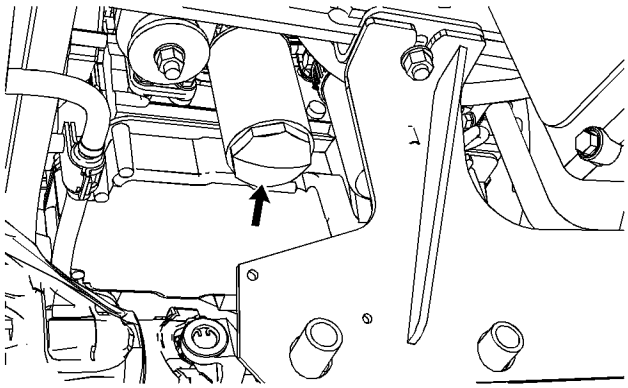

Illustration 283 g01180774

2. Remove the filter element with a strap type wrench.

3. Clean the filter mounting base with a clean cloth. Make sure that the old filter gasket has been removed.

4. Apply a thin film of clean engine oil to the sealing surface of the new filter element.

5. Install the new oil filter by hand.

Instructions for the installation of the filter are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

6. Open the engine access door on the top of the machine.

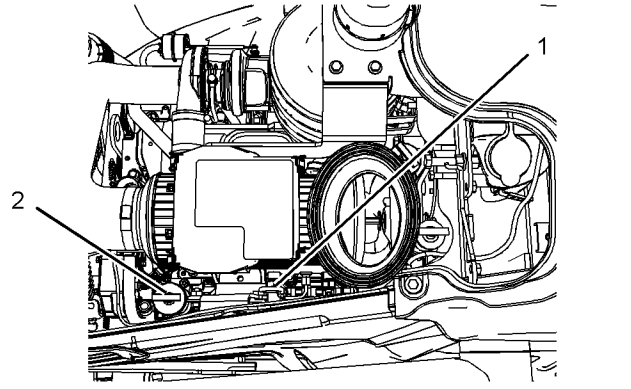

Illustration 284 g01457436

7. Remove the oil filler cap (2). Fill the crankcase with new oil. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”. Clean the oil filler cap and install the oil filler cap.

8. Start the engine and allow the oil to warm. Check for leaks.

9. Stop the engine and allow the oil to drain back into the oil pan. Maintain the oil level in the crosshatched region of the engine oil dipstick (1). Add oil, if necessary.

10. Replace the engine access panel and close the engine access door.

i01897328

Engine Valve Lash - Check

SMCS Code: 1102; 1102-082; 1102-535; 1209; 1209-082

Note: A qualified service person should perform the valve lash check and/or the valve lash adjustment. Special tools and training are required.

Refer to your machine's Service Manual for complete instructions.

i06889606

Extendable Stick Pads - Inspect/Adjust

SMCS Code: 6533-025-JP; 6533-040-JP

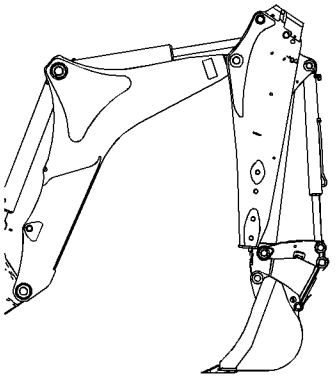

Illustration 285 g01960113

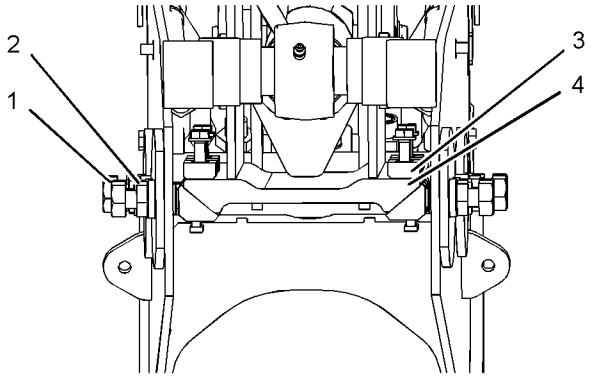

Illustration 286 g01960120

1. Park the machine on level ground as shown in Illustration 285 .

2. Ensure that the wear pads and sliding surfaces of the extendable stick are free from debris.

3. Check for clearance on wear pad (3). If the gap between wear pad (3) and the surface (4) is more than 0.8 mm (0.032 inch) the wear pad requires an adjustment.

4. Loosen locknuts (2). There are four locknuts on each side of the stick. Tighten the set screws (1) to 30 N·m (22 lb ft), make sure that the inner stick is kept centered with the outer stick. Tighten locknuts (2) to 80 N·m (59 lb ft). Make sure that the extendable stick is able to move to freely and make sure that the extendable stick extends properly. There are four set screws on each side of the stick.

Note: Ensure that the extendable stick is centered with the outer stick for proper adjustment.

5. Ensure that the extendable stick is able to move freely and make sure that the extendable stick extends properly.

The pads do not normally require any lubrication. If the pads become noisy, a small amount of a silicone-based lubricant may be applied.

Note: Do not apply an excessive amount of grease or silicone-based lubricant. Dirt can be attracted to the lubricant and dirt can cause abrasion to the pad assemblies and wear to the pad assemblies.

i07681009

Film (Product Identification) - Clean

SMCS Code: 7405-070; 7557-070

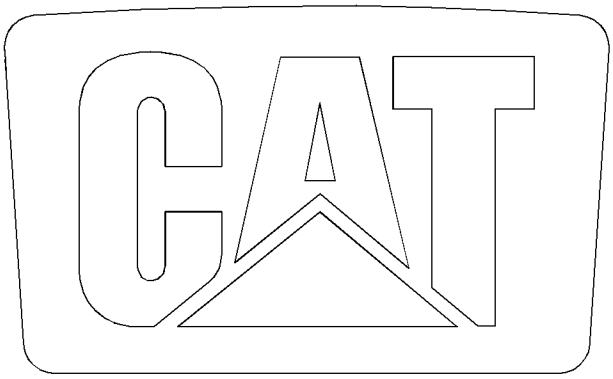

Illustration 287 g02174985

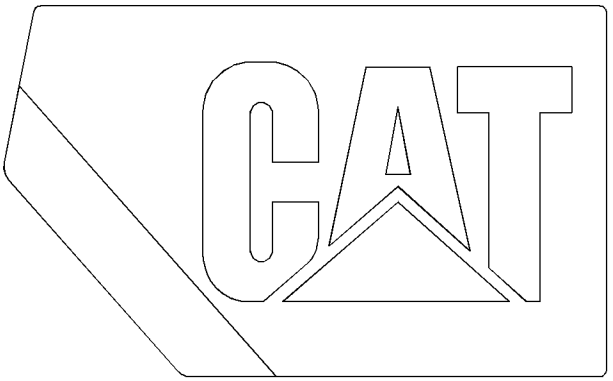

Illustration 288 g02175297

Illustration 289 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.

i02369952

Final Drive Oil (Front) - Change

SMCS Code: 4050-044-OC

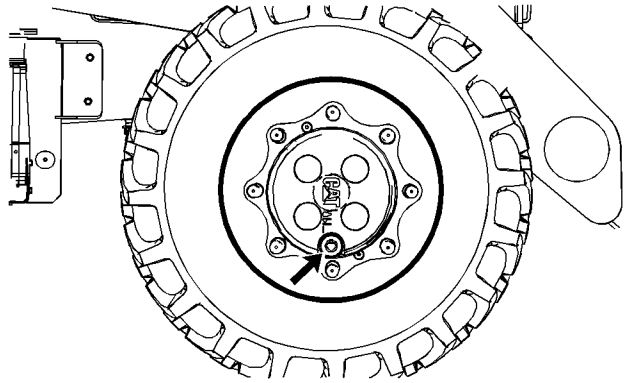

Illustration 290 g01182475

1. Position the oil fill/drain plug at the bottom. Remove the oil fill/drain plug and drain the oil into a suitable container.

2. The plug is magnetic. The plug will attract metal from the oil. Check the plug for an increased amount of metal on the plug. If any abnormal particles are found, consult your Caterpillar dealer.

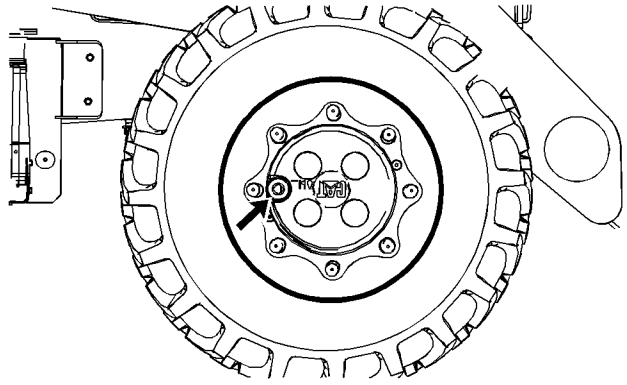

Illustration 291 g01182493

3. Position the plug hole at a horizontal position. Use the line on the final drive as a reference.

4. Add oil until the oil is level with the plug threads. Refer to Operation and Maintenance Manual, “Lubricant Specifications” and Operation and Maintenance Manual, “Capacities (Refill)” for the oil.

5. Clean the plug and install the plug.

6. Repeat the procedure for the other final drive.

i07058981

Final Drive Oil (Rear) - Change

SMCS Code: 4050-044-OC

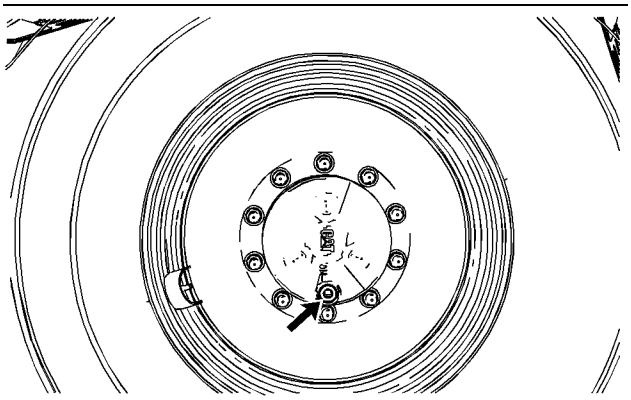

Illustration 292 g01200973

1. Position the oil fill/drain plug at the bottom. Remove the oil fill/drain plug and drain the oil into a suitable container.

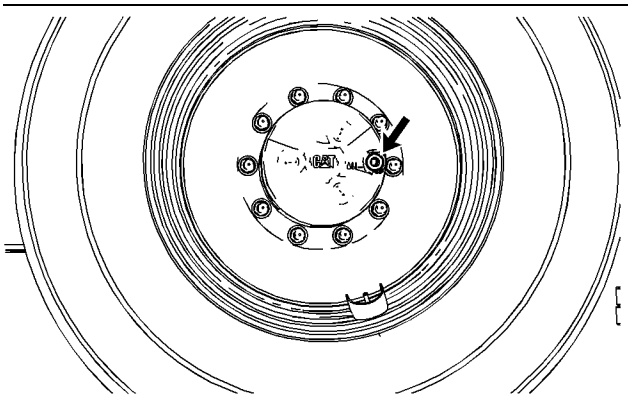

Illustration 293 g01200981

2. Position the plug hole at a horizontal position. Use the line on the final drive as a reference.

3. Add oil until the oil is level with the plug threads. Refer to Operation and Maintenance Manual, “Lubricant Specifications” and Operation and Maintenance Manual, “Capacities (Refill)” for the oil.

4. Clean the plug and install the plug.

5. Repeat the procedure for the other final drive.

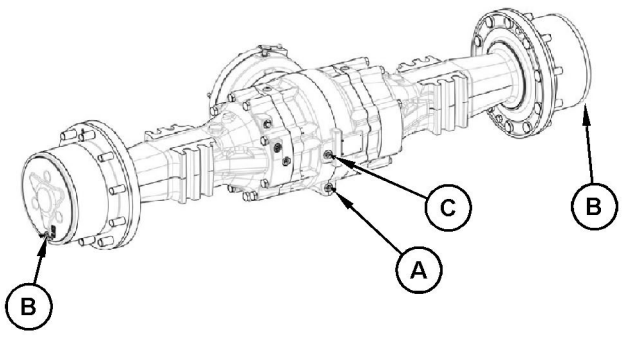

Illustration 294 g06212617

For machines with LBF and LBS prefix only

(A) Oil drain hole
(B) Oil drain hole
(C) Oil filler hole/oil level check hole

Note: For machines with LBF and LBS prefix, There is no need to fill the final drives, there is a communication channel between the differential and final drives. Refer to Illustration 294 . Refer to “Differential Oil (Rear) - Change”

i02370034

Final Drive Oil Level (Front) - Check

SMCS Code: 4050-535-OC

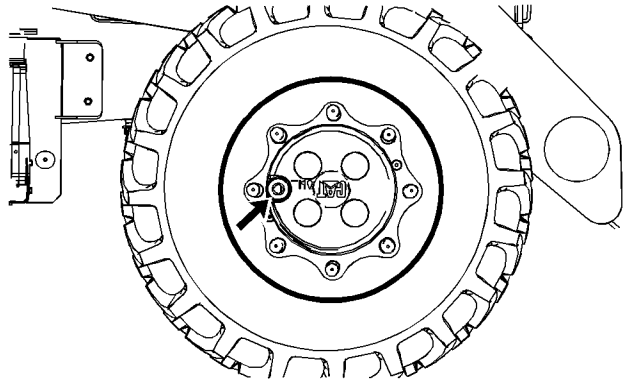

Illustration 295 g01182493

1. Position the oil fill/drain plug at a horizontal position in order to check the oil level.
2. Remove the oil fill/drain plug in order to check the oil level.
3. The oil should be level with the bottom of the plug threads.
4. The plug is magnetic. Check the plug for metal. Clean the plug and install the plug.
5. Repeat the procedure for the other final drive.

i07058969

Final Drive Oil Level (Rear) - Check

SMCS Code: 4050-535-OC

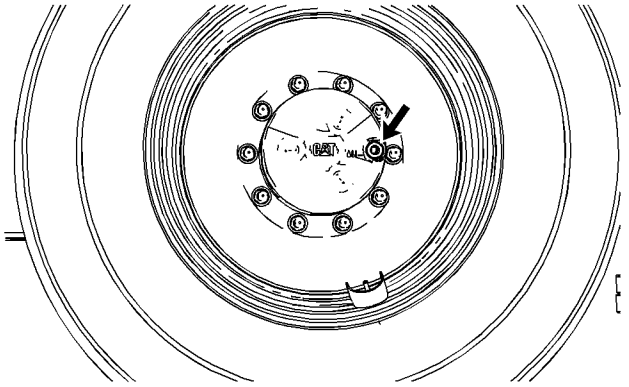

Illustration 296 g01200981

1. Position the oil fill/drain plug at a horizontal position to check the oil level.
2. Remove the oil fill/drain plug to check the oil level.
3. The oil should be level with the bottom of the plug threads.
4. Clean the plug and install the plug.
5. Repeat the procedure for the other final drive.

