



Operation and Maintenance Manual

345D, 349D and 349D2 Excavators

RGG 1-UP (345D)
MLK 1-UP (345D)
RGD 1-UP (345D)
KFH 1-UP (345D)
LKY 1-UP (345D)
NLM 1-UP (345D)
KHS 1-UP (349D)
RBJ 1-UP (349D)
FLA 1-UP (349D)
YAE 1-UP (349D2)
GAX 1-UP (349D2)

Language: Original Instructions



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



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.



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.



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:

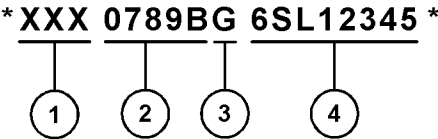


Illustration 1

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

i03994753

Safety Messages

SMCS Code: 7000; 7405

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

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

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

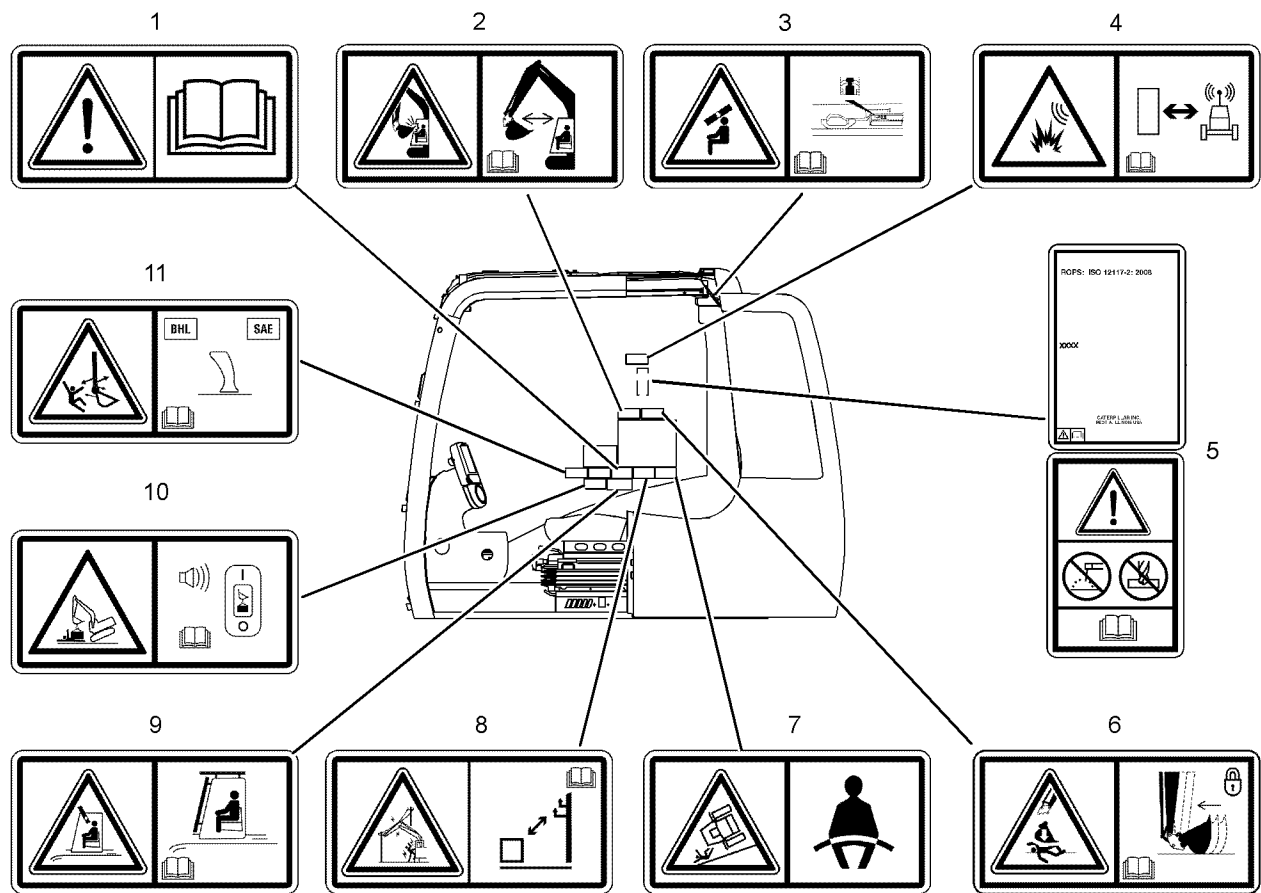


Illustration 2

g02016255

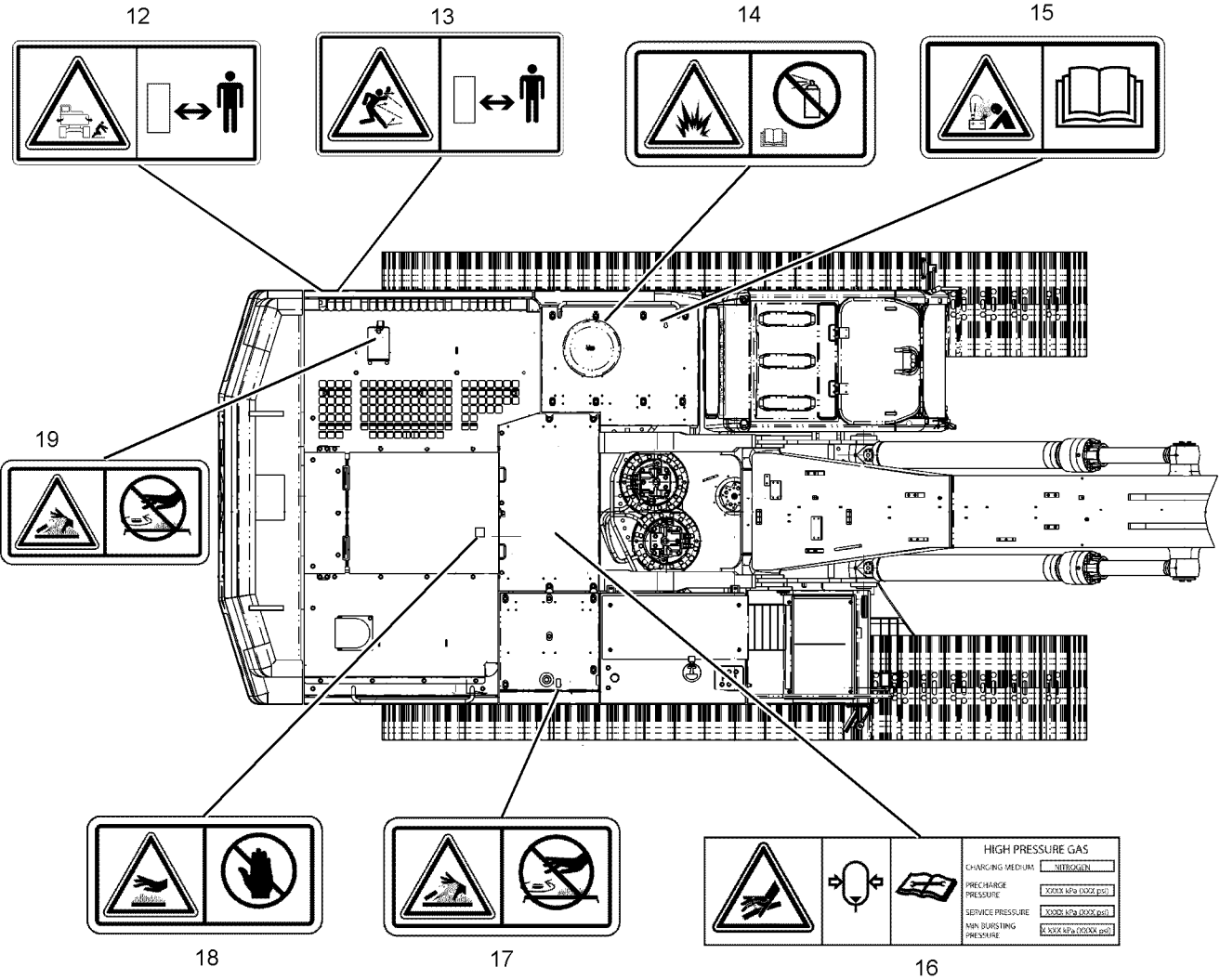


Illustration 3

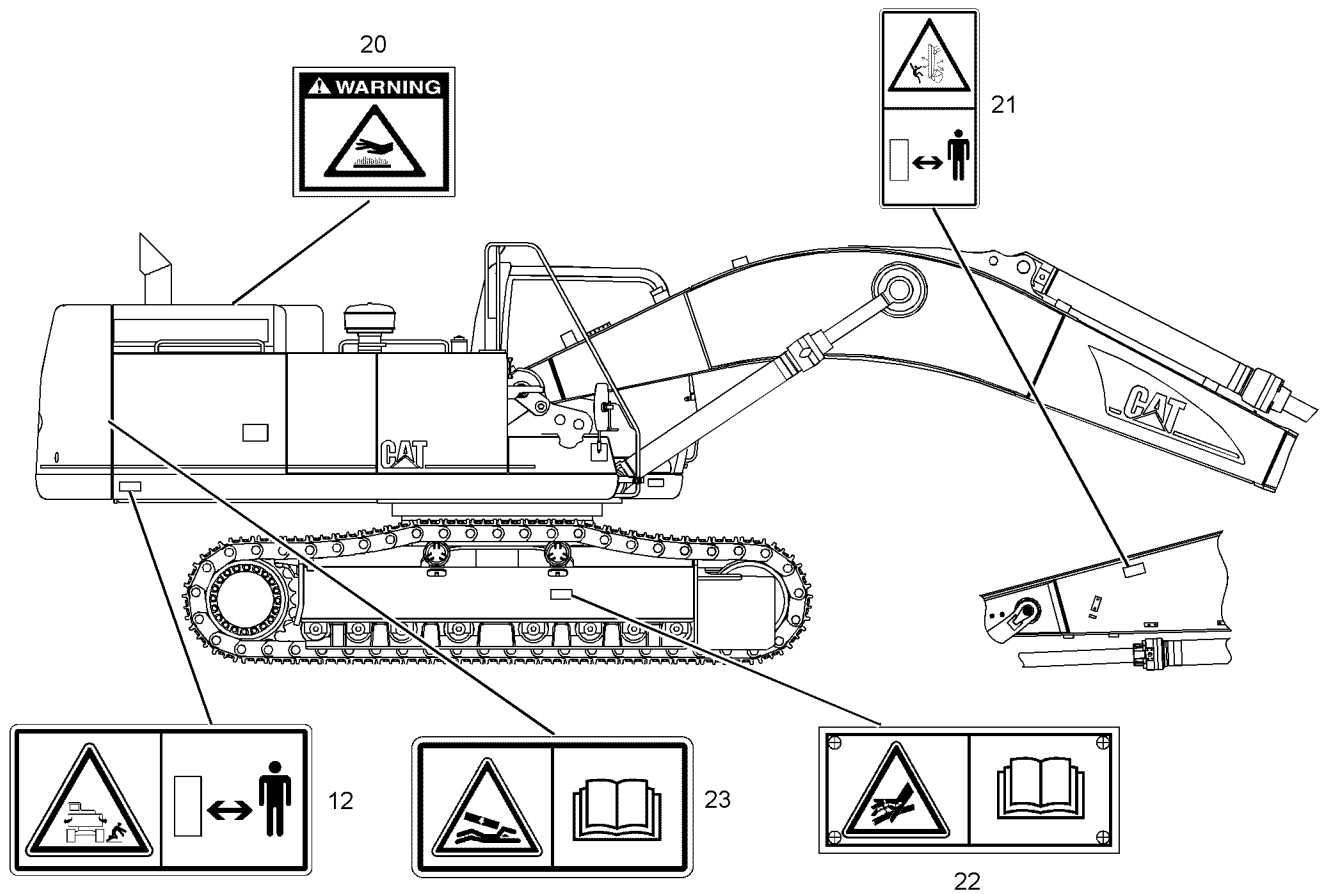


Illustration 4

g02173233

Do Not Operate (1)

This safety message is located in the cab.



Illustration 5

g01370904

WARNING

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

Crushing Hazard (2)

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



Illustration 6

g01373971

WARNING

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

Refer to Operation and Maintenance Manual, "Operating Technique Information" for further information.

Crushing Hazard (3)

This safety message is located in the cab.



Illustration 7

g01373978

WARNING

Personal injury can result if the window is not latched in the overhead position; ensure the auto lock is engaged.

Product Link (4)

If equipped, this safety message is positioned in the cab on the left side door post.

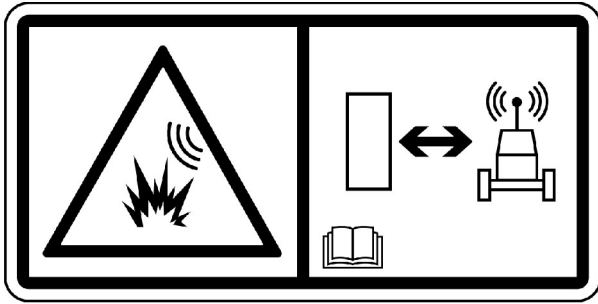


Illustration 8

g01370917

! WARNING

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

Refer to Operation and Maintenance Manual, "Product Link" for further information.

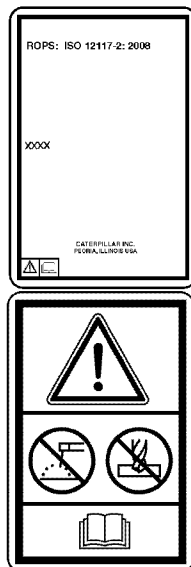
Do Not Weld or Drill on ROPS (5)

Illustration 9

g01970802

If equipped, this safety message is located on the left side pillar in the cab.

! WARNING

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

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

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

Crushing Injury (6)

If equipped, this safety message is located in the cab on the right side window.



Illustration 10

g01374035

! 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.

Refer to Operation and Maintenance Manual, "Quick Coupler Operation" for further information.

Seat Belt (7)

This safety message is located in the cab.

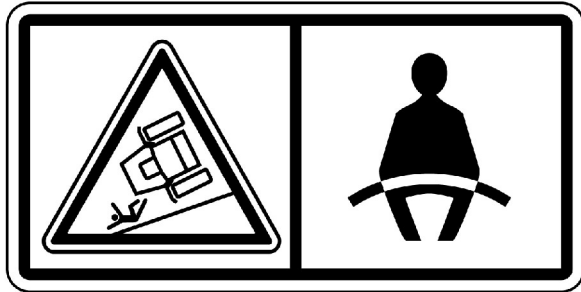


Illustration 11

g01370908

WARNING

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

Electrical Power Lines (8)

This safety message is located in the cab.

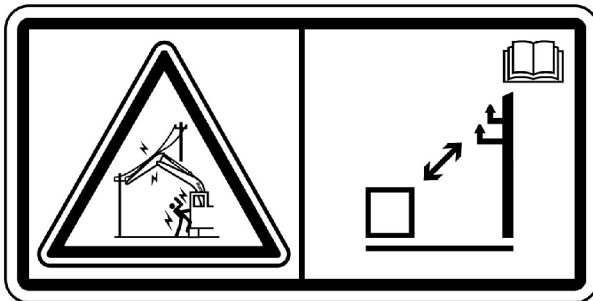


Illustration 12

g01374045

DANGER

Electrocution Hazard! Keep the machine and attachments a safe distance from electrical power. Stay clear 3 m (10 ft) plus twice the line insulator length. Read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions and warnings will cause serious injury or death

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

Crushing Hazard (9)

This safety message is located in the cab.

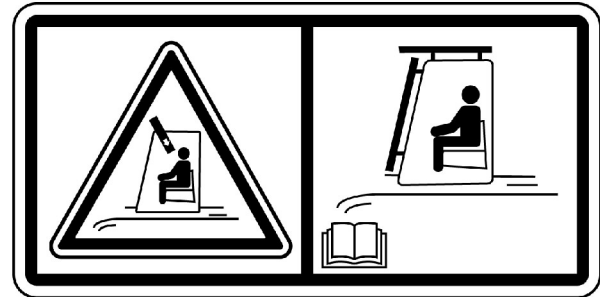


Illustration 13

g01374048

WARNING

The impact from objects that strike the front of the cab or the top of the cab could result in a crushing hazard with the potential for personal injury or death.

The front guard and the top guard should be installed on the cab for applications where the hazard of falling objects exist. Read the Operation and Maintenance Manual.

Refer to Operation and Maintenance Manual, "Guards" for further information.

Overload Warning Device (If Equipped) (10)

This safety message is located in the cab.

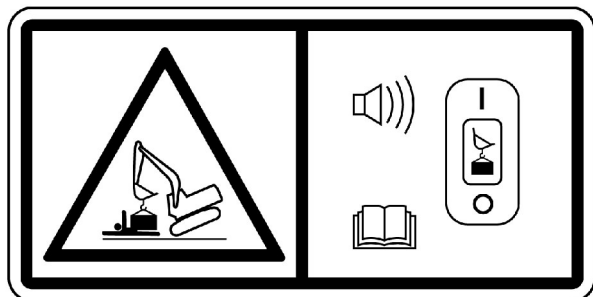


Illustration 14

g01602013

WARNING

Overloading the machine could impact the machine's stability which could result in a tipover hazard. A tipover hazard could result in serious injury or death. Always activate the overload warning device before you handle or lift objects.

Refer to Operation and Maintenance Manual, "Operator Controls" for further information.

Joystick Controls Alternate Patterns (11)

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

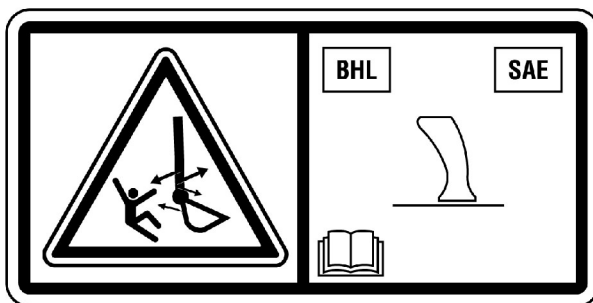


Illustration 15

g01374050

WARNING

Crush Hazard. Improper joystick setting could cause possible unexpected movement of the boom, stick, or worktool which could result in serious injury or death. Confirm that the joystick settings are properly configured before you operate the machine. Read the Operation and Maintenance Manual.

Refer to Operation and Maintenance Manual, "Joystick Controls Alternate Patterns" for further information.

Crushing Hazard (12)

This safety message is located on the rear of each side of the machine. This safety message is also located on each side of the counterweight.

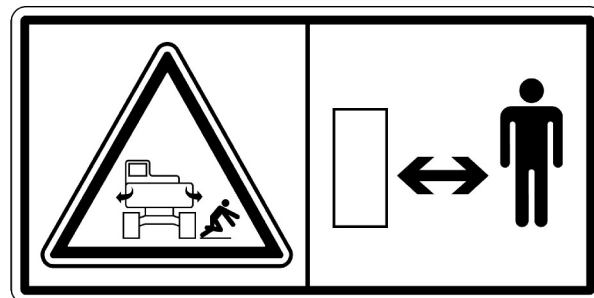


Illustration 16

g01374060

WARNING

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

Flying Debris (13)

This safety message is located on the left side near the rear of the machine.

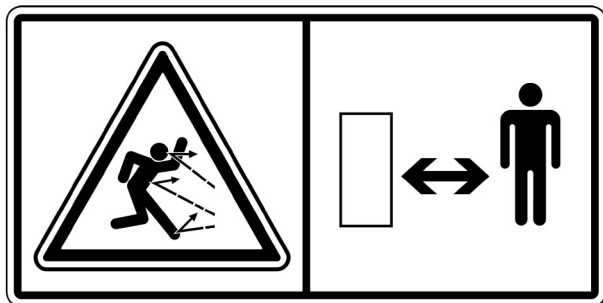


Illustration 17

g01404266

WARNING

During operation of the reversing fan, flying debris could be discharged from the machine which could result in personal injury or death. Stay clear of the reversing fan discharge area during reversing fan operation.

Aerosol Starting Aid (14)

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



Illustration 18

g01372254

WARNING

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

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

Improper Connections For Jump Start Cables (15)

This safety message is positioned on the circuit breaker panel.

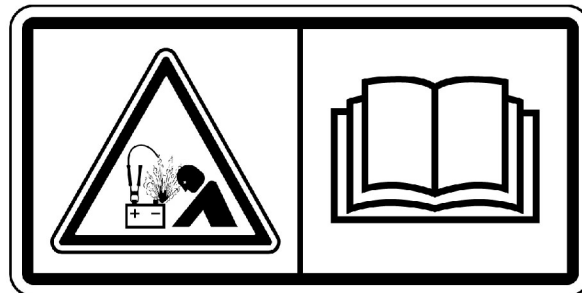


Illustration 19

g01370909

WARNING

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

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

High Pressure Gas (16)

This safety message is located on the accumulator.

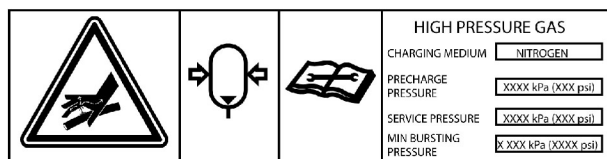


Illustration 20

g01374065

⚠ WARNING

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

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

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

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

Relieve Hydraulic Tank Pressure (17)

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



Illustration 21

g01371640

⚠ WARNING**HYDRAULIC TANK**

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

Hot Surface (18)

Illustration 22

g01372256

This safety message is located on the engine hood.

⚠ WARNING

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

Pressurized System (19)

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



Illustration 23

g01371640

WARNING

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

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

Hot Surface (20)



Illustration 24

g01401055

This safety message is located under the engine hood.

WARNING

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

Crushing Hazard (21)

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

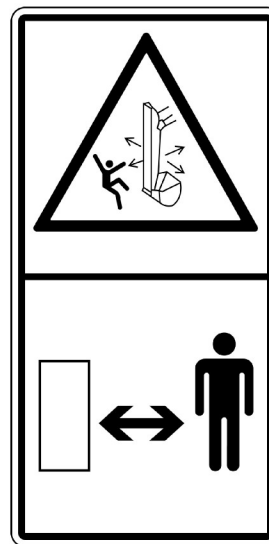


Illustration 25

g01385579

WARNING

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

High Pressure Cylinder (22)

This safety message is positioned on the track adjuster.

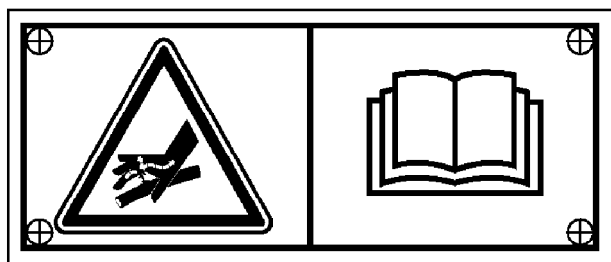


Illustration 26

g01076729

WARNING

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

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

Crushing Hazard (Counterweight) (23)

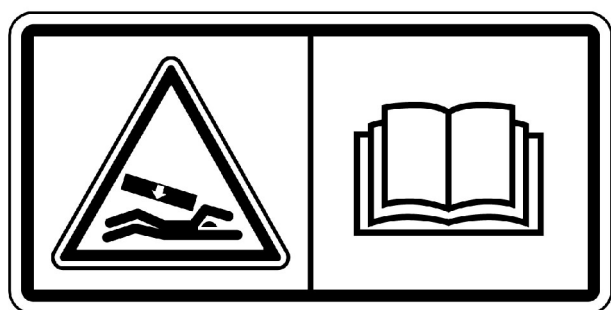


Illustration 27

g01435553

This safety message is located on the right side of the machine inside the access door.

WARNING

Crushing Hazard! When the counterweight is in the fully extended position for servicing the machine, secure the extended counterweight with the counterweight lock lever.

Use the counterweight lock lever to avoid possible personnel injury or death from crushing.

Refer to Operation and Maintenance Manual, "Counterweight Removal and Installation" for further information.

i03434620

Additional Messages

SMCS Code: 7000; 7405

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

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

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

Safety Section
Additional Messages

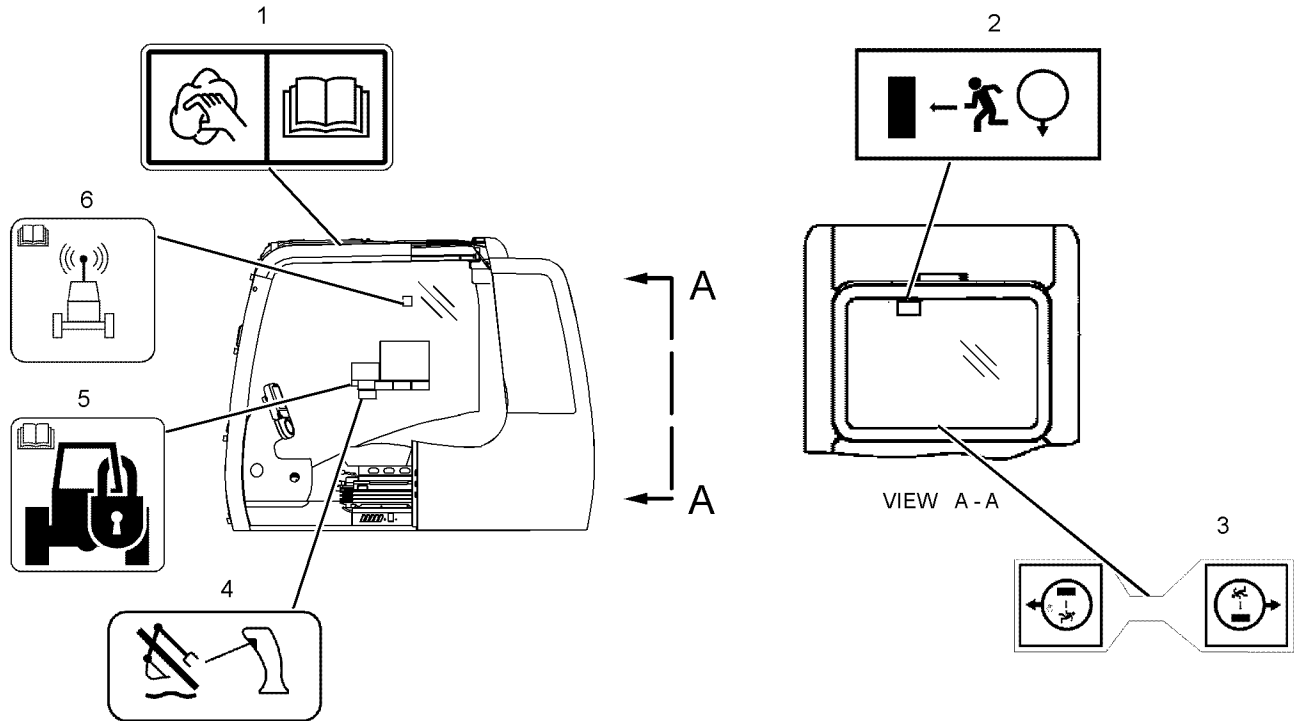


Illustration 28

g01785234

Additional messages inside of cab (if equipped)

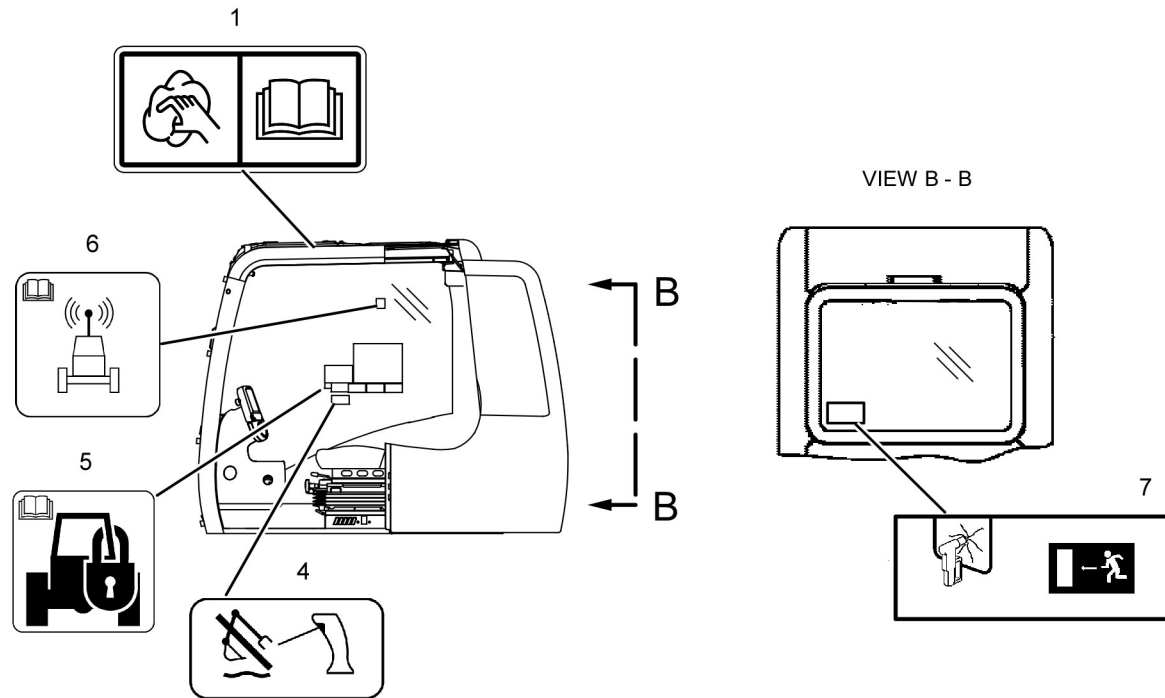


Illustration 29

g01785257

Additional messages inside of cab (if equipped)

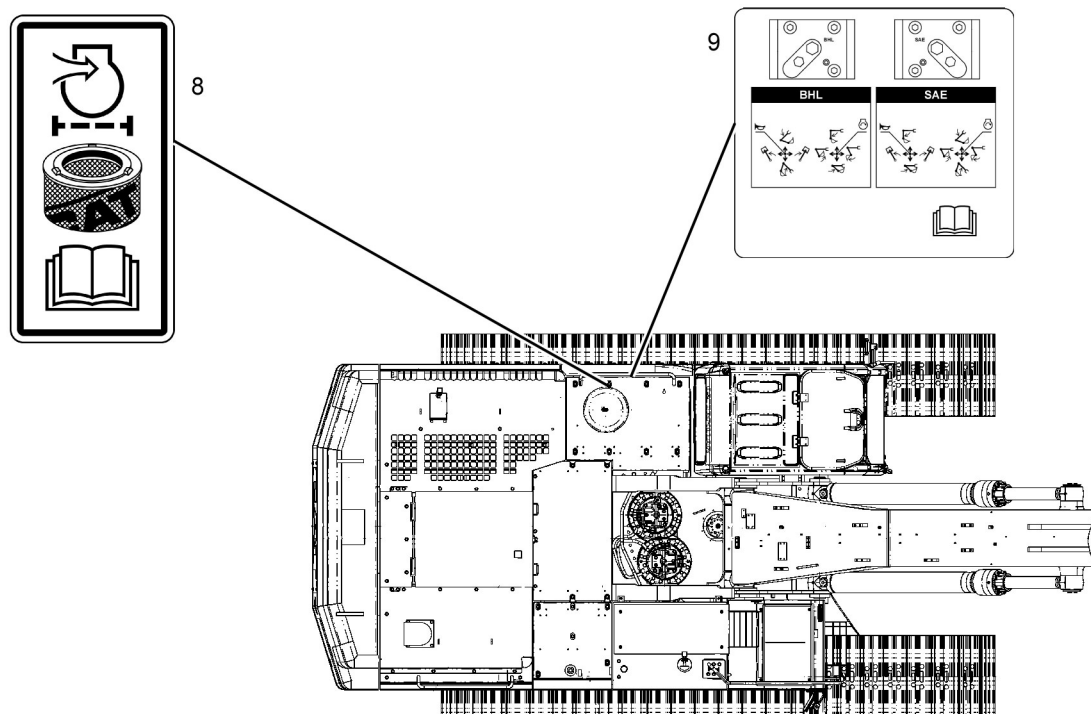


Illustration 30

g01785275

(1) Cleaning Windows

This message is located in three places on the cab windows.

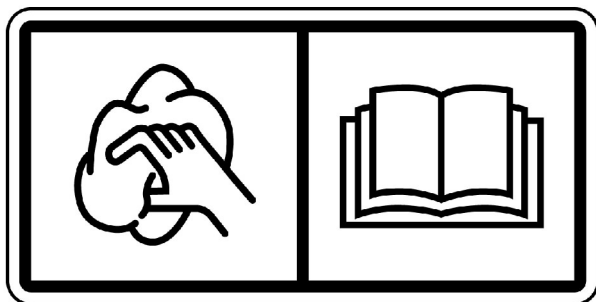


Illustration 31

g01134495

NOTICE

Clean windows with a wet cloth or sponge. Dry cloth or sponge may scratch window material.

(2) Alternate Exit

If equipped, this message is located on the rear window in the cab.

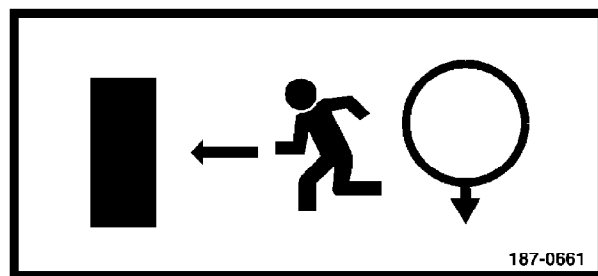


Illustration 32

g00915906

If the primary exits are blocked, pull the ring in order to open the rear window. Exit the machine through the window.

(3) Ring for the Alternate Exit

If equipped, this message is located on the ring for the alternate exit.

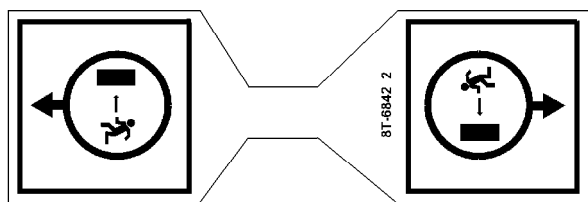


Illustration 33

g00915912

Pull the ring in order to open the alternate exit.

(4) SmartBoom (If Equipped)

This message is located inside the cab on the window.

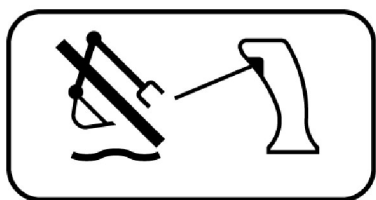


Illustration 34

g01783614

Refer to Operation and Maintenance Manual, "SmartBoom Operation" and Operation and Maintenance Manual, "SmartBoom Control" for more information about smartboom.

(5) Machine Security System

This message is located on the window on the right side of the cab.



Illustration 35

g00951606

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

Refer to Operation and Maintenance Manual, "Machine Security System" for more information.

(6) Data Privacy

This message is located inside the cab on the window.

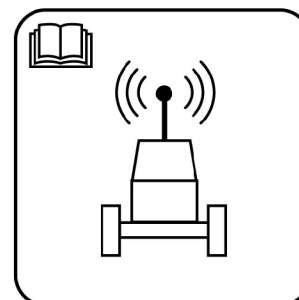


Illustration 36

g01418953

The Product Link System is a satellite communication device that transmits information regarding the machine back to Caterpillar and Caterpillar dealers and customers. All logged events and diagnostic codes that are available to the Caterpillar Electronic Technician (ET) on the CAT data link can be sent to the satellite. Information can also be sent to the Product Link System. The information is used to improve Caterpillar products and Caterpillar services.

Refer to Operation and Maintenance Manual, "Product Link" for more information about product link.

(7) Alternate Exit

If equipped, this message is located on the rear window in the cab.

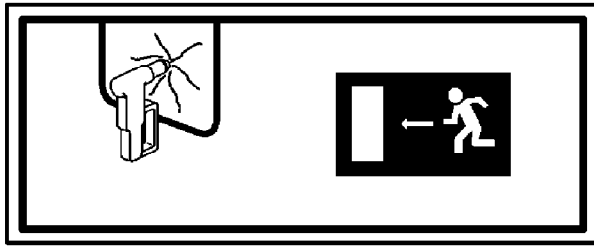


Illustration 37

g01069768

The rear window serves as an alternate exit.

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

Refer to Operation and maintenance Manual, "Alternate Exit" for more information.

(8) Radial Seal Air Filters

This message is located on the air cleaner.

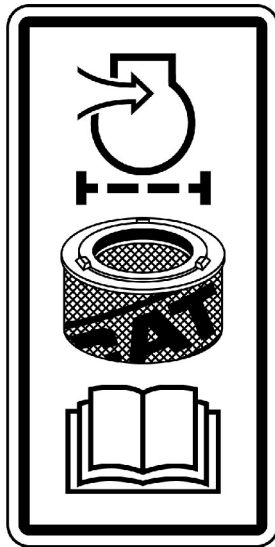


Illustration 38

g01134494

To avoid engine damage, use only Caterpillar radial seal air filters. Other filters will not seal properly. Read the Operation and Maintenance Manual..

Refer to Operation and Maintenance Manual, "Engine Air Filter Primary Element - Clean/Replace".

(9) Alternate Joystick Control Patterns

This message is located behind the front left side access door.

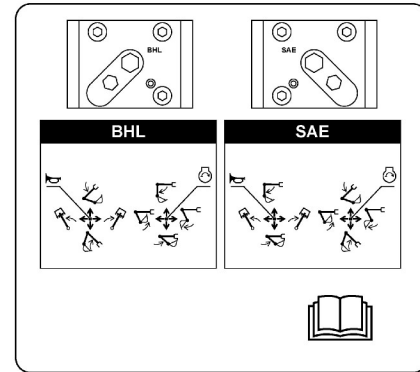


Illustration 39

g01233974

The machine control pattern can easily be changed to the SAE system or to the standard backhoe loader hydraulic system (BHL) by changing the position of the two-way valve (if equipped).

Refer to Operation and Maintenance Manual, "Joystick Controls Alternate Patterns" for further information.

Do not step in this area.

i07746355

General Hazard Information

SMCS Code: 7000

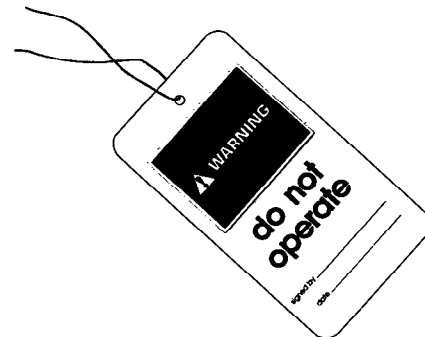


Illustration 40

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.

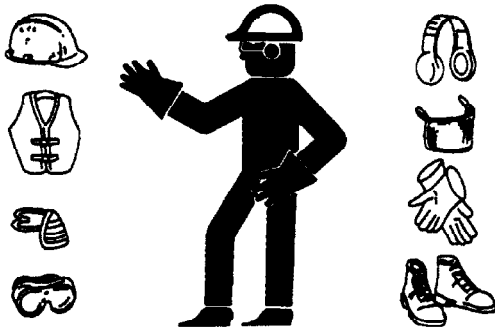


Illustration 41

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.

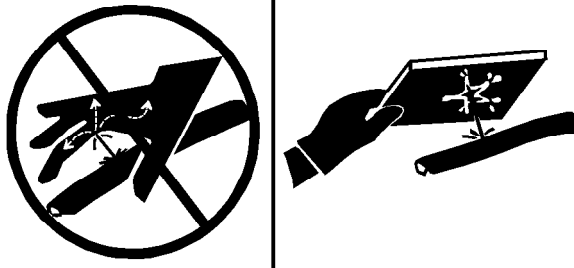


Illustration 42

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

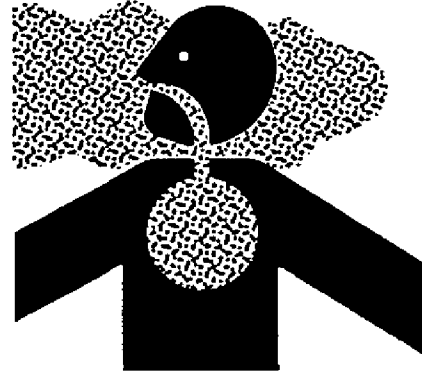


Illustration 43

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

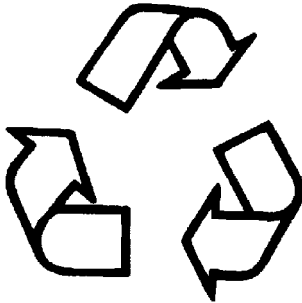


Illustration 44

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 45

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 46

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 47

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.

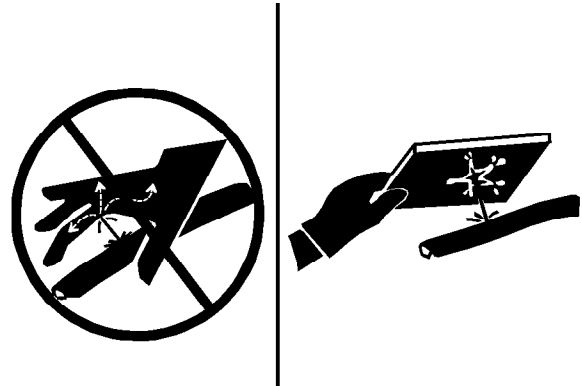


Illustration 48

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.

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.

i07041871

Fire Safety

SMCS Code: 7000

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

i01932259

Fire Extinguisher Location

SMCS Code: 7000; 7419

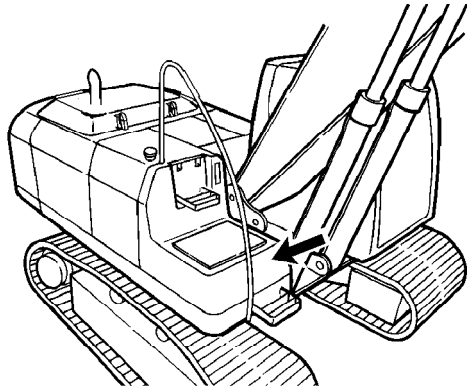


Illustration 49

g01005330

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

The recommended location for mounting the fire extinguisher is in the storage box.

i01329108

Track Information

SMCS Code: 4170; 7000

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

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

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

i01122596

Electrical Storm Injury Prevention

SMCS Code: 7000

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

- Mount the machine.

- Dismount the machine.

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

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.

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.

i06590787

Restricted Visibility

SMCS Code: 7000

The size and the configuration of this machine may result in areas that cannot be seen when the operator is seated. For restricted visibility areas, an appropriate 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".

Illustrations 50 - 52 provide an approximate visual indication of the areas at ground level inside a radius of 12 m (39 ft) from the operator of significant restricted visibility for various machine configurations. Refer to the correct illustration for your machine configuration. All restricted visibility areas less than 300 mm wide may not be shown. These illustrations do not indicate areas of restricted visibility for distances outside of the shown radius. The areas of restricted visibility shown in the illustrations are with the track and work tool of the machine in the Travel position. Illustration 53 shows the position of the work tool in the travel position. The Caterpillar authorized work tool that resulted in the largest visibility restriction was used.

Illustration 50 indicates restricted visibility areas at ground level inside the shown radius from the operator without the use of visual aids that may be optional for this product in some markets.

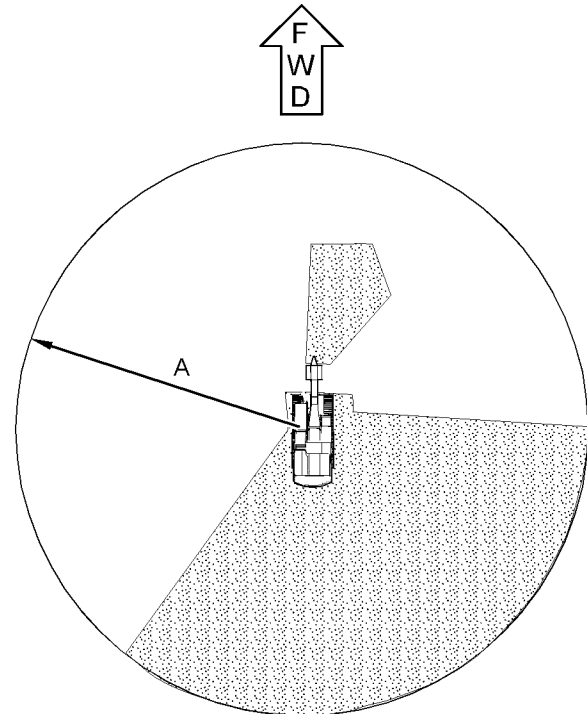


Illustration 50

g03864264

Top view of the machine, ground level visibility without use of optional visual aids

(A) 24 m (79 ft)

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

Illustration 51 indicates restricted visibility areas at ground level inside the shown radius from the operator with the use of available rear camera, right side mirror, and left side mirror installed.

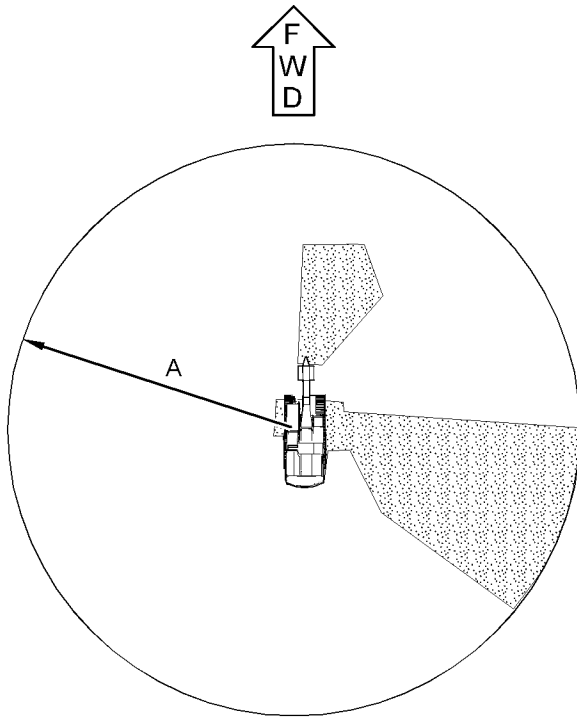


Illustration 51

g03864275

Top view of the machine, ground level visibility with available camera, left side mirror, and right side mirror

(A) 24 m (79 ft)

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

Illustration 52 indicates restricted visibility areas at ground level inside the shown radius from the operator with the use of available rear camera, right side camera (if equipped), left side mirrors installed.

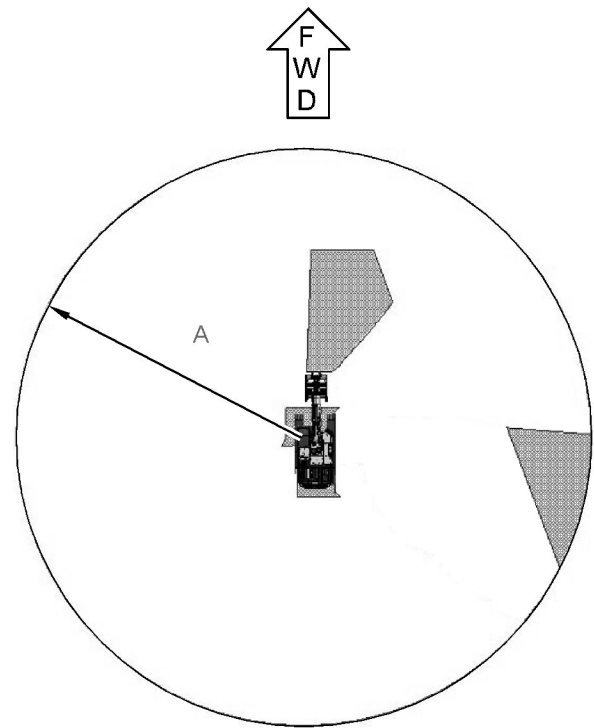


Illustration 52

g06037869

Top view of the machine, ground level visibility with available camera, left side mirror.

(A) 24 m (79 ft)

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

Restricted visibility is measured when the front linkage of the machine is in the travel position. Illustration 53 shows the machine in the travel position.

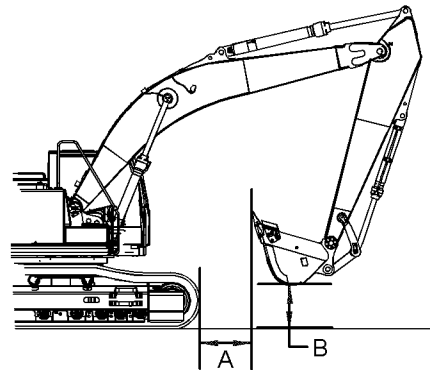


Illustration 53

g02155813

(A) 1 m (3.0 ft) from the front of the machine to the bucket
(B) 0.5 m (1.6 ft) from ground level

i03562260

i04159629

Engine Starting

SMCS Code: 1000; 7000

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

Make sure that you are seated before you start the engine.

Move all hydraulic controls to the HOLD position before you start the engine. Move the hydraulic lockout control to the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, "Operator Controls".

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

Briefly sound the horn before you start the engine.

i01340061

Before Operation

SMCS Code: 7000

Clear all personnel from the machine and from the area.

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

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

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

Fasten the seat belt securely.

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

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

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.

i07742495

Operation

SMCS Code: 7000

Machine Operating Temperature Range

The machine must function satisfactorily in the anticipated ambient temperature limits that are encountered during operation. The standard machine configuration is intended for use within an ambient temperature range of -18°C (0°F) to 43°C (109°F). Special configurations for different ambient temperatures may be available. Consult your Cat dealer for additional information on special configurations of your machine.

Limiting Conditions and Criteria

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

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

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

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

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

Table 1

System or Component Name	Limiting Condition	Criteria for Action	Required Action
Line, tubes, and hoses	End fittings are damaged or leaking. Outer coverings are chafed or cut. Wires are exposed. Outer coverings are swelling or ballooning. Flexible parts of the hoses are kinked. Outer covers have exposed embedded armoring. End fittings are displaced.	Visible corrosion, loose, or damaged lines, tubes, or hoses. Visible fluid leaks.	Immediately repair any lines, tubes, or hoses that are corroded, loose, or damaged. Immediately repair any leaks as these may provide fuel for fires.
Electrical Wiring	Signs of fraying, abrasion, cracking, discoloration, cuts on the insulation	Visible damage to electrical wiring	Immediately replace damaged wiring
Battery cable(s)	Signs of fraying, abrasion, cracking, discoloration, cuts on the insulation of the cable, fouling, corroded terminals, damaged terminals, and loose terminals	Visible damage to battery cable(s)	Immediately replace damaged battery cables
Operator Protective Structure	Structures that are bent, cracked, or loose. Loose, missing, or damaged bolts.	Visible damage to structure. Loose, missing, or damaged bolts.	Do not operate machine with damaged structure or loose, missing, or damaged bolts. Contact your Cat dealer for inspection and repair or replacement options.
Seat Belt	Worn or damaged seat belt or mounting hardware	Visible wear or damage	Immediately replace parts that are worn or damaged.
Seat Belt	Age of seat belt	Three years after date of installation	Replace seat belt three years after date of installation
Safety Messages	Appearance of safety message	Damage to safety messages making them illegible	Replace the illustrations if illegible.
Audible Warning Device(s) (if equipped)	Sound level of audible warning	Reduced or no audible warning present	Immediately repair or replace audible warning devices not working properly.
Camera(s) (if equipped)	Dirt or debris on camera lens	Dirt or debris obstructing camera view	Clean camera before operating machine.
Cab Windows (if equipped)	Dirt, debris, or damaged windows	Dirt or debris obstructing operator visibility. Any damaged windows.	Clean windows before operating machine. Repair or replace damaged windows before operating machine.
Mirrors (if equipped)	Dirt, debris, or damaged mirror	Dirt or debris obstructing operator visibility. Any damaged mirrors.	Clean mirrors before operating machine. Repair or replace damaged mirrors before operating machine.
Braking System	Inadequate braking performance	System does not pass Braking System - Test(s) included in Maintenance Section or in the Testing and Adjusting Manual	Contact your Cat dealer to inspect and, if necessary, repair the brake system.
Cooling System	The coolant temperature is too high.	Monitoring System displays Warning Category 3	Stop the engine immediately. Check the coolant level and check the radiator for debris. Refer to Operation and Maintenance Manual, Cooling System Coolant Level - Check. Check the fan drive belts for the water pump. Refer to Operation and Maintenance Manual, Belts - Inspect/Adjust/ Replace. Make any necessary repairs.
Engine Oil System	A problem has been detected with the engine oil pressure.	Monitoring System displays Warning Category 3	If the warning stays on during low idle, stop the engine and check the engine oil level. Perform any necessary repairs as soon as possible.
Engine system	An engine fault has been detected by the engine ECM.	Monitoring System displays Warning Category 3	Stop the engine immediately. Contact your Cat dealer for service.
Fuel System	A problem has been detected with the fuel system.	Monitoring System displays Warning Category 3	Stop the engine. Determine the cause of the fault and perform any necessary repairs.
Hydraulic Oil System	The hydraulic oil temperature is too high.	Monitoring System displays Warning Category 3	Stop the engine immediately. Check the hydraulic oil level and check the hydraulic oil cooler for debris. Perform any necessary repairs as soon as possible.

(continued)

(Table 1, contd)

System or Component Name	Limiting Condition	Criteria for Action	Required Action
Steering System	A problem has been detected with the steering system. (If equipped with steering system monitoring.)	Monitoring System displays Warning Category 3	Move machine to a safe location and stop the engine immediately. Contact your Cat dealer to inspect and, if necessary, repair the steering system.
Overall Machine	Machine service is required.	Monitoring System displays Warning Category 3	Stop the engine immediately. Contact your Cat dealer for service.

Machine Operation

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

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

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

Make sure that no personnel will be endangered before you move the machine. Do not allow riders on the machine unless the machine has an additional seat with a seat belt.

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

Never use the work tool for a work platform.

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

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

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

When possible, operate the machine up slopes and down slopes with the final drive sprockets facing down the slope. Avoid operating the machine across the slope. Place the heaviest end of the machine uphill when you are working on an incline.

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

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

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

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

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

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

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

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

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

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

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

Know the maximum dimensions of your machine.

Watch the load at all times.

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

The clamshell, the grapple, or the magnet can swing in all directions. Move the joysticks in a continuous motion. Failure to move the joysticks in a continuous motion can cause the clamshell, the grapple, or the magnet to swing into the cab or into a person in the work area. This will result in personal injury.

Certain machine front linkage combinations (boom, stick, quick coupler, work tool) can allow the work tool to contact the machine undercarriage, swing frame, boom, boom hydraulic cylinder and or the cab. Be aware of the position of the work tool while you operate the machine.

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

Machine Operation when the Machine is not Completely Assembled

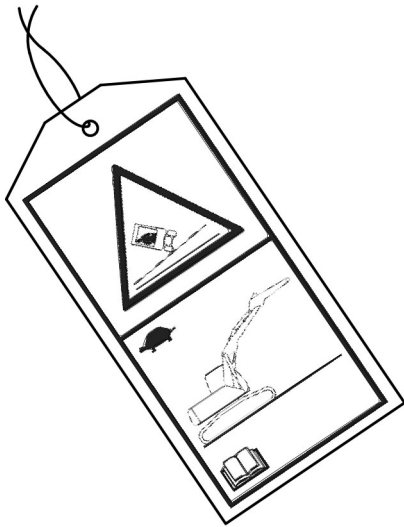


Illustration 54

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Attach the tag to the controls of the machine. When the tag is attached to the controls, operate the machine as described below.

If the machine needs to be operated without the boom, stick, and/or counterweight being installed, the machine should be operated slowly on flat, stable ground or pavement by qualified operators. Avoid any machine operations which could affect machine stability, including the swing function. The ROPS structural certification depends on the support of the boom, stick, and counterweight in the event of a machine tip over or a machine rollover incident.

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.

i07262981

Lifting Objects

SMCS Code: 7000

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

If this machine is used to lift objects within an area that is controlled by the European Directive "2006/42/EC", the machine must be equipped with a boom lowering control valve, a stick lowering control valve, and an overload warning device.

i06781973

Parking

SMCS Code: 7000

The hydraulic system controls remain pressurized if the accumulator is charged. This condition is true even when the engine is not running. The hydraulic control system pressure should decrease in a short time (approximately 1 minute). While the hydraulic controls maintain a charge, the hydraulic work tools and machine controls remain functional.

There can be residual pressure within the hydraulic system even when the accumulator is empty. Refer to this Operation and Maintenance Manual, "System Pressure Release" before any service is performed to the hydraulic system.

Machine movement that is sudden and unexpected will occur if any of the controls are moved. Machine movement that is sudden and unexpected, can cause personal injury or death.

Always move the hydraulic lockout control to the LOCKED position before you shut off the engine or immediately after the engine stops running.

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

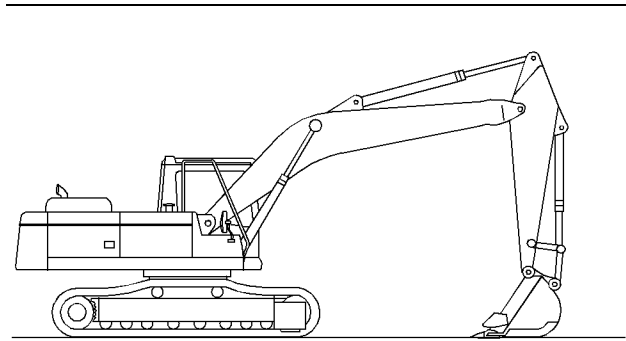


Illustration 55

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Place the machine in the servicing position.

Note: Make sure that all work tools are in the recommended servicing position before servicing the machine.

Move the hydraulic lockout control to the LOCKED position.

Stop the engine.

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

Turn the battery disconnect switch to the OFF position.

Remove the disconnect switch key if you do not operate the machine for an extended period. This will prevent drainage of the battery. A battery short circuit, any current draw from certain components, and vandalism can cause drainage of the battery.

Install barriers or lighting as required to prevent interference in road traffic.

Select places free of danger by flooding and other water damage.

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-II

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

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Sound Information and Vibration Information

SMCS Code: 7000

Sound Level Information

The declared dynamic operator sound pressure level is 78 dB(A) when "ISO 6396: 2008" is used to measure the value for an enclosed cab. The measurement was conducted at 70% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

The declared sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

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.

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

The declared exterior sound power level L_{WA} is 107 dB(A) when the value is measured according to the dynamic test procedures and conditions that are specified in "ISO 6395:2008". The measurement was conducted at 70% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds.

The declared dynamic operator sound pressure level is 78 dB(A) when "ISO 6396: 2008" is used to measure the value for an enclosed cab. The measurement was conducted at 70% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

The declared sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

Sound Level Information for Machines in Eurasian Economic Union Countries

The declared dynamic operator sound pressure level is 78 dB(A) when "ISO 6396:2008" is used to measure the value for an enclosed cab. The measurement was conducted at 70 % of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed.

The declared exterior sound power level L_{WA} is 107 dB(A) when the value is measured according to the dynamic test procedures and the conditions that are specified in "ISO 6395:2008". The measurement was conducted at 70 % of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds.

The declared sound levels listed above include both measurement uncertainty and uncertainty due to production variation.

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

Vibration Data for Track-Type Excavator

Information Concerning Hand/Arm Vibration Level

When the machine is operated according to the intended use, the hand/arm vibration of this machine is below 2.5 m/s².

Information Concerning Whole Body Vibration Level

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

The expected vibration levels can be estimated with the information in Table 2 to calculate the daily vibration exposure. A simple evaluation of the machine application can be used. 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 to obtain the estimated vibration level. For aggressive operations and severe terrain, add the Scenario Factors to the average vibration level to obtain the estimated vibration level.

Table 2

“ISO Reference Table A - Equivalent vibration levels of whole body vibration emission for earthmoving equipment.”							
Machine Type	Typical Operating Activity	Vibration Levels(m/s ²)			Scenario Factors(m/s ²)		
		X axis	Y axis	Z axis	X axis	Y axis	Z axis
Track-Type Excavator	excavating	0.44	0.27	0.30	0.24	0.16	0.17
	hydraulic breaker application	0.53	0.31	0.55	0.30	0.18	0.28
	mining application	0.65	0.42	0.61	0.21	0.15	0.32
	transfer	0.48	0.32	0.79	0.19	0.20	0.23

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.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

Vibration levels are influenced by many different parameters, such as: operator training, operator behavior, operator mode and stress, job site organization, job site preparation, job site environment, job site weather, job site material, machine type, quality of the seat, quality of the suspension system, attachments, and condition of the 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 manufacturers recommendations: tire pressures and brake and steering systems, controls, hydraulic system, and linkages.
3. Keep the terrain in good condition by performing the following items: remove any large rocks or obstacles, fill any ditches and holes and provide machines and schedule time to maintain the conditions of the terrain.
4. Keep the seat maintained and adjusted by doing the following: adjust the seat and suspension for the weight and the size of the operator and inspect and maintain the seat suspension and adjustment mechanisms.
5. Perform the following operations smoothly: steer, brake, accelerate, and shift the gears.
6. Move the attachments smoothly.
7. Adjust the machine speed and the route to minimize the vibration level by doing the following: drive around obstacles and rough terrain and slow down when necessary to go over rough terrain.
8. Minimize vibrations for a long work cycle or a long travel distance by doing the following: use machines that are equipped with suspension systems, if no ride control system is available, reduce speed to prevent bounce and haul the machines between workplaces.
9. Less operator comfort may be caused by other risk factors. The following guidelines can be effective to provide better operator comfort: adjust the seat and adjust the controls to achieve good posture, adjust the mirrors to minimize twisted posture, provide breaks to reduce long periods of sitting, avoid jumping from the cab, minimize repeated handling of loads and lifting of loads and minimize any shocks and impacts during sports and leisure activities.

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

Use the following web site to find your local dealer:

Caterpillar, Inc.
www.cat.com

Sources

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

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

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

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

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

Use the following web site to find your local dealer:

Caterpillar, Inc.
www.cat.com

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Operator Station

SMCS Code: 7300; 7301; 7325

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

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Guards (Operator Protection)

SMCS Code: 7000; 7150

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

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

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

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

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

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

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

Other Guards (If Equipped)

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

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

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

- Demolition applications
- Rock quarries
- Forestry products

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

Product Information Section

General Information

- Ensure that machine application conditions comply with Caterpillar's recommendations.
- Ensure that the operating weight does not exceed limits set by manufacturer.

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Specifications

SMCS Code: 7000

Intended Use

The intended use of this machine is for excavating with a bucket or working with approved work tools. The machine should be operated with the undercarriage in a stationary position since the upper structure is normally capable of 360 degree swing with mounted equipment. This machine can be used in object handling applications that are within the lift capacity of the machine. When this machine is used in object handling applications, ensure that the machine is properly configured and operated properly. Obey any local governmental regulations and regional governmental regulations. Only lift objects from approved lifting points and with approved lifting devices.

Expected Life

The expected life, defined as total machine hours, of this machine is dependent upon many factors including the machine owner's desire to rebuild the machine back to factory specifications. The expected life interval of this machine is 10,000 service hours. The expected life interval corresponds to the service hours to engine overhaul or replacement. Service hours to engine overhaul or replacement may vary based on overall machine duty cycle. At the expected life interval, remove the machine from operation and consult your Cat dealer for inspect, repair, rebuild, install remanufactured, install new components, or disposal options and to establish a new expected life interval. If a decision is made to remove this machine from service, refer to Operation and Maintenance Manual, "Decommissioning and Disposal".

The following items are required to obtain an economical expected life of this machine:

- Perform regular preventive maintenance procedures as described in the Operation and Maintenance Manual.
- Perform machine inspections as described in the Operation and Maintenance Manual and correct any problems discovered.
- Perform system testing as described in the Operation and Maintenance Manual and correct any problems discovered.

Product Information Section Specifications

- Ensure that all frame cracks are identified, inspected, and repaired to prevent further development.

Specification Data

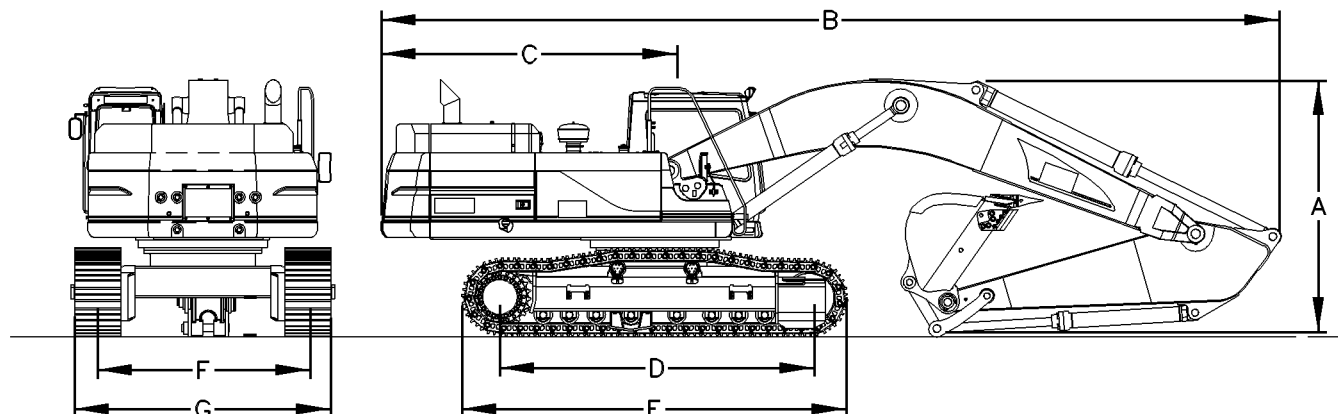


Illustration 56

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Table 3

Excavator with a Reach Boom and a Fixed Gauge Undercarriage ⁽¹⁾	
Approximate Weight	47400 kg (104500 lb)
Shipping Height (A)	3690 mm (12 ft 1 inch)
Shipping Length (B)	11940 mm (39 ft 2 inch)
Swing Radius (C)	3770 mm (12 ft 4 inch)
Length to Center of Rollers (D)	4360 mm (14 ft 4 inch)
Length of Track (E)	5370 mm (17 ft 7 inch)
Track Gauge (F)	2740 mm (8 ft 12 inch)
Overall Width ⁽²⁾ (G)	3490 mm (11 ft 5 inch)

⁽¹⁾ These specifications are for a machine with a 6.9 m (22 ft 8 inch) boom, a 3.35 m (11 ft) stick and a 2.0 m³ (2.62 yd³) bucket. The fuel tank is 10 percent full.

⁽²⁾ Width includes 750 mm (30 inch) track shoes.

Table 4

Excavator with a Mass Boom and a Fixed Gauge Undercarriage ⁽¹⁾	
Approximate Weight	47800 kg (105380 lb)
Shipping Height (A)	4020 mm (13 ft 2 inch)

(Table 4, contd)

Shipping Length (B)	11640 mm (38 ft 2 inch)
Swing Radius (C)	3770 mm (12 ft 4 inch)
Length to Center of Rollers (D)	4360 mm (14 ft 4 inch)
Length of Track (E)	5370 mm (17 ft 7 inch)
Track Gauge (F)	2740 mm (8 ft 12 inch)
Overall Width ⁽²⁾ (G)	3340 mm (10 ft 11 inch)

⁽¹⁾ These specifications are for a machine with a 6.55 m (21 ft 6 inch) boom, a 3.0 m (9 ft 10 inch) stick and a 2.6 m³ (3.40 yd³) bucket. The fuel tank is 10 percent full.

⁽²⁾ Width includes 600 mm (24 inch) track shoes.

Table 5

Excavator with a Reach Boom and a Variable Gauge Undercarriage ⁽¹⁾	
Approximate Weight	50000 kg (110230 lb)
Shipping Height (A)	3790 mm (12 ft 5 inch)
Shipping Length (B)	11850 mm (38 ft 10 inch)
Swing Radius (C)	3770 mm (12 ft 4 inch)
Length to Center of Rollers (D)	4340 mm (14 ft 3 inch)

(continued)

(continued)

(Table 5, contd)

Length of Track (E)	5330 mm (17 ft 6 inch)
Track Gauge ⁽²⁾ (F)	2390 mm (7 ft 10 inch)
Track Gauge ⁽³⁾ (F)	2890 mm (9 ft 6 inch)
Overall Width ⁽⁴⁾ (G)	3140 mm (10 ft 4 inch)
Overall Width ⁽⁵⁾ (G)	3640 mm (11 ft 11 inch)

(1) These specifications are for a machine with a 6.9 m (22 ft 8 inch) boom, a 3.35 m (11 ft) stick and a 2.2 m³ (2.88 yd³) bucket. The fuel tank is 10 percent full.

(2) Retracted

(3) Extended

(4) Retracted width includes 750 mm (30 inch) track shoes.

(5) Extended width includes 750 mm (30 inch) track shoes.

Table 6

Excavator with a Mass Boom and a Variable Gauge Undercarriage⁽¹⁾	
Approximate Weight	50660 kg (111690 lb)
Shipping Height (A)	4040 mm (13 ft 3 inch)
Shipping Length (B)	11530 mm (37 ft 10 inch)
Swing Radius (C)	3770 mm (12 ft 4 inch)
Length to Center of Rollers (D)	4340 mm (14 ft 3 inch)
Length of Track (E)	5330 mm (17 ft 6 inch)
Track Gauge ⁽²⁾ (F)	2390 mm (7 ft 10 inch)
Track Gauge ⁽³⁾ (F)	2890 mm (9 ft 6 inch)
Overall Width ⁽⁴⁾ (G)	2990 mm (9 ft 9 inch)
Overall Width ⁽⁵⁾ (G)	3490 mm (11 ft 5 inch)

(1) These specifications are for a machine with a 6.55 m (21 ft 6 inch) boom, a 3.0 m (9 ft 10 inch) stick and a 2.8 m³ (3.66 yd³) bucket. The fuel tank is 10 percent full.

(2) Retracted

(3) Extended

(4) Retracted width includes 600 mm (24 inch) track shoes.

(continued)

(Table 6, contd)
(5) Extended width includes 600 mm (24 inch) track shoes.

Working Ranges

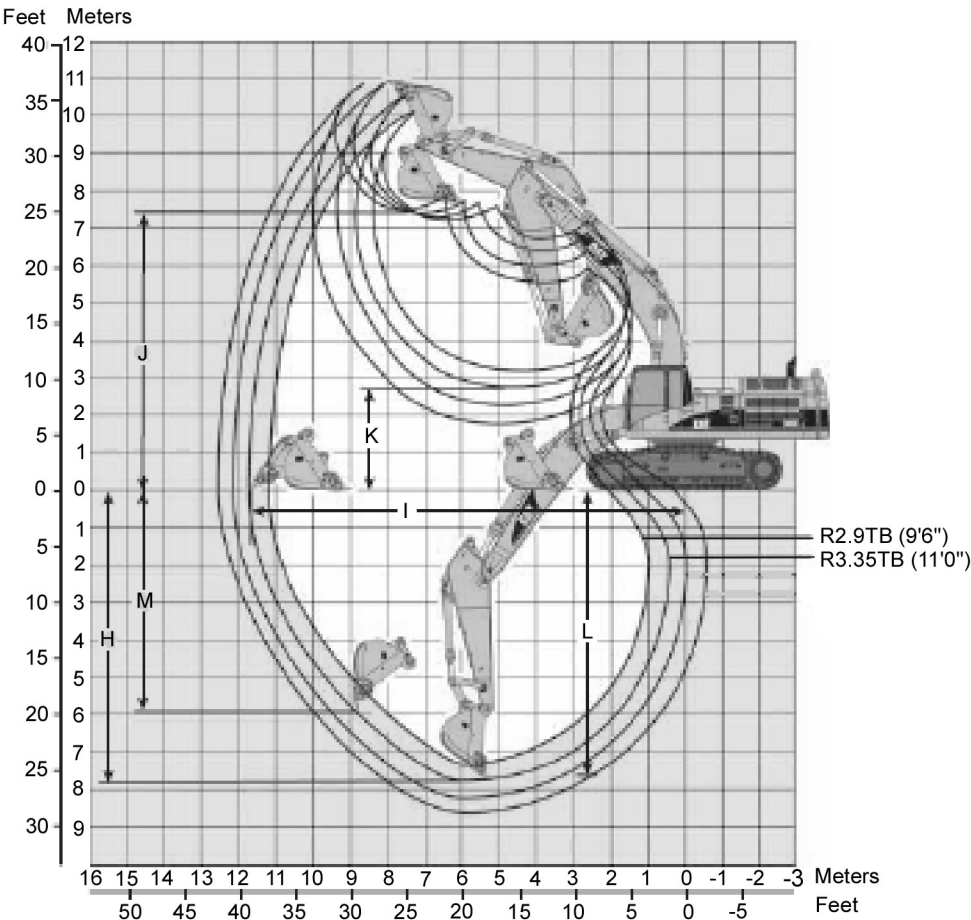


Illustration 57
Reach Boom

g01212080

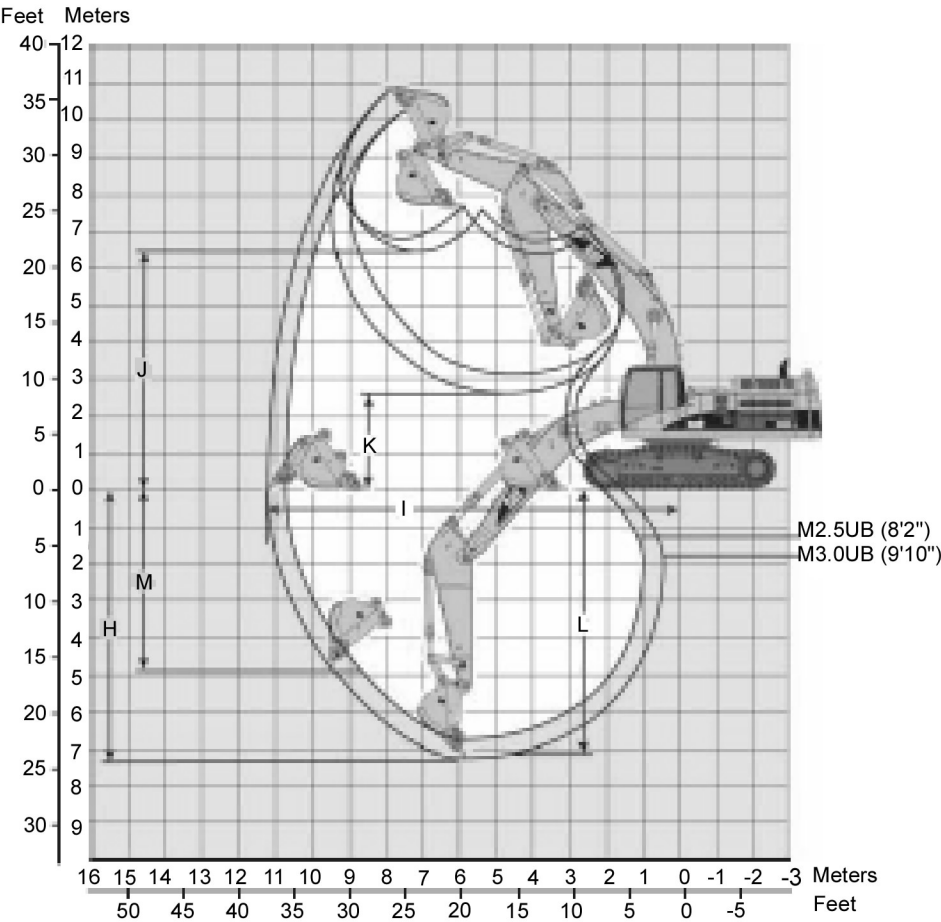


Illustration 58
Mass Boom

g01217094

Table 7

Fixed Gauge Undercarriage				
	6.9 m (22 ft 8 inch) Reach Boom		6.55 m (21 ft 6 inch) Mass Boom	
	2.9 m (9 ft 6 inch) Stick	3.35 m (11 ft) Stick	2.5 m (8 ft 2 inch) Stick	3.0 m (9 ft 10 inch) Stick
Bucket	2.2 m ³ (2.88 yd ³)	2.0 m ³ (2.62 yd ³)	2.6 m ³ (3.40 yd ³)	
Maximum Digging Depth (H)	7186 mm (23 ft 7 inch)	7636 mm (25 ft 1 inch)	6755 mm (22 ft 2 inch)	7255 mm (23 ft 10 inch)
Maximum Reach at Ground Level (I)	11313 mm (37 ft 1 inch)	11731 mm (38 ft 6 inch)	10786 mm (35 ft 5 inch)	11249 mm (36 ft 11 inch)
Maximum Loading Height (J)	7258 mm (23 ft 10 inch)	7435 mm (24 ft 5 inch)	6584 mm (21 ft 7 inch)	6777 mm (22 ft 3 inch)
Minimum Loading Height (K)	3266 mm (10 ft 9 inch)	2823 mm (9 ft 3 inch)	3135 mm (10 ft 3 inch)	2659 mm (8 ft 9 inch)
Maximum Cut Depth (L) ⁽¹⁾	7024 mm (23 ft 1 inch)	7489 mm (24 ft 7 inch)	6584 mm (21 ft 7 inch)	7103 mm (23 ft 4 inch)
Maximum Digging Depth (Vertical wall) (M)	5033 mm (16 ft 6 inch)	5441 mm (17 ft 10 inch)	4069 mm (13 ft 4 inch)	4507 mm (14 ft 9 inch)

⁽¹⁾ 2440 mm (8 ft) level bottom

Table 8

Variable Gauge Undercarriage				
	6.9 m (22 ft 8 inch) Reach Boom		6.55 m (21 ft 6 inch) Mass Boom	
	2.9 m (9 ft 6 inch) Stick	3.35 m (11 ft) Stick	2.5 m (8 ft 2 inch) Stick	3.0 m (9 ft 10 inch) Stick
Bucket	2.2 m ³ (2.88 yd ³)	2.0 m ³ (2.62 yd ³)	2.6 m ³ (3.40 yd ³)	
Maximum Digging Depth (H)	7041 mm (23 ft 1 inch)	7491 mm (24 ft 7 inch)	6610 mm (21 ft 8 inch)	7110 mm (23 ft 4 inch)
Maximum Reach at Ground Level (I)	11284 mm (37 ft)	11703 mm (38 ft 5 inch)	10756 mm (35 ft 4 inch)	11220 mm (36 ft 10 inch)
Maximum Loading Height (J)	7403 mm (24 ft 3 inch)	7580 mm (24 ft 10 inch)	6729 mm (22 ft 1 inch)	6922 mm (22 ft 9 inch)
Minimum Loading Height (K)	3411 mm (11 ft 2 inch)	2968 mm (9 ft 9 inch)	3280 mm (10 ft 9 inch)	2804 mm (9 ft 2 inch)
Maximum Cut Depth (L)⁽¹⁾	6879 mm (22 ft 7 inch)	7344 mm (24 ft 1 inch)	6439 mm (21 ft 2 inch)	7026 mm (23 ft 1 inch)
Maximum Digging Depth (Vertical wall) (M)	4888 mm (16 ft)	5296 mm (17 ft 4 inch)	3924 mm (12 ft 10 inch)	4362 mm (14 ft 4 inch)

⁽¹⁾ 2440 mm (8 ft) level bottom

i05757008

Boom/Stick/Bucket Combinations

SMCS Code: 6000; 6700

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

Buckets are grouped into families (B and C) according to the capacity of the bucket. Generally, use a bucket with a smaller capacity when you are using a longer stick and/or a longer boom. Conversely, use a bucket with a larger capacity when you are using a shorter stick and/or a shorter boom. This rule ensures better machine stability and protection against structural machine damage.

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

Variable Gauge

Table 9

Variable Gauge							
SAE Capacity of Bucket	Weight of Bucket	Width of Bucket	Track Shoe Width	Counterweight	6.9 m (22 ft 8 inch) HD Reach Boom		
					3.9 m (12 ft 9 inch) Stick	3.35 m (11 ft 0 inch) Stick	2.9 m (9 ft 6 inch) Stick
2.8 m ³ (3.66 yd ³)	2667 kg (5879 lb)	1750 mm (69 inch)	600 mm (24 inch)	9000 kg (19840 lb)	(1)	(2)	(3)

(1) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.(2) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.(3) 1800 kg/m³ (3000 lb/yd³) is the maximum density of material.

Table 10

Variable Gauge							
SAE Capacity of Bucket	Weight of Bucket	Width of Bucket	Track Shoe Width	Counterweight	6.55 m (21 ft 6 inch) Mass Boom		
					3.0 m (9 ft 10 inch) Stick	2.55 m (8 ft 4 inch) Stick	
3.2 m ³ (4.19 yd ³)	3173 kg (6995 lb)	1750 mm (69 inch)	600 mm (24 inch)	9000 kg (19840 lb)	(1)	(2)	

(1) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.(2) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.

Fixed Gauge

Table 11

Fixed Gauge					
SAE Capacity of Bucket	Weight of Bucket	Width of Bucket	Track Shoe Width	Counterweight	6.9 m (22 ft 8 inch) HD Reach Boom
					3.35 m (11 ft 0 inch) Stick
2.2 m ³ (2.88 yd ³)	2468 kg (5441 lb)	1500 mm (59 inch)	600 mm (24 inch)	9000 kg (19840 lb)	(1)

(1) 1500 kg/m³ (2500 lb/yd³) is the maximum density of material.

Table 12

Fixed Gauge						
SAE Capacity of Bucket	Weight of Bucket	Width of Bucket	Track Shoe Width	Counterweight	6.55 m (21 ft 6 inch) Mass Boom	
					3.0 m (9 ft 10 inch) Stick	2.55 m (8 ft 4 inch) Stick
2.8 m ³ (3.66 yd ³)	3236 kg (7134 lb)	1550 mm (61 inch)	600 mm (24 inch)	9000 kg (19840 lb)	(1)	
3.2 m ³ (4.19 yd ³)	3405 kg (7507 lb)	1700 mm (67 inch)	600 mm (24 inch)	9000 kg (19840 lb)		(1)

(1) 1200 kg/m³ (2000 lb/yd³) is the maximum density of material.

Consult your Cat dealer for more information.

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Lifting Capacities

SMCS Code: 7000

WARNING

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

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

- lubricants
- full fuel tank
- Steel track
- cab
- 75 kg (165 lb) operator

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

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

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

For European applications, the lifting capacities are defined by "ISO 10567 2007". The lifting capacities are defined as the lower value of 75% of the static tipping capacity or 87% of the hydraulic lift capacity.

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

This machine may be equipped with various sticks. Lifting capacities may vary between the different sticks. Measure the distance on the stick between the boom hinge pin and the work tool hinge pin. This distance will inform you of the size of the stick that is equipped on the machine.

Note: In European countries, regulations require a load sensing indicator and a boom lowering control device if more than 1000 kg (2200 lb) is lifted during object handling applications. Regulations also require a load sensing indicator and a boom lowering control device if a force that is greater than 40000 N·m (29500 lb ft) is created during object handling applications. Even if the hydraulic lift capacity is capable, do not exceed a load of 1000 kg (2200 lb). Do not exceed a force of 40000 N·m (29500 lb ft) in European object handling applications.

Fixed Gauge



Illustration 59

g01055537

(H) Height

(F) Lifting capacity over the front of the machine

(S) Lifting capacity over the side of the machine

(R) Reach

Table 13

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 3.35 m (11 ft 2 in) stick, a 2.2 m ³ (2.94 yd ³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes ⁽¹⁾ All lifting capacities are in kilograms and pounds.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
9.0 m 30.0 ft											4800 ⁽²⁾ 10600 ⁽²⁾		8.19 26.50
7.5 m 25.0 ft											4800 ⁽²⁾ 10600 ⁽²⁾		9.09 29.63
6.0 m 20.0 ft							7950 ⁽²⁾ 17250 ⁽²⁾		7300 ⁽²⁾ 15900 ⁽²⁾	6350 13500	4750 ⁽²⁾ 10400 ⁽²⁾		9.87 32.23
4.5 m 15.0 ft			15400 ⁽²⁾ 32700 ⁽²⁾		11050 ⁽²⁾ 23750 ⁽²⁾		89500 ⁽²⁾ 19350 ⁽²⁾	8700 18600	7750 ⁽²⁾ 16800 ⁽²⁾	6100 13050	4800 ⁽²⁾ 10550 ⁽²⁾	4450 9850	10.36 33.93
3.0 m 10.0 ft					13300 ⁽²⁾ 28500 ⁽²⁾	11800 25400	10100 ⁽²⁾ 21800 ⁽²⁾	8150 17500	8350 ⁽²⁾ 18050 ⁽²⁾	5850 12450	5050 ⁽²⁾ 11050 ⁽²⁾	4100 9050	10.61 34.78
1.5 m 5.0 ft					14900 ⁽²⁾ 32050 ⁽²⁾	11000 23700	11100 ⁽²⁾ 23900 ⁽²⁾	7700 16500	8850 ⁽²⁾ 19150 ⁽²⁾	5500 11900	5450 ⁽²⁾ 11950 ⁽²⁾	3950 8750	10.62 34.85
0			22950 ⁽²⁾		15450 ⁽²⁾ 33350 ⁽²⁾	10600 22750	11600 ⁽²⁾ 25050 ⁽²⁾	7350 15800	9150 ⁽²⁾ 19750 ⁽²⁾	5350 11450	6100 ⁽²⁾ 13400 ⁽²⁾	4050 8900	10.41 34.14
-1.5 m -5.0 ft			19700 ⁽²⁾ 42800 ⁽²⁾	17050 36550	15050 ⁽²⁾ 32500 ⁽²⁾	11500 22450	11500 ⁽²⁾ 24850	7200 15500	9000 ⁽²⁾ 19250 ⁽²⁾	5250 11250	7100 ⁽²⁾ 15650 ⁽²⁾	4400 9650	9.95 32.63
-3.0 m -10.0 ft	18400 ⁽²⁾ 42100 ⁽²⁾		17500 ⁽²⁾ 38000 ⁽²⁾	17250 37000	13750 ⁽²⁾ 29700 ⁽²⁾	10500 22550	10650 ⁽²⁾ 22850 ⁽²⁾	7250 15500	7950 ⁽²⁾	5300	7450 ⁽²⁾ 16400 ⁽²⁾	5100 11250	9.24 30.21
-4.5 m -15.0 ft			14150 ⁽²⁾ 30400 ⁽²⁾		11300 ⁽²⁾ 24150 ⁽²⁾	10750 23150	8500 ⁽²⁾ 17800 ⁽²⁾	7450 16000			7050 ⁽²⁾ 15450 ⁽²⁾	6500 14550	8.15 26.53

⁽¹⁾ Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

⁽²⁾ Capacity is limited by hydraulics rather than by a tipping load.

Product Information Section
Lifting Capacities

Table 14

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 3.35 m (11 ft 2 in) stick, a 2.2 m³ (2.94 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
9.0 m 30.0 ft											5400 ⁽²⁾ 11550 ⁽²⁾		8.19 26.50
7.5 m 25.0 ft											5450 ⁽²⁾ 11950 ⁽²⁾		9.09 29.63
6.0 m 20.0 ft							9000 ⁽²⁾ 19550 ⁽²⁾		8300 ⁽²⁾ 18100 ⁽²⁾	6250 13500	5350 ⁽²⁾ 11750 ⁽²⁾	5150 11400	9.87 32.23
4.5 m 15.0 ft			17150 ⁽²⁾ 36450 ⁽²⁾		12400 ⁽²⁾ 26650 ⁽²⁾		10100 ⁽²⁾ 21900 ⁽²⁾	8700 18600	8800 ⁽²⁾ 19150 ⁽²⁾	6100 13050	5450 ⁽²⁾ 11900 ⁽²⁾	4450 9850	10.36 33.93
3.0 m 10.0 ft					14900 ⁽²⁾ 32000 ⁽²⁾	11800 25400	11400 ⁽²⁾ 24600 ⁽²⁾	8150 17500	9500 ⁽²⁾ 20550 ⁽²⁾	5850 12450	5700 ⁽²⁾ 12500 ⁽²⁾	4100 9050	10.61 34.78
1.5 m 5.0 ft					16700 ⁽²⁾ 36000 ⁽²⁾	11000 23700	12500 ⁽²⁾ 27000 ⁽²⁾	7700 16500	9950 21300	5500 11900	6150 ⁽²⁾ 13450 ⁽²⁾	3950 8750	10.62 34.85
0			24750 ⁽²⁾		17350 ⁽²⁾ 37500 ⁽²⁾	10600 22750	13100 ⁽²⁾ 28300 ⁽²⁾	7350 15800	9700 20800	5350 11450	6850 ⁽²⁾ 15050 ⁽²⁾	4050 8900	10.41 34.14
-1.5 m -5.0 ft			21000 ⁽²⁾ 48000 ⁽²⁾	17050 36550	16900 ⁽²⁾ 36600 ⁽²⁾	10450 22450	13000 ⁽²⁾ 28000	7200 15500	9100 ⁽²⁾	5300	7900 ⁽²⁾ 17450 ⁽²⁾	4400 9650	9.95 32.63
-3.0 m -10.0 ft	19650 ⁽²⁾ 45000 ⁽²⁾		19700 ⁽²⁾ 42750 ⁽²⁾	17250 37000	15500 ⁽²⁾ 33500 ⁽²⁾	10500 22550	12050 ⁽²⁾ 25950 ⁽²⁾	7250 15500	9100 ⁽²⁾	5300	8550 ⁽²⁾ 18850 ⁽²⁾	5100 11250	9.24 30.21
-4.5 m -15.0 ft			16000 ⁽²⁾ 34400 ⁽²⁾		12850 ⁽²⁾ 27500 ⁽²⁾	10750 23450	9750 ⁽²⁾ 20450 ⁽²⁾	7450 16000			8150 ⁽²⁾ 17850 ⁽²⁾	6500 14550	8.15 26.53

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 15

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 3.0 m (9 ft 10 inch) stick, a 2.8 m³ (3.66 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
9.0 m 30.0 ft											4950 ⁽²⁾		7.59
7.5 m 25.0 ft							7200 ⁽²⁾ 15850 ⁽²⁾				4950 ⁽²⁾ 10850 ⁽²⁾		8.57 27.92

(continued)

(Table 15, contd)

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 3.0 m (9 ft 10inch) stick, a 2.8 m³ (3.66 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
6.0 m 20.0 ft							7650 ⁽²⁾ 16550 ⁽²⁾				5100 ⁽²⁾ 11250 ⁽²⁾		9.22 30.10
4.5 m 15.0 ft			15200 ⁽²⁾ 32150 ⁽²⁾		10650 ⁽²⁾ 22800 ⁽²⁾		8500 ⁽²⁾ 18350 ⁽²⁾	7950 16950	7300 ⁽²⁾ 15900 ⁽²⁾	5350 11350	5200 ⁽²⁾ 11350 ⁽²⁾	4350 9700	9.74 31.91
3.0 m 10.0 ft					12750 ⁽²⁾ 27400 ⁽²⁾	11050 23750	9550 ⁽²⁾ 20600 ⁽²⁾	7400 15850	7800 ⁽²⁾ 16850 ⁽²⁾	5100 10800	5450 ⁽²⁾ 11950 ⁽²⁾	3950 8650	10.00 32.79
1.5 m 5.0 ft					14250 ⁽²⁾ 30650 ⁽²⁾	10250 22000	10450 ⁽²⁾ 22450 ⁽²⁾	6950 14850	8200 ⁽²⁾ 17700 ⁽²⁾	4800 10250	5950 ⁽²⁾ 13100 ⁽²⁾	3800 8300	10.00 32.82
0					14600 ⁽²⁾ 31450 ⁽²⁾	9850 21150	10800 ⁽²⁾ 23300 ⁽²⁾	6650 14200	8350 ⁽²⁾ 17900 ⁽²⁾	4650 9850	6800 ⁽²⁾ 14900 ⁽²⁾	3900 8550	9.76 32.02
-1.5 m -5.0 ft			18400 ⁽²⁾ 39950 ⁽²⁾	16550 35350	13900 ⁽²⁾ 30050 ⁽²⁾	9750 20900	10500 ⁽²⁾ 22550 ⁽²⁾	6500 13950	7800 ⁽²⁾	4600	7350 ⁽²⁾ 16150 ⁽²⁾	4350 9600	9.25 30.32
-3.0 m -10.0 ft	19000 ⁽²⁾ 41300 ⁽²⁾		15500 ⁽²⁾ 33600 ⁽²⁾		12200 ⁽²⁾ 26250 ⁽²⁾	9900 21200	9150 ⁽²⁾ 19500 ⁽²⁾	6600 14100			7150 ⁽²⁾ 15700 ⁽²⁾	5300 11750	8.46 27.65
-4.5 m -15.0 ft			11250 ⁽²⁾ 24000 ⁽²⁾		8900 ⁽²⁾ 18750 ⁽²⁾						6300 ⁽²⁾ 13650 ⁽²⁾		7.22 23.45

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 16

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 3.0 m (9 ft 10inch) stick, a 2.8 m³ (3.66 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
9.0 m 30.0 ft											5600 ⁽²⁾		7.59
7.5 m 25.0 ft							8250 ⁽²⁾ 18150 ⁽²⁾				5600 ⁽²⁾ 12300 ⁽²⁾		8.57 27.92
6.0 m 20.0 ft							8750 ⁽²⁾ 18950 ⁽²⁾	8400 17950			5800 ⁽²⁾ 12750 ⁽²⁾	5200 11600	9.22 30.10
4.5 m 15.0 ft			17000 ⁽²⁾ 36050 ⁽²⁾		12050 ⁽²⁾ 25800 ⁽²⁾		9700 ⁽²⁾ 21000 ⁽²⁾	7950 16950	8450 ⁽²⁾ 18300 ⁽²⁾	5350 11350	5900 ⁽²⁾ 12900 ⁽²⁾	4350 9700	9.74 31.91

(continued)

Product Information Section
Lifting Capacities

(Table 16, contd)

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 3.0 m (9 ft 10inch) stick, a 2.8 m³ (3.66 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
3.0 m 10.0 ft					14450 ⁽²⁾ 30950 ⁽²⁾	11050 23750	10900 ⁽²⁾ 23500 ⁽²⁾	7400 15850	9000 ⁽²⁾ 19400 ⁽²⁾	5100 10800	6200 ⁽²⁾ 13550 ⁽²⁾	3950 8650	10.00 32.79
1.5 m 5.0 ft					16100 ⁽²⁾ 34650 ⁽²⁾	10250 22000	11900 ⁽²⁾ 25650 ⁽²⁾	6950 14850	9200 19700	4800 10250	6750 ⁽²⁾ 14800 ⁽²⁾	3800 8300	10.00 32.82
0					16500 ⁽²⁾ 35600 ⁽²⁾	9850 21150	12350 ⁽²⁾ 26600 ⁽²⁾	6650 14200	9000 19300	4650 10250	7600 ⁽²⁾ 16800 ⁽²⁾	3900 8550	9.76 32.02
-1.5 m -5.0 ft			20750 ⁽²⁾ 45050 ⁽²⁾	16550 35350	15750 ⁽²⁾ 34100 ⁽²⁾	9750 20900	12000 ⁽²⁾ 25800 ⁽²⁾	6500 13950	8950	4600	8500 ⁽²⁾ 18700 ⁽²⁾	4350 9600	9.25 30.32
-3.0 m -10.0 ft	21500 ⁽²⁾ 46750 ⁽²⁾		17600 ⁽²⁾ 38100 ⁽²⁾	16750 35800	13900 ⁽²⁾ 29950 ⁽²⁾	9900 21200	10550 ⁽²⁾ 22500 ⁽²⁾	6600 14100			8300 ⁽²⁾ 18250 ⁽²⁾	5300 11750	8.46 27.65
-4.5 m -15.0 ft			12950 ⁽²⁾ 27650 ⁽²⁾		10300 ⁽²⁾ 21750 ⁽²⁾						7400 ⁽²⁾ 16100 ⁽²⁾		7.22 23.45

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 17

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 2.55 m (8 ft 2 inch) short stick, a 3.2 m³ (4.19 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds.												
(H)												
	4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach			
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft	
7.5 m 25.0 ft					7850 ⁽²⁾				6700 ⁽²⁾ 14650 ⁽²⁾		8.03 26.14	
6.0 m 20.0 ft					8200 ⁽²⁾ 17750 ⁽²⁾	8200 ⁽²⁾ 17450			7000 ⁽²⁾ 15400 ⁽²⁾	5800 12950	8.72 28.45	
4.5 m 15.0 ft			11400 ⁽²⁾ 24400 ⁽²⁾		9000 ⁽²⁾ 19400 ⁽²⁾	7750 16550			7100 ⁽²⁾ 15600 ⁽²⁾	4800 10700	9.28 30.37	
3.0 m 10.0 ft			13400 ⁽²⁾ 28750 ⁽²⁾	10750 23150	9950 ⁽²⁾ 21350 ⁽²⁾	7250 15550	8050 ⁽²⁾ 17450	4950 10550	7450 16400 ⁽²⁾	4350 9550	9.54 31.29	
1.5 m 5.0 ft			14550 ⁽²⁾ 31250 ⁽²⁾	10100 21650	10350 ⁽²⁾ 22900 ⁽²⁾	6850 14650	8350 ⁽²⁾ 17950 ⁽²⁾	4750 10100	7700 ⁽²⁾ 16900 ⁽²⁾	4150 9150	9.55 31.33	
0			14450 ⁽²⁾ 31200 ⁽²⁾	9800 21050	10800 ⁽²⁾ 23300 ⁽²⁾	6600 14100			7750 ⁽²⁾ 17100	4350 9500	9.29 30.49	

(continued)

(Table 17, contd)

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 2.55 m (8 ft 2 inch) short stick, a 3.2 m³ (4.19 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds.											
(H)	4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
-1.5 m -5.0 ft	17250 ⁽²⁾ 37500 ⁽²⁾	16800 35950	13400 ⁽²⁾ 29000 ⁽²⁾	9800 21000	10200 ⁽²⁾ 21900 ⁽²⁾	6550 13950			7750 ⁽²⁾ 17050 ⁽²⁾	4900 10800	8.76 28.72
-3.0 m -10.0 ft	13800 ⁽²⁾ 29950 ⁽²⁾		11300 ⁽²⁾ 24300 ⁽²⁾	10000 21450	8350 ⁽²⁾	6700			7350 ⁽²⁾ 16100 ⁽²⁾	6100 13550	7.92 25.86
-4.5 m -15.0 ft			7150 ⁽²⁾ 14700 ⁽²⁾						5850 ⁽²⁾ 12650 ⁽²⁾		6.56 21.27

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 18

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 2.55 m (8 ft 2 inch) short stick, a 3.2 m³ (4.19 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.											
(H)	4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
7.5 m 25.0 ft					9000 ⁽²⁾				7500 ⁽²⁾ 16150 ⁽²⁾	7250 16150 ⁽²⁾	8.03 26.14
6.0 m 20.0 ft					9350 ⁽²⁾ 20300 ⁽²⁾	8200 17450			7850 ⁽²⁾ 17300 ⁽²⁾	5800 12950	8.72 28.45
4.5 m 15.0 ft			12900 ⁽²⁾ 27600 ⁽²⁾	11750 25300	10250 ⁽²⁾ 22150 ⁽²⁾	7750 16550			7950 ⁽²⁾ 17500 ⁽²⁾	4800 10700	9.28 30.37
3.0 m 10.0 ft			15150 ⁽²⁾ 32500 ⁽²⁾	10750 23150	11300 ⁽²⁾ 24400 ⁽²⁾	7250 15550	9250 ⁽²⁾ 20050	4950 10550	8350 18350 ⁽²⁾	4350 9550	9.54 31.29
1.5 m 5.0 ft			16400 ⁽²⁾ 35350 ⁽²⁾	10100 21650	12150 ⁽²⁾ 26150 ⁽²⁾	6850 14650	9150 19550	4750 10100	8200 18000	4150 9150	9.55 31.33
0			16350 ⁽²⁾ 35350 ⁽²⁾	9800 21050	12350 ⁽²⁾ 26550 ⁽²⁾	6600 14100			8500 18700	4350 9500	9.29 30.49
-1.5 m -5.0 ft	19450 ⁽²⁾ 42350 ⁽²⁾	16800 35950	15200 ⁽²⁾ 32950 ⁽²⁾	9800 21000	11650 ⁽²⁾ 25100 ⁽²⁾	6550 13950			8950 ⁽²⁾ 19700 ⁽²⁾	4900 10800	8.76 28.72
-3.0 m -10.0 ft	15700 ⁽²⁾ 34100 ⁽²⁾		12900 ⁽²⁾ 27800 ⁽²⁾	10000 21450	9650 ⁽²⁾	6700			8550 ⁽²⁾ 18700 ⁽²⁾	6100 13550	7.92 25.86
-4.5 m -15.0 ft			8400 ⁽²⁾ 17250 ⁽²⁾						6980 ⁽²⁾ 15000 ⁽²⁾		6.56 21.27

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Fixed Gauge

Symbols Found in the Lifting Capacity Charts

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

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

(mm) **Measurements are provided in**
(inch) **millimeters and inches**



Lift Capacities are provided in kilograms and pounds



Load is limited by hydraulic lifting capacity rather than by a tipping load



Lift point radius



Lift point height



Lifting capacity over the front of the machine



Lifting capacity over the side of the machine



Heavy Lift ON

Reach Boom and 3.35 m (11 ft 2 inch) Stick

(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300		9000 360				(mm) (inch)
															
3000 360													* 8300 * 18450	* 8300 * 18450	7300 230
7500 300									* 10050 * 22050	* 10050 * 22050			* 7800 * 17250	* 7800 * 17250	8430 330
6000 240									* 10500 * 22300	* 10500 * 22300	* 3850 * 18650	7350 17000	* 7650 * 16300	* 7650 * 16750	3280 370
4500 180					* 17500 * 37550	* 17500 * 37550	* 13450 * 29050	* 13450 * 29050	* 11400 * 24700	10300 22200	* 10200 * 22200	7800 16750	* 7750 * 17050	6800 15050	3770 330
3000 120					* 21500 * 46200	20450 44100	* 15350 * 33150	13550 29300	* 12400 * 26850	3900 21300	* 10650 * 23150	7550 16300	* 8100 * 17750	6450 14150	10010 400
1500 60					* 17600 * 42150	* 17600 * 41600	* 16850 * 36400	12900 27850	* 13250 * 28700	3500 20500	* 11100 * 24050	7350 15850	* 8650 * 19000	6300 13850	10020 400
0 0					* 19850 * 46050	18350 40700	* 17500 * 37850	12500 26350	* 13700 * 23650	3250 19300	* 11250 * 24350	7200 15500	* 3550 * 21050	6400 14150	3800 330
-1500 -60			* 14100 * 31900	* 14100 * 31900	* 22750 * 43350	18900 40600	* 17250 * 37350	12350 26650	* 13600 * 23350	3100 19600	* 10900 * 23450	7150 15400	* 10350 * 22750	6850 15050	9330 370
-3000 -120			* 22600 * 51000	* 22600 * 51000	* 20650 * 44750	13050 41000	* 16050 * 34650	12400 26750	* 12600 * 27100	3150 19700			* 10350 * 22800	7700 17050	8570 340
-4500 -180			* 21650 * 46700	* 21650 * 46700	* 17150 * 36350	* 17150 * 36350	* 13450 * 28800	12650 27300					* 10050 * 22100	3500 21250	7430 230

Illustration 60

g03642192

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 3.35 m (11 ft 2 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

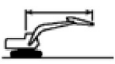
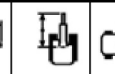
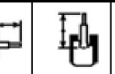
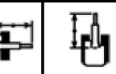
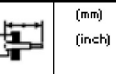
(mm) (inch)	1500 60	3000 120	4500 180	6000 240	7500 300	9000 360			
									(mm) (inch)
+2									
3000									* 3100 * 3100 7300
360									* 20150 * 20150 230
7500									* 8550 * 8550 8490
300									* 18850 * 18850 330
6000									* 11600 10650 * 10800 7350 * 8400 7550 3280
240									* 25350 22950 * 20400 17000 * 18500 16750 370
4500									* 13300 * 13300 * 14850 14400 * 12600 10300 * 11300 7800 * 8500 6800 3770
180									* 41400 * 41400 * 32100 31000 * 27350 22200 * 24600 16750 * 18700 15050 390
3000									* 23750 20450 * 17000 13550 * 13700 9900 * 11850 7550 * 8850 6450 10010
120									* 51050 44100 * 36700 23300 * 23750 21300 * 25750 16300 * 13450 14150 400
1500									* 18650 * 18650 * 18650 12900 * 14700 9500 11750 7350 * 3450 6300 10020
60									* 44600 41600 * 40300 27850 * 31800 20500 25350 15850 * 20850 13850 400
0									* 21000 18350 * 13400 12500 15150 3250 11600 7200 10300 6400 3800
0									* 46800 40700 * 42000 26950 32550 19300 24350 15500 22650 14150 330
-1500									* 14350 * 14350 * 25200 18300 * 13150 12350 15000 3100 11550 7150 11000 6850 3330
-60									* 33800 * 33800 * 54750 40600 * 41450 26650 32250 19600 24850 15400 24250 15050 370
-3000									* 23300 * 23300 * 22950 19050 * 17800 12400 * 14000 3150 * 11550 7700 8570
-120									* 54050 * 54050 * 43700 41000 * 38500 26750 * 30150 19700 * 25450 17050 340
-4500									* 24200 * 24200 * 19150 * 19150 * 15000 12650 * 11250 3500 7430
-180									* 52150 * 52150 * 41150 * 41150 * 32100 27300 * 24700 21250 230

Illustration 61

g03642244

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 3.35 m (11 ft 2 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

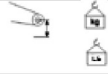
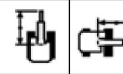
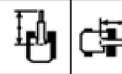
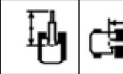
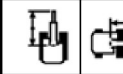
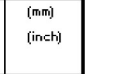
(mm) (inch)	1500 60	3000 120	4500 180	6000 240	7500 300	9000 360			
									(mm) (inch)
3000 360									* 8300 * 8300 7300 * 18450 * 18450 230
7500 300					* 10050 * 10050 * 22050 * 22050				* 7800 * 7800 8430 * 17250 * 17250 330
6000 240					* 10500 * 10500 * 22300 22650	* 3850 7850 * 18650 16800			* 7650 * 7450 3280 * 16900 16500 370
4500 180			* 17500 * 17500 * 37550 * 37550	* 13450 * 13450 * 23050 * 23050	* 11400 10150 * 24700 21900	* 10200 7700 * 22200 16500			* 7750 * 6700 3770 * 17050 14850 330
3000 120			* 21500 20150 * 46200 43500	* 15350 13400 * 33150 28900	* 12400 3750 * 26850 21000	* 10650 7450 * 23150 16050			* 8100 * 6350 10010 * 17750 13950 400
1500 60			* 17600 * 17600 * 42150 41050	* 16850 12750 * 36400 27450	* 13250 3350 * 28700 20200	* 11100 7250 * 24050 15600			* 8650 * 6200 10020 * 19000 13650 400
0 0			* 19850 18650 * 46050 40150	* 17500 12350 * 37850 26600	* 13700 3100 * 23650 13600	* 11250 7100 * 24350 15300			* 9550 * 6300 9800 * 21050 13900 330
-1500 -60		* 14100 * 14100 * 31300 * 31300	* 22750 18650 * 43350 40050	* 17250 12200 * 37350 26250	* 13600 8350 * 23350 13350	* 10300 7050 * 23450 15200			* 10350 * 6750 3330 * 22750 14850 370
-3000 -120		* 22600 * 22600 * 51000 * 51000	* 20650 18800 * 44750 40400	* 16050 12200 * 34650 26350	* 12600 3000 * 27100 13400				* 10350 * 7600 8570 * 22800 16800 340
-4500 -180		* 21650 * 21650 * 46700 * 46700	* 17150 * 17150 * 36350 * 36350	* 13450 12450 * 28800 26300					* 10050 * 3400 7430 * 22100 20950 230

Illustration 62

g03642250

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 3.35 m (11 ft 2 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

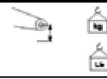
(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300		9000 360				
														(mm) (inch)	
+Z															
3000 360													* 3100 * 20150	* 3100 * 20150	7300 230
7500 300									* 11100 * 24400	10750 23050			* 8550 * 18850	* 8550 * 18850	8430 330
6000 240									* 11600 * 25350	10550 22650	* 10800 * 20400	7850 16800	* 8400 * 18500	7450 16500	3280 370
4500 180					* 19300 * 41400	* 19300 * 41400	* 14850 * 32100	14200 30600	* 12600 * 27350	10150 21900	* 11300 * 24600	7700 16500	* 8500 * 18700	6700 14850	3770 330
3000 120					* 23750 * 51050	20150 43500	* 17000 * 36700	13400 28300	* 13700 * 23750	3750 21000	11800 25450	7450 16050	* 8850 * 13450	6350 13950	10010 400
1500 60					* 18650 * 44600	* 18650 41050	* 18650 * 40300	12750 27450	* 14700 * 31800	3350 20200	11600 24350	7250 15600	* 3450 * 20850	6200 13650	10020 400
0 0					* 21000 * 48800	18650 40150	* 13400 * 42000	12350 26600	14300 32050	3100 13600	11400 24600	7100 15300	10100 22300	6300 13900	3800 330
-1500 -60			* 14350 * 33800	* 14350 * 33800	* 25200 * 54750	18650 40050	* 13150 * 41450	12200 26250	14750 31750	8350 13350	11350 24450	7050 15200	10800 23850	6750 14850	3330 370
-3000 -120			* 23300 * 54050	* 23300 * 54050	* 22950 * 43700	18800 40400	* 17800 * 38500	12200 26350	* 14000 * 30150	3000 19400			* 11550 * 25450	7600 16800	8570 340
-4500 -180			* 24200 * 52150	* 24200 * 52150	* 13150 * 41150	* 13150 * 41150	* 15000 * 32100	12450 26300					* 11250 * 24700	3400 20350	7430 230

Illustration 63

g03642253

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 3.35 m (11 ft 2 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Reach Boom and 2.9 m (9 ft 6 inch) Stick

(mm) (inch)	1500 60	3000 120	4500 180	6000 240	7500 300	3000 360		(mm) (inch)
								
3000 360								* 3900 * 3900 6720 * 22000 * 22000 260
7500 300					* 10700 * 10700 * 23500 22350			* 3250 * 3250 7390 * 20400 * 20400 320
6000 240				* 12450 * 12450 * 26300 * 26300	* 11050 10550 * 24050 22650			* 3050 8100 8830 * 19350 17350 350
4500 180			* 18800 * 18800 * 40300 * 40300	* 14100 * 14100 * 30500 * 30500	* 11800 10200 * 25650 21350	* 10550 7700 * 23050 16550		* 3200 7250 9340 * 20200 16050 370
3000 120			* 18100 * 18100 * 47250 43050	* 15300 13400 * 34350 28300	* 12750 9800 * 27600 21100	* 10950 7500 * 23750 16150		* 3600 6800 9600 * 21100 15050 380
1500 60			* 12350 * 12350 * 31750 * 31750	* 17150 12800 * 37100 27600	* 13500 9450 * 23200 20350	* 11250 7350 * 24400 15800		* 10300 6700 9610 * 22700 14700 380
0 0			* 18400 * 18400 * 43000 40700	* 17550 12500 * 38000 26300	* 13800 9200 * 23850 19850	* 11250 7200 * 24300 15550		* 10700 6850 9380 * 23550 15050 370
-1500 -60		* 14250 * 14250 * 32300 * 32300	* 21950 19000 * 47750 40800	* 17000 12400 * 36850 26700	* 13450 9150 * 23000 19700			* 10800 7350 8880 * 23750 16200 350
-3000 -120		* 23950 * 23950 * 52250 * 52250	* 19550 19200 * 42400 41300	* 15450 12500 * 33350 26300	* 12050 9200 * 25850 19900			* 10700 8400 8080 * 23600 18600 320
-4500 -180			* 15600 * 15600 * 33500 * 33500	* 12300 * 12300 * 26100 * 26100				* 10150 * 10150 6860 * 22200 * 22200 270

Illustration 64

g03642289

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 2.9 m (9 ft 6 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300		9000 360				
															(mm) (inch)
															
3000 360													* 10800 * 24000	* 10800 * 24000	6720 260
7500 300									* 11800 * 26000	10700 22950			* 10100 * 22300	9600 21550	7390 320
6000 240							* 13700 * 29700	* 13700 * 29700	* 12200 * 26600	10550 22650			* 3300 * 21800	8100 17950	8630 350
4500 180					* 20750 * 44450	* 20750 * 44450	* 15600 * 33700	14150 30550	* 13100 * 28400	10200 21950	* 11700 * 25550	7700 16550	* 10050 * 22100	7250 16050	3340 370
3000 120					* 19200 * 50000	* 19200 * 43050	* 17600 * 38000	13400 28900	* 14100 * 30600	9800 21100	11950 25700	7500 16150	* 10500 * 23050	6800 15050	3600 380
1500 60					* 13700 * 33650	* 13700 * 33650	* 19000 * 41150	12800 27600	* 14350 * 32400	9450 20350	11750 25250	7350 15800	10700 23500	6700 14700	3610 380
0 0					* 19500 * 45550	18950 40700	* 19450 * 42150	12500 26300	15100 32500	9200 19850	11600 25000	7200 15550	10350 24150	6850 15050	3380 370
-1500 -60			* 15100 * 34250	* 15100 * 34250	* 24400 * 53000	19000 40800	* 18850 * 40900	12400 26700	* 14300 * 32250	9150 19700			11800 26100	7350 16200	8880 350
-3000 -120			* 26500 * 58200	* 26500 * 58200	* 21750 * 47150	19200 41300	* 17200 * 37100	12500 26300	* 13450 * 28750	9200 19300			* 11950 * 26300	8400 18600	8080 320
-4500 -180					* 17450 * 37400	* 17450 * 37400	* 13700 * 29150	12800 27650					* 11350 * 24800	10750 24050	8660 270

Illustration 65

g03642300

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 2.9 m (9 ft 6 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

(mm) (inch)	1500 60	3000 120	4500 180	6000 240	7500 300	9000 360			
									(mm) (inch)
3000 360									* 3300 * 3300 6720 * 22000 * 22000 260
7500 300					* 10700 10500 * 23500 22650				* 3250 * 3250 7330 * 20400 * 20400 320
6000 240				* 12450 * 12450 * 26300 * 26300	* 11050 10400 * 24050 22350				* 3050 8000 8830 * 19950 17700 350
4500 180			* 18800 * 18800 * 40300 * 40300	* 14100 14000 * 30500 30150	* 11800 10050 * 25650 21650	* 10550 7600 * 23050 16300			* 3200 7150 9340 * 20200 15800 370
3000 120			* 18100 * 18100 * 47250 42450	* 15300 13200 * 34350 28500	* 12750 9650 * 27600 20800	* 10350 7400 * 23750 15350			* 3600 6700 9600 * 21100 14800 380
1500 60			* 12350 * 12350 * 31750 * 31750	* 17150 12600 * 37100 27200	* 13500 9300 * 23200 20050	* 11250 7250 * 24400 15550			* 10300 6600 9640 * 22700 14500 380
0 0			* 18400 * 18400 * 43000 40100	* 17550 12300 * 38000 26500	* 13800 9100 * 23850 19550	* 11250 7100 * 24300 15300			* 10700 6750 9380 * 23550 14800 370
-1500 -60		* 14250 * 14250 * 32300 * 32300	* 21950 18700 * 47750 40200	* 17000 12200 * 36850 26300	* 13450 9000 * 23000 19400				* 10800 7250 8880 * 23750 15350 350
-3000 -120		* 23350 * 23350 * 52250 * 52250	* 19550 18950 * 42400 40700	* 15450 12300 * 33350 26500	* 12050 9100 * 25850 19600				* 10700 8300 8080 * 23600 18350 320
-4500 -180			* 15600 * 15600 * 33500 * 33500	* 12300 * 12300 * 26100 * 26100					* 10150 * 10150 6860 * 22200 * 22200 270

Illustration 66

g03642304

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 2.9 m (9 ft 6 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300		9000 360				(mm) (inch)
															
+2															
3000													* 10800	* 10800	6720
360													* 24000	* 24000	260
7500									* 11800	10600			* 10100	9500	7390
300									* 26000	22650			* 22300	21250	320
6000							* 13700	* 13700	* 12200	10400			* 9900	8000	8830
240							* 29700	* 29700	* 26600	22350			* 21800	17700	350
4500					* 20750	* 20750	* 15600	14000	* 13100	10050	* 11700	7600	* 10050	7150	3340
180					* 44450	* 44450	* 33700	30150	* 28400	21650	* 25550	16300	* 22100	15800	370
3000					* 19200	* 19200	* 17600	13200	* 14100	3650	11750	7400	* 10500	6700	3600
120					* 50000	42450	* 38000	28500	* 30600	20800	25300	15350	* 23050	14800	380
1500					* 13700	* 13700	* 19000	12600	* 14350	9300	11550	7250	10500	6600	3610
60					* 33650	* 33650	* 41150	27200	* 32400	20050	24900	15550	23150	14500	380
0					* 19500	16650	* 19450	12300	14300	9100	11450	7100	10800	6750	3380
0					* 45550	40100	* 42150	26500	32000	19550	24600	15300	23750	14800	370
-1500			* 15100	* 15100	* 24400	18700	* 18850	12200	14800	9000			11650	7250	8880
-60			* 34250	* 34250	* 53000	40200	* 40300	26300	31850	19400			25650	15350	350
-3000			* 26500	* 26500	* 21750	16350	* 17200	12300	* 13450	9100			* 11950	8300	8080
-120			* 58200	* 58200	* 47150	40700	* 37100	26500	* 28750	19600			* 26300	16350	320
-4500					* 17450	* 17450	* 13700	12650					* 11350	10600	6860
-180					* 37400	* 37400	* 23150	27250					* 24800	23700	270

Illustration 67

g03642306

Lift Chart Above: 349D LC, 6.9 m (22 ft 8 inch) reach boom, 2.9 m (9 ft 6 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Mass Boom and 3.0 m (9 ft 10 inch) Stick

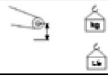
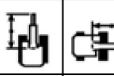
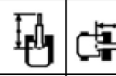
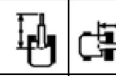
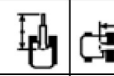
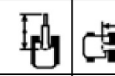
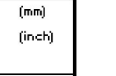
(mm) (inch)	1500 60	3000 120	4500 180	6000 240	7500 300	9000 360			
									(mm) (inch)
7500 300					* 10600	10500			* 3200 * 3200 7670 * 20350 * 20350 300
6000 240					* 10700	10350			* 8950 8250 8540 * 19750 18400 340
4500 180			* 17350 * 17350	* 13400 * 13400	* 11400	10000	* 9900	7400	* 3050 7300 3070 * 19900 16150 360
3000 120			* 21050 20000	* 15100 13200	* 12250	9550	* 10600	7200	* 3450 6800 3330 * 45250 43150 * 32650 28450 * 26550 20500 * 23000 15500 * 20750 15000 370
1500 60			* 21700 18750	* 16450 12500	* 12350	9150	* 10850	7000	* 10150 6650 3340 * 43800 40400 * 35550 26300 * 28050 19650 * 23500 15100 * 22350 14600 370
0 0			* 23000 18350	* 16350 12050	* 13250	8850	* 10750	6900	* 10600 6800 3100 * 43900 39450 * 36650 26000 * 28700 19050 * 23350 14300 360
-1500 -60		* 16950 * 16950	* 21750 18300	* 16500 11900	* 12900	8750			* 10700 7300 8600 * 38350 * 38350 * 47150 39350 * 35650 25650 * 27800 18850 * 23550 16100 340
-3000 -120		* 24700 * 24700	* 19250 18550	* 14300 12000	* 11300	8650			* 10650 8500 7760 * 53650 * 53650 * 41650 39850 * 32100 25850 * 24000 19100 * 23400 18800 310
-4500 -180			* 14950 * 14950	* 11300 * 11300					* 3950 * 3950 6480 * 31900 * 31900 * 23700 * 23700 * 21750 * 21750 260

Illustration 68

g03642337

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 3.0 m (9 ft 10 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

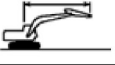
(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300		9000 360				
															(mm) (inch)
+2															
7500 300									* 11650	10500			* 10050	10050	7670
													* 22250	* 22250	300
6000 240									* 11900	10350			* 3600	8250	8540
									* 25950	22200			* 21600	19400	340
4500 180					* 19200	* 19200	* 14850	14050	* 12650	10000	* 10850	7400	* 3900	7300	3070
					* 41200	* 41200	* 32100	30350	* 27500	21450			* 21800	16150	360
3000 120					* 23350	20000	* 16800	13200	* 13600	9550	11700	7200	* 10350	6800	3330
					* 50150	43150	* 36250	28450	* 23500	20500	25100	15500	* 22700	15000	370
1500 60					* 23000	18750	* 18250	12500	* 14400	3150	11450	7000	10850	6650	3340
					* 55250	40400	* 39500	26900	* 31250	19650	24650	15100	23850	14500	370
0					* 25600	18350	* 18850	12050	* 14800	8850	11300	6900	11150	6800	3100
0					* 55500	39450	* 40800	26000	31850	19050			24550	14900	360
-1500			* 17950	* 17950	* 24200	18300	* 18350	11900	* 14400	8750			* 11950	7300	8600
-60			* 40650	* 40650	* 52500	39350	* 39750	25650	* 31050	18850			* 26350	16100	340
-3000			* 27600	* 27600	* 21450	18550	* 16600	12000	* 12650	8850			* 11900	8500	7760
-120			* 53950	* 53950	* 46450	39850	* 35850	25850	* 26900	19100			* 26200	18800	310
-4500					* 16750	* 16750	* 12700	12400					* 11200	* 11200	6480
-180					* 35800	* 35800	* 26650	* 26650					* 24500	* 24500	260

Illustration 69

g03642344

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 3.0 m (9 ft 10 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

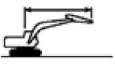
(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300		9000 360				(mm) (inch)
															
7500 300									* 10600	10350			* 3200	* 3200	7670
													* 20350	* 20350	300
6000 240									* 10700	10200			* 6350	6150	6540
									* 23400	21900			* 19750	18150	340
4500 180					* 17350	* 17350	* 13400	* 13400	* 11400	9850	* 3900	7300	* 3050	7200	3070
					* 37300	* 37300	* 29000	* 29000	* 24750	21150			* 19300	15300	360
3000 120					* 21050	19700	* 15100	13000	* 12250	3400	* 10600	7100	* 3450	6700	3330
					* 45250	42550	* 32650	28100	* 26550	20250	* 23000	15250	* 20750	14750	370
1500 60					* 21700	18500	* 16450	12300	* 12350	9000	* 10850	6300	* 10150	6550	3340
					* 43900	39800	* 35550	26500	* 28050	19350	* 23500	14850	* 22350	14350	370
0					* 23000	18050	* 16350	11900	* 13250	8700	* 10750	6750	* 10600	6650	3100
0					* 43900	38850	* 36650	25600	* 28700	18750			* 23350	14650	360
-1500 -60			* 16350	* 16350	* 21750	18050	* 16500	11750	* 12300	8600			* 10700	7200	8600
			* 38350	* 38350	* 47150	38750	* 35650	25250	* 27800	18550			* 23550	15850	340
-3000 -120			* 24700	* 24700	* 19250	18250	* 14300	11800	* 11300	8700			* 10650	8350	7760
			* 53650	* 53650	* 41650	39250	* 32100	25450	* 24000	18800			* 23400	18500	310
-4500 -180					* 14350	* 14350	* 11300	* 11300					* 3950	* 3950	6480
					* 31900	* 31900	* 23700	* 23700					* 21750	* 21750	260

Illustration 70

g03642347

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 3.0 m (9 ft 10 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300		9000 360					
															(mm) (inch)	
+2																
7500 300										* 11650 10350				* 10050 * 22250	3950 22250	7670 300
6000 240										* 11900 * 25350	10200 21900			* 9800 * 21600	8150 18150	8540 340
4500 180						* 13200 * 41200	* 13200 * 41200	* 14850 * 32100	13900 28950	* 12650 * 27500	3850 21150	* 10850 7300		* 9300 * 21800	7200 15300	9070 360
3000 120						* 23350 * 50150	19700 42550	* 16800 * 36250	13000 28100	* 13600 * 29500	3400 20250	11500 24700	7100 15250	* 10350 * 22700	6700 14750	9330 370
1500 60						* 23000 * 55250	18500 39800	* 18250 * 39500	12300 26500	* 14400 * 31250	3000 19350	11300 24250	6300 14850	10650 23500	6550 14350	9340 370
0 0						* 25600 * 55500	18050 38850	* 18850 * 40800	11900 25600	14550 31350	8700 18750	11150 6750		10350 24150	6650 14650	9100 360
-1500 -60			* 17350 * 40650	* 17350 * 40650	* 24200 * 52500	18050 38750	* 18350 * 39750	11750 25250	* 14400 * 31050	8600 18550				11900 26200	7200 15850	8600 340
-3000 -120			* 27600 * 53350	* 27600 * 53350	* 21450 * 46450	18250 39250	* 16600 * 35850	11800 25450	* 12650 * 26900	8700 18800				* 11900 * 26200	8350 18500	7760 310
-4500 -180						* 16750 * 35800	* 16750 * 35800	* 12700 * 26650	12200 26400					* 11200 * 24500	11050 24500	6480 260

Illustration 71

g03642348

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 3.0 m (9 ft 10 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Mass Boom and 2.5 m (8 ft 2 inch) Stick

(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300				(mm) (inch)	
												(mm) (inch)		
7500 300												* 11600 * 25650	11350 25500	7110 280
6000 240							* 12750 * 27700	* 12750 * 27700	* 11400 * 25000	10250 22000	* 11200 * 24700	3100 20250	8040 320	
4500 180					* 18850 * 40400	* 18850 * 40400	* 14200 * 30700	13300 30000	* 12000 * 26050	3300 21350	* 11100 * 24400	7350 17600	8600 340	
3000 120					* 15800 * 48050	13100 42200	* 12700 * 34150	3500 28250	* 11100 * 27600	7400 20500	* 11100 * 24450	8880 16300	350	
1500 60							* 16300 * 36500	12450 26850	* 13300 * 28800	3150 13750	* 11200 * 24650	7200 15850	8830 350	
0 0					* 22650 * 43250	18500 33750	* 17050 * 36350	12150 26150	* 13400 * 23000	8350 13250	* 11300 * 24300	7400 16300	8640 340	
-1500 -60			* 17100 * 33050	* 17100 * 33050	* 20350 * 45500	18550 33900	* 16250 * 35200	12050 26000	* 12700 * 27300	8300 13200	* 11350 * 25000	8050 17800	8100 320	
-3000 -120			* 21550 * 46350	* 21550 * 46350	* 18000 * 39000	* 18000 * 39000	* 14150 * 30450	12250 26400			* 11100 * 24350	3600 21300	7210 230	
-4500 -180					* 12300 * 27300	* 12300 * 27300					* 3750 * 21250	* 3750 * 21250	5730 230	

Illustration 72

g03642820

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 2.5 m (8 ft 2 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

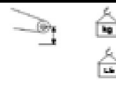
(mm) (inch)	1500 60	3000 120	4500 180	6000 240	7500 300			
								(mm) (inch)
+2								
7500 300								* 12850 11350 7110 * 28400 25500 280
6000 240								* 14100 * 14100 * 12650 10250 * 12450 3100 8040 * 30600 * 30600 * 27700 22000 * 27400 20250 320
4500 180								* 20850 * 20850 * 15750 13300 * 13300 9300 * 12300 7350 8600 * 44650 * 44650 * 34000 30000 * 28300 21350 * 27100 17600 340
3000 120								* 17550 13100 * 14150 9500 11950 7400 8880 * 53250 42200 * 37850 28250 * 30650 20500 26350 16300 350
1500 60								* 18750 12450 * 14800 9150 11750 7200 8830 * 40550 26850 * 32050 19750 25850 15850 350
0 0								* 24100 18500 * 18350 12150 14300 8350 12150 7400 8640 * 54700 33750 * 41100 26150 32000 19250 26750 16300 340
-1500 -60								* 18150 * 18150 * 23300 18550 * 18100 12050 * 14150 8300 * 12650 8050 8100 * 41350 * 41350 * 50650 33900 * 33200 26000 * 30450 19200 * 27900 17800 320
-3000 -120								* 24100 * 24100 * 20100 16850 * 15800 12250 * 12400 9600 7210 * 52550 * 52550 * 43550 40550 * 34000 26400 * 27250 21300 230
-4500 -180								* 14500 * 14500 * 11000 * 11000 5730 * 30750 * 30750 * 23950 * 23950 230

Illustration 73

g03642828

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 2.5 m (8 ft 2 inch) stick, 9000 kg (19840 lb) and 750 mm (30 inch) triple grouser track shoes.

(mm) (inch)	1500 60	3000 120	4500 180	6000 240	7500 300			
 (mm) (inch)								(mm) (inch)
7500 300								* 11600 11200 7110 * 25650 25200 280
6000 240				* 12750 * 12750 * 11400 10100 * 27700 * 27700 * 25000 21700				* 11200 3000 8040 * 24700 20000 320
4500 180			* 16850 * 16850 * 14200 13700 * 12000 9800 * 40400 * 40400 * 30700 23600 * 26050 21050					* 11100 7850 8600 * 24400 17350 340
3000 120			* 15800 12300 * 12700 9400 * 48050 41600 * 34150 27850 * 27600 20200					* 11100 7300 8880 * 24450 16050 350
1500 60				* 16300 12300 * 13300 9000 * 36500 26450 * 26800 13450				* 11200 7100 8830 * 24650 15600 350
0 0			* 22650 18200 * 17050 11950 * 43250 33150 * 36350 25750					* 13400 8800 * 11300 7300 8640 * 23000 18350 * 24300 16050 340
-1500 -60		* 17100 * 17100 * 20350 18300 * 16250 11900 * 12700 8750						* 11350 7950 8100 * 25000 17550 320
-3000 -120		* 21550 * 21550 * 18000 * 18000 * 14150 12050						* 11100 3450 7210 * 24350 20950 230
-4500 -180			* 12300 * 12300					* 3750 * 3750 5730 * 21250 * 21250 230

Illustration 74

g03642832

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 2.5 m (8 ft 2 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Product Information Section
Lifting Capacities

(mm) (inch)	1500 60		3000 120		4500 180		6000 240		7500 300				
  	 	 	 	 	 	 	 	 			(mm) (inch)		
+2													
7500 300												* 12850 11200 7110 * 28400 25200 280	
6000 240							* 14100 * 30600	* 14100 * 30600	* 12650 10100 * 27700 21700	* 12450 3000 8040 * 27400 20000 320			
4500 180					* 20850 * 44650	* 20850 * 44650	* 15750 13700 * 34000 29600	* 13300 9800 * 28300 21050	* 12300 7850 8600 * 27100 17350 340				
3000 120					* 53250 41600		* 17550 12900 * 37850 27850	* 14150 3400 * 30650 20200	* 11750 7300 8880 * 25350 16050 350				
1500 60							* 18750 12300 * 40550 26450	* 14800 3000 * 32050 13450	* 11550 7100 8890 * 25450 15600 350				
0 0					* 24100 * 54700	18200 33150	* 18350 11950 * 41100 25750	14650 8800 31500 18350	* 11950 7300 8640 * 26300 16050 340				
-1500 -60			* 18150 * 41350	* 18150 * 41350	* 23300 18300 * 50650 39300		* 18100 11900 * 39200 25600	* 14150 8750 * 30450 18300	* 12650 7950 8100 * 27900 17550 320				
-3000 -120			* 24100 * 52550	* 24100 * 52550	* 20100 18600 * 43550 39950		* 15800 12050 * 34000 26000		* 12400 3450 7210 * 27250 20950 290				
-4500 -180					* 14500 * 30750	* 14500 * 30750			* 11000 * 23950				

Illustration 75

g03642928

Lift Chart Above: 349D LC, 6.55 m (21 ft 6 inch) mass boom, 2.5 m (8 ft 2 inch) stick, 9000 kg (19840 lb) and 600 mm (24 inch) triple grouser track shoes.

Variable Gauge



Illustration 76

g01055537

(H) Height
(F) Lifting capacity over the front of the machine

(S) Lifting capacity over the side of the machine
(R) Reach

Table 19

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 3.9 m (12 ft 9 inch) stick, a 2.8 m ³ (3.60 yd ³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes ⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.							
H	(R)						Maximum Reach
	3.0 m 10.0 ft	4.5 m 15.0 ft	6.0 m 20.0 ft	7.5 m 25.0 ft	9.0 m 30.0 ft	10.5 m 35.0 ft	

(continued)

(Table 19, contd)

	F	S	F	S	F	S	F	S	F	S	F	S	F	S	m ft
9.0 m 30.0 ft													4650 ⁽²⁾ 10250 ⁽²⁾		8.76 28.41
7.5 m 25.0 ft									7200 ⁽²⁾ 14400 ⁽²⁾				4600 ⁽²⁾ 10200 ⁽²⁾		9.64 31.40
6.0 m 20.0 ft									7550 ⁽²⁾ 16450 ⁽²⁾	7200 15300			4550 ⁽²⁾ 10050 ⁽²⁾		10.36 33.88
4.5 m 15.0 ft								9400 ⁽²⁾ 20300 ⁽²⁾	8200 ⁽²⁾ 17750 ⁽²⁾	6900 14750	6700 ⁽²⁾ 12300 ⁽²⁾	4950 10500	4700 ⁽²⁾ 10300	4600 10200	10.81 35.43
3.0 m 10.0 ft			20300 ⁽²⁾ 44800 ⁽²⁾		14000 ⁽²⁾ 30050 ⁽²⁾	13450 28900	10800 ⁽²⁾ 23250 ⁽²⁾	9250 19800	8950 ⁽²⁾ 19350 ⁽²⁾	6600 14100	7800 ⁽²⁾ 16500 ⁽²⁾	4800 10200	5000 ⁽²⁾ 10900 ⁽²⁾	4300 9450	11.03 36.17
1.5 m 5.0 ft					16050 ⁽²⁾ 34550 ⁽²⁾	12550 26950	12000 ⁽²⁾ 25900 ⁽²⁾	8700 18700	9650 ⁽²⁾ 20850 ⁽²⁾	6300 13450	7900 16900	4650 9850	5450 ⁽²⁾ 11950 ⁽²⁾	4150 9150	11.02 36.16
0.0 m			14950 ⁽²⁾ 35150 ⁽²⁾		17000 ⁽²⁾ 36700 ⁽²⁾	12000 25750	12750 ⁽²⁾ 27550 ⁽²⁾	8350 17850	10100 ⁽²⁾ 21800 ⁽²⁾	6050 12950	7750 16400 ⁽²⁾	4500 9600	6150 ⁽²⁾ 13500 ⁽²⁾	4250 9350	10.79 35.41
-1.5 m -5.0 ft	10100 ⁽²⁾ 23100 ⁽²⁾		22550 ⁽²⁾ 49550 ⁽²⁾	19200 41150	16900 ⁽²⁾ 36550 ⁽²⁾	11800 25300	12850 ⁽²⁾ 27750 ⁽²⁾	8150 17450	10050 21500	5950 12650			7200 ⁽²⁾ 15900 ⁽²⁾	4600 10100	10.34 33.90
-3.0 m -10.0 ft	19750 ⁽²⁾ 44950 ⁽²⁾		20700 ⁽²⁾ 44850 ⁽²⁾	19400 41550	15800 ⁽²⁾ 34100 ⁽²⁾	11800 25300	12150 ⁽²⁾ 26200 ⁽²⁾	8100 17350	9350 ⁽²⁾ 19900 ⁽²⁾	5950 12700			8150 ⁽²⁾ 17950 ⁽²⁾	5300 11650	9.63 31.51
-4.5 m -15.0 ft	21800 ⁽²⁾ 47050 ⁽²⁾		17300 ⁽²⁾ 37250 ⁽²⁾		13500 ⁽²⁾ 29000 ⁽²⁾	12000 25750	10300 ⁽²⁾ 21900 ⁽²⁾	8250 17700					8000 ⁽²⁾ 17600 ⁽²⁾	6650 14800	8.57 27.92
-6.0 m -20.0 ft					9250 ⁽²⁾ 19050 ⁽²⁾								7100 ⁽²⁾ 15350 ⁽²⁾		6.98 22.49

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 20

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 3.35 m (11 ft 2 in) stick, a 2.8 m³ (3.6 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes ⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy Lift ON													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
9.0 m 30.0 ft											5300 ⁽²⁾ 1165 ⁽²⁾		8.29 26.86
7.5 m 25.0 ft									6500 ⁽²⁾ 14330 ⁽²⁾		5300 ⁽²⁾ 11700 ⁽²⁾		9.16 29.86
6.0 m 20.0 ft							8950 ⁽²⁾ 19400 ⁽²⁾		8150 ⁽²⁾ 17800 ⁽²⁾	7050 15050	5200 ⁽²⁾ 11500 ⁽²⁾		9.93 32.43
4.5 m 15.0 ft			17600 ⁽²⁾ 37350 ⁽²⁾		12500 ⁽²⁾ 26850 ⁽²⁾		10100 ⁽²⁾ 21800 ⁽²⁾	9650 20650	8700 ⁽²⁾ 18900 ⁽²⁾	6850 14550	5300 ⁽²⁾ 11650 ⁽²⁾	5000 11050	10.40 34.05

(continued)

Product Information Section
Lifting Capacities

(Table 20, contd)

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 3.35 m (11 ft 2 in) stick, a 2.8 m³ (3.6 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy Lift ON													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
3.0 m 10.0 ft					14950 ⁽²⁾ 32150 ⁽²⁾	13150 28300	11400 ⁽²⁾ 24550 ⁽²⁾	9100 19550	9400 ⁽²⁾ 20300 ⁽²⁾	6550 14000	5600 ⁽²⁾ 12250 ⁽²⁾	4650 10250	10.62 34.82
1.5 m 5.0 ft					16700 ⁽²⁾ 35950 ⁽²⁾	12400 26600	12450 ⁽²⁾ 26850 ⁽²⁾	8650 18550	10000 ⁽²⁾ 21550 ⁽²⁾	6300 13400	6050 ⁽²⁾ 13300 ⁽²⁾	4550 10000	10.61 34.82
0			10800 ⁽²⁾ 26200 ⁽²⁾		17200 ⁽²⁾ 37150 ⁽²⁾	12000 25750	13000 ⁽²⁾ 28000 ⁽²⁾	8350 17850	10200 21850	6100 13000	6800 ⁽²⁾ 14950 ⁽²⁾	4650 10250	10.37 34.03
-1.5 m -5.0 ft			21750 ⁽²⁾ 47300 ⁽²⁾	19450 41650	16700 ⁽²⁾ 36100 ⁽²⁾	11850 25450	12800 ⁽²⁾ 27650 ⁽²⁾	8200 17550	10000 ⁽²⁾ 21500 ⁽²⁾	6000 12850	7900 ⁽²⁾ 17500 ⁽²⁾	5050 11200	9.90 32.45
-3.0 m -10.0 ft	20750 ⁽²⁾ 47500 ⁽²⁾		19300 ⁽²⁾ 41800 ⁽²⁾		15200 ⁽²⁾ 32750 ⁽²⁾	11950 25650	11750 ⁽²⁾ 25250 ⁽²⁾	8250 17650			8400 ⁽²⁾ 18450 ⁽²⁾	5900 13100	9.15 29.93
-4.5 m -15.0 ft			15400 ⁽²⁾ 33100 ⁽²⁾		12350 ⁽²⁾ 26350 ⁽²⁾	12250 26250	9200 ⁽²⁾ 19250 ⁽²⁾	8450 18200			7900 ⁽²⁾ 17300 ⁽²⁾	7600 17000	8.02 26.10

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 21

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 2.9 m (9 ft 6 inch) short stick, a 2.8 m³ (3.6 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy Lift ON												
(H)	(R)											
	4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach			
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft	
9.0 m 30.0 ft									5400 ⁽²⁾ 11500 ⁽²⁾		7.76 25.08	
7.5 m 25.0 ft					8850 ⁽²⁾ 19400 ⁽²⁾				6450 ⁽²⁾ 14200 ⁽²⁾		8.68 28.29	
6.0 m 20.0 ft					9500 ⁽²⁾ 20650 ⁽²⁾		8650 ⁽²⁾ 18900 ⁽²⁾	6950 14800	6350 ⁽²⁾ 14000 ⁽²⁾	6200 13750	9.48 30.97	
4.5 m 15.0 ft			13300 ⁽²⁾ 28550 ⁽²⁾		10600 ⁽²⁾ 22900 ⁽²⁾	9500 20350	9100 ⁽²⁾ 19750 ⁽²⁾	6750 14400	6450 ⁽²⁾ 14200 ⁽²⁾	5400 12000	9.97 32.66	
3.0 m 10.0 ft			15650 ⁽²⁾ 33600 ⁽²⁾	12900 27750	11800 ⁽²⁾ 25450 ⁽²⁾	9000 19300	9700 ⁽²⁾ 20950 ⁽²⁾	6500 13850	6800 ⁽²⁾ 14950 ⁽²⁾	5050 11050	10.21 33.47	
1.5 m 5.0 ft			17000 ⁽²⁾ 36700 ⁽²⁾	12200 26300	12700 ⁽²⁾ 27400 ⁽²⁾	8550 18350	10150 ⁽²⁾ 21950 ⁽²⁾	6250 13350	7400 ⁽²⁾ 16200 ⁽²⁾	4900 10800	10.20 33.46	

(continued)

(Table 21, contd)

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 2.9 m (9 ft 6 inch) short stick, a 2.8 m³ (3.6 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy Lift ON											
(H)	(R)										
	4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
0			17150 ⁽²⁾ 37100 ⁽²⁾	11950 25650	13050 ⁽²⁾ 28150 ⁽²⁾	8300 17800	10200 21850	6100 13000	8300 ⁽²⁾ 18250 ⁽²⁾	5050 11150	9.95 32.64
-1.5 m -5.0 ft	20550 ⁽²⁾ 44700 ⁽²⁾	19600 42000	16300 ⁽²⁾ 35300 ⁽²⁾	11900 25550	12650 ⁽²⁾ 27250 ⁽²⁾	8200 17600	9800 ⁽²⁾ 20900 ⁽²⁾	6050 12950	8900 ⁽²⁾ 19550 ⁽²⁾	5550 12250	9.46 31.00
-3.0 m -10.0 ft	17750 ⁽²⁾ 38600 ⁽²⁾		14450 ⁽²⁾ 31200 ⁽²⁾	12050 25850	11250 ⁽²⁾ 24100 ⁽²⁾	8300 17800			8700 ⁽²⁾ 19100 ⁽²⁾	6550 14550	8.67 28.34
-4.5 m -15.0 ft	13500 ⁽²⁾ 29000 ⁽²⁾		11100 ⁽²⁾ 23550 ⁽²⁾						7850 ⁽²⁾ 17150 ⁽²⁾		7.46 24.23

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 22

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 3.0 m (9 ft 10 inch) stick, a 3.2 m³ (4.19 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.												
(H)	(R)											
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach	
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S) m ft
9.0 m 30.0 ft											5700 ⁽²⁾ 12550 ⁽²⁾	7.80 25.22
7.5 m 25.0 ft							8400 ⁽²⁾ 18400 ⁽²⁾				5700 ⁽²⁾ 12500 ⁽²⁾	8.72 28.43
6.0 m 20.0 ft							8900 ⁽²⁾ 19350 ⁽²⁾		8100 ⁽²⁾ 17850 ⁽²⁾	6500 14330	5950 ⁽²⁾ 13100 ⁽²⁾	9.28 30.36
4.5 m 15.0 ft			17600 ⁽²⁾ 37250 ⁽²⁾		12350 ⁽²⁾ 26500 ⁽²⁾		9950 ⁽²⁾ 21450 ⁽²⁾	9150 19550	8600 ⁽²⁾ 18650 ⁽²⁾	6300 13400	6150 ⁽²⁾ 13500 ⁽²⁾	5250 11600 9.74 31.90
3.0 m 10.0 ft					14750 ⁽²⁾ 31600 ⁽²⁾	12750 27400	11100 ⁽²⁾ 23950 ⁽²⁾	8650 18500	9150 ⁽²⁾ 19750 ⁽²⁾	6000 12850	6450 ⁽²⁾ 14200 ⁽²⁾	4800 10550 9.98 32.72
1.5 m 5.0 ft					16350 ⁽²⁾ 35150 ⁽²⁾	11950 25700	12100 ⁽²⁾ 26050 ⁽²⁾	8200 17500	9600 ⁽²⁾ 20700 ⁽²⁾	5800 12300	7050 ⁽²⁾ 15500 ⁽²⁾	4650 10250 9.97 32.70
0					16650 ⁽²⁾ 36000 ⁽²⁾	11600 24850	12500 ⁽²⁾ 26900 ⁽²⁾	7900 16900	9700 ⁽²⁾ 20850 ⁽²⁾	5600 11950	8000 ⁽²⁾ 17600 ⁽²⁾	4800 10600 9.71 31.84
-1.5 m -5.0 ft			20700 ⁽²⁾ 44850 ⁽²⁾	19250 41150	15900 ⁽²⁾ 34350 ⁽²⁾	11500 24650	12100 ⁽²⁾ 26000 ⁽²⁾	7800 16650			8600 ⁽²⁾ 19000 ⁽²⁾	5350 11800 9.19 30.12

(continued)

Product Information Section
Lifting Capacities

(Table 22, contd)

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 3.0 m (9 ft 10inch) stick, a 3.2 m³ (4.19 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
-3.0 m -10.0 ft	21100 ⁽²⁾ 45950 ⁽²⁾		17700 ⁽²⁾ 38300 ⁽²⁾		13950 ⁽²⁾ 30050 ⁽²⁾	11650 24950	10550 ⁽²⁾ 22450 ⁽²⁾	7850 16850			8400 ⁽²⁾ 18500 ⁽²⁾	6500 14400	8.38 27.37
-4.5 m -15.0 ft			12900 ⁽²⁾ 27500 ⁽²⁾		10200 ⁽²⁾ 21450 ⁽²⁾						7450 ⁽²⁾ 16200 ⁽²⁾		7.10 23.06

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 23

Excavator with a 6.55 m (21 ft 6 inch) mass boom, a 2.5 m (8 ft 2 inch) short stick, a 3.2 m³ (4.19 yd³) bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.												
(H)	R											
	4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach			
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft	
9.0 m 30.0 ft									5800 ⁽²⁾ 12750 ⁽²⁾		7.19 23.59	
7.5 m 25.0 ft					9200 ⁽²⁾ 20250 ⁽²⁾				7650 ⁽²⁾ 16700 ⁽²⁾		8.19 26.66	
6.0 m 20.0 ft					9650 ⁽²⁾ 21000 ⁽²⁾	9500 20300			8150 ⁽²⁾ 17850 ⁽²⁾	6800 15150	8.78 28.71	
4.5 m 15.0 ft			13300 ⁽²⁾ 28550 ⁽²⁾		10600 ⁽²⁾ 22850 ⁽²⁾	9050 19400			8400 ⁽²⁾ 18450 ⁽²⁾	5850 12950	9.27 30.36	
3.0 m 10.0 ft			15550 ⁽²⁾ 33400 ⁽²⁾	12550 27000	11650 ⁽²⁾ 25100 ⁽²⁾	8600 18400	9550 ⁽²⁾ 20650 ⁽²⁾	6050 12850	8800 ⁽²⁾ 19350 ⁽²⁾	5350 11800	9.52 31.23	
1.5 m 5.0 ft			16750 ⁽²⁾ 36100 ⁽²⁾	11900 25600	12450 ⁽²⁾ 26800 ⁽²⁾	8200 17550	9850 ⁽²⁾ 21250 ⁽²⁾	5800 12400	9000 19850	5200 11450	9.51 31.21	
0			16650 ⁽²⁾ 36000 ⁽²⁾	11650 25000	12600 ⁽²⁾ 27150 ⁽²⁾	7950 17050			9250 ⁽²⁾ 20350 ⁽²⁾	5450 11950	9.24 30.30	
-1.5 m -5.0 ft	19450 ⁽²⁾ 42300 ⁽²⁾		15450 ⁽²⁾ 33450 ⁽²⁾	11650 25000	11850 ⁽²⁾ 25550 ⁽²⁾	7900 16950			9200 ⁽²⁾ 20250 ⁽²⁾	6100 13450	8.70 28.51	
-3.0 m -10.0 ft	15900 ⁽²⁾ 34550 ⁽²⁾		13050 ⁽²⁾ 28100 ⁽²⁾	11850 25450	9700 ⁽²⁾ 21350 ⁽²⁾	8100 17850			8750 ⁽²⁾ 19200 ⁽²⁾	7550 16700	7.83 25.57	
-4.5 m -15.0 ft			8250 ⁽²⁾ 18150 ⁽²⁾						7300 ⁽²⁾ 16050 ⁽²⁾		6.36 20.87	

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 24

Excavator with a 6.9 m (22 ft 8 inch) heavy-duty boom, a 3.9 m (12 ft 9 inch) stick, a quick coupler without a bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.																	
H	R																
	1.5 m 5.0 ft		3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		10.5 m 35.0 ft		Maximum Reach		
	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	m ft
7.5 m 25.0 ft											6550 ⁽²⁾ 13650 ⁽²⁾				5850 ⁽²⁾ 12850 ⁽²⁾		9.31 30.31
6.0 m 20.0 ft											8900 ⁽²⁾ 19500 ⁽²⁾	8400 18050			5900 ⁽²⁾ 12900 ⁽²⁾		10.01 32.72
4.5 m 15.0 ft									10450 ⁽²⁾ 22750 ⁽²⁾		9450 ⁽²⁾ 20600 ⁽²⁾	8150 17450			6100 ⁽²⁾ 13350 ⁽²⁾		10.45 34.22
3.0 m 10.0 ft			8700 ⁽²⁾ 19450 ⁽²⁾		11650 ⁽²⁾ 26350 ⁽²⁾		14350 ⁽²⁾ 30950 ⁽²⁾		11750 ⁽²⁾ 25400 ⁽²⁾	10350 22300	10150 ⁽²⁾ 22100 ⁽²⁾	7800 16750	7450 ⁽²⁾ 16400 ⁽²⁾	6050 13300	6500 ⁽²⁾ 14250 ⁽²⁾	5900 13000	10.65 34.93
1.5 m 5.0 ft			8750 ⁽²⁾ 19100 ⁽²⁾		9250 ⁽²⁾ 20600 ⁽²⁾		12150 ⁽²⁾ 27500 ⁽²⁾		12900 ⁽²⁾ 27950 ⁽²⁾	9800 21150	10850 ⁽²⁾ 23550	7450 16050	8150 ⁽²⁾ 17950 ⁽²⁾	5850 12900	7100 ⁽²⁾ 15650 ⁽²⁾	5750 12600	10.64 34.91
0.0 m	8500 ⁽²⁾ 18700 ⁽²⁾		8950 ⁽²⁾ 19550 ⁽²⁾		8700 ⁽²⁾ 19250 ⁽²⁾		10550 ⁽²⁾ 23600 ⁽²⁾		13750 ⁽²⁾ 29800 ⁽²⁾	9400 20200	11300 24300	7200 15450			8100 ⁽²⁾ 17850 ⁽²⁾	5800 12700	10.41 34.15
-1.5 m -5.0 ft	11650 ⁽²⁾ 25300 ⁽²⁾		8750 ⁽²⁾ 19150 ⁽²⁾		8600 ⁽²⁾ 19050 ⁽²⁾		10000 ⁽²⁾ 22350 ⁽²⁾		13600 ⁽²⁾ 30500 ⁽²⁾	9150 19650	11100 23900	7050 15100			9600 21200	6100 13400	9.95 32.61
-3.0 m -10.0 ft	9550 ⁽²⁾ 20950 ⁽²⁾		8550 ⁽²⁾ 18750 ⁽²⁾		8700 ⁽²⁾ 19250 ⁽²⁾		10050 ⁽²⁾ 22500 ⁽²⁾		13650 ⁽²⁾ 29600 ⁽²⁾	9050 19450	10900 ⁽²⁾ 23400 ⁽²⁾	7000 15050			10550 ⁽²⁾ 23250 ⁽²⁾	6750 14950	9.22 30.14
-4.5 m -15.0 ft	8750 ⁽²⁾ 19150 ⁽²⁾		8450 ⁽²⁾ 18650 ⁽²⁾		8950 ⁽²⁾ 19900 ⁽²⁾		10650 ⁽²⁾ 23900 ⁽²⁾		12300 ⁽²⁾ 26300 ⁽²⁾	9150 19700					10950 ⁽²⁾ 24150 ⁽²⁾	8150 18200	8.14 26.50
-6.0 m -20.0 ft			8700 ⁽²⁾ 19250 ⁽²⁾		9650 ⁽²⁾ 21600 ⁽²⁾		12300 ⁽²⁾ 26150 ⁽²⁾								11100 ⁽²⁾ 24400 ⁽²⁾		6.55 21.08

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 25

Excavator with a 6.9 m (22 ft 8 inch) reach boom, a 3.35 m (11 ft 2 in) stick, a quick coupler without a bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.															
(H)	(R)														
	1.5 m 5.0 ft		3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
7.5 m 25.0 ft													5900 ⁽²⁾ 12800 ⁽²⁾		8.86 28.83
6.0 m 20.0 ft									10150 ⁽²⁾ 22150 ⁽²⁾		8800 ⁽²⁾ 17850 ⁽²⁾	8300 17800	6450 ⁽²⁾ 14200 ⁽²⁾		9.59 31.35

(continued)

Product Information Section
Lifting Capacities

(Table 25, contd)

Excavator with a 6.9 m (22 ft 8 inch) reach boom, a 3.35 m (11 ft 2 in) stick, a quick coupler without a bucket, a 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.															
(H)	(R)														
	1.5 m 5.0 ft		3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
4.5 m 15.0 ft							13100 ⁽²⁾ 28300 ⁽²⁾		11200 ⁽²⁾ 24250 ⁽²⁾	10800 23250	10000 ⁽²⁾ 21800 ⁽²⁾	8050 17300	6700 ⁽²⁾ 14650 ⁽²⁾	6650 14650	10.05 32.92
3.0 m 10.0 ft					10350 ⁽²⁾ 23400 ⁽²⁾		15250 ⁽²⁾ 32950 ⁽²⁾	14350 30900	12350 ⁽²⁾ 26750 ⁽²⁾	10250 22100	10650 ⁽²⁾ 23100 ⁽²⁾	7750 16650	7100 ⁽²⁾ 15600 ⁽²⁾	6250 13800	10.26 33.66
1.5 m 5.0 ft					8800 ⁽²⁾ 19550 ⁽²⁾		11550 ⁽²⁾ 26100 ⁽²⁾		13400 ⁽²⁾ 29000 ⁽²⁾	9750 21000	11200 ⁽²⁾ 24350 ⁽²⁾	7450 16000	7800 ⁽²⁾ 17200 ⁽²⁾	6100 13400	10.25 33.64
0			10000 ⁽²⁾ 21650 ⁽²⁾		8550 ⁽²⁾ 18850 ⁽²⁾		10250 ⁽²⁾ 22950 ⁽²⁾		14050 ⁽²⁾ 30450 ⁽²⁾	9400 20200	11300 24350	7200 15550	8950 ⁽²⁾ 19650 ⁽²⁾	6200 13600	10.01 32.85
-1.5 m -5.0 ft	13750 ⁽²⁾ 30450 ⁽²⁾		9100 ⁽²⁾ 19850 ⁽²⁾		8550 ⁽²⁾ 18850 ⁽²⁾		9950 ⁽²⁾ 22200 ⁽²⁾		14150 ⁽²⁾ 30650 ⁽²⁾	9200 19750	11200 24100	7100 15300	10300 22750	6550 14450	9.53 31.23
-3.0 m -10.0 ft	10000 ⁽²⁾ 21750 ⁽²⁾		8600 ⁽²⁾ 18850 ⁽²⁾		8650 ⁽²⁾ 19150 ⁽²⁾		10200 ⁽²⁾ 22850 ⁽²⁾		13500 ⁽²⁾ 29050 ⁽²⁾	9150 19700			10950 ⁽²⁾ 24200 ⁽²⁾	7400 16350	8.76 28.65
-4.5 m -15.0 ft			8450 ⁽²⁾ 18650 ⁽²⁾		9050 ⁽²⁾ 20100 ⁽²⁾		11150 ⁽²⁾ 25250 ⁽²⁾		11500 ⁽²⁾ 25350 ⁽²⁾	9350 20600			11200 ⁽²⁾ 24650 ⁽²⁾	9150 20400	7.62 24.79
-6.0 m -20.0 ft					10150 ⁽²⁾ 22800 ⁽²⁾								10750 ⁽²⁾ 23500 ⁽²⁾		5.89 18.86

(1) Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

(2) Capacity is limited by hydraulics rather than by a tipping load.