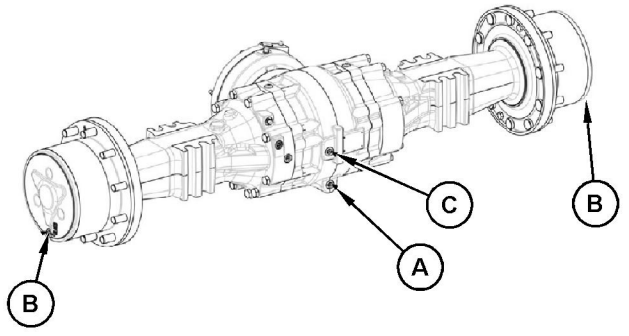

Illustration 297 g06212617

For machines with LBS and LBF prefix only

(A) Oil drain hole
(B) Oil drain hole
(C) Oil filler hole/oil level check hole

Note: For machines with LBS and LBF prefix, Do not check oil level on final drives, the oil check level should be performed only on the differential section. Refer to Illustration 297 .

Refer to “Differential Oil Level (Rear) - Check”

i02370039

Final Drive Oil Sample (Front) - Obtain

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

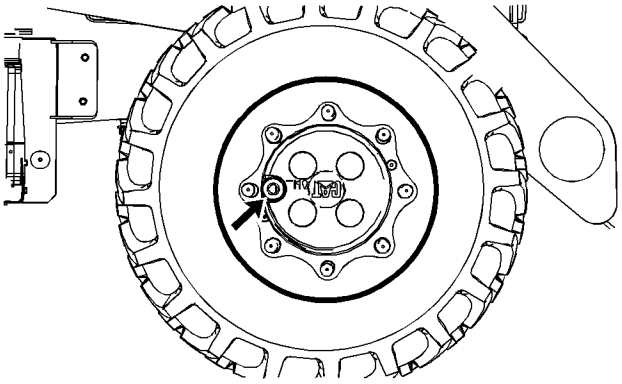

Illustration 298 g01182493

Obtain the oil sample from the fill/drain plug. 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, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of oil.

i02404432

Final Drive Oil Sample (Rear) - Obtain

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

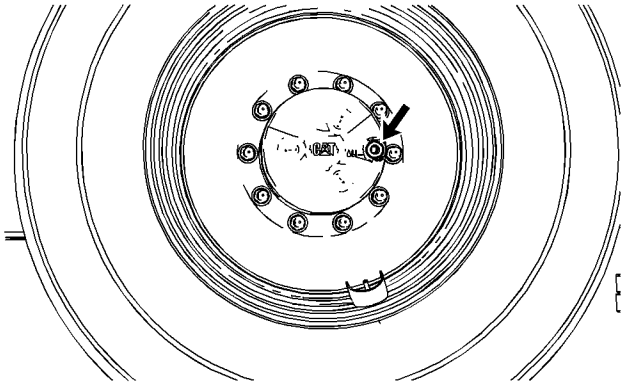

Illustration 299 g01200981

Obtain the oil sample from the fill/drain plug. 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, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of oil.

i06500146

Fuel System - Prime

SMCS Code: 1250-548

If air enters the fuel system, the air must be purged from the fuel system before the engine can be started. Air can enter the fuel system when the following events occur:

- The fuel tank is empty or the fuel tank has been partially drained.
- The low-pressure fuel lines are disconnected.
- A leak exists in the low-pressure fuel system.
- The fuel filter is replaced.
- A new injection pump is installed.

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

NOTICE
Do not crank the engine continuously for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking the engine again.

Engines with Electric Priming Pumps

There are many different types of electric priming pumps. These fuel pumps can be put into two categories. Remotely mounted fuel priming pump and secondary fuel filter mounted priming pump.

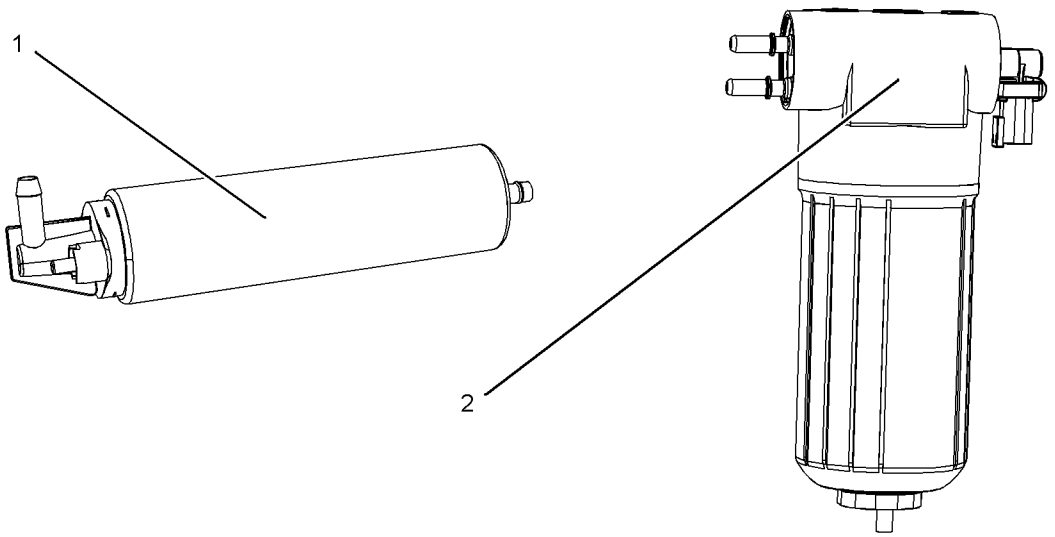

Illustration 300 g03721131

(1) Typical example of a remotely mounted priming pump.
(2) Typical example of a priming pump mounted on a secondary fuel filter.

Priming the Fuel Injection Pump for a Variable Speed Engine

1. Turn the engine start switch to the START position and release. The electric priming pump will begin to prime the system. Allow 180 seconds for the electric priming pump to prime the system.
2. Turn the engine start switch to the OFF position and then start the engine with the throttle in the closed position. Operate the engine at idle with no load for 60 seconds and then shutdown the engine.
3. Wait 30 seconds and start the engine. This procedure will remove any air that could be trapped within the fuel injection pump. Check for leaks in the fuel system.

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

Priming the Fuel Injection Pump for a Constant Speed Engine

1. Turn the engine start switch to the START position and release. The electric priming pump will begin to prime the system. Allow 180 seconds for the electric priming pump to prime the system.
2. Turn the engine start switch to the OFF position and then start the engine. Operate the engine with no load for 60 seconds and then shutdown the engine.
3. Wait 30 seconds and start the engine. This procedure will remove any air that could be trapped within the fuel injection pump. Check for leaks in the fuel system.

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

Engines with Mechanically Operated Priming Pumps

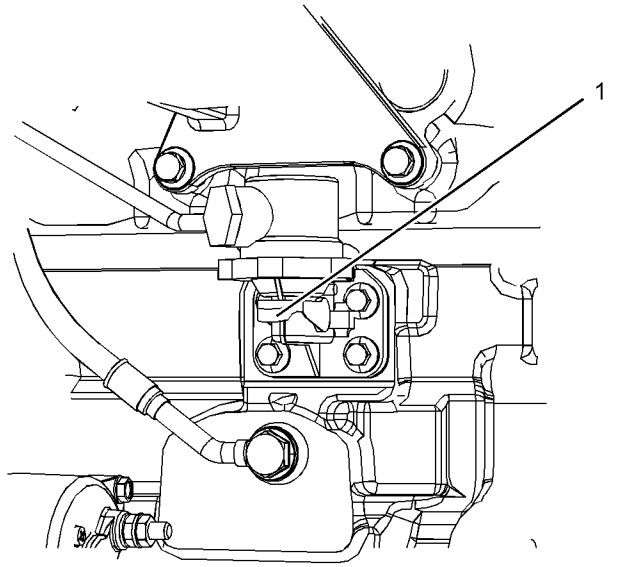

Illustration 301 g03721133

Typical example.

1. Loosen the vent screw on the secondary fuel filter.

Note: The fuel priming pump is mechanically operated by the camshaft. In curtain positions the camshaft lobe can act upon the arm of the fuel priming pump reducing the hand priming pump ability to prime. This condition will be felt as low resistance on the operating arm. Rotating the crankshaft will move the camshaft lobe acting on the priming pump arm. Rotating the camshaft will allow the priming pump full ability to prime.

2. Operate the lever (1) on the priming pump. When fuel free from air can be seen, close the vent screw. Tighten vent screw securely.

3. The fuel injection pump will self vent. Turn the keyswitch to the ON position and operate the lever on the priming pump. Operate the pump by hand for 2 minutes and then stop.

4. Turn the keyswitch to the OFF position and then start the engine. Operate the engine with no load for 60 seconds and then shutdown the engine.

5. Wait 30 seconds and start the engine. This procedure will remove any air that could be trapped within the fuel injection pump. Check for leaks in the fuel system.

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

i02778910

Fuel System Filter and Water Separator - Replace

SMCS Code: 1261-510; 1263-510-FQ

Some fuel supplies may not meet the minimum standard for fuel lubricity. Caterpillar recommends the use of fuels that meet certain minimum specifications. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”.

NOTICE
It is extremely important to drain water from the water separator daily, or every ten hours. It is also extremely important to drain water from the fuel tank weekly, or every 50 hours. Failure to do so could result in damage to the fuel system.

1. Install the lift cylinder brace. Refer to Operation and Maintenance Manual, “Lift Cylinder Brace - Connect and Disconnect” for more information.

2. Remove the access panel from the left side of the machine.

The machine uses a fuel filter with a push and twist collar.

Note: The primary fuel filter is a reverse flow filter. When you service the machine, the proper filter must be used.

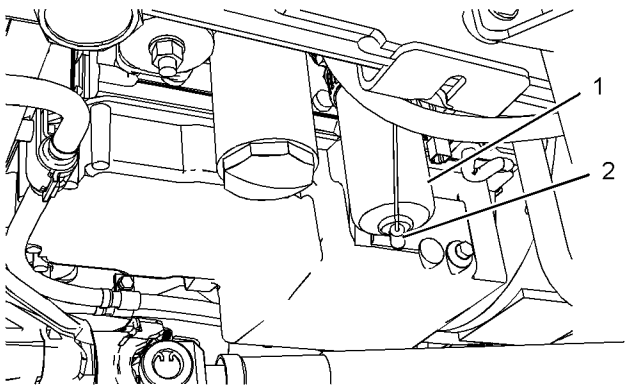

Illustration 302 g01180932

3. Remove sensor (2) and the wire from the bottom of the filter.

4. Remove primary fuel filter (1) that is located next to the engine oil filter under the left side of the machine. Rotate the locking ring counterclockwise in order to remove the filter element. Discard the filter properly.

5. Clean the filter element mounting base. Remove any part of the filter element gasket that remains on the filter element mounting base.

6. Coat the seal of the new filter element with clean diesel fuel.

7. Install the new fuel filter by hand.

Instructions for the installation of the filter are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

8. Install the sensor and the wire into the new filter.

9. Replace the access panel.

i03685320

Fuel System Secondary Filter - Replace
(If Equipped)

SMCS Code: 1261-510-SE

NOTICE
Do not fill the secondary fuel filter with fuel before installing. The fuel would not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: The secondary fuel filter is a standard flow filter. When you service the machine, the proper filter must be used.

Note: Before you replace the secondary fuel filter, the primary fuel filter must be replaced. Refer to the Operation and Maintenance Manual, “Fuel System Filter and Water Separator - Replace”.