Table 26

Excavator with a 6.9 m (22 ft 7 inch) heavy-duty boom, a 2.9 m (9 ft 6 inch) short stick, a quick coupler without a bucket, 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes ⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
7.5 m 25.0 ft							7100 ⁽²⁾ 14600 ⁽²⁾				5850 ⁽²⁾ 12650 ⁽²⁾		8.36 27.17
6.0 m 20.0 ft							10750 ⁽²⁾ 23400 ⁽²⁾		7450 ⁽²⁾ 16400 ⁽²⁾		7100 ⁽²⁾ 15350 ⁽²⁾		9.13 29.84
4.5 m 15.0 ft	9300 ⁽²⁾ 21500 ⁽²⁾		15100 ⁽²⁾ 35450 ⁽²⁾		13850 ⁽²⁾ 29950 ⁽²⁾		11700 ⁽²⁾ 25350 ⁽²⁾	10650 22950	10400 ⁽²⁾ 22700 ⁽²⁾	7950 17100	7850 ⁽²⁾ 17250 ⁽²⁾	7150 15750	9.61 31.48
3.0 m 10.0 ft			9500 ⁽²⁾ 21400 ⁽²⁾		14600 ⁽²⁾ 33750 ⁽²⁾	14100 30450	12800 ⁽²⁾ 27700 ⁽²⁾	10150 21850	10950 ⁽²⁾ 23850 ⁽²⁾	7700 16500	8450 ⁽²⁾ 18500 ⁽²⁾	6650 14700	9.83 32.25

(continued)

(Table 26, contd)

Excavator with a 6.9 m (22 ft 7 inch) heavy-duty boom, a 2.9 m (9 ft 6 inch) short stick, a quick coupler without a bucket, 9000 kg (19840 lb) counterweight, and 600 mm (24 inch) triple grouser track shoes⁽¹⁾ All lifting capacities are in kilograms and pounds. Heavy lift is ON.													
(H)	(R)												
	3.0 m 10.0 ft		4.5 m 15.0 ft		6.0 m 20.0 ft		7.5 m 25.0 ft		9.0 m 30.0 ft		Maximum Reach		
	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	(F)	(S)	m ft
1.5 m 5.0 ft			8550 ⁽²⁾ 18900 ⁽²⁾		11050 ⁽²⁾ 25050 ⁽²⁾		13700 ⁽²⁾ 29700 ⁽²⁾	9700 20850	11450 ⁽²⁾ 24800	7400 15950	9350 ⁽²⁾ 20600 ⁽²⁾	6500 14300	9.82 32.23
0	11800 ⁽²⁾ 26600 ⁽²⁾		8450 ⁽²⁾ 18650 ⁽²⁾		10050 ⁽²⁾ 22500 ⁽²⁾		14250 ⁽²⁾ 30800 ⁽²⁾	9350 20150	11300 24350	7250 15550	10350 22800	6600 14550	9.57 31.41
-1.5 m -5.0 ft	9550 ⁽²⁾ 20750 ⁽²⁾		8500 ⁽²⁾ 18750 ⁽²⁾		9900 ⁽²⁾ 22200 ⁽²⁾		14100 ⁽²⁾ 30500 ⁽²⁾	9200 19800	11250 24800	7150 15750	11150 24550	7100 15600	9.07 29.71
-3.0 m -10.0 ft	8650 ⁽²⁾ 19000 ⁽²⁾		8650 ⁽²⁾ 19150 ⁽²⁾		10350 ⁽²⁾ 23350 ⁽²⁾		13100 ⁽²⁾ 28200 ⁽²⁾	9250 19900			11550 ⁽²⁾ 25400 ⁽²⁾	8100 17950	8.26 26.98
-4.5 m -15.0 ft	8450 ⁽²⁾ 18700 ⁽²⁾		9150 ⁽²⁾ 20450 ⁽²⁾		11900 ⁽²⁾ 27200 ⁽²⁾						11600 ⁽²⁾ 25550 ⁽²⁾	10400 23250	7.03 22.83

⁽¹⁾ Lift capacities are based on "ISO 10567:2007" standards. The listed capacities do not exceed 87 percent of the hydraulic lifting capacity or 75 percent of the tipping capacity. Weight of all lifting accessories must be subtracted from the lifting capacities. Lifting capacities are based on the machine standing on a firm and uniform supporting surface.

⁽²⁾ Capacity is limited by hydraulics rather than by a tipping load.

Identification Information

i07777738

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.

Product Identification Number (PIN) and CE Plate

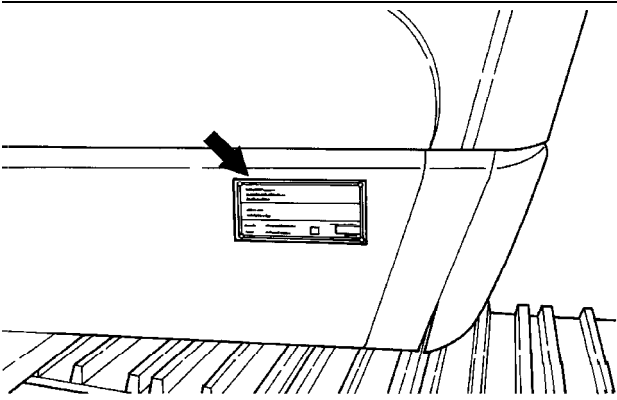


Illustration 77 g00675011

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

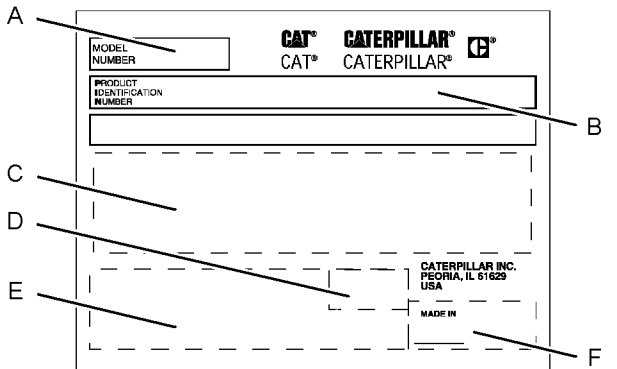


Illustration 78 g02436556

Model number (A) _____

Machine PIN (B) _____

Service Information Plate (C) _____

Month and Year of Manufacture (If Required) (D) _____

CE Plate (If Required) (E) _____

Country of Origin Info Plate (If Required) (F) _____

Local regulation may require documentation of the Month and/or Year of Manufacture in the Operation and Maintenance Manual. Enter on line (D) above if required.

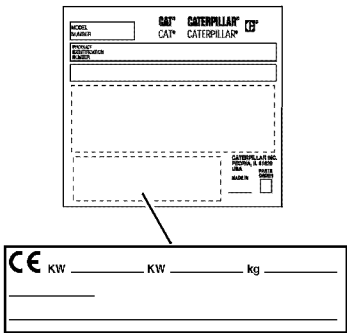


Illustration 79 g01883459

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

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

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

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

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

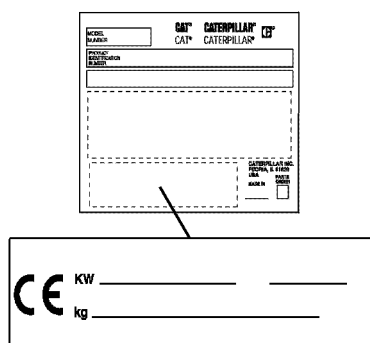


Illustration 80

g01120192

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

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

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

Eurasian Economic Union

For machines compliant to the Eurasian Economic Union requirements, the EAC mark plate is positioned near the Product Identification Number (PIN) plate (see Product Information Section of the machine Operation and Maintenance Manual). The EAC mark plate is placed on machines certified to the Eurasian Economic Union requirements effective at the time of market entry.



Illustration 81

g06094564

The Month and Year of Manufacture are on the PIN plate.

Manufacturer Information

Manufacturer:

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

Entity authorized by the manufacturer at the territory of Eurasian Economic Union:

Caterpillar Eurasia LLC
75, Sadovnicheskaya Emb.
Moscow 115035, Russia

Electromagnetic Emissions

Note: This label is on machines that are going into Canada.



Illustration 82

g06063443

If equipped, this label is located next to the Pin plate. This label verifies that the product meets the requirements of ICES-002 Issue 6. Compliance to ICES-002 Issue 6 is accomplished by meeting electromagnetic emissions industry standard CISPR-12.

Engine Serial Number

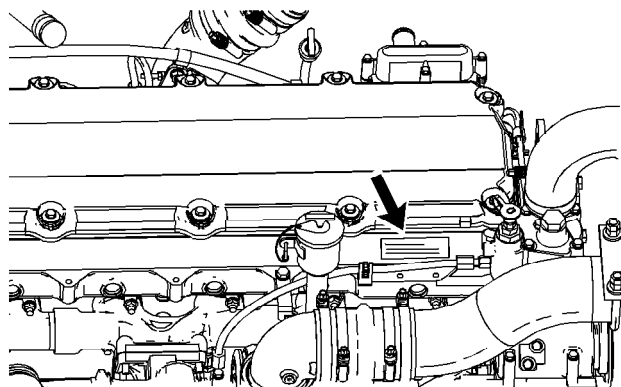


Illustration 83

g01097912

Engine Serial Number _____

Certification for Falling Object Guard Structure

This message is positioned on the falling object guard structure.

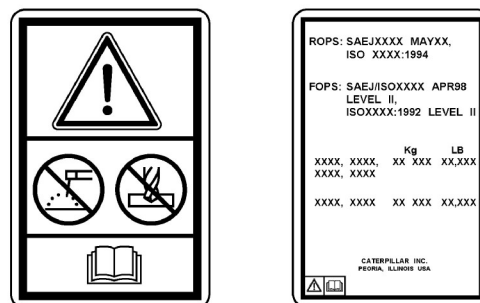


Illustration 84

g01211895

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.

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.

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

Sound Certification

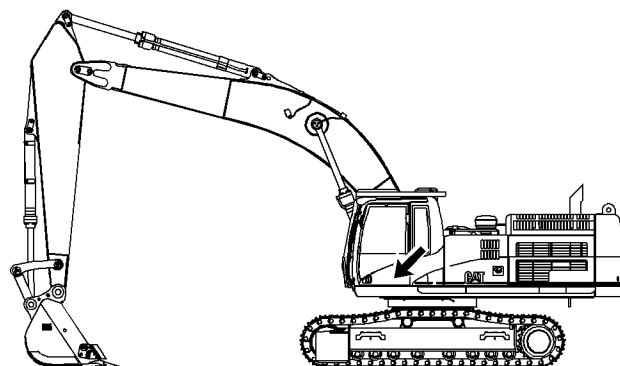


Illustration 85

g01592195

This film is on the left side of the machine.

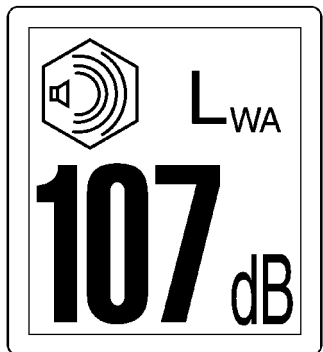


Illustration 86

g06006142

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

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

i06624518

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.

Product Information Section
Declaration of Conformity

Declaration of Conformity

SMCS Code: 1000; 7000

Table 27

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

ORIGINAL EC or EU DECLARATION OF CONFORMITY

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

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

Standards & Regulations Manager, Caterpillar France S.A.S 40,
Avenue Leon-Blum, B.P. 55, 38041 Grenoble Cedex 9, France

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

Description:	Generic Denomination:	Earth-moving Equipment
	Function:	Hydraulic Excavator
	Model/Type:	345D and 349D
	Serial Number:	
	Commercial Name:	Caterpillar

Fulfills all the relevant provisions of the following Directives

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

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

Done at:

Signature

Date:

Name/Position

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

Operation Section

Before Operation

i01967054

Daily Inspection

SMCS Code: 1000; 6319; 6700; 7000

WARNING

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

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

Steam can cause personal injury.

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

Remove the cooling system pressure cap slowly to relieve pressure.

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

NOTICE

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

For maximum service life of the machine, perform a thorough daily inspection before you mount the machine and before you start the engine.

First 100 Hours

Daily, perform the procedures that are applicable to your machine:

- Operation and Maintenance Manual, “Boom, Stick and Bucket Linkage - Lubricate”

Severe Applications

Daily, perform the procedures that are applicable to your machine:

- Operation and Maintenance Manual, “Boom, Stick and Bucket Linkage - Lubricate”

Daily Basis

Daily, perform the procedures that are applicable to your machine:

- Operation and Maintenance Manual, “Cooling System Level - Check”
- Operation and Maintenance Manual, “Engine Oil Level - Check”
- Operation and Maintenance Manual, “Fuel System Water Separator - Drain”
- Operation and Maintenance Manual, “Fuel Tank Water and Sediment - Drain”
- Operation and Maintenance Manual, “Hydraulic System Oil Level - Check”
- Operation and Maintenance Manual, “Indicators and Gauges - Test”
- Operation and Maintenance Manual, “Seat Belt - Inspect”
- Operation and Maintenance Manual, “Track Adjustment - inspect”
- Operation and Maintenance Manual, “Travel Alarm - Test”
- Operation and Maintenance Manual, “Undercarriage - Check”

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

Note: Watch closely for leaks. If you observe a leak, find the source of the leak and correct the leak. If you suspect a leak or you observe a leak, check the fluid levels more frequently.

Operation Section

Mounting and Dismounting

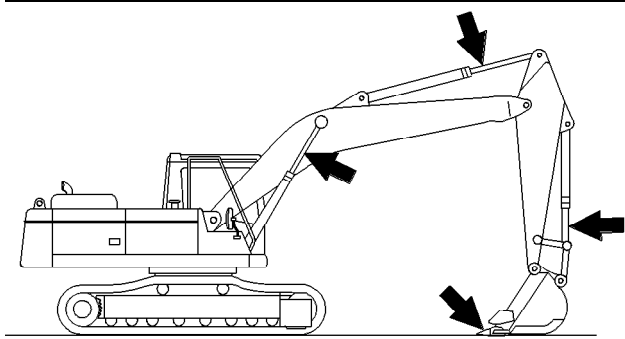


Illustration 87

g00101867

Inspect the attachment control linkage, attachment cylinders, and attachment for damage or excessive wear. Make any necessary repairs.

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

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

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

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

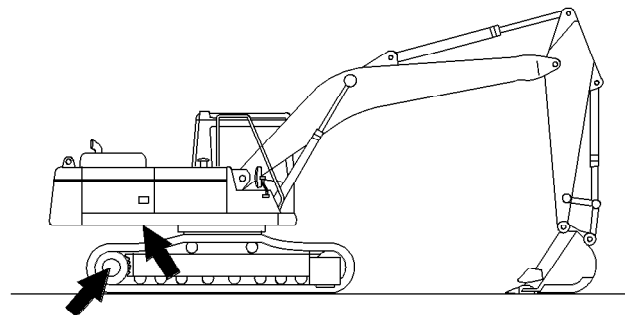


Illustration 88

g00101870

Inspect the hydraulic system for leaks. Inspect the tank, cylinder rod seals, hoses, tubes, plugs, connections, and fittings. Correct any leaks in the hydraulic system.

Inspect the differential and the final drives for leaks. Make any necessary repairs.

Inspect the swing drive for leaks.

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

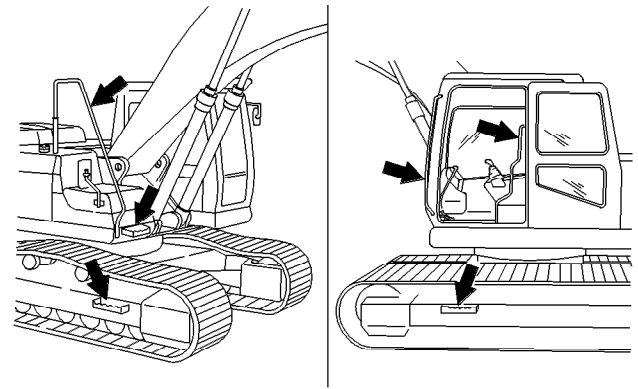


Illustration 89

g00101987

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

Inspect the operator compartment for trash buildup. Check for trash buildup under the floorplate and on the crankcase guard. Keep these areas clean.

Adjust the mirrors in order to achieve the best visibility.

i04027420

Mounting and Dismounting

SMCS Code: 6700; 7000

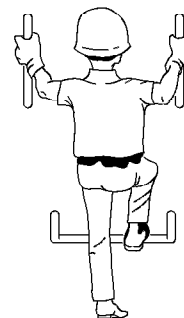


Illustration 90

g00037860

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

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

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

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

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.

Machine Operation

i07059455

Alternate Exit

SMCS Code: 7310

Rear Window with Ring Seal (If Equipped)

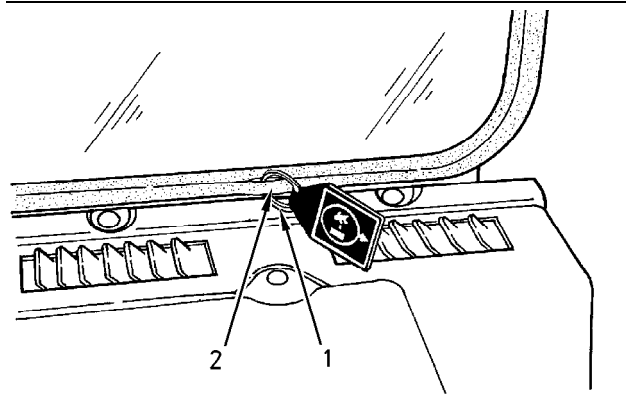


Illustration 91

g00681020

- (1) Ring
(2) O-ring seal



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

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

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

Rear Window with Lever (If Equipped)

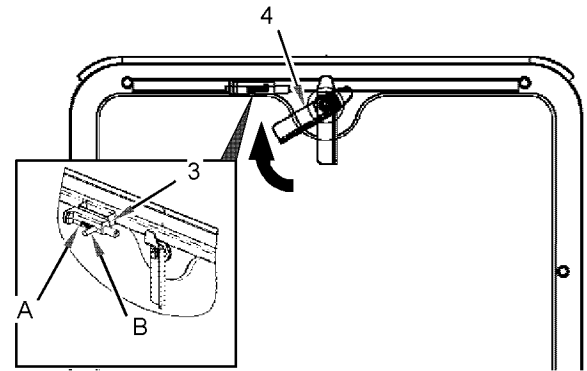


Illustration 92

g01137161

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

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

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

Removing Rear Window from the Inside

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

Removing Rear Window from the Outside

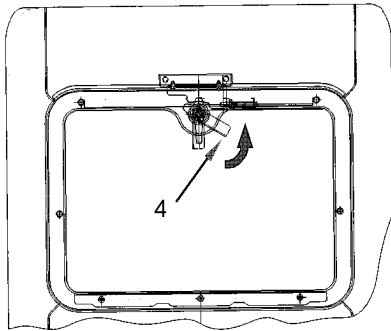


Illustration 93

g01137162

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

Hammer (If Equipped)

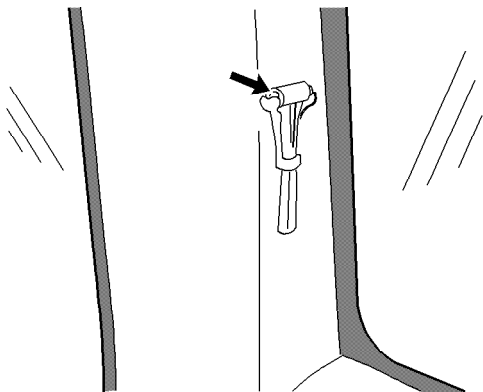


Illustration 94

g00748659



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



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

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

i03210934

Seat

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

Early Type

Put the hydraulic lockout control in the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, "Operator Controls". Do this procedure before you adjust the seat and the console. This will prevent any possibility of unexpected movement of the machine.

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

Always use the seat belt when you operate the machine. For further details on this procedure, refer to Operation and Maintenance Manual, "Seat Belt".

The seat should be adjusted so that full pedal travel is allowed.

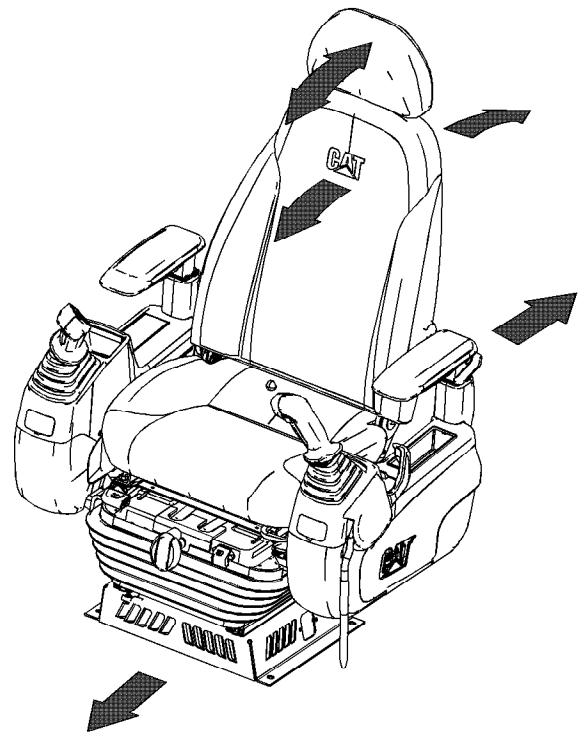


Illustration 95

g01098275

The operator can adjust the seat position forward or backward. The operator may also adjust the seat back tilt. Select the desired position in order to allow full pedal travel and full lever travel.

The seat and the consoles can also slide as one unit.

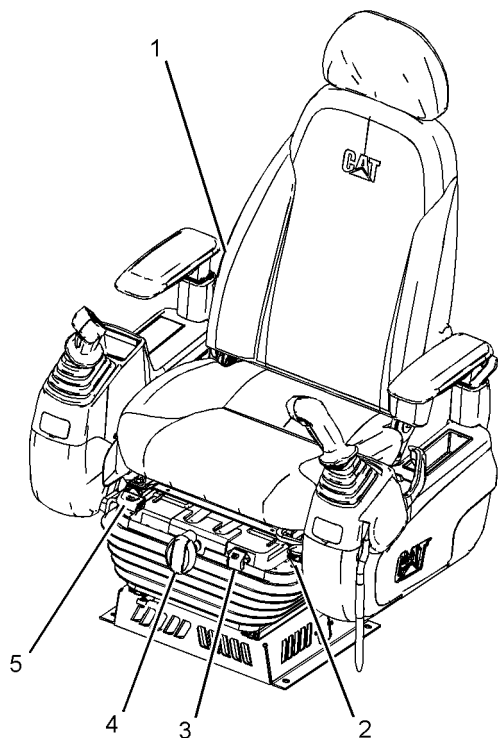


Illustration 96

g01120894

To adjust the seat back tilt, move lever (1) and move the seat back to the desired position.

Pull up lever (2) in order to change the angle of the seat. Hold the seat in the desired position. Release the lever.

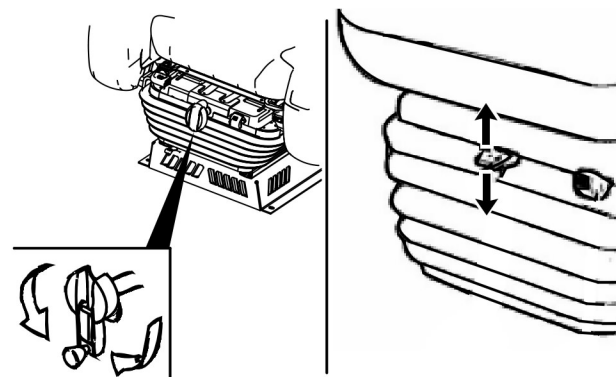


Illustration 97

g01120901

Use handle (4) in order to adjust the height of the seat. Place the handle in the operating position. Turning the handle clockwise increases the height of the seat. Turning the handle counterclockwise decreases the height of the seat. If your machine is equipped with an air ride suspension, the seat will be equipped with a lever. Pull up the lever in order to raise the height of the seat. Push down on the lever in order to lower the seat. If the adjustment is correct, indicator (3) will turn green. If the indicator shows red, further adjustment is required.

To adjust the seat forward or backward, pull up lever (5) and hold the lever. Move the seat to the desired position. To lock the seat in the selected position, release the lever.

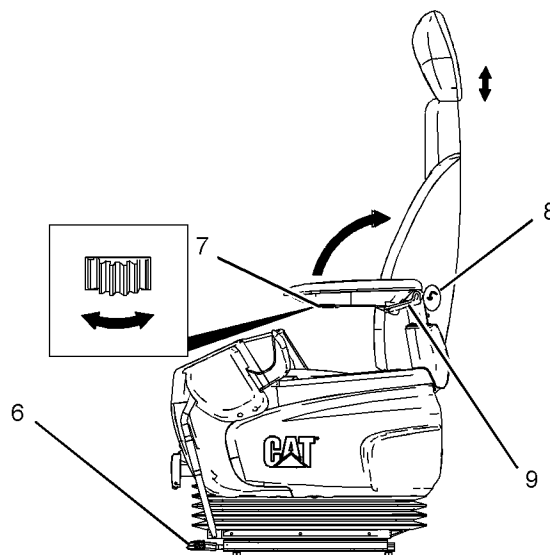


Illustration 98

g01120893

To move the seat, the left console, and the right console forward or backward as one unit, pull up lever (6) and hold the lever. Hold the seat in the desired position. Release the lever in order to lock the seat, the left console, and the right console.

To adjust the angle of the armrest, operate dial (7). A dial is on the bottom of each armrest. Place the armrests in the upright position when you enter the machine or when you exit the machine.

The lumbar support is located in the back of the seat. Turn knob (8) (if equipped) counterclockwise in order to increase the force of the lumbar support. In order to decrease the lumbar support, continue to turn the knob counterclockwise.

The height of the armrest can be adjusted. Squeeze lever (9) in order to adjust the height of the armrest. Move the armrest upward or move the armrest downward. Release the lever when the armrest is in the desired position.

The operator can adjust the height of headrest (if equipped). To adjust the headrest, hold the headrest with both hands. Move the headrest up and down. Release the headrest when the desired position is attained. The headrest will remain in the desired position.

Later Type

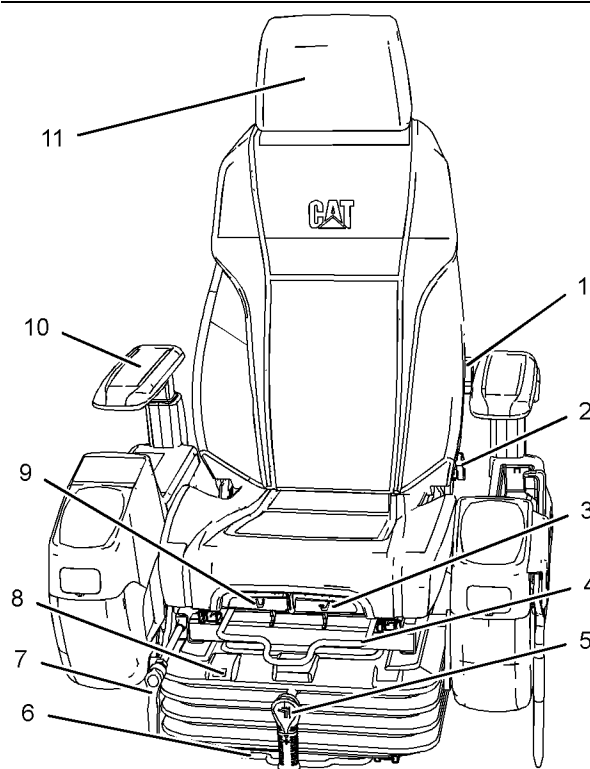


Illustration 99

g01636841

- (1) Adjustment lever for the lumbar support
- (2) Adjustment lever for reclining the seat
- (3) Lever for the seat cushion adjustment
- (4) Seat fore and aft adjustment.
- (5) Seat height adjustment
- (6) Fore and aft seat and console adjustment
- (7) Console adjustment
- (8) Indicator
- (9) Seat angle lever
- (10) Armrest
- (11) Headrest

The lumbar support is located in the back of the seat. Turn knob (1) (if equipped) counterclockwise in order to increase the force of the lumbar support. In order to decrease the lumbar support, continue to turn the knob counterclockwise.

Pull up lever (2) in order to change the angle of the seat. Hold the seat back in the desired position. Release the lever.

Push in lever (3) in order to adjust the length of the cushion.

To adjust the seat forward or backward, pull up lever (4) and hold the lever. Move the seat to the desired position. To lock the seat in the selected position, release the lever.

Note: Before adjusting the seat forward or backward, make sure that the lever for the seat height adjustment (5) is in the downward position.

Turn lever (5) in order to adjust the seat and the console to the desired height. In order to raise the seat height, pull the grip downward and rotate the grip with the plus sign outward. In order to lower the seat height, pull the grip downward and rotate the grip with the minus sign outward. Release grip in order to return to the original position.

Pull lever (6) in order to adjust the seat and the console forward and backward.

Use handle (7) in order to adjust the height of the console. . When the lever is pulled forward, a gear is released. The operator can rotate the lever freely. Release the lever in order to return to the original position.

Push the lever (9) in order to adjust the tilt angle of the seat.

The operator can adjust the height of headrest (11). To adjust the headrest, hold the headrest with both hands. Move the headrest up and down. Release the headrest when the desired position is attained. The headrest will remain in the desired position.

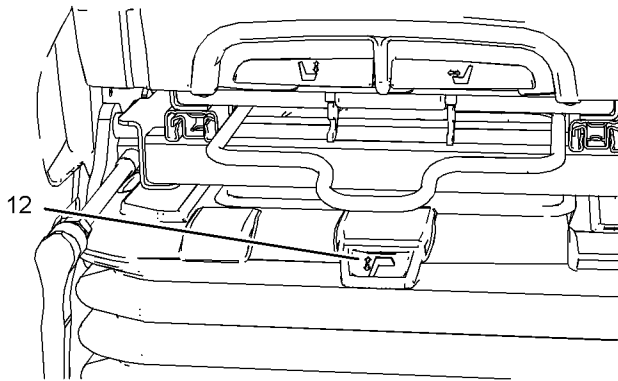


Illustration 100

g01637296

If your machine is equipped with an air ride suspension, the seat will be equipped with a lever (12). Pull up the lever in order to raise the height of the seat. Push down on the lever in order to lower the seat. If the adjustment is correct, indicator (8) will turn green. If the indicator shows red, further adjustment is required.

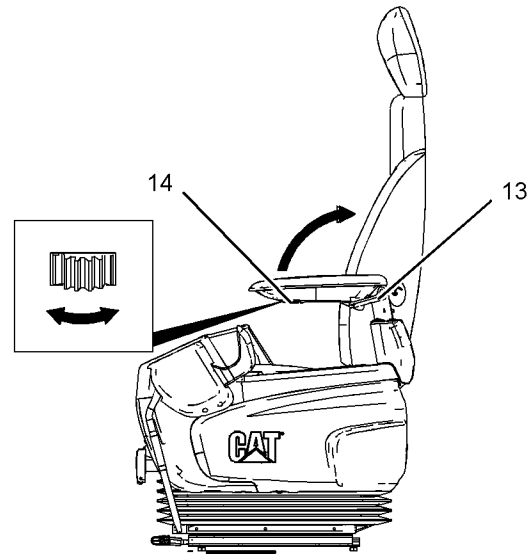


Illustration 101

g01636977

(13) Armrest adjustment knob
(14) Armrest height adjustment

The height of the armrest can be adjusted. Squeeze lever (13) in order to adjust the height of the armrest. Move the armrest upward or move the armrest downward. Release the lever when the armrest is in the desired position.

To adjust the angle of the armrest (10), operate dial (14). A dial is on the bottom of each armrest. Place the armrests in the upright position when you enter the machine or when you exit the machine.

i04200349

Seat Belt

SMCS Code: 7327

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

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

Seat Belt Adjustment for Non-Retractable Seat Belts

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

Lengthening the Seat Belt

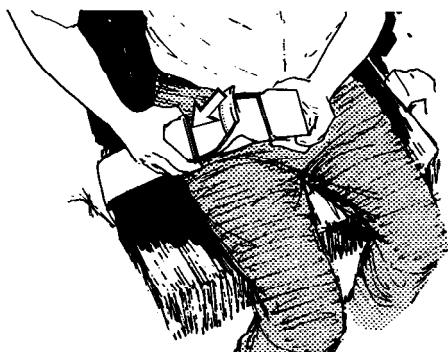


Illustration 102

g00100709

1. Unfasten the seat belt.

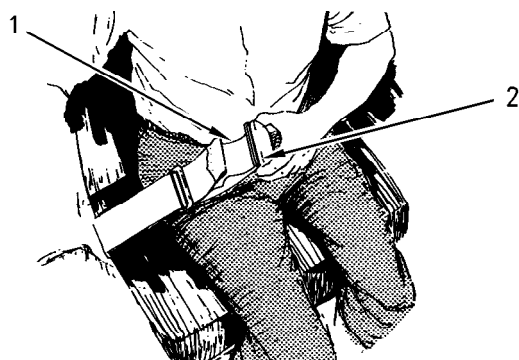


Illustration 103

g00932817

2. To remove the slack in outer loop (1), rotate buckle (2). This will free the lock bar. This permits the seat belt to move through the buckle.
3. Remove the slack from the outer belt loop by pulling on the buckle.
4. Loosen the other half of the seat belt in the same manner. If the seat belt does not fit snugly with the buckle in the center, readjust the seat belt.

Shortening the Seat Belt

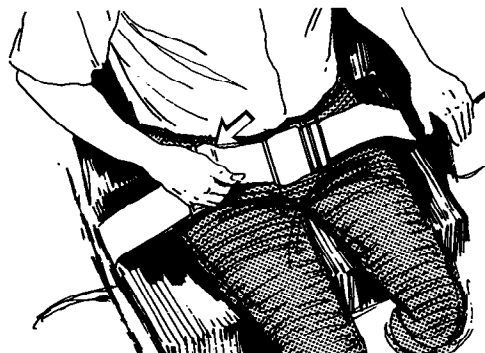


Illustration 104

g00100713

1. Fasten the seat belt. Pull out on the outer belt loop in order to tighten the seat belt.
2. Adjust the other half of the seat belt in the same manner.
3. If the seat belt does not fit snugly with the buckle in the center, readjust the seat belt.

Fastening The Seat Belt

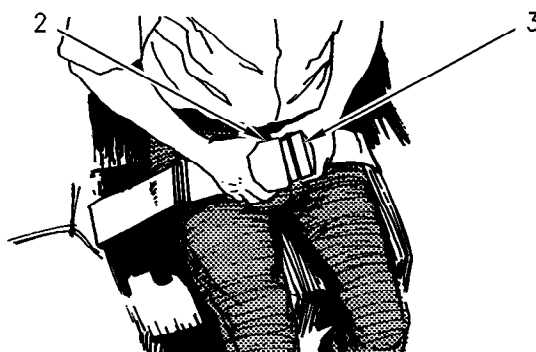


Illustration 105

g00932818

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

Releasing The Seat Belt

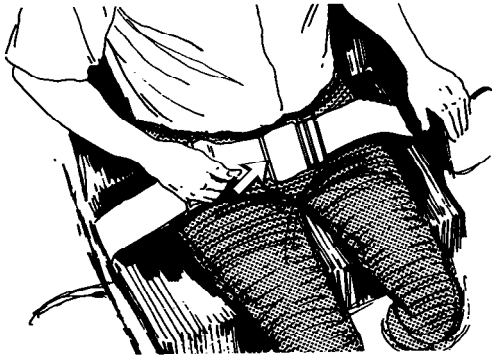


Illustration 106

g00100717

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

Seat Belt Adjustment for Retractable Seat Belts

Fastening The Seat Belt

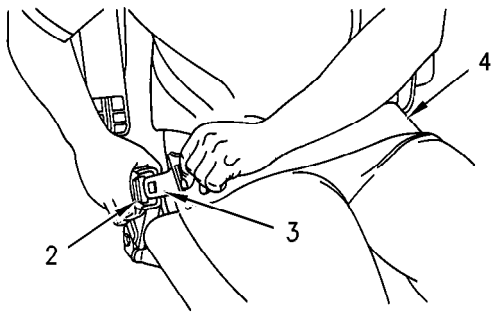


Illustration 107

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

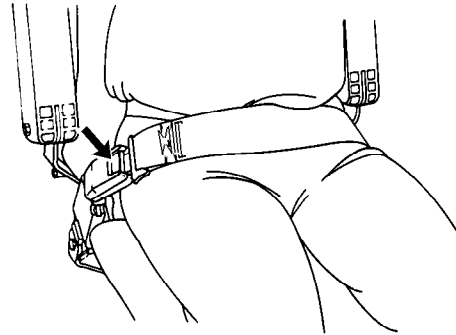


Illustration 108

g00039113

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

Extension of the Seat Belt

⚠ WARNING

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

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

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

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

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

i05771124

Operator Controls

SMCS Code: 7300; 7301; 7451

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

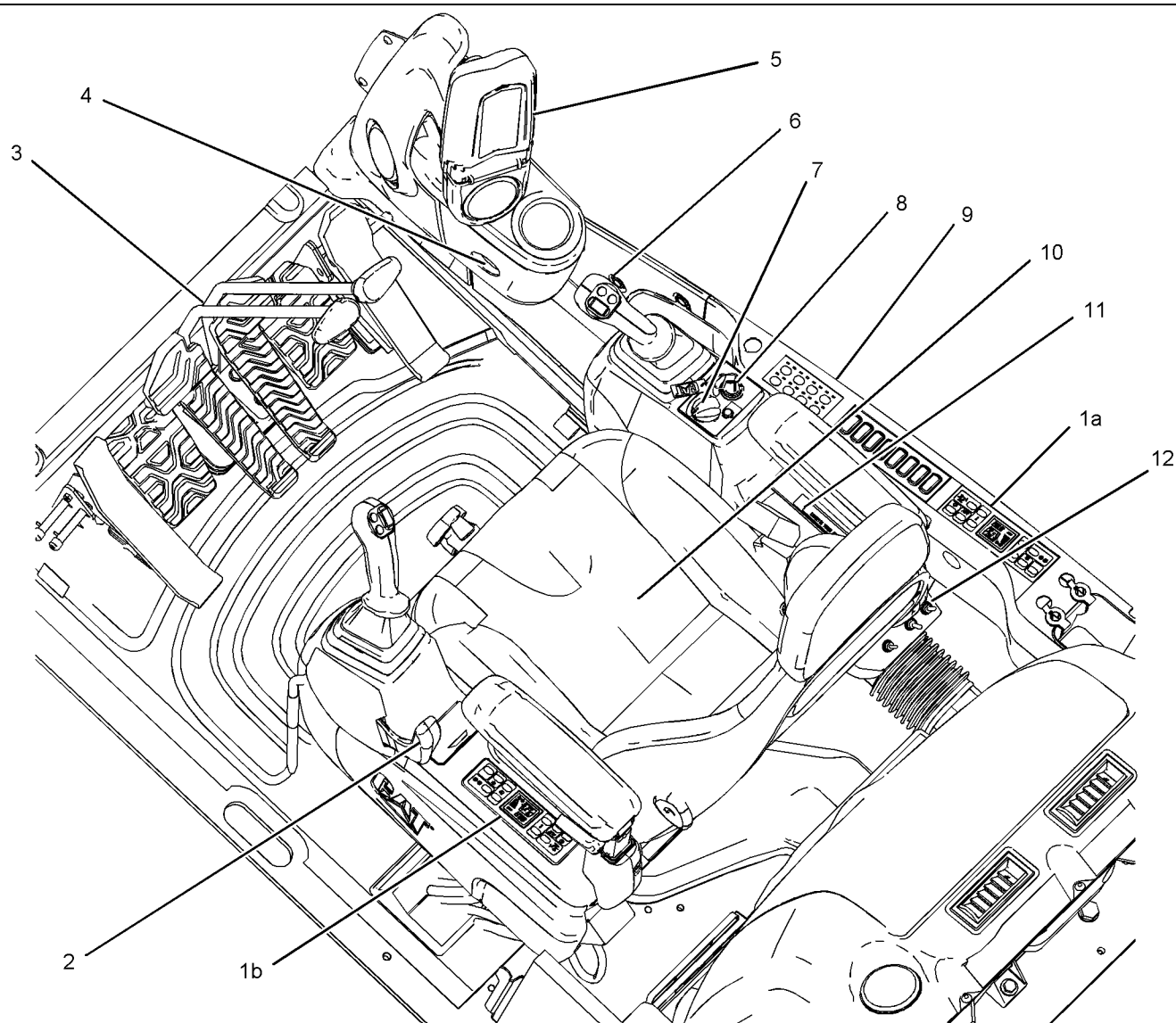


Illustration 109

g03654245

- (1a) Air Conditioning and Heater Control
(Early type and location)
- (1b) Air Conditioning and Heater Control
(Later type and location)
- (2) Hydraulic Lockout Control

- (3) Travel Controls
- (4) Service Hour Meter
- (5) Monitor
- (6) Joystick Controls
- (7) Engine Speed Control

- (8) Engine Start Switch
- (9) Right Side Control Panel
- (10) Operator's Seat
- (11) Radio
- (12) Backup Controls

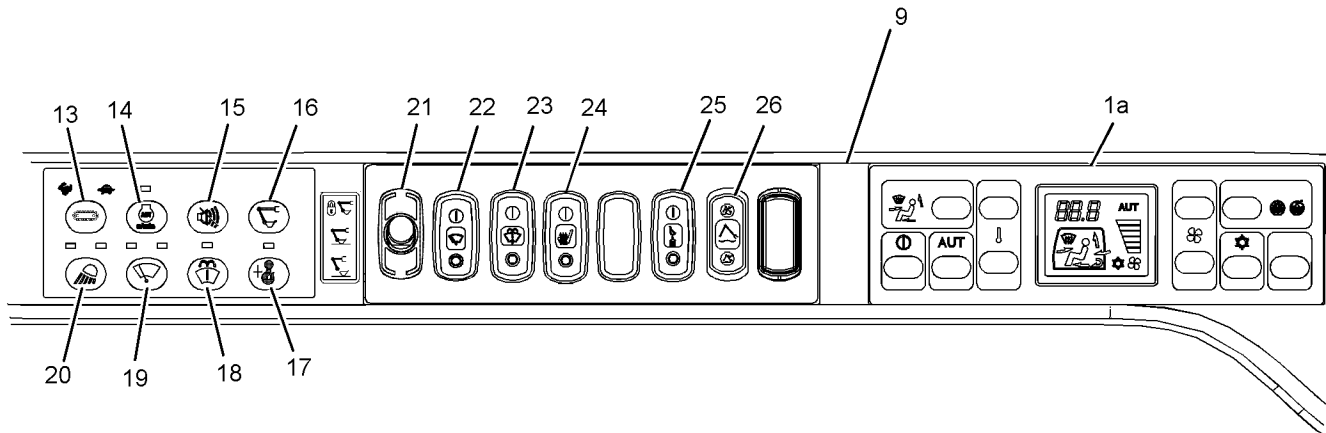


Illustration 110

g03654243

Right Side Control Panel (9)

(13) Travel Speed Control
 (14) Automatic Engine Speed Control (AEC)
 (15) Travel Alarm Cancel Switch
 (16) Work Tool Control
 (17) Heavy Lift Control
 (18) Upper Window Washer

(19) Upper Window Wiper
 (20) Light Switch
 (21) Quick Coupler Control
 (22) Lower Window Wiper
 (23) Lower Window Washer
 (24) Seat Heater

(25) Overload Warning Device
 (26) SmartBoom Control
 (1a) Air Conditioning and Heater Control
 (Early type and location)

Air Conditioning and Heater Control (1a -1b)

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



Unlocked – Move the lever for the hydraulic lockout control forward to the UNLOCKED position. This makes all of the factory installed hydraulic controls operable.

Travel Control (3)

Hydraulic Lockout Control (2)

The lever for the hydraulic lockout control is located at the left side of the left console.



Locked – Move the travel levers/pedals and move the joysticks to the HOLD (center) position. Move the lever for the hydraulic lockout control backward to the LOCKED position. This makes all of the factory installed hydraulic controls inoperable.

Note: Make sure that the lever for the hydraulic lockout control is in the LOCKED position before attempting to start the engine. If the lever is in the UNLOCKED position, the engine start switch will not function.

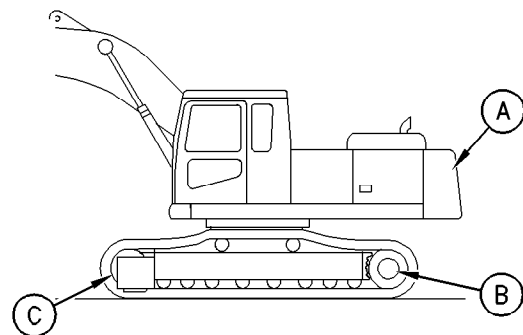


Illustration 111

g00753277

Position for normal travel

(A) Rear of machine
 (B) Final drive
 (C) Idler

When you travel, make sure that final drive sprockets (B) are under the rear of the machine.

Stop – Release the travel levers/pedals in order to stop the machine. When you release the travel levers/pedals from any position, the travel levers/pedals will return to the CENTER position. This applies the travel brakes.

Move both of the travel levers or both of the travel pedals equally in the same direction in order to travel straight.

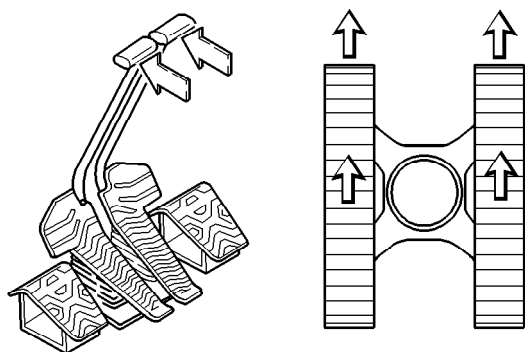


Illustration 112

g00731542

Forward Travel

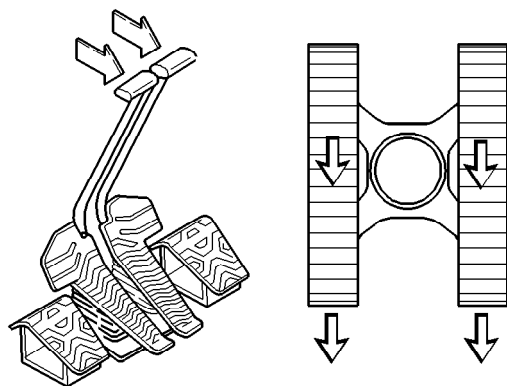


Illustration 113

g00731543

Reverse Travel

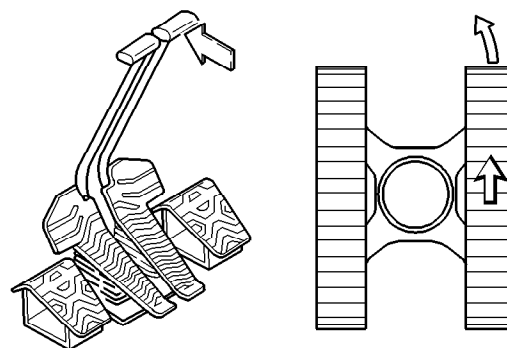


Illustration 114

g00731472

Pivot Left Turn (Forward)

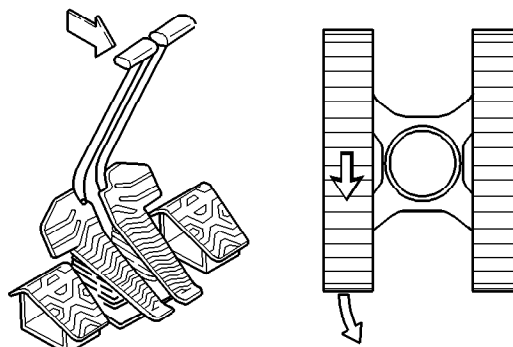


Illustration 115

g00731478

Pivot Left Turn (Reverse)

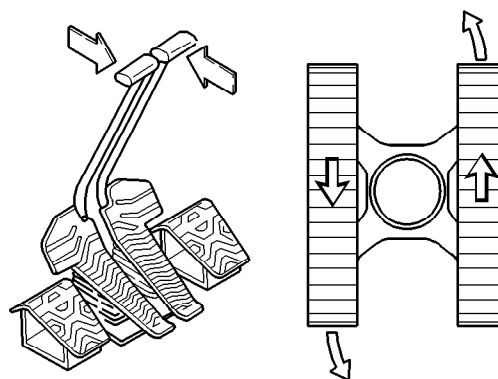


Illustration 116

g00731476

Counterrotate Turn (Left)

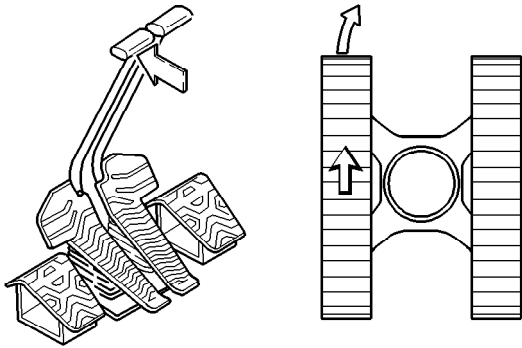


Illustration 117

g00731471

Pivot Right Turn (Forward)

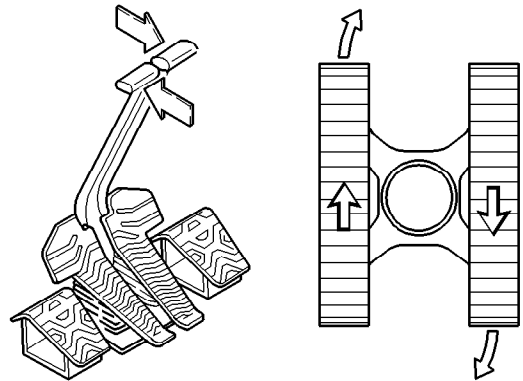


Illustration 119

g00731477

Counterrotate Turn (Right)

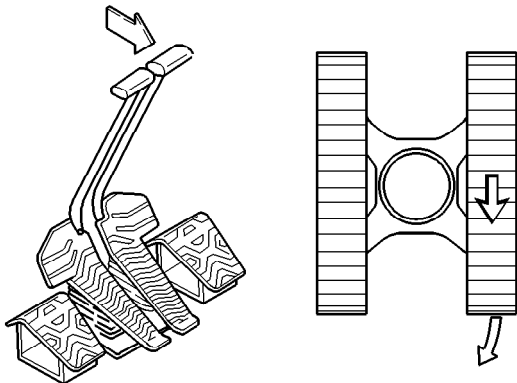


Illustration 118

g00731479

Pivot Right Turn (Reverse)

Service Hour Meter (4)



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

Monitor (5)

The monitor is used in order to display various operating information of the machine. For more information on the operation of the monitor, refer to Operation and Maintenance Manual, “Monitoring System”.

Joystick Controls (6)

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

Engine Speed Control (7)



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



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



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

Backup Method for Controlling Engine Speed

If the control system does not work due to a malfunction and the engine speed cannot be adjusted by the engine speed dial, the following method will allow you to adjust the engine speed temporarily. Make repairs as soon as possible.

Check the message display for any error messages. If the error message "ECM ERROR" is displayed, there is a problem in the electronic controller. See "Backup Controls (If Equipped) (12)".

If the engine speed cannot be adjusted by the engine speed dial and the indicator for the electronic controller does not come on, see "Backup Controls (If Equipped) (12)".

Note: Even if you cannot control the engine speed, you can turn the engine on and off with the engine start switch.

Engine Start Switch (8)

NOTICE

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



OFF – 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 engine start switch is in the OFF position. Turn the engine start switch to the OFF position before you attempt to restart the engine. Turn the engine start switch to the OFF position in order to stop the engine.



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



START – Turn the engine start switch clockwise to the START position in order to crank the engine. Release the engine start switch key after the engine starts. The start switch will return to the ON position.

Note: If the engine does not start after 30 seconds, return the engine start switch to the OFF position. Wait for 2 minutes before you return the engine start switch to the START position.

To start the engine, the battery disconnect switch must be on and the hydraulic lockout control must be in the locked position. For details, see the Operation and Maintenance Manual, "Engine Starting".

Operator's Seat (10)

The operator's seat and the console has various adjustments in order to meet a wide range of operators. For more information, refer to Operation and Maintenance Manual, "Seat".

Radio (11)

This machine may be equipped with a radio. For more information, refer to Operation and Maintenance Manual, "Radio".

Backup Controls (If Equipped) (12)

The backup switches are located under the right armrest.

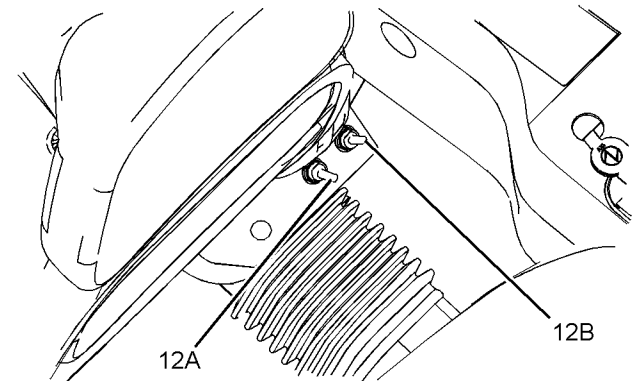


Illustration 120

g03661499



Engine Speed Control – By utilizing these switches, the engine speed can be controlled manually by the operator or the engine speed can be controlled automatically by the electronic controller.



Automatic – When the electronic control system is functioning properly, backup switch (12A) should be in this position.



Manual – If a problem occurs in the electronic control system, move backup switch (12A) to this position in order to disconnect the controller circuit of the electronic controller system. In this condition, the machine can be operated at a reduced ratio of pump output on a temporary basis. "BACK UP SWITCH ON" will appear on the message display.



Fast Engine Speed – Move backup switch (12B) to this position in order to increase the engine speed. This backup switch will not operate if backup switch (12A) is not in the **MANUAL** position. When the switch is released the switch returns to the **NEUTRAL** position and the machine will maintain the engine speed. This switch overrides the function of the engine speed dial.



Slow Engine Speed – Move backup switch (12B) to this position in order to decrease the engine speed. This backup switch will not operate if backup switch (12A) is not in the **MANUAL** position. When the switch is released the switch returns to the **NEUTRAL** position and the machine will maintain the engine speed. This switch overrides the function of the engine speed dial.

Travel Speed Control (13)

WARNING

Do not change the setting of the travel speed control switch while you travel. Machine stability may be adversely affected.

Personal injury can result from sudden changes in machine stability.



Travel Speed Control Switch – Press the travel speed control switch in order to select automatic travel speed or low travel speed. When the engine start switch is on, the travel speed control switch is always set at the **LOW SPEED** speed position. Whenever the travel speed control switch is pressed, the travel speed changes.



LOW SPEED – Select the **LOW SPEED** position if you travel on rough surfaces or on soft surfaces or if you require a great drawbar pull. Also, select the **LOW SPEED** position if you are loading a machine onto a trailer or you are unloading a machine from a trailer.



AUTOMATIC – If you travel on a hard, level surface at a fast speed, select the **AUTO** position.

Continuous driving at high speed should be limited to 2 hours. If you need to continue driving at high speed for more than 2 hours, stop the machine for 10 minutes. This will cool down the travel drives before you resume driving.

Automatic Engine Speed Control (14)

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

The AEC system will be inoperable while the backup switch of the electronic controller system is in the **MAN** position.

The engine rpm will recover automatically to the setting of the engine speed dial when any hydraulic function is activated. The AEC system operates in three modes. Refer to Table 28 for a description of each mode.



Automatic Engine Speed Control (AEC) – The Automatic Engine Speed Control switch is activated when the engine start switch is turned to the **ON** position. The indicator lamp will turn on. When you press the AEC switch, the function of the AEC switch changes from **ON** to **OFF**, and vice versa. The operator can choose from three possible modes for automatic engine speed control. Refer to Table 28 for more details.

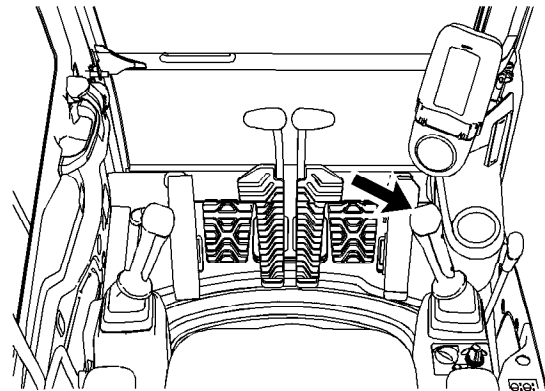


Illustration 121

g01077282

The switch for manual low idle is on the right joystick.

Manual Low Idle – Activate the manual low idle in order to reduce the engine speed to approximately 1020 rpm. Pressing the switch again will allow the engine speed to return to the original setting of the engine speed dial.

The manual low idle allows the operator to easily reduce the rpm without touching the engine speed dial. This is useful when the operator wants to reduce the engine speed in order to talk to someone or while the operator is waiting for a truck.

Operation of the automatic engine speed control depends on the position of the AEC switch and of the switch for manual low idle. The engine rpm will recover automatically to the setting of the engine speed dial when any hydraulic function is activated.

Table 28

AEC Mode	Position of AEC Switch	Setting of Engine Speed Dial	Position of Manual Low Idle Switch	Description of Mode
First stage	OFF	5 to 10	OFF	The electronic controller automatically reduces engine speed by 100 rpm after there has been no hydraulic demand for approximately 3 seconds.
Second stage	ON	5 to 10	OFF	The AEC system in the electronic controller will automatically reduce the engine rpm to approximately 1300 rpm after there has been no hydraulic demand for approximately 3 seconds.
Manual low Idle	ON or OFF	3 to 10	ON	The engine speed is reduced to approximately 1020 rpm.

Travel Alarm Cancel Switch (15)



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

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

Work Tool Control (16)



Work Tool Control (Switch) – Press this switch in order to display the selected work tool on the monitor display. Press the switch repeatedly in order to change the selected work tool.

Heavy Lift Control (17)

Push this button in order to activate heavy lift mode. Also push this button in order to deactivate heavy lift mode.



Heavy Lift Mode – This work mode increases the relief pressure in the hydraulic circuit, which increases the hydraulic force that is available for lifting operations. The cylinder speed is slower when this mode is selected.

Note: During normal excavation work, the heavy lift control must be in the OFF position.

NOTICE

If this machine is used to lift objects within an area that is controlled by the European Directive “2006/42/EC”, the machine must be equipped with a boom lowering control valve, a stick lowering control valve, and an overload warning device.

Upper Window Wiper and Window Washer (18-19)



Window Washer (18) – Push the switch in order to activate the window washer. While the switch is depressed, the indicator light will come on and washer fluid will spray from the nozzle. The window wiper will also operate while the switch is depressed. After the switch is released for approximately 3 seconds, the window wiper will stop.



Window Wiper (19) – Push the switch in order to activate the window wiper. Whenever the switch is depressed, the mode of the window wiper will change according to the indicator light that is illuminated.

6 Second Delay – When the window wiper switch is depressed one time, the first indicator light will turn on. The window wiper will operate intermittently at six second intervals.

3 Second Delay – When the window wiper switch is depressed two times, the second indicator light will turn on. The window wiper will operate intermittently at three second intervals.

Continuous Operation – When the window wiper switch is depressed three times, the first indicator light and the second indicator light will turn on. The window wiper will operate continuously.

OFF – When the window wiper switch is depressed four times, the indicator lights will turn off. The window wiper stops.

NOTICE

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

NOTICE

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

Light Switches (20)

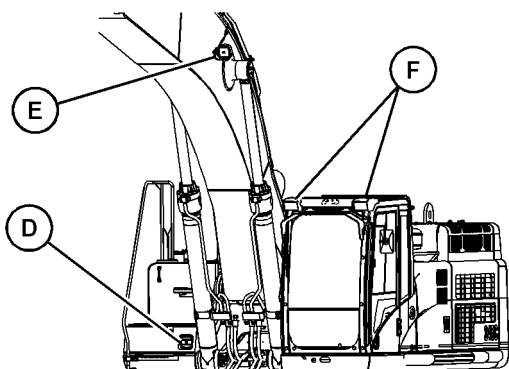


Illustration 122

g01125953



Light Switch – Push the switch in order to turn on the work lights.

Whenever you push the switch, you change the pattern of the work lights that are turned on. The indicator lights in the cab indicate the pattern of the work lights.

Pattern 1 – When you press the light switch once, the first indicator light turns on. When the first indicator light is on, the following work lights are turned on: work light (D), which is mounted on the chassis, and work lights (F), which are mounted on the cab.

Pattern 2 – When you press the light switch twice, the first indicator light and the second indicator light turn on. When the first indicator light and the second indicator lights are on, the following work lights are turned on: work light (D), which is mounted on the

chassis, work lights (F), which are mounted on the cab, and work lights (E), which are mounted on the boom.

OFF – When both of the indicator lights are off, all of the work lights are off.

Note: Your machine may be equipped with a lighting system that has a time delay. When this system is installed, cab lights (F) will not turn off for a predetermined amount of time after the engine start key has been turned to the OFF position. The time delay can vary from 0 seconds to 90 seconds. For further details, consult your Caterpillar dealer.

Quick Coupler Control (21)



LOCKED – Move the switch to this position in order to engage the quick coupler onto the work tool.



LOCKING – Move the switch for the quick coupler to the LOCKING position in order to retract the wedge.



UNLOCKING – Move the switch for the quick coupler to the UNLOCKING position in order to extend the wedge.

Use this position only during the coupling or uncoupling of the work tool. The hydraulic system is pressurized when the switch is in this position.

Note: An alarm will sound whenever the switch is in the UNLOCKING or LOCKING position.

For further details, see Operation and Maintenance Manual, “Quick Coupler Operation”.

Lower Window Wiper and Window Washer (22-23)



Lower Window Wiper (22) – Push down on the top of the switch in order to turn on the lower window wiper. Push down the bottom portion of the switch in order to turn off the lower window wiper.



Lower Window Washer (23) – Push down on the top of the switch and keep the switch depressed in order to activate the lower window washer. While the switch is depressed, the washer fluid will spray from the nozzle.

NOTICE

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

NOTICE

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

Seat Heater (24)

 WARNING

Preexisting skin conditions can be aggravated by continued use of the seat heater. If skin condition worsens, discontinue use of the seat heater.



Seat Heater – In cold weather, the seat heater can be activated in order to improve operator comfort.



ON – Push down on the top of the seat heater switch in order to activate the seat heater.



OFF – Push down on the bottom of the seat heater switch in order to deactivate the seat heater.

NOTICE

Do not leave any heavy item or object with a sharp point on the seat.

Do not cover the seat or seat back with a blanket, seat cushion or any other similar covering. The seat heater can be over heated. Be sure to remove any spills on the seat and thoroughly dry the spill.

Note: The thermostat in the seat heater deactivates when the temperature in the cab is above 10°C (50°F). The seat heater will not operate when the thermostat is deactivated.

Overload Warning Device (25) (If Equipped)

The switch for the overload warning device is located on the right console.

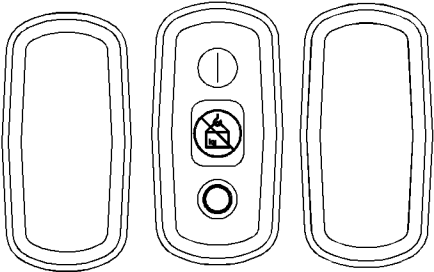


Illustration 123

g01615354

Early Type

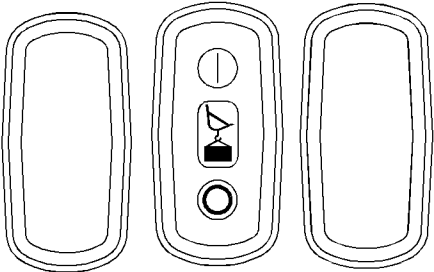


Illustration 124

g01615363

Later Type



Overload Warning Device – In lifting applications, the overload warning device

activates a buzzer when there is an unstable load condition. When this occurs, the bucket load should be reduced or the stick should be moved inward.



ON – Push the right side of the switch in order to activate the overload warning device.



OFF – Push the left side of the switch in order to deactivate the overload warning device.

SmartBoom Control (26) (If Equipped)

This machine may be equipped with SmartBoom Control. For more information, refer to Operation and Maintenance Manual, “SmartBoom Control” and Operation and Maintenance Manual, “SmartBoom Operation”.

Service Port

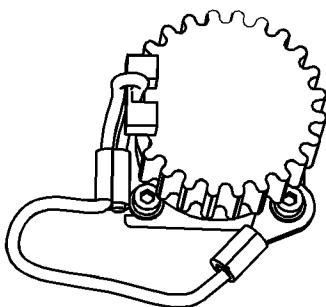


Illustration 125

g03320855

Electronic Technician service port

An Electronic Technician (ET) service port is located inside the cab on the right side of the seat. This service port allows service personnel to connect a laptop computer that is equipped with Electronic Technician. Service personnel can use electronic technician in order to diagnose machine and engine systems.

Contact your Cat dealer for additional information.

i05039774

Battery Disconnect Switch

SMCS Code: 1411-B11

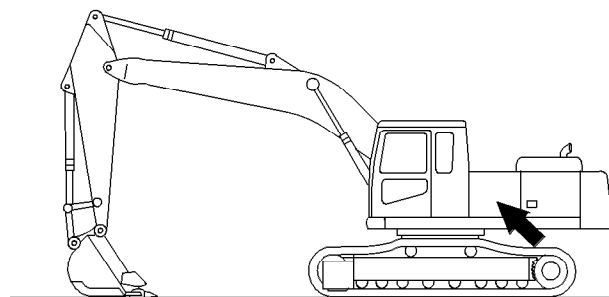


Illustration 126

g00100862

The battery disconnect switch is on the left side of the machine behind the front access door.

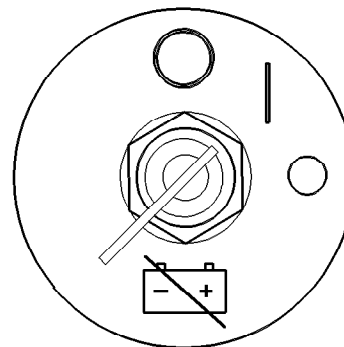


Illustration 127

g00406959



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



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

The battery disconnect switch operates differently than the engine start switch. When the battery disconnect switch is in the OFF position, the electrical system is disabled. When the engine start switch is turned to the OFF position and the battery disconnect switch is turned to the ON position, the battery remains connected to the entire electrical system.

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

Turn the battery disconnect switch to the OFF position and remove the disconnect switch key if you do not operate the machine for an extended period of a month or more. This will prevent drainage of the battery.

NOTICE

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

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

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

1. With the battery disconnect switch in the ON position, verify that electrical components in the operator compartment are functioning. Verify that the hour meter is displaying information. Verify that the engine will crank.
2. Turn the battery disconnect switch to the OFF position.
3. Verify that the following items are not functioning: electrical components in the operator compartment, hour meter and engine cranking. If any of the items continue to function with the battery disconnect switch in the OFF position, consult your Cat dealer.

i07742538

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

Product Link

SMCS Code: 7490; 7606

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

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"

i02793352

Power Receptacle (If Equipped)

SMCS Code: 1436; 7451

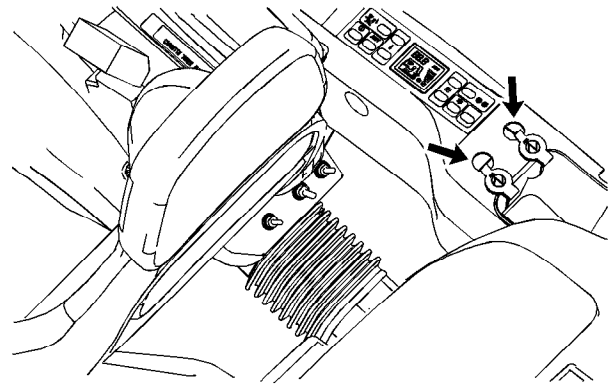


Illustration 128

g01073919

Power Receptacle – A twelve volt power receptacle is located on the right side console. This power receptacle can be used for powering automotive electrical equipment or accessories. Remove the cap before use. This machine can be equipped with one power receptacle or with two power receptacles.

i07037877

Machine Security System (If Equipped)

SMCS Code: 7631

Operation Section

NOTICE

This machine is equipped with a Caterpillar Machine Security System (MSS) 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 Security System (MSS) – Machines that are equipped with a Caterpillar Machine Security System (MSS) can be identified by a decal in the operator station. The MSS is a theft deterrent and will prevent the unauthorized operation of the machine.

Basic Operation

MSS may be programmed to use a standard Caterpillar key or an electronic key. The electronic key contains an electronic chip within the plastic housing for the key. Each key emits a unique signal to the MSS. The keys can be identified by a gray housing or a yellow housing. MSS may have programmed settings that require an electronic key for starting during certain periods of time. The MSS may also have programmed settings that allow a standard Caterpillar key to start the machine during certain periods of time.

Note: Ensure that you have only one electronic key near the engine start switch when you are attempting to start the machine. If there is more than one electronic key near the engine start switch the MSS may not be able to read the key in the engine start switch and the machine will not start.

When the engine start switch is turned to the ON position, the ECM will read the unique ID that is stored in the electronic key. The ECM will then compare this ID to the list of authorized keys. The status of the key will be displayed on the monitor. If the key is not authorized for the machine, “UNAUTHORIZED KEY” will be displayed on the monitor.

Note: MSS will not shut down the machine after the machine has started.

Security Management

MSS allows you to program the system to automatically activate at different time periods with different keys. The MSS can also be programmed to reject a specific electronic key after a selected date and time. When you turn the key to the OFF position and the MSS is active, you have a 30 second interval to restart the machine. Also if the machine stalls, there is a 30 second interval for restarting the machine. This 30 second interval is counted from the time of turning the key to the OFF position.

Note: Know your machine's settings because the use of an electronic key is no guarantee that the machine can be restarted.

An expiration date can be set for each electronic key that is contained in the list of keys for the machine. The key will no longer start the machine when the internal clock in the security system passes the expiration date. Each entry in the list of keys can have a different expiration date.

Spare keys are available from your dealer. Before a key can operate the machine, the MSS must be set to accept that particular key. Contact your Caterpillar dealer for information on additional features of the MSS.

Regulatory Compliance Section

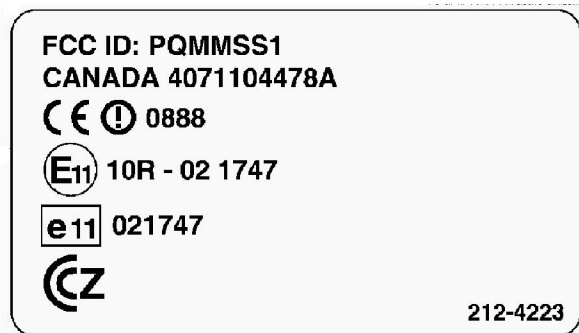


Illustration 129

g00832427

Consult your Caterpillar Dealer with any questions that concern the operation of the MSS in a specific country.

CATERPILLAR®

**EC DECLARATION OF CONFORMITY IN RESPECT OF TYPE-APPROVED,
TYPE-EXAMINED OR SELF-CERTIFICATION CONSTRUCTION PLANT
AND EQUIPMENT**

I, the undersigned, Mark Pfeleiderer, hereby certify that the construction equipment component specified hereunder

1. Category	COMPONENT
2. Make	CATERPILLAR INC.
3. Type	MACHINE SECURITY SYSTEM (MSS)
4. Type/serial number of equipment	B GZ
5. Year of manufacture	Beginning 2001

has been manufactured in conformity with

--EC type-examination (1)

-- EC self-certification (2)

as shown in the table below

In the case of EC type-examination/self-examination:

Directives	No.	Date	Approved Body
99/5/EC	MSS TCF 7-13-01.DOC	2001-05-21	(1) MIRA
73/23/EEC	MSS TCF 7-13-01.DOC	2001-07-13	(2)
89/336/EEC	MSS TCF 7-13-01.DOC	2001-05-29	(1) MIRA
00/02/EC	MSS TCF 7-13-01.DOC	2001-05-29	(1) MIRA

6. Special Provisions...

Done at
Caterpillar Inc.
100 N.E. Adams St.
Peoria, IL 61629-AC6130

Date
2001-10-03

Signature

Mark Pfeleiderer
Administrative

Illustration 130

g00822256

i03671535

Camera

SMCS Code: 7347; 7348

Your machine may be equipped with two types of cameras.

Rear View Camera (If Equipped)

The rear view camera system consists of a camera that is located in the middle of the top of the counterweight and a "VIDEO MODE SETTING" menu on the monitor.

Note: The rear view camera system has been set up by the factory or by a Caterpillar dealer in order to provide views which comply with specified guidelines. Consult your Caterpillar dealer before any adjustments are made to the system.

For more information refer to Operation and Maintenance Manual, "Monitoring System".

Work Area Vision System (WAVS) (If Equipped)

Operation

WAVS is a closed circuit video monitoring system. WAVS consists of a 178 mm (7 inch) LCD display and a camera. The display is mounted in the machine cab.

Power is supplied to the system when the operator turns the engine start switch to the ON position. The power ON/OFF button that is on the display is disabled.

The camera lens and the display screen will require periodic cleaning. Cleaning instructions for the camera lens and the display are described in the Maintenance section.

Automatic Mode

The single camera system is only available with the automatic mode. The single camera system can be placed in "Standby" .

Note: If the single camera system can be placed in manual mode, notify service personnel.

WAVS will automatically display the camera view which is based on current machine operation and the configuration of WAVS. For example, WAVS may be configured to display a side view from a side mounted camera.

Camera

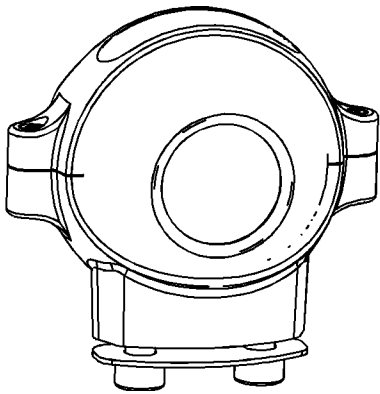


Illustration 131

g01223051

WAVS camera

The orientation of the camera is set during installation. After installation, there should be no need to make any physical adjustments to any of the cameras under normal operating conditions. WAVS uses a fixed-focused camera that has been installed at the factory, a Caterpillar dealer, or a qualified technician.

Display

Keypad

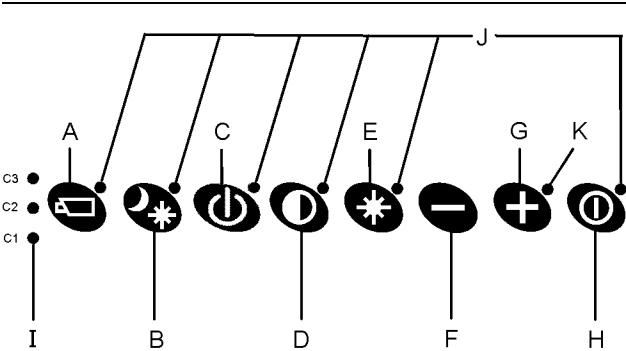


Illustration 132 g01291176

- (A) Camera Selection Button (multiple cameras only)
- (B) Automatic Brightness
- (C) Standby Function
- (D) Contrast Button
- (E) Brightness Button
- (F) Decrease Adjustment Button
- (G) Increase Adjustment Button
- (H) Power Button (disabled)
- (I) Camera Select LED Lights (multiple cameras only)
- (J) Button Status LED Lights
- (K) Light Sensor

Adjustment

The following selections for the WAVS display can be changed by the operator.

Table 29

Display Button Operation for single camera system		
Operation	Procedure	Notes
Brightness Adjustment	Press button (E) in order to enable the "Brightness Adjustment" . Then press either button (F) or (G) in order to adjust the brightness.	Press any other display button in order to exit brightness adjustment mode.
Contrast Adjustment	Press button (D) in order to enable the Contrast Adjustment. Then press either button (6) or (7) in order to adjust the contrast level.	Press any other display button in order to exit the adjustment for the contrast.

(continued)

(Table 29, contd)

Automatic Brightness ON/OFF	Press button (B) in order to turn the automatic brightness ON/OFF.	When WAVS is placed in the "Automatic Brightness" mode, the display will illuminate or the display will dim automatically as the ambient light increases or decreases. The set point for the brightness can be changed by the operator. Turn the auto brightness on, and adjust the brightness to the desired level in order to change the starting set point.
Standby ON/OFF	Press button (C) in order to turn the standby ON/OFF.	Standby may be useful at night, when the display is not desired. If the standby mode is on, the display will remain dark until a WAVS input is detected, however, the power and standby LED should remain on.
LED Indicators		
If LED for button (H) and the LED (I) for the camera flash together, the image will turn off because the ambient temperature is below -25 °C (-13°F) or above 70 °C (158 °F).		

Marker Line

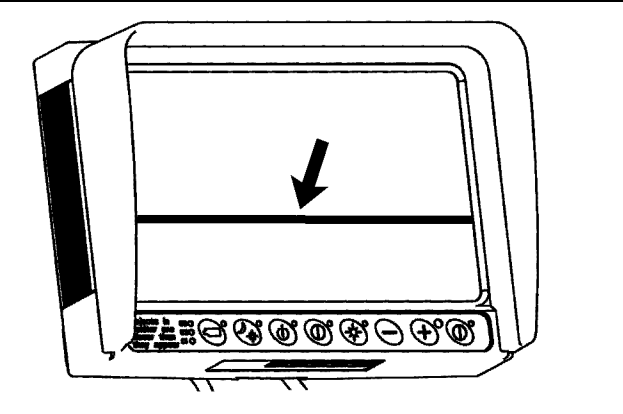


Illustration 133 g01291431

Display screen with marker line

The marker line option provides a green horizontal line on the display. The marker line can be configured by a Caterpillar technician. The marker line represents a fixed distance from the machine. The marker line is not adjustable by the operator.

Mounting Position

In order to adjust the position of the display , perform the following steps:

- 1. Hold the display securely and loosen the mounting clamp handle.
- 2. Adjust the display to the desired position.
- 3. Tighten the mounting clamp handle.

Note: Do not adjust the display in a position that would cause any of the following:

- Cover any warning films or other important information.
- Restrict access and exit procedures for the machine.
- Obstruct the operator's outside view.
- Obstruct the operator's view of instrumentation.
- Restrict the operation of any controls.

For more information about the WAVS system, refer to Operation and Maintenance Manual, SEBU8157, "Work Area Vision System".

i06621652

Monitoring System

SMCS Code: 7451; 7490

Note: Your machine may have a second monitor for showing a rear view and side view. See "Second Monitor" section for more detail.

NOTICE

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

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

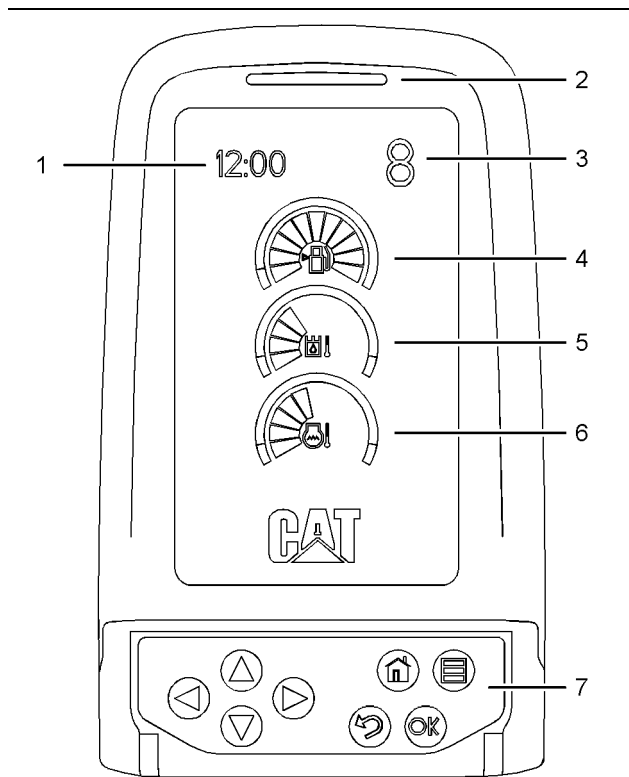


Illustration 134

g01105763

- (1) Clock
- (2) Alert indicator
- (3) Engine speed dial indicator
- (4) Fuel level
- (5) Hydraulic oil temperature
- (6) Engine coolant temperature
- (7) Keypad

Engine Speed Dial Indicator – This digital display indicates the current position of the engine speed dial. For more information on the engine speed dial, refer to Operation and Maintenance Manual, “Operator Controls”.



Fuel Level – This gauge indicates the amount of fuel that is remaining in the fuel tank. When the fuel gauge indicates that the fuel level is in the red range, add fuel immediately.



Hydraulic Oil Temperature – This gauge indicates the temperature of the hydraulic oil. The normal operating range is the green range. If the gauge reaches the red range, reduce the load on the system. If the gauge stays in the red range, stop the machine and investigate the cause of the problem.



Engine Coolant Temperature – This gauge indicates the temperature of the engine coolant. The normal operating range is the green range. If the gauge reaches the red range, stop the machine and investigate the cause of the problem.

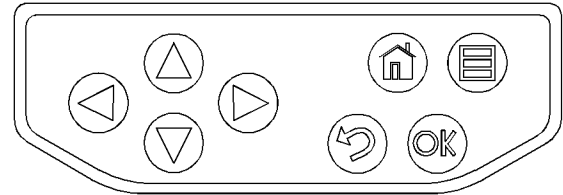


Illustration 135

g01105768

Keypad

The keypad has eight keys that are used in order to input information into the electronic monitoring system.



Up Key – Press the up key in order to move the cursor upward. Also press the up key in order to increase values.



Down Key – Press the down key in order to move the cursor downward. Also press the down key in order to decrease values.



Left Key – Press the left key in order to move the cursor to the left. Also press the left key in order to decrease values.



Right Key – Press the right key in order to move the cursor to the right. Also press the right key in order to increase values.



Home Key – Press the home key in order to return to the default display at any time.



Menu Key – Press the menu key in order to access the main menu. For more information, refer to “Main Menu”.



OK Key – Press the OK key in order to select a menu option. Also press the OK key in order to set values.



Back Key – Press the back key in order to reject a menu option or a setting value. Also, press the back key in order to return to the previous display.

Prestart Monitoring Function

Turn the engine start switch to the ON position.

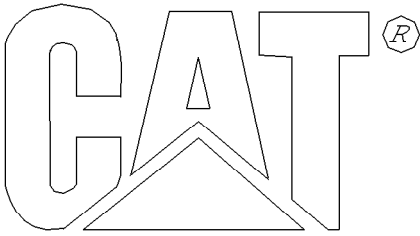


Illustration 136

g00928810

After approximately one second, Illustration 136 appears in the display and the alert indicator turns on.

The coolant temperature, the hydraulic oil temperature, the fuel level, and the position of the engine speed dial are now indicated.

The monitoring system checks the level of the engine coolant, the engine oil, and the hydraulic oil before the engine starts.

If the fluid level check detects a low fluid level, the appropriate message will be displayed and a pictograph will be shown to indicate the fluid level that is low.

Note: If more than one fluid level is low, the symbols for the right key and the left key are indicated in the bottom right area of warning message. Press the right key or the left key in order to check the other warning message. The low fluid level indicators will disappear within five seconds after the engine is started.

Note: The machine cannot perform an accurate fluid level check when the machine is on a slope. Perform the fluid level check on level ground.

If the engine is started during the fluid level check, the monitor will cancel these checks.

The service hours for the filters are checked first. Then, the service hours for the fluids are checked. If a filter or a fluid is over the recommended change interval, "CHECK FLTR/FLUID INFO" appears on the display. Refer to "Main Menu" for more information. This message will disappear after five seconds.

Machine Warnings

The monitoring system provides three warning categories.

- The first warning category requires only operator awareness. This type of warning will be indicated by a message on the display screen.

- The second warning category requires a change to the machine operation or a change to the maintenance of the machine. This type of warning will be indicated by a message on the display screen and by a blinking of the Alert Indicator.
- The third warning category requires immediate shutdown of the engine. This type of warning will be indicated by a message on the display screen, by a blinking of the Alert Indicator, and by a buzzer.

If multiple warnings are present in the system, the most important problem is shown first. Press the right key or press the left key in order to view all of the warnings that are present in the machine. If no keys are pressed within five seconds, the display will return to the most important problem.

Note: The menu is still functional by pressing the menu key.

Warning Category 1

In this category, only a warning will be shown in the display screen. This category alerts the operator that the machine system needs attention. Failure of these systems will not endanger the operator. Failure of these systems will not cause serious damage to the machine components.



"UNAUTHORIZED KEY" – This machine is equipped with a Machine Security System. The key that is currently in the ignition switch is not an authorized key. Remove the key and insert an authorized key.



"BATTERY VOLTAGE IRREGULAR" – The electrical charging system is malfunctioning. Check the electrical components of the charging circuit immediately. Perform any necessary repairs.



"REVERSE FAN ERROR" – An error has occurred while the reverse fan is operating. Another warning should appear. This other warning will indicate a specific cause. Check this warning and take appropriate action. If the problem cannot be resolved, contact your Caterpillar Dealer.



"HYD RETURN FLTR PLUGGED" – The hydraulic return filter is restricted. This will cause hydraulic components to malfunction. Turn the engine start switch to the OFF position and then turn the engine start switch to the ON position. If the warning disappears the filter is good. Operate the machine on flat ground for at least ten minutes. If the warning reappears, replace the return filter cartridge. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Filter (Return) - Replace".

Note: The warning for the restricted hydraulic return filter will disappear from the display after three minutes.



“ATT FLTR PLUGGED” – The hydraulic filter is restricted. This will cause hydraulic components to malfunction.

Turn the engine start switch to the OFF position and then turn the engine start switch to the ON position. If the warning disappears the filter is good. Operate the machine on flat ground for at least ten minutes. If the warning reappears, replace the filter.



“INTAKE AIR FLTR PLUGGED” – The air filter is restricted. Engine output will be decreased. Immediately inspect the air filter.

Clean the air filter. Inspect the condition of the air filter. Replace the air filter, if necessary. Perform any necessary repairs. Refer to Operation and Maintenance Manual, “Engine Air Filter Primary Element - Clean/Replace”.



“FUEL FLTR PLUGGED” – The fuel filter is restricted. Engine output will be decreased. Immediately inspect the fuel filter.

Replace the fuel filter, if necessary. Perform any necessary repairs. Refer to Operation and Maintenance Manual, “Fuel System Primary Filter (Water Separator) Element - Replace”.



“WATER SEPARATOR FULL” – The water separator is full. Drain the water from the water separator as soon as possible.

Refer to Operation and Maintenance Manual, “Fuel System Water Separator - Drain”.



“FUEL LEVEL LOW” – The fuel in the tank is low on fuel. Refill the fuel tank.



“LUBE LEVEL LOW” – The reservoir for the automatic lubrication system is low on grease. Refill the reservoir.



“AUTOLUBE ERROR” – The automatic lubrication system is malfunctioning. Stop using the system and check the system for the cause of the malfunction.

Warning Category 2



“INLET AIR TEMP HIGH” – The inlet air temperature is too high. Stop the machine and investigate the cause of the fault.



“COOLANT TEMP HIGH” – The coolant temperature is too high. Stop operating the machine and run the engine at low idle until the coolant temperature decreases to the correct level. If the warning stays on during low idle, stop the engine. Check the coolant level and check the radiator for debris. Refer to Operation and Maintenance Manual, “Cooling System Coolant Level - Check”. Check the fan drive belts for the water pump. Refer to Operation and Maintenance Manual, “Belt - Inspect/Adjust/Replace”. Make any necessary repairs.



“ENGINE SHUTDOWN ACTIVATING” – An error has occurred with the engine and the engine is shutting down. Contact your Caterpillar Dealer.



“ENG OVERSPEED WARNING” – The engine speed is too fast. Change the operating technique. If the situation continues, contact your Caterpillar Dealer.



“HYD OIL TEMP HIGH” – The hydraulic oil temperature is too high. Stop operating the machine and run the engine at low idle until the hydraulic oil temperature decreases to the correct level. If the warning stays on during low idle, stop the engine. Check the hydraulic oil level and check the hydraulic oil cooler for debris. Perform any necessary repairs as soon as possible.



“HYD OIL TEMP HIGH (TOOL)” – The hydraulic oil temperature is too high. Stop operating the machine and run the engine at low idle until the hydraulic oil temperature decreases to the correct level. If the warning stays on during low idle, stop the engine. Check the hydraulic oil level and check the hydraulic oil cooler for debris. Perform any necessary repairs as soon as possible.



“FUEL PRESS HIGH” – The fuel pressure is too high. Contact your Caterpillar Dealer.



“ECM ERROR” – The ECM has malfunctioned. Contact your Caterpillar Dealer.



“ENGINE ECM ERROR” – The engine ECM has malfunctioned. Contact your Caterpillar Dealer.



“MONITOR ERROR” – The monitor has malfunctioned. Contact your Caterpillar Dealer.



“SERVICE REQUIRED” – The machine has detected a malfunction. Contact your Caterpillar Dealer.



"TOOL CONTROL MALFUNCTION" – The work tool has malfunctioned. Stop the machine and inspect the work tool.

Warning Category 3



"LIFT OVERLOAD WARNING" – The load on the machine is too heavy. The machine is in danger of tipping. Reduce the load immediately. Refer to Operation and Maintenance Manual, "Lifting Capacities" for more information.



"ENG OIL PRESS LOW" – The engine oil pressure is too low. Stop the machine immediately. Stop the engine and investigate the cause of the problem. Do not operate the machine until the cause of the problem has been corrected.

Other Messages

Prestart



CHECK SERVICE PARTS INFORMATION – One of the machine's filters has exceeded the recommended change interval. Replace the filter and reset the hours for the filter.



"COOLANT LEVEL LOW" – The coolant level is too low. Stop the machine immediately. Stop the engine and investigate the cause of the fault.



"ENG OIL LEVEL LOW" – The engine oil level is too low. Stop the machine immediately. Stop the engine and investigate the cause of the fault.



"HYD OIL LEVEL LOW" – The hydraulic oil level is too low. Stop the machine immediately. Stop the engine and investigate the cause of the fault.



"CHECK FILTER FLUID INFO" – One of the machine's filters has exceeded the recommended change interval. Replace the filter and reset the hours for the filter. Refer to Operation and Maintenance Manual, "Monitoring System" for more information.

Miscellaneous



"REVERSE FAN STARTING" – The reverse fan is currently operating. Do not operate the machine until the reverse fan has stopped.



"LUBE STARTING" – The automatic lubrication system is lubricating the machine's bearings.



"LEVER IS NOT NEUTRAL" – The lever is not in the NEUTRAL position. Move the lever to the NEUTRAL position.



"COUNTERWEIGHT REMOVAL" – The counterweight has been removed. Do not operate the machine until the counterweight has been reinstalled.



"NOT CONFIGURED" – This is a general warning that indicates that a machine component needs to be configured.



"NOT CALIBRATED" – This is a general warning that indicates that a machine component needs to be calibrated.



"CYCLE THE LOCK LEVER" – An error has occurred with the lock lever. Cycle the lock lever.

Adjusting the Monitor

Follow this procedure in order to adjust the position of the monitor.

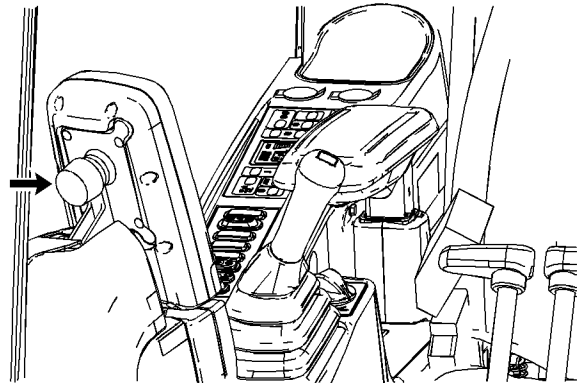


Illustration 137

g01105770

1. Loosen the knob that is on the back of the monitor.
2. Adjust the monitor to the desired position.
3. Tighten the knob.

Main Menu

The "MAIN MENU" allows the operator to view information concerning the machine. This menu also allows the operator to change information concerning the machine.

1. Push the menu key when the default display is active.

Table 30

MAIN MENU			
SETTING			

2. The “MAIN MENU” will be displayed with four new menu options: setting, maintenance information, performance and service. For more information on these menus, refer to the respective descriptions below.
3. Press the right key or the left key in order to highlight the desired menu. Press the OK key in order to open the desired menu.

Note: Press the back key or the home key in order to exit this menu and return to the default display.

Setting

The “SETTING” menu allows the operator to change the various machine settings.

1. Press the menu key.

Table 31

MAIN MENU			
SETTING			

2. Press the right key or the left key in order to highlight the “SETTING” menu. Press the OK key.

Table 32

SETTING
“DISPLAY SETUP”
“WORK TOOL SELECT”

(Table 32, contd)

--

3. The “SETTING” menu will be displayed with two new menu options. For more information on these menus, refer to the respective descriptions below.
4. Press the up key or the down key in order to highlight the desired menu. Press the OK key in order to open the desired menu.

Note: Press the home key in order to return to the default display.

Maintenance Information

The “MAINTENANCE INFO” menu allows the operator to view the current hours of use and the recommended change intervals for various system components.

1. Press the menu key.

Table 33

MAIN MENU			
“MAINTENANCE INFO”			

2. Press the right key or the left key in order to highlight the “MAINTENANCE INFO” menu. Press the OK key.

Table 34

“MAINTENANCE INFO”	
COOLANT	100 / 12000 [HR]
HYD OIL	100 / 2000 [HR]

(Table 34, contd)

ENGINE OIL
100 / 500 [HR]

3. A list of system components will be displayed.
Press the up key or the down key in order to scroll through the list. For each of the system components, the current hours of use will be displayed. If the component has a recommended change interval, the recommended interval will be displayed to the right of the current hours of use.

Note: Press the home key in order to return to the default display.

Performance

The “PERFORMANCE” menu allows the operator to view measurements of various system components. The following components are a few examples of the components that can be viewed through the “PERFORMANCE” menu: battery voltage, engine speed and pump pressure.

1. Press the menu key.

Table 35

MAIN MENU			
PERFORMANCE			

2. Press the right key or the left key in order to highlight the “PERFORMANCE” menu. Press the OK key.

Table 36

PERFORMANCE	
BATTERY VOLTAGE	26.0 [V]
ENGINE SPEED	“1300 [RPM]”
COOLANT TEMP	20 [°C]

3. The “PERFORMANCE” menu will be displayed with a list of system components and measurements. Press the up key or the down key in order to scroll through the list.

Note: Press the home key in order to return to the default display.

Service

The “SERVICE” menu allows the operator to change the password and the accumulated hours for the machine's filters and fluids.

1. Press the menu key.

Table 37

MAIN MENU			
SERVICE			

2. Press the right key or the left key in order to highlight the “SERVICE” menu. Press the OK key.

Note: You will be prompted to enter a password. Refer to “Password Entry” for information on entering a password.

Table 38

SERVICE
MAINTENANCE
“PASSWORD CHANGE”

3. After the password has been entered successfully, the “SERVICE” menu will be displayed with two new menu options. For more information on these menus, refer to the respective descriptions below.

Note: Press the home key in order to return to the default display.

Password Entry

When you try to access certain menus, you will be prompted to enter a password. Follow this procedure in order to enter the password.

Table 39

PASSWORD
"ENTER PASSWORD"

"< B C D E F 0 1 2 3 4 5 >"

1. Press the right key or the left key in order to select the desired character.

Note: The password is alphanumeric. You may choose from "0" to "9". You may also choose from "A" to "F".

Note: When the machine leaves the factory, the password is initially set as 0001.

2. Press the OK key in order to enter the character.

Note: Press the back key in order to delete the last character that was entered.

3. After you enter 4 characters, the monitoring system checks the password. If the password is correct, you will have access to the menu.

Table 40

PASSWORD
"ENTER PASSWORD"

INVALID PASSWORD

4. If the password is incorrect, "INVALID PASSWORD" will be displayed. Press the OK key in order to retry the password or press the back key in order to return to the previous menu.

Note: Consult your Caterpillar dealer if you forget your password.

Display Setup

The "DISPLAY SETUP" menu allows the operator to change the various display settings of the monitor.

1. Press the menu key.

Table 41

MAIN MENU				
SETTING				
<table><tr><td></td><td></td><td></td><td></td></tr></table>				

2. Press the right key or the left key in order to highlight the "SETTING" menu. Press the OK key.

Table 42

SETTING
"DISPLAY SETUP"
"WORK TOOL SELECT"

3. Press the up key or the down key in order to highlight the "DISPLAY SETUP" menu. Press the OK key.

Table 43

"DISPLAY SETUP"
"CLOCK ADJUST"
"LANGUAGE SELECT"
INDICATED ITEM
CONTRAST
BRIGHTNESS
BRIGHTNESS

- 4. The “DISPLAY SETUP” menu will be displayed with various options for the monitor. For more information on these menus, refer to the respective descriptions below.
- 5. Press the up key or the down key in order to highlight the desired menu. Press the OK key in order to open the desired menu.

Note: Press the home key in order to return to the default display.

Selecting the Work Tool

The “WORK TOOL SELECT” menu allows the operator to change the settings for the work tool.

Note: Make sure that the hydraulic lockout control is in the LOCKED position before you change the settings for the work tool.

- 1. Press the menu key.

Table 44

MAIN MENU			
SETTING			

- 2. Press the right key or the left key in order to highlight the “SETTING” menu. Press the OK key.

Table 45

SETTING
“DISPLAY SETUP”
“WORK TOOL SELECT”

- 3. Press the up key or the down key in order to highlight the “WORK TOOL SELECT” menu. Press the OK key.

Table 46

“WORK TOOL SELECT”
“BUCKET/NO TOOL”
“TOOL #01”
“TOOL #02”
“TOOL #03”
“TOOL #04”

Note: If the work tools have been configured through the Electronic Technician (ET), the names of the work tools will be displayed instead of the numbers.

- 4. The “WORK TOOL SELECT” menu will be displayed with the current options for work tools. Press the up key or the down key in order to highlight the desired work tool. Press the OK key in order to select the new work tool.

Note: Press the home key in order to return to the default display.

Note: If a bucket is installed on the machine, or no work tool is installed, select “Bucket/No Tool” in the menu.

Adjusting the Clock

The “CLOCK ADJUST” menu allows the operator to change the time on the clock.

- 1. Press the menu key.

Table 47

MAIN MENU
SETTING

- 2. Press the right key or press the left key in order to highlight the “SETTING” menu. Press the OK key.

Table 48

SETTING
"DISPLAY SETUP"
"WORK TOOL SELECT"

3. Press the up key or press the down key in order to highlight the "DISPLAY SETUP" menu. Press the OK key.

Table 49

"DISPLAY SETUP"
"CLOCK ADJUST"
"LANGUAGE SELECT"
INDICATED ITEM
CONTRAST
BRIGHTNESS
BRIGHTNESS

4. Press the up key or press the down key in order to highlight the "CLOCK ADJUST" menu. Press the OK key.

Table 50

"CLOCK ADJUST"
12 : 00

5. The "CLOCK ADJUST" menu will be displayed with the current time. Press the left key or the right key in order to select the hour or the minute. Press the up key in order to increase the value. Press the down key in order to decrease the value.
6. When the clock is set to the desired time, press the OK key in order to save the new time in memory.

Note: Press the back key in order to return to the previous display without saving.

Note: Press the home key in order to return to the default display.

Language Selection

The "LANGUAGE SELECT" menu allows the operator to change the language settings.

1. Press the menu key.

Table 51

MAIN MENU			
SETTING			

2. Press the right key or the left key in order to highlight the "SETTING" menu. Press the OK key.

Table 52

SETTING
"DISPLAY SETUP"
"WORK TOOL SELECT"

3. Press the up key or the down key in order to highlight the "DISPLAY SETUP" menu. Press the OK key.

Table 53

"DISPLAY SETUP"
"CLOCK ADJUST"
"LANGUAGE SELECT"
INDICATED ITEM

(continued)

(Table 53, contd)

CONTRAST
BRIGHTNESS
BRIGHTNESS

4. Press the up key or the down key in order to highlight the “LANGUAGE SELECT” menu. Press the OK key.

Table 54

“LANGUAGE SELECT”
“ENGLISH”
“DANISH”
“FINNISH”
“ICELANDIC”
“NORWEGIAN”
“SWEDISH”

5. The “LANGUAGE SELECT” menu will be displayed with a list of available languages. Press the up key or the down key in order to scroll through the available languages. Press the set key in order to select the desired language.

Note: Press the home key in order to return to the default display.

Indicated Item

The “INDICATED ITEM” menu allows the operator to display the name of the current work tool and/or the service hours for the machine on the default display. This procedure is also used to remove these items from the default display.

1. Press the menu key.

Table 55

MAIN MENU
SETTING

2. Press the right key or the left key in order to highlight the “SETTING” menu. Press the OK key.

Table 56

SETTING
“DISPLAY SETUP”
“WORK TOOL SELECT”

3. Press the up key or the down key in order to highlight the “DISPLAY SETUP” menu. Press the OK key.

Table 57

“DISPLAY SETUP”
“CLOCK ADJUST”
“LANGUAGE SELECT”
INDICATED ITEM
CONTRAST
BRIGHTNESS
BRIGHTNESS

4. Press the up key or the down key in order to highlight the “INDICATED ITEM” menu. Press the OK key.

Note: You will be prompted to enter a password. Refer to “Password Entry” for information on entering a password.

Table 58

INDICATED ITEM
“TOOL NAME”
“SERVICE HR METER”

5. The “INDICATED ITEM” menu will be displayed with two items. Press the up key or the down key in order to highlight the desired item. Press the OK key in order to enable the item. Also, press the OK key in order to disable the item. By choosing to enable the item, that item will be shown on the default display. By choosing to disable the item, that item will be removed from the default display.

Note: Press the home key in order to return to the default display.

Adjusting the Contrast

The “CONTRAST” menu allows the operator to change the contrast of the monitor.

1. Press the menu key.

Table 59

MAIN MENU			
SETTING			

2. Press the right key or the left key in order to highlight the “SETTING” menu. Press the OK key.

Table 60

SETTING
“DISPLAY SETUP”
“WORK TOOL SELECT”

3. Press the up key or the down key in order to highlight the “DISPLAY SETUP” menu. Press the OK key.

Table 61

“DISPLAY SETUP”

(Table 61, contd)

“CLOCK ADJUST”
“LANGUAGE SELECT”
INDICATED ITEM
CONTRAST
BRIGHTNESS
BRIGHTNESS

4. Press the up key or the down key in order to highlight the “CONTRAST” menu. Press the OK key.

Table 62

CONTRAST
5

5. The contrast can be set between 1 and 10. Press the right key in order to increase the contrast. Press the left key in order to decrease the contrast.

Note: Press the home key in order to return to the default display.

Adjusting the Brightness

The “BRIGHTNESS” menu allows the operator to change the brightness of the monitor.

1. Press the menu key.

Table 63

MAIN MENU
SETTING

2. Press the right key or the left key in order to highlight the “SETTING” menu. Press the OK key.

Table 64

SETTING
“DISPLAY SETUP”
“WORK TOOL SELECT”

3. Press the up key or the down key in order to highlight the “DISPLAY SETUP” menu. Press the OK key.

Table 65

“DISPLAY SETUP”
“CLOCK ADJUST”
“LANGUAGE SELECT”
INDICATED ITEM
CONTRAST
BRIGHTNESS
BRIGHTNESS

4. Press the up key or the down key in order to highlight the desired “BRIGHTNESS” menu. Press the OK key.

Note: There are two “BRIGHTNESS” menus. The first menu is used for machine operation during the day. The second menu is used for machine operation at night.

Table 66

BRIGHTNESS
5

5. The brightness can be set between 1 and 10. Press the right key in order to increase the brightness. Press the left key in order to decrease the brightness.

Note: Press the home key in order to return to the default display.

Maintenance

The “MAINTENANCE” menu allows the operator to turn on the reverse fan. The “MAINTENANCE” menu also allows the operator to change the accumulated hours for the machine's filters and fluids.

1. Press the menu key.

Table 67

MAIN MENU
SERVICE

2. Press the right key or the left key in order to highlight the “SERVICE” menu. Press the OK key.

Note: You will be prompted to enter a password. Refer to “Password Entry” for information on entering a password.

Table 68

SERVICE
MAINTENANCE
“PASSWORD CHANGE”

3. After the password has been entered successfully, press the up key or the down key in order to highlight the “MAINTENANCE” menu. Press the OK key.

Table 69

MAINTENANCE
REVERSE FAN
"FLTR/FLUID INFO"

4. The "MAINTENANCE" menu will be displayed with two new menu options. For more information on these menus, refer to the respective descriptions below.

Note: Press the home key in order to return to the default display.

Changing the Password

The "PASSWORD CHANGE" menu allows the operator to change the password.

1. Press the menu key.

Table 70

MAIN MENU
SERVICE

2. Press the right key or the left key in order to highlight the "SERVICE" menu. Press the OK key.

Note: You will be prompted to enter a password. Refer to "Password Entry" for information on entering a password.

Table 71

SERVICE
MAINTENANCE
"PASSWORD CHANGE"

(Table 71, contd)

3. After the password has been entered successfully, press the up key or the down key in order to highlight the "PASSWORD CHANGE" menu. Press the OK key.

Table 72

"PASSWORD CHANGE"
"ENTER NEW PASSWORD"
" " - - - -
"< B C D E F 0 1 2 3 4 5 >"

4. Press the right key or the left key in order to select the desired character.

Note: The password is alphanumeric. You may choose from "0" to "9". You may also choose from "A" to "F".

Note: When the machine leaves the factory, the password is initially set as 0001.

5. Press the OK key in order to enter the character.

Note: Press the back key in order to delete the last character that was entered.

Table 73

"PASSWORD CHANGE"
"ENTER NEW PASSWORD"
" * * * "
"ARE YOU SURE?"

6. After you enter 4 characters, you will be asked to confirm your selection. Press the OK key in order to save the password in memory and return to the “SERVICE” menu. Press the back key in order to return to the “SERVICE” menu without saving the password.

Note: Press the home key in order to return to the default display.

Reverse Fan

Note: Make sure that the hydraulic lockout control is in the LOCKED position before you activate the reverse fan function.

The “REVERSE FAN” menu allows the operator to operate the radiator cooling fan in reverse.

Note: The reverse fan function is an optional attachment which may not be equipped on your machine.

1. Press the menu key.

Table 74

MAIN MENU			
SERVICE			

2. Press the right key or the left key in order to highlight the “SERVICE” menu. Press the OK key.

Note: You will be prompted to enter a password. Refer to “Password Entry” for information on entering a password.

Table 75

SERVICE			
MAINTENANCE			
“PASSWORD CHANGE”			

3. After the password has been entered successfully, press the up key or the down key in order to highlight the “MAINTENANCE” menu. Press the OK key.

Table 76

MAINTENANCE			
REVERSE FAN			
“FLTR/FLUID INFO”			

4. Press the up key or the down key in order to highlight the “REVERSE FAN” menu. Press the OK key.

Table 77

REVERSE FAN			
“STAND BY”			

Note: Make sure that the hydraulic lockout control is in the LOCKED position before you activate the reverse fan function.

5. The monitor should indicate that the reverse fan function is in “STAND BY” mode. Press the OK key in order to activate the reverse fan function.

Table 78

REVERSE FAN			
“ACTIVE”			

6. The monitor should now indicate that the reverse fan function is in “ACTIVE” mode.

Note: The reverse fan function will automatically stop when the fan has completed a cycle. However, the reverse fan function can be stopped manually by pressing the left key.

7. Press the home key in order to return to the default display.

Note: The reverse fan function will not be cancelled if the home key is pressed. Instead, a message that indicates “REVERSE FAN STARTING” will be shown on the default display until normal operation of the fan resumes.

Error Messages for the Reverse Fan

Table 79

REVERSE FAN
ERROR
“-HYD OIL TEMP HIGH”

Typical example of an error message for the reverse fan function

Reverse Fan Function Will Not Start

The monitor will provide one of the following error messages if the reverse fan function does not start:

“NOT INSTALLED” – The reverse fan is not installed on this machine. If this message is received in error, consult your Caterpillar dealer.

“HYD OIL TEMP HIGH” – The hydraulic oil temperature is too high. Shut off the engine and do not operate the machine until the hydraulic oil temperature is below 85 °C (185 °F).

“COOLANT TEMP HIGH” – The coolant temperature is too high. Shut off the engine and do not operate the machine until the coolant temperature is below 95 °C (203 °F).

“HYD LOCK SW OFF” – The hydraulic lockout control is in the UNLOCKED position. Move the hydraulic lockout control to the LOCKED position.

“SOL MALFUNCTION” – The reverse fan is malfunctioning. Consult your Caterpillar dealer.

Reverse Fan Function Is Interrupted

If one of the following conditions occur, the reverse fan function will stop, and regular operation of the radiator cooling fan will resume:

- The hydraulic lockout control is moved to the UNLOCKED position.
- The temperature of the hydraulic oil rises above 90 °C (194 °F).
- The coolant temperature rises above 100 °C (212 °F).

This event will be accompanied by a “REVERSE FAN ERROR” message.

Filter and Fluid Information

The “FLTR/FLUID INFO” menu allows the operator to change the accumulated hours for the machine's filters and fluids.

1. Press the menu key.

Table 80

MAIN MENU
SERVICE

2. Press the right key or press the left key in order to highlight the “SERVICE” menu. Press the OK key.

Note: You will be prompted to enter a password. Refer to “Password Entry” for information on entering a password.

Table 81

SERVICE
MAINTENANCE
“PASSWORD CHANGE”

3. After the password has been entered successfully, press the up key or the down key in order to highlight the "MAINTENANCE" menu. Press the OK key.

Table 82

MAINTENANCE
REVERSE FAN
"FLTR/FLUID INFO"

4. Press the up key or the down key in order to highlight the "FLTR/FLUID INFO" menu. Press the OK key.

Table 83

"FLTR/FLUID INFO"
ENGINE OIL FILTER
"00000 / 00000 [HR]"
"HYD OIL RET FILTER"
"00000 / 00000 [HR]"
PILOT OIL FILTER
"00000 / 00000 [HR]"

5. A list of filters and fluids will be displayed. For each item, the current hours of use will be displayed on the left. The recommended change interval will be displayed on the right. Press the up key or the down key in order to highlight the desired filter or fluid. Press the OK key.
6. Press the left key in order to reset the accumulated hours for the selected item.
7. Press the OK key in order to save the new hours in memory.

Note: Press the back key in order to return to the previous display without saving the value.

Note: Press the home key in order to return to the default display.

Economy Mode Select

Table 84

"SETTING"
"DISPLAY SETUP"
"WORK TOOL SELECT"
"ECONO MODE SELECT"
"POWER MODE SELECT"
"VIDEO MODE SETTING"

From the "SETTING" menu, press the up key or press the down key in order to highlight the "ECONOMY MODE SELECT" menu. Then press the "OK" key.

Press the up key or the down key in order to highlight "ECONO MODE ON" or highlight "ECONO MODE OFF". Press the "OK" key in order to confirm the desired selection.

When "ECONO MODE ON" is selected, the symbol for economy mode will appear at the top of the screen on the monitor.

Note: If "STD HYD POWER" is selected from the "MAIN MENU/SETTING/POWER MODE SELECT" menu, then the standard power mode symbol will appear at the top of the screen on the monitor and "ECONO MODE SELECT" will not be available.

Note: If "ECONOMY MODE FIX" is selected from the "MAIN MENU/SETTING/DISPLAY SETUP/INDICATED ITEM" menu, then "ECONO MODE SELECT" will not be available.

Note: When the "ECONOMY MODE ON" is selected a work tool cannot be used. Once a work tool is enabled economy mode is temporarily disabled and the "ECONOMY MODE" symbol will not appear on the monitor display. When the "BUCKET NO TOOL" option is selected again, the "ECONOMY MODE" will appear. Economy mode will automatically resume.

Note: The machine may be set to “ECONOMY MODE ON” as a default setting and “ECONOMY MODE” reset function. Once you turn off the key at “STD HYD POWER ON” mode or “HIGH HYD POWER ON” mode and then turn on the key, the mode should be reset to “ECONOMY MODE ON” . Consult your local CAT dealer if disabling these functions.

Power Mode Select

Table 85

“SETTING”
“DISPLAY SETUP”
“WORK TOOL SELECT”
“ECONO MODE SELECT”
“POWER MODE SELECT”
“VIDEO MODE SETTING”

From the “SETTING” menu, press the up key or press the down key in order to highlight the “POWER MODE SELECT” menu. Then press the “OK” key .

Press the up key or the down key in order to highlight “STD HYD POWER” or highlight “HIGH HYD POWER” . Press the “OK” key in order to confirm the desired selection.

Note: When “STD HYD POWER” is selected, the symbol for standard power mode will appear at the top of the screen on the monitor.

Note: The machine may be set to “ECONOMY MODE ON” as a default setting and “ECONOMY MODE” reset function. Once you turn off the key at “STD HYD POWER ON” mode or “HIGH HYD POWER ON” mode and then turn on the key, the mode should be reset to “ECONOMY MODE ON” . Consult your local CAT dealer if disabling these functions.

Rear View Camera System (If Equipped)

Note: If both rear view camera and side view camera are equipped on your machine, this menu is not applicable for Rear View Camera. Refer "Second Monitor" section for more detail.

The rear view camera system consists of a camera that is located in the middle of the top of the counterweight and a “VIDEO MODE SETTING” menu on the monitor.

Note: The rear view camera system has been set up by the factory or by a Caterpillar dealer in order to provide views which comply with specified guidelines. Consult your Caterpillar dealer before any adjustments are made to the system.

Video Mode Setting

The “VIDEO MODE SETTING” menu allows the operator to change the various settings for the rear view camera.

1. Push the menu key.

Table 86

“MAIN MENU”
“SETTING”

2. Press the right key or the left key in order to highlight the “SETTING” menu. Press the OK key.

Table 87

“SETTING”
“DISPLAY SETUP”
“WORK TOOL SELECT”
“VIDEO MODE SETTING”

3. Press the up key or the down key in order to highlight the “VIDEO MODE SETTING” menu. Press the OK key.

Table 88

“VIDEO MODE SETTING”
“VIDEO MODE”
“ON”
“SIGNAL TYPE”
“NTSC”

(Table 88, contd)

	"VERTICAL DIRECTION"	
	"NORMAL"	

4. The "VIDEO MODE SETTING" menu will be displayed with a list of settings for the rear view camera. Press the up key or the down key in order to scroll through the list.

Note: Press the home key in order to return to the default display.

Note: The image from the rear view camera can be viewed from the "VIDEO MODE SETTING" menu by pressing the left key. Press the up key or the down key in order to change the setting while the image from the rear view camera is being viewed.

The following options are available within the "VIDEO MODE SETTING" menu:

Video Mode

The "VIDEO MODE" menu allows the operator to activate the rear view camera. The rear view camera is only available when "ON" is selected.

Table 89

"VIDEO MODE SETTING"	
"VIDEO MODE"	"ON"
"SIGNAL TYPE"	"NTSC"
"VERTICAL DIRECTION"	"NORMAL"

1. Press the up key or the down key in order to highlight the "VIDEO MODE" menu. Press the OK key.

Table 90

"VIDEO MODE SETTING"	
"VIDEO MODE"	"ON"
"SIGNAL TYPE"	"NTSC"
"VERTICAL DIRECTION"	"NORMAL"

2. Press the up key or the down key in order to select "ON" or "OFF" .

3. Press the OK key.

Signal Type

The "SIGNAL TYPE" menu allows the operator to select the signal type for the rear view camera.

Table 91

"VIDEO MODE SETTING"	
"VIDEO MODE"	"ON"
"SIGNAL TYPE"	"NTSC"
"VERTICAL DIRECTION"	"NORMAL"

1. Press the up key or the down key in order to highlight the "SIGNAL TYPE" menu. Press the OK key.

Table 92

"VIDEO MODE SETTING"	
"VIDEO MODE"	"ON"
"SIGNAL TYPE"	"NTSC"
"VERTICAL DIRECTION"	"NORMAL"

2. Press the up key or the down key in order to select either "NTSC" or "PAL" as the signal type for the rear view camera.

3. Press the OK key.

Vertical Direction

The "VERTICAL DIRECTION" menu allows the operator to reverse up and down of the rear view camera image.

Table 93

"VIDEO MODE SETTING"

(continued)

(Table 93, contd)

"VIDEO MODE"	"ON"
"SIGNAL TYPE"	"NTSC"
"VERTICAL DIRECTION"	"NORMAL"

1. Press the up key or the down key in order to highlight the "VERTICAL DIRECTION" menu. Press the OK key.

Table 94

"VIDEO MODE SETTING"	
"VIDEO MODE"	"ON"
"SIGNAL TYPE"	"NTSC"
"VERTICAL DIRECTION"	"NORMAL"

2. Press the up key or the down key in order to select either "NORMAL" or "REVERSE" for the rear view camera image.
3. Press the OK key.

Horizontal Direct

The "HORIZONTAL DIRECT" menu allows the operator to reverse right and left of the rear view camera image.

Table 95

"VIDEO MODE SETTING"	
"HORIZONTAL DIRECT"	"NORMAL"
"TINT"	"7"
"COLOR"	"7"

1. Press the up key or the down key in order to highlight the "HORIZONTAL DIRECT" menu. Press the OK key.

Table 96

"VIDEO MODE SETTING"	
"HORIZONTAL DIRECT"	"NORMAL"
"TINT"	"7"
"COLOR"	"7"

2. Press the up key or the down key in order to select either "NORMAL" or "REVERSE" for the rear view camera image.

NORMAL – When "NORMAL" is selected in the "HORIZONTAL DIRECT" menu the right side of the monitor display is the left side of the machine and the left side of the monitor display is the right side of the machine.

REVERSE – When "REVERSE" is selected in the "HORIZONTAL DIRECT" menu the right side of the monitor display is the right side of the machine and the left side of the monitor display is the left side of the machine.

3. Press the OK key.

Tint

The "TINT" menu allows the operator to adjust the tint of the rear view camera image.

Table 97

"VIDEO MODE SETTING"	
"HORIZONTAL DIRECT"	"NORMAL"
"TINT"	"7"
"COLOR"	"7"

1. Press the up key or the down key in order to highlight the "TINT" menu. Press the OK key.

Table 98

"VIDEO MODE SETTING"	
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(Table 98, contd)

"HORIZONTAL DIRECT"	
"TINT"	"NORMAL"
"COLOR"	"7"

2. Press the up key or the down key in order to set the tint of the rear view camera image between "0" and "15" .
3. Press the OK key.

Color

The "COLOR" menu allows the operator to adjust the color of the rear view camera image.

Table 99

"VIDEO MODE SETTING"	
"HORIZONTAL DIRECT"	
"TINT"	"NORMAL"
"COLOR"	"7"

1. Press the up key or the down key in order to highlight the "COLOR" menu. Press the OK key.

Table 100

"VIDEO MODE SETTING"	
"HORIZONTAL DIRECT"	
"TINT"	"NORMAL"
"COLOR"	"7"

2. Press the up key or the down key in order to set the color of the rear view camera image between "0" and "15" .
3. Press the OK key.

Brightness

The "BRIGHTNESS" menu allows the operator to adjust the brightness of the rear view camera image.

Table 101

"VIDEO MODE SETTING"	
"BRIGHTNESS"	"22"
"BRIGHTNESS (NIGHT)"	"22"
"CONTRAST"	"7"

1. Press the up key or the down key in order to highlight the "BRIGHTNESS" menu. Press the OK key.

Table 102

"VIDEO MODE SETTING"	
"BRIGHTNESS"	"22"
"BRIGHTNESS (NIGHT)"	"22"
"CONTRAST"	"7"

2. Press the up key or the down key in order to set the brightness of the rear view camera image between "0" and "22" .
3. Press the OK key.

"Brightness (Night)"

The "BRIGHTNESS (NIGHT)" menu allows the operator to adjust the brightness of the rear view camera image for viewing at night.

Table 103

"VIDEO MODE SETTING"	
"BRIGHTNESS"	"22"
"BRIGHTNESS (NIGHT)"	

(continued)

(Table 103, contd)

	"22"
"CONTRAST"	
	"7"

1. Press the up key or the down key in order to highlight the "BRIGHTNESS (NIGHT)" menu. Press the OK key.

Table 104

"VIDEO MODE SETTING"	
"BRIGHTNESS"	"22"
"BRIGHTNESS (NIGHT)"	
	"22"
"CONTRAST"	"7"

2. Press the up key or the down key in order to set the brightness of the rear view camera image for viewing at night between "0" and "22" .
3. Press the OK key.

Contrast

The "CONTRAST" menu allows the operator to adjust the contrast of the rear view camera image.

Table 105

"VIDEO MODE SETTING"	
"BRIGHTNESS"	"22"
"BRIGHTNESS (NIGHT)"	
	"22"
"CONTRAST"	
	"7"

1. Press the up key or the down key in order to highlight the "CONTRAST" menu. Press the OK key.

Table 106

"VIDEO MODE SETTING"	
"BRIGHTNESS"	"22"
"BRIGHTNESS (NIGHT)"	
	"22"
"CONTRAST"	
	"7"

2. Press the up key or the down key in order to set the contrast of the rear view camera image between "0" and "15" .
3. Press the OK key.

Monitor Starting, Switching, and Termination

Monitor Starting

If "VIDEO MODE" is set to "ON" the rear view camera image is displayed when the engine starts.

Note: If a warning is detected, the rear view camera image will not be displayed when the engine starts.

Monitor Switching From the Rear View Camera Image to the Default Screen

Press any key in order to return to the default display from the rear view camera image.

If any of the following conditions are found the monitor will return to the default display automatically:

- New warning is found.
- The engine coolant temperature gauge reaches level 10.
- The hydraulic oil temperature gauge reaches level 10.
- The fuel level gauge reaches level 10.

Note: When the crane system is active the rear view camera image can not be displayed continuously. Press the OK key in order to display the rear view camera image .

Monitor Switching From the Default Screen to the Rear View Camera Image

In order to display the rear view camera image from the default display, press the OK key.

Note: This operation is only valid when the default screen is displayed.

Note: If both rear view camera and side view camera are equipped on your machine, this menu is not applicable for rear view camera.

Monitor Termination

If the rear view camera is displayed and the engine start switch is turned to the "OFF" position, the monitor will terminate after the default display is shown for 3 seconds.

If the default display is shown and the engine start switch is turned to the "OFF" position, the monitor will terminate immediately.

Second Monitor (If Equipped)

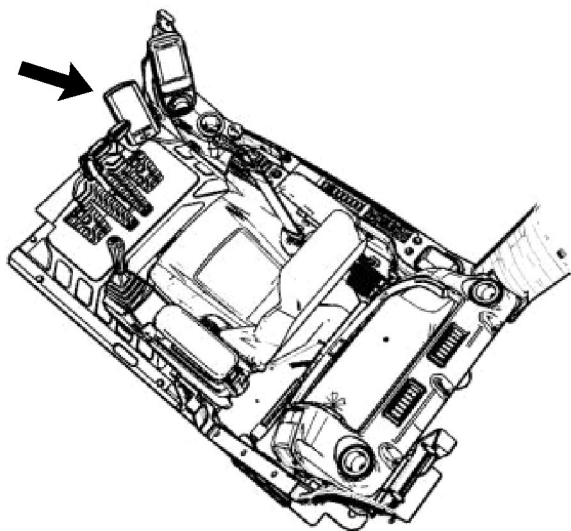


Illustration 138

g06050236

The Second Monitor may be equipped on your machine for an operator to see a right side view and a rear view simultaneously.

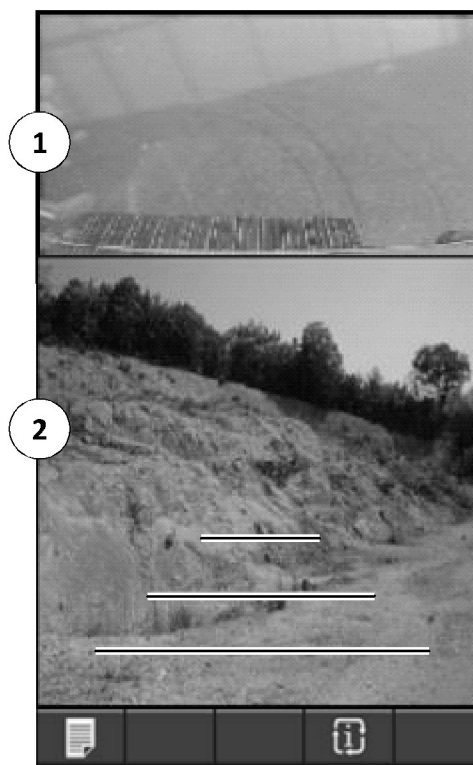


Illustration 139

g06050251

- (1) Side View
- (2) Rear View

The top view of this monitor shows a right-hand side view as a "natural view" image. The bottom view of the monitor shows a rear view as a "mirror view" image.

Note: Horizontal guide lines can be enabled/disabled. Please contact your Cat dealer when you want to change the setting.

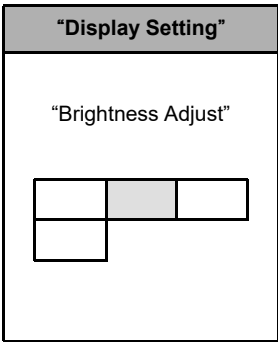
Adjusting the Brightness

The "Brightness Adjust" menu allows the operator to change the brightness of the monitor.

1. Press the menu key.
2. Press any of the arrow keys in order to highlight the "Brightness Adjust" menu. Press the OK key.
3. Press any of the arrow keys in order to highlight the "Brightness Adjust" menu. Press the OK key.

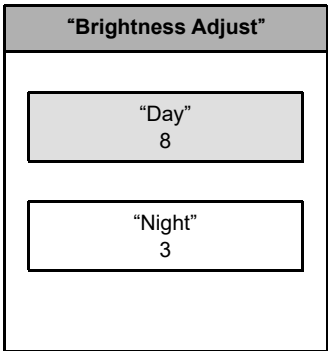
Note: There are two brightness settings. The first setting is used for machine operation during the day. The second setting is used for machine operation at night.

Table 107



4. Press the up arrow key or the down arrow key in order to select the "Day" setting or the "Night" setting. Press the OK key.

Table 108



5. Press the right key in order to increase the brightness. Press the left key in order to decrease the brightness. The brightness can be set between 1 and 10.

Note: Press the home key in order to return to the default display.

Note: The second monitor is used for displaying a rear view and side view only. You may see the function menus under "Main menu" but are not-functional except for "Brightness Adjust" .

i03720083

Storage Box (If Equipped)

SMCS Code: 7268

Interior Storage Box

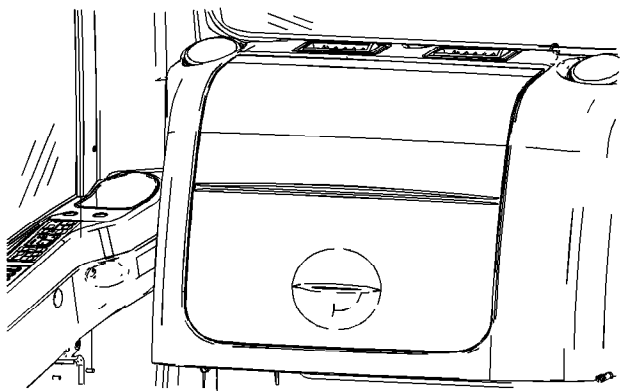


Illustration 140

g01096952

The storage box is used to store miscellaneous items such as a first aid kit or a lunch box.

Exterior Storage Box

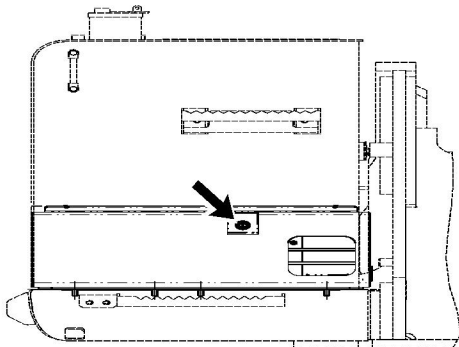


Illustration 141

g01096953

Open the storage box by pressing the push button. The storage box is used to store the refueling pump. The storage box is also used to store miscellaneous tools.

i05192538

Storage and Literature Compartment (If Equipped)

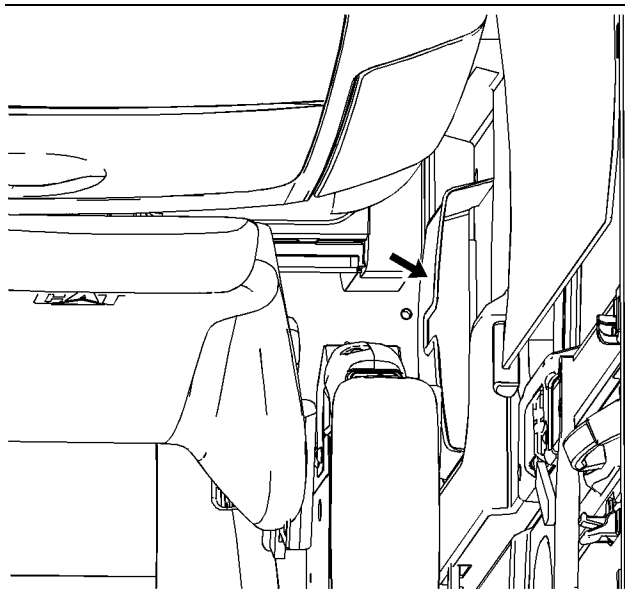
SMCS Code: 7268

Illustration 142

g01160959

A storage compartment is located inside the cab on the left side. Use the compartment to store the literature for the machine.

Note: Do not store tools in the storage compartment. Tools stored in the compartment could damage the compartment.

i03911690

Radio (If Equipped)

SMCS Code: 7338

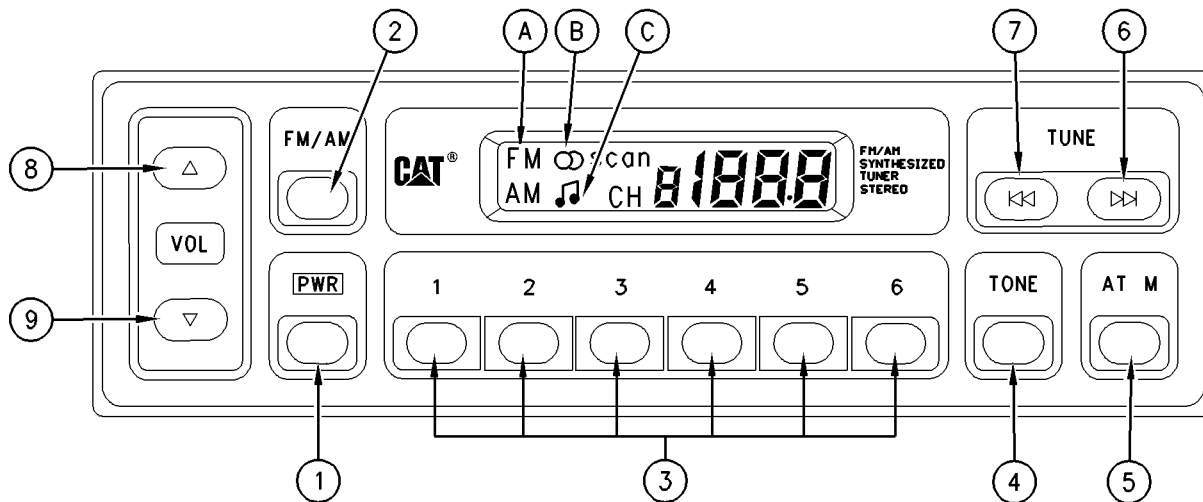


Illustration 143

g00729076

(A) Display panel
 (B) Display (Stereo)
 (C) Display (Music)
 (1) Power switch
 (2) AM/FM band selector

(3) Preset buttons
 (4) "Tone" control
 (5) Button for scan and auto memory function
 (6) "Tune" button

(7) "Tune" button
 (8) Volume control
 (9) Volume control

Note: When the machine is in operation, turn down the volume of the radio.

Note: The radio can be used only when the battery disconnect switch and the engine start switch are in the ON position.

Note: When a button is pushed, a beep will occur.

(1) Power Switch – Push the power switch in order to turn on the radio. Push the power switch again in order to turn off the radio.

(2) AM/FM Band Selector – After you push the AM/FM band selector, the selected radio band appears on display panel (A).

(3) Preset Buttons – The circuitry in the memory system allows you to preset six radio stations. To preset any of the "preset" buttons, follow the "Later Type" procedure.

(4) Tone Control – Music is optimized by pressing the tone control so that display (C) will show "MUSIC".

(5) Scan and Auto Memory – Press button (5) for less than 0.5 seconds in order to listen to 5 seconds of each preset radio station. Press button (5) at least

1.5 seconds in order to store the radio stations with the six strongest signals.

(6) and (7) "Tune" Buttons – Push the "tune" buttons in order to select a radio station. Pressing "tune" button (7) will decrease the frequency. Pressing "tune" button (6) will increase the frequency. Pressing the "tune" button for less than 0.5 seconds changes the radio station one at a time. Pressing the "tune" buttons for more than 0.5 seconds will change the frequency automatically until a radio station is found.

(8) and (9) Volume Control – Push the volume control in order to control the volume. Push the upper volume control in order to increase the sound level and push the lower volume control in order to decrease the sound level.

Presetting Radio Stations

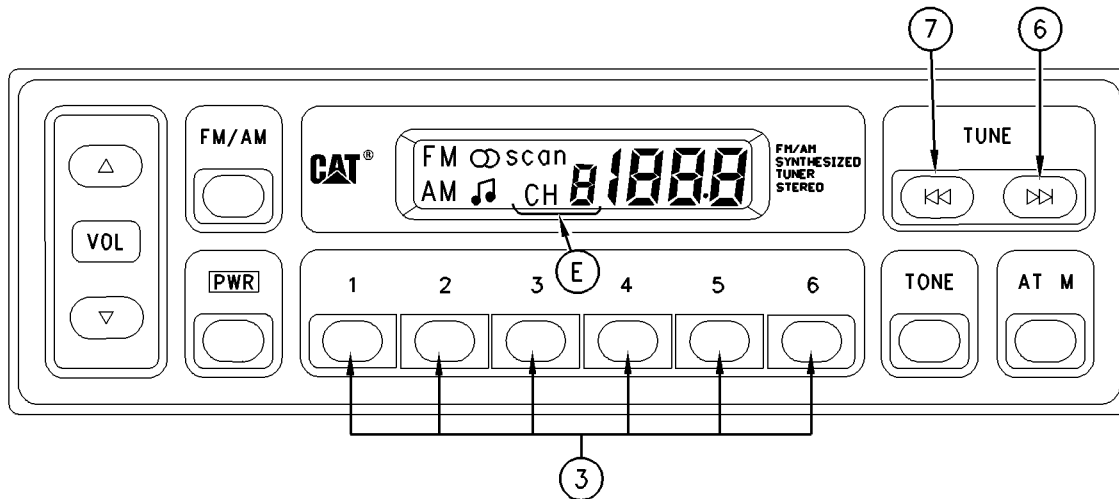


Illustration 144

g00729101

(E) Display
(3) Preset buttons

(6) "Tune" button
(7) "Tune" button

1. Turn on the radio. Select the AM band or the FM band.
2. Select the first radio station by using tuning switch (6) or tuning switch (7).
3. Depress one of preset buttons (3) for more than 1.5 seconds. The radio station is stored on display (E).
4. Push preset button (3) in order to tune in the radio station.
5. Repeat the same procedure for the remaining preset switches.

Note: When the preset station is faint, use the “tune” buttons to locate a stronger signal.

Scan and Auto Memory

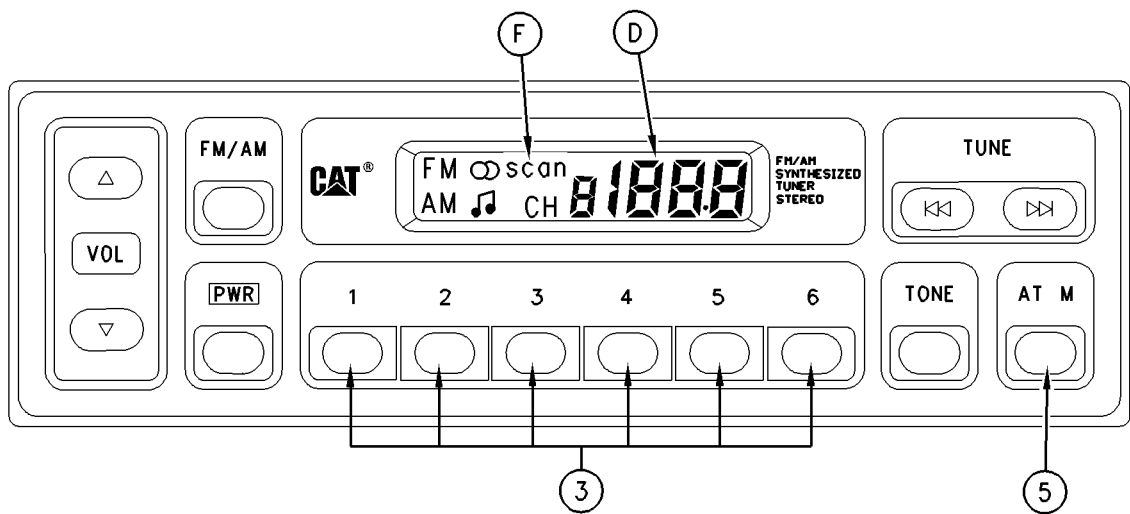


Illustration 145

g00729102

(D) Display (Frequency)
(F) Display (Scan)

(3) Preset buttons

(5) Button for scan and auto memory function

Scan – Press button (5) for less than 0.5 seconds in order to listen for 5 seconds to each of the preset radio stations. Press button (5) again in order to stop scanning through the preset stations and keep listening to the current station. When this function is used, “SCAN” is shown on the display. The frequency of the radio station is also shown on the display.

Auto Memory – Press button (5) for more than 1.5 seconds in order to store the radio stations that have the strongest signal. The radio stations are stored in the six presets (3). Stations that are already stored in the memory will be erased.

Table 109

AREA	Switch Position	
	1	2
North America		X
Central and South America		X
European Union	X	
Asia / Oceania	X	

Loss of Memory

The memory system is erased after a few days if the battery is disconnected.

Radio Reception

The area of reception can be set two different ways. Use the method that corresponds to the radio that is installed in your machine.

Early Type

Move the “area switch” according to the following table:

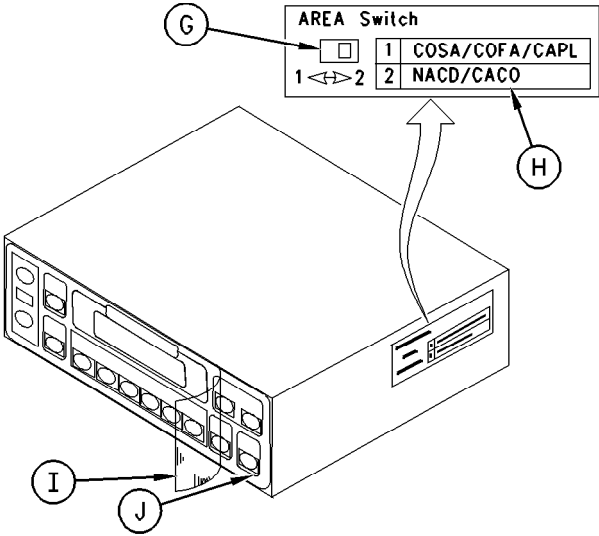


Illustration 146
g00729104
(G) "Area switch"
(H) Selection table
(I) Protective film
(J) Control panel

Note: Remove the film from the radio. Remove the vinyl from the operator seat. The film and vinyl may cause noise interference in the radio.

Later Type

Note: The radio must be connected to a power source in order to set the area of reception.

Set the area of reception according to the following table:

Table 110

AREA	Display Setting	
	EU	US
North America		X
Central and South America		X
European Union	X	
Asia / Oceania	X	

Use the following procedure in order to set the desired area.

1. Turn off the radio.
2. Press preset button "1" , preset button "4" and button (5) at the same time. Hold until "EU" or "US" is displayed on the display panel.

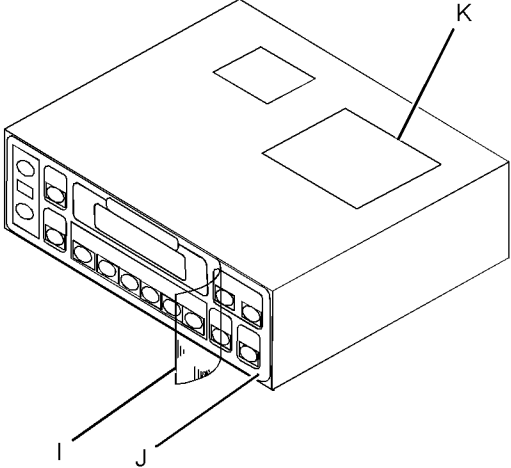


Illustration 147
g01566514
(I) Protective film
(J) Control panel
(K) Method of selection

Note: Remove the film from the radio. Remove the vinyl from the operator seat. The film and vinyl may cause noise interference in the radio.

i06259786

Radio
(If Equipped)

SMCS Code: 7338

An AM/FM radio may be installed in the right side instrument panel.

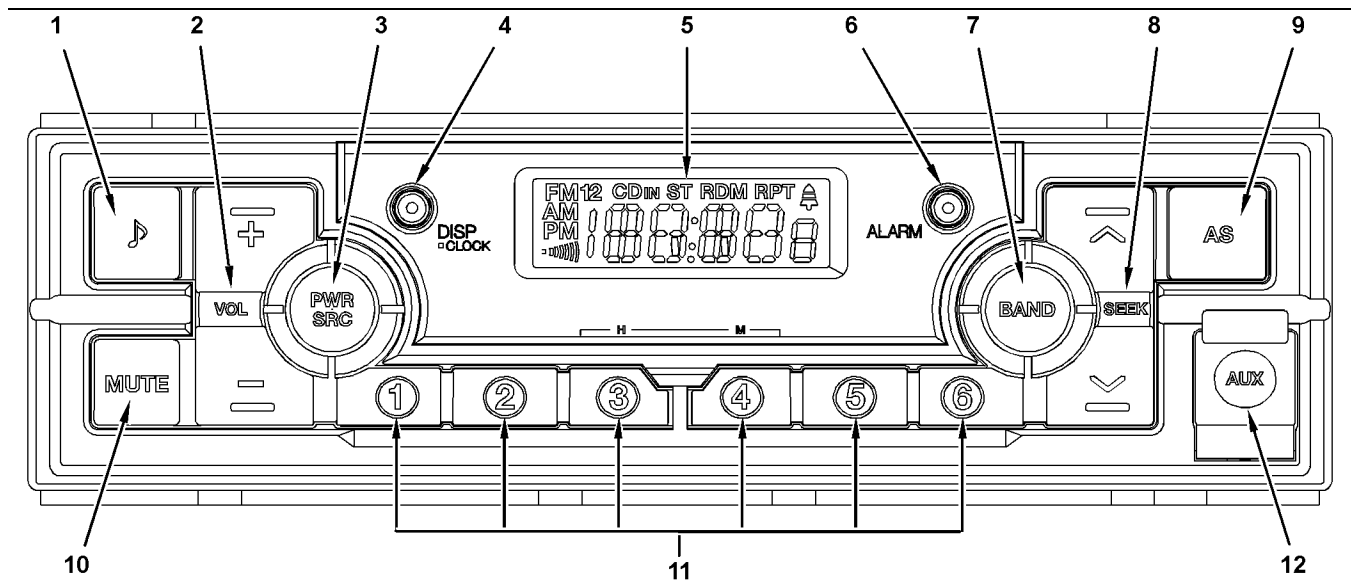


Illustration 148

g02831713

- | | |
|--------------------------|-----------------------|
| (1) Tone button | (5) Radio display |
| (2) Volume control | (6) Alarm button |
| (3) PWR/SRC button | (7) AM/FM band button |
| (4) Display/Clock button | (8) Tune button |

- | |
|-----------------------|
| (9) Auto Store button |
| (10) Mute button |
| (11) Preset buttons |
| (12) Auxiliary input |

Note: When the machine is in operation turn down the volume of the radio.

Note: The battery disconnect switch and the engine start switch must be in the ON position in order for the radio to function.

Tone Button (1) – In order to adjust the sound effects and tone, press button (1) and select bass “BA”, treble “TR”, or balance “BA”. Use volume control (2) in order to make adjustments.

Volume Control (2) – Press “+” in order to increase the volume. Press “-” in order to decrease the volume.

PWR/SRC Button (3) – Press the PWR/SRC button in order to turn on the power. Press and hold the PWR/SRC button for 2 seconds in order to turn off the power. With the power on, press the PWR/SRC button in order to change the operation mode to either “RADIO”, “AU1(AUX1)”, or AU2(AUX2).

Display/Clock Button (4) – Press this button once in order to select the desired display in radio display (5). Press and hold this button for 2 seconds in order to switch to the clock setting mode. Use the preset button “3” in order to adjust the hour and preset button “4” in order to adjust the minute. Press the display/clock button again in order to return to the radio display.

Radio Display (5) – Displays information such as the clock, station, and band.

Alarm Button (6) – Press this button once in order to turn the alarm on or off. An alarm indicator will appear in the radio display when the alarm is on.

Press and hold this button for 2 seconds in order to switch to alarm setting mode. Use the preset button “3” in order to adjust the hour and preset button “4” in order to adjust the minute. Press the alarm button again in order to return to the radio display. During the alarm, there will be a beep for 3 minutes, press the alarm button once in order to stop the alarm.

AM/FM Band Button (7) – Press this button in order to switch between FM1, FM2, AM1, or AM2 while in radio mode.

Tune Button (8) – In order to select a radio station manually, press “+” or “-”. In order to select a radio station automatically, press and hold “+” or “-”.

Auto Store Button (9) – Press this button in order to store good reception stations with automatically as one of the 6 preset buttons.

Mute Button (10) – Press this button to turn off the sound immediately. “MUTE” will appear in the radio display. Press this button again in order to return to normal operation.

Preset Buttons (11) – Use tune button (8) in order to select a desired radio station to store. Press and hold one of the preset buttons for 2 seconds in order to store the station in the preset memory.

Auxiliary Input (12) – An external input jack is provided in order to allow playback of sound and music from an external device. Use PWR/SRC button (3) in order to select “AU1”.

Radio Reception Area

This unit is set up to receive the following type of reception area frequencies:

- U.S. Standard
- Other Countries
- Europe Standard

Selecting the Radio Reception Area

Note: All station preset memory will be lost once the reception area is changed.

Press AM/FM band selector (2) and select the desired radio band.

U.S. Standard

While pressing tone button (1), press and hold the number “1” preset button for longer than 2 seconds.

Other Countries

While pressing tone button (1), press and hold the number “2” preset button for longer than 2 seconds.

Europe Standard

While pressing tone button (1), press and hold the number “3” preset button for longer than 2 seconds.

i02817636

Fuel Transfer Pump (Refueling) (If Equipped)

SMCS Code: 1256

Use the following procedure to pump fuel and store hose.

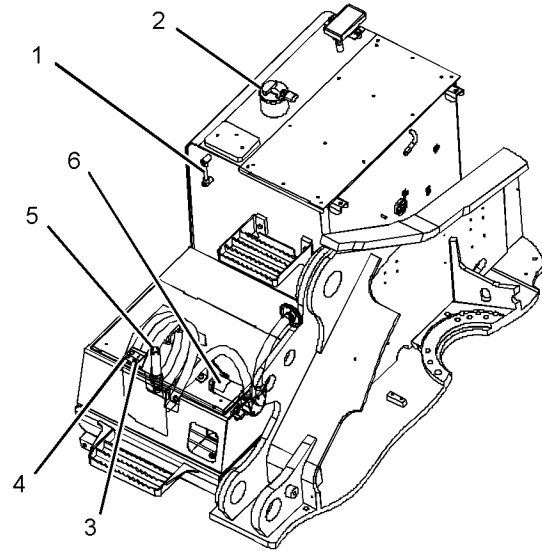


Illustration 149

g01405201

Open the cover of the storage box that is located on the right side in front of the fuel tank.

The electric refueling pump (6) pumps fuel into the fuel tank.

NOTICE

Do not continuously operate the refueling pump for more than 30 minutes. Do not operate the refueling pump more than a few seconds without fuel. Pump damage can result.



On – Push switch (3) in order to activate the refueling pump.



Off – Push switch (4) in order to deactivate the refueling pump.

1. Remove cap (2) from the fuel tank.
2. Properly insert the free end of suction hose (5) into a container of fuel.
3. Push switch (3) in order to supply the fuel to the tank. When the tank is full, the pump stops refueling.

Note: Look at level gauge (1) in order to determine the fuel level.

4. After refueling, install cap (2) to the fuel tank.
5. Make sure that excess fuel is drained from suction hose (5) before storing the suction hose.
6. When you store suction hose (5), wind the hose on the bar. Secure the hose end in place.

NOTICE

To prevent hose damage, do not coil the hose in a tight radius.

7. Close the cover of the storage box.

i02998725

Air Conditioning and Heating Control

SMCS Code: 7304; 7320; 7337

S/N: RGD1–Up

S/N: RGG1–Up

S/N: KFH1–Up

S/N: RBJ1–Up

S/N: MLK1–Up

S/N: NLM1–Up

S/N: KHS1–Up

S/N: LKY1–Up

All machines are equipped with a heater. Only certain machines are equipped with an air conditioner. Those machines that are not equipped with an air conditioner also are not equipped with a compressor switch.

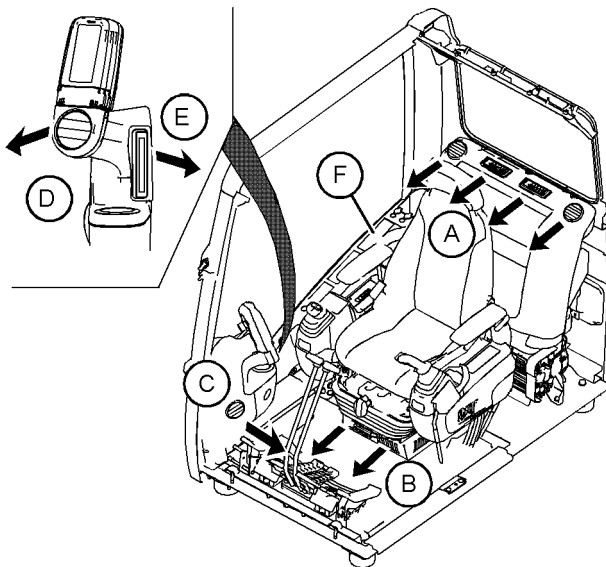


Illustration 150

g01122088

- (A) Vent for upper body
- (B) Floor vent
- (C) Defroster vent
- (D) Defroster Vent
- (E) Vent for upper body
- (F) Control panel

Redirect the louvers for air outlets (A), (C), (D), and (E) by hand to the desired direction. The louvers for air outlet (B) cannot be redirected.

The climate control panel is located under the right window inside the cab:

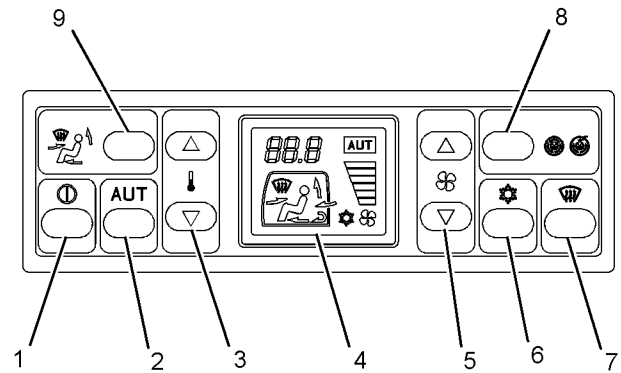


Illustration 151

g01106999

- (1) On/Off switch
- (2) Automatic control switch
- (3) Temperature switch
- (4) LCD panel
- (5) Fan switch
- (6) Compressor switch
- (7) Defrost mode
- (8) Air inlet select switch
- (9) Air outlet select switch



Main Power ON/OFF Switch (1) – Push the ON/OFF switch in order to power on the system. Push the switch again in order to power off the system.



Automatic Control Switch (2) – In order to enter the full “AUT” mode for automatic climate control, push this switch. However, if you push the switch again, you cannot turn off the air conditioning. When the system is in full “AUT” mode, you can manually change specific functions by pushing another switch. If you manually change a specific function, “AUT” does not appear in the display, but the unchanged functions will remain in “AUT” mode. Even on a day that is sunny, a climate control system with only a heater can cool the cab in full “AUT” mode if the ambient temperature is no more than 20 °C (68 °F).

The climate control unit provides excellent operator comfort in the full “AUT” setting. Press the “AUT” switch for full “AUT” mode. Push temperature switch (3) in order to set the desired temperature. The temperature is only shown in metric values. All other functions of climate control will be handled automatically.

In order to take advantage of the full "AUT" setting of the climate control system, always keep the sunlight sensor clean. Do not obstruct the sunlight sensor. If the climate control system is in the full "AUT" setting at engine start-up and the temperature inside the cab is too warm or too cool, the damper for fresh air ventilation may automatically close for a few minutes. This will help to bring the air temperature to the preset temperature more quickly.



Temperature Switch (3) – These switches control the temperature of the air that is coming from the air outlets in order to achieve the preset temperature. This preset temperature appears on LCD panel (4). If the heating and air conditioning system is in the automatic mode, pushing these switches changes the preset temperature.



Increase – Push this switch in order to increase the temperature of the air that is coming out of the air outlets or push this switch in order to increase the preset temperature.



Decrease – Push this switch in order to decrease the temperature of the air that is coming out of the air outlets or push this switch in order to decrease the preset temperature.



Fan Switch (5) – The fan switch directly controls the fan speed. If the climate control system is operating in the automatic mode, pushing this switch overrides the automatically selected fan speed.



Increase – Push this switch in order to increase the fan speed.



Decrease – Push this switch in order to decrease the fan speed.



Compressor Switch (6) – Push the switch in order to turn on the compressor or push the switch in order to turn off the compressor. In humid conditions, the compressor may be used to remove moisture from the air in the cab. In cool weather, operate the compressor weekly in order to prevent leakage of the refrigerant gas. This will also help to maintain the compressor in optimum working order.



Defrost (7) – Depressing this switch will defog the windows. The air will also be dehumidified while the compressor is running. This selection directs air flow out of air outlet (C) and air outlet (D).

Air Inlet Select Switch (8) – This switch selects the position of the air inlet.



Recirculate – When this position is selected, the air inlet is closed. The air will recirculate inside the cab.



Fresh Air – When this position is selected, the air inlet is open. Fresh air will circulate into the cab.

Air Outlet Select Switch (9) – This switch selects the position of each air outlet. Each switch controls a different air outlet.



Upper Body – Selecting this switch will open air outlet (A) and air outlet (D).



Upper Body and Floor – Selecting this switch will open air outlet (A), air outlet (B) and air outlet (D).



Floor – Selecting this switch will open air outlet (B).



Floor and Defroster – Selecting this switch will open air outlet (B) and air outlets (C) and (D).

Consult with your Caterpillar dealer for periodic maintenance of the heating and air conditioning system.

English Versus Metric Toggle

In order to convert the temperature reading from Degrees Celsius to Degrees Fahrenheit, depress both keys of the fan switch at the same time for five seconds. The same action is used for converting the temperature reading from Degrees Fahrenheit to Degrees Celsius.

i05197649

Air Conditioning and Heating Control

SMCS Code: 7304; 7320; 7337

S/N: FLA1–Up

S/N: YAE1–Up

S/N: GAX1–Up

All machines are equipped with a heater. Only certain machines are equipped with an air conditioner. Those machines that are not equipped with an air conditioner also are not equipped with a compressor switch.

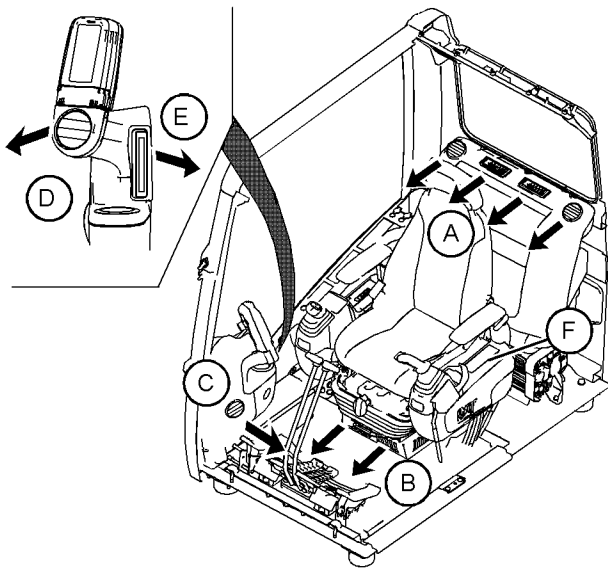


Illustration 152

g03330500

- (A) Vent for upper body
- (B) Floor vent
- (C) Defroster vent
- (D) Defroster vent
- (E) Vent for upper body
- (F) Control panel

Redirect the louvers for air outlets (A), (C), (D), and (E) by hand to the desired direction. The louvers for air outlet (B) cannot be redirected.