1. Park the machine on a level surface. Ensure that the parking brake is fully engaged.

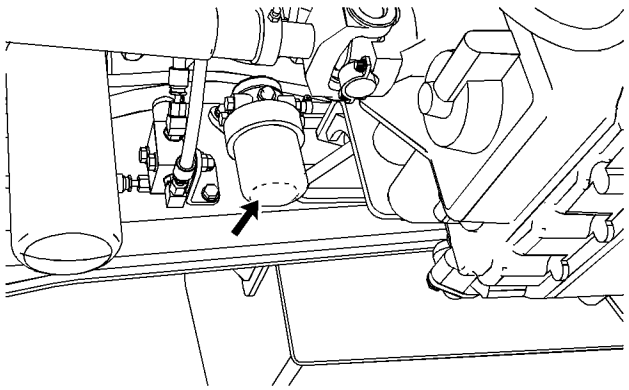

Illustration 303 g01223120

2. Use a strap wrench and remove the secondary fuel filter. Discard the secondary fuel filter properly.

3. Clean the fuel filter base.

4. Coat the seal for the new secondary fuel filter with clean diesel fuel prior to installation.

5. Install the new secondary fuel filter by hand.

Instructions for the installation of the filter are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

6. Start the engine and check for leaks.

i02364753

Fuel System Water Separator - Drain

SMCS Code: 1263-543

Some fuel supplies may not meet the minimum standard for fuel lubricity. Caterpillar recommends the use of fuels that meet certain minimum specifications. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”.

NOTICE
It is extremely important to drain water from the water separator daily, or every ten hours. It is also extremely important to drain water from the fuel tank weekly, or every 50 hours. Failure to do so could result in damage to the fuel system.

The water separator is located by the drain plug for the engine crankcase.

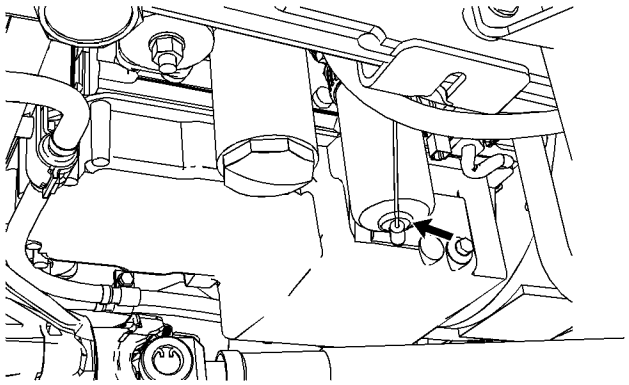

Illustration 304 g01181122

1. Loosen the drain valve on the bottom of the fuel filter. Allow the water and the sediment to drain into a suitable container.

2. Tighten the drain valve.

3. If the engine fails to start, change the fuel filter. If there is a power loss, change the fuel filter.

i02940470

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

Some fuel supplies may not meet the minimum standard for fuel lubricity. Caterpillar recommends the use of fuels that meet certain minimum specifications. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations”.

NOTICE
It is extremely important to drain water from the water separator daily, or every ten hours. It is also extremely important to drain water from the fuel tank weekly, or every 50 hours. Failure to do so could result in damage to the fuel system.

The fuel tank is located on the left side of the machine.

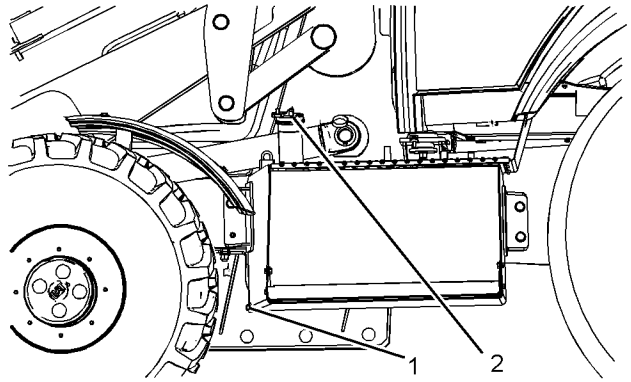

Illustration 305 g01194887

Flip up the tab on the fuel cap. Turn the tab counterclockwise on the fuel cap and slowly remove the fuel tank cap (2) in order to relieve pressure.

The fuel tank drain valve (1) is located on the lower right corner on the front of the fuel tank. Loosen the fuel tank drain plug until the water flows. Allow the water and sediment to drain into a suitable container. Install the fuel tank drain plug. Replace the fuel tank cap.

i03623821

Fuses - Replace

SMCS Code: 1417-510-F6

Fuses protect the electrical system from damage that is caused by overloaded circuits. Replace the fuse if the element separates. If the element of a new fuse separates, check the circuit. Repair the circuit, if necessary.

NOTICE
Replace the fuses with the same type and size only. Otherwise, electrical damage can result.

If it is necessary to replace fuses frequently, an electrical problem may exist. Contact your Caterpillar dealer

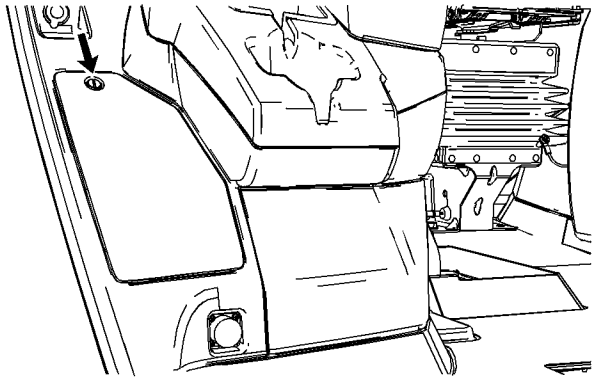

Illustration 306 g01195099

Remove the cover on the front of the right side console in order to access the main fuse panel.

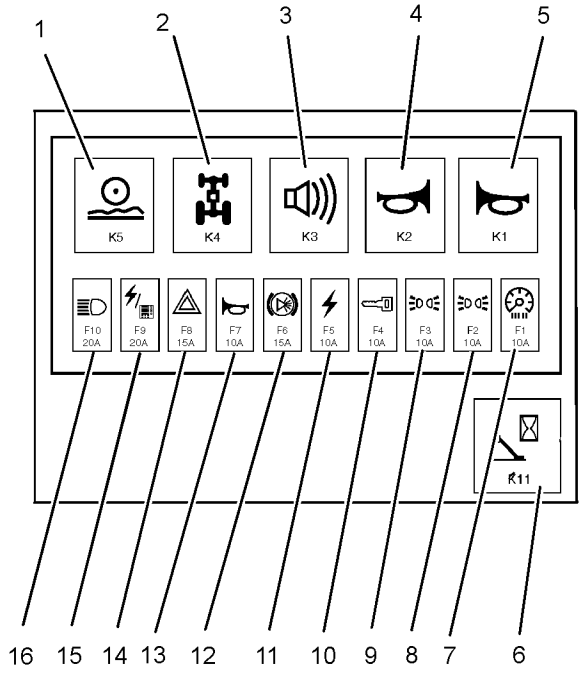

Illustration 307 g01551697

Ride Control (1) – Relay

All Wheel Drive (2) – Relay

Backup Alarm (3) – Relay

Rear Horn (4) – Relay

Front Horn (5) – Relay

Stabilizer Timer (6) – Relay

Dash Panel Lights (7) – 10 Amp

Left Tail Light (8) – 10 Amp

Right Tail Light (9) – 10 Amp

Keyswitch (10) – 10 Amp

Ride Control (11) – 10 Amp

Brake Lights (12) – 10 Amp

Horn (13) – 10 Amp

Hazard Warning (14) – 15 Amp

Machine ECM (15) – 20 Amp

Roading Lights (16) – 20 Amp

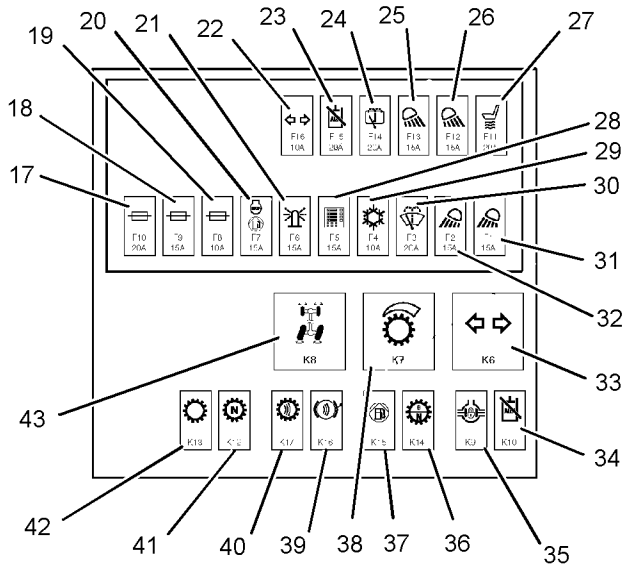

Illustration 308 g01551695

Spare (17) – 20 Amp

Spare (18) – 15 Amp

Spare (19) – 10 Amp

Fuel Pump (20) – 15 Amp

Rotating Beacon (21) – 15 Amp

Turn Signals (22) – 10 Amp

Implement Disable (23) – 20 Amp

Rear Window Wiper and Washer (24) – 20 Amp

Right Rear Floodlight Attachment(25) – 15 Amp

Right Rear Floodlights (26) – 15 Amp

Air Seat (27) – 20 Amp

Monitor (28) – 5 Amp

Air Conditioner (29) – 10 Amp

Front Window Wiper and Washer (30) – 20 Amp

Right Front Floodlights (31) – 15 Amp

Right Front Floodlight Attachment(32) – 15 Amp

Turn Signal (33) – Relay

Hydraulic Lockout (34) – Relay

Differential Lock (35) – Relay

Neutral Start (36) – Relay

Fuel Lift Pump (37) – Relay

Torque Limiter (38) – Relay

Parking Brake Alarm (39) – Relay

Neutral Lock Alarm (40) – Relay

Transmission Neutralizer (41) – Relay

Transmission Control Lever (42) – Relay

All Wheel Drive (43) – Relay

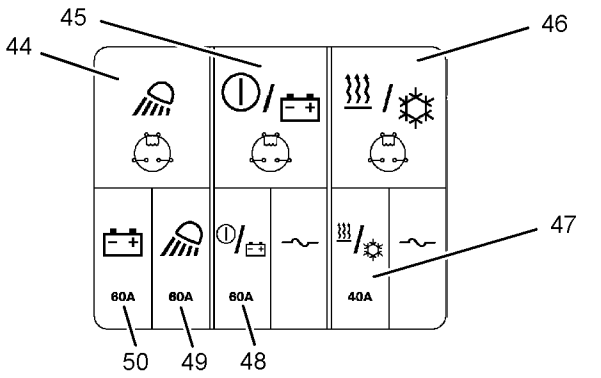

Illustration 309 g01970633

Roading Lights (44) – Relay

Auxiliary Power / Keyswitch Supply (45) – Relay

Heater / Air Conditioner (46) – Relay

Heater / Air Conditioner (47) – 40 Amp

Auxiliary Power / Keyswitch Supply (48) – 60 Amp

Roading Lights (49) – 60 Amp

Fuse Panel Power Supply (50) – 60 Amp

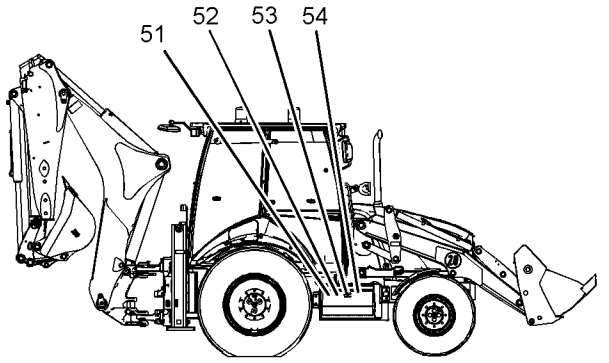

Illustration 310 g01943809

Open the battery box in order to access the fuses and the relays.

Glow Plug Starting Aid (51) – 40 Amp

Starting System (52) – 30 Amp

Glow Plug Starting Aid (53) – Relay

Starting System (54) – Relay

i02502761

Hydraulic Oil Sample - Obtain

SMCS Code: 5050-008; 7542-008

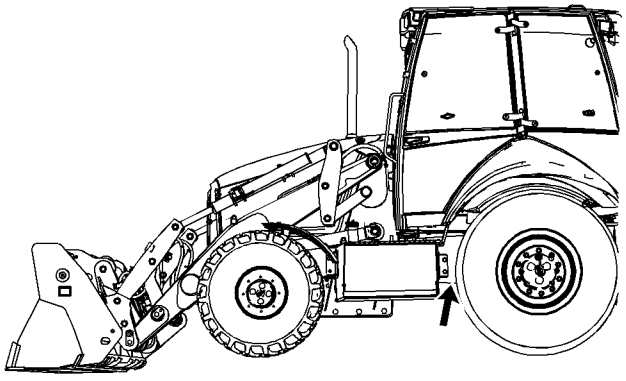

Illustration 311 g01259036

Obtain a sample of the hydraulic oil from the hydraulic quick disconnect fitting that is located on the hydraulic oil filter housing. The hydraulic oil filter housing is located near the rear axle.