The climate control panel is located under the right window inside the cab:

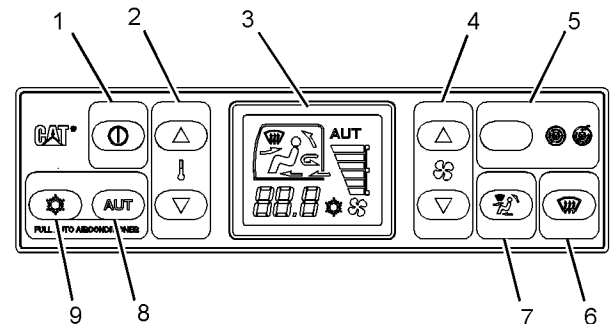


Illustration 153

g03330502

- (1) On/Off switch
- (2) Temperature switch
- (3) LCD panel
- (4) Fan switch
- (5) Air inlet select switch
- (6) Defrost mode
- (7) Air outlet select switch
- (8) Automatic control switch
- (9) Compressor switch



Main Power ON/OFF Switch (1) – Push the ON/OFF switch in order to power on the system. Push the switch again in order to power off the system.



Temperature Switch (2) – These switches control the temperature of the air that is coming from the air outlets in order to achieve the preset temperature. This preset temperature appears on LCD panel (3). If the heating and air conditioning system is in the automatic mode, pushing these switches changes the preset temperature.



Increase – Push this switch in order to increase the temperature of the air that is coming out of the air outlets or push this switch in order to increase the preset temperature.



Decrease – Push this switch in order to decrease the temperature of the air that is coming out of the air outlets or push this switch in order to decrease the preset temperature.



Fan Switch (4) – The fan switch directly controls the fan speed. If the climate control system is operating in the automatic mode, pushing this switch overrides the automatically selected fan speed.



Increase – Push this switch in order to increase the fan speed.



Decrease – Push this switch in order to decrease the fan speed.

Air Inlet Select Switch (5) – This switch selects the position of the air inlet.



Recirculate – When this position is selected, the air inlet is closed. The air will recirculate inside the cab.



Fresh Air – When this position is selected, the air inlet is open. Fresh air will circulate into the cab.



Defrost (6) – Depressing this switch will defog the windows. The air will also be dehumidified while the compressor is running. This selection directs air flow out of air outlet (C) and air outlet (D).

Air Outlet Select Switch (7) – This switch selects the position of each air outlet. Each switch controls a different air outlet.



Upper Body – Selecting this switch will open air outlet (A) and air outlet (D).



Upper Body and Floor – Selecting this switch will open air outlet (A), air outlet (B) and air outlet (D).



Floor – Selecting this switch will open air outlet (B).



Floor and Defroster – Selecting this switch will open air outlet (B) and air outlets (C) and (D).



Automatic Control Switch (8) – In order to enter the full “AUT” mode for automatic climate control, push this switch. However, if you push the switch again, you cannot turn off the air conditioning. When the system is in full “AUT” mode, you can manually change specific functions by pushing another switch. If you manually change a specific function, “AUT” does not appear in the display, but the unchanged functions will remain in “AUT” mode. Even on a day that is sunny, a climate control system with only a heater can cool the cab in full “AUT” mode if the ambient temperature is no more than 20 °C (68 °F).

The climate control unit provides excellent operator comfort in the full “AUT” setting. Press the “AUT” switch for full “AUT” mode. Push temperature switch (2) in order to set the desired temperature. The temperature is only shown in metric values. All other functions of climate control will be handled automatically.

In order to take advantage of the full “AUT” setting of the climate control system, always keep the sunlight sensor clean. Do not obstruct the sunlight sensor. If the climate control system is in the full “AUT” setting at engine start-up and the temperature inside the cab is too warm or too cool, the damper for fresh air ventilation may automatically close for a few minutes. This will help to bring the air temperature to the preset temperature more quickly.



Compressor Switch (9) – Push the switch in order to turn on the compressor or push the switch in order to turn off the compressor. In humid conditions, the compressor may be used to remove moisture from the air in the cab. In cool weather, operate the compressor weekly in order to prevent leakage of the refrigerant gas. This will also help to maintain the compressor in optimum working order.

Consult with your Caterpillar dealer for periodic maintenance of the heating and air conditioning system.

English Versus Metric Toggle

In order to convert the temperature reading from Degrees Celsius to Degrees Fahrenheit, depress both keys of the fan switch at the same time for five seconds. The same action is used for converting the temperature reading from Degrees Fahrenheit to Degrees Celsius.

i02630263

Window (Front)

SMCS Code: 7310-FR

Note: The sun visor (if equipped) must be down before the front window is raised. The front window will not lock in the overhead storage position with the sun visor in the raised position.

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

WARNING

When opening or closing the windows, be extra careful to prevent any personal injury. The hydraulic lockout control must be in the LOCKED position in order to prevent any possibility of sudden movement of the machine due to inadvertent contact with the hydraulic control(s).

Do not change the position of the window until the following items have been done:

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the lever for the hydraulic lockout control to the LOCKED position.
- Stop the engine.

50/50 Window

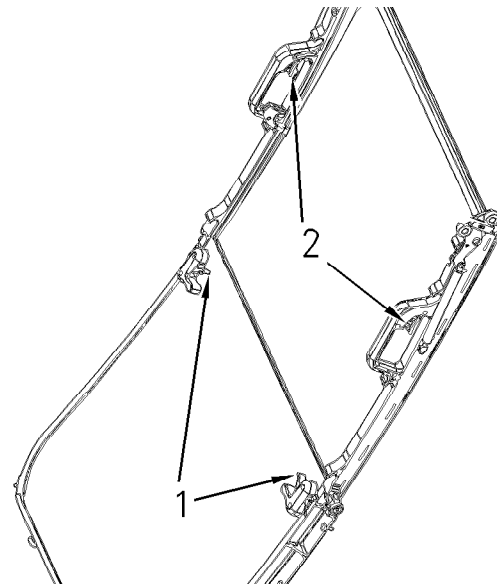


Illustration 154

g00888387

- (1) Latches for the lower window
(2) Latches for the upper window

Open the Lower Window

Use the following procedure in order to open the lower window:

1. Squeeze latches (1) on each side of the lower window.
2. Lift up on the lower window.

Note: When the lower window is fully opened, latches (1) will lock in place. This will secure the lower window into position.

Close the Lower Window

Use the following procedure in order to close the window:

1. Squeeze latches (1) on each side of the lower window.
2. Lower the lower window into position.

Note: Hold the lower window. This will prevent the window from falling.

Note: When the lower window is fully closed, latches (1) will lock in place. This will secure the lower window into position.

Open the Upper Window

Use the following procedure in order to open the upper window:

Note: Before you open the upper window, fully close the sun screen.

1. Squeeze latches (2) on each side of the upper window.
2. Pull the upper window into the overhead position.
3. When the upper window is fully opened, latches (2) will lock in place. This will secure the upper window into position.

Close the Upper Window

Use the following procedure in order to close the upper window:

1. Squeeze latches (2) on each side of the upper window and pull down on the upper window.
2. Push the upper window toward the front of the machine.

Note: When the upper window is fully closed, latches (2) will lock in place. This will secure the upper window into position.

Open Both Windows Together

1. Follow the procedure for opening the lower window. The lower window will latch to the upper window.
2. Follow the procedure for opening the upper window.

Close Both Windows

1. Squeeze latches (2) on each side of the upper window and pull down on the upper window.
2. Push the upper window toward the front of the machine until the window latches in place.
3. Squeeze latches (1) on each side of the lower window.
4. Lower the lower window into position.

Note: Hold the lower window. This will prevent the window from falling.

Note: When the lower window is fully closed, latches (1) will lock in place. This will secure the lower window into position.

70/30 window

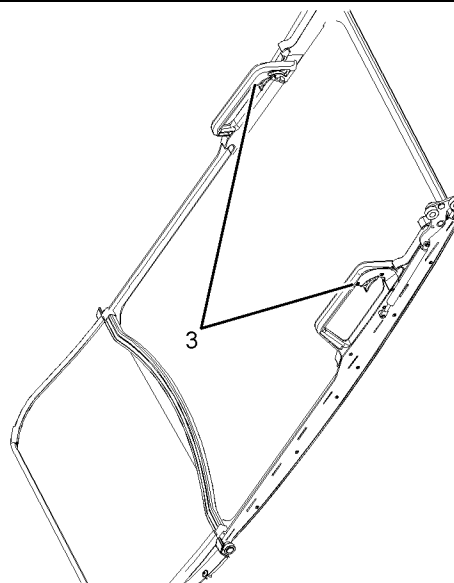


Illustration 155

g01214362

Open the Upper Window

Use the following procedure in order to open the upper window:

Note: Before you open the upper window, fully close the sun screen.

1. Squeeze latches (3) on each side of the upper window.
2. Pull the upper window into the overhead position.
3. When the upper window is fully opened, latches (3) will lock in place. This will secure the upper window into position.

Close the Upper Window

Use the following procedure in order to close the upper window:

1. Squeeze latches (3) on each side of the upper window and pull down on the upper window.
2. Push the upper window toward the front of the machine.

Note: When the upper window is fully closed, latches (3) will lock in place. This will secure the upper window into position.

Open the Lower Window and Close the Lower Window

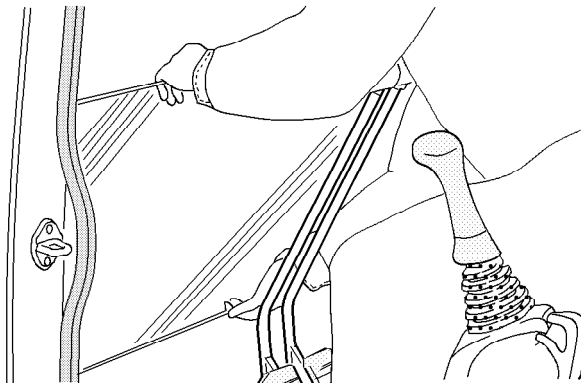


Illustration 156

g00103837

1. Open the upper window.
2. Raise the lower window out of the window frame.

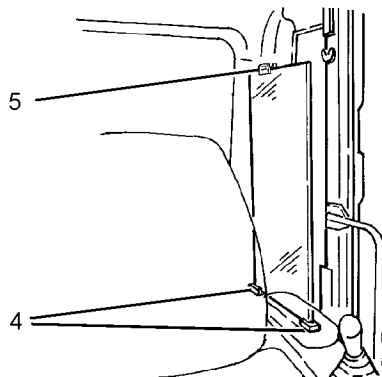


Illustration 157

g01319054

- (4) Brackets
(5) Catch

3. Store the lower window in the holder that is located in the rear of the left side cab frame. In order to store the lower window, locate one end of the lower window into brackets (4). Secure the opposite end of the lower window with catch (5).
4. In order to close the lower window, reverse the procedure that is used for opening the lower window.

Note: The lower window is curved. The lower window can only be positioned one way in the holders.

i03267463

Mirror (If Equipped)

SMCS Code: 7319

WARNING

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

WARNING

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

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

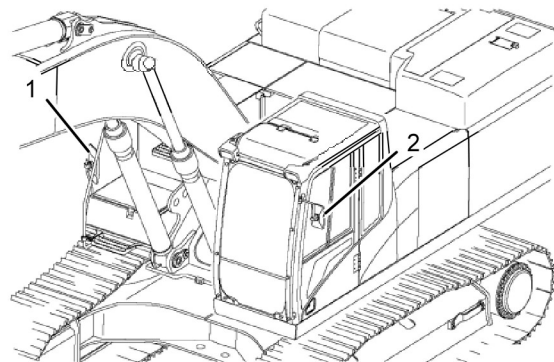


Illustration 158

g01598160

- (1) Right side rear view mirror
(2) Left side rear view 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.

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

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

Mirror Adjustment

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

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

Right Side Rear View Mirror (1)



Illustration 159

g01665875

(1) Right side rear view mirror

Adjust the side mirror (1) on the storage box so that the right side access door and the right side track can be seen from the operator seat. Additionally, provide as much visibility to the rear of the machine as possible.

Left Side Rear View Mirror (2)

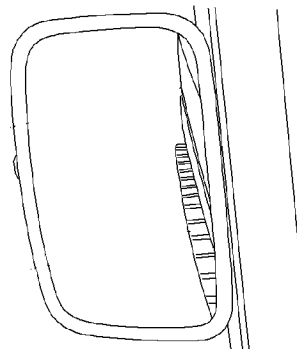


Illustration 160

g01666174

(2) Left side rear view mirror

Adjust the left mirror (2) on the cab so that the left access door and the left side track can be seen from the operator seat. Additionally, provide as much visibility to the rear of the machine as possible.

i04647729

Mirror (If Equipped)

SMCS Code: 7319

WARNING

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

WARNING

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

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

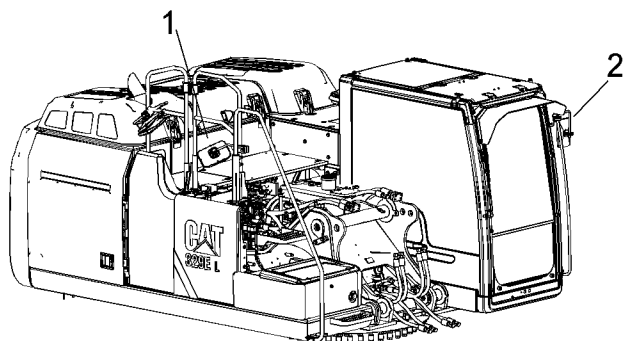


Illustration 161

g02789412

- (1) Right side rear view mirror
(2) Left side rear view 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.

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

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

Mirror Adjustment

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

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

Right Side Rear View Mirror (1)

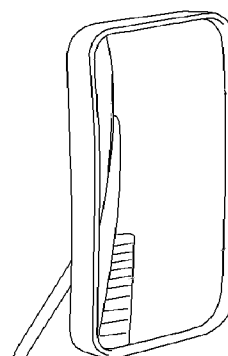


Illustration 162

g01665875

- (1) Right side rear view mirror

Adjust the side mirror (1) on the storage box so that the right side access door and the right side track can be seen from the operator seat. Additionally, provide as much visibility to the rear of the machine as possible.

Left Side Rear View Mirror (2)

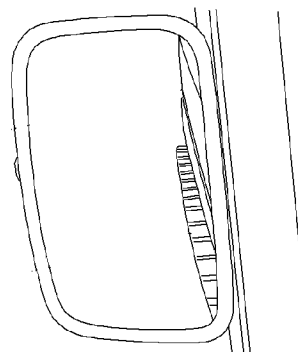


Illustration 163

g01666174

- (2) Left side rear view mirror

Adjust the left mirror (2) on the cab so that the left access door and the left side track can be seen from the operator seat. Additionally, provide as much visibility to the rear of the machine as possible.

i01523337

Cab Visor (If Equipped)

SMCS Code: 7301-ZZ

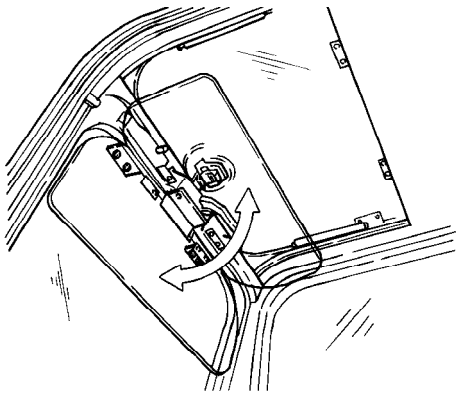


Illustration 164

g00681071

The cab visor is used to shade the sunlight that is coming in through the sun roof or coming in through the front windshields. Attach the cab visor to the top of the front windshield and tilt the cab visor to the desired angle.

Note: The cab visor cannot be attached to a power window.

Sun Screen (If Equipped)

SMCS Code: 7165-ZZ

i02500596

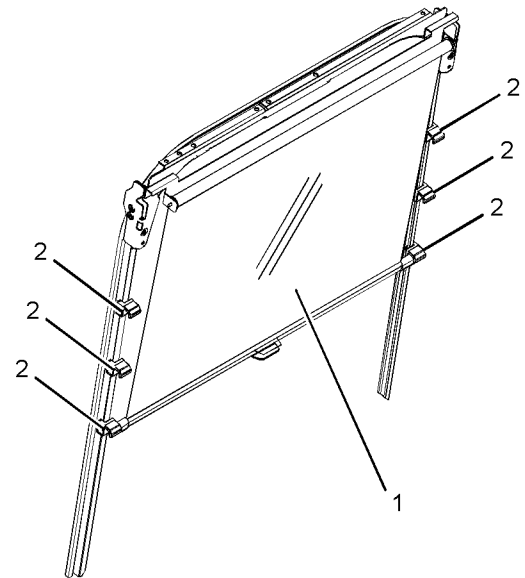


Illustration 165

g01250563

Pull out the sun screen (1). Hook the sun screen to the bracket (2). The sun screen may be positioned in 3 different places.

i01463742

Roof Hatch

SMCS Code: 7303

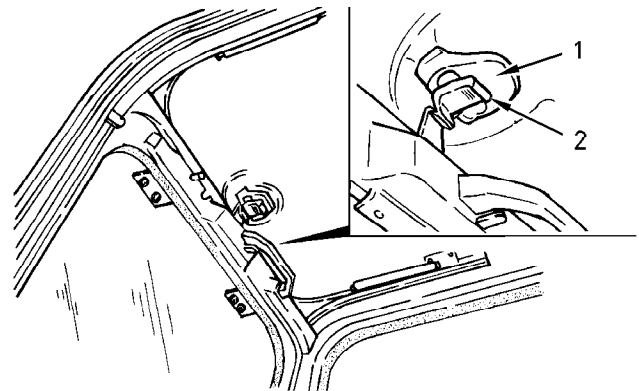


Illustration 166

g00681034

(1) Grip
(2) Lock

In order to open the roof hatch, release lock (2). Hold grip (1) and push the roof hatch backward.

To close the roof hatch, hold grip (1) and pull the roof hatch forward. Engage lock (2) securely.

i02325795

Cab Door

SMCS Code: 7308

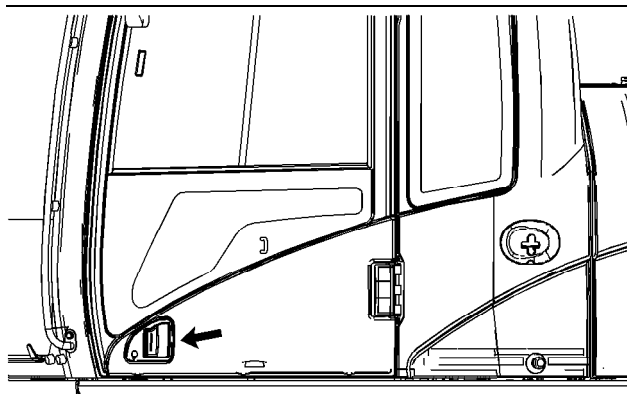


Illustration 167

g01096558

In order to open the cab door from the outside of the cab, pull outward on the door handle.

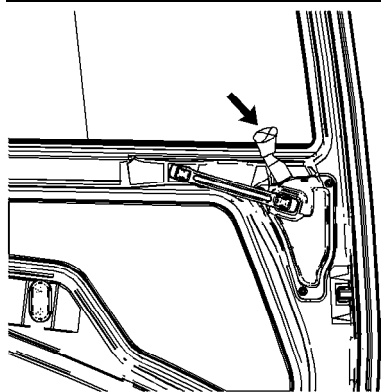


Illustration 168

g01095780

In order to open the cab door from the inside of the cab, push forward on the lever for the cab door latch.

For additional ventilation, open the cab door all the way in order to engage the catch on the exterior wall of the cab.

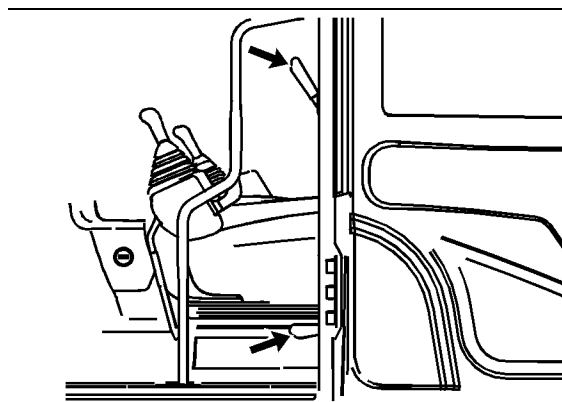


Illustration 169

g01121189

In order to release the cab door from the catch, pull downward on one of the two cab door release levers.

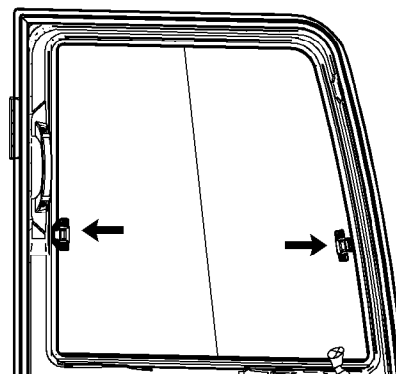


Illustration 170

g01096005

In order to open a window, release the window latch, and then slide the window to the desired position.

i01447292

Travel Control (Straight Travel Pedal (If Equipped))

SMCS Code: 5462

WARNING

With certain attachment combinations, the third pedal can have different functions. Always check for third pedal function before using the third pedal. Improper operation of the third pedal could result in serious injury or death.

Operation Section Straight Travel Pedal (If Equipped)

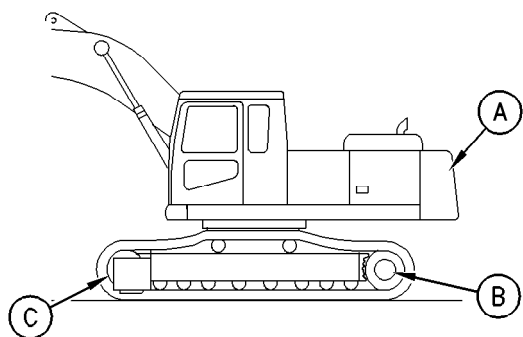


Illustration 171

g00753277

Position for normal travel

- (A) Rear of machine
- (B) Final drive
- (C) Idler

When you travel, make sure that final drive sprockets (B) are under the rear of the machine.

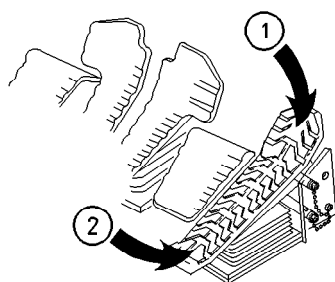


Illustration 172

g00757775

- (1) Forward Travel
- (2) Reverse Travel

The third pedal is to the right of the right travel pedal. The third pedal controls the forward and backward movement of the machine.

Note: If the third pedal is depressed and a travel pedal or a travel lever is operated, the machine will turn accordingly.

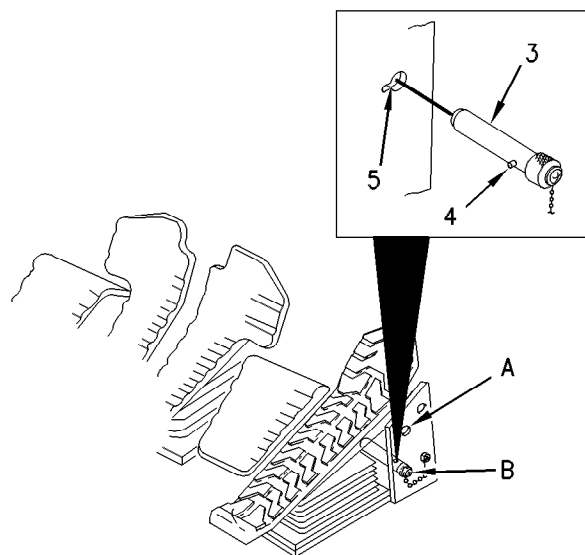


Illustration 173

g00555934

- (3) Lock pin
- (4) Pin
- (5) Notch
- (A) LOCKED position
- (B) UNLOCKED position (STORAGE position)

When the machine is not operated with the third pedal, install lock pin (3) at the LOCKED position in order to prevent accidental operation.

Note: To prevent lock pin (3) from being pulled out, insert pin (4) through notch (5) and turn lock pin (3) counterclockwise by 1/4 turn.

i03174824

Work Tool Control Pedal (If Equipped)

SMCS Code: 5059-P9

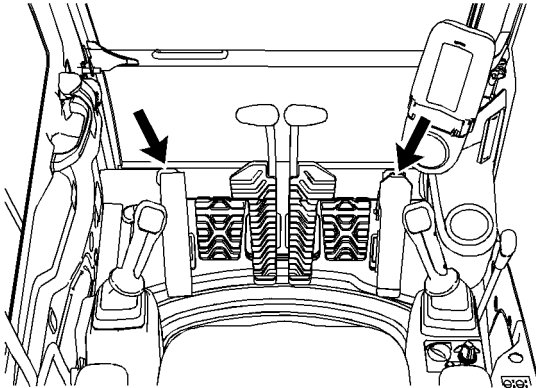


Illustration 174

g01133975

The pedal for work tool control can be located on either side of the travel pedals or located on both sides of the travel pedals. The pedal can be used to actuate work tools that require hydraulic flow in one direction or both directions. The pedal allows modulation of the speed of the work tool. To cause the work tool to move faster, push down on the pedal more.

Push down on the front of the pedal in order to activate the work tool. Push down on the rear of the pedal in order to activate the work tool in the opposite direction.

Note: There is a lock pin in the right pedal (if equipped) and there is a lock pin in the left pedal (if equipped). When you are changing the position of one of the lock pins, you must also change the position of the other lock pin.

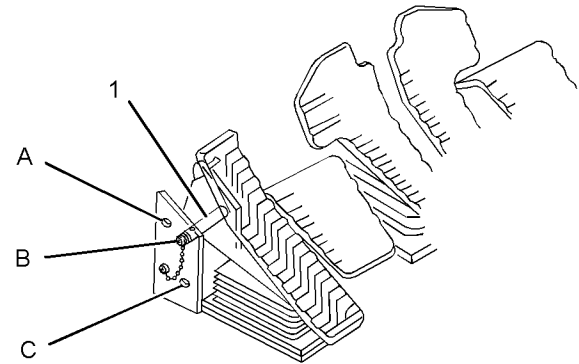


Illustration 175

g01622566

- (1) Lock pin
- (A) One-way flow
- (B) Locked
- (C) Two-way flow

In order to use the work tool, remove lock pin (1) from LOCKED position (B) and place lock pin (1) in UNLOCKED position (A) or (C).

When you are not using the work tool, put lock pin (1) in LOCKED position (B) on both the left pedal (if equipped) and the right pedal (if equipped). This will lock the pedals in order to help prevent any unexpected operation of the work tool.

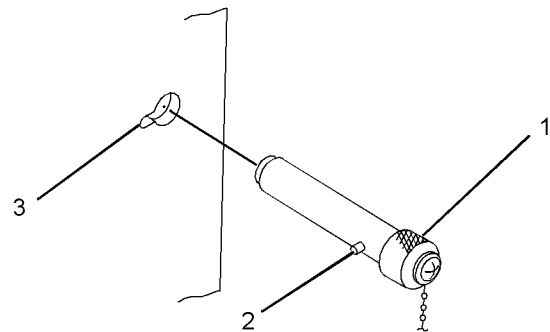


Illustration 176

g01622575

- (1) Lock pin
- (2) Pin
- (3) Notch

Note: To prevent lock pin (1) from being accidentally pulled out, insert pin (2) through notch (3). Turn lock pin (1) counterclockwise by 1/4 turn. Repeat for the other pedal, if equipped.

One-way Flow

The following information pertains to work tools that require hydraulic oil flow in one direction. Hydraulic hammers are an example of work tools that require hydraulic oil flow in one direction.

Note: Make sure that the lock pin is in the one-way flow position.

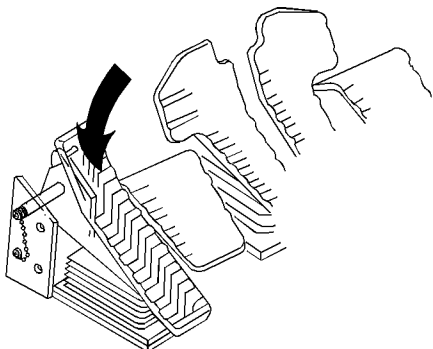


Illustration 177

g01622588



Variable Speed – Push down on the front of the pedal in order to activate the work tool. Push the pedal further in order to increase the speed of the work tool. Release the pedal in order to turn off the work tool.

Two-way Flow

The following information pertains to work tools that require hydraulic oil flow in two directions. These work tools can also be equipped with a rotate circuit. Hydraulic shears, pulverizers, crushers, and grapples are examples of work tools that require hydraulic oil flow in two directions.

Note: Make sure that the lock pin is in the two-way flow position.

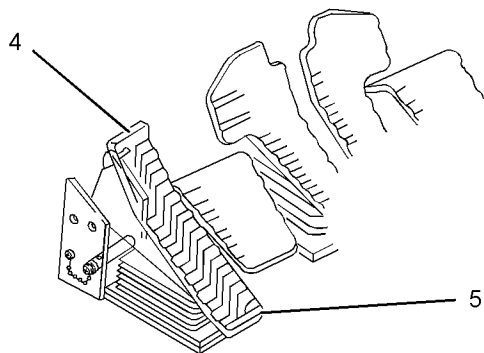


Illustration 178

g01622577



(4) CLOSE – Push down on the front of the pedal in order to close the work tool.



(5) OPEN – Push down on the rear of the pedal in order to open the work tool.

Operation with Two Pedals

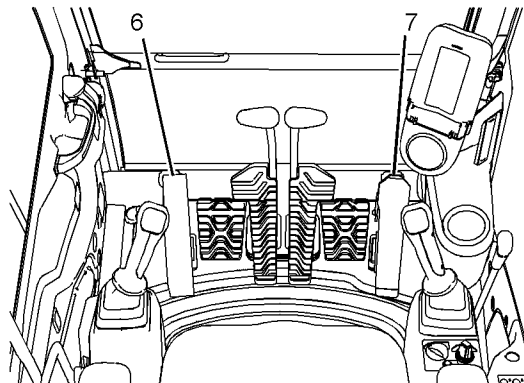


Illustration 179

g01623786



(6) OPEN – Push down on the front of the left pedal in order to open the work tool.



(7) CLOSE – Push down on the front of the right pedal in order to close the work tool.

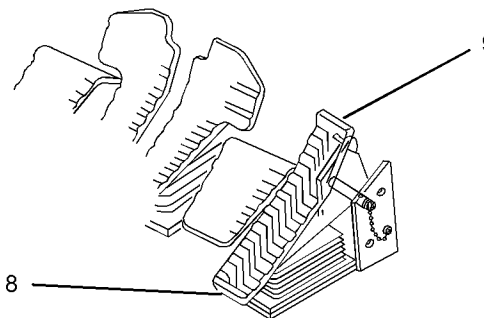


Illustration 180

g01623788

Right pedal

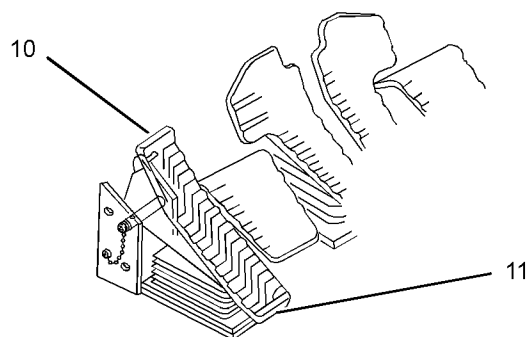


Illustration 181

g01623789

Left pedal



(8) OPEN – Push down on the rear of the right pedal in order to open the work tool.



(9) CLOSE – Push down on the front of the right pedal in order to close the work tool.



(10) ROTATE CLOCKWISE – Push down on the front of the left pedal in order to rotate the work tool clockwise.



(11) ROTATE COUNTERCLOCKWISE – Push down on the rear of the left pedal in order to rotate the work tool counterclockwise.

i04036189

Joystick Controls

SMCS Code: 5705

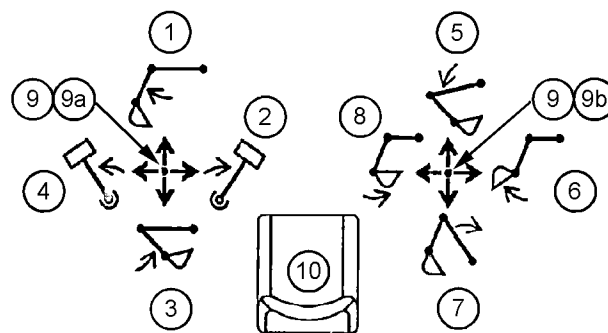


Illustration 182

g02233473

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

WARNING

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

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

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

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

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

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

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

i06836341

SmartBoom Control (If Equipped)

SMCS Code: 5461-ZS; 7332

WARNING

Personal injury or death can result from not following the proper procedures.

To avoid the possibility of injury or death, follow the established procedure.

WARNING

Activating the SmartBoom function and using the work tool joystick control while the front of the machine is elevated could result in unexpected machine motion. Unexpected machine motion could result in serious injury or death. Do not activate the SmartBoom function if the front of the machine is elevated by the front linkage.

WARNING

Do not elevate or lower the track when in the SmartBoom mode. Follow the operation procedures for the SmartBoom in the Operation and Maintenance Manual. Failure to follow these instructions can result in serious injury or death.

WARNING

Always make sure that the boom control joystick is in the NEUTRAL position before activating the SmartBoom control. Activating the SmartBoom control with the joystick out of the neutral position could result in unexpected machine motion which could result in serious injury or death.

WARNING

Do not select any SmartBoom mode, using the SmartBoom selector switch located on the console, while the tracks are elevated. Selecting the SmartBoom mode with the tracks elevated could result in a sudden drop of the machine which could result in serious injury or death.

WARNING

If any SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground, pressing the disable button that is located on the front of the right hand joystick could cause a sudden boom down motion. This control function could lift the machine upward, with unexpected machine movement that could result in serious injury or death. Do not press the disable button while the SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground.

WARNING

Do not attempt to lift the tracks of the machine by using the disable button and applying downward force with the boom lowering control while the machine is in any SmartBoom mode. Releasing the disable button will immediately return the machine to the active SmartBoom mode. This action could cause the machine to drop down abruptly which could result in serious injury or death.

The switches for the SmartBoom are on the right side instrument panel and on the right joystick.

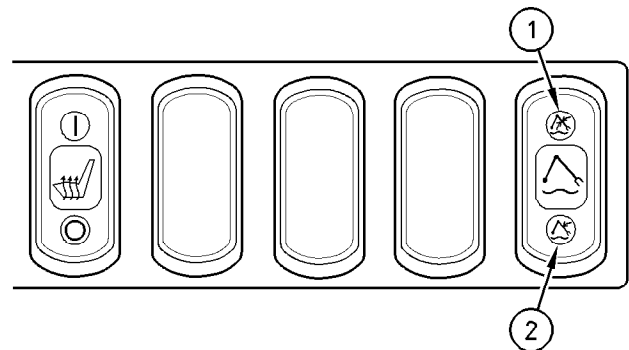


Illustration 183

Right side instrument panel

g00753781

i02473848



(1) SmartBoom UP AND DOWN – Push down on the top of the rocker switch to activate the SmartBoom UP AND DOWN mode. When the boom control joystick is moved to the BOOM DOWN position, the boom will lower by the weight of the boom. The boom can move upward freely.



(2) SmartBoom DOWN – Push down on the bottom of the rocker switch to activate the SmartBoom DOWN mode. The boom will lower by the weight of the boom when the control lever is moved to the BOOM LOWER position. This mode prevents the boom from moving upward. To move the boom upward, the operator must use the boom control joystick to activate the BOOM UP mode.

Note: When the rocker switch for the SmartBoom is in the CENTER position, the SmartBoom is no longer functional.

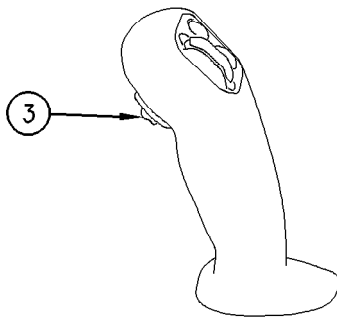


Illustration 184

g00753783

Right Joystick



(3) SmartBoom TEMPORARY DISABLE – Press the trigger switch on the front of the right joystick to temporarily override the SmartBoom function. Release the trigger switch to return to the selected SmartBoom function.

During operation of the SmartBoom, the operator may wish to apply downward force to the boom. When the rocker switch is in the SmartBoom DOWN position or the rocker switch is in the SmartBoom UP AND DOWN position, the operator can disable the SmartBoom function temporarily with the SmartBoom DISABLE switch. While the trigger switch is pressed, BOOM RAISE and BOOM LOWER will operate in the normal modes.

Note: Smart Boom Control function is deactivated when "Reach Front" is selected at "Boom Configuration" on Monitor menu.

Joystick Controls Alternate Patterns (If Equipped)

SMCS Code: 5059; 5137

WARNING

Whenever a change is made to the machine control pattern, also exchange the pattern card in the cab to match the new pattern.

Check the machine control pattern for conformance to the pattern on the card in the cab. If the pattern does not match, change the card to match the machine control pattern before you operate the machine. Failure to do so could result in personal injury.

The machine control pattern can easily be changed to the SAE system or to the standard backhoe loader hydraulic system (BHL) by changing the position of the two-way valve (if equipped). Use the following procedure to change the position of the two-way valve.

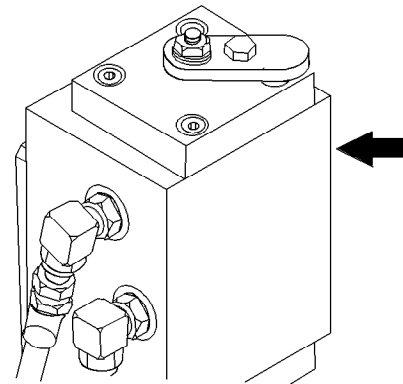


Illustration 185

g00101286

The two-way valve is located inside the front left access door.

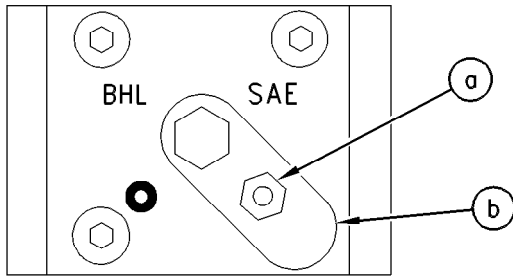


Illustration 186

g00104103

(a) Bolt
(b) Lever

1. Loosen bolt (a) and move lever (b) to the SAE position or to the BHL position.

Note: Illustration 186 shows that the two-way valve is in the SAE position.

2. After you set the machine control pattern, tighten bolt (a) in order to secure lever (b).

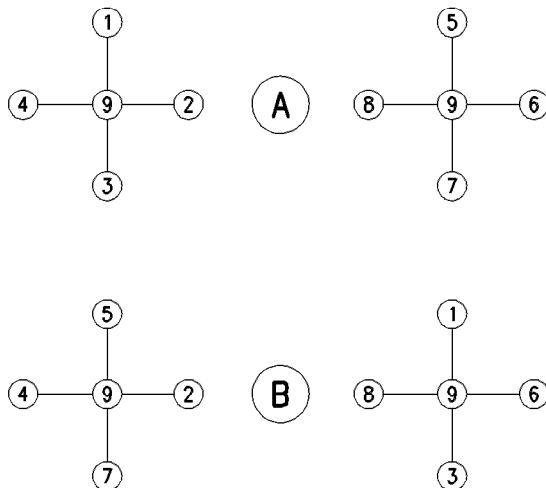


Illustration 187

g00101291

(A) SAE machine control pattern
(B) Machine control pattern for standard backhoe

The patterns on the left side of Illustration 187 show the possible configurations for the left control lever. The patterns on the right side of the illustration show the possible configurations for the right control lever.



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



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



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



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



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



BUCKET DUMP (6) – Move the control lever to this position in order to dump the bucket.



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



BUCKET CLOSE (8) – Move the control lever to this position in order to close the bucket.

HOLD (9) – When the control lever is released from any position, the control lever will return to the HOLD position. Movement of the upper structure will stop.

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

If the machine is equipped with a hydraulic hammer, the functions of positions (6) and (8) are different.

HYDRAULIC HAMMER RAISE (6) – Move the control lever to this position in order to raise the hydraulic hammer.

HYDRAULIC HAMMER LOWER (8) – Move the control lever to this position in order to lower the hydraulic hammer.

i03996727

Joystick Controls Alternate Patterns (If Equipped)

SMCS Code: 5059; 5137

WARNING

Whenever a change is made to the machine control pattern, also exchange the pattern card in the cab to match the new pattern.

Check the machine control pattern for conformance to the pattern on the card in the cab. If the pattern does not match, change the card to match the machine control pattern before you operate the machine. Failure to do so could result in personal injury.

The machine control pattern can be changed to the SAE system by changing the position of the two-way valve (if equipped). The machine control pattern can also be changed to the standard backhoe loader hydraulic system (BHL) by changing the valve position. Use the following procedure to change the position of the two-way valve.

The two-way valve is located inside the front left access door.

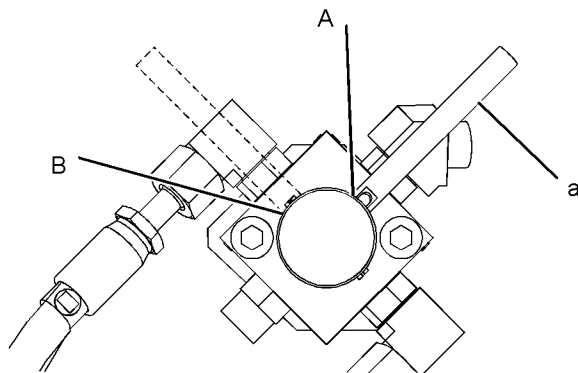


Illustration 188

g02042557

- (a) Lever
(A) SAE machine control pattern
(B) BHL machine control pattern

1. Pull up on lever (a) and turn the lever to the SAE position or to the BHL position.

Note: Illustration 188 shows that the two-way valve is in the SAE position.

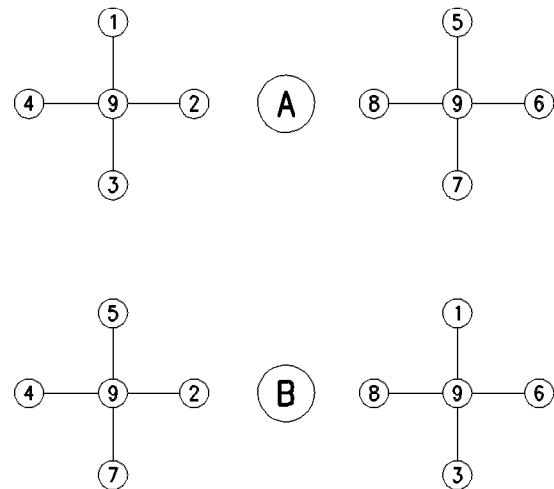


Illustration 189

g00102966

- (A) SAE machine control pattern
(B) BHL machine control pattern for standard backhoe

The patterns on the left side of the illustration show the possible configurations for the left control lever. The patterns on the right side of the illustration show the possible configurations for the right control lever.



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



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



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



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



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



BUCKET DUMP (6) – Move the control lever to this position in order to dump the bucket.



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



BUCKET CLOSE (8) – Move the control lever to this position in order to close the bucket.

HOLD (9) – When the control lever is released from any position, the control lever will return to the HOLD position. Movement of the upper structure will stop.

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

If the machine is equipped with a hydraulic hammer, the function of position (6) and of position (8) is different.

HYDRAULIC HAMMER RAISE (6) – Move the control lever to this position in order to raise the hydraulic hammer.

HYDRAULIC HAMMER LOWER (8) – Move the control lever to this position in order to lower the hydraulic hammer.

Note: For more detailed information that pertains to draining the water and sediment from the fuel tank, refer to Operation and Maintenance Manual, “Fuel Tank Water and Sediment - Drain”.

i06089585

Fuel Tank Shutoff and Drain Control

SMCS Code: 1273

The fuel tank drain valve is located under the main hydraulic pump. The fuel shutoff valve is located underneath the fuel tank.

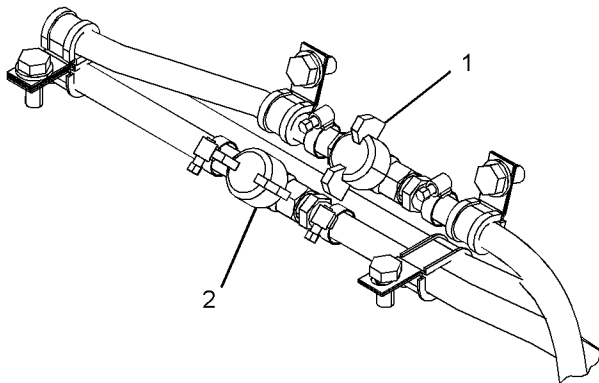


Illustration 190

g03803783

- (1) Fuel Tank Drain Valve
(2) Fuel shutoff valve

Fuel Tank Drain Valve (1) – To drain the water and sediment from the fuel tank, turn the fuel drain valve counterclockwise. To close the fuel tank drain valve, turn the drain valve clockwise.

Fuel Shutoff Valve (2) – To shut off the fuel supply, turn the fuel shutoff valve clockwise. To turn on the fuel supply, turn the fuel shutoff valve counterclockwise.

Engine Starting

i05293191

Engine Starting

SMCS Code: 1000; 1090; 1456; 7000

NOTICE

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

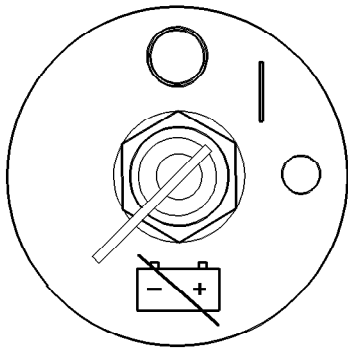


Illustration 191

g00406959

1. Turn the battery disconnect switch to the ON position.
2. Make sure that the reset button for the circuit breaker remains depressed. Refer to Operation and Maintenance Manual, "Circuit Breakers - Reset".

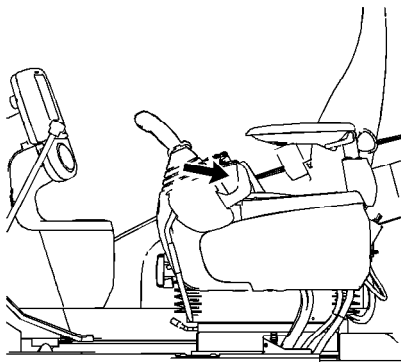


Illustration 192

g01075262

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

This machine is equipped with an engine neutral start system. The system only allows the engine to start when the hydraulic lockout control is in the LOCKED position.

4. Move the joysticks to the HOLD position.
5. Before you start the engine, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the horn before you start the engine.

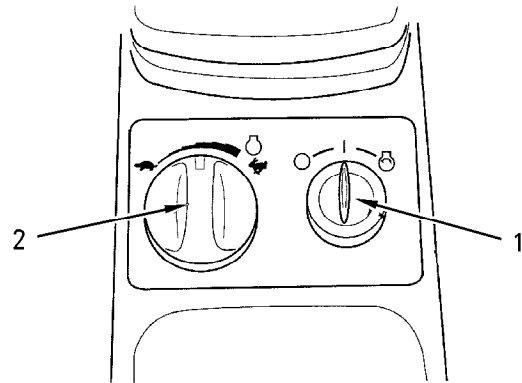


Illustration 193

g00682776

- (1) Engine start switch
(2) Engine speed dial

6. Turn engine start switch (1) to the ON position.
7. The monitoring system starts.

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

8. If the engine start switch is held in the ON position for 2 seconds or more, the pre-start check of the monitoring system will be activated. If any fluid levels are low, the low fluid level will be shown on the message display. Refer to Operation and Maintenance Manual, "Monitoring System" for more information on the prestart monitoring function.

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

9. Turn engine speed dial (2) to speed position "1".

NOTICE

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

10. Turn engine start switch (1) to the START position.
11. Release the engine start switch key after the engine starts.

This machine engine with standard specifications can start in areas that have temperatures as low as -18°C (0°F). For areas that are cooler, a starting kit for cold weather is available.

i03545993

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

S/N: RGD1–Up

S/N: RGG1–Up

S/N: KFH1–Up

S/N: RBJ1–Up

S/N: MLK1–Up

S/N: NLM1–Up

S/N: KHS1–Up

S/N: LKY1–Up

NOTICE

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

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

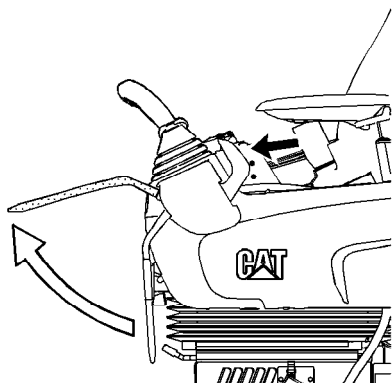


Illustration 194

g01077703

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

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

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

- If the temperature is greater than 0°C (32°F), warm up the engine for approximately 15 minutes.
- If the temperature is less than 0°C (32°F), warm up the engine for approximately 30 minutes.
- If the temperature is less than -18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

2. To warm up the hydraulic oil, turn the engine speed dial to the medium engine speed. Run the engine for approximately five minutes and move the joystick intermittently from the BUCKET DUMP position to the HOLD position. Do not hold the joystick in the BUCKET DUMP position with the bucket cylinder fully extended for more than 10 seconds.

3. Turn the engine speed dial to the maximum engine speed and repeat Step 2.

This allows the oil to attain relief pressure, which causes the oil to warm up more rapidly.

4. Cycle all controls in order to circulate warm oil through all hydraulic cylinders and all hydraulic lines, and through the swing motor and travel motors.

WARNING

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

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

i07011934

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

S/N: FLA1–Up

S/N: YAE1–Up**S/N:** GAX1–Up**NOTICE**

Keep engine speed low and do not operate until the message "Warm-Up Mode Power Derate" on the monitor goes out. If it does not go out within thirty seconds, stop the engine and investigate the cause before starting again. Failure to do so, can cause engine damage.

NOTICE

Always run the engine at low idle for at least ten minutes before performing any other operations in cold conditions or each time the engine oil and oil filter are changed in order to protect your engine and hydraulic components.

NOTICE

Depending on the ambient temperature, in order to prevent the machine operation with high speed without sufficient lubrication at the turbo bearing, the engine speed may be set to low speed and the hydraulic power minimized for a pre-determined time after the engine starts. Refer to turbo protection feature.

The engine may automatically change speeds when the machine is stationary and idling in cold ambient temperature for an extended time.

Hydraulic System

WARNING

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

1. Make sure that the area is clear of personnel and equipment.

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

2. Allow the engine to warmup at low idle for at least 5 minutes. Engage the work tool controls and disengage the work tool controls. This will speed up the warmup of the hydraulic components.

When you idle the machine for warmup, observe the following recommendations:

- If the temperature is greater than 0°C (32°F), warm up the engine for approximately 15 minutes.
- If the temperature is less than 0°C (32°F), warm up the engine for approximately 30 minutes.
- If the temperature is less than – 18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

NOTICE

The hydraulic oil temperature should be higher than 25 °C (77 °F) before performing work with the machine. Make sure that the warm-up procedure is performed.

If the hydraulic oil temperature is less than 25 °C (77 °F) and the machine is operated abruptly, serious damage to the hydraulic components may occur.

Note: The recommended operating temperature of the hydraulic fluid for this machine is 55 °C (131 °F).

3. To warmup the hydraulic oil, turn the engine speed dial to the medium engine speed.
4. Run the engine for approximately 5 minutes and move the joystick intermittently from the BUCKET DUMP position to the HOLD position. Do not hold the joystick in the BUCKET DUMP position with the bucket cylinder fully extended for more than 10 seconds.

This allows the oil to attain relief pressure, which causes the oil to warmup more rapidly.

5. Turn the engine speed dial to the maximum engine speed and repeat Step 4.
6. Cycle all controls to circulate warm oil through all hydraulic cylinders and all hydraulic lines, and through the swing motor and travel motors.
7. Observe the gauges and the indicators frequently during the operation.

Turbo Protection



Turbo Protection Power Derate – After an engine start, the engine speed will be set to low speed and the hydraulic power limited for a time period . During this period, the monitor displays the message "Warm-Up Mode Power Derate". (Maximum is around 30 seconds). After the turbo bearing lubrication is sufficient, the engine speed goes to the setting dial speed and the monitor stops to display the message.

Operation

i03933151

Operation Information

SMCS Code: 7000

Note: Operating Temperature Range for the Machine The machine must function satisfactorily in the anticipated ambient temperature limits that are encountered during operation. The standard machine configuration is intended for use within an ambient temperature range of -18°C (0°F) to 43°C (109°F). Special configurations for different ambient temperatures may be available. Consult your Caterpillar dealer for additional information on special configurations of your machine.

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

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

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

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

When you travel for any distance, keep the stick inward and carry the boom in a low position.

When you drive up a steep grade, keep the boom as close to the ground as possible.

When you travel uphill or you travel downhill, keep the boom on the uphill side of the machine.

1. Adjust the operator seat.
2. Fasten the seat belt.

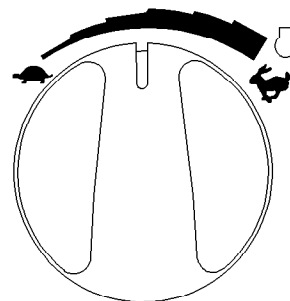


Illustration 195

g00732198

3. Turn the engine speed dial to the operating range.
4. Move the hydraulic lockout control to the UNLOCKED position.

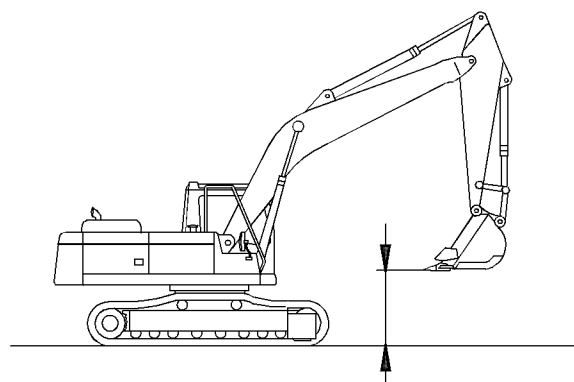


Illustration 196

g02154513

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

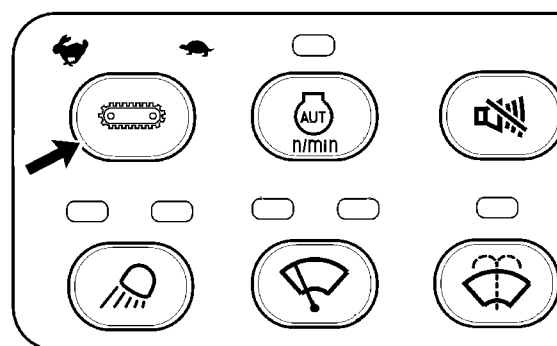


Illustration 197

g01113024

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

7. Make sure that the position of the upper structure and of the undercarriage is known before you move the machine. The drive sprockets should be at the rear of the machine.

Note: The directional steering controls will operate normally if the drive sprockets are at the rear of the machine. The idlers should be at the front of the machine and under the cab. When the sprockets are under the cab, the travel controls will operate backward.

8. Turn the engine speed dial in order to increase the engine speed (rpm) to the desired speed.
9. Push both travel levers forward at the same time in order to travel forward. If both travel levers are pushed farther, the travel speed at the selected engine speed (rpm) will be faster.

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

10. See Operation and Maintenance Manual, "Operator Controls" for information about spot turning and about pivot turns.
11. When you make turns in soft material, travel in a forward direction occasionally in order to clear the tracks.
12. Slowly move both of the travel levers or both of the travel pedals to the CENTER position in order to stop the machine.

Lifting Objects

If the machine is equipped with the CE plate per requirements for the European Union, used to lift objects, then the machine must be equipped with the optional boom lowering control valve and an overload warning device.

A fit for purpose test was completed in order to confirm that a properly equipped machine meets the requirements of the European Union Machinery Directive "2006/42/EC" for lifting objects.

The overload warning device (if equipped) must be adjusted for the bucket linkage and bucket size that is installed on the machine. Adjust the overload warning device for proper operation.

The setting for the overload warning device (if equipped) should be checked by an authorized dealer.

i00059294

Frozen Ground Conditions

SMCS Code: 7000

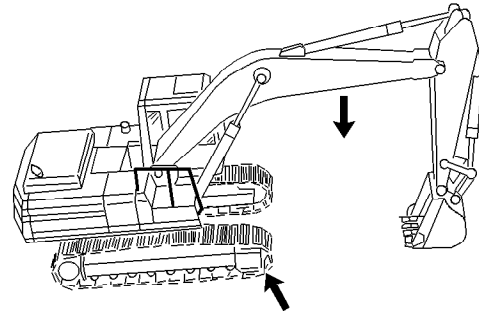


Illustration 198

g00101468

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

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

i04029988

Equipment Lowering with Engine Stopped

SMCS Code: 7000

In order to lower the boom, place the hydraulic lockout control in the UNLOCKED position. Move the joystick to the BOOM LOWER position. If the accumulator is still charged, the boom will lower.

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

Machine with a Boom Lowering Control Valve

WARNING

Boom load may cause cylinder oil pressure to reach relief pressure of the boom lowering control device when the boom is supported by one cylinder. Boom can lower suddenly, causing possible injury or death.

To avoid possible injury or death, be sure no one is under or near the work tool before manually lowering the boom.

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

If the engine is shut down or the hydraulic system is disabled, the operator can still lower the boom. Use the following procedure if the machine is equipped with a boom lowering control valve.

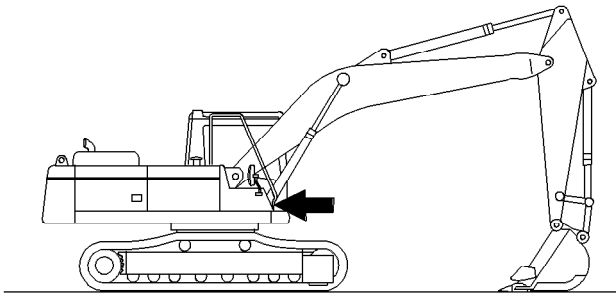


Illustration 199

g00101574

The boom lowering control valve is at the back of the base of the boom. The boom lowering control valve allows the operator to manually lower the boom if the engine is stopped.

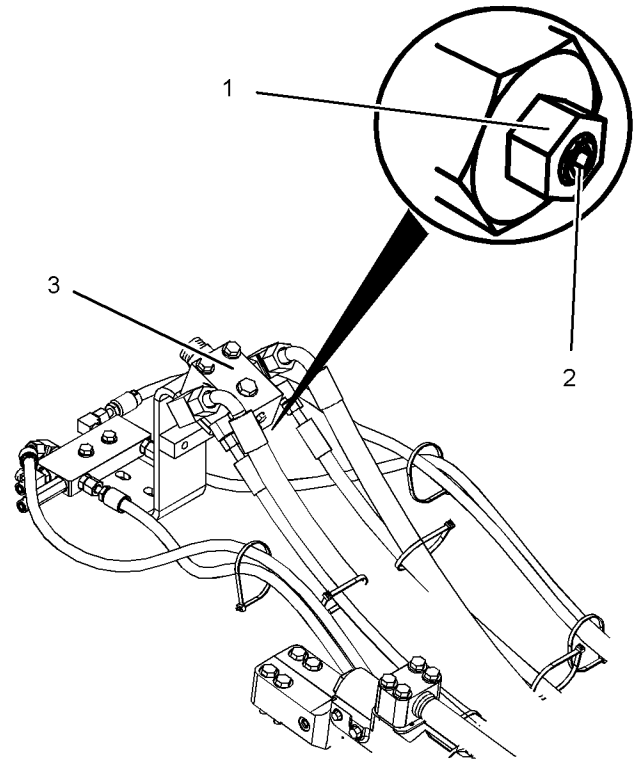


Illustration 200

g01753942

- (1) Locknut
- (2) Check valve
- (3) Boom lowering control device

Note: The locknut (1) and the check valve (2) is located on the bottom side of the boom lowering control device (3).

1. Loosen locknut (1).
2. Slowly turn check valve (2) counterclockwise until the check valve stops. The boom will lower to the ground.
3. Make sure that the work tool has been lowered onto the ground. Tighten check valve (2) to a torque of $2.25 \pm 0.25 \text{ N}\cdot\text{m}$ ($1.66 \pm 0.18 \text{ lb ft}$).
4. Tighten locknut (1) to a torque of $4 \pm 0.5 \text{ N}\cdot\text{m}$ ($3 \pm 0.37 \text{ lb ft}$).
5. Before you begin operating the machine, make any necessary repairs.

For additional information, consult your Cat dealer.

Operating Techniques

i05125989

Operating Technique Information

SMCS Code: 7000

WARNING

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

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

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

NOTICE

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

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

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

Whenever the tracks of the machine raise off the ground while digging, lower the machine back to the ground smoothly. **DO NOT DROP OR CATCH IT WITH THE HYDRAULICS.** Damage to the machine can result.

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

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

Consult your Caterpillar dealer for special work tool tips that are available for use in severe applications.

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

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

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

Use a comfortable travel speed while you operate the machine.

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

Never swing a load over a truck cab or workers.

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

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

Restricted Operation

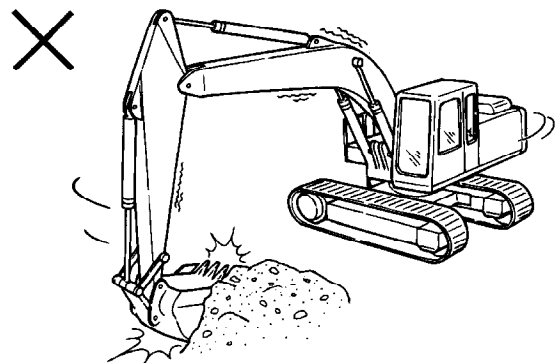


Illustration 201

g00529436

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

- Soil compaction
- Ground breaking
- Demolition

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

Operation Section
Operating Technique Information

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

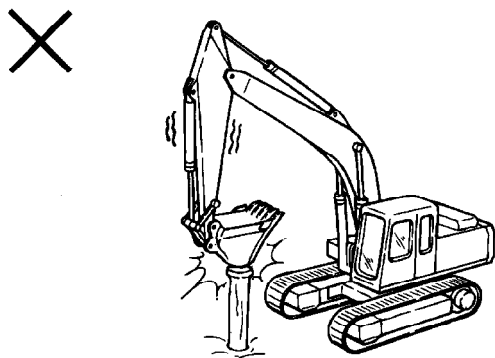


Illustration 202

g00529457

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

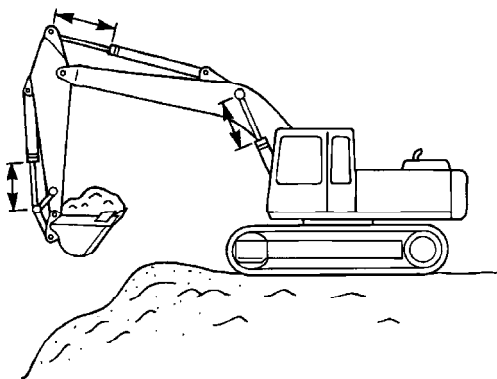


Illustration 203

g00529458

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

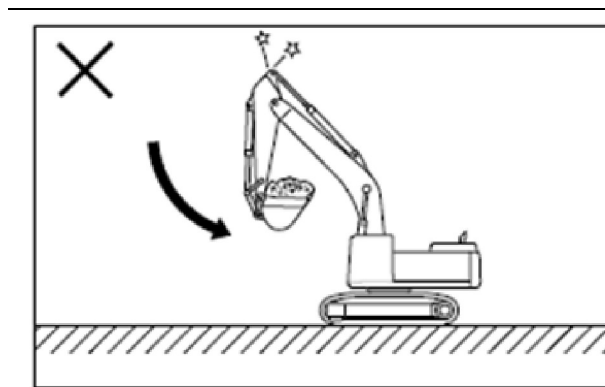


Illustration 204

g03286378

If the stick IN function is operated at full speed with a fully loaded bucket or heavy work tool attachment to the end of the cylinder stroke, excessive force will occur inside the stick cylinder. This action will reduce the life of the stick cylinder. To avoid this problem, always operate a stick IN function with moderate speed towards the end of cylinder stroke.

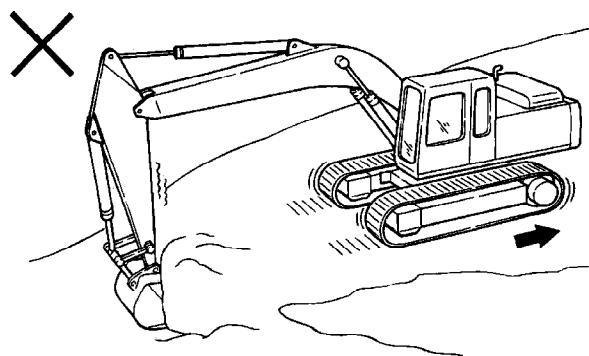


Illustration 205

g00529459

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

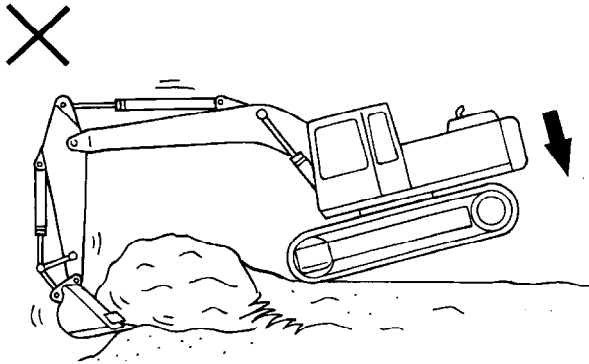


Illustration 206

g00529460

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

Operating Precaution

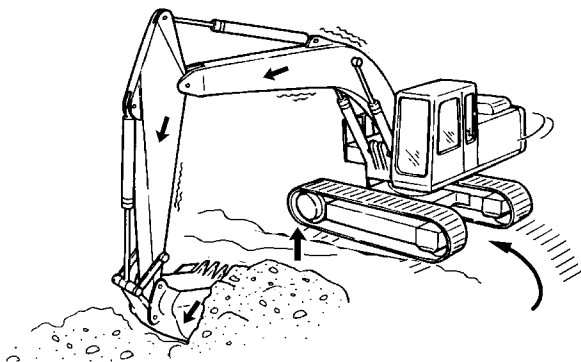


Illustration 207

g01250228

NOTICE

Do not allow the machine to swing from the force of traveling when you use the bucket, the stick, or the boom to assist in travel. If the force from traveling causes the machine to swing, damage may occur to the swing motor and to the swing drive.

Do not use the force of the bucket, the stick, or the boom to assist in turning the machine while the machine is traveling. This technique is referred to as "jump steering". This technique will damage the swing motor and the swing brake.

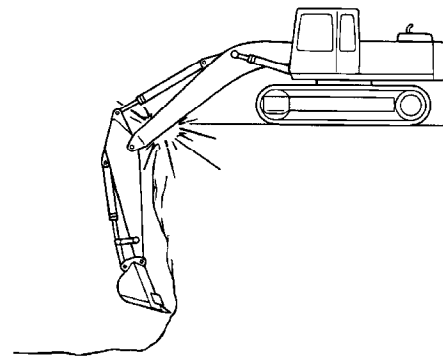


Illustration 208

g00529462

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

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

i05032265

Travel in Water and Mud

SMCS Code: 7000-V6

NOTICE

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

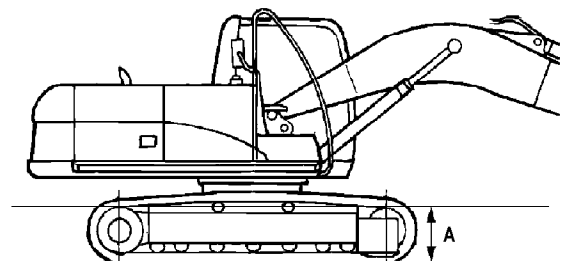


Illustration 209

g00807842

Depth of water to the center of the track carrier roller

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

Operation Section

Travel in Water and Mud

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

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

NOTICE

Do not allow the fan on the engine to contact the water while the machine travels through the water. Do not allow the fan on the engine to contact the water during a swing while the machine is in the water. Damage to the fan may occur if the fan contacts the water.

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

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

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

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

Procedure for Removing the Machine from Water or Mud

NOTICE

Do not allow the machine to swing from the force of traveling when you use the bucket, the stick, or the boom to assist in travel. If the force from traveling causes the machine to swing, damage may occur to the swing motor and to the swing drive.

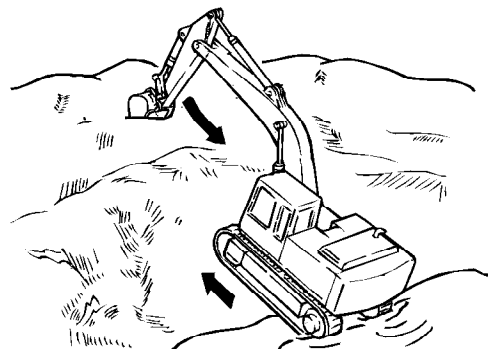


Illustration 210

g00808148

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

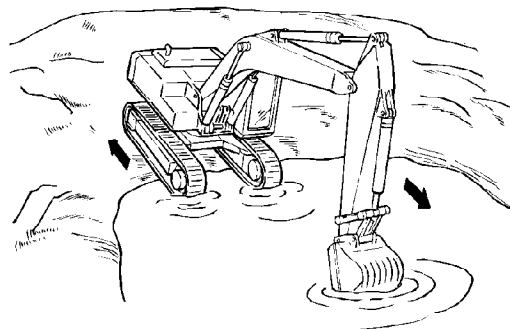


Illustration 211

g00808151

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

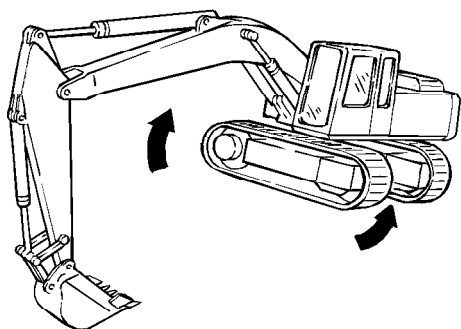


Illustration 212

g00808152

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

i05150572

Boom, Stick and Bucket Operation

SMCS Code: 7000

Digging

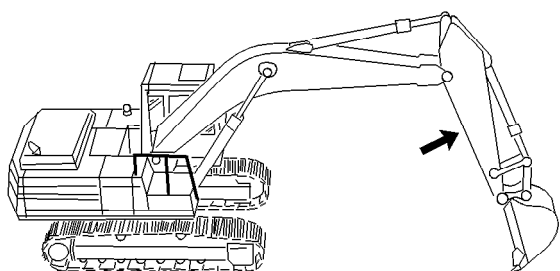


Illustration 213

g00101523

1. Position the stick at a 70 degree angle to the ground.

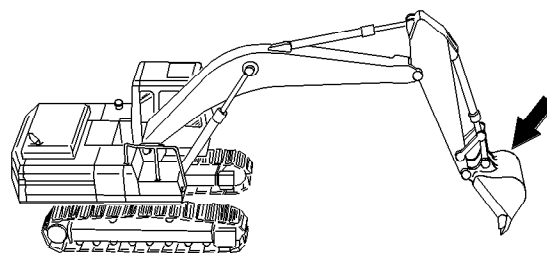


Illustration 214

g00101525

2. Position the bucket cutting edge at a 120 degree angle to the ground. Maximum breakout force can now be exerted with the bucket.

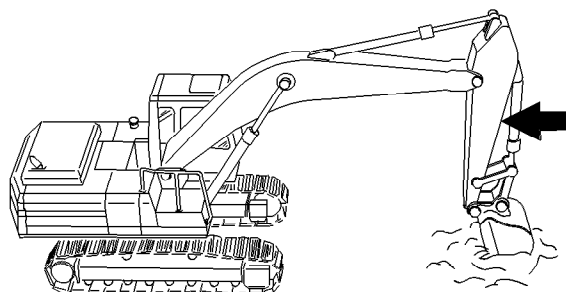


Illustration 215

g00101526

3. Move the stick toward the cab and keep the bucket parallel to the ground.

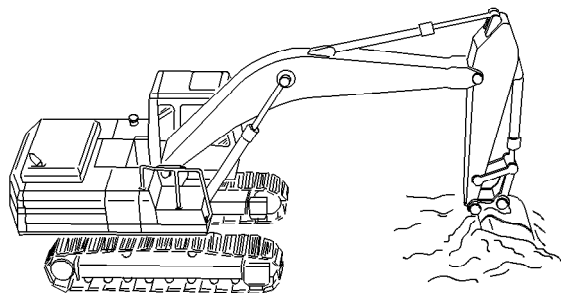


Illustration 216

g00101527

4. If the stick stops due to the load, raise the boom and/or perform a curl in order to adjust the depth of the cut.
5. To apply the greatest force at the cutting edge, decrease the down pressure as you move the stick toward the cab.
6. Maintain a bucket attitude that ensures a continuous flow of material into the bucket.
7. Continue the pass in a horizontal direction so that material peels into the bucket.

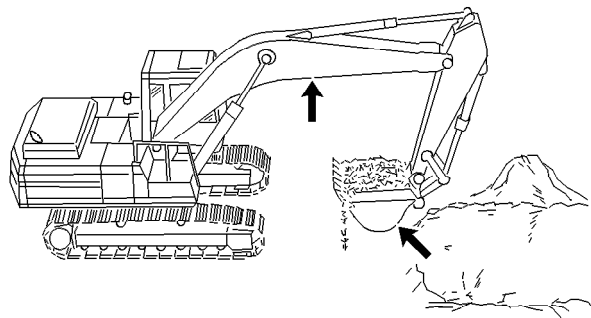


Illustration 217

g00101528

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

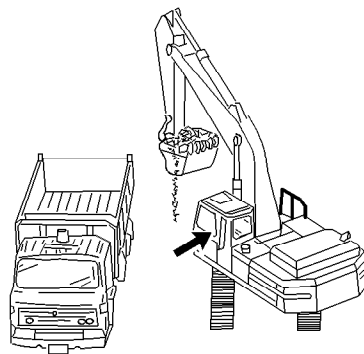


Illustration 218

g00101529

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

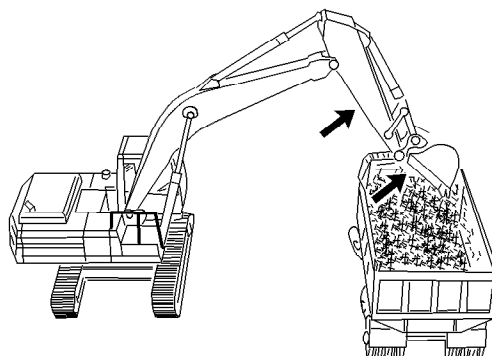


Illustration 219

g00101530

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

Lifting Objects

WARNING

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

NOTICE

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

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

If this machine is used to lift objects within an area that is controlled by the European Directive "2006/42/EC", the machine must be equipped with a boom lowering control valve, a stick lowering control valve, and an overload warning device.

Japan regulations require some machines to use a shovel crane configuration in order to lift certain objects.

Contact your Cat dealer for additional information.

Short slings will prevent excessive load swing.

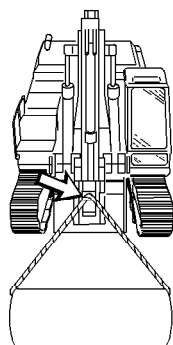


Illustration 220

g00101531

Use the lifting eye that is provided on the linkage to lift objects.

If the lifting eye is used, the connection must be made with a sling or with a shackle.

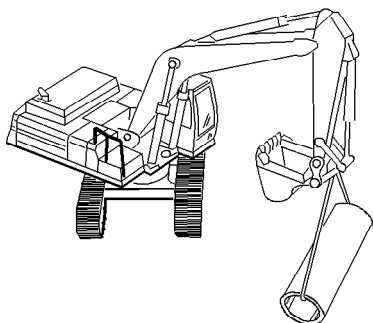


Illustration 221

g00101532

An unstable condition can exist if a load exceeds the machine load rating or if a heavy load is swung over an end or over a side.

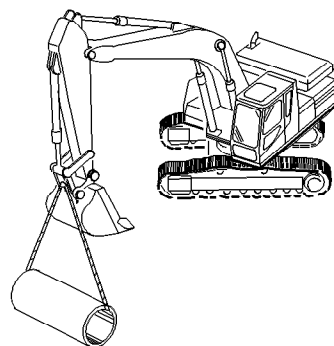


Illustration 222

g00101533

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

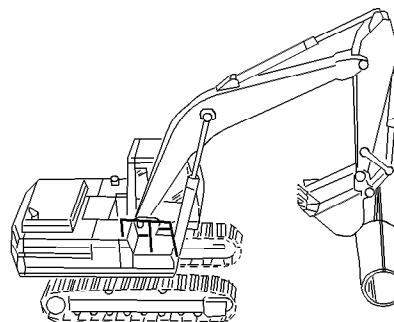


Illustration 223

g00101534

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

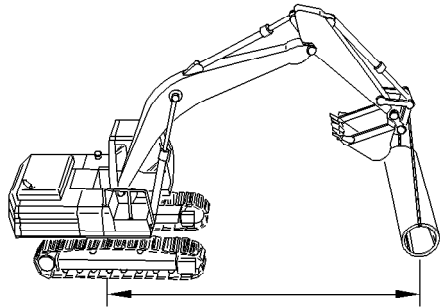


Illustration 224

g00101535

Lift capacity decreases as the distance from the swing centerline is increased.

Machines that are Equipped with a Long Reach Configuration

Machines with a long reach configuration require larger swing drift than standard machines when stopping, because inertial force in time of swing is large. Taking this into account, adjustments are made in timing for applying the swing brakes and speed of swinging.

Machines with a long reach configuration could be damaged and stability of the machine would be adversely affected if a control was suddenly operated, because inertial force of work tool is large.

i03875131

SmartBoom Operation (If Equipped)

SMCS Code: 5461-ZS; 7332

WARNING

Personal injury or death can result from not following the proper procedures.

To avoid the possibility of injury or death, follow the established procedure.

WARNING

Activating the SmartBoom function and using the work tool joystick control while the front of the machine is elevated could result in unexpected machine motion. Unexpected machine motion could result in serious injury or death. Do not activate the SmartBoom function if the front of the machine is elevated by the front linkage.

WARNING

Do not elevate or lower the track when in the SmartBoom mode. Follow the operation procedures for the SmartBoom in the Operation and Maintenance Manual. Failure to follow these instructions can result in serious injury or death.

WARNING

Always make sure that the boom control joystick is in the NEUTRAL position before activating the SmartBoom control. Activating the SmartBoom control with the joystick out of the neutral position could result in unexpected machine motion which could result in serious injury or death.

WARNING

Do not select any SmartBoom mode, using the SmartBoom selector switch located on the console, while the tracks are elevated. Selecting the SmartBoom mode with the tracks elevated could result in a sudden drop of the machine which could result in serious injury or death.

WARNING

If any SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground, pressing the disable button that is located on the front of the right hand joystick could cause a sudden boom down motion. This control function could lift the machine upward, with unexpected machine movement that could result in serious injury or death. Do not press the disable button while the SmartBoom mode is active and the boom control joystick is in the BOOM DOWN position (forward) with a bucket or a work tool on the ground.

WARNING

Do not attempt to lift the tracks of the machine by using the disable button and applying downward force with the boom lowering control while the machine is in any SmartBoom mode. Releasing the disable button will immediately return the machine to the active SmartBoom mode. This action could cause the machine to drop down abruptly which could result in serious injury or death.

The Caterpillar SmartBoom provides significant advantages in the following operations:

Excavation and Loading

The operator should select the SmartBoom UP AND DOWN mode for excavating operations and for loading operations. This mode is effective during the return cycle. The BOOM DOWN movement is assisted by gravity, and the pump flow that is normally required for the boom circuit is available for faster STICK OUT and SWING functions. More work is performed for the amount of hydraulic oil flow that is provided by the pumps. This results in faster cycle times and improved fuel efficiency.

When the SmartBoom UP AND DOWN mode is active, no downward hydraulic force is applied to the boom. The operator can intermittently apply downward hydraulic force when the force is required for bucket penetration. A button on the right joystick enables the operator to override the SmartBoom mode.

Hammering

The operator should select the SmartBoom DOWN mode for hammering operations. In the SmartBoom DOWN mode, the weight of the hammer plus the boom and the stick provides sufficient downward force for effective hammering. This mode prevents the hammer from rebounding. The boom follows the hammer downward freely as the tool penetrates the rock. This mode also reduces strain on the machine structures.

Advantages

In hammering, the SmartBoom provides the following advantages:

- The mode reduces shock in the cab.
- The mode reduces strain on machine structures.
- The mode prevents blank shots.
- The mode maintains optimum frequency.

In rock cleaning, the SmartBoom provides the following advantages:

- The mode reduces strain on machine structures.
- The mode reduces wear on the bucket and the teeth.
- The mode maintains optimum frequency.

In a leveling operation, the SmartBoom eases the operation. Only STICK IN actuation and bucket actuation are required to level the surface.

In material handling, the SmartBoom reduces the chance of damage below the material.

i03122643

Quick Coupler Operation (Circuit for Universal Coupler (If Equipped))

SMCS Code: 6129; 6522; 7000

Operation

This procedure describes the use of the hydraulic circuit with a Caterpillar dedicated quick coupler. If a different quick coupler is used, please contact your Caterpillar dealer for pressure adjustment and consult the documentation for the quick coupler for proper operation.

- The engine start switch is on.
- The engine is running.
- The hydraulic lockout control must be in the UNLOCKED position in order to operate the quick coupler controls.
- During the operation, the alarm will sound.

When the above conditions are achieved, the system will perform the desired operation. A warning alarm will sound if the switch for the quick coupler is turned to the LOCKING position or the UNLOCKING position as long as the hydraulic lockout control is in the UNLOCKED position.

Resetting the Quick Coupler Controls

Operation of the quick coupler may be interrupted by deactivating the hydraulic lockout control. The quick coupler controls will be disabled. Use the following procedure to reset the quick coupler control.

1. Return the quick coupler switch to the LOCKED position.
2. Turn the engine start switch to the OFF position and then turn the engine start switch to the ON position.

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

Securing the Work Tool

WARNING

Inspect the coupler wedge engagement before you operate the excavator.

Serious injury or death may result from an improperly engaged coupler.

Inspect coupler wedge engagement from the cab by rotating the bucket or the work tool inward. Extend the bucket cylinder to bring the coupler actuator into view and bring the stick in until the wedges are visible.

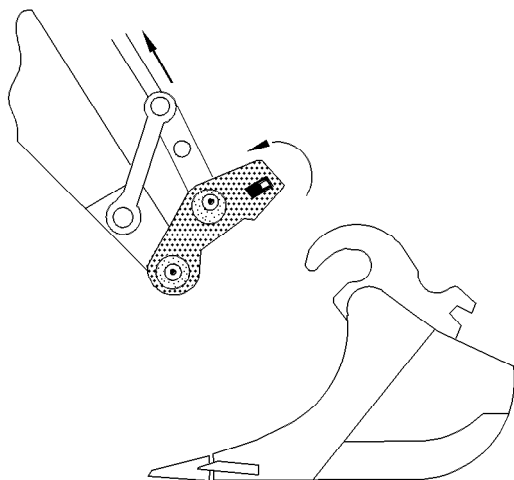


Illustration 225

g00104707

1. Position the work tool on a level surface.
2. Retract the bucket cylinder. Position the quick coupler in alignment between the hinges of the work tool.

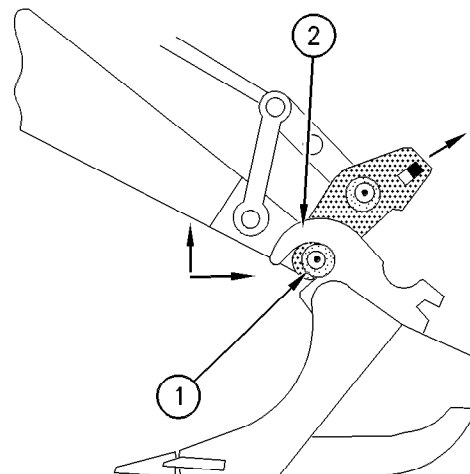


Illustration 226

g00104708

- (1) Lower bosses
- (2) Hinges

3. Move the stick forward and raise the stick until the lower bosses (1) engage the hinges (2) of the work tool.

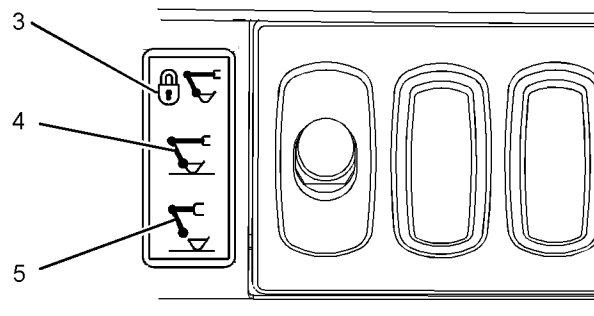


Illustration 227

g01599774

- (3) Locked
- (4) Locking
- (5) Unlocking

4. Move the switch for the quick coupler to the UNLOCKING position in order to extend the wedge. Use this position only during the coupling or uncoupling of the work tool. The hydraulic system is pressurized when the switch is in this position.

Note: Whenever the wedge is extended, a warning alarm will sound.

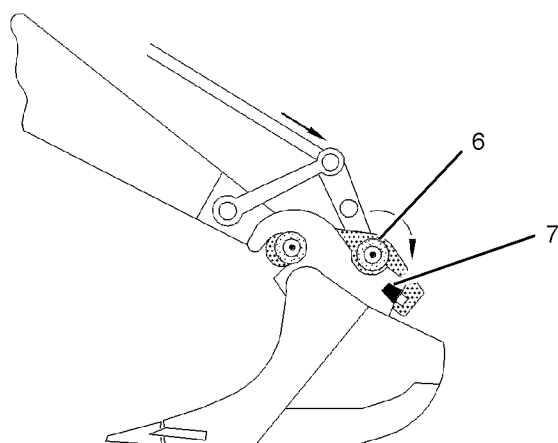


Illustration 228

g01620262

- (6) Center bosses
(7) Locking area

5. Extend the bucket cylinder in order to rotate the quick coupler toward the work tool.

Center bosses (6) must engage with the cutout of the hinge.

6. Move the switch for the quick coupler to the LOCKING position in order to retract the wedge.

The springs in the quick coupler will move the wedge into the locking area (7).

Note: Hold the switch in this position for about 5 seconds. This will make sure that the wedge is secured in position by keeping the system pressurized. Do not Keep the switch in this position for a longer period of time. The warning alarm will sound as a reminder.

7. Return the switch to the LOCKED position. The alarm will turn off.

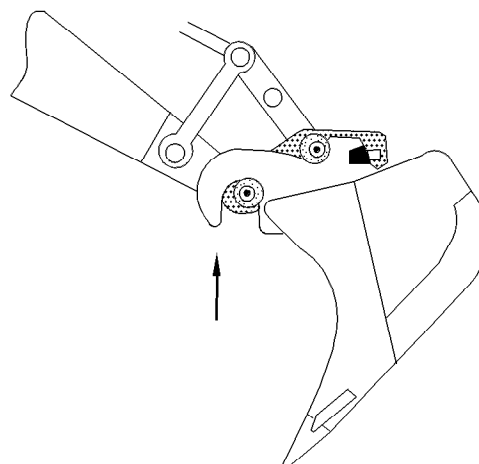


Illustration 229

g00104710

8. Raise the boom or raise the stick. Retract the bucket cylinder in order to confirm that the wedge is fully engaged. If the wedge is fully engaged, the work tool is locked in place. The work tool is ready to use.

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.

Operation Section
Circuit for Universal Coupler (If Equipped)

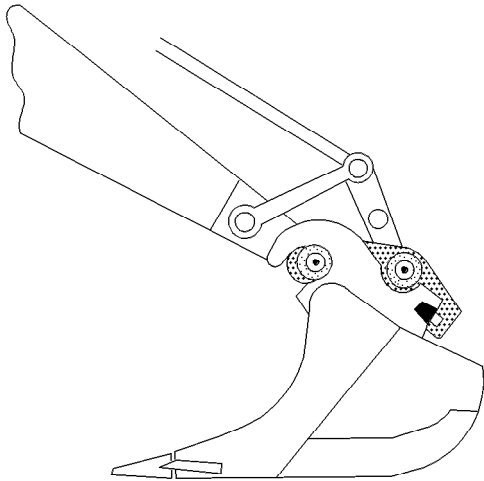


Illustration 230

g00104711

1. Level the bucket or level the work tool on the ground.

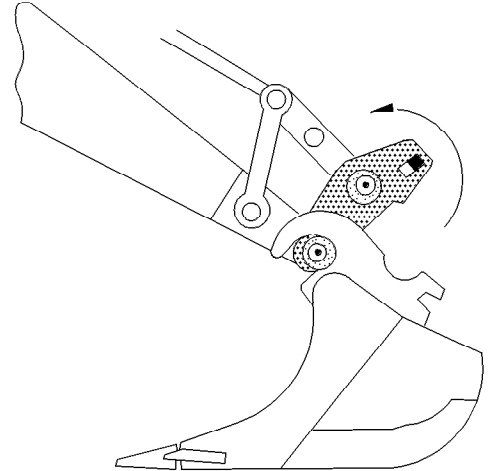


Illustration 232

g00104713

3. Retract the bucket cylinder in order to move the quick coupler toward the machine.
4. Move the switch for the quick coupler to the LOCKED position in order to retract the wedge. The alarm will turn off.

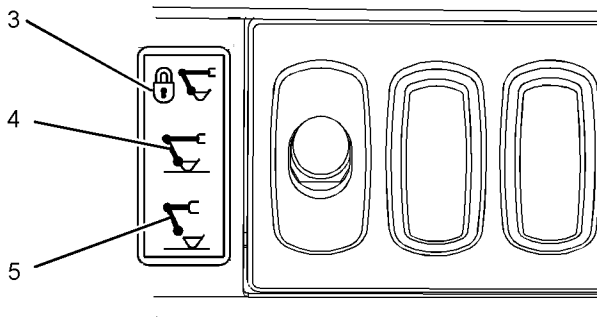


Illustration 231

g01599774

- (3) Locked
(4) Locking
(5) Unlocking

2. Move the switch for the quick coupler to the UNLOCKING position in order to extend the wedge. Use this position only during the coupling or uncoupling of the work tool. The hydraulic system is pressurized when the switch is in this position.

Note: The warning alarm will sound.

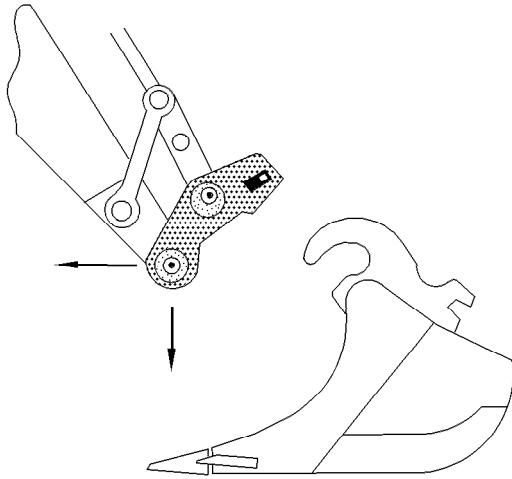


Illustration 233

g00104714

5. Lower the stick and move the stick toward the machine in order to disengage the quick coupler.

i03548680

Hammer Operation (If Equipped)

SMCS Code: 5705-WTL

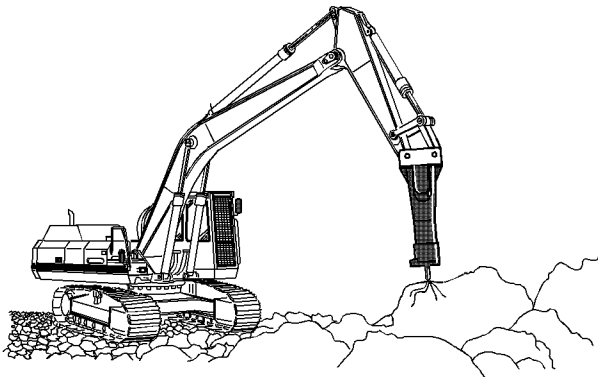


Illustration 234

g01876560

NOTICE

Use only a hydraulic hammer that is recommended by Caterpillar. The use of a hydraulic hammer that is not recommended by Caterpillar could damage your machine. Consult your Caterpillar dealer for information on recommended hydraulic hammers.

Only use the hydraulic hammer to break rocks, concrete, and other hard objects. Before you start hydraulic hammer operation, place the machine on a level, stable surface.

Before you start hydraulic hammer operation, close the front window. Caterpillar recommends the installation of a window guard on the front window for protection from flying debris.

NOTICE

In order to avoid structural damage to the host machine or the hydraulic hammer, comply with the following:

Do not attempt to break rocks or concrete by burying the hammer tool completely into the rocks or concrete.

Do not apply a prying force to the hammer tool in order to remove the hammer tool from the material.

Do not allow the hydraulic hammer to continuously operate at one location and for more than 15 seconds. Change the location of the hydraulic hammer and repeat the procedure. Failure to change the location of the hydraulic hammer could cause the hydraulic oil to overheat. Overheated hydraulic oil could cause damage to the accumulator.

Stop the hydraulic hammer immediately if the jumper lines are pulsating violently. This indicates that the accumulator nitrogen charge is lost. Consult your Caterpillar dealer for the necessary repair.

NOTICE

Do not use the dropping force of the hydraulic hammer to break rocks or other hard objects. This could cause structural damage to the machine.

Do not use the sides or back of the hydraulic hammer to move rocks or other hard objects. Doing this could cause damage not only to the hammer but to stick or boom cylinder.

Do not operate the hydraulic hammer with any of the cylinders fully retracted or extended. Doing this could cause structural damage to the machine, resulting in reduced machine life.

Do not use the hydraulic hammer to lift an object.

Do not operate the hydraulic hammer while the stick is vertical to the ground. This could allow the stick cylinder to vibrate excessively.

Operate the attachment control levers carefully in order to keep the hydraulic hammer's tool from hitting the boom.

Do not operate the hydraulic hammer under water unless the hydraulic hammer is properly equipped. Operating the hydraulic hammer under water could cause serious damage to the machine hydraulic system. Consult your Caterpillar dealer for information on underwater operation.

Do not operate the hydraulic hammer with the upper structure sideways to the undercarriage. Before you start hydraulic hammer operation, place the upper structure in the recommended positions that are shown in illustration 235. Any other operating positions could make the machine unstable. Any other operating positions could place excessive loads on the undercarriage.

Refer to the following for any additional questions about the operation and care of your Caterpillar hydraulic hammer: Operation and Maintenance Manual, SEBU7346, "Hydraulic Hammers", Operation and Maintenance Manual, HEPU9000, "Hydraulic Hammers" and Decal, SMEU7397, "Hammer Operation/Maintenance".

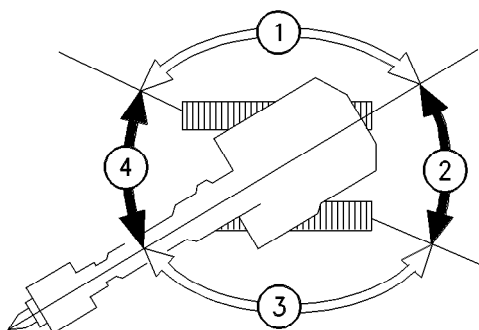


Illustration 235

g00101503

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

i03578566

Shear Operation (If Equipped)

SMCS Code: 5705-WTL

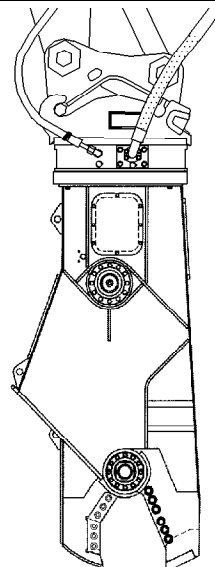


Illustration 236

g00763823

WARNING

Do not operate or work on this work tool unless you have read and understand the instructions and warnings in the Operation And Maintenance Manual for both the work tool and the host machine.

Failure to follow the instructions or heed the warnings could result in injury or death.

Contact your Caterpillar dealer for replacement manuals. Proper care is your responsibility.

NOTICE

Selection of a hydraulic shear must be done with extra care.

Use of a hydraulic shear not recommended by Caterpillar could result in structural damage to the machine.

Consult your Caterpillar dealer for hydraulic shear information.

Be sure that no one is near the work tool in order to prevent injury. Keep the work tool under control at all times in order to prevent injury. When a demolition tool is used, all personnel should maintain a minimum distance of 10 m (33 ft).

Close all windows. Make sure that all required guards are in place. Wear all required protective equipment. Follow the instructions in the Operation and Maintenance Manual for the work tool.

WARNING

Serious injury or death could occur from the demolition of pipes, vessels, tanks or other containers that may contain gas, flammable materials or hazardous chemicals.

Do not perform any demolition work on these items until all of their contents have been removed.

Follow all regulations for the removal and disposal of these materials.

NOTICE

Using the demolition tool to level the work site or push over standing structures may damage the machine or the demolition tool. Use appropriate equipment to do site preparation or maintenance operations.

NOTICE

To avoid structural damage to the machine, do not break road surfaces by placing the cutting edge of the hydraulic shear on the ground and moving the machine.

i06139647

Bucket - Remove and Install

SMCS Code: 6001-011; 6001-012; 6001; 6101; 6102; 6523

Captured Flag

WARNING

Failure to follow the instruction below for the installation of a work tool may result in personal injury or death. Special care must be taken if more than one person is installing the work tool.

- Confirm the verbal communication and the hand signals that will be used during the installation.
- Be alert for sudden movement of the front linkage and the work tool.
- Do not insert fingers into the bores of the support pins when the support pins and the bores are being aligned.

NOTICE

To facilitate removal of the bucket pins without causing damage to the pins, the bearings, and/or the O-ring seals put the bucket on the floor and the stick in a vertical position, as shown.

Removal Procedure

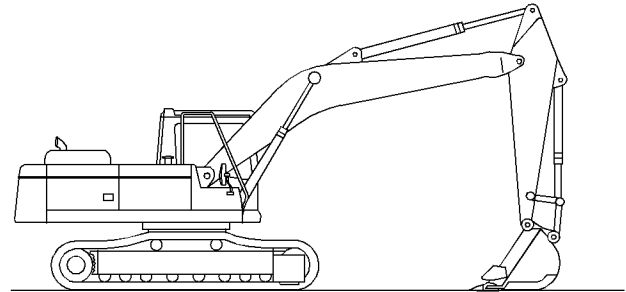


Illustration 237

g02154493

1. Start the engine. Park the machine on a hard, level surface. Position the bucket, the stick, and the bucket control linkage, as shown. Shut off the engine.

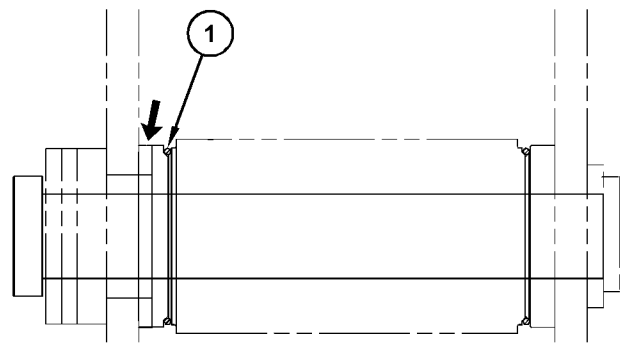


Illustration 238

g03822729

2. Slide O-ring seals (1) off the pin joints and onto the flanges of the bucket.

WARNING

When the pin assembly is removed, the linkage assembly may swing out of the bucket. To prevent possible personal injury, do not stand in front of the linkage assembly when the pin assembly is being removed.

Operation Section
Bucket - Remove and Install

Note: Removing the support pin may be difficult due to excessive pressure on the support pin. Remove the pressure on the support pin by adjusting the front linkage.

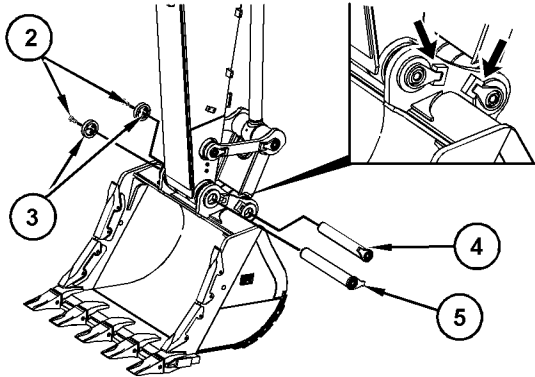


Illustration 239

g03822731

3. Remove bolts (2) and retaining plates (3). Then remove support pin (4) and support pin (5).
4. Start the engine and raise the stick out of the bucket.
5. Remove the O-ring seals (1) from the flanges on the bucket.

Note: After the support pins have been removed, make sure that the support pins do not become contaminated with sand or dirt. Make sure that the seals on the end of the stick and the seals on the end of the link do not become damaged.

Installation Procedure

1. Clean each pin and each pin bore. Lubricate each pin bore with molybdenum grease.

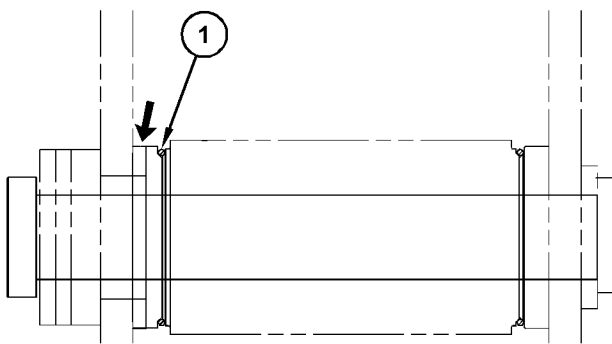


Illustration 240

g03822729

2. Position the O-ring seals (1) onto the flanges of the bucket.

3. Start the engine and lower the stick into the bucket until the pin bores are in alignment with each other. Stop the engine.

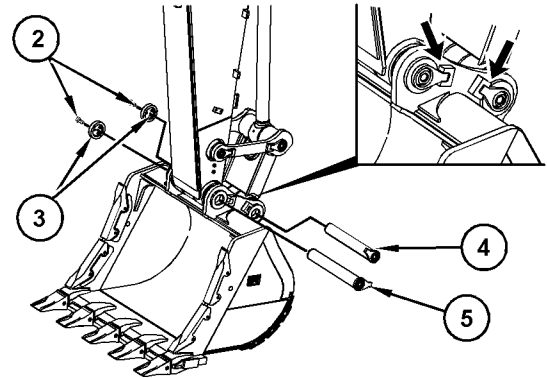


Illustration 241

g03822731

4. Insert support pin (5) into the pin bore. Make sure that the flange of the support pin rest inside the support on the side of the bucket.
5. Refer to Operation and Maintenance Manual, "Bucket Linkage - Inspect/Adjust" in order to adjust the bucket clearance.
6. Install retaining plate (3). Install bolts (2). Tighten bolts (2) evenly.
7. Slide O-ring seals (1) in position over the pin joints between the bucket and the stick.
8. Start the engine and position the bucket linkage into the bucket until the pin bores are in alignment with each other. Stop the engine.
9. Insert support pin (4) into the pin bore. Make sure that the flange of the support pin rest inside the support on the side of the bucket.
10. Install retaining plate (3). Install bolts (2). Tighten bolts (2) evenly.
11. Slide the O-ring seals (1) over the pin joints between the bucket and the link assembly.

12. Lubricate the bucket pins. Refer to Operation and Maintenance Manual, "Bucket Linkage - Lubricate" or Operation and Maintenance Manual, "Boom, Stick, and Bucket Linkage - Lubricate".

Bolted Flag

WARNING

Failure to follow the instruction below for the installation of a work tool may result in personal injury or death. Special care must be taken if more than one person is installing the work tool.

- Confirm the verbal communication and the hand signals that will be used during the installation.
- Be alert for sudden movement of the front linkage and the work tool.
- Do not insert fingers into the bores of the support pins when the support pins and the bores are being aligned.

NOTICE

To facilitate removal of the bucket pins without causing damage to the pins, the bearings, and/or the O-ring seals put the bucket on the floor and the stick in a vertical position, as shown.

Removal Procedure

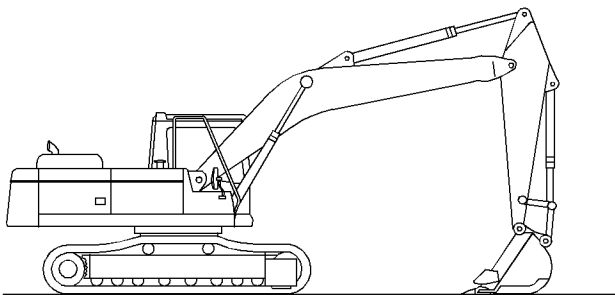


Illustration 242

g02154493

1. Start the engine. Park the machine on a hard, level surface. Position the bucket, the stick, and the bucket control linkage, as shown. Shut off the engine.

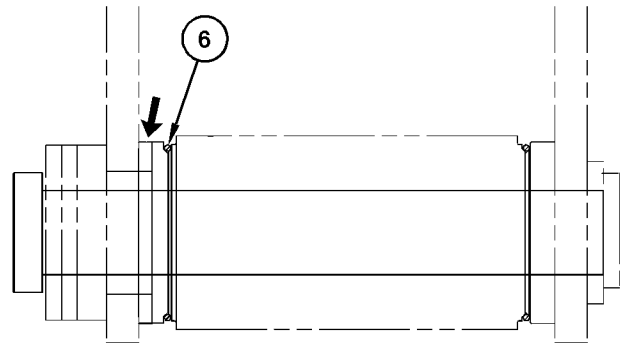


Illustration 243

g03822734

2. Slide O-ring seals (6) off the pin joints and onto the flanges of the bucket.

WARNING

When the pin assembly is removed, the linkage assembly may swing out of the bucket. To prevent possible personal injury, do not stand in front of the linkage assembly when the pin assembly is being removed.

Note: Removing the support pin may be difficult due to excessive pressure on the support pin. Remove the pressure on the support pin by adjusting the front linkage.

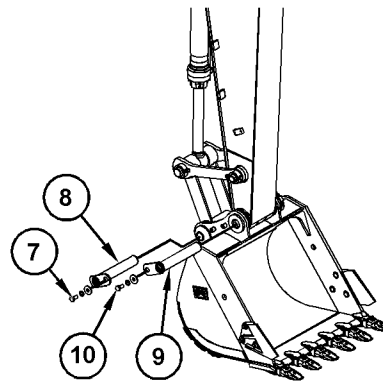


Illustration 244

g03822736

3. Remove bolt (7). Remove support pin (8).
4. Remove bolt (10). Remove support pin (9).
5. Start the engine and raise the stick out of the bucket.
6. Remove the O-ring seals (6) from the flanges on the bucket.

Note: After the support pins have been removed, make sure that the support pins do not become contaminated with sand or dirt. Make sure that the seals on the end of the stick and the seals on the end of the link do not become damaged.

Installation Procedure

1. Clean each pin and each pin bore. Lubricate each pin bore with molybdenum grease.

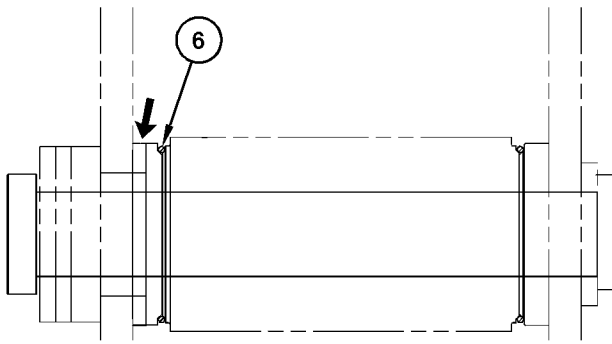


Illustration 245

g03822734

2. Position the O-ring seals (6) onto the flanges of the bucket.

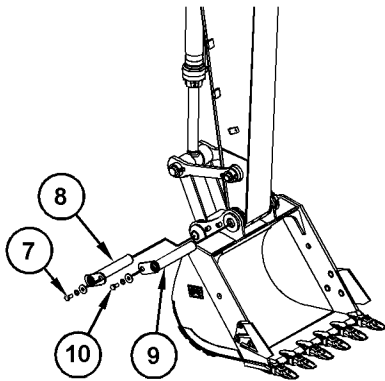


Illustration 246

g03822736

3. Start the engine and lower the stick into the bucket until the pin bores are in alignment with each other. Stop the engine.
4. Install support pin (9) into the pin bore.
5. Install bolt (10).
6. Refer to Operation and Maintenance Manual, "Bucket Linkage - Inspect/Adjust" in order to adjust the bucket clearance.
7. Slide O-ring seals (6) in position over the pin joints between the bucket and the stick.

8. Start the engine and position the bucket linkage into the bucket until the pin bores are in alignment with each other. Stop the engine.

9. Install support pin (8) into the pin bore.

10. Install Bolt (7).

11. Slide the O-ring seals (6) over the pin joints between the bucket and the link assembly.

12. Lubricate the bucket pins. Refer to Operation and Maintenance Manual, "Bucket Linkage - Lubricate" or Operation and Maintenance Manual, "Boom, Stick, and Bucket Linkage - Lubricate".

Crossbolt

WARNING

Failure to follow the instruction below for the installation of a work tool may result in personal injury or death. Special care must be taken if more than one person is installing the work tool.

- Confirm the verbal communication and the hand signals that will be used during the installation.
- Be alert for sudden movement of the front linkage and the work tool.
- Do not insert fingers into the bores of the support pins when the support pins and the bores are being aligned.

NOTICE

To facilitate removal of the bucket pins without causing damage to the pins, the bearings, and/or the O-ring seals put the bucket on the floor and the stick in a vertical position, as shown.

Removal Procedure

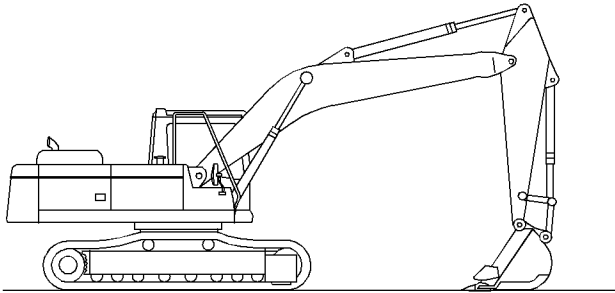


Illustration 247

g02154493

1. Start the engine. Park the machine on a hard, level surface. Position the bucket, the stick, and the bucket control linkage, as shown. Shut off the engine.

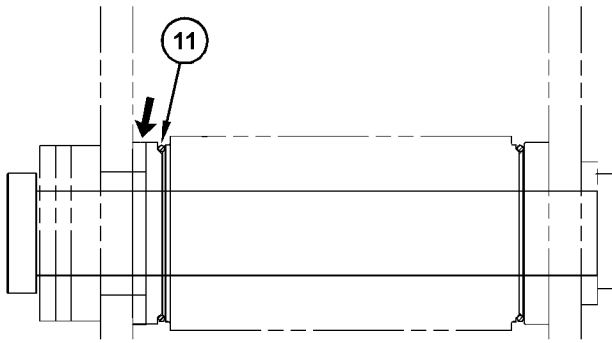


Illustration 248

g03822738

2. Slide O-ring seals (11) off the pin joints and onto the flanges of the bucket.

WARNING

When the pin assembly is removed, the linkage assembly may swing out of the bucket. To prevent possible personal injury, do not stand in front of the linkage assembly when the pin assembly is being removed.

Note: Removing the support pin may be difficult due to excessive pressure on the support pin. Remove the pressure on the support pin by adjusting the front linkage.

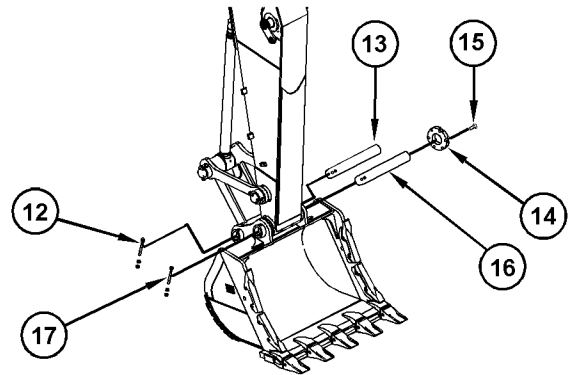


Illustration 249

g03822739

3. Remove nuts and retaining bolt (12) from support pin (13). Remove support pin (13).
4. Remove bolts (15) and adapter plate (14). Remove the shims.
5. Remove nuts and retaining bolt (17) from support pin (16). Remove support pin (16).
6. Start the engine and raise the stick out of the bucket.
7. Remove the O-ring seals (11) from the flanges on the bucket.

Note: After the support pins have been removed, make sure that the support pins do not become contaminated with sand or dirt. Make sure that the seals on the end of the stick and the seals on the end of the link do not become damaged.

Installation Procedure

1. Clean each pin and each pin bore. Lubricate each pin bore with molybdenum grease.

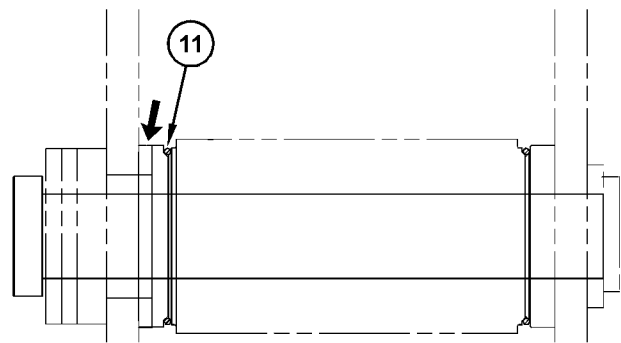


Illustration 250

g03822738

2. Position the O-ring seals (11) onto the flanges of the bucket.

Operation Section
Bucket - Remove and Install

3. Start the engine and lower the stick into the bucket until the pin bores are in alignment with each other. Stop the engine.

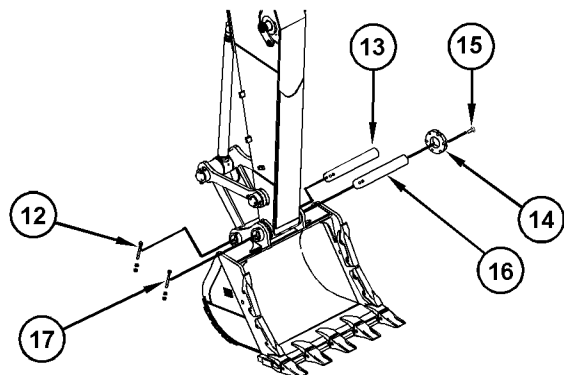


Illustration 251

g03822739

4. Install support pin (16). Put the retaining bolt hole that is in support pin (16) in alignment with the retaining bolt hole that is in the bucket.
5. Install the retaining bolt and nuts (17). Install adapter plate (14) without the shims, and without bolts (15) that hold adapter plate (14).
6. Refer to Operation and Maintenance Manual, "Bucket Linkage - Inspect/Adjust" in order to adjust the bucket clearance.
7. Slide O-ring seals (11) in position over the pin joints between the bucket and the stick.
8. Start the engine and position the bucket linkage into the bucket until the pin bores are in alignment with each other. Stop the engine.
9. Install support pin (13). Put the retaining bolt hole that is in the bucket pin in alignment with the retaining bolt hole that is in the bucket.
10. Install the retaining bolt and nuts (12).
11. Slide the O-ring seals (11) over the pin joints between the bucket and the link assembly.

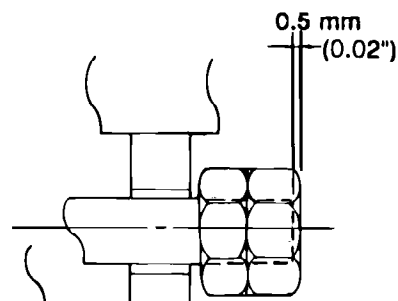


Illustration 252

g00510030

12. Tighten retaining nuts (12) and (17). Position the outside nut even with the end of the retaining bolt or 0.5 mm (0.02 inch) beyond the end of the retaining bolt. Tighten the inside nut against the outside nut.
13. Lubricate the bucket pins. Refer to Operation and Maintenance Manual, "Bucket Linkage - Lubricate" or Operation and Maintenance Manual, "Boom, Stick, and Bucket Linkage - Lubricate".

Parking

i02111770

Stopping the Machine

SMCS Code: 7000

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

Note: The swing parking brake is automatically applied when the machine is stopped. The swing parking brake is released when the engine is running and the joystick is activated.

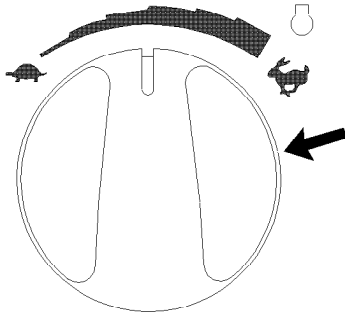


Illustration 253

g01075261

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

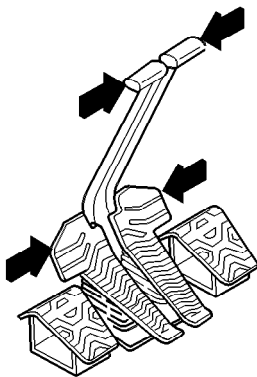


Illustration 254

g00560313

2. Release the travel levers/pedals in order to stop the machine.
3. Lower the work tool to the ground. Apply a slight downward pressure.

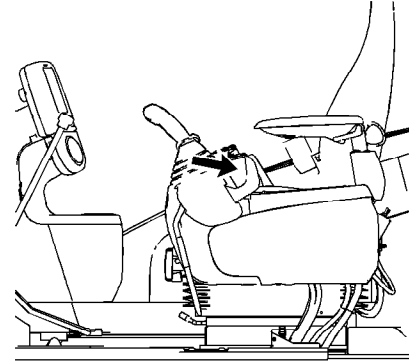


Illustration 255

g01075262

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

i01871055

Freezing Conditions

SMCS Code: 7000

If freezing temperatures are expected, remove the mud and the dirt from each track roller frame. Park the machine on wood planks. Use the following procedure to clean each track roller frame.

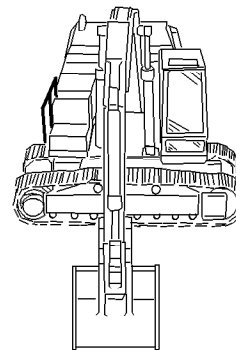


Illustration 256

g00101644

1. Position the boom over one side of the machine.
2. Use boom down pressure in order to lift the track on one side off the ground. Operate the track in the forward direction. Then operate the track in reverse. Continue this procedure until the maximum amount of material is thrown off the track.
3. Lower the track onto the wood planks.
4. Repeat the procedure for the other track.
5. Clean the area around the carrier rollers and around the track rollers.

- Lower the work tool onto a wood plank in order to prevent the work tool from touching the ground.

i06089591

Stopping the Engine

SMCS Code: 1000; 7000

NOTICE

Stopping the engine immediately after it has been working under load can result in overheating and accelerated wear of engine components.

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

- Stop the machine and run the engine at low idle for five minutes.

NOTICE

Never turn the battery disconnect switch to the OFF position while the engine is running. Serious damage to the electrical system may result.

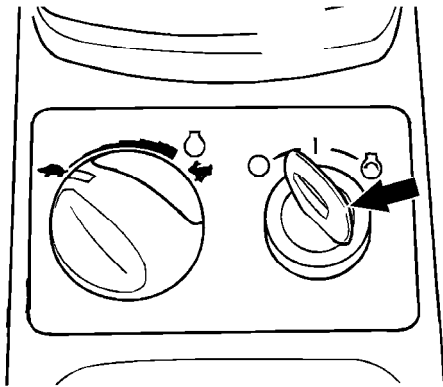


Illustration 257

g00683306

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

Engine Stop Control

Turn the engine start switch to the OFF position. If the engine does not stop, perform the following procedure.

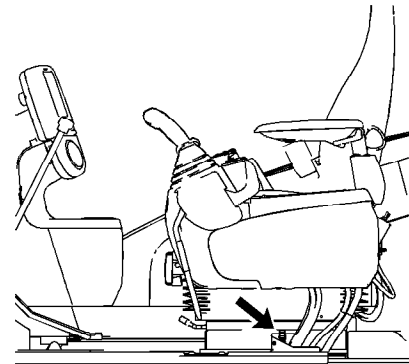


Illustration 258

g01073837

- The switch is located below the left side of the operator seat.

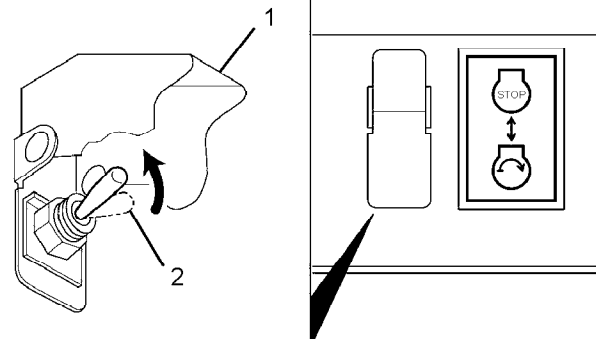


Illustration 259

g01048511

- Lift cover (1).
- Push switch (2) upward. This should stop the engine.

Note: Use the engine start switch to stop the engine first. Use the engine stop control as an alternate method to stop the engine.

- Return the switch to the original position. The engine will be enabled to start.

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

- Use the method that follows if the previous steps do not stop the engine.

Stop the Engine if an Electrical Malfunction Occurs

Turn the engine start switch to the OFF position. If the engine does not stop, perform the procedure that follows.

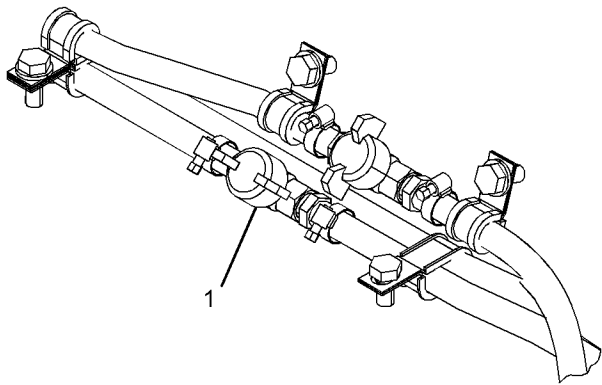


Illustration 260

g03811560

(1) Fuel shutoff valve

Shut off the fuel supply by turning the fuel shutoff valve (1) clockwise. The engine will stop after consuming the fuel in the fuel line. The engine may continue to run for a few minutes.

Repair the engine before you restart the engine. The fuel system may need to be primed. See Operation and Maintenance Manual, "Fuel System - Prime" for instructions.

Note: For more detailed information that pertains to draining the water and sediment from the fuel tank, refer to Operation and Maintenance Manual, "Fuel Tank Water and Sediment - Drain".

i02247246

Leaving the Machine

SMCS Code: 7000

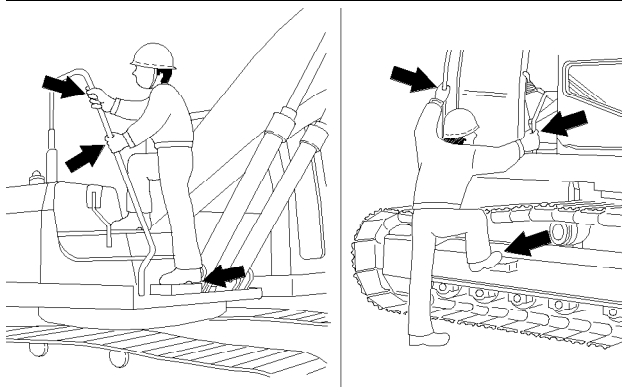


Illustration 261

g00103309

The above illustration shows an operator that is properly dismounting an excavator.

1. Use the steps and the handholds when you dismount. When you dismount, face the machine and use both hands. Be sure that you clean any debris from the steps.

2. Inspect the engine compartment for debris. Clean out any debris in order to avoid a fire hazard.
3. Remove all flammable debris from the front bottom guard through the access doors in order to reduce a fire hazard. Discard the debris properly.
4. When the machine is left for an extended period of one month or longer, turn the key for the battery disconnect switch to the OFF position. Remove the key. This will help to prevent a battery short circuit. Removing the key will also help to protect the battery from vandalism and from the current draw that is made by certain components.
5. Lock all vandalism covers and all compartments.

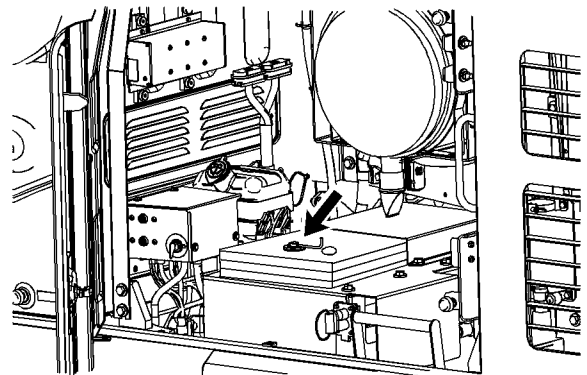


Illustration 262

g01131590

6. Remove the bolt that holds the vandalism guards in place. Remove the vandalism guards from the storage area.

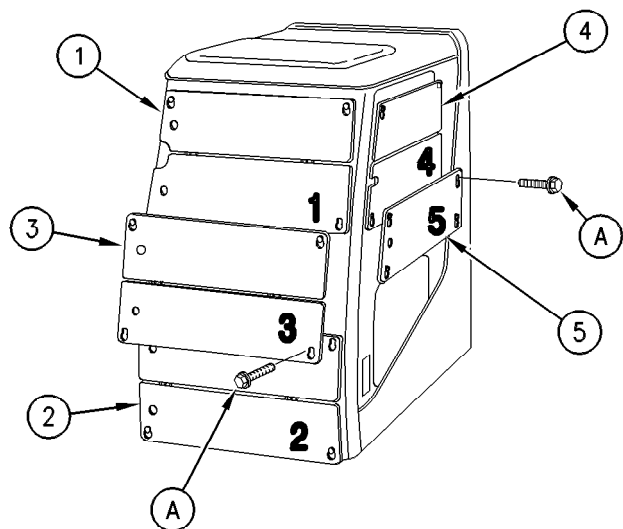


Illustration 263

g00101578

7. Install the vandalism guards on the front window and on the cab door. An identification number is stamped on each of the vandalism guards. Install the vandalism guards in the correct sequence. Use bolts (A) only for vandalism guard (3) and for vandalism guard (5).

Storing Vandalism Guards

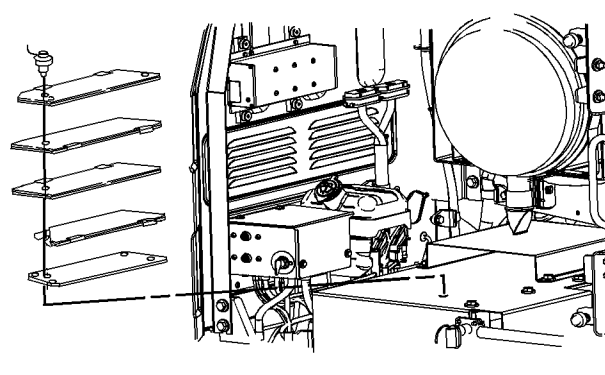


Illustration 264

g01131609

Note: When you are storing the vandalism guards, make sure that you place the guards in the storage area in sequential order, as shown. The vandalism guards will only fit in the storage area in this manner.

i07735116

Machine Storage and Specified Storage Period

SMCS Code: 7000

Machine Storage

The Safety Section of this Operation and Maintenance Manual contains storage information for fuels, lubricants, and ether (if equipped).

The Operation Section of this Operation and Maintenance Manual contains information for short-term storage of this machine, including engine shutdown, parking, and instructions for leaving the machine.

For detailed steps on long-term storage refer to Special Instruction, SEHS9031, "Storage Procedure for Caterpillar Products".

Specified Storage Period

The specified storage period of this machine is 1 year.

After the specified storage period has expired, consult your Cat dealer for inspect, repair, rebuild, install remanufactured, or install new components, and disposal options, and to establish a new specified storage period.

If a decision is made to remove the machine from service, refer to Decommissioning and Disposal for further information.

Transportation Information

i07200040

Shipping the Machine

SMCS Code: 7000; 7500

WARNING

Automatic Engine Speed Control (AEC) will increase engine speed automatically when you operate the control levers and/or travel pedals with AEC switch on.

When loading and unloading the machine from the truck or working in close quarters always turn AEC switch off to prevent any possibility of sudden movement of machine, which could result in serious injury or death.

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

Investigate the travel route for overpass clearances. Make sure that there will be adequate clearance for the machine.

Remove ice, snow, or other slippery material from the loading dock and from the truck bed before you load the machine onto the transport machine. Removing ice, snow, or other slippery material will help to prevent the machine from slipping in transit.

Note: Obey all laws that govern the characteristics of a load (height, weight, width, and length). Observe all regulations that govern wide loads.

Choose the flattest ground when you load the machine or when you unload the machine.

1. Before you load the machine, chock the trailer wheels or the rail car wheels.
2. When you use loading ramps, make sure that the loading ramps have adequate length, adequate width, adequate strength, and an adequate slope.
3. Maintain the slope of the loading ramps within 15 degrees of the ground.
4. Position the machine so that the machine can drive straight up the loading ramps. The final drives should be toward the rear of the machine. Do not operate the control levers while the machine is on the loading ramps.
5. When you drive over the loading ramp joint areas, maintain the balance point of the machine.
6. Lower the work tool to the bed or to the floor of the transport machine.

7. To prevent rolling of the machine or sudden movement of the machine, perform the following items:

- Chock both tracks.
- Install sufficient tie-downs at several locations.
- Fasten wire cables.

NOTICE

Do not allow the chrome surface of the bucket cylinder rod to touch any part of the trailer. Damage to the rod can occur from impact with the trailer during transport.

Note: Refer to Operation and Maintenance Manual, "Specifications".

Shipping a Machine that is not Completely Assembled

If the machine must be shipped when the boom, stick, or counterweight is not assembled on the machine, follow the instructions in Operation and Maintenance Manual, "Operation".

WARNING

The ROPS structural certification depends on the support of the boom, stick, and counterweight in the event of a machine tip over or a machine rollover incident.

When the machine needs to be moved without the boom, stick, or counterweight being installed, avoid any machine operations which could affect machine stability as a machine tip over or a machine rollover incident could result in serious injury or death.

The machine should be operated slowly on flat, stable ground or pavement by qualified operators.

i04000495

Securing the Machine

SMCS Code: 7000

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

Operation Section
Securing the Machine

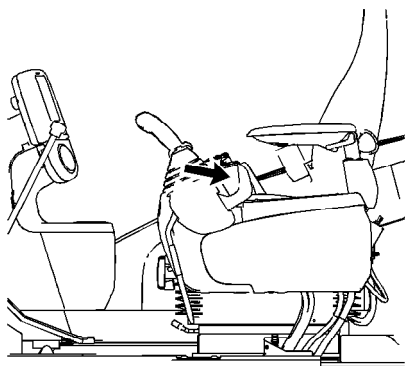


Illustration 265

g01075262

1. Move the hydraulic lockout control to the LOCKED position.
2. Turn the engine start switch to the OFF position in order to stop the engine. Remove the engine start switch key.
3. Turn the battery disconnect switch to OFF and remove the disconnect switch key.
4. Remove the ether starting aid cylinder. See Operation and Maintenance Manual, "Ether Starting Aid Cylinder - Replace" for the removal procedure.
5. Lock the door and the access covers. Attach any vandalism protection.
6. The Product Link antenna (if equipped) may be repositioned in order to meet the regulations regarding height of some locations. The Product Link antenna is located on top of the cab. Perform the following procedure in order to move the Product Link antenna to the transport position.

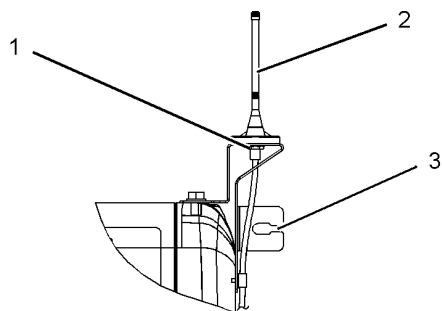


Illustration 266

g01438598

- a. Loosen nut (1).

- b. Remove antenna (2) and place the antenna in hole (3).
- c. Tighten nut (1).

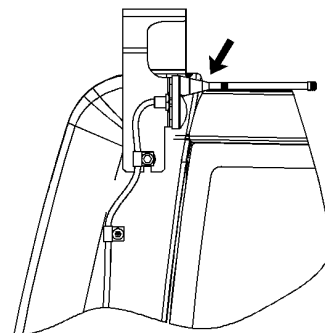


Illustration 267

g01438821

Antenna for Product Link in transport position

- d. Return the antenna to the operational position before operating the machine.
7. The AccuGrade antenna (if equipped) must be repositioned for transport. The AccuGrade antenna is located on top of the cab. Perform the following procedure in order to move the AccuGrade antenna to the transport position.

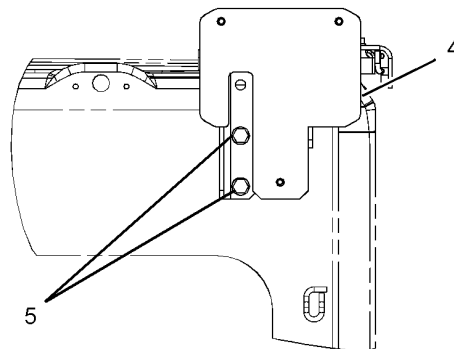


Illustration 268

g02177286

Bracket in position for operation

- a. Remove bolts (5) from bracket (4).

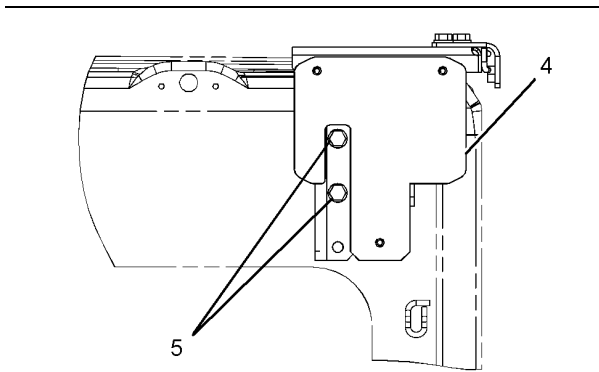


Illustration 269

g02177305

Bracket in position for transport

- b. Reinstall bracket (4) with bolts (5) located in the top two holes of the bracket. Refer to Illustration 269 .

Note: The bracket for the AccuGrade antenna must be place back into the normal operating position before the machine can be placed back into service.

8. Cover the exhaust opening.

NOTICE

Do not allow the turbocharger to rotate while the engine is not operating. Damage to the turbocharger can result.

Note: Before you remove the excavator from the transport machine, remove the protective covering from the exhaust opening.

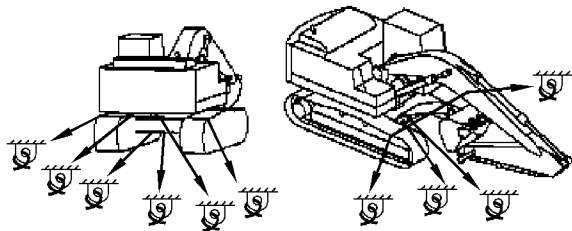


Illustration 270

g02176682

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

Use the front towing eyes and the rear towing eyes on the lower frame, and the rear towing eye on the upper frame.

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

When the engine is stopped, the swing parking brake is automatically applied. This action prevents the upper structure from swinging.

NOTICE

In freezing weather, protect the cooling system with antifreeze, to the lowest outside expected temperature on the travel route. Or, drain the cooling system completely.

i00703722

Mirror Installation

SMCS Code: 7319

Note: Before you transport the machine, remove the rearview mirror or reposition the rearview mirror inward.

After you transport the machine, reinstall the rearview mirror or return the rearview mirror to the proper position. Use the following procedure.

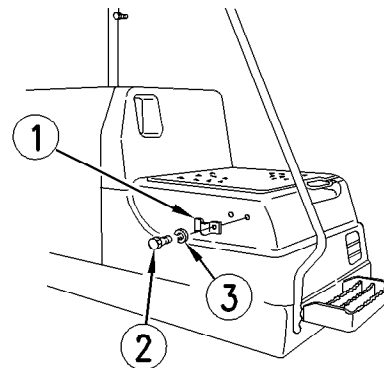


Illustration 271

g00101689

1. Use two bolts (2) and two washers (3) to install bracket (1) on the right side of the storage box.

i03853332

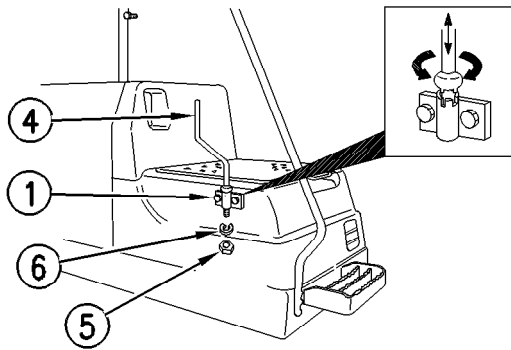


Illustration 272

g00101690

2. Put bar (4) into bracket (1). Align the notches at the lower part of the bar so that the bar faces outward. Secure the bar by tightening nut (5) and washer (6) on the bar.

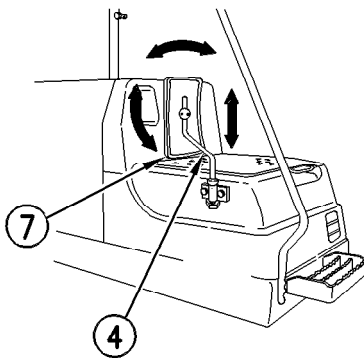


Illustration 273

g00101693

3. Install mirror (7) to bar (4). Rotate the mirror by hand to the desired angle.

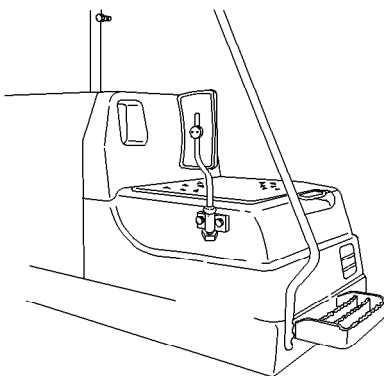


Illustration 274

g00101700

Reposition the rearview mirror inward before you transport the machine.

Adjustable Gauge Undercarriage Frame

SMCS Code: 4150-VAR

S/N: FLA1-Up

S/N: RGD1-Up

S/N: YAE1-Up

S/N: RGG1-Up

S/N: NLM1-Up

S/N: KHS1-Up

S/N: GAX1-Up

S/N: LKY1-Up

WARNING

Before extending or retracting the track frames, be sure to keep all other people away from the machine.

Always use two or more people to do this work. Perform machine movements only after getting signals from a signal man.

The automatic engine speed control (AEC) switch must be in the OFF position and the travel speed switch must be in the LOW position.

Never make a sudden movement of the front equipment. When operating the front equipment, slowly activate the controls with extra care.

WARNING

Do not operate the machine if both track frames are retracted. Do not operate the machine if one track frame is retracted. The machine is unstable if either track frame is retracted. If either track frame is retracted, the machine could rollover, resulting in serious injury or death. If the machine is unstable, damage could occur to bolts connecting the car body and the track frames.

Fully extend the track frames when the machine is operated. Retract the track frames when the machine is unloaded. Retract the track frames when the machine is loaded.

Do not operate the machine if both track frames are retracted. Do not operate the machine if one track frame is retracted. The machine is unstable if either track frame is retracted.

NOTICE

Before starting adjustment of the track frames, clean the contacting areas of the car body and track frames, and their mounting bolts. Prior to installing the bolts, apply 9M-3710 Anti-Seize Compound to the underside of the head and to the threads of the bolts.

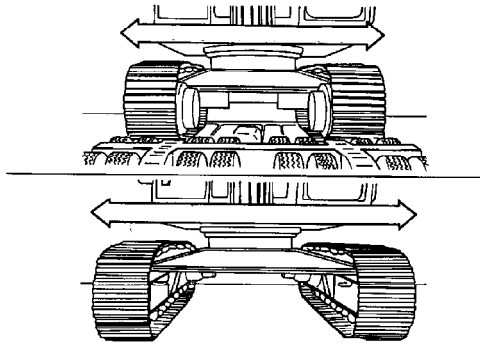


Illustration 275

g00285692

This machine has adjustable track frames that are held in place with bolts. Completely widen the track frames when the machine is being operated.

Retracting

Park the machine on a hard, level surface.

Retract the track frames one at a time.

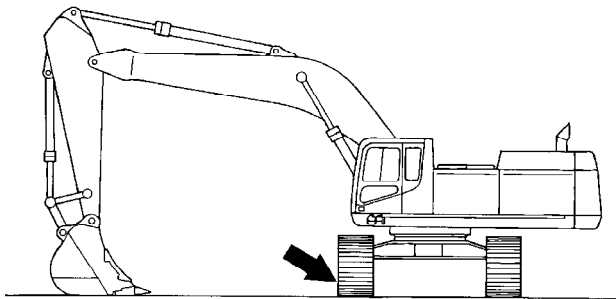


Illustration 276

g00581851

1. Position the machine with the front at a right angle to the track frame that is being retracted, as shown.
2. Stop the engine.

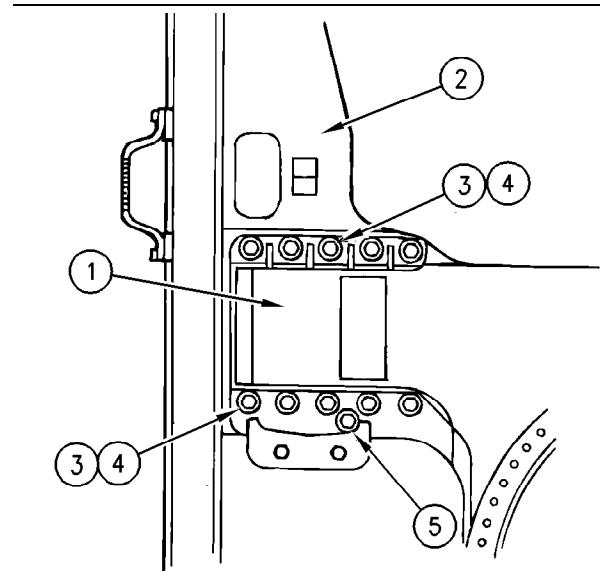


Illustration 277

g00697382

- (1) Carbody
- (2) Track frame
- (3) Bolts
- (4) Spacers
- (5) Bolts

3. Remove 19 bolts (3) and 19 spacers (4). The bolts hold track frame (2) to carbody (1).

Note: When you move track frame (2) in order to retract the overall width, do not loosen two bolts (5) that are for the guide.

Note: Ten bolts (3) and spacers (4) are installed on the side with the idler. Nine bolts (3) and spacers (4) are installed on the side with the final drive .

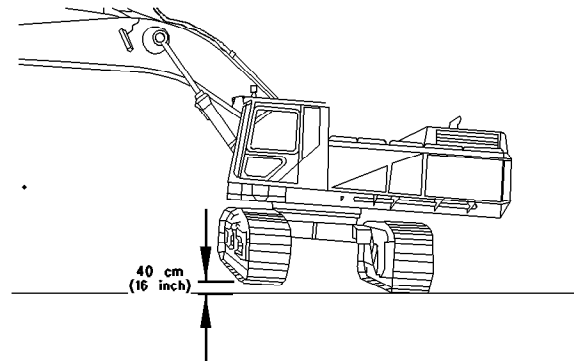


Illustration 278

g00697383

4. Start the engine. Apply downward pressure with the boom in order to raise the track approximately 40 cm (16 inch) above ground level.

Operation Section

Adjustable Gauge Undercarriage Frame

5. Slowly run the raised track at a low idle. This will cause the raised track to slide toward the center of the machine. The full sliding distance should be 250 mm (10 inch).
6. After the raised track frame has been correctly retracted, lower the track frame to the ground.

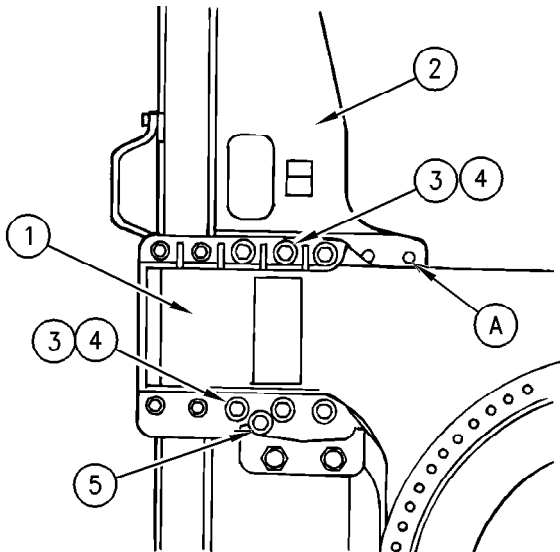


Illustration 279

g00697384

- (1) Carbody
- (2) Track frame
- (3) Bolts
- (4) Spacers
- (5) Bolts

7. Align the bolt holes of carbody (1) and track frame (2). Install 11 bolts (3) and 11 spacers (4). If necessary, slowly operate the machine back and forth until the bolt holes are aligned. Tighten the bolts to a torque of 2700 ± 300 N·m (2000 ± 220 lb ft).

Note: To protect the bolt holes that are in the track frame from debris and mud, insert corks into 5 bolt holes (A).

8. Repeat Steps 1 through 7 for the other track frame.

Note: Store the 16 bolts (3) and 16 spacers (4) that were removed in this procedure in the tool box.

Extending

NOTICE

Damage to the car body guide on the track roller frame can result if the track is raised more than 60 mm (2.4 inch) off the ground, with the car body bolts removed.

Park the machine on a hard, level surface.

Extend the track frames one at a time.

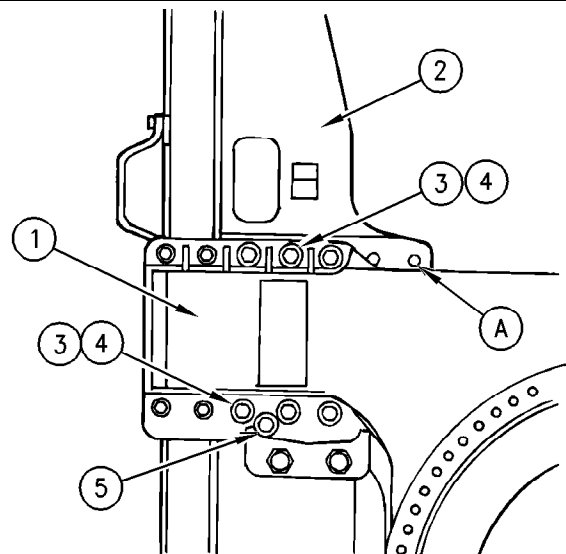


Illustration 280

g00697384

- (1) Carbody
- (2) Track frame
- (3) Bolts
- (4) Spacers
- (5) Bolts

1. Remove the 5 corks that are in bolt holes (A).
2. Remove 11 bolts (3) and 11 spacers (4). The bolts hold track frame (2) to carbody (1).

Note: When you move track frame (2) in order to extend the overall width, do not loosen two bolts (5) that are for the guide.

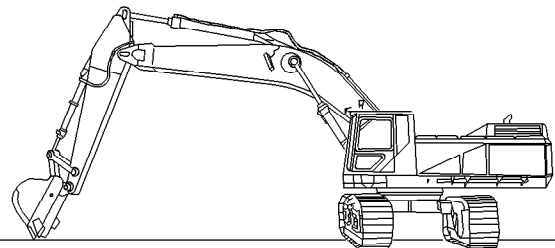


Illustration 281

g00286687

3. Position the boom over the opposite track frame with the stick at an approximate 80 degree angle to the ground. Place the bucket teeth into the ground, as shown. This machine position provides the best stability for extending the track frames.

4. Apply a downward pressure with the boom in order to slightly raise the track.

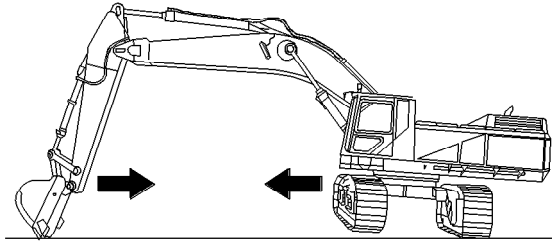


Illustration 282

g00286117

5. Use the STICK IN position to extend the track frame by moving the carbody away from the track.
6. After the track frame has been correctly extended, lower the raised track frame to the ground.

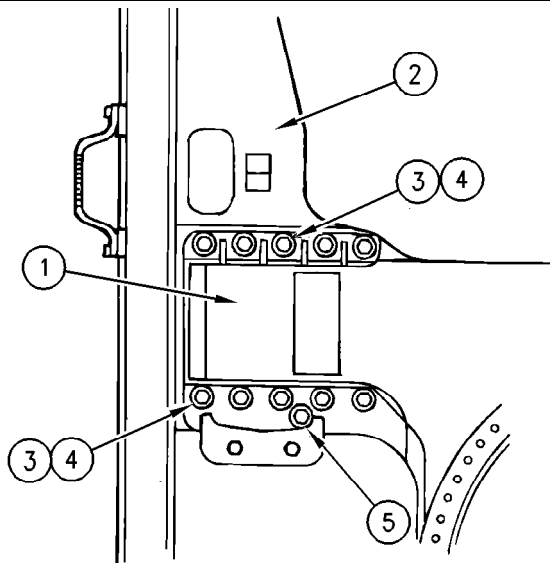


Illustration 283

g00697382

- (1) Carbody
- (2) Track frame
- (3) Bolts
- (4) Spacers
- (5) Bolts

7. Align the bolt holes of carbody (1) and track frame (2). Install 19 bolts (3) and 19 spacers (4). If necessary, slowly operate the machine back and forth until the bolt holes are aligned. Tighten the bolts to a torque of $2700 \pm 300 \text{ N}\cdot\text{m}$ ($2000 \pm 220 \text{ lb ft}$).

8. Repeat Steps 1 through 7 for the other track frame.

i02986933

Camera Harness - Disconnect and Connect

SMCS Code: 1408; 7348

WARNING

Working on the wiring harness for the rear camera during the removal and installation of the counterweight could result in a crushing hazard. The counterweight could fall, and the falling of the counterweight could cause personal injury or death. Disconnect the wiring harness to the rear camera before you remove the counterweight. Reconnect the wiring harness to the rear camera after you install the counterweight.

WARNING

Unexpected machine movement can cause injury or death.

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

1. Park the machine on level ground.
2. Lower the work tool to the ground.
3. Move the hydraulic lockout control to the LOCKED position.
4. Turn the engine start switch to the OFF position in order to stop the engine. Remove the engine start switch key.
5. Turn the battery disconnect switch to OFF and remove the disconnect switch key.

Disconnection of the Harness for the Rear View Camera

Disconnect the harness for the rear view camera before removing the counterweight.

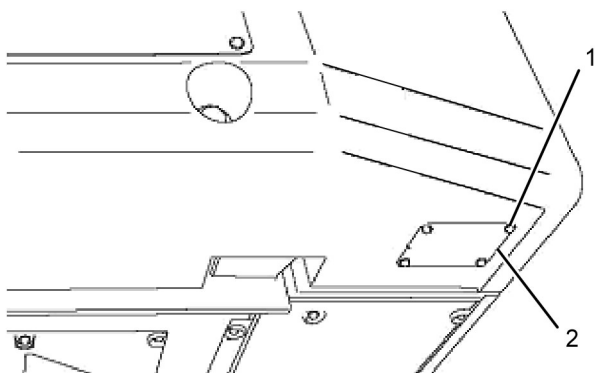


Illustration 284

g01513434

1. Remove four bolts (1) and cover (2) that is located under the counterweight.

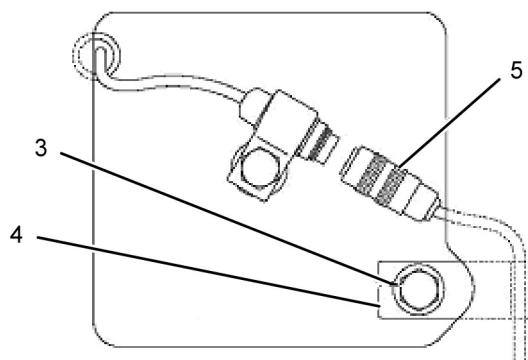


Illustration 285

g01513461

2. Remove bolt (3) and clip (4).
3. Turn plug(5) and pull apart.
4. Install cover (2) and four bolts (1).
5. Open the access door on the right side of the machine.

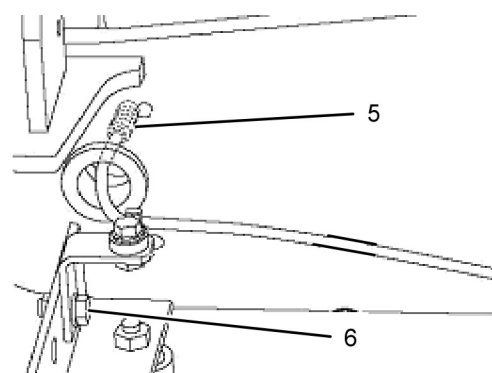


Illustration 286

g01513463

6. Remove bolt (6). Pull the wiring for the rear view camera until plug (5) comes in to the pump compartment.

7. Close the access door.

Connection of the Harness for the Rear View Camera

Reconnect the harness for the camera in the reverse order.

i04701274

Counterweight Removal and Installation

SMCS Code: 7056

Counterweight Removal and Installation for Machines with Lifting Eyes

WARNING

Unexpected machine movement can cause injury or death.

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

! WARNING

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

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

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

! WARNING

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

Counterweight Removal

Note: Before you remove the counterweight, disconnect the wiring for the rear view camera. Refer to Operation and Maintenance Manual, "Camera Harness - Disconnect and Connect" for more information.

1. Position the machine on a surface that is hard and level. Lower the work tool to the ground.
2. Move the hydraulic lockout control to the LOCKED position.

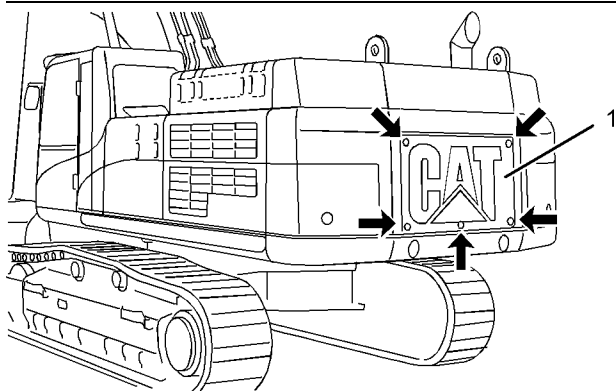


Illustration 287

g01235188

3. Remove the five bolts from cover (1).

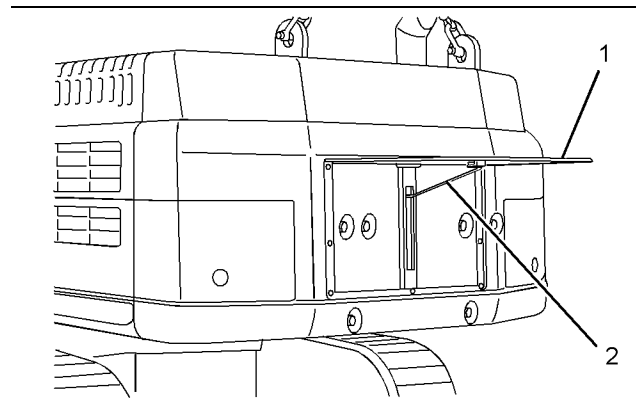


Illustration 288

g01230845

4. Open cover (1) and lock the cover into the OPEN position. Use bar (2) in order to support the cover while the cover is in the OPEN position.