1. Turn off the engine.

⚠ WARNING

Taking oil samples under a running machine may cause personal injury or death. The use of a sample tube allows an oil sample to be taken while the person is outside of the tread path of the tires. The sample tube should be attached to the sample port when the machine is not running. The oil sample should then be taken only when the following conditions exist:

- **The machine transmission is in NEUTRAL.**
- **The parking brake is applied.**
- **The swing lock pin is engaged.**
- **All implements are lowered to the ground.**
- **The hydraulic lockout switch (if equipped) is applied.**

2. Attach a hose with a female quick disconnect fitting to the hydraulic quick disconnect fitting.

Note: Ensure that all personnel are clear of the machine before starting the engine.

3. Turn the engine start switch in order to start the engine.

4. Use the hose in order to obtain a sample of the hydraulic oil.

Note: Allow oil to pass through the hose for 10 seconds before obtaining the sample in order to ensure that no contaminants are in the oil sample.

5. Turn off the engine.

6. Remove the hose that was used to obtain the oil sample.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to a sample of the hydraulic oil. For additional information about taking an oil sample, refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample”.

i03063680

Hydraulic System Oil - Change

SMCS Code: 5095-044

Note: The normal hydraulic oil change interval is at every 2000 Service Hours or 1 Year. By performing S·O·S oil analysis, the hydraulic oil change interval may be extended to 4000 Service Hours or 2 Years. S·O·S oil analysis must be performed at every 500 Service Hours or 3 Months in order to extend the hydraulic oil change interval. The results from the S·O·S oil analysis will determine if the hydraulic oil change interval may be extended. If S·O·S oil analysis is not available, the hydraulic oil change interval must remain at every 2000 Service Hours or 1 Year. Refer to the Operation and Maintenance Manual, “S·O·S Information”.

Note: Cat HYDO Advanced 10 has a 50% increase in the standard oil drain interval for machine hydraulic systems (3000 hours versus 2000 hours) over second and third choice oils - when following the maintenance interval schedule for oil filter changes and for oil sampling that is stated in the Operation and Maintenance Manual for your particular machine. 6000 hour oil drain intervals are possible when using S·O·S Services oil analysis. Contact your Cat dealer for details.

Operate the machine for a few minutes in order to warm the hydraulic system oil.

The machine should be level . Lower the bucket to the ground and apply slight downward pressure. Engage the parking brake and stop the engine.

The hydraulic tank filler cap is located under the access door on the top of the engine compartment.

1. Open the engine access door on the top of the machine.

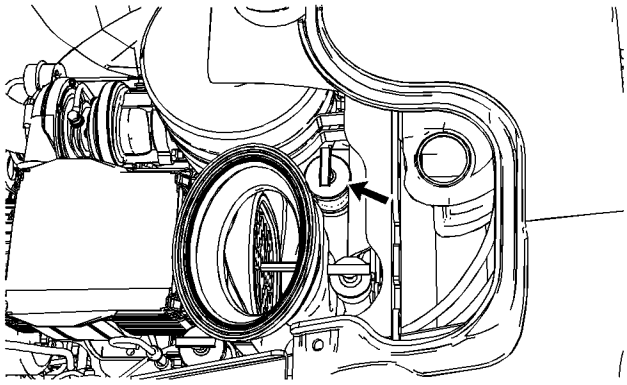

Illustration 312 g01181113

2. Remove the hydraulic tank filler cap.

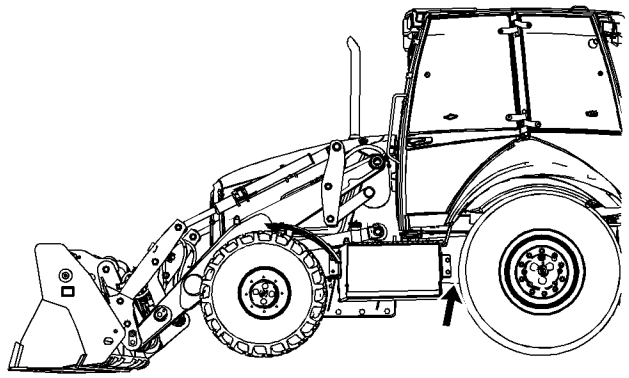

Illustration 313 g01259036

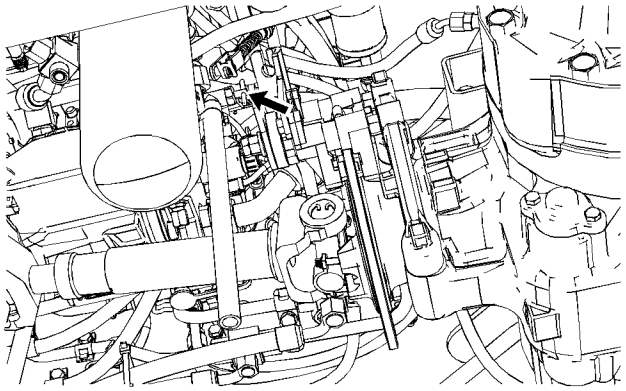

Illustration 314 g01360845

3. Open the drain valve for the hydraulic system. Allow the oil to drain into a suitable container. Close the drain valve.

4. Change the hydraulic system filter. Refer to Operation and Maintenance Manual, “Hydraulic System Oil Filter - Change”.

5. Inspect the hydraulic tank breather that is located on a hose from the overflow container. Replace the breather, if necessary.

6. Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

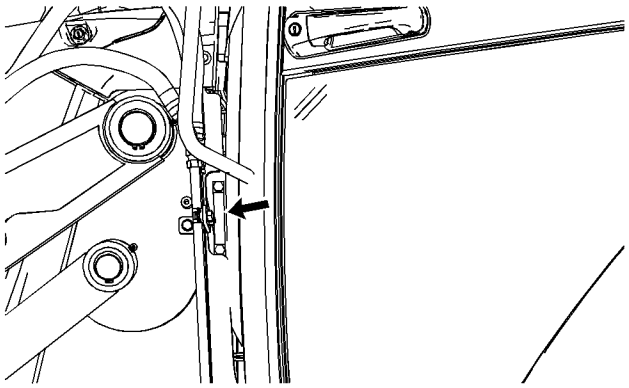

Illustration 315 g01181904

7. Maintain the hydraulic oil level in the sight gauge between the “MIN” mark and the “MAX” mark.

Check the hydraulic oil level with the loader on the ground and with the backhoe in the transport position.

Note: The oil must be free of bubbles. If bubbles are present in the oil, air is entering the hydraulic system. Inspect the suction hoses and hose clamps.

8. Inspect the gasket on the hydraulic tank filler cap for damage. Replace the gasket, if necessary.

9. Install the hydraulic tank filler cap.

10. Close the access door.

i03480268

Hydraulic System Oil Filter - Replace

SMCS Code: 5068-510

1. Open the engine access door on the top of the machine.

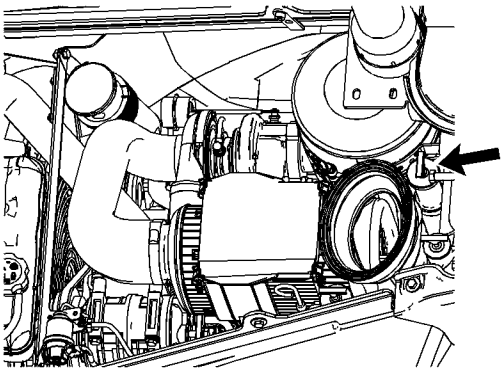

Illustration 316 g01818893

2. Remove the hydraulic tank filler cap that is located under the access panel on the top of the engine compartment.

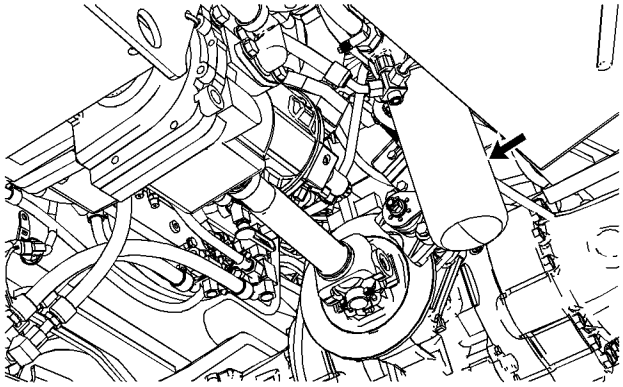

Illustration 317 g01210154

Note: The hydraulic filter is located next to the rear axle.

3. Remove the filter element with a strap type wrench.

4. Clean the filter element mounting base. Remove any part of the filter element gasket that remains on the filter element mounting base.

5. Apply a light coat of oil to the gasket of the new filter element.

6. Install the new oil filter by hand.

Instructions for the installation of the filter are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

7. Remove the hydraulic tank breather. Replace the old breather with a new breather.

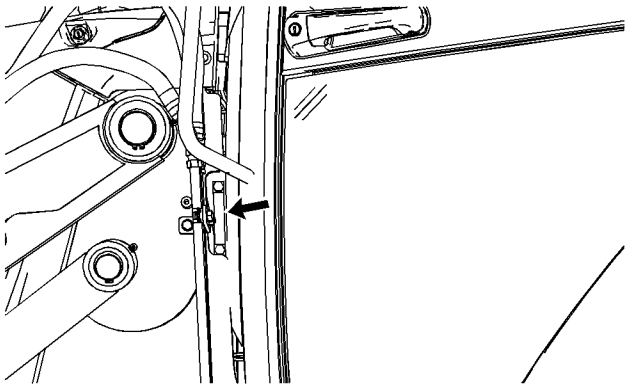

Illustration 318 g01181904

8. Maintain the hydraulic oil level in the sight gauge between the “MIN” mark and the “MAX” mark. Add oil, if necessary.

9. Inspect the gasket on the hydraulic tank filler cap for damage. Replace the gasket, if necessary.

10. Install the hydraulic tank filler cap.

11. Close the access door.

i02368450

Hydraulic System Oil Level - Check

SMCS Code: 5056-535; 7479-535

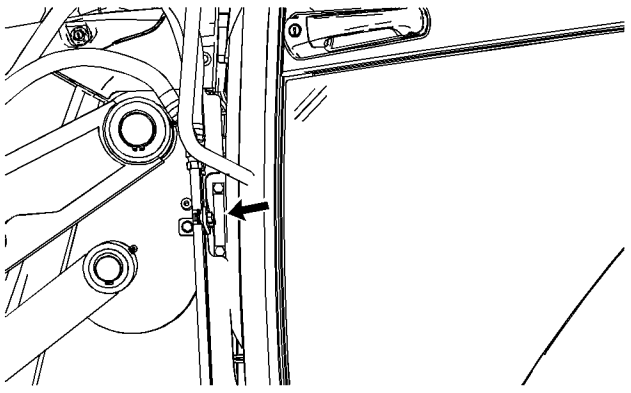

Illustration 319 g01181904

The sight gauge for the hydraulic tank is located on the left side of the machine. Move the backhoe to the transport position and lower the loader bucket to the ground.

Turn off the engine. Wait about five minutes before you check the hydraulic system oil level.

Maintain the oil level in the sight gauge between the “MIN” mark and the “MAX” mark.

i04764552

Indicators and Gauges - Test

SMCS Code: 4100-081; 7000-081; 7450-081; 7490-081

Before you operate the machine, perform the following checks and make any necessary repairs:

1. Look for broken lenses on the gauges, broken indicator lights, broken switches, and other broken components in the cab.

2. Start the engine.

3. Look for inoperative gauges.

4. Turn on all machine lights. Check for proper operation.

5. Move the machine forward. If the service brakes malfunction, consult your Cat dealer for proper repair.

6. Engage the parking brake.

7. Move the machine forward in order to test the parking brake. If the parking brake malfunctions, consult your Cat dealer for proper repair.

8. Stop the engine.

9. Make any repairs that are required before operating the machine.

i03670584

Loader Bucket, Cylinder, and Linkage Bearings - Lubricate

SMCS Code: 5457-086-BD; 6001-086-BD; 6513-086-BD

Single Tilt Machines

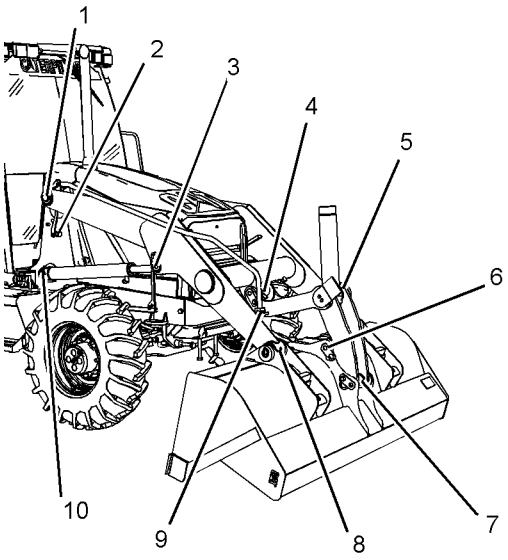

Illustration 320 g01203892

Apply lubricant to the grease fittings (1) for the frame and for the lift arm. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fitting (2) for the pivot for the linkage of bucket positioner and lift kickout.

Apply lubricant to the grease fittings (3) for the rod end of the lift cylinder. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (4) for the pivot pin at the loader lift arm. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (5) for the pivot bearings for the bucket tilt cylinder. There is a grease fitting in each linkage (four total).

Apply lubricant to the grease fitting (6) for the rod end of the tilt cylinder.

Apply lubricant to the grease fittings (7) for the upper pivot pin. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (8) for the lower pivot pins. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fitting (9) for the pivot for the linkage of bucket positioner and lift kickout.

Apply lubricant to the grease fittings (10) for the head end of the lift cylinder. There is a grease fitting for each side of the machine.

There is a total of 18 grease fittings.

Open the engine access door on the top of the machine.

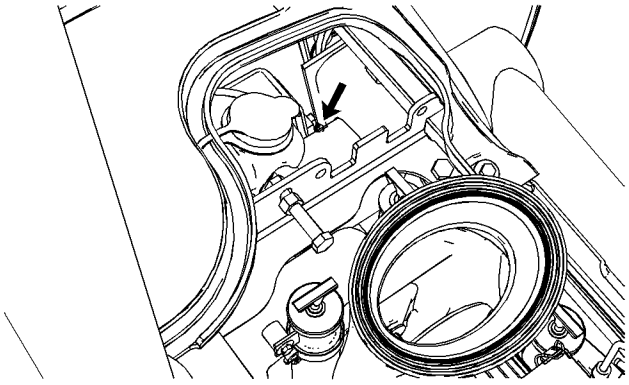

Illustration 321 g01758234

Apply lubricant to the grease fitting for the pivot point for the lift arms.

Parallel Lift Machines

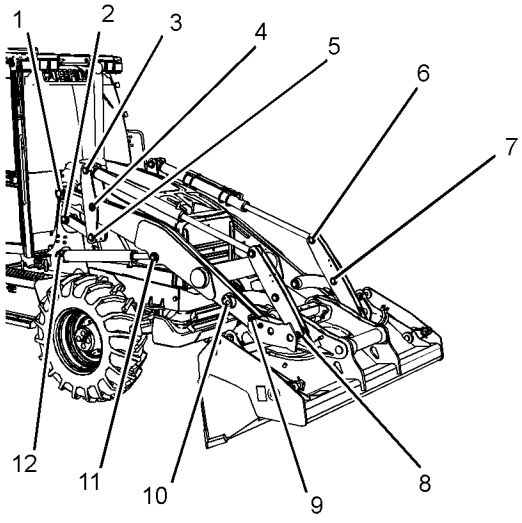

Illustration 322 g01253459

Apply lubricant to the grease fittings (1) for the frame and for the lift arm. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (2) for the frame and for the parallel linkage. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (3) for the head end of the tilt cylinder. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (4) for the center pivot pin of the parallel linkage. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (5) for the lower pivot pin of the parallel linkage. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (6) for the rod end of the tilt cylinder. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (7) for the upper pivot pin of the tilt linkage. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (8) for the upper pivot pin of the quick coupler assembly. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (9) for the lower pivot pin of the quick coupler assembly. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (10) for the lower pivot pin of the tilt linkage. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (11) for the rod end of the lift cylinder. There is a grease fitting for each side of the machine.

Apply lubricant to the grease fittings (12) for the head end of the lift cylinder. There is a grease fitting for each side of the machine.

There is a total of 24 grease fittings.

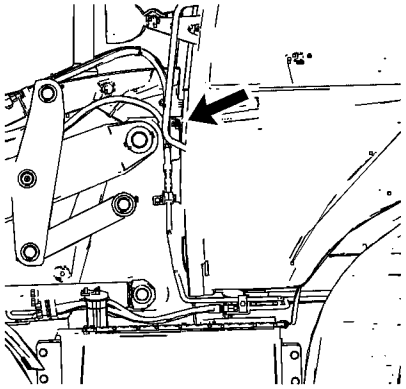

Illustration 323 g01982393

428E

Apply lubricant to the grease fitting for the pivot point for the lift arms.

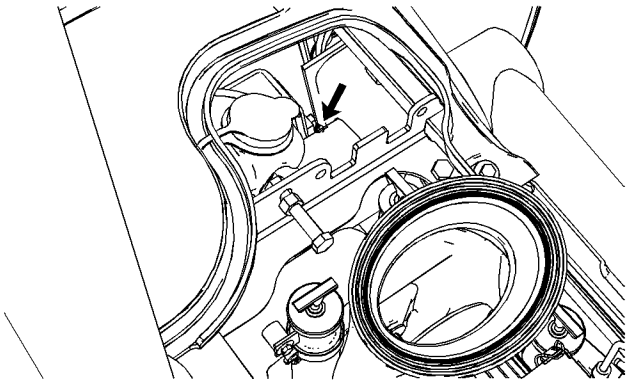

Illustration 324 g01758234

432E and 442E

Apply lubricant to the grease fitting for the pivot point for the lift arms.

Multi Purpose Bucket

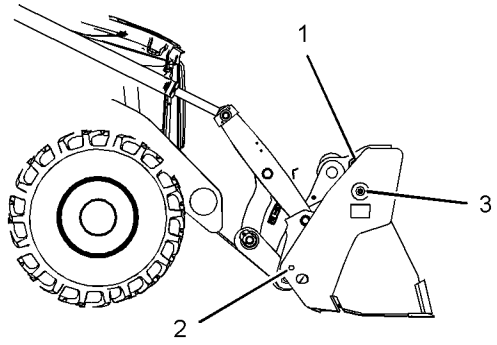

Illustration 325 g01495053

Apply lubricant to the grease fittings (1) for the rod end of the lift cylinder. There is a grease fitting for each side of the bucket.

Apply lubricant to the grease fittings (2) for the head end of the lift cylinder. There is a grease fitting for each side of the bucket.

Apply lubricant to the grease fittings (3) for the bucket hinge pin. There is a grease fitting for each side of the bucket.

There is a total of six grease fittings.

i02106227

Oil Filter - Inspect

SMCS Code: 1318-040; 3067-040; 5068-040

Inspect a Used Filter for Debris

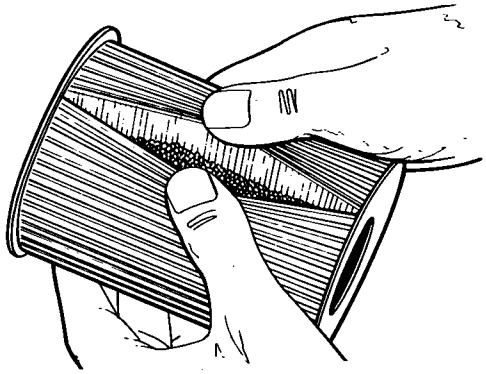

Illustration 326 g00100013

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.

i02368709

Parking Brake - Check/Adjust

SMCS Code: 4267-025; 4267-535

Check Procedure

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

Check the brakes on a dry, level surface.

Fasten the seat belt before you check the brakes.

The following checks are used to determine if the parking brake is functional. These checks are not intended to measure the maximum brake holding effort. The brake holding effort that is required to sustain a machine at a specific engine rpm varies depending on the machine. The variations are the differences in the engine setting, in the power train efficiency, and in the brake holding ability, etc.

1. Start the engine. Raise the bucket slightly.

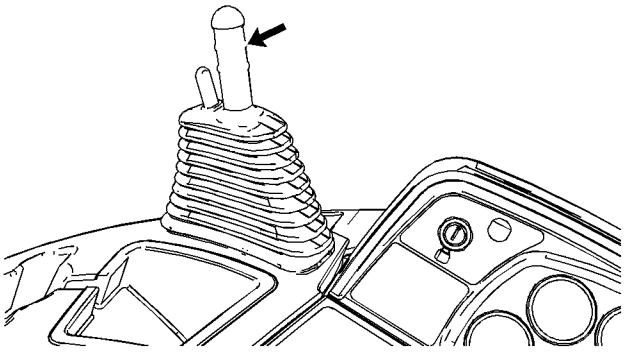

Illustration 327 g01182047

2. Engage the parking brake.

3. If the machine is equipped with the direct drive transmission, move the transmission speed shift lever to THIRD gear. Move the transmission direction control lever to FORWARD, to NEUTRAL, and back to FORWARD. If the machine is equipped with a power shift transmission move the transmission control lever to THIRD SPEED FORWARD, to NEUTRAL, and back to THIRD SPEED FORWARD. This is done in order to override the transmission neutralizer for this test.

Note: Place machines that are equipped with all wheel drive into two-wheel drive mode.

Note: The parking brake indicator light should come on and the parking brake alarm should sound.

4. Gradually increase the engine speed to high idle. The machine should not move.

⚠ WARNING

If the machine begins to move, reduce the engine speed immediately and apply the service brake pedal.

5. Reduce the engine speed. Move the transmission to NEUTRAL. Lower the bucket to the ground. Stop the engine.

Adjustment Procedure

If the machine moved during the test, perform the following procedure in order to adjust the parking brake.

1. Apply the service brakes.

2. Disengage the parking brake.

3. As you view the parking brake adjuster knob from the operator seat, turn the knob clockwise for one half of a turn.

4. Repeat steps 1 to 5 in the check procedure.

If the machine moves during the parking brake test, then perform the adjustment procedure again. If you run out of adjustment on the parking brake adjuster knob, refer to Systems Operation, Testing and Adjusting, “Parking Brake Control - Adjust” for your machine.

i03616683

Power Sideshift Stabilizer Wear Pads - Inspect
(If Equipped)

SMCS Code: 7222-040-JP

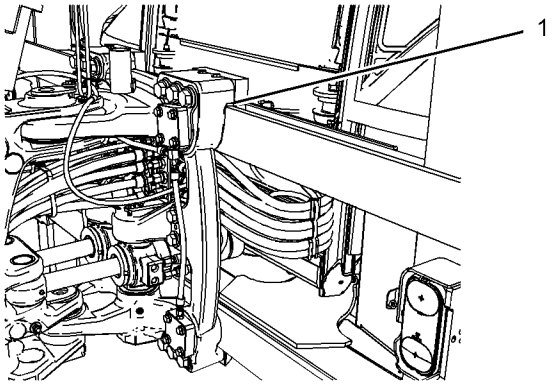

Illustration 328 g01940256

1. Inspect two pads (1). There is one pad on each side of the slide frame. The minimum thickness for pads (1) is 5 mm (0.2 inch).

2. If replacement of the pads is required, please see your Caterpillar dealer.

i02972021

Quick Coupler - Clean

SMCS Code: 6129-070

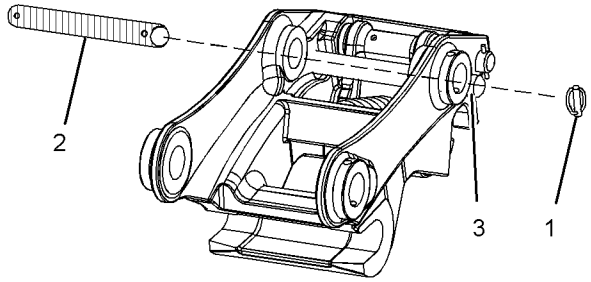

Illustration 329 g01500053

1. Remove the work tool from the quick coupler.

2. Remove pin (1) on the left side of the quick coupler.

3. Remove safety pin (2) from the right side of the quick coupler.

4. Clean safety pin (2).

5. Clean the quick coupler jaw areaand clean the quick coupler spring.

6. Clean out bore (3) on either side of the coupler.

7. Apply grease to safety pin (2).

Refer to Special Publication, SEBU6250, “Caterpillar Machine Fliud Recommendations” for more information about the selection of grease.

8. Insert safety pin (2) into bore (3) on the right side.

9. Insert pin (1) into safety pin (2) on the left side of the quick coupler.

i04587970

Quick Coupler - Lubricate
(Hydraulic Pin Grabber Quick Coupler (If Equipped))

SMCS Code: 6129-086

S/N: JBA150–Up

S/N: NBA150–Up

S/N: EME150–Up

S/N: SEF150–Up

S/N: DPH150–Up

S/N: SJL150–Up

S/N: MAW150–Up

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.

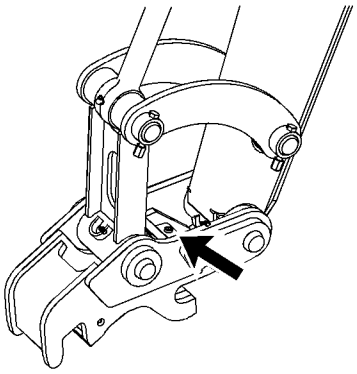

Illustration 330 g02741682

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.

i04909263

Quick Coupler - Lubricate
(If Equipped)

SMCS Code: 6129-086

Pin Grabber Quick Coupler

1. Lower all work tools to the ground.

2. Wipe off the fitting before you lubricate the fitting.

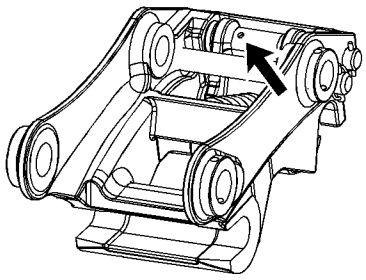

Illustration 331 g01498493

3. Apply grease to the fitting for the quick coupler.

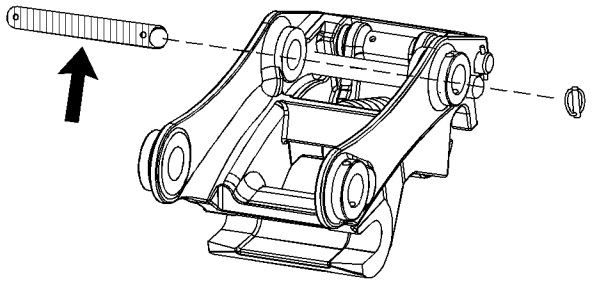

Illustration 332 g01498513

4. Apply grease to the external surface of the pin in the lock assembly.

Dual Locking Quick Coupler

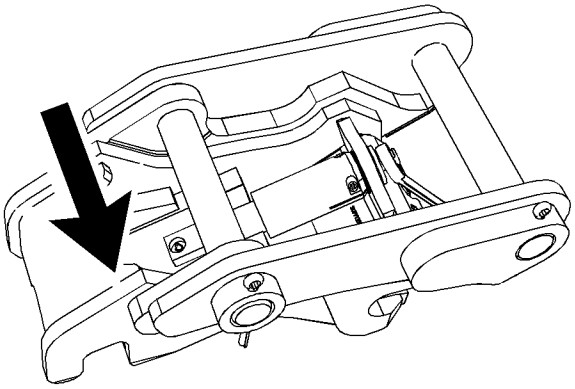

Illustration 333 g03077797

1. Wipe off the fitting before you lubricate the fitting.

2. Apply grease to the fitting for the quick coupler.

3. Check that all pin retainers are in place.

4. Check the full operation of all of the moving parts within the quick coupler. Repair or replace any damaged parts.

5. Check to ensure that there is no build up around the rear locking mechanism, threaded actuator, or wedge plate. Check to ensure that there is no build up around the front locking mechanism.