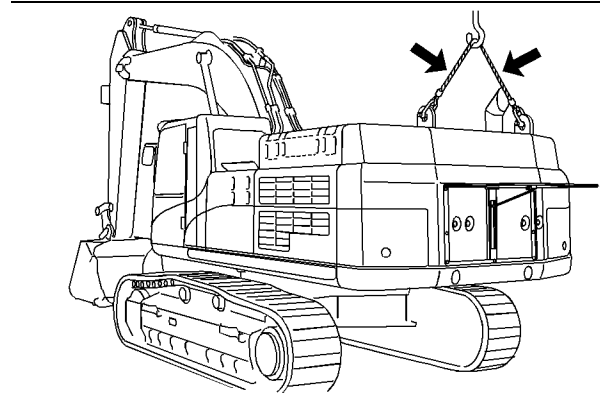


Illustration 289

g01430963

5. Fasten a proper rated cable with shackles to the brackets. Use an appropriate lifting device in order to tension the cable.
6. Lift the counterweight enough so that there is no load on the retaining bolts. Removing the bolts is difficult if the cable is too tight. Removing the bolts is difficult if the cable is too loose.

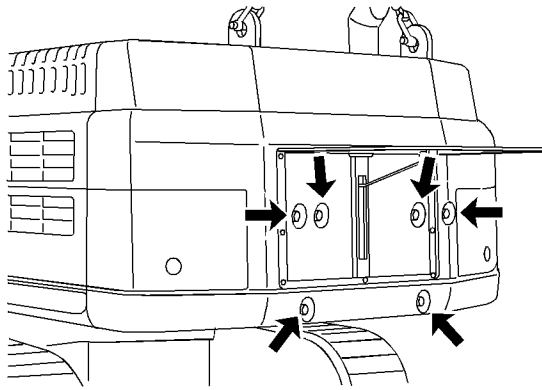


Illustration 290

g01230848

7. Remove the six counterweight mounting bolts and six washers.

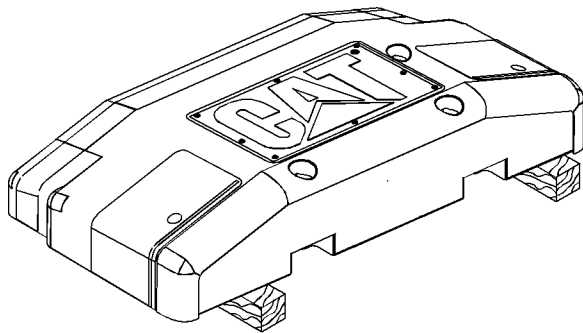


Illustration 291

g01430966

8. Separate the counterweight from the machine.
Lower the counterweight onto suitable supports.

Counterweight Installation

Perform the installation procedure in reverse order.

Note: Temporarily tighten the six counterweight mounting bolts. Decrease the tension on the lifting cable. Make sure that the counterweight is correctly positioned on the retaining pins. Tighten the bolts to a torque of 2700 ± 300 N·m (1990 ± 220 lb ft).

Note: After the counterweight has been installed, reconnect the wiring for the rear view camera. Refer to Operation and Maintenance Manual, "Camera Harness - Disconnect and Connect" for more information.

Counterweight Removal and Installation for Machines with Endless Links

Counterweight Removal

WARNING

Unexpected machine movement can cause injury or death.

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

WARNING

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

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

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

WARNING

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

Note: Before you remove the counterweight, disconnect the wiring for the rear view camera. Refer to Operation and Maintenance Manual, "Camera Harness - Disconnect and Connect" for more information.

1. Position the machine on a surface that is hard and level. Lower the work tool to the ground.
2. Move the hydraulic lockout control to the LOCKED position.



Illustration 292

g02809156

3. Fasten a proper rated cable with shackles to the links. Use an appropriate lifting device in order to tension the cable.

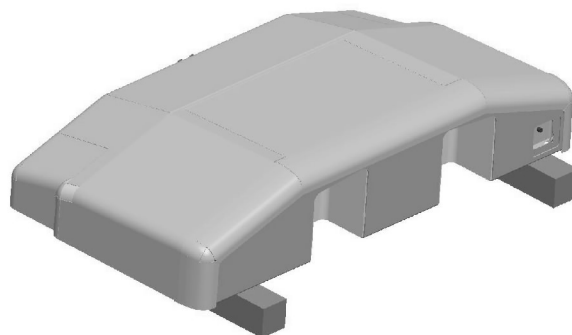


Illustration 294

g02809158

5. Separate the counterweight from the machine.
Lower the counterweight onto suitable supports.

Counterweight Installation

Perform the installation procedure in reverse order.

Note: Temporarily tighten the eight counterweight mounting bolts. Decrease the tension on the lifting cable. Make sure that the counterweight is correctly positioned on the retaining plates. Tighten the bolts to a torque of $2800 \pm 350 \text{ N}\cdot\text{m}$ ($2065 \pm 260 \text{ lb}\cdot\text{ft}$).

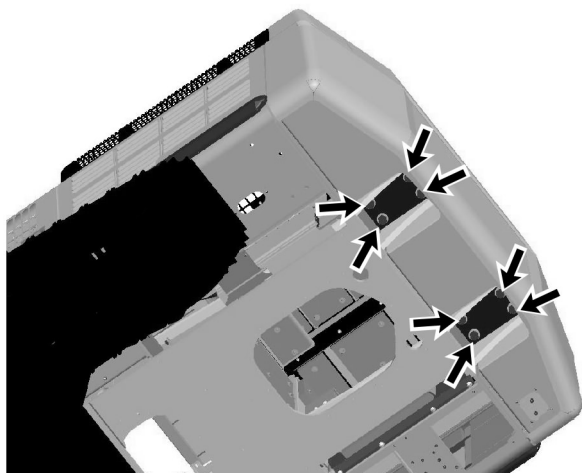


Illustration 293

g02809157

4. The counterweight mounting bolts are located on the bottom of the counterweight. Remove the eight counterweight mounting bolts and eight washers.

Note: After the counterweight has been installed, reconnect the wiring for the rear view camera. Refer to Operation and Maintenance Manual, "Camera Harness - Disconnect and Connect" for more information.

i03998268

Lifting and Tying Down the Machine

SMCS Code: 7000; 7500

Preferred Method

Spreader Bar

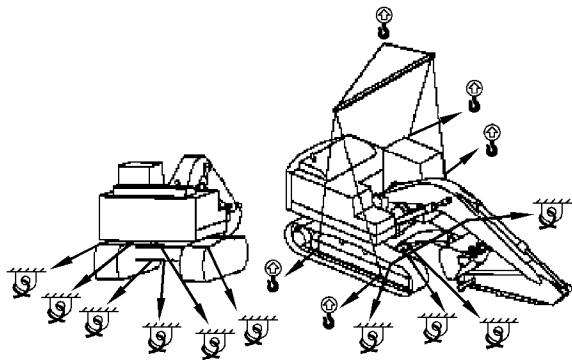


Illustration 295

g02175782

WARNING

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

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

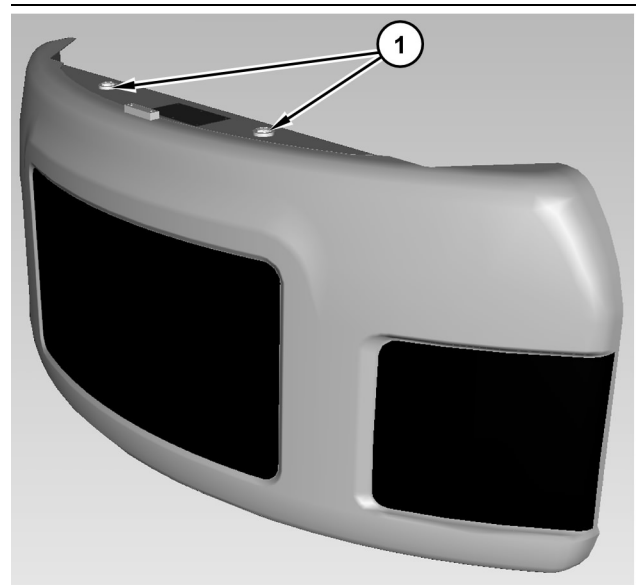


Illustration 296

g02161694

This lifting method is the preferred method to be used for all machines. This method is the only method acceptable on machines that are equipped with threaded bosses (1) located on the counterweight.

Note: The threaded bosses must only be used to remove the counterweight. These bosses will not support the weight of the machine.

Note: The shipping weight that is listed is the weight of the most common configuration of the machine. If attachments have been installed on your machine, the weight of your machine and the center of gravity of your machine may vary.

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

1. Use correctly rated cables and slings for lifting.
The crane should be positioned so that the machine is lifted parallel to the ground.
2. To prevent contact with the machine, lifting cables should have sufficient length.
3. The width of the spreader bar and the strength of the spreader bar should be sufficient to prevent contact with the machine.

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

4. Move the lever for the hydraulic lockout control to the LOCKED position.

Note: Never use the step as a lifting point for lifting the machine.

Additional Method (If Equipped)

Rear Eyes and Front Eyes

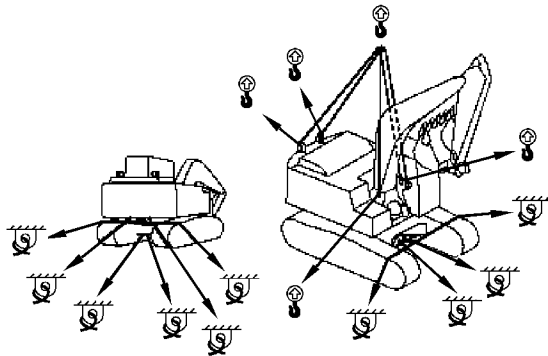


Illustration 297

g02175805

WARNING

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

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

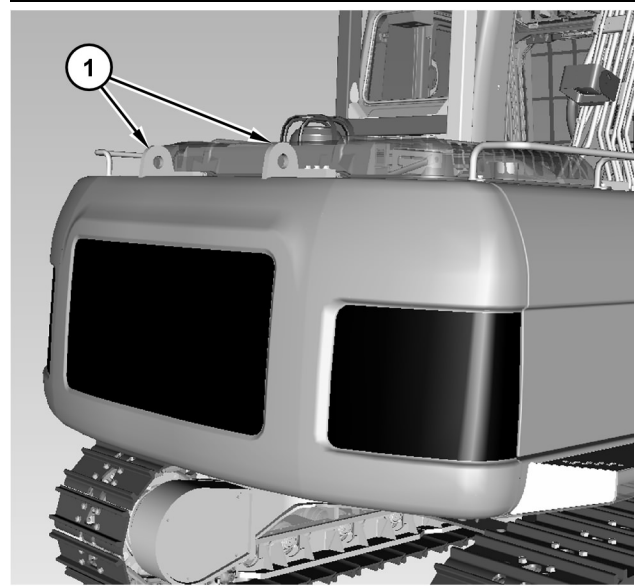


Illustration 298

g02161689

This lifting method can only be used as an alternative on machines that are equipped with lifting eyes (1) located on the counterweight.

Note: The shipping weight that is listed is the weight of the most common configuration of the machine. If attachments have been installed on your machine, the weight of your machine and the center of gravity of your machine may vary.

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

1. Use proper rated cables and slings for lifting. The crane should be positioned so that the machine is lifted parallel to the ground.
2. To prevent contact with the machine, lifting cables should have sufficient length.
3. Use the rear eyes and the front eyes that are provided on the lower frame to fasten tie-downs. Use corner protectors for sharp corners.

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

Lifting the Machine Segments

Bucket

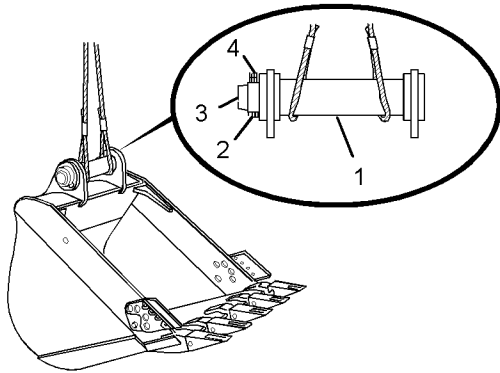


Illustration 299

g01587173

- (1) Sleeve
- (2) Bolts
- (3) Pin
- (4) Nuts

Install pin (3) and install sleeve (1) in the brackets of the bucket. The previous illustration indicates the method to secure pin (3) with bolts (2) and nuts (4). Fasten two proper rated wire cables to pin (3).

Note: Never use the step as a lifting point for lifting the machine.

Towing Information

i04233071

Towing the Machine

SMCS Code: 7000

WARNING

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

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

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

Relieve the hydraulic tank and line pressure before any disassembly.

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

NOTICE

To tow the machine, both final drives must be disengaged.

Do not operate the travel motors with the final drives disengaged. Damage could result.

These towing instructions are for moving a disabled machine for a short distance at low speed. Move the machine at a speed of 2 km/h (1.2 mph) or less to a convenient location for repair. Always haul the machine if long distance moving is required.

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

Do not allow an operator to be on the machine that is being towed.

Before you tow the machine, make sure that the tow line or the tow bar is in good condition. Make sure that the tow line or the tow bar has enough strength for the towing procedure that is involved. The strength of the tow line or of the tow bar should be at least 150 percent of the gross weight of the towing machine. This requirement is for a disabled machine that is stuck in the mud and for towing on a grade.

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

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

Keep the tow line angle to a minimum. Do not exceed a 30 degree angle from the straight ahead position.

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

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

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

Do not tow a loaded machine.

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

Parking Brake Release

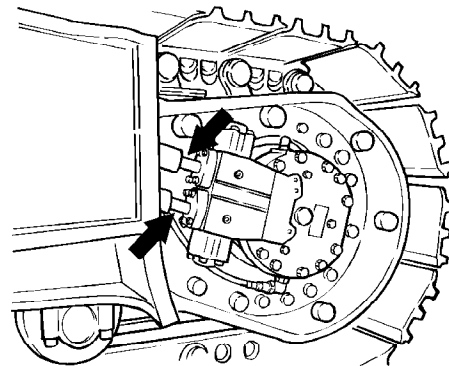


Illustration 300

g00692529

1. Remove the travel drive covers from the base frame.

2. Clean the travel motors, travel brake valves, and nearby areas.
3. Disconnect the hydraulic lines from the brake valve. Plug the disconnected line.

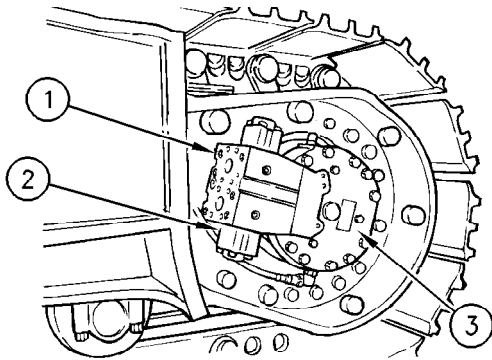


Illustration 301

g00692530

4. Loosen bolts (1). Remove brake valve (2) from travel motor (3).

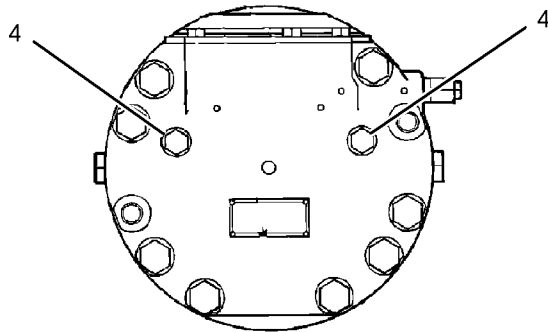


Illustration 302

g02409157

5. Remove plugs (4).

Table 111

Washer Dimensions			
Callout	Inner diameter (I.D.)	Outer Diameter (O.D.)	Thickness
(5)	11 mm (0.43 inch)	25 mm (0.98 inch)	3 mm (0.12 inch)
(6)	11 mm (0.43 inch)	19 mm (0.75 inch)	6 mm (0.24 inch)
Bolt			
(7)	M8 x 1.25 x 90 mm		

6. Install one washer (5) in each hole.
7. Install one washer (6) on top of each washer (5).

8. Insert one M8 x1.25 x 90 mm bolt (7) into each hole and tighten until snug against the washers and travel motor head.
9. Alternately turn each bolt one half turn until each bolt has been rotated two turns.

Note: If longer bolts are used, install the appropriate thicker washers in order to maintain required spacing.

⚠ WARNING

Brake valve cover (9) is forced by spring (11). It can fly apart suddenly when the mounting bolts are removed. Take extra care when removing cover (9).

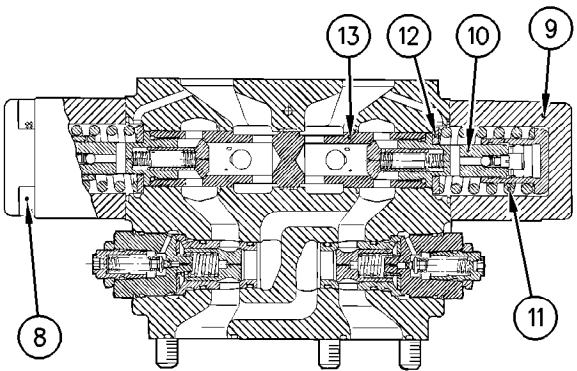


Illustration 303

g00692532

10. Remove bolts (8) in order to remove cover (9) of brake valve (2). To remove bolts (8), remove the two bolts that are separated by 180 degrees. Install two replacement M12 bolts in the removed bolt holes. Tighten the bolts.
11. Remove the remaining two bolts (8). Slowly remove the replacement M12 bolts.
12. Remove bushing (10), spring (11), washer (12) and spool (13) from the brake valve.
13. Install cover (9) to the valve body. Tighten bolts (8).

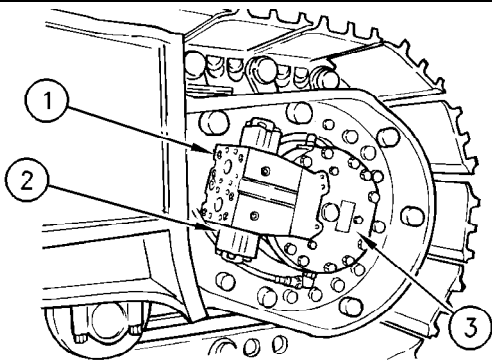


Illustration 304 g00692530

14. Install brake valve (2) to motor (3) with bolts (1). Reconnect the two lines to brake valve (2).
15. Repeat Steps 1 through 14 for the other travel motor.
- Note:** The parking brake has now been released. The machine is ready for towing.
16. After the machine has been towed, return the brake and the brake valve to the original condition. Verify that the brake and the brake valve activate correctly.

Table 112

Item Number	Part	Recommended Torque	
		N·m	lb ft
(1)	Bolt	100 ± 20	74 ± 10

(continued)

(Table 112, contd)

Item Number	Part	Recommended Torque	
		N·m	lb ft
(8)			

Retrieval of Machine

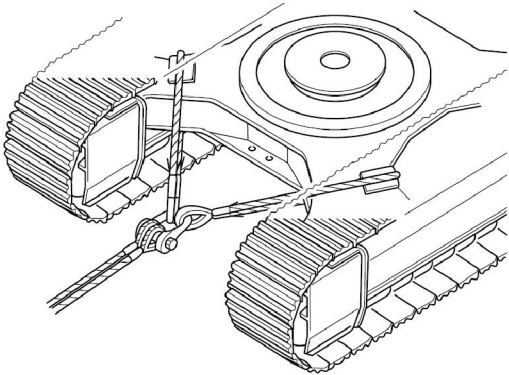


Illustration 305 g01954141

- Note:** Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.
- Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. The permissible force for the lower frame is 100 percent of the gross weight of the towed machine.
- Note:** In order to prevent damage to the wire rope or the lower frame of the machines, use protective sleeves on the corners of the lower frame.
- Retrieve the disabled machine carefully. The applied load for each wire rope should be equal. Operate the machine at a low speed.

Engine Starting (Alternate Methods)

i05974849

Engine Starting with Jump Start Cables (If Equipped)

SMCS Code: 1000; 7000

WARNING

Failure to properly service the batteries may cause personal injury.

Prevent sparks near the batteries. They could cause vapors to explode. Do not allow the jump start cable ends to contact each other or the machine.

Do not smoke when checking battery electrolyte levels.

Electrolyte is an acid and can cause personal injury if it contacts 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

To prevent damage to engine bearings and to electrical circuits when you jump-start a machine, do not allow the stalled machine to touch the machine that is used as the electrical source.

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

Use only equal voltage for starting. Check the battery and starter voltage rating of your machine. Use only the same voltage for jump starting. Use of a welder or higher voltage will damage the electrical system.

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.

Refer to Special Instruction, SEHS7633, "Battery Test Procedure" for complete testing and charging information. This publication is available from your Cat dealer.

When the auxiliary start receptacles are not available, use the following procedure.

1. Lower the equipment to the ground. Move all controls to the HOLD position. Move the hydraulic lockout control to the LOCKED position.
2. Turn the start switch on the stalled machine to the OFF position. Turn off all accessories.
3. Turn the battery disconnect switch on the stalled machine to the ON position.
4. Move the machine that is being used as an electrical source near the stalled machine so that the jump-start cables reach the stalled machine.
Do not allow the machines to contact each other.
5. Stop the engine of the machine that is being used as an electrical source. If you are using an auxiliary power source, turn off the charging system.
6. Ensure that battery caps on both machines are tight and correctly placed. Ensure that batteries in the stalled machine are not frozen. Make sure that the batteries have enough electrolyte.

Note: The positive terminal of the 24 V system of the source and the negative terminal of the 24 V system of the source must be identified correctly before the jumper cables are connected. The positive terminal of the 24 V system of the discharged battery must be identified correctly before the jumper cables are connected.

7. The positive ends of the jump-start cable are red. Connect one positive end of the jump-start cable to the positive cable terminal of the discharged battery. Some machines have battery sets.

Note: Batteries that are in series may be in separate compartments. Use the terminal that is connected to the starter solenoid. This battery or battery set is normally on the same side of the machine as the starter.

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

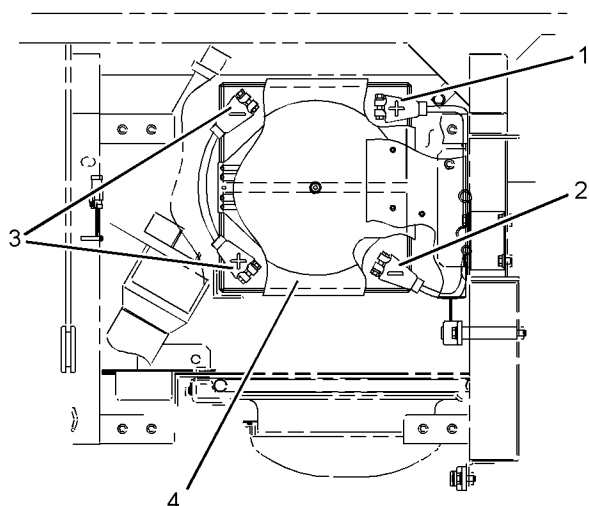


Illustration 306

g01226420

Typical example of the location of the batteries in an excavator

- (1) Red positive post to starter
- (2) The black negative post connects to the battery disconnect switch.
- (3) Do not use these two connections for jump starting. The red positive post is connected in series to the black negative post.
- (4) Cover

8. Connect the other positive end of the jump-start cable to the positive cable terminal of the electrical source.
9. Connect one negative end of the jump-start cable to the negative cable terminal of the electrical source.
10. Finally, connect the other negative end of the jump-start cable to the frame of the stalled machine. Do not connect the jump-start cable to the battery post. Do not allow the jump-start cables to contact the battery cables, the fuel lines, the hydraulic lines, or any moving parts.

11. Start the engine of the machine that is being used as an electrical source or energize the charging system on the auxiliary power source.
12. Wait at least two minutes before you attempt to start the stalled machine. This will allow the batteries in the stalled machine to partially charge.
13. Attempt to start the stalled engine. See Operation and Maintenance Manual, "Engine Starting" for the correct starting procedure.
14. Immediately after you start the stalled engine, disconnect the jump-start cables in reverse order.

i06697121

Engine Starting with Auxiliary Start Receptacle (If Equipped)

SMCS Code: 1000; 7000

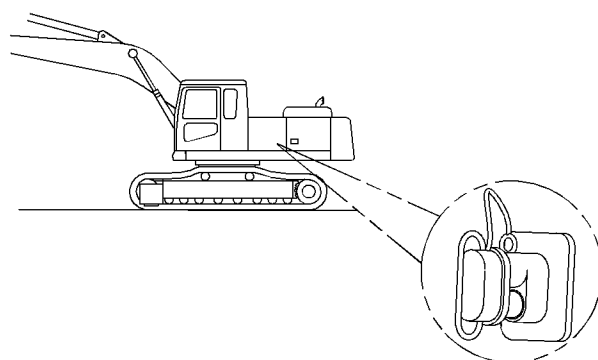


Illustration 307

g01122769

Typical location

Some Caterpillar products may be equipped with an auxiliary start receptacle as a standard part. If your machine is not equipped with an auxiliary start receptacle, the machine can be equipped with an auxiliary start receptacle from parts service. This will ensure that a permanent receptacle is always available to jump-start the machine.

There are two cable assemblies that can be used to jump-start the stalled machine. You can jump-start the stalled machine from another machine that is equipped with an auxiliary start receptacle or with an auxiliary power pack. Your Caterpillar dealer can provide the correct cable lengths for your application.

1. Determine the reason that the engine will not start.

Reference: Refer to Special Instruction, SEHS7633, "Battery Test Procedure" for more information.

2. Ensure that the travel control levers on the stalled machine are in the CENTER position. Engage the hydraulic lockout control. Lower all work tools to the ground. Move all controls to HOLD.
3. Turn the engine start switch key on the stalled machine to the OFF position. Turn off all accessories.
4. Turn the battery disconnect switch on the stalled machine to ON.
5. Move the machine that is being used as a power source close to the stalled machine. The jump-start cables should reach the batteries on both machines. **DO NOT ALLOW THE MACHINES TO CONTACT EACH OTHER.**
6. Stop the engine on the machine that is being used as a power source. If you use an auxiliary power source, turn off the charging system.
7. Connect the appropriate jump-start cable to the auxiliary start receptacle on the stalled machine.
8. Connect the other end of the jump-start cable to the auxiliary start receptacle of the machine that is being used as a power source.
9. Start the engine on the machine that is being used as a power source or energize the charging system on the auxiliary power source.
10. Wait for a minimum of 2 minutes while the batteries in the stalled machine partially charge.
11. Attempt to start the stalled engine.
12. Immediately after the stalled engine starts, disconnect the jump-start cable from the power source.
13. Disconnect the other end of the jump-start cable from the stalled machine.
14. Conclude the failure analysis on the starting charging system of the stalled machine, as required. Check the machine while the engine is running and the charging system is in operation.

Maintenance Section

Maintenance Access

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Access Door and Cover Locations

SMCS Code: 726A-CH

Engine Hood

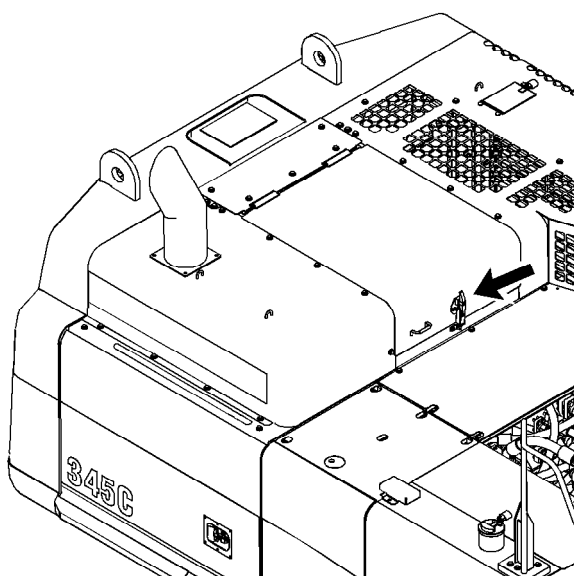


Illustration 308

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Left Rear Access Door

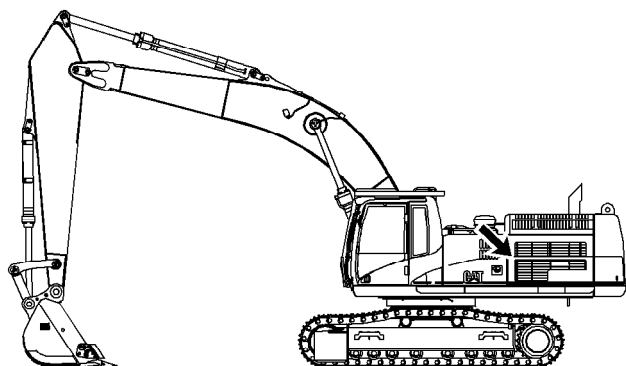


Illustration 309

g01070536

Left Front Access Door

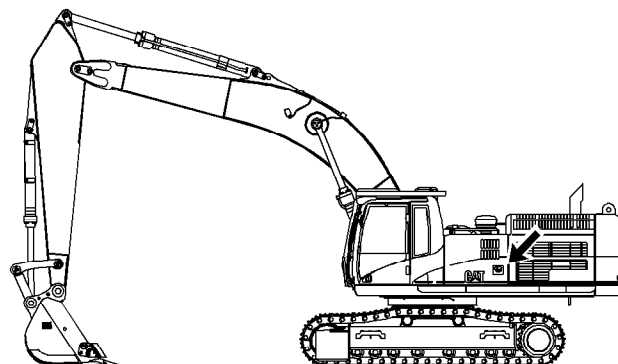


Illustration 310

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Right Access Door

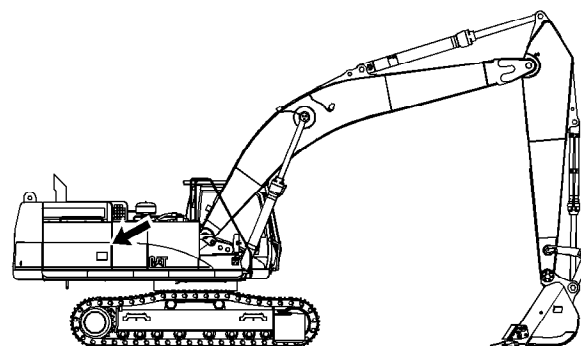


Illustration 311

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Lubricant Viscosities and Refill Capacities

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Lubricant Viscosities (Fluids Recommendations)

SMCS Code: 7581

General Information for Lubricants

When you are operating the machine in temperatures below -20°C (-4°F), refer to Special Publication, SEBU5898, "Cold Weather Recommendations". This publication is available from your Cat dealer.

Refer to the "Lubricant Information" section in the latest revision of the Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for a list of Cat engine oils and for detailed information. This manual may be found on the web at Safety.Cat.com.

The footnotes are a key part of the tables. Read ALL footnotes that pertain to the machine compartment in question.

Selecting the Viscosity

To select the proper oil for each machine compartment, refer to the "Lubricant Viscosity for Ambient Temperature" table. Use the oil type AND oil viscosity for the specific compartment at the proper ambient temperature.

The proper oil viscosity grade is determined by the minimum ambient temperature (the air in the immediate vicinity of the machine). Measure the temperature when the machine is started and while the machine is operated. To determine the proper oil viscosity grade, refer to the "Min" column in the table. This information reflects the coldest ambient temperature condition for starting a cold machine and for operating a cold machine. Refer to the "Max" column in the table for operating the machine at the highest temperature that is anticipated. Unless specified otherwise in the "Lubricant Viscosities for Ambient Temperatures" tables, use the highest oil viscosity that is allowed for the ambient temperature.

Machines that are operated continuously should use oils that have the higher oil viscosity. The oils that have the higher oil viscosity will maintain the highest possible oil film thickness. Refer to "General Information for Lubricants" article, "Lubricant Viscosities" tables, and any associated footnotes. Consult your Cat dealer if additional information is needed.

NOTICE

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

Engine Oil

Cat oils have been developed and tested in order to provide the full performance and life that has been designed and built into Cat engines.

Cat DEO-ULS 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.

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

Table 113

Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance Requirements	Oil Viscosities	°C		°F	
			Min	Max	Min	Max
Engine Crankcase	Cat DEO-ULS Cold Weather	SAE 0W-40	-40	40	-40	104
	Cat DEO-ULS 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
Pump Coupling (If Equipped)	Cat DEO-ULS Cat DEO	SAE 10W-30	-18	40	0	104

Note: API engine oil categories are backwards compatible. Cat DEO-ULS (API CK-4) oil can be used in all engines with some restrictions related to fuel sulfur level. Cat DEO (API CI-4/API CI-4 PLUS) can be used in engines that are Tier 3 emissions certified and prior, and in engines that do not use aftertreatment devices.

Hydraulic Systems

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

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

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

Cat HYDO Advanced oils allow 6000 hours or higher oil drain intervals for most applications. S·O·S Services oil analysis is recommended when the oil drain interval is increased to 6000 hours or higher. In comparison, non-Cat commercial hydraulic oils (second choice oils) allow 2000 hours oil drain interval. It is recommended to 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. Consult your Cat dealer for details. When switching to Cat HYDO Advanced fluids, cross contamination with the previous oil should be kept to less than 10%.

Second choice oils are listed below.

- Cat MTO
- Cat DEO
- Cat DEO-ULS

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

Note: Oil drain intervals of the oils listed above are less than those of Cat HYDO Advanced oils. The oil drain interval of these oils is typically 2000 hours and up to a maximum of 4000 hours. An exception is Cat TDTO Cold Weather oil which allows 6000 hours or higher oil drain interval. S·O·S Services oil analysis is required when the oils listed above are used in Cat hydraulic system components and hydrostatic transmissions.

Table 114

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

Other Fluid Applications

Table 115

Excavators, Front Shovels, Mass Excavators, Demolition Excavators, and Track Material Handlers Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance Requirements	Oil Viscosity Grade	°C		°F	
			Min	Max	Min	Max
Final Drives and Swing Drives	Cat TDTO Cat TDTO-TMS Cat TDTO SYN Cold Weather commercial TO-4	SAE 0W-20	-40	0	-40	32
		SAE 0W-30	-40	10	-40	50
		SAE 5W-30	-30	10	-22	50
		SAE 10W	-30	0	-22	32
		SAE 30	-25	25	-13	77
		SAE 50	-15	50	5	122
		Cat TDTO-TMS	-30	25	-22	77
Track Roller Frame Recoil Spring and Pivot Shaft Bearings	Cat TDTO Cat TDTO-TMS Cat TDTO SYN Cold Weather commercial TO-4	SAE 0W-20	-40	0	-40	32
		SAE 0W-30	-40	10	-40	50
		SAE 5W-30	-35	0	-31	32
		SAE 10W	-30	0	-22	32
		SAE 30	-20	25	-4	77
		SAE 40	-10	40	14	104
		SAE 50	0	50	32	122
		Cat TDTO-TMS	-25	25	-13	77

(continued)

(Table 115, contd)

Excavators, Front Shovels, Mass Excavators, Demolition Excavators, and Track Material Handlers Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance Requirements	Oil Viscosity Grade	°C		°F	
			Min	Max	Min	Max
Track Idlers and Track Rollers	Cat DEO (single grade) Cat DEO SYN Cat DEO-ULS SYN	SAE 30	-20	25	-4	77
	Cat ECF-1-a Cat ECF-2 Cat ECF-3 API CF	SAE 5W-40	-35	40	-31	104

Table 116

Excavators, Front Shovels, Mass Excavators, Demolition Excavators, and Track Material Handlers Lubricant Viscosities for Ambient Temperatures						
Compartment or System	Oil Type and Performance Requirements	Oil Viscosity Grade	°C		°F	
			Min	Max	Min	Max
Variable Pitch Flexxaire Fan (If Equipped)	Cat Full Synthetic Multi-grade DEO commercial Full Synthetic Multigrade Diesel Engine Oil meeting either Cat ECF-1 or API CG-4	SAE 0W40 ⁽¹⁾	-40	50	-40	122
		SAE 5W40 ⁽¹⁾	-40	50	-40	122
	Caterpillar Non-Synthetic TO-4	SAE 30 ⁽²⁾	-15	25	-5	77
		SAE 50 ⁽²⁾	-10	50	14	122

(1) This is the first choice. Full synthetic oils are recommended. Synthetic oils may provide longer service life for the fan. Synthetic oils allow for increased service intervals over non-synthetic oils.

(2) This is the second choice. Caterpillar TDTO is acceptable. Commercial oils that meet the TO-4 specification are also acceptable. TDTO is non-synthetic. Commercial TO-4 oils are typically non-synthetic.

Special Lubricants

Grease

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 117

Recommended Grease						
Compartment or System	Grease Type	NLGI Grade	°C		°F	
			Min	Max	Min	Max
External Lubrication Points	Cat Prime Application Grease	NLGI Grade 2	-20	140	-4	284
	Cat Extreme Application Grease	NLGI Grade 1	-20	140	-4	284
		NLGI Grade 2	-15	140	+5	284

(continued)

(Table 117, contd)

Recommended Grease						
Compartment or System	Grease Type	NLGI Grade	°C		°F	
			Min	Max	Min	Max
	Cat Extreme Application Grease-Artic	NLGI Grade 0.5	-50	130	-58	266
	Cat Extreme Application Grease-Desert	NLGI Grade 2	-10	140	+14	284
	Cat Utility Grease	NLGI Grade 2	-20	140	-4	284
	Cat Ball Bearing Grease	NLGI Grade 2	-20	160	-4	320

Grease for the Autolube System (if Equipped)

The grease used with the automatic lubrication system must not contain any graphite or PTFE.

Note: Pumpability is based on “US Steel Mobility and Lincoln Ventmeter Tests”. Performance may vary depending on lubrication equipment and the length of the lines.

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

Table 118

Recommended Grease for the Autolube System						
Compartment or System	Grease Type	NLGI Grade	°C		°F	
			Min	Max	Min	Max
Cat Autolube System	Cat Extreme Application Grease	NLGI Grade 1	-35	40	-31	104
		NLGI Grade 2	-30	50	-22	122

Diesel Fuel Recommendations

Diesel fuel must meet “Caterpillar Specification for Distillate Fuel” and the latest versions of “ASTM D975” or “EN 590” to ensure optimum engine performance. Refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” for the latest fuel information and for Cat fuel specification. This manual may be found on the web at Safety.Cat.com.

The preferred fuels are distillate fuels. These fuels are commonly called diesel fuel, furnace oil, gas oil, or kerosene. These fuels must meet the “Caterpillar Specification for Distillate Diesel Fuel for Off-Highway Diesel Engines”. Diesel Fuels that meet the Caterpillar specification will help provide maximum engine service life and performance.

Misfueling with fuels of high sulfur level can have the following negative effects:

- Reduce engine efficiency and durability

- Increase the wear
- Increase the corrosion
- Increase the deposits
- Lower fuel economy
- Shorten the time period between oil drain intervals (more frequent oil drain intervals)
- Increase overall operating costs
- Negatively impact engine emissions

Failures that result from the use of improper fuels are not Caterpillar factory defects. Therefore the cost of repairs would not be covered by a Caterpillar warranty.

Caterpillar does not require the use of ULSD in off road and machine applications that are not Tier 4/ Stage IIIB certified engines. ULSD is not required in engines that are not equipped with after treatment devices.

Follow operating instructions and fuel tank inlet labels, if available, to ensure that the correct fuels are used.

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more details about fuels and lubricants. This manual may be found on the web at Safety.Cat.com.

Fuel Additives

Cat Diesel Fuel Conditioner and Cat Fuel System Cleaner are available for use when needed. These products are applicable to diesel and biodiesel fuels. Consult your Cat dealer for availability.

Biodiesel

Biodiesel is a fuel that can be made from various renewable resources that include vegetable oils, animal fat, and waste cooking oil. Soybean oil and rapeseed oil are the primary vegetable oil sources. 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.

When biodiesel fuel is used, certain guidelines must be followed. Biodiesel fuel can influence the engine oil, aftertreatment devices, non-metallic, fuel system components, and others. Biodiesel fuel has limited storage life and has limited oxidation stability. Follow the guidelines and requirements for engines that are seasonally operated and for standby power generation engines.

To reduce the risks associated with the use of biodiesel, the final biodiesel blend and the biodiesel fuel used must meet specific blending requirements.

Capacities (Refill)

SMCS Code: 1000; 7000

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.

i05807997

Table 119

Approximate Refill Capacities			
Component or System	Liters	US gal	Recommended Type
Fuel Tank	705	186	Refer to Operation and Maintenance Manual, "Lubricant Viscosities".
Cooling System	35.5	9.4	
Coolant Reservoir	4.5	1.2	
Engine Crankcase with Filter	40	10.5	
Hydraulic System ⁽¹⁾	262	69	
Each Swing Drive	10	2.6	
Each Final Drive	15	4	
Pump Coupling	0.6	0.16	SAE 10W-30
	kg	lbs	
Swing Gear	43	94.8	Refer to Operation and Maintenance Manual, "Lubricant Viscosities".
Refrigerant ⁽²⁾	0.9	2.0	R-134a

(1) The amount of hydraulic fluid that is needed to refill the hydraulic system after performing Operation and Maintenance Manual, "Hydraulic System Oil - Change"

(2) Refer to Service Manual, "Air Conditioning and Heating R-134a for All Caterpillar Machines" for additional information

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S·O·S Information

SMCS Code: 1000; 1348; 3080; 4050; 5050; 7000; 7542-008

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

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

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

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

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

Maintenance Support

i07245353

System Pressure Release

SMCS Code: 1250-553-PX; 1300-553-PX; 1350-553-PX; 5050-553-PX; 6700-553-PX; 7540-553-PX

WARNING

Personal injury or death can result from sudden machine movement.

Sudden movement of the machine can cause injury to persons on or near the machine.

To prevent injury or death, make sure that the area around the machine is clear of personnel and obstructions before operating the machine.

Coolant System

WARNING

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

To relieve the pressure from the coolant system, turn off the machine. Allow the cooling system pressure cap to cool. Remove the cooling system pressure cap slowly to relieve pressure.

Hydraulic System

The release of hydraulic pressure in a hydraulic circuit is required before service is performed to that hydraulic circuit. Release the pressure in the following hydraulic circuits before any service associated with that hydraulic circuit is performed.

- Boom hydraulic circuit
- Stick hydraulic circuit
- Bucket hydraulic circuit
- Swing hydraulic circuit
- Travel hydraulic circuit
- Attachment hydraulic circuits (if equipped)
- Pilot hydraulic circuit
- Return hydraulic circuit

Note: Refer to the Disassembly and Assembly Manual for additional information concerning service of the components of specific hydraulic circuits.

Release of Hydraulic Pressure from the Main 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 work tools have been lowered to the ground, and the oil is cool before performing any service. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat® products.

Dispose of all fluids according to local regulations and mandates.

Perform the following steps to release the hydraulic system pressure from the main hydraulic system. For information on any fluids and capacities, refer to this Operation and Maintenance Manual, "Lubricant Viscosities" and "Capacities (Refill)" for more information.

Note: For additional safety, wrap hydraulic joint with material that could absorb/reduce any residual pressure of oil when released. Loosen the joint slowly, pause, and carefully check hydraulic joint for tensions indicating presence of pressure or spring force in lines or components.

1. Position the machine on level ground.

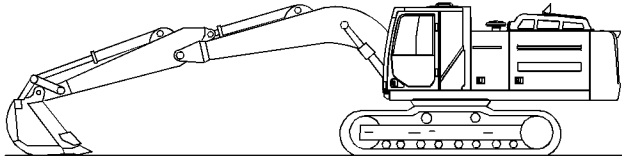


Illustration 312

g02137969

2. Fully retract the stick cylinder rod. Adjust the position of the linkage so that the work tool is parallel to the ground. Lower the boom until the work tool is flat on the ground. Refer to Illustration 312.

3. Release the system pressure from the implement and swing hydraulic circuits.

a. Shut off the engine.

Note: Perform Step 3b through Step 3d immediately after the engine is shut off to insure adequate pilot system pressure is available to release the pressure in the hydraulic circuits.

b. Turn the engine start switch to the ON position without starting the engine.

c. Place the hydraulic activation control lever in the UNLOCKED position.

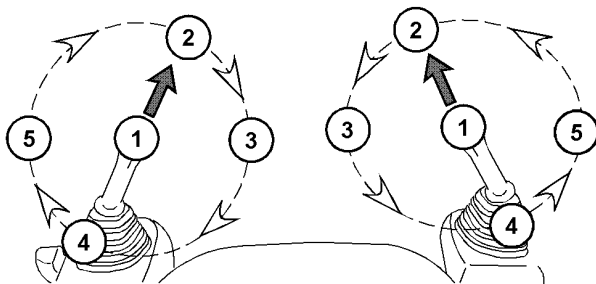


Illustration 313

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d. Move both joysticks in a circular motion to the FULL STROKE positions multiple times until the pilot accumulator has been exhausted.

Note: Pilot pressure is required to relieve hydraulic system pressure.

e. Place the hydraulic activation control lever in the LOCKED position.

f. Start the engine to recharge pilot accumulator.

Note: Do not activate any levers when recharging pilot accumulator.

g. Shut off the engine.

h. Repeat Step 3b through Step 3g until the high-pressure lines have been released.

Each time the accumulator is recharged, start the joysticks at different positions or rotate in the reverse direction. Doing so will ensure that the same circuit is not being relieved each time.

Note: To release pressure in a single circuit, move the joysticks or pedals of the hydraulic circuit that requires service to the full stroke positions after moving joysticks in a circular motion. Moving the joysticks or pedals to the full stroke position will release the high pressure only in that single hydraulic circuit. Moving the joysticks or pedals to the full stroke position will also release any pressure that might be present in the pilot hydraulic circuit.

4. Release hydraulic system pressure in the attachment circuits, if equipped.

a. Start the engine to charge pilot accumulator.

b. Shut off the engine.

Note: Perform Step 4c through Step 4e immediately after the engine is shut off to insure adequate pilot system pressure is available to release the pressure in the hydraulic circuits.

c. Turn the engine start switch to the ON position without starting the engine.

d. Place the hydraulic activation control lever in the UNLOCKED position.

e. Activate the switch or pedal for the attachment circuit.

f. Place the hydraulic activation control lever in the LOCKED position.

g. Start the engine to recharge pilot accumulator.

Note: Do not activate any pedals or switches when recharging pilot accumulator.

h. Shut off the engine.

i. Repeat Step 4a through Step 4h for each attachment circuit.

- 5. After releasing the hydraulic pressure in each of the desired hydraulic circuits, place the hydraulic activation control lever in the LOCKED position.
 - 6. Turn the engine start switch to the OFF position.
 - 7. Slowly loosen the filler plug on the hydraulic tank and release the pressure from the hydraulic tank. Leave the filler plug loose for a minimum of 45 seconds. This will release the pressure that may be present in the return hydraulic circuit.
 - 8. Tighten the filler plug on the hydraulic tank to the specified torque.
- Note:** The travel hydraulic circuit is open to the hydraulic tank. Pressure from the travel circuit is released by releasing pressure from the return circuit.
9. Release the pressure that may be present in the boom circuit to remove the risk of residual pressure in the line. Make sure that the engine start switch is in the OFF position and the pressure in the hydraulic tank has been released.

For machines equipped with a boom lowering control valve, there is a manual valve located near the base of the boom or a valve on the load control valve on the boom cylinder. Refer to Operation and Maintenance Manual, Equipment Lowering with Engine StoppedMachine with a Boom Lowering Control Valve for more information.

For machines **NOT** equipped with a boom lowering control valve, refer to Operation and Maintenance Manual, Equipment Lowering with Engine StoppedMachine without a Boom Lowering Control Valve for more information.

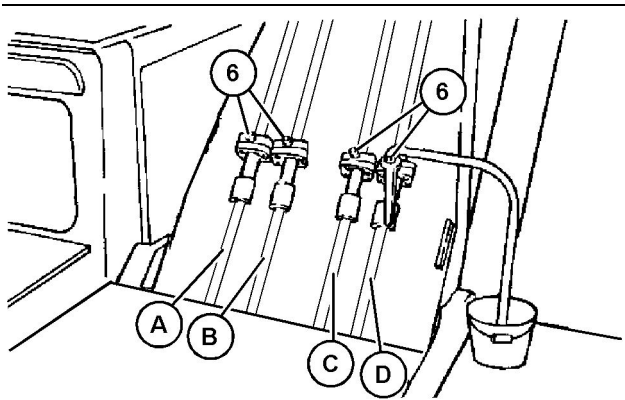


Illustration 314 g06234927

Stick and Bucket circuit locations

- (6) Purge Screws (If Equipped)
- (A) Circuit A
- (B) Circuit B
- (C) Circuit C
- (D) Circuit D

10. If the purge screws are equipped, perform the following pressure release procedure for each Stick and Bucket circuit. Refer to Illustration 314 and Table 120 for the stick and bucket circuit locations.

Table 120

Stick and Bucket Circuit Locations				
Sales Model	Circuits			
	A	B	C	D
326 / 329 / 330	Stick In	None	Stick Out	None
336 / 340	Bucket Close	Stick In	Stick Out	Bucket Open
349 / 352	Stick Out	Stick In	Bucket Close	Bucket Open

- a. Connect one end of a drain hose to purge screw (6). Insert the other end of the drain hose into an empty container.
 - b. Loosen purge screw (6) by 1/2 turn. Hydraulic oil will be drained from the drain hose to the container.
- Note:** Dispose of drained fluid according to local regulations.
- c. Tighten purge screw (6) to a torque of 13 +/- 2 Nm (9 +/- 1 lb ft) after all the hydraulic oil has been drained from the line.
 - d. Repeat Steps 10a through 10c for all circuits.
 - e. Remove the drain hose and install hydraulic tank fill cap.

11. The pressure in the multiple hydraulic circuits that require service is now released and lines and components can be disconnected or removed from those hydraulic circuits.

i07746333

Welding on Machines and Engines with Electronic Controls

SMCS Code: 1000; 7000

Do not weld on any protective structure. If it is necessary to repair a protective structure, contact your Cat dealer.

Proper welding procedures are necessary to avoid damage to the electronic controls and to the bearings. When possible, remove the component that must be welded from the machine or the engine and then weld the component. If you must weld near an electronic control on the machine or the engine, temporarily remove the electronic control to prevent heat related damage. The following steps should be followed to weld on a machine or an engine with electronic controls.

1. Turn off the engine. Place the engine start switch in the OFF position.
2. If equipped, turn the battery disconnect switch to the OFF position. If there is no battery disconnect switch, remove the negative battery cable at the battery.

NOTICE

Do NOT use electrical components (ECM or sensors) or electronic component grounding points for grounding the welder.

3. Clamp the ground cable from the welder to the component that will be welded. Place the clamp as close as possible to the weld. Make sure that the electrical path from the ground cable to the component does not go through any bearing. Use this procedure to reduce the possibility of damage to the following components:
 - Bearings of the drive train
 - Hydraulic components
 - Electrical components
 - Other components of the machine
4. Protect any wiring harnesses and components from the debris and the spatter which is created from welding.
5. Use standard welding procedures to weld the materials together.

i07777792

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 6000 hours. S·O·S services after 3000 hours is strongly recommended. Consult your Cat dealer for details.

When Required

" Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/Replace"	226
" Battery - Recycle"	226
" Battery or Battery Cable - Inspect/Replace"	226
" Boom Base Pins - Lubricate"	227
" Bucket Linkage - Inspect/Adjust"	230
" Bucket Tips - Inspect/Replace"	231
" Cab Air Filter (Fresh Air) - Clean/Replace"	234
" Cab Air Filter (Fresh Air) - Clean/Replace"	235
" Camera - Clean/Adjust"	236
" Circuit Breakers - Reset"	238
" Engine Air Filter Primary Element - Clean/Replace"	243
" Engine Air Filter Secondary Element - Replace"	246

" Engine Air Precleaner - Clean"	247
" Ether Starting Aid Cylinder - Replace"	251
" Film (Product Identification) - Clean"	253
" Fuel System - Prime"	255
" Fuses - Replace"	260
" High Intensity Discharge Lamp (HID) - Replace"	262
" Oil Filter - Inspect"	277
" Track Adjustment - Adjust"	286
" Window Washer Reservoir - Fill"	289
" Window Wiper - Inspect/Replace"	289
" Windows - Clean"	289

Every 10 Service Hours or Daily for First 100 Hours

" Boom, Stick and Bucket Linkage - Lubricate"	228
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Every 10 Service Hours or Daily

" Cooling System Coolant Level - Check"	241
" Engine Oil Level - Check"	247
" Fuel System Water Separator - Drain"	258
" Fuel Tank Water and Sediment - Drain"	259
" Hydraulic System Oil Level - Check "	273
" Indicators and Gauges - Test"	275
" Radiator Core - Clean"	279
" Seat Belt - Inspect"	280
" Track Adjustment - Inspect"	287
" Travel Alarm - Test"	288

“ Undercarriage - Check” 288

Every 10 Service Hours or Daily for Machines Used in Severe Applications

“ Boom, Stick and Bucket Linkage - Lubricate” . . 228

Every 50 Service Hours or Weekly

“ Boom, Stick and Bucket Linkage - Lubricate” . . 228

Every 100 Service Hours of Continuous Hammer Use

“ Hydraulic System Oil Filter (Case Drain) - Replace” 267

“ Hydraulic System Oil Filter (Pilot) - Replace” . . 268

“Oil Filter (Hydraulic Hammer) - Replace” 275

Initial 250 Service Hours

“ Engine Valve Lash and Fuel Injector Timing - Check” 251

“ Final Drive Oil - Change” 254

“ Hydraulic System Filter Element (Fine Filtration) - Replace” 262

“ Hydraulic System Oil Filter (Case Drain) - Replace” 267

“ Hydraulic System Oil Filter (Pilot) - Replace” . . 268

“ Hydraulic System Oil Filter (Return) - Replace” 269

“ Swing Drive Oil - Change” 282

Every 250 Service Hours

“Cooling System Coolant Sample (Level 1) - Obtain” 242

“ Engine Oil Sample - Obtain” 248

“ Final Drive Oil Sample - Obtain” 255

Every 250 Service Hours or Monthly

“ Belt - Inspect/Adjust/Replace” 227

“ Condenser (Refrigerant) - Clean” 239

“ Final Drive Oil Level - Check” 254

“ Swing Bearing - Lubricate” 281

“ Swing Drive Oil Level - Check” 283

Every 250 Service Hours of Partial Hammer Use (50% of Service Hours)

“ Hydraulic System Oil Filter (Case Drain) - Replace” 267

“ Hydraulic System Oil Filter (Pilot) - Replace” . . 268

“Oil Filter (Hydraulic Hammer) - Replace” 275

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

“Cooling System Coolant Sample (Level 2) - Obtain” 243

Every 500 Service Hours

“ Hydraulic System Oil Sample - Obtain” 274

“ Pump Coupling Oil Level - Check” 278

“ Swing Drive Oil Sample - Obtain” 284

Every 500 Service Hours or 3 Months

“ Engine Crankcase Breather - Clean” 247

“ Engine Oil and Filter - Change” 249

“ Fuel System Primary Filter (Water Separator) Element - Replace” 256

“ Fuel System Secondary Filter - Replace” 257

“ Fuel Tank Cap and Strainer - Clean” 259

“ Hydraulic System Filter Element (Fine Filtration) - Replace” 262

Every 600 Service Hours of Continuous Hammer Use

“ Hydraulic System Oil - Change” 263

“ Hydraulic System Oil Filter (Return) - Replace” 269

Every 1000 Service Hours or 6 Months

“ Battery - Clean” 226

“ Battery Hold-Down - Tighten” 226

“Hydraulic System Oil Filter (Case Drain) - Replace”	267
“Hydraulic System Oil Filter (Pilot) - Replace”	268
“Rollover Protective Structure (ROPS) - Inspect”	280
“Swing Drive Oil - Change”	282

Every 1000 Service Hours of Partial Hammer Use (50% of Service Hours)

“Hydraulic System Oil - Change”	263
“Hydraulic System Oil Filter (Return) - Replace”	269

Every 2000 Service Hours or 1 Year

“Engine Valve Lash and Fuel Injector Timing - Check”	251
“Engine Valve Rotators - Inspect”	251
“Final Drive Oil - Change”	254
“Hydraulic System Oil Filter (Return) - Replace”	269
“Receiver Dryer (Refrigerant) - Replace”	280

“Swing Gear - Lubricate”	285
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Every Year

“Cooling System Coolant Sample (Level 2) - Obtain”	243
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Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

“Seat Belt - Replace”	281
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Every 5000 Service Hours

“Pump Coupling Oil - Change”	277
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Every 5000 Service Hours or 3 Years

“Hydraulic System Oil (If Equipped with Fine Filtration Filter) - Change”	263
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Every 6000 Service Hours or 3 Years

“Cooling System Coolant Extender (ELC) - Add”	240
“Hydraulic System Oil - Change”	263

Every 12 000 Service Hours or 6 Years

“Cooling System Coolant (ELC) - Change”	239
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i06553710

i00934864

Air Conditioner/Cab Heater Filter (Recirculation) - Inspect/Replace

SMCS Code: 1054-040-A/C; 1054-510-A/C

NOTICE

An air recirculation filter element plugged with dust will result in decreased performance and service life to the air conditioner or cab heater.

To prevent decreased performance, clean the filter element, as required.

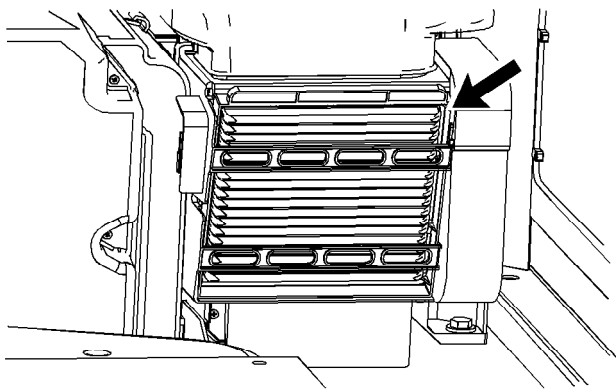


Illustration 315

g01100988

The air conditioner filter is located on the lower left side of the cab behind the seat.

1. Slide the operator seat forward.
2. Slide the filter element upward.
3. Tap the air filter against the palm of one's hand in order to remove the dirt. Do not use compressed air to clean the filter.
4. After you clean the filter element, inspect the filter element. If the filter element is damaged or badly contaminated, use a new filter element. Make sure that the filter element is dry.

Note: Ensure that the grating is at the rear of filter when installing the air filter.

5. Install the filter element.

NOTICE

Failure to reinstall the filter element for the air conditioning system will contaminate and damage the system components.

Battery - Clean

SMCS Code: 1401-070

Clean the battery surface with a clean cloth. Keep the terminals clean and keep the terminals coated with petroleum jelly. Install the post cover after you coat the terminal post with petroleum jelly.

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

i00934872

Battery Hold-Down - Tighten

SMCS Code: 7257

Tighten the hold-downs for the battery in order to prevent the batteries from moving during machine operation.

i04064489

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401-510; 1401-040; 1401; 1401-561; 1402-040; 1402-510

WARNING

Personal injury can result from battery fumes or explosion.

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

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

Always wear protective glasses when working with batteries.

1. Turn all of the switches to the OFF position. Turn the engine start switch key to the OFF position.
2. Turn the battery disconnect switch to the OFF position. Remove the key.
3. Disconnect the negative battery cable at the battery.
4. Disconnect the positive battery cable at the battery.
5. Disconnect the battery cables at the battery disconnect switch. The battery disconnect switch is connected to the machine frame.
6. Make necessary repairs or replace the battery.
7. Connect the battery cable at the battery disconnect switch.
8. Connect the positive battery cable of the battery.
9. Connect the negative battery cable of the battery.
10. Install the key and turn the battery disconnect switch to the ON position.

i02090963

Belt - Inspect/Adjust/Replace

SMCS Code: 1357-025; 1357-510; 1357-040; 1397-510; 1397-025; 1397-040

Note: This engine is equipped with a belt tightener that automatically adjusts the belt to the correct tension.

1. Unlatch the engine hood and raise the engine hood.
2. Inspect the belt for wear and for cracking.
3. If the belt requires replacement, perform Step 3a through Step 3c.

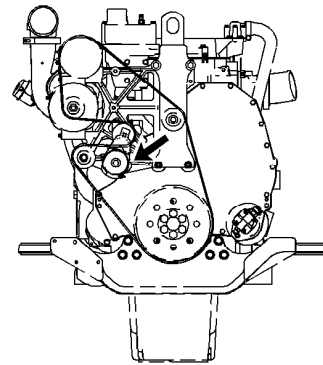


Illustration 316

g01066414

- a. Turn the belt tensioner in order to release the tension from the belt.
- b. Remove the belt.
- c. Install a new belt.
- d. Close the engine hood.

i03865131

Boom Base Pins - Lubricate

SMCS Code: 6501-086

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the boom linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on molybdenum grease.

When the boom pin is replaced, lubricate the new boom pin.

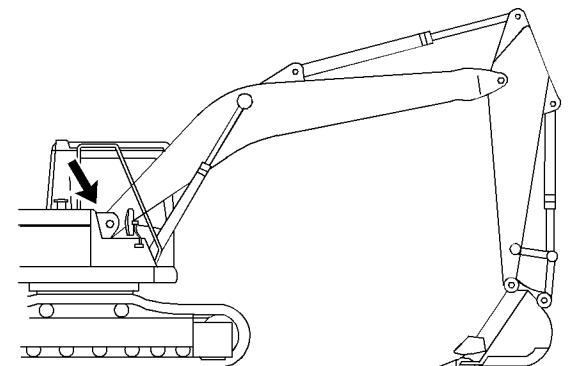


Illustration 317

g02108998

1. Park the machine on a level surface and lower the bucket to the ground.

Maintenance Section

Boom, Stick and Bucket Linkage - Lubricate

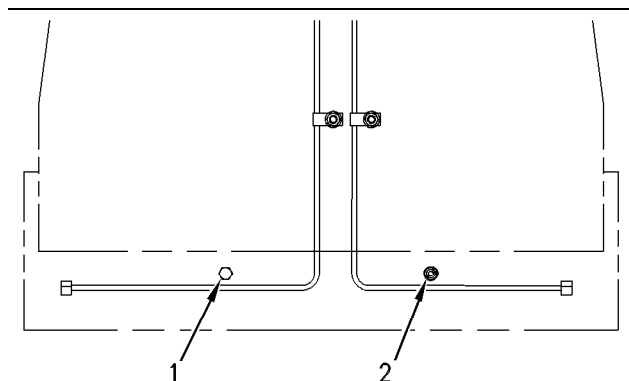


Illustration 318

g00537172

Typical example

- (1) Vent plug
(2) Fitting

Note: Vent plug (1) and fitting (2) are on the base of the boom.

2. Remove vent plug (1).
3. Apply lubricant through fitting (2) until lubricant comes out of the plug hole.
4. Install vent plug (1).

i03865613

Boom, Stick and Bucket Linkage - Lubricate

SMCS Code: 6501-086; 6502-086; 6513-086

Note: Caterpillar recommends the use of 5% molybdenum grease for lubricating the boom, stick, and bucket linkage. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on molybdenum grease.

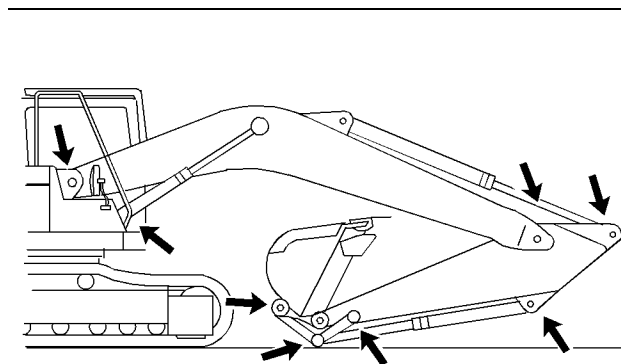


Illustration 319

g02109428

Wipe all fittings before you apply lubricant.

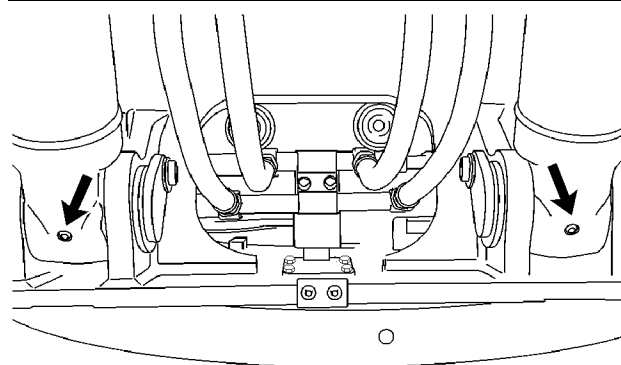


Illustration 320

g01122104

1. Apply lubricant through the fitting at the base of each boom cylinder.

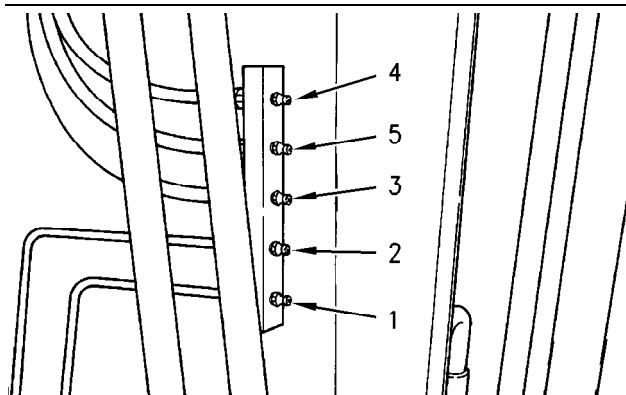


Illustration 321

g00685798

2. The fittings are at the base of the boom. The fittings can be serviced from the platform on the storage box. To lubricate the lower boom bearings, apply lubricant through fittings (1) and (2). To lubricate the boom cylinder rod, apply lubricant through fittings (3) and (4). To lubricate the stick cylinder head, apply lubricant through fitting (5).

Note: To ensure proper lubrication of the lower boom bearings and of the boom cylinder rod end bearings, lubricant should be applied through fittings (1), (2), (3), and (4). Apply lubricant first when the boom is raised and any work tool is suspended. Then apply lubricant when the boom is lowered and the work tool is rested on the ground with a slight downward pressure.

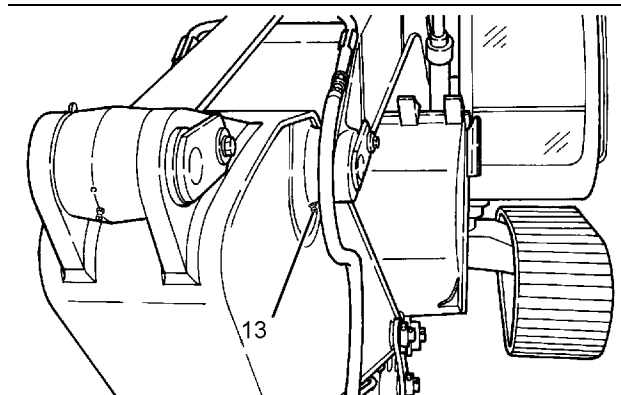


Illustration 323

g01122102

6. Apply lubricant through fitting (13). Fitting (13) is at the connection point of the boom and of the stick.

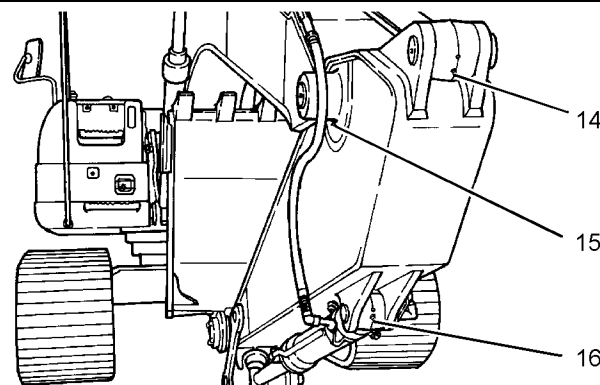


Illustration 324

g01122103

7. Apply lubricant through fitting (14) on the stick cylinder rod. Apply lubricant through fitting (15). Fitting (15) is at the connection point of the boom and of the stick. Apply lubricant through fitting (16) on the bucket cylinder head end.

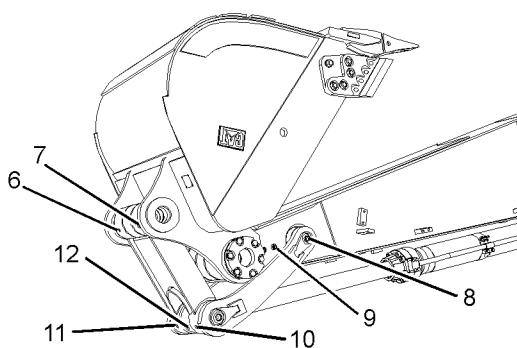


Illustration 322

g01396856

3. Apply lubricant through fittings (6) and (7). These fittings are on the bucket.
4. Apply lubricant through fittings (8) and (9). These fittings are on the stick.
5. Apply lubricant through fittings (10), (11), and (12). These fittings are on the link.

Grease Block on the Stick

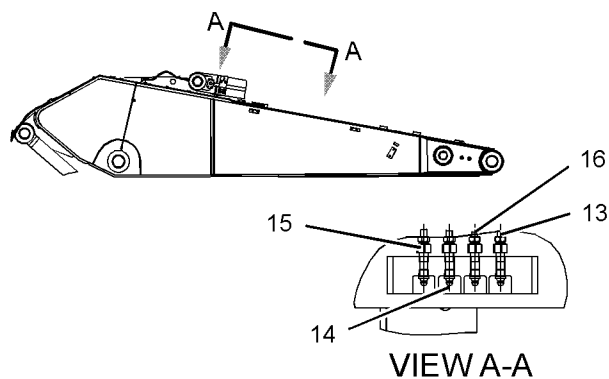


Illustration 325

g01396894

- (13) Left side connection point of boom and stick
(14) Stick cylinder rod
(15) Right side connection point of boom and stick
(16) Bucket cylinder head end

Some machines may be equipped with a grease block that is located on the stick. Apply lubricant through the fittings.

i03902571

Bucket Linkage - Inspect/Adjust

SMCS Code: 6513-025; 6513-040

WARNING

Unexpected machine movement can cause injury or death.

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

NOTICE

Improperly adjusted bucket clearance could cause galling on the contact surfaces of the bucket and stick, resulting in excessive noise and/or damaged O-ring seals.

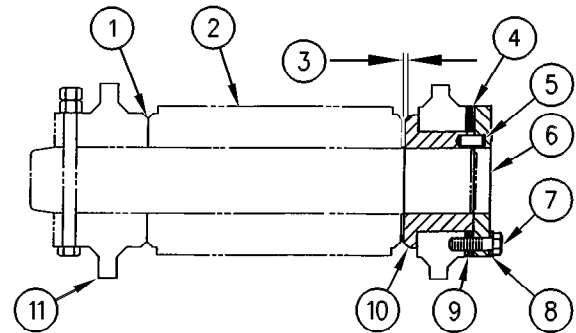


Illustration 326

g00101687

- (1) No gap. (2) Stick boss. (3) Bucket clearance. (4) Shims. (5) Pin. (6) Plate. (7) Bolts. (8) Washers. (9) Location. (10) Flange. (11) Bucket boss.

The clearance of the bucket control linkage on this machine can be adjusted by shimming. If the gap between the bucket and the stick becomes excessive, adjust bucket clearance (3) to 0.5 to 1 mm (0.02 to 0.04 inch).

Two shims of different thickness are used at location (9). The thicknesses of the shims are 0.5 mm (0.02 inch) and 1.0 mm (0.04 inch).

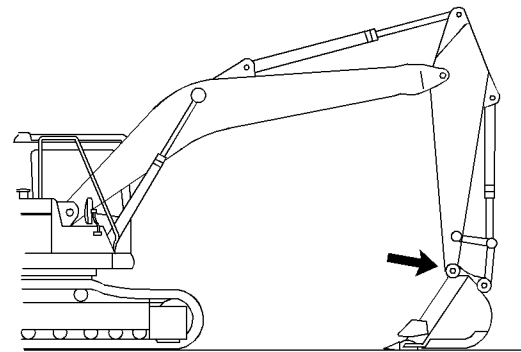


Illustration 327

g02109636

Area for linkage adjustment

1. Position the machine on a level surface and lower the bucket to the ground.
2. Slowly operate the swing control lever until stick boss (2) and the bucket boss (11) are in full face contact at no gap (1). This will help to determine the total clearance of the connection point of the stick and of the bucket.
3. Move the hydraulic lockout control to the LOCKED position. Stop the engine.
4. Measure bucket clearance (3), which is the existing total clearance.

5. Determine the number of shims that need to be removed from shims (4) by using the following calculation:

Subtract 0.5 mm (0.02 inch) or 1.0 mm (0.04 inch) from bucket clearance (3).
6. Remove the appropriate number of shims at location (9) in order to meet the above thickness. Make sure that you use a minimum of three 0.5 mm (0.02 inch) shims. To remove the shims, remove bolts (7), washers (8), and plate (6).
7. After the correct number of shims has been removed and pin (5) is aligned with the pin hole, install plate (6), washers (8), and bolts (7). Tighten bolts (7) to a torque of $240 \pm 40 \text{ N}\cdot\text{m}$ ($175 \pm 30 \text{ lb ft}$).
8. After installation, make sure that bucket clearance (3) is still correct.

i07089696

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.

Note: In order to maximize the life of the bucket tip and the penetration of the bucket tip, the bucket tip can be rotated.

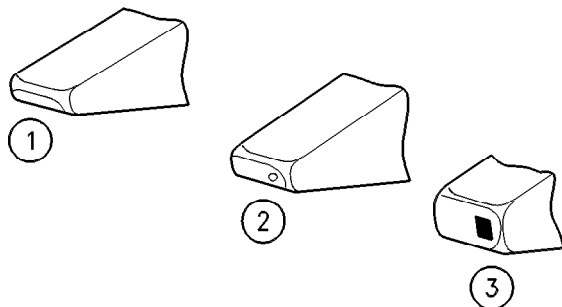


Illustration 328

g00101352

- (1) Usable
(2) Replace
(3) Overworn

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

Removal

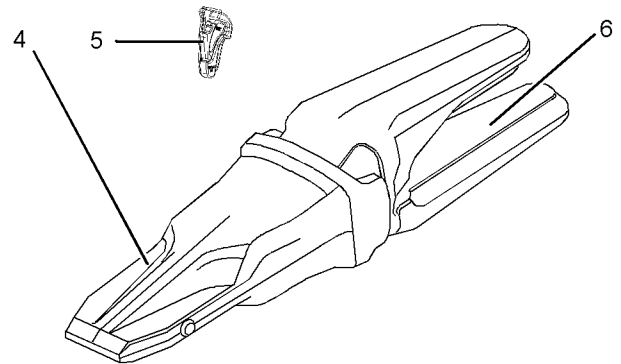


Illustration 329

g01389463

Note: Retainers are often damaged during the removal process. Caterpillar recommends the installation of a new retainer when bucket tips are rotated or replaced.

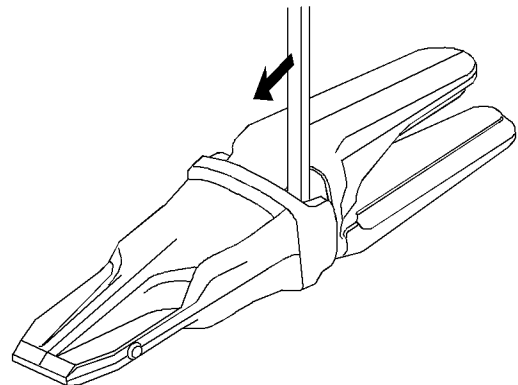


Illustration 330

g01175361

1. Use a pry bar in order to disengage retainer (5).
2. Use the pry bar in order to remove retainer (5) from bucket tip (4).
3. Remove bucket tip (4) from adapter (6) with a slight counterclockwise rotation.
4. Clean adapter (6).

Installation

1. Clean the adapter and the area around the latch, if necessary.
2. Install the new bucket tip onto the adapter with a slight clockwise rotation.

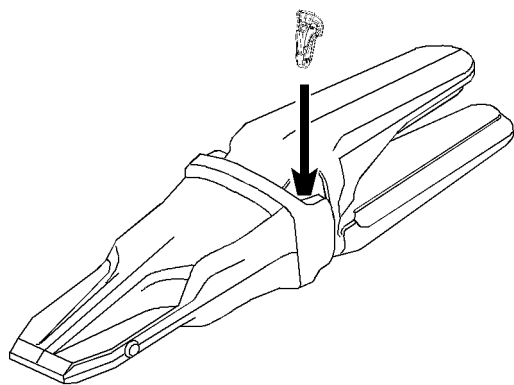


Illustration 331

g01124736

3. Install the retainer. Make sure that the retainer's latch catches under the tip pocket.
4. Make sure that the latch is properly seated by trying to remove the bucket tip.

Bucket Tips (Cat® Advansys) - If Equipped

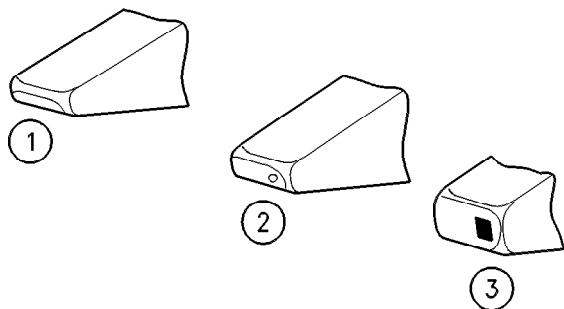


Illustration 332

g00101352

- (1) Usable
- (2) Removal Procedure
- (3) Removal Procedure

Check the bucket tips for wear. If the bucket tip has a hole, replace the bucket tip.

Removal

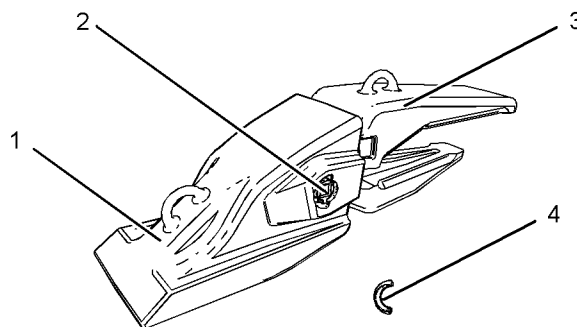


Illustration 333

g03830653

- (1) Bucket Tip
- (2) Retainer
- (3) Adapter
- (4) Compression Sleeve

1. Use a 1/2" ratchet and rotate the retainer (2) 180 degrees to the unlocked position.
2. Remove the bucket tip (1) from adapter (3).
3. Clean adapter (3).

Installation

1. Clean the adapter and the area around the latch, if necessary.
2. Install the new bucket tip (1) onto the adapter (3).