6. Check the quick coupler for cracks, bent components, or wear.

i03025039

Radiator Core - Clean

SMCS Code: 1353-070-KO

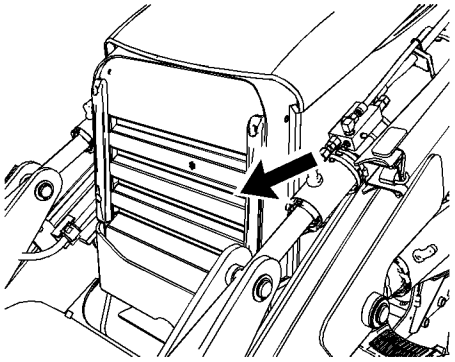

Illustration 334 g01529857

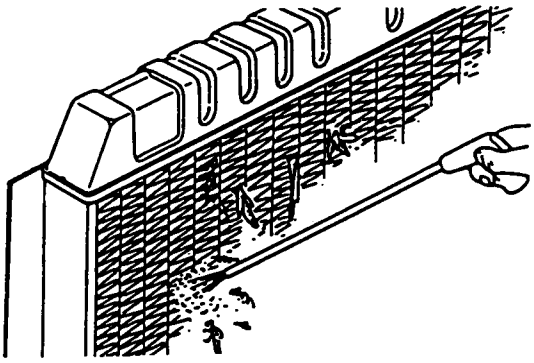

Illustration 335 g00101939

NOTICE
Do not spray high pressure water into the radiator while the engine is running.

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.

Note: If necessary, tilt the oil cooler away from the radiator in order to remove dust and debris between the radiator and the oil cooler.

Note:

i05805860

Receiver Dryer (Refrigerant) - Replace

SMCS Code: 7322-710

⚠ 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.

i03593327

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7325-040

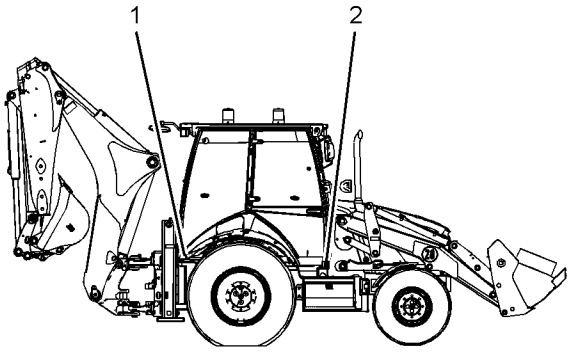

Illustration 336 g01919155

1. Inspect the ROPS for loose bolts or for damaged bolts. Replace any damaged bolts or missing bolts with original equipment parts only.

Tighten the M24 bolts (1) to a torque of 524 ± 100 N·m (386 ± 74 lb ft). Tighten the M16 bolts (2) to a torque of 165 ± 30 N·m (122 ± 22 lb ft).

Note: Apply oil to all ROPS bolt threads before you install the bolts. Failure to apply oil to the bolt threads can result in improper bolt torque.

2. Operate the machine on a rough surface. Replace the ROPS mounting supports if the ROPS emits a noise. Replace the ROPS mounting supports if the ROPS rattles.

Do not straighten the ROPS. Do not repair the ROPS by welding reinforcement plates to the ROPS.

Consult your Caterpillar dealer for repair of any cracks in the ROPS.

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.

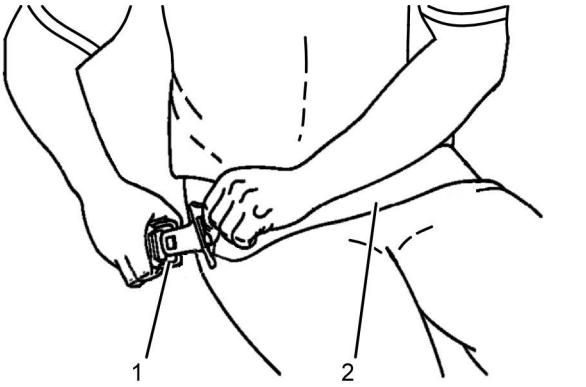

Illustration 337 g02620101

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).

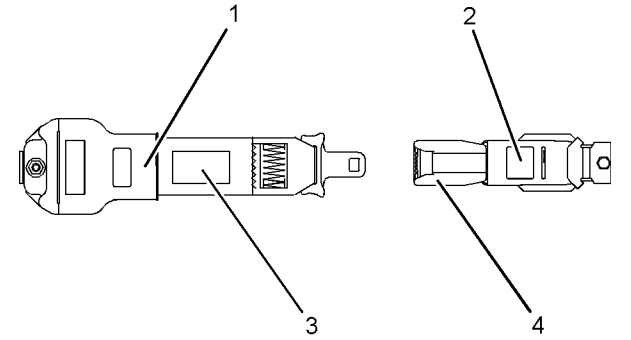

Illustration 338 g01152685

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.

i06629082

Sideshift Stabilizer Wear Pads - Inspect/Adjust

SMCS Code: 7222-040-JP; 7222-025-JP

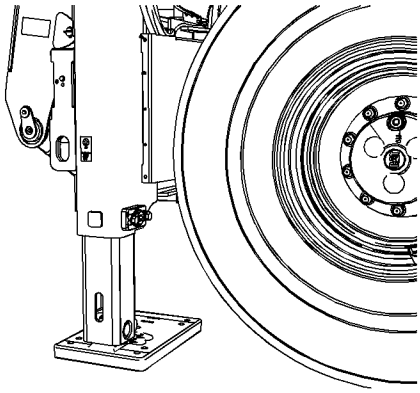

Illustration 339 g01939833

1. Lower the stabilizers until the feet are just above the ground.

2. Check the stabilizer legs for movement in both directions. Maximum free play is 1 mm (0.0394 inch). If adjustment is needed, perform the following step:

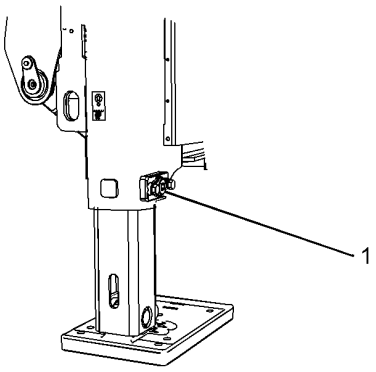

Illustration 340 g01939873

Outside location

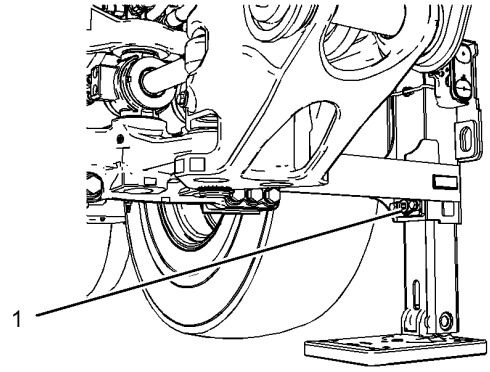

Illustration 341 g01940054

Inside location

a. Adjust the wear pads by turning the stabilizer wear pad adjustment port(1) with a square drive.

Note: There are two locations to adjust each stabilizer.

3. Fully retract the stabilizers before moving the machine.

The stabilizer pads do not normally require any lubrication. If the stabilizers become noisy, a small amount of a silicone-based lubricant may be applied.

Note: Do not apply an excessive amount of grease or silicone-based lubricant. Dirt can be attracted to the lubricant and dirt can cause abrasion to the pad assemblies and wear to the pad assemblies.

i03593376

Stabilizer - Clean/Inspect

SMCS Code: 7222-070; 7222-040

1. Lower the stabilizer legs.

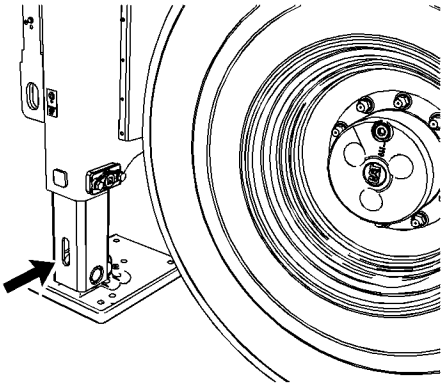

Illustration 342 g01919412

2. Inspect the inner leg through the slot in the leg.

3. Remove excessive debris with pressurized water. Remove dry debris with a long tool.

i03616885

Swing Frame and Cylinder Bearings - Lubricate/Inspect

SMCS Code: 5105-040; 5105-086; 6506-040; 6506-086; 6507-086; 6507-040; 7063-040; 7063-086

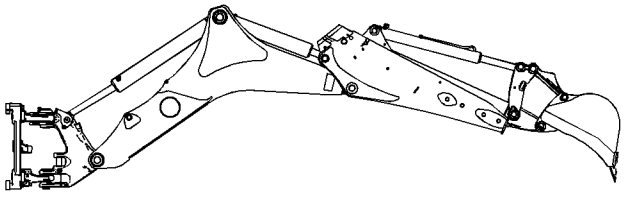

Illustration 343 g01936699

Position the backhoe into the service position that is shown above. Lower the bucket to the ground. Relieve the hydraulic pressure and remove the load from the greased joints.

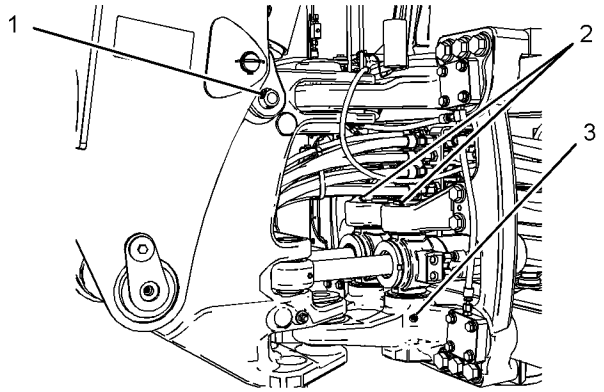

Illustration 344 g01940402

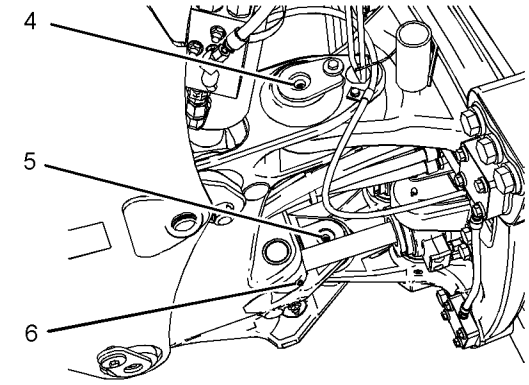

Illustration 345 g01940437

Apply lubricant to the grease fitting (1) for the boom lock. Repeat for the opposite side.

Apply lubricant to the grease fittings (2) for the bearing on the top of the swing cylinders.

Apply lubricant to the grease fitting (3) for the bearing on the bottom of the swing cylinder. Repeat for the other swing cylinder.

Apply lubricant to the grease fitting (4) for the top swing pin.

Apply lubricant to the grease fitting (5) for the bottom swing pin.

Note: Inspect the lower swing capture plate which is mounted below the grease fitting (5). If the lower swing capture plate is missing or damaged contact your local Caterpillar dealer.

Apply lubricant to the grease fitting (6) for the eye of the swing cylinder. Repeat for the other swing cylinder.

There is a total of ten grease fittings.

i02369786

Tire Inflation - Check

SMCS Code: 4203-535

Measure the tire pressure on each tire. Tire inflation pressures for each application may vary. These tire inflation pressures should be obtained from your tire supplier.

Inflate the tires, if necessary. Refer to Operation and Maintenance Manual, “Tire Inflation with Air”.

The operating pressure is based on the following conditions.

- The weight of a ready-to-work machine at the front tires and at the rear tires
- The rated payload
- Average operating conditions

Contact your tire supplier if your machine is experiencing tire slippage. Tire wear may cause tire slippage.

i04003416

Transmission Magnetic Screen - Clean

SMCS Code: 3030-070-MGS

1. Drain the transmission oil. Refer to Operation and Maintenance Manual, “Transmission Oil - Change”.

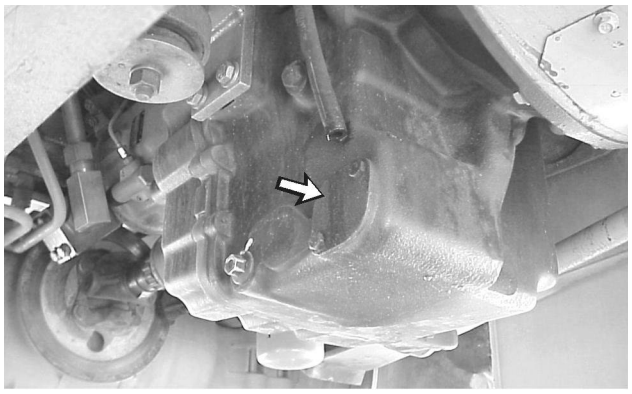

Illustration 346 g00725296

Magnetic strainer cover for the standard transmission

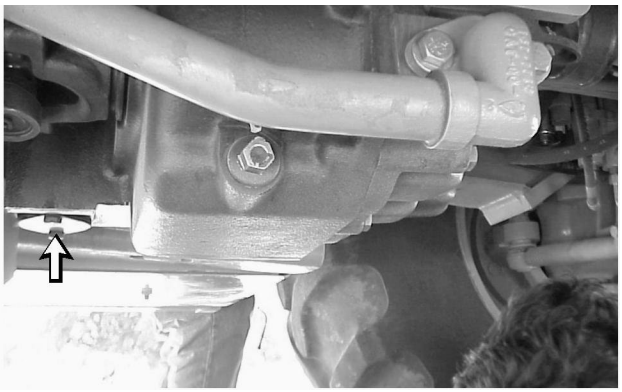

Illustration 347 g00725298

Magnetic strainer cover for the power shift or auto shift transmissions

2. Remove the magnetic strainer cover.

3. Remove the magnets from the housing.

4. Remove the screen from the housing.

5. Wash the tube and the screen in a clean, nonflammable solvent.

NOTICE
Do not drop or rap the magnets against any hard objects. Replace any damaged magnets.

6. Clean the magnets with a cloth, with a stiff bristle brush, or with pressure air.

7. Install the magnets and the tube assembly into the magnetic screen.

8. Install the magnetic screen.

9. Clean the cover and inspect the seal. Replace the seal, if the seal is damaged.

10. Install the cover. Tighten the cover bolts.

11. Fill the transmission. Refer to Operation and Maintenance Manual, “Transmission Oil - Change”.

i03007392

Transmission Oil - Change

SMCS Code: 3080-044

Operate the machine for a few minutes in order to warm the transmission oil.

The machine should be level. Lower the bucket to the ground and apply slight downward pressure. Engage the parking brake and stop the engine.

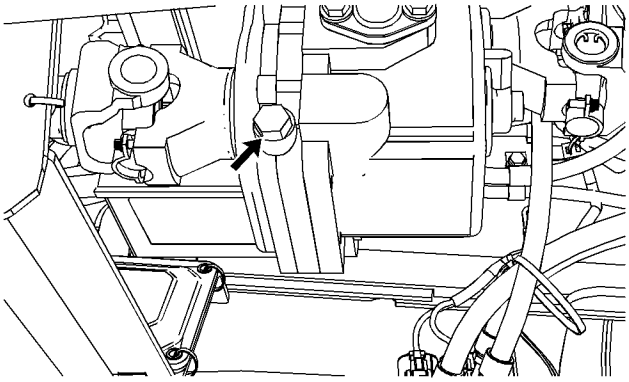

Illustration 348 g01204396

Drain plug for direct drive transmission

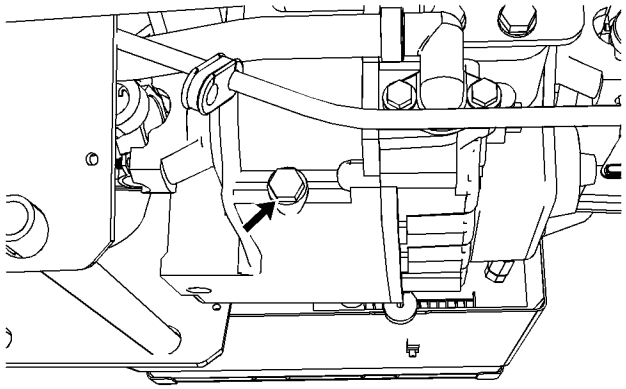

Illustration 349 g01204398

Drain plug for power shift transmission

1. Remove the transmission drain plug. Allow the transmission oil to drain into a suitable container. Clean the transmission drain plug and install the transmission drain plug.

2. Change the transmission oil filter element. Refer to Operation and Maintenance Manual, “Transmission Oil Filter - Replace”.

3. Clean the transmission magnetic screen. Refer to Operation and Maintenance Manual, “Transmission Magnetic Screen - Clean”.

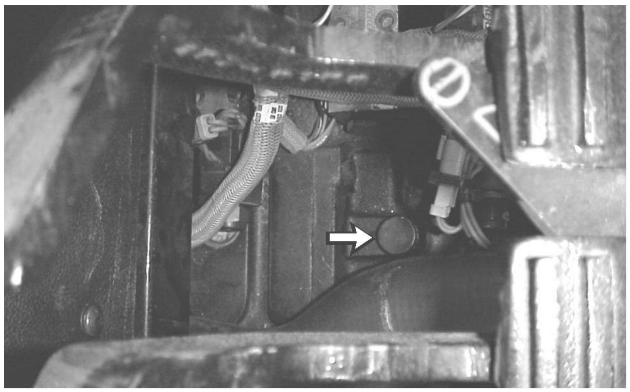

Illustration 350 g00725462

4. Remove the transmission breather from the top of the transmission case. Clean the breather in clean nonflammable solvent and allow the breather to dry. Replace the breather.

5. Open the engine access door on the top of the machine.

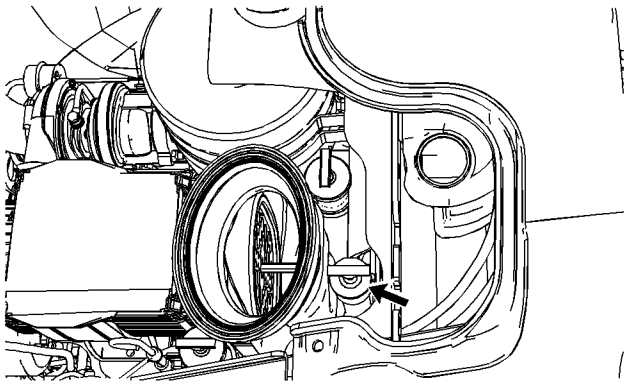

Illustration 351 g01182357

6. Remove the dipstick/fill cap and fill the transmission with transmission oil. Refer to Operation and Maintenance Manual, “Lubricant Viscosities” and Operation and Maintenance Manual, “Capacities (Refill)”.

7. Start the engine and run the engine at low idle. Apply the service brake. Slowly operate the transmission controls in order to circulate the oil.

8. Move the transmission control lever to NEUTRAL and engage the parking brake. Inspect the transmission for leaks.

9. Maintain the transmission oil level within the crosshatched region on the “CHECK WITH OIL WARM” side of the dipstick when the transmission is warm. Add transmission oil through the transmission filler tube, if necessary.

Note: The transmission can be checked with cold transmission oil. Ensure that the oil level is within the crosshatched region on the “Safe to Start” side of the dipstick/fill plug. Add transmission oil, if necessary.

10. Install the dipstick/fill cap and install the engine access door.

11. Stop the engine.

i02975321

Transmission Oil Filter - Replace

SMCS Code: 3067-510

The transmission filter is located on the left side of the machine .

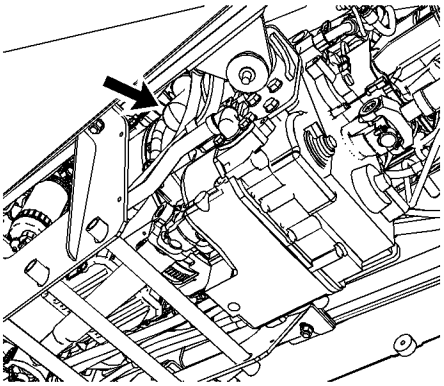

Illustration 352 g01503161

1. Remove the transmission oil filter element with a strap type wrench.

2. Clean the filter element mounting base. Remove any part of the filter element gasket that remains on the filter element mounting base.

3. Apply a light coat of oil to the gasket of the new filter element.

4. Install the new oil filter by hand.

Instructions for the installation of the filter are printed on the side of each Caterpillar spin-on filter. For non-Caterpillar filters, refer to the installation instructions that are provided by the supplier of the filter.

5. Start the engine and apply the service brake. Slowly operate the transmission controls in order to circulate the transmission oil.

6. Move the transmission control lever to NEUTRAL and engage the parking brake. Inspect the filter element for leaks.

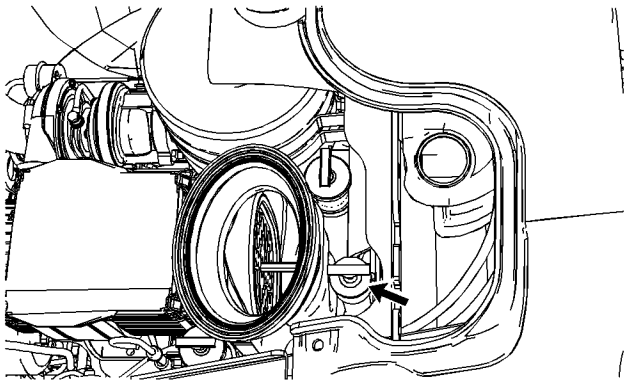

Illustration 353 g01182357

7. Check the transmission oil level. Refer to Operation and Maintenance Manual, “Transmission Oil Level - Check” for more information.

8. Stop the engine.

i03480366

Transmission Oil Level - Check

SMCS Code: 3081-535

Check the transmission oil level while the machine is on a level surface. The loader should be resting on the ground.

1. Open the engine access door on the top of the machine.

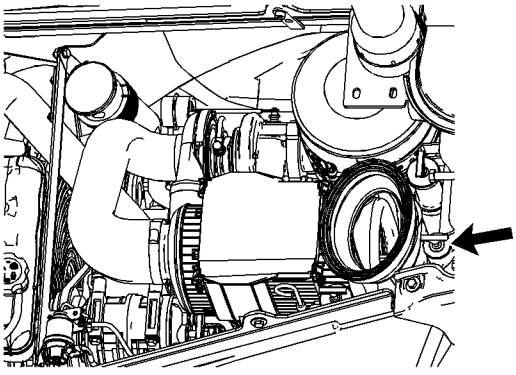

Illustration 354 g01818934

2. Remove the dipstick/fill plug for the transmission.

3. Ensure that the oil level is within the crosshatched region on the “Safe To Start” side of the dipstick/fill plug. Add transmission oil, if necessary.

4. Start the engine. Run the engine for 5 minutes.

5. Maintain the oil level within the crosshatched region on the “CHECK WITH WARM OIL” side of the dipstick/fill plug when the transmission is warm and the engine is at low idle. Add transmission oil, if necessary.

6. Clean the dipstick/fill plug and install the dipstick/fill plug.

i03480361

Transmission Oil Sample - Obtain

SMCS Code: 3030-008; 7542-008

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.

⚠ WARNING

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

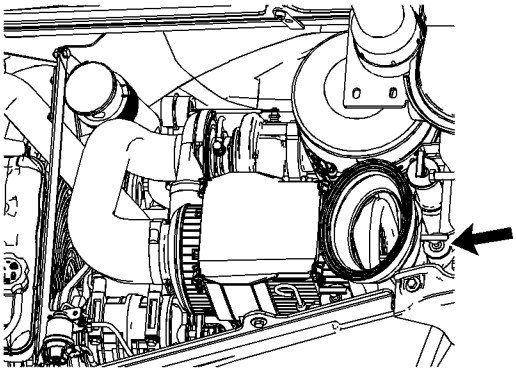

Illustration 355 g01818934

Obtain a sample of the transmission oil from the transmission oil filler tube.

Refer to Special Publication, SEBU6250, “S·O·S Oil Analysis” for information that pertains to obtaining a sample of the transmission oil. Refer to Special Publication, PEHP6001, “How To Take A Good Oil Sample” for more information about obtaining a sample of the transmission oil.

i01986834

Wheel Bearings (Front) - Lubricate
(Two-Wheel Drive)

SMCS Code: 4201-086-BD

Use the following procedure for both wheels.

1. Raise the front wheels slightly off the ground.

2. Install sufficient blocking under the frame and lower the machine to the blocking.

3. Remove the nuts and both wheels.

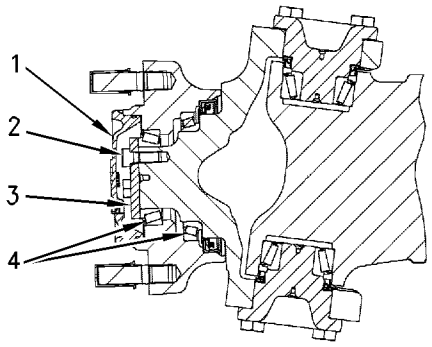

Illustration 356 g00976070

4. Remove the dust cap (1).

5. Remove bolts (2) and retaining plate (3).

6. Pull the hub assembly (4) until the cone and roller assembly come out of the hub assembly. Then, pull off the hub all the way.

7. Clean all of the parts in clean, nonflammable solvent and allow the parts to air dry. Do not use pressure air.

8. Inspect the roller assemblies for heat discoloration and for wear. Inspect the seals for damage. Replace any damaged parts.

9. Make sure that the grease gets packed between the rollers and the cage on both bearings.

Force the grease through the bearing from the large end of the rollers.

10. Pack a 6 mm (0.25 inch) layer of grease between the bearing assemblies in the hub. Do not pack the hub fully with grease.

11. Apply a 6 mm (0.25 inch) thick film of grease on the spindle surface.

12. Install the hub, the bearings, the washer, the nut and the wheel.

13. While you turn the wheel, tighten bolt (2) until a slight drag is noticed.

14. All bearing surfaces must make contact. The wheel should turn freely within 0.025 to 0.25 mm (0.001 to 0.010 inch) end play.

15. Install the dust cap.

i02525863

Wheel Nut Torque - Check

SMCS Code: 4210-535

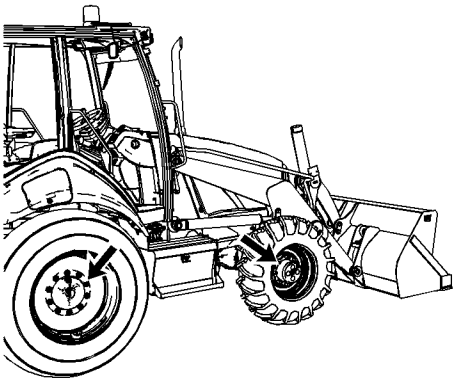

Illustration 357 g01263488

Check the torque on new wheels or repaired wheels after every ten service hours until the specified torque is maintained.

The nut and the stud should be clean and dry for reassembly. Apply one drop of lubricating oil to the stud before installing the nut onto the stud.

Torque the nuts to 460 ± 60 N·m (339 ± 44 lb ft). Use a star pattern when you torque the nuts.

Check the nuts on all four wheels.

i03480604

Window Washer Reservoir - Fill

SMCS Code: 7306-544

NOTICE
When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.

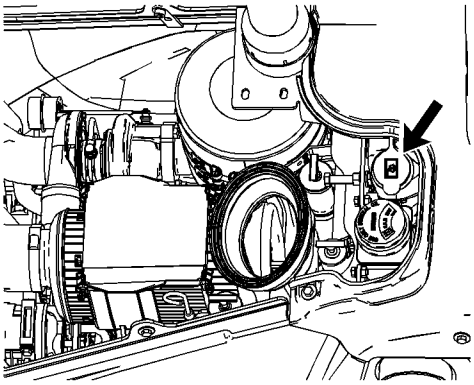

Illustration 358 g01819233

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.

i01437556

Window Wipers - Inspect/ Replace

SMCS Code: 7305-510; 7305-040

Inspect the condition of the wiper blades. Replace the wiper blades if the wiper blades are worn or damaged or if streaking occurs.

i03912371

Windows - Clean

SMCS Code: 7310-070

Clean the outside of the windows from the ground, unless handholds are available.

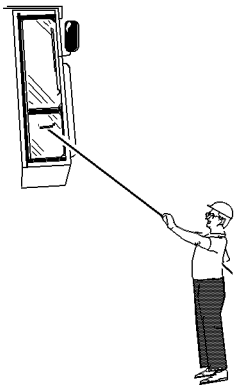

Illustration 359 g00566124

Typical example

Cleaning Methods

Aircraft Window Cleaner

Apply the cleaner with a soft cloth. Rub the window with moderate pressure until all the dirt is removed. Allow the cleaner to dry. Wipe off the cleaner with a clean soft cloth.

Soap and Water

Use a clean sponge or a soft cloth. Wash the windows with a mild soap or with a mild detergent. Also use plenty of lukewarm water. Rinse the windows thoroughly. Dry the windows with a moist chamois or with a moist cellulose sponge.

Stubborn Dirt and Grease

Wash the windows with a good grade of naphtha, of isopropyl alcohol, or of Butyl Cellosolve. Then, wash the windows with soap and with water.

Polycarbonate Windows (If equipped)

Wash polycarbonate windows with a mild soap or detergent. Never use a cleaning solvent on polycarbonate windows.

Wash polycarbonate windows with warm water and a soft sponge, or damp cloth. Never use a dry cloth or paper towels on polycarbonate windows.

Rinse the windows with a sufficient amount of clean water.

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

i04398017

Decommissioning and Disposal

SMCS Code: 1000; 7000

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

i04640450

Caterpillar Approved Work Tools

SMCS Code: 6700

S/N: JBA150–Up

S/N: NBA150–Up

S/N: EME150–Up

S/N: SEF150–Up

S/N: DPH150–Up

S/N: SJL150–Up

S/N: MAW150–Up

Consult your Cat dealer to match a quick coupler to the approved host machine.

i04888492

Caterpillar Approved Work Tools

SMCS Code: 6700

Only use Caterpillar approved work tools on this machine.

Note: Do not use a Caterpillar work tool on a machine that is not approved by Caterpillar.

Consult your Cat dealer to match a quick coupler to the approved host machine.

Note: The weights provided in Operation and Maintenance Manual, “Tire Shipping Pressure” include the weight of the machine and any work tools that are attached. Ensure that the tires are appropriate for the particular work tool.

Front Work Tools

Table 90

Caterpillar Approved Work Tools for Backhoe Loaders						
Work Tool	**422E**	**428E**	**432E**	**434E**	**442E**	**444E**
General Purpose Bucket Pin On, Parallel Lift 0.96 m^3 (1.25 yd)	NR	A	A	NR	NR	NR
General Purpose Bucket Quick Coupler, Parallel Lift 1.00 m^3 (1.31 yd)	NR	NR	NR	NR	NR	NR
General Purpose Bucket Pin On, Parallel Lift 1.03 m^3 (1.35 yd)	NR	A	A	NR	A	NR
General Purpose Bucket Quick Coupler, Parallel Lift 1.03 m^3 (1.35 yd)	NR	NR	A	NR	A	NR
General Purpose Bucket Pin On, Single Tilt 1.07 m^3 (1.40 yd)	A	NR	NR	NR	NR	NR
General Purpose Bucket Pin On, Parallel Lift 1.15 m^3 (1.50 yd)	NR	NR	NR	A	NR	NR
General Purpose Bucket Quick Coupler, Parallel Lift 1.30 m^3 (1.70 yd)	NR	NR	NR	A	NR	A
General Purpose Bucket Pin On, Parallel Lift 1.30 m^3 (1.70 yd)	NR	NR	NR	NR	NR	A
Multipurpose Bucket Pin On, Single Tilt 0.96 m^3 (1.25 yd)	A	NR	NR	NR	NR	A
Multipurpose Bucket Pin On, Parallel Lift 0.96 m^3 (1.25 yd)	NR	A	A	NR	A	NR
Multipurpose Bucket Pin On, Parallel Lift 1.03 m^3 (1.35 yd)	NR	A	A	NR	A	NR
Multipurpose Bucket Quick Coupler, Parallel Lift 1.03 m^3 (1.35 yd)	NR	NR	A	NR	A	NR
Multipurpose Bucket Pin On, Parallel Lift 1.15 m^3 (1.50 yd)	NR	NR	NR	A	NR	NR
Multipurpose Bucket Pin On, Parallel Lift 1.30 m^3 (1.70 yd)	NR	NR	NR	A	NR	A
Multipurpose Bucket Quick Coupler, Parallel Lift 1.30 m^3 (1.70 yd)	NR	NR	NR	A	NR	A

(continued)

(Table 90, contd)

BP24 Pickup Broom	NR	NR	A	A	A	A
BA25 Angle Broom	NR	NR	A	A	A	A
BP25 Pickup Broom	NR	NR	NR	NR	NR	NR
Carriage and Fork Tines	NR	NR	A	A	A	A
Material Handling Arm	NR	NR	A	A	A	A
Truss Boom	NR	NR	A	A	A	A
Hook	NR	NR	A	A	A	A
Landscape Rake	NR	NR	A	A	A	A
Snow Plow 3099 mm (122 inch)	NR	NR	A	A	A	A
Snow Plow3213 mm (126.5 inch)	NR	NR	A	A	A	A
Snow Plow3708 mm (146 inch)	NR	NR	A	A	A	A
Asphalt Cutter 470 mm (18.5 inch)	NR	NR	A	A	A	A

A – The machine performance is acceptable with this work tool.

NR – This work tool is not recommended for use on this machine.

Rear Work Tools

Table 91

Caterpillar Approved Work Tools for Backhoe Loaders	
Work Tool	**Size**
Standard Duty Bucket	305 mm (12 inch)
Standard Duty Bucket	458 mm (18 inch)
Standard Duty Bucket	610 mm (24 inch)
Standard Duty Bucket	762 mm (30 inch)
Standard Duty Bucket	914 mm (36 inch)
Standard Duty Bucket Uniteeth	305 mm (12 inch)
Standard Duty Bucket Uniteeth, Scallop	305 mm (12 inch)
Standard Duty Bucket Uniteeth	458 mm (18 inch)
Standard Duty Bucket Uniteeth	610 mm (24 inch)
Standard Duty Bucket Uniteeth	762 mm (30 inch)
Standard Duty Bucket Uniteeth	914 mm (36 inch)

(continued)

(Table 91, contd)

Heavy Duty Bucket	305 mm (12 inch)
Heavy Duty Bucket	407 mm (16inch)
Heavy Duty Bucket	458 mm (18 inch)
Heavy Duty Bucket	610 mm (24 inch)
Heavy Duty Bucket	762 mm (30 inch)
Heavy Duty Bucket	800 mm (31.5 inch)
Heavy Duty Bucket	914 mm (36 inch)
Heavy Duty Bucket Pin Lock	407 mm (16inch)
Heavy Duty Bucket Pin Lock	458 mm (18 inch)
Heavy Duty Bucket Pin Lock	610 mm (24 inch)
Heavy Duty Bucket Pin Lock	762 mm (30 inch)
Heavy Duty Bucket Pin Lock	914 mm (36 inch)
Heavy Duty Bucket Uniteeth	300 mm (11.8 inch)
Heavy Duty Bucket Uniteeth	450 mm (17.7 inch)
Heavy Duty Bucket Uniteeth	600 mm (23.6 inch)
Heavy Duty Bucket Uniteeth	750 mm (29.5 inch)

(continued)

(Table 91, contd)

Heavy Duty Bucket Uniteeth	900 mm (35.4 inch)
High Capacity Bucket	458 mm (18 inch)
High Capacity Bucket	610 mm (24 inch)
High Capacity Bucket	762 mm (30 inch)
High Capacity Bucket	914 mm (36 inch)
High Capacity Bucket Pin Lock	305 mm (12 inch)
High Capacity Bucket Pin Lock	407 mm (16inch)
High Capacity Bucket Pin Lock	458 mm (18 inch)
High Capacity Bucket Pin Lock	610 mm (24 inch)
High Capacity Bucket Pin Lock	762 mm (30 inch)
High Capacity Bucket Pin Lock	914 mm (36 inch)
High Capacity Bucket Uniteeth	457 mm (18 inch)
High Capacity Bucket Uniteeth	610 mm (24 inch)
High Capacity Bucket Uniteeth	762 mm (30 inch)
High Capacity Bucket Uniteeth	914 mm (36 inch)
Heavy-Duty Rock Bucket	305 mm (12 inch)
Heavy-Duty Rock Bucket	458 mm (18 inch)
Heavy-Duty Rock Bucket	610 mm (24 inch)
Heavy-Duty Rock Bucket	762 mm (30 inch)
Heavy-Duty Rock Bucket	914 mm (36 inch)
Soil Excavation Bucket	458 mm (18 inch)
Soil Excavation Bucket	610 mm (24 inch)
Soil Excavation Bucket	762 mm (30 inch)
Soil Excavation Bucket	914 mm (36 inch)
Coral Bucket	305 mm (12 inch)
Coral Bucket	458 mm (18 inch)
Coral Bucket	610 mm (24 inch)
Coral Bucket	762 mm (30 inch)
Ditch Cleaning Bucket	1200 mm (48 inch)
Ditch Cleaning Bucket	1371 mm (54 inch)

(continued)

(Table 91, contd)

Ditch Cleaning Bucket	1400 mm (55 inch)
Ditch Cleaning Bucket	1500 mm (59 inch)
Ditch Cleaning Bucket	1524 mm (60 inch)
Ditch Cleaning Bucket	1600 mm (63 inch)
Ditch Cleaning Bucket	1800 mm (71 inch)
Ditch Cleaning Bucket Pin Lock	1200 mm (48 inch)
Cribbing Bucket High Rotation	230 mm (9 inch)
PC404 Cold Planer	450 mm (17.7 inch)
CVP40 Vibratory Compactor	
H65 Hammer	
H70 Hammer	

NOTICE

Ensure that the backhoe is carefully placed into the travel position when the machine is equipped with a hydraulic hammer. The point of the hammer must not contact the boom or machine damage may occur.

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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:	_____	_____	_____