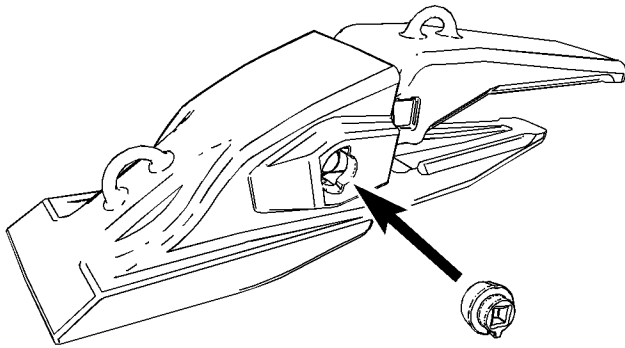


Illustration 334

g03832654

3. Use a 1/2" ratchet to rotate the retainer (2) 180 degrees to the locked position.

Side Cutters (If Equipped)

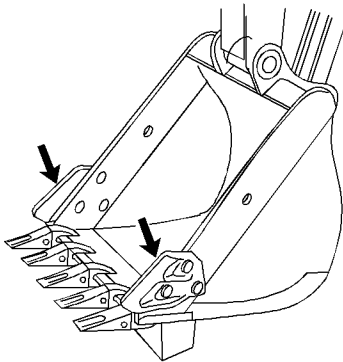


Illustration 335

g01389740

Bucket with side cutters
Side cutters

1. Remove the mounting bolts and the side cutters.
2. Clean the mounting surface of the side plate on the bucket and of the side cutter. Remove any burrs or protrusions on the mating surfaces.

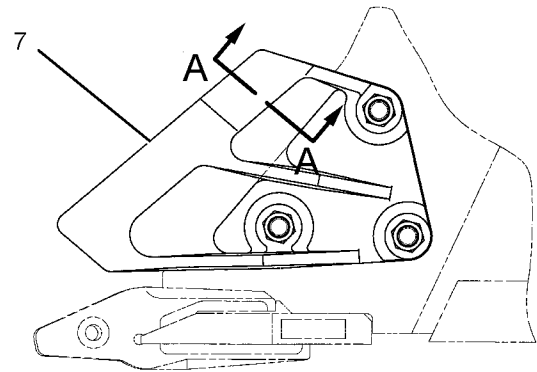


Illustration 336

g01389456

(7) Side cutter

Note: Some side cutters may be rotated for additional wear.

3. Install the side cutter.

Note: Certain bolts may require thread compound.

4. Hand tighten the bolts.

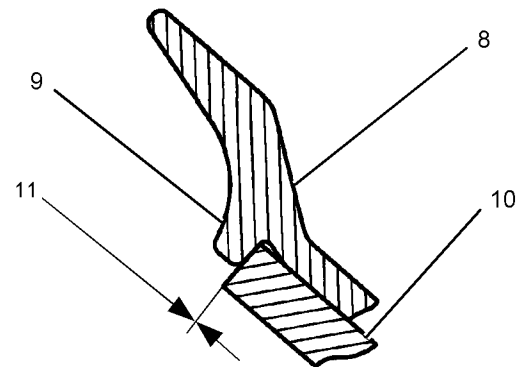


Illustration 337

g01389457

Section A-A From Illustration 336

- (8) Side cutter
(9) Shear ledge on a side cutter
(10) Side plate on a bucket
(11) 0.0 mm (0.0 inch)

5. Make sure that there is not a gap between the side plate on the bucket and the shear ledge on the side cutter.

6. Torque the mounting bolts to the correct specification.

Side Protectors (If Equipped)

Inspect the wear of the side protector. When too much wear is present, replace the protector.

Maintenance Section
Cab Air Filter (Fresh Air) - Clean/Replace

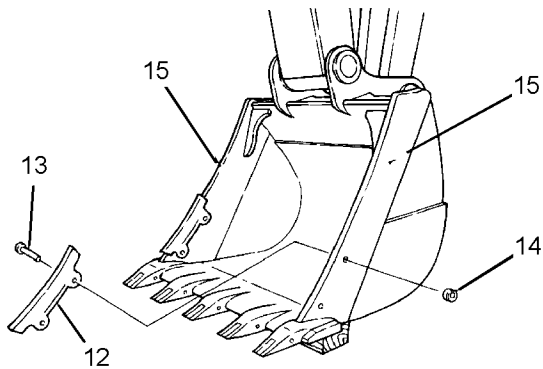


Illustration 338

g01389458

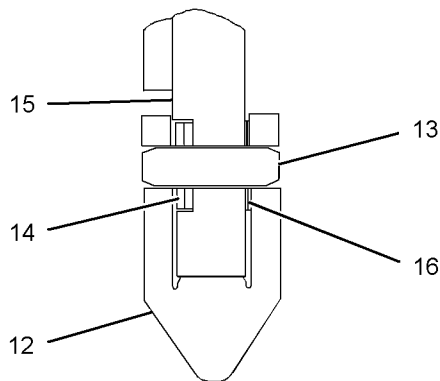


Illustration 339

g01903698

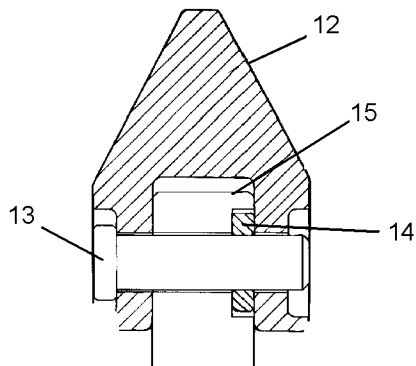


Illustration 340

g01389459

- (12) Side protector
(13) Pin
(14) Retainer
(15) Side plate
(16) Shim

1. Hit pin (13) from the side of the bucket without the retainer in order to remove side protector (12) from side plate (15).

2. Clean side protector (12), pin (13), retainer (14) and side plate (15) before installation.

Note: Lateral clearance between the side plate and the side protector should not exceed 1 mm (0.04 inch). Shims (16) may be required in order to decrease the lateral clearance which will decrease movement. Install the shims (16) between the side plate and the side protector on the opposite side of the retainer.

3. Put retainer (14) in side plate (15).
4. Align two pin holes of the new protector and the side plate. Hit the pin from the retainer side of the bucket.

Note: If the pin and/or the retainer are worn, replace the pin and/or the retainer.

i03901495

Cab Air Filter (Fresh Air) - Clean/Replace

SMCS Code: 7342-070; 7342-510

S/N: FLA1-Up

S/N: YAE1-Up

S/N: KFH1-Up

S/N: RBJ1-Up

S/N: NLM1-Up

S/N: KHS1-Up

S/N: GAX1-Up

S/N: LKY1-Up

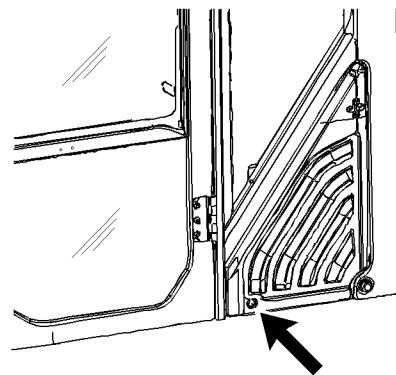


Illustration 341

g01973174

The cab air filter is located on the left side of the cab.

1. Use the ignition key in order to open the access panel.

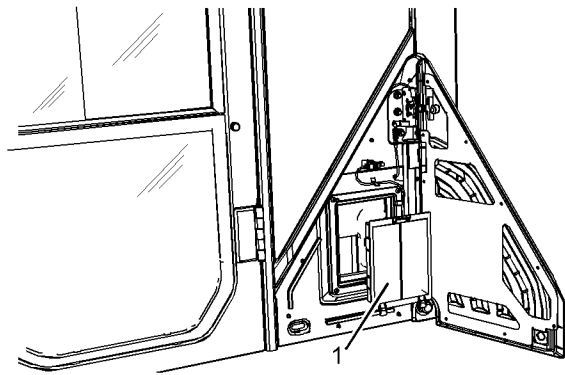


Illustration 342

g02144326

(1) Air filter

2. Remove air filter (1).
3. Clean the air filter with a maximum of 200 kPa (30 psi) pressure air.
4. After you clean the air filter, inspect the air filter. If the air filter is damaged or badly contaminated, use a new air filter.
5. Install the air filter and the filter cover.

i06890844

Cab Air Filter (Fresh Air) - Clean/Replace

SMCS Code: 7342-070; 7342-510

S/N: RGD1–Up

S/N: RGG1–Up

S/N: KFH1–Up

S/N: MLK1–Up

S/N: NLM1–Up

S/N: LKY1–Up

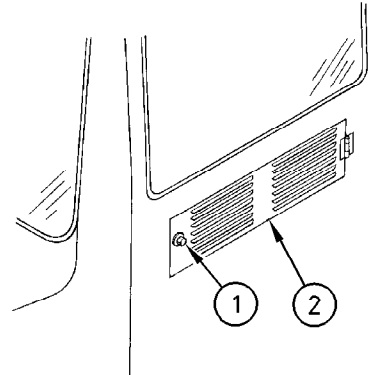


Illustration 343

g00730030

(1) Bolt
(2) Filter cover

The cab air filter is behind the cab.

1. Loosen bolt (1) and open filter cover (2).

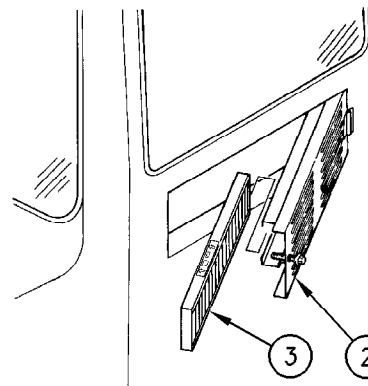


Illustration 344

g00730032

(2) Filter cover
(3) Air filter

2. Remove air filter (3) from filter cover (2).
3. Clean the air filter with a maximum of 200 kPa (30 psi) pressure air.
4. After you clean the air filter, inspect the air filter. If the air filter is damaged or badly contaminated, use a new air filter.
5. Install the air filter and the filter cover.

Note: Make sure that the arrow on top of the air filter is facing forward.

i06621844

Camera - Clean/Adjust (If Equipped)

SMCS Code: 7348

WARNING

Failure to use an appropriate external ladder or an appropriate platform for direct access to the cameras could result in slipping and falling which could result in personal injury or death. Be sure to use an appropriate external ladder or an appropriate platform for direct access to the cameras.

The counterweight of the machine and the engine hood of the machine are not approved as maintenance platforms.

WARNING

Unexpected machine movement can cause injury or death.

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

When maintenance or servicing of the rear view camera is required, follow these steps.

1. Park the machine on a level surface.
2. Place the work tool on the level surface.
3. Move the hydraulic lockout control to the LOCKED position.
4. Turn the engine start switch to the OFF position and remove the engine start switch key.
5. Turn the battery disconnect switch to the OFF position and remove the battery disconnect switch key.

Clean Camera Lens

If necessary, clean the camera lens before you operate the machine. Use a soft cloth for cleaning.

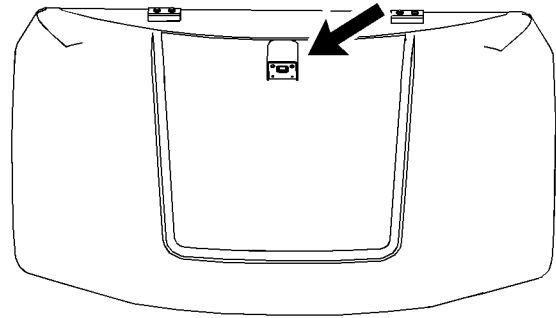


Illustration 345

g02158495

The rear view camera is located on top of the counterweight.

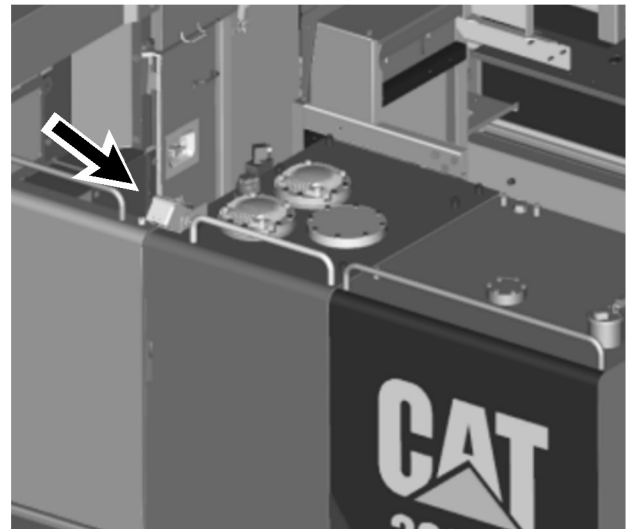


Illustration 346

g06055216

The side view camera is located on top of Hydraulic Oil Tank.

If necessary, use a damp cloth in order to clean the glass of the camera. The camera is sealed. The camera is not affected by a wash with high-pressure spray.

Note: Alternatively, cameras may be cleaned from ground level by using a wash with a high-pressure spray or a damp rag on a wand.

If necessary, clean the camera lens before you operate the machine. Use a soft cloth for cleaning.

Adjust the Area of Visibility

If the camera displays an undesired view, adjust the area of the visibility.

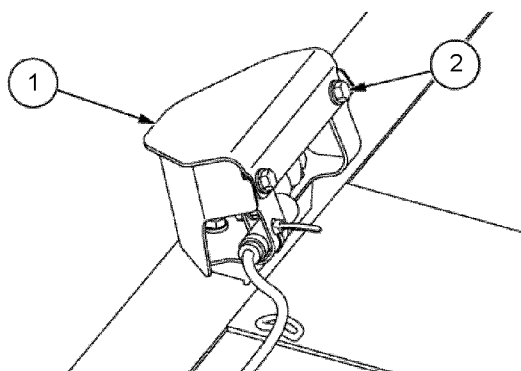


Illustration 347

g01598213

- (1) Cover
(2) Bolt

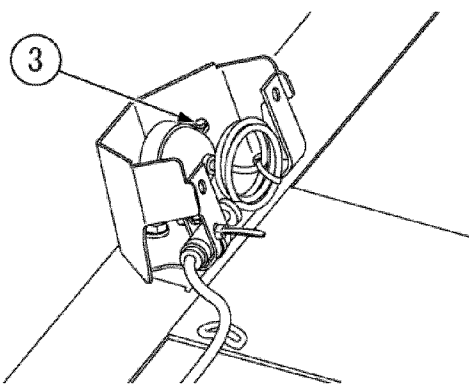


Illustration 348

g01598214

- (3) Bolt

1. Remove the 2 bolts (2) in order to remove the cover (1).
2. Unfasten the 2 bolts (3).

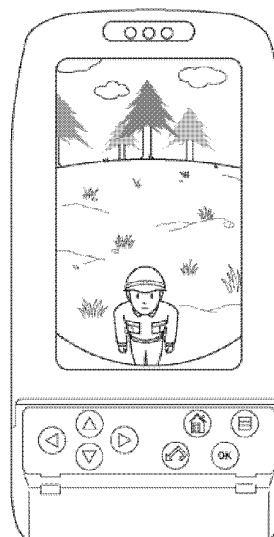


Illustration 349

g01598234

3. Adjust the area of the visibility of the camera so that a 1.5 m (5 ft 11 inch) tall obstacle which is 1 m (3 ft) behind the counterweight can be seen.
4. Tighten the 2 bolts (3) to a torque of $0.5 \pm 0.05 \text{ N}\cdot\text{m}$ ($4 \pm 0.4 \text{ lb in}$).
5. Tighten the 2 bolts (2) to a torque of $55 \pm 10 \text{ N}\cdot\text{m}$ ($40 \pm 7 \text{ lb ft}$) in order to fix the cover (1).

Work Area Vision System (If Equipped)

In order to maintain sufficient vision, keep the Work Area Vision System (WAVS) camera lens and the display clean.

Display

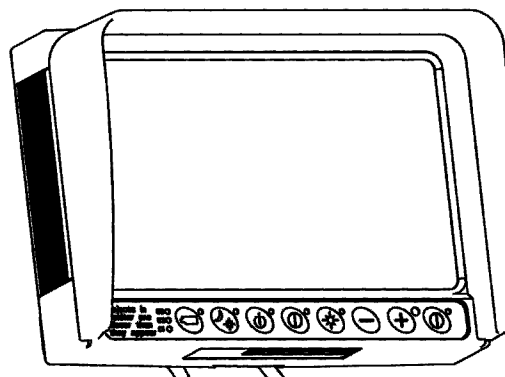


Illustration 350

g01223034

WAVS display

Use a soft, damp cloth in order to clean the display. The display has a soft plastic surface that can be easily damaged by an abrasive material. **The display is not sealed. Do not immerse the display with liquid.**

Camera

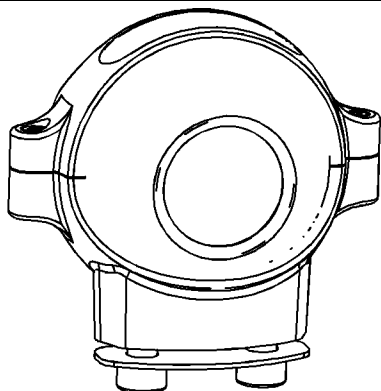


Illustration 351

g01223051

Use a damp cloth or water spray in order to clean the camera lens. The camera is a sealed unit. The camera is not affected by high pressure spray.

The camera is equipped with an internal heater to help counteract the effects of condensation, snow, or ice.

Note: For more information on WAVS, refer to Operation and Maintenance Manual, SEBU8157, "Work Area Vision System".

i02107779

Circuit Breakers - Reset

SMCS Code: 1420-529

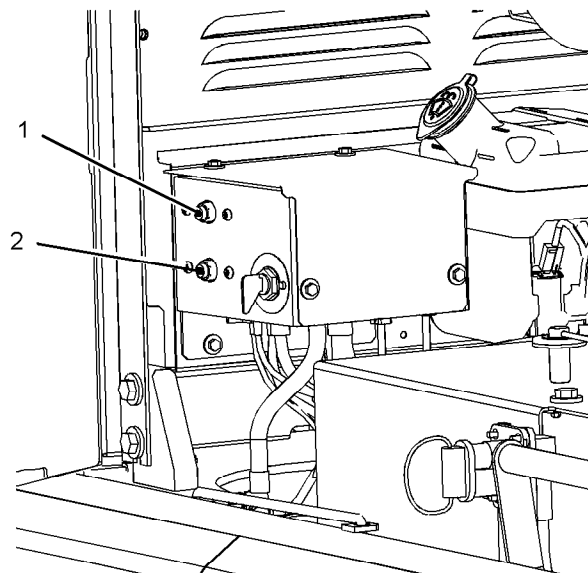


Illustration 352

g01070621

The circuit breaker is located behind the front left access door.



Main Circuit (1) – This circuit breaker is designed to protect the wires between the batteries and the fuses. If the wires are shorted to the machine's body, this circuit breaker would minimize the damage to the wires.

The main circuit breaker has a capacity of 80 Amp.



Alternator Circuit (2) – This circuit breaker is designed to protect the alternator. If the batteries are installed with reversed polarity, the circuit breaker would prevent the alternator from damaging the rectifier.

The circuit breaker for the alternator has a capacity of 105 Amp.

Circuit Breaker Reset – Push in the button in order to reset the circuit breaker. If the electrical system is working properly, the button will remain depressed. If the button does not remain depressed, check the appropriate electrical circuit. Repair the electrical circuit, if necessary.

i02164189

i02586555

Condenser (Refrigerant) - Clean

SMCS Code: 1805-070

NOTICE

If excessively dirty, clean condenser with a brush. To prevent damage or bending of the fins, do not use a stiff brush.

Repair the fins if found defective.

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

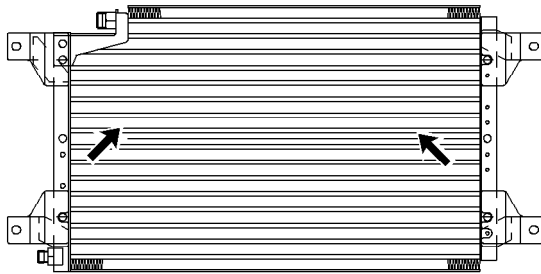


Illustration 353

g00537515

Typical example

2. Inspect the condenser for debris. Clean the condenser, if necessary.
3. Use clean water to wash off all dust and dirt from the condenser.
4. Close the access door.

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044

! WARNING

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

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

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

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

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

NOTICE

Do not change the coolant until you read and understand the material in the Cooling System Specifications section.

NOTICE

Mixing Extended Life Coolant (ELC) with other products reduces the effectiveness of the coolant and shortens coolant life. Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specifications for premixed or concentrate coolants. Use only Caterpillar Extender with Caterpillar ELC. Failure to follow these recommendations could result in the damage to cooling systems components.

If ELC cooling system contamination occurs, refer to Special Publication, SEBU6250, "Cat Extended Life Coolant (ELC)".

This machine was factory filled with Extended Life Coolant.

If the coolant in the machine is changed to Extended Life Coolant from another type of coolant, see Special Publication, SEBU6250, "Extended Life Coolant (ELC) Cooling System Maintenance".

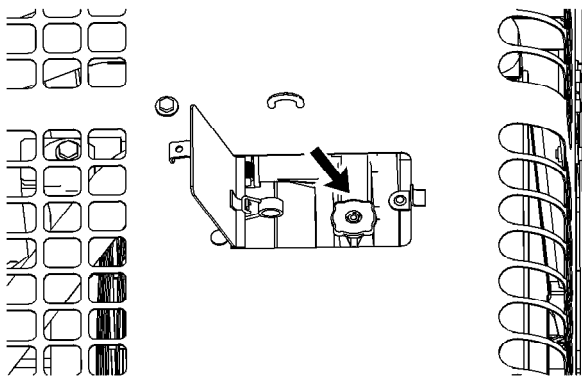


Illustration 354

g01098735

1. Open the access cover for the radiator cap that is located on top of the machine.
2. Loosen the radiator cap slowly in order to release pressure. Remove the radiator cap.
3. Remove the access cover for the radiator drain valve that is located under the upper structure. This will allow access to the drain valve.

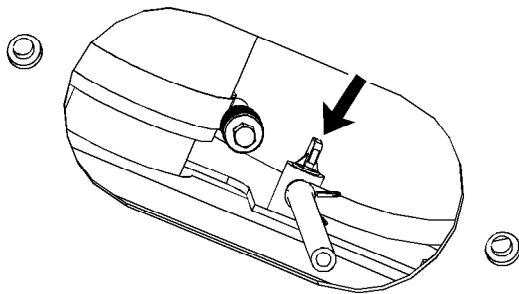


Illustration 355

g01098356

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

4. Open the drain valve and allow the coolant to drain into a suitable container.

Note: Dispose of drained fluids according to local regulations.

5. Flush the cooling system with clean water until the draining water is clean.
6. Close the drain valve.
7. Add the Extended Life Coolant. See Operation and Maintenance Manual, "Capacities (Refill)".

8. Start the engine. Operate the engine without the radiator cap until the thermostat opens and the coolant level stabilizes.

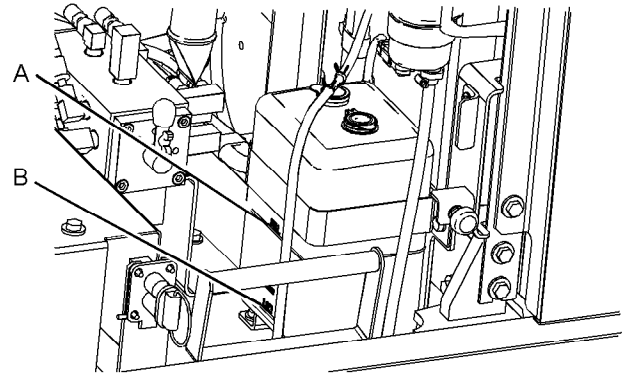


Illustration 356

g01101505

9. Check the coolant reservoir. Maintain the coolant level between the "FULL" mark and the "LOW" mark.
10. Install the radiator cap.
11. Stop the engine.
12. Close the radiator access door.

i02586579

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352; 1353; 1395

WARNING

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

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

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

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

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

When a Caterpillar Extended Life Coolant (ELC) is used, an Extender must be added to the cooling system. See the Special Publication, SEBU6250, "Coolant Recommendations" for all cooling system requirements.

Use a coolant conditioner test kit in order to check the concentration of the coolant.

NOTICE

Use only Caterpillar products or commercial products that have passed Caterpillar EC-1 specification for pre-mixed or concentrated coolants.

Use only Caterpillar Extender with Extended Life Coolant.

Mixing Extended Life Coolant with other products reduces the Extended Life Coolant service life. Failure to follow the recommendations can reduce cooling system components life unless appropriate corrective action is performed.

Note: Refer to Special Publication, SEBU6250, "Extended Life Coolant (ELC)" for instructions regarding contamination of the ELC Cooling System.

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

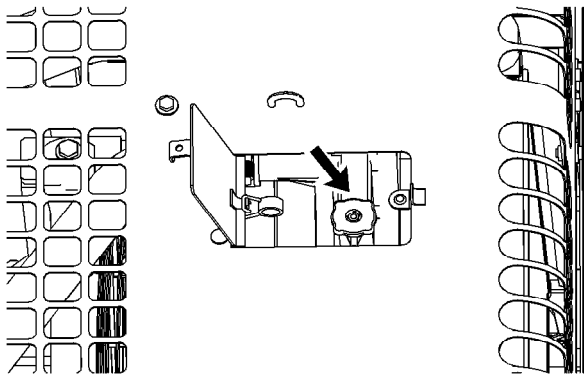


Illustration 357

g01098735

2. Open the radiator cap access cover.
3. Loosen the radiator cap slowly in order to relieve pressure. Remove the radiator cap.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

4. It may be necessary to drain some coolant from the radiator so that Extender can be added to the cooling system.

Note: Dispose of drained fluids according to local regulations.

5. Add 1.7 L (24 oz) of Extender to the cooling system.
6. Replace the radiator cap if the cap gasket is damaged. Install the radiator cap.
7. Close the access door.

i02586603

Cooling System Coolant Level - Check

SMCS Code: 1350-535-FLV; 1350-040; 1395-535-FLV

WARNING

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

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

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

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

Cooling System Coolant Additive contains alkali. Avoid contact with skin and eyes.

1. Open the access doors on the left side of the machine.

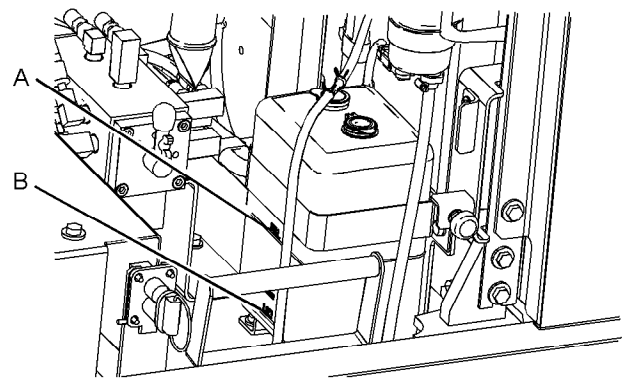


Illustration 358

g01101505

2. Maintain the coolant level between the marks on the coolant reservoir.

Maintenance Section

Cooling System Coolant Sample (Level 1) - Obtain

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

3. If additional coolant is necessary, remove the coolant filler cap and add the appropriate coolant mixture. Install the filler cap.

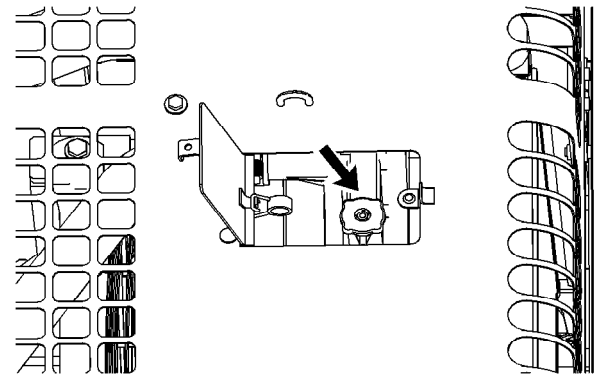


Illustration 359

g01098735

4. If the coolant reservoir is empty, open the radiator cap access cover.
5. Slowly loosen the cooling system pressure cap. Add coolant to the radiator.

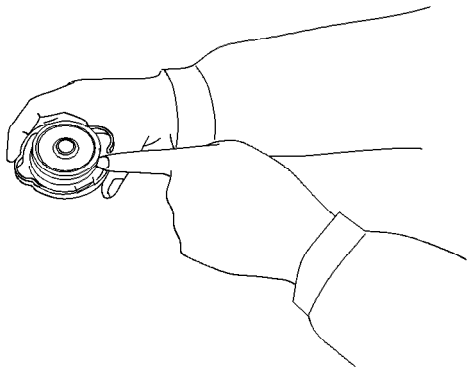


Illustration 360

g00102170

6. Inspect the condition of the cap gasket. Replace the cap gasket, if necessary.
7. Install the cooling system pressure cap.
8. Inspect the radiator core for debris and clean the radiator core, if necessary. Refer to Operation and Maintenance, "Radiator Core - Clean" for more information on cleaning the radiator core.

Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1395-554; 1395-008; 7542

Note: It is not necessary to obtain a Coolant Sample (Level 1) if the cooling system is filled with Cat ELC (Extended Life Coolant). Cooling systems that are filled with Cat ELC should have a Coolant Sample (Level 2) that is obtained at the recommended interval that is stated in the Maintenance Interval Schedule.

Note: Obtain a Coolant Sample (Level 1) if the cooling system is filled with any other coolant instead of Cat ELC. This includes the following types of coolants.

- Commercial long life coolants that meet the Caterpillar Engine Coolant Specification -1 (Caterpillar EC-1)
- Cat Diesel Engine Antifreeze/Coolant (DEAC)
- Commercial heavy-duty coolant/antifreeze

NOTICE

Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

Note: Level 1 results may indicate a need for Level 2 Analysis.

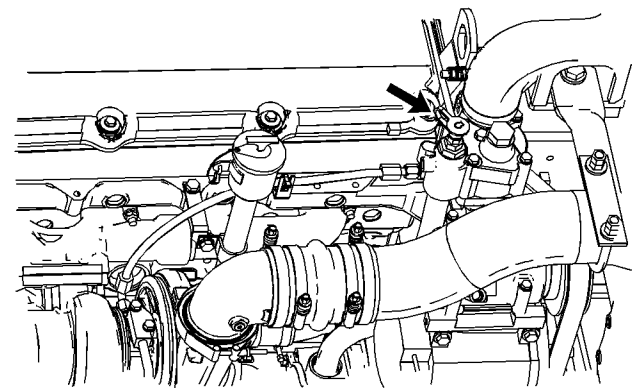


Illustration 361

g01106802

Coolant sample port

Refer to the Operation and Maintenance Manual, "Access Doors and Covers" for the location of the service points.

i02354405

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.

i07349178

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1395-008; 1395-554; 7542

Reference: Refer to Operation and Maintenance Manual, "Cooling System Coolant Sample (Level 1) - Obtain" for the guidelines for proper sampling of the coolant.

Obtain the sample of the coolant as close as possible to the recommended sampling interval. Supplies for collecting samples can be obtained from your Cat dealer.

Submit the sample for Level 2 analysis.

Reference: For additional information about coolant analysis, refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" or consult your Cat dealer.

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-070; 1054-510

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

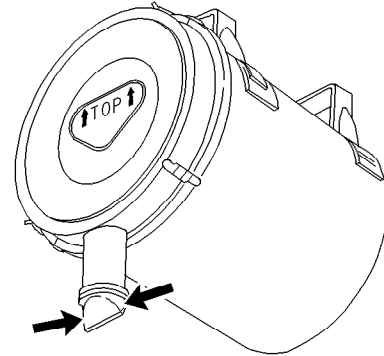


Illustration 362

g00537958

2. Squeeze the outlet tube slightly into a container in order to purge the dirt from the outlet tube.

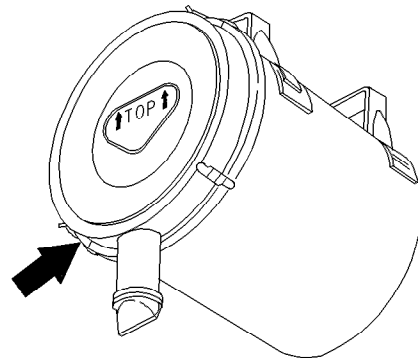


Illustration 363

g00101413

3. Loosen the 6 cover latches and remove the air cleaner cover.

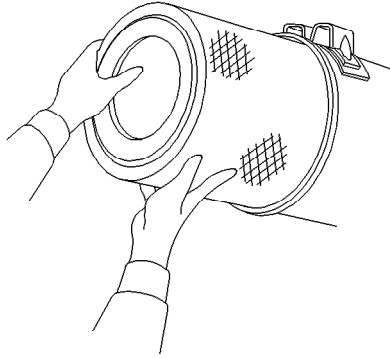


Illustration 364

g00101415

4. Remove the primary filter element from the air cleaner housing.
5. Clean the air cleaner cover and the inside of the air cleaner housing.
6. Inspect the O-ring seal on the air cleaner cover. Replace the O-ring seal if the O-ring seal is worn or damaged.
7. Inspect the primary filter. If the primary filter element is not damaged, you can clean the primary element.

Refer to "Cleaning Primary Air Filter Elements".

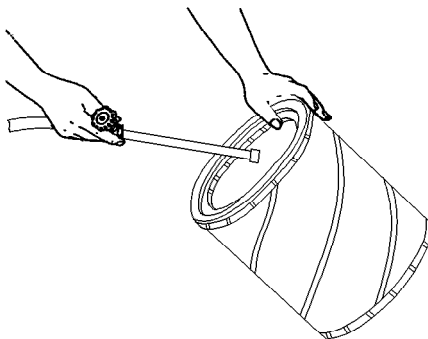


Illustration 365

g00102884

8. Direct air along the pleats inside the primary filter element and outside the primary filter element.
9. Inspect the primary filter element after cleaning. Do not use a primary filter element with damaged pleats, damaged gaskets or damaged seals.
10. Encase the clean primary filter element and store the clean primary filter element in a clean, dry place.
11. Install the clean primary filter.

12. Install the air cleaner cover and close the latches securely.

13. Change the filter if any of the following conditions occurs:

- Restricted Air Filter indicator on the monitor panel still comes on.
- Exhaust smoke is still black after the installation of a primary filter.

Note: The primary filter can be cleaned up to six times. Replace the primary filter if the primary filter has been used for one year.

Cleaning Primary Air Filter Elements

NOTICE

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

Observe the following guidelines if you attempt to clean the filter element:

Do not tap or strike the filter element in order to remove dust.

Do not wash the filter element.

Use low pressure compressed air in order to remove the dust from the filter element. Air pressure must not exceed 207 kPa (30 psi). Direct the air flow up the pleats and down the pleats from the inside of the filter element. Take extreme care in order to avoid damage to the pleats.

Do not use air filters with damaged pleats, gaskets, or seals. Dirt entering the engine will cause damage to engine components.

The primary air filter element can be used up to six times if the element is properly cleaned and if the element is properly inspected. When the primary air filter element is cleaned, check for rips or tears in the filter material. The primary air filter element should be replaced at least one time per year. This replacement should be performed regardless of the number of cleanings.

NOTICE

Do not clean the air filter elements by bumping or tapping. This could damage the seals. Do not use elements with damaged pleats, gaskets, or seals. Damaged elements will allow dirt to pass through. Engine damage could result.

Visually inspect the primary air filter elements before cleaning. Inspect the air filter elements for damage to the seal, the gaskets, and the outer cover. Discard any damaged air filter elements.

There are two common methods that are used to clean primary air filter elements:

- Pressurized air
- Vacuum cleaning

Pressurized Air

Pressurized air can be used to clean primary air filter elements that have not been cleaned more than two times. Pressurized air will not remove deposits of carbon and oil. Use filtered, dry air with a maximum pressure of 207 kPa (30 psi).

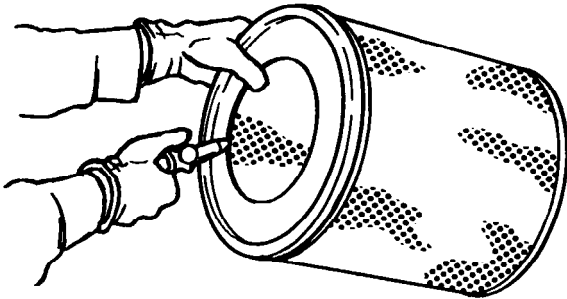


Illustration 366

g00281692

Note: When the primary air filter elements are cleaned, always begin with the clean side (inside) in order to force dirt particles toward the dirty side (outside).

Aim the hose so that the air flows inside the element along the length of the filter in order to help prevent damage to the paper pleats. Do not aim the stream of air directly at the primary air filter element. Dirt could be forced further into the pleats.

Vacuum Cleaning

Vacuum cleaning is another method for cleaning primary air filter elements which require daily cleaning because of a dry, dusty environment. Cleaning with pressurized air is recommended prior to vacuum cleaning. Vacuum cleaning will not remove deposits of carbon and oil.

Inspecting the Primary Air Filter Elements

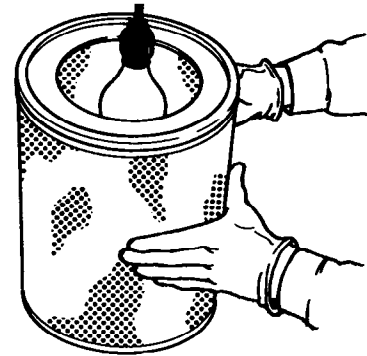


Illustration 367

g00281693

Inspect the clean, dry primary air filter element. Use a 60 watt blue light in a dark room or in a similar facility. Place the blue light in the primary air filter element. Rotate the primary air filter element. Inspect the primary air filter element for tears and/or holes. Inspect the primary air filter element for light that may show through the filter material. If it is necessary in order to confirm the result, compare the primary air filter element to a new primary air filter element that has the same part number.

Do not use a primary air filter element that has any tears and/or holes in the filter material. Do not use a primary air filter element with damaged pleats, gaskets or seals. Discard damaged primary air filter elements.

Storing Primary Air Filter Elements

If a primary air filter element that passes inspection will not be used, the primary air filter element can be stored for future use.

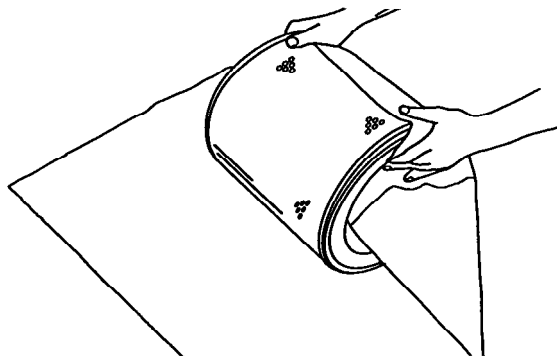


Illustration 368

g00281694

Do not use paint, a waterproof cover, or plastic as a protective covering for storage. An airflow restriction may result. To protect against dirt and damage, wrap the primary air filter elements in Volatile Corrosion Inhibited (VCI) paper.

Place the primary air filter element into a box for storage. For identification, mark the outside of the box and mark the primary air filter element. Include the following information:

- Date of cleaning
- Number of cleanings

Store the box in a dry location.

i00702568

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510

NOTICE

Always replace the secondary filter element. Never attempt to reuse the secondary filter element by cleaning the element.

When the primary filter element is replaced, the secondary filter element should be replaced.

The secondary filter element should also be replaced if the restricted Air Filter indicator comes on after the installation of a clean primary filter element or if the exhaust smoke is still black.

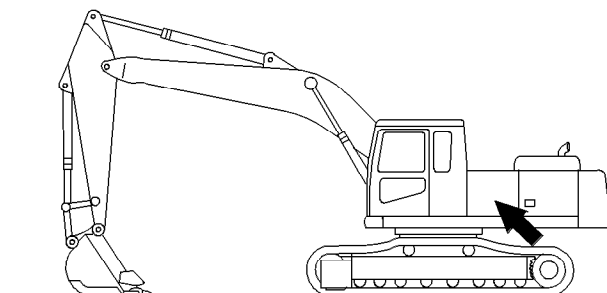


Illustration 369

g00101721

1. Open the access door on the front left side of the machine.
2. See Operation and Maintenance Manual, "Engine Air Filter Primary Element - Clean/Replace". Remove the air cleaner cover from the air cleaner housing. Remove the primary filter element from the air cleaner housing.

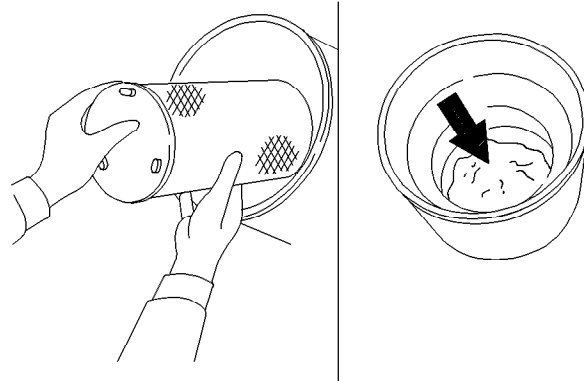


Illustration 370

g00101451

3. Remove the secondary filter element.
4. Cover the air inlet opening. Clean the inside of the air cleaner housing.
5. Remove the cover from the air inlet opening.
6. Install the new secondary filter element.
7. Install the primary filter element.
8. Install the air cleaner cover and close the latches securely.
9. Close the access door.

i02174202

Engine Air Precleaner - Clean

SMCS Code: 1055-070-DJ

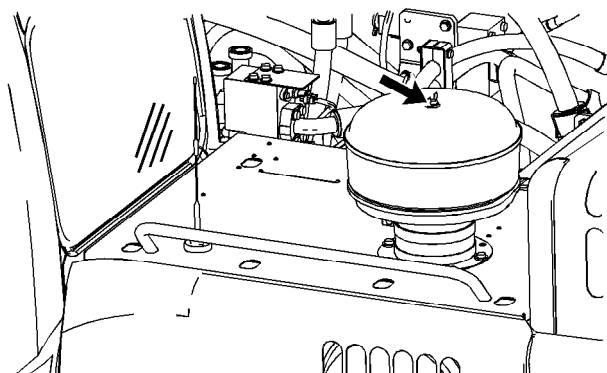


Illustration 371

g01101669

Check the precleaner for accumulation of trash and dirt.

1. Empty the precleaner bowl whenever the dirt reaches the "FULL" mark.
2. Loosen the wing nut on the cover and remove the cover.
3. Empty the precleaner bowl. Wash the precleaner bowl and the cover.
4. Install the precleaner bowl and install the cover. Tighten the wing nut until the wing nut is only finger tight. Do not use a tool to tighten the wing nut.

i02166456

Engine Crankcase Breather - Clean

SMCS Code: 1317-070-DJ

1. Unlatch the engine hood. Raise the engine hood.

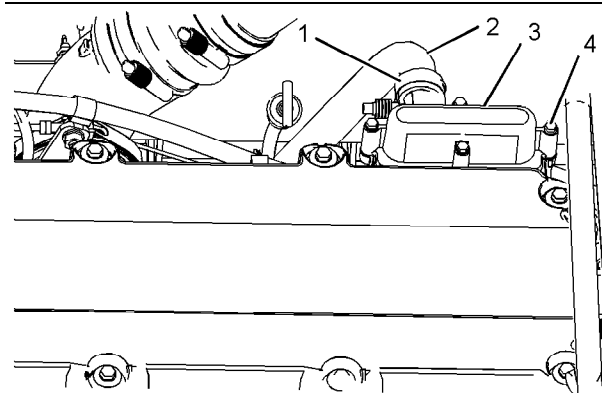


Illustration 372

g01098267

(1) Hose clamp. (2) Outlet hose. (3) Breather. (4) Bolts.

2. Loosen hose clamp (1). Disconnect outlet hose (2) from breather (3).
 3. Loosen four bolts (4). Remove breather (3) and the seal.
- Note:** Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.
4. Wash breather (3) in a clean, nonflammable solvent.
 5. Inspect the seal. If the seal is damaged, install a new seal.
 6. Install the O-ring seal and clean breather (3). Tighten four bolts (4) to $14 \pm 3 \text{ N}\cdot\text{m}$ ($10 \pm 2 \text{ lb ft}$).
 7. Slide hose on breather (3). Tighten hose clamp (1).
 8. Close the engine hood. Latch the engine hood.

i04533765

Engine Oil Level - Check

SMCS Code: 1000-535

WARNING

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

NOTICE

Do not overfill the crankcase. Engine damage can result.

Maintenance Section

Engine Oil Sample - Obtain

Note: This machine is equipped with both an automated function for checking fluid levels and a dipstick. Refer to Operation and Maintenance Manual, "Monitoring System" regarding the automated system. If the machine is on an incline or the engine has been stopped only for a short time, then the engine oil does not return to the crankcase and the fluid level cannot be properly checked by either method. Park the machine on level ground and check the oil level after the engine has been stopped for at least 30 minutes.

Check the oil level while the engine is stopped. Do not check the oil level while the engine is running.

1. Open the engine hood.

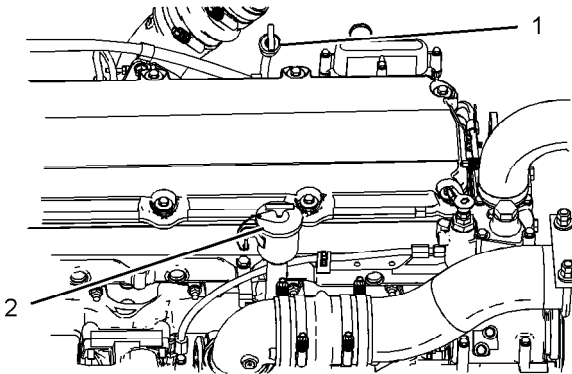


Illustration 373

g01097911

- (1) Dipstick
(2) Oil filler plug

2. Loosen the handle and remove dipstick (1). Wipe the oil off the dipstick and reinsert the dipstick.

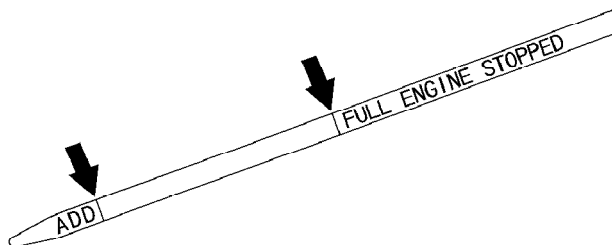


Illustration 374

g00832222

3. Remove the dipstick and check the dipstick. The oil level should be between the "FULL" mark and the "ADD" mark.
4. Reinsert the dipstick.

NOTICE

Do not fill above the "FULL" mark on the dipstick.

If the oil level is above the "FULL" Mark, the crankshaft might dip into the oil during engine operation. This will lead to excessively high oil temperatures. High oil temperatures can reduce the lubricating characteristics of oil.

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

5. Remove oil filler plug (2) in order to add oil, if necessary. See Operation and Maintenance Manual, "Lubricant Viscosities".

Note: If the oil is deteriorated or badly contaminated, change the oil regardless of the maintenance interval.

6. Clean the oil filler plug. Install the oil filler plug.
7. Check the oil level.
8. Tighten the handle on the dipstick so that the seal is snug against the tube.

Note: Do not over tighten the dipstick. Overtightening can cause the seal to pop out of the tube and allow dirt to enter the system.

9. Close the engine hood.

i03866334

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 1000; 1348-554-SM; 1348-008; 7542-554-OC; 7542-554-SM; 7542-008

Open the access door on the right side of the machine in order to access the sampling valve.

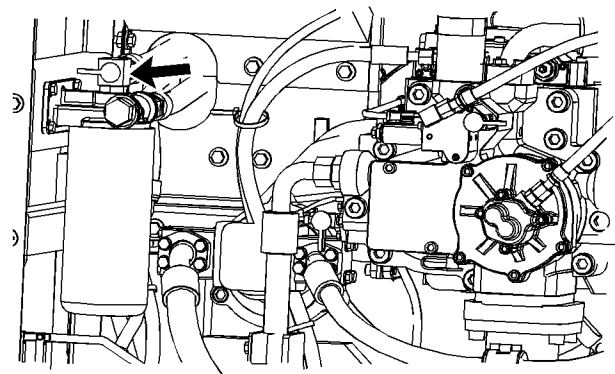


Illustration 375

g01129870

The sampling valve for the engine oil is located on the top of the engine oil filter.

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" "S·O·S Oil Analysis" for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEGJ0047, "How To Take A Good Oil Sample" for more information about obtaining a sample of the engine oil.

i02788014

Engine Oil and Filter - Change

SMCS Code: 1318-510

Park the machine on a level surface and engage the parking brake. Stop the engine.

Note: Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase. The particles will not be removed by draining the oil and the particles will recirculate in the engine lubrication system with the new oil.

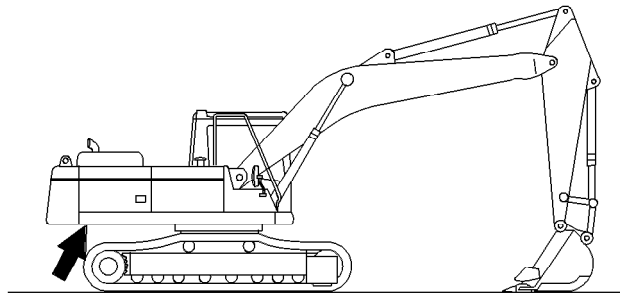


Illustration 376

g00101627

The crankcase drain valve is located under the rear of the upper structure.

1. Remove the bolts and the washers. Open the crankcase drain valve access cover.

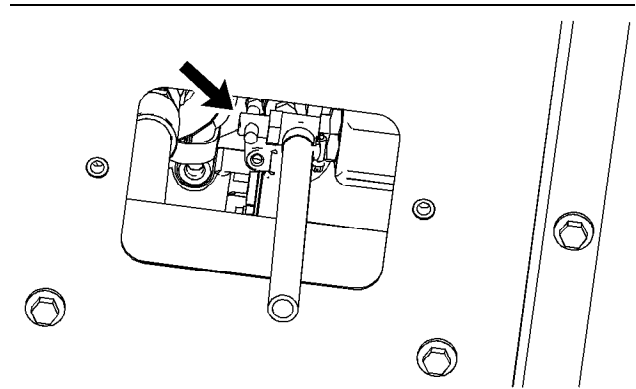


Illustration 377

g01098172

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

2. Open the crankcase drain valve. Allow the oil to drain into a suitable container.

Note: Dispose of drained fluids according to local regulations.

3. Close the drain valve.

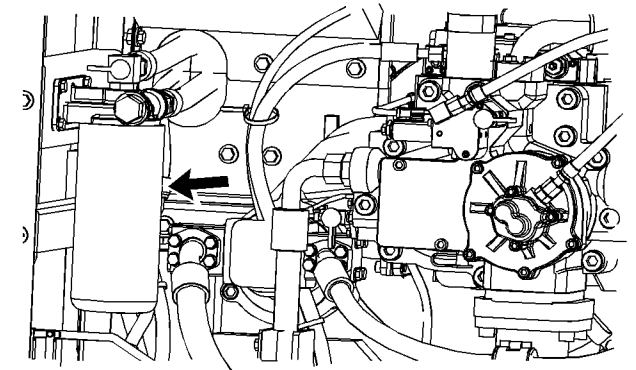


Illustration 378

g01129934

4. Open the access door on the left side of the machine.
5. Remove the oil filter with a strap type wrench. See Operation and Maintenance Manual, "Oil Filter - Inspect".

Note: Dispose of the used oil filter according to local regulations.

6. Clean the filter housing base. Make sure that all of the old filter gasket is removed.

Maintenance Section
Engine Oil and Filter - Change

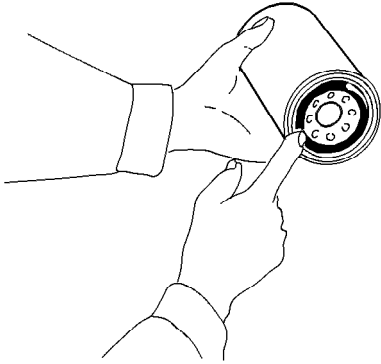


Illustration 379

g00101634

7. Apply a thin coat of engine oil to the gasket of the new filter.

8. Install the new 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.

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

10. Close the crankcase drain valve access cover.

11. Install the bolts and the washers.

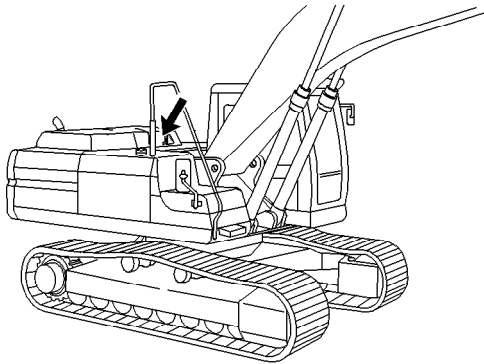


Illustration 380

g00278210

12. Unlatch the engine hood and raise the engine hood.

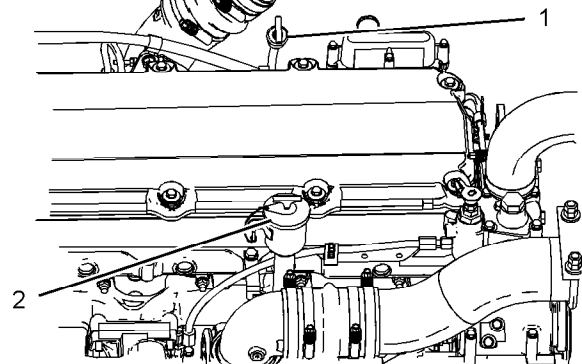


Illustration 381

g01097911

(1) Dipstick
(2) Oil filler plug

13. Remove oil filler plug (2). Fill the crankcase with new oil. See Operation and Maintenance Manual, "Capacities (Refill)". Clean the oil filler plug and install the oil filler plug.

NOTICE

Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

14. Start the engine and allow the oil to warm. Check the engine for leaks. Stop the engine.

15. Wait for fifteen minutes so that the oil can drain back into the crankcase, before you check the oil.

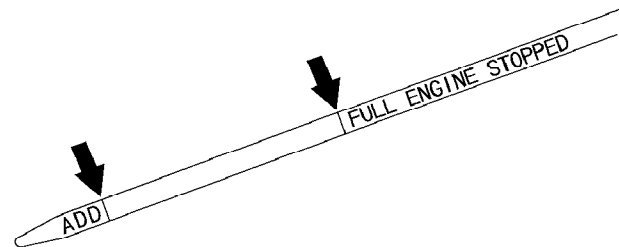


Illustration 382

g00832222

16. Remove dipstick (1). Maintain the oil between the marks on the "ENGINE STOPPED" side of the dipstick.

17. Close the engine hood and latch the engine hood.

i00707053

Engine Valve Lash and Fuel Injector Timing - Check

SMCS Code: 1105-025; 1209-535; 1290-531-FT

Refer to the Service Manual for the complete procedure for checking the engine valve lash. This procedure lists the steps for the engine valve lash adjustment and the steps in order to check the engine valve lash.

Note: Make sure that a qualified mechanic works on the injector fuel timing. Special tools and training are required.

Refer to the Service Manual for the complete procedure for checking the injector fuel timing or for adjusting the injector fuel timing.

Note: The correct fuel timing specification is given on the Engine Information Plate. Fuel timing specifications may differ for distinct engine applications and/or power ratings.

i00059702

Engine Valve Rotators - Inspect

SMCS Code: 1109-040

WARNING

When inspecting the valve rotators, protective glasses or face shield and protective clothing must be worn to prevent being burned by hot oil spray.

1. Start the engine and run the engine at low idle.

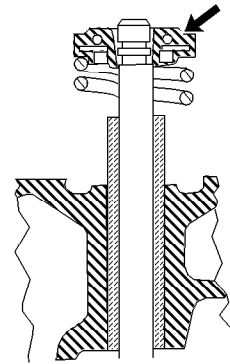


Illustration 383

g00102025

2. Watch the top surface on each valve rotator. Each valve rotator should turn slightly whenever the cylinder valve closes.

If a cylinder valve fails to rotate, consult your Caterpillar dealer.

i07051358

Ether Starting Aid Cylinder - Replace (If Equipped)

SMCS Code: 1456-510-CD

WARNING

Breathing ether vapors or repeated contact of ether with skin can cause personal injury. Personal injury may occur from failure to adhere to the following procedures.

Use ether only in well ventilated areas.

Do not smoke while changing ether cylinders.

Use ether with care to avoid fires.

Do not store replacement ether cylinders in living areas or in the operator's compartment.

Do not store ether cylinders in direct sunlight or at temperatures above 49 °C (120 °F).

Discard cylinders in a safe place. Do not puncture or burn cylinders.

Keep ether cylinders out of the reach of unauthorized personnel.

The ether cylinder is located inside the rear access door on the left side of the machine.

Refer to Operation and Maintenance, “Fire Prevention and Explosion Prevention” before you replace the ether cylinder.

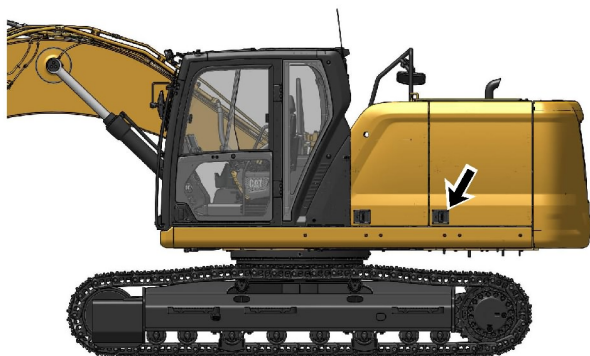


Illustration 384

g06179792

1. Open the rear access door at the left side of the machine.

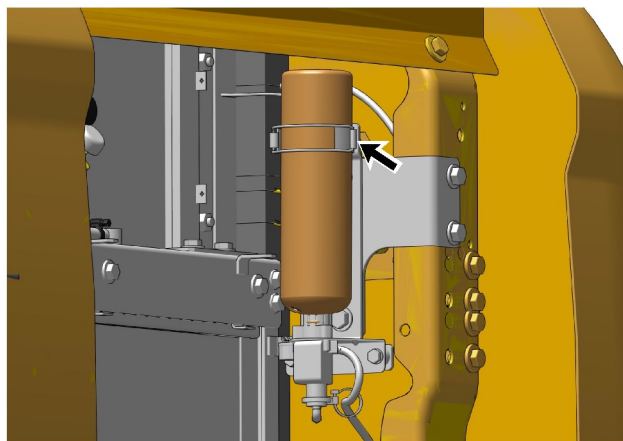


Illustration 385

g06211094

2. Loosen the cylinder retaining clamp.
3. Unscrew the empty ether starting aid cylinder and remove the empty ether starting aid cylinder.

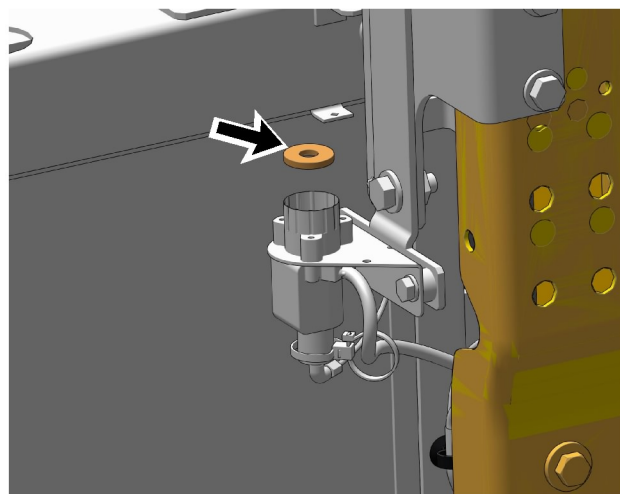


Illustration 386

g06211096

4. Remove the used gasket.

5. Install a new gasket.

Note: A new gasket and O-ring is provided with each new ether starting aid cylinder.

6. Install the new ether starting aid cylinder.
7. Tighten the ether starting aid cylinder hand tight.
8. Tighten the cylinder retaining clamp securely.
9. Close the access door.

i07681009

Film (Product Identification) - Clean

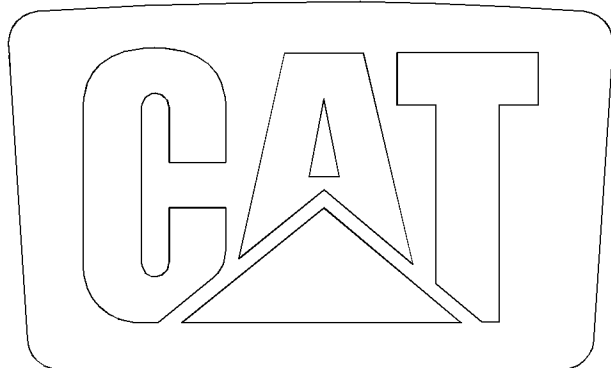
SMCS Code: 7405-070; 7557-070

Illustration 387

g02174985

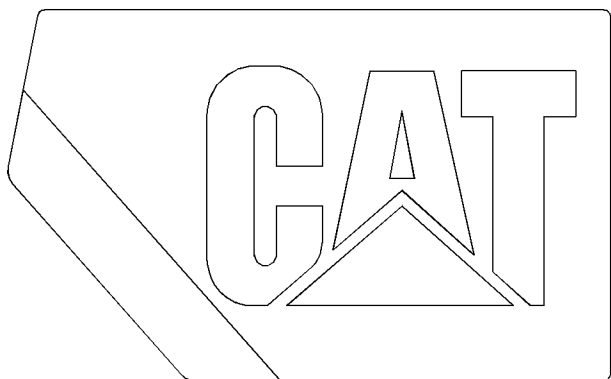


Illustration 388

g02175297



Illustration 389

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.

i06882903

Final Drive Oil - Change

SMCS Code: 4050-044-FLV

WARNING

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

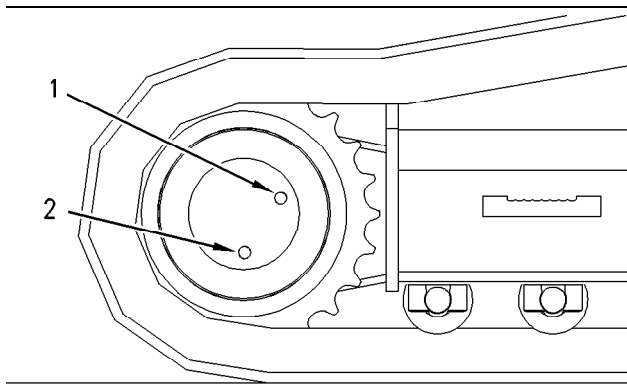


Illustration 390

g00822278

- (1) Oil level plug
(2) Oil drain plug

- Position one final drive so that oil drain plug (2) is at the bottom.

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

- Remove drain plug (2) and level plug (1). Allow the oil to drain into a suitable container.
- Clean the plugs and inspect the O-ring seals. If wear or damage is evident, replace the drain plug, the level plug, and/or the O-ring seals.
- Install drain plug (2).
- Fill the final drive to the bottom of the opening on level plug (1). See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Capacities (Refill)".

Note: If the oil fills slowly, the fill hole may be blocked by the planetary gear. Rotate the final drive to move the planetary gear away from the fill hole.

Note: Overfilling the final drive will cause the seals on the travel motor to allow hydraulic oil or water to enter the final drive. The final drive may become contaminated.

- Install level plug (1).
- Perform Step 1 to Step 6 on the other final drive. Use a different container for the oil so that the oil samples from the final drives will be separate.
- Completely remove the oil that has spilled onto surfaces.
- Start the machine and allow the final drives to run through several cycles.
- Stop the machine. Check the oil level.
- Check the drained oil for metal chips or for particles. If there are any chips or particles, consult your Cat dealer.
- Properly dispose of the drained material. Obey local regulations for the disposal of the material.

i03914051

Final Drive Oil Level - Check

SMCS Code: 4050-535-FLV

WARNING

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

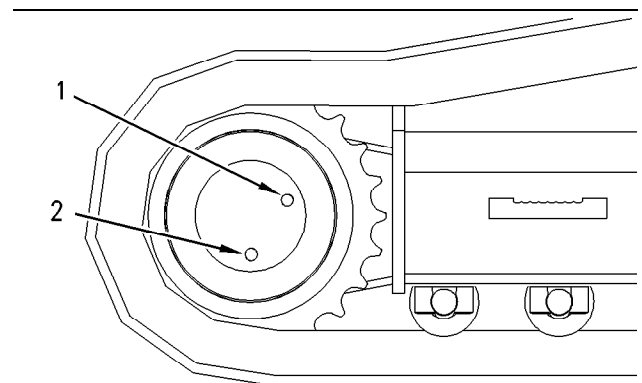


Illustration 391

g00822278

- (1) Oil level plug
(2) Oil drain plug

- Position one final drive so that oil drain plug (2) is at the bottom.

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

2. Remove oil level plug (1).
3. Check the oil level. The oil should be near the bottom of the level plug opening.
4. Add oil through the level plug opening, if necessary. See Operation and Maintenance, "Lubricant Viscosities".

Note: If the oil fills slowly, the fill hole may be blocked by the planetary gear. Rotate the final drive in order to move the planetary gear away from the fill hole.

Note: Overfilling the final drive will cause the seals on the travel motor to allow hydraulic oil or water to enter the final drive. The final drive may become contaminated.

5. Clean oil level plug (1). Inspect the O-ring seal. Replace the O-ring seal if the O-ring seal is worn or damaged.
6. Install oil level plug (1).
7. Repeat the procedure for the other final drive.

i03756611

Final Drive Oil Sample - Obtain

SMCS Code: 4011-008; 4050-008; 4050-SM; 7542-008

WARNING

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

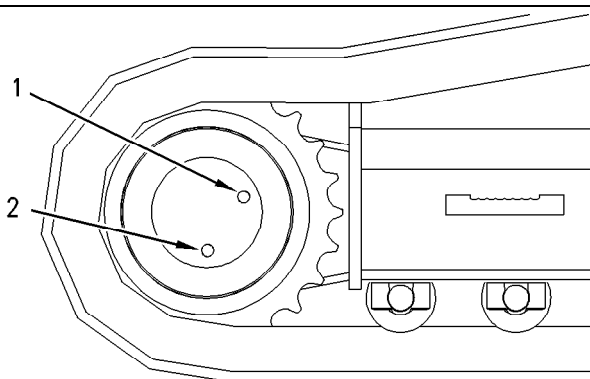


Illustration 392

g00822278

- (1) Oil level plug
(2) Oil drain plug

1. Position the final drive so that oil drain plug (2) is at the bottom.

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

2. Remove oil level plug (1).
3. Obtain a sample of the final drive oil through the hole for the oil level plug.
4. Install oil level plug (1).

Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" "S·O·S Oil Analysis" for more information on obtaining a sample of the final drive oil. For additional information about taking an oil sample, refer to Special Publication, PEGJ0047, "How To Take A Good Oil Sample".

i02799661

Fuel System - Prime

SMCS Code: 1250-548

WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat® products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Do not loosen the fuel lines at the fuel manifold. The fittings may be damaged and/or a loss of priming pressure may occur when the fuel lines are loosened.

Prime the fuel system in order to fill the fuel filter, and prime the fuel system in order to purge trapped air. The fuel system should be primed under the following conditions:

- The fuel tank is running low.
- The machine has been stored.

- The fuel filter is being replaced.

i03255376

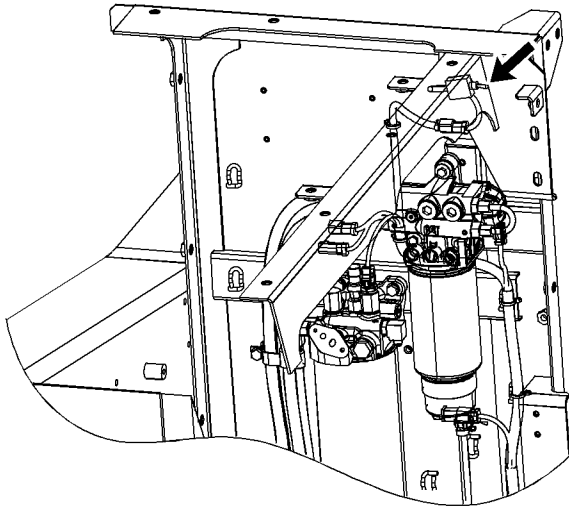


Illustration 393

g01399394

The switch for the fuel priming pump is located by the primary fuel filter/water separator.

1. Open the front access door on the left side of the machine.
2. Hold the switch for the fuel priming pump in the ON position. Allow the fuel priming pump to run for several seconds.
3. Return the switch for the fuel priming pump to the OFF position.

NOTICE

Do not crank the engine continuously for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking the engine again.

4. Start the engine. If you cannot start the engine, the engine needs more priming. If the engine continues to misfire or to smoke, more priming is necessary.

Note: The fuel priming pump will only operate if the engine start switch key is in the OFF position. Shut off the engine before any additional priming.

5. Run the engine at the LOW IDLE position until the engine runs smoothly.
6. Check the fuel system for leaks. Stop the engine.
7. Close the access door.

Note: Do not activate the fuel priming pump while you crank the engine.

Fuel System Primary Filter (Water Separator) Element - Replace

SMCS Code: 1263-510-FQ

WARNING

Personal injury or death may result from failure to adhere to the following procedures.

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

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill the fuel filters with fuel before installing the fuel filters. The fuel will not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts.

The primary filter/water separator is located behind the left front access door.

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

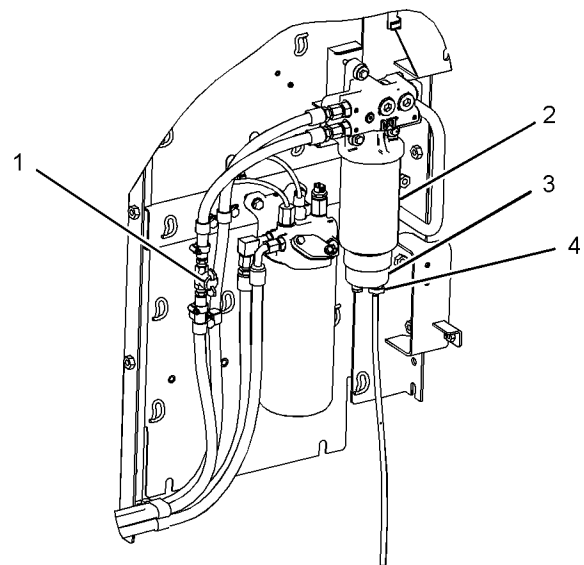


Illustration 394

g01400041

- (1) Shutoff valve
- (2) Filter
- (3) Bowl
- (4) Drain valve

2. Turn off the fuel supply to the fuel filter by turning the shutoff valve (1) clockwise.
3. Turn drain valve (4) counterclockwise in order to open. The drain valve is located on the bottom of the water separator.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" that pertains to containing fluid spillage.

4. Drain the water and sediment into a suitable container.

Note: Dispose of drained fluids and used filters according to local regulations.

5. Close drain valve (4).
6. Remove the filter (2) from the filter base. A filter wrench may be used to loosen the filter.
7. Remove the bowl (3) from the filter (2). Discard the used filter.

Note: The water separator bowl is reusable. Do not discard the water separator bowl.

8. Clean the inside surface of the filter head and of bowl (3).
9. Inspect the O-ring seal for bowl (3). Replace the O-ring seal if the seal is worn or damaged.
10. Lubricate the O-ring seal for the bowl (3) with clean diesel fuel or lubricate the O-ring seal with motor oil. Place the O-ring seal in the groove in the bowl.
11. Install the bowl (3) onto the new filter element by hand until the bowl is snug. Tighten the bowl to 7.3 N·m (5.0 lb ft) to approximately 1/6 of a turn. Do not use tools to tighten the bowl to the new filter element.
12. Lubricate the O-ring seal on the new filter element with clean diesel fuel or lubricate the O-ring seal with motor oil.
13. Install the new 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.

14. Turn on the fuel supply to the filter by turning the shutoff valve (1) counterclockwise.

Note: Do not start the engine until all service to the fuel system is complete. For instructions about priming the fuel system, refer to Operation and Maintenance Manual, "Fuel System - Prime".

15. Close the access door.

i02801459

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510

WARNING

Personal injury or death can result from a fire.

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

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill fuel filters with fuel before installing them. Contaminated fuel will cause accelerated wear to fuel system parts.

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

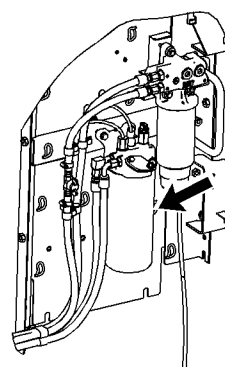


Illustration 395

g01400034

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

2. Remove the fuel filter.

Note: The fuel filter has not been drained. The filter contains fuel. When you remove the filter, use caution in order to avoid spilling the fuel.

3. Inspect the fuel filter for debris by cutting the fuel filter open.
4. Clean the mounting base of the fuel filter. Make sure that all of the old seal is removed from the mounting base.

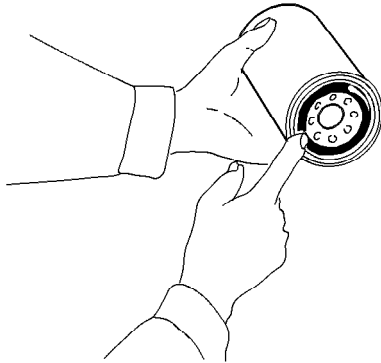


Illustration 396

g00101318

5. Apply a thin coat of clean diesel fuel to the sealing surface of the new fuel filter.
6. Install the new 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. Prime the fuel system. See Operation and Maintenance Manual, "Fuel System - Prime" for instructions.
8. Close the front access door on the left side of the machine.

i02582074

Fuel System Water Separator - Drain

SMCS Code: 1263

WARNING

Personal injury or death may result from failure to adhere to the following procedures.

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

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

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

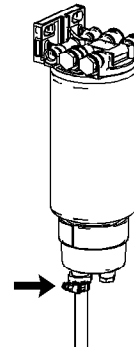


Illustration 397

g01101164

2. If water is present, drain the water from the bowl.
3. Turn the drain valve counterclockwise in order to open.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

4. Drain the water and drain the sediment into a suitable container.

Note: Dispose of drained fluids according to local regulations.

5. Close the drain valve.
6. Close the access door.

i01589598

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR

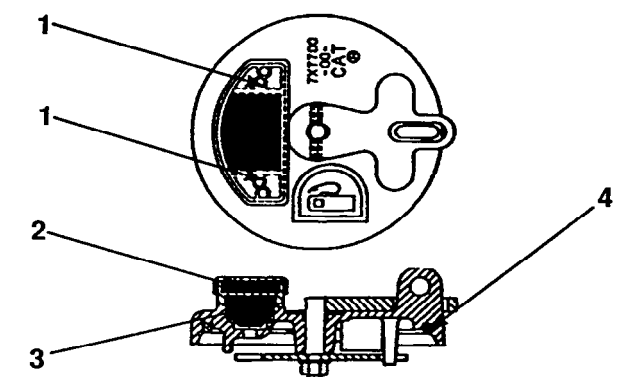


Illustration 398

g00824193

1. Remove the fuel cap.
2. Inspect seal (4) for damage. Replace the seal, if necessary.
3. Remove screws (1), filter assembly (2), drain valve (3) and the gaskets.

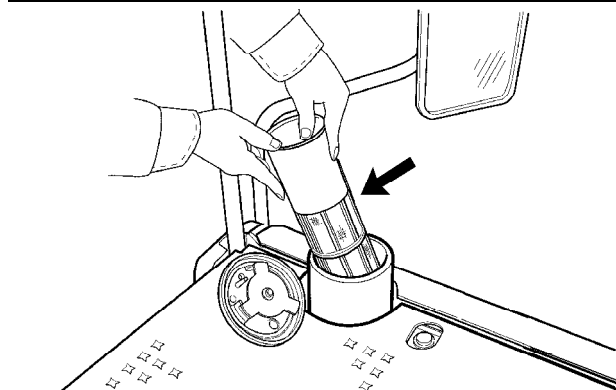


Illustration 399

g00824196

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

4. Remove the strainer that is located in the filler opening.
5. Wash the strainer and the fuel tank cap in a clean, nonflammable solvent.
6. Install a new cap filter kit. Install the gaskets, drain valve (3), filter assembly (2), and screws (1).

7. Install the strainer into the filler opening.

8. Install the fuel tank cap.

i04363385

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543

Refer to this Operation and Maintenance Manual, "Fuel Tank Shutoff and Drain Control" for the exact location of the fuel tank drain valve

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

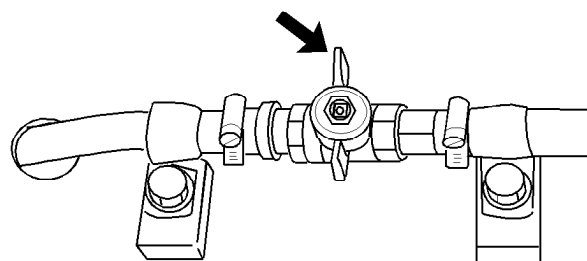


Illustration 400

g01043694

Typical example

1. Open the drain valve by turning the valve counterclockwise. Allow the water and the sediment to drain into a suitable container.

Note: Dispose of drained fluids according to local regulations.

2. Close the drain valve by turning the valve clockwise.

i03201894

Fuses - Replace

SMCS Code: 1417-510

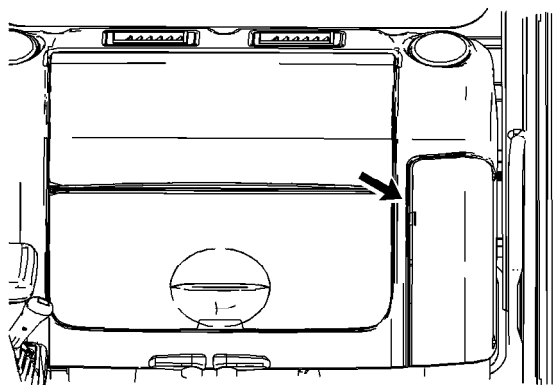


Illustration 401

g01101038

The fuse panel is located on the left side of the interior storage box. Remove the cover in order to access the fuses.



Fuses – Fuses protect the electrical system from damage that is caused by overloaded circuits. Change a fuse if the element separates. If the element of a new fuse separates, check the circuit and/or repair the circuit.

NOTICE

Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

NOTICE

If it is necessary to replace fuses frequently, an electrical problem may exist.

Contact your Caterpillar dealer.

To replace a fuse, use the puller that is stored in the fuse panel. One fuse of 5 Amperes, one fuse of 15 Amperes, one fuse of 25 Amperes, and one fuse of 30 Amperes are contained in the fuse panel as spare fuses.

The following list identifies the circuits that are protected by each fuse. The amperage for each fuse is included with each circuit.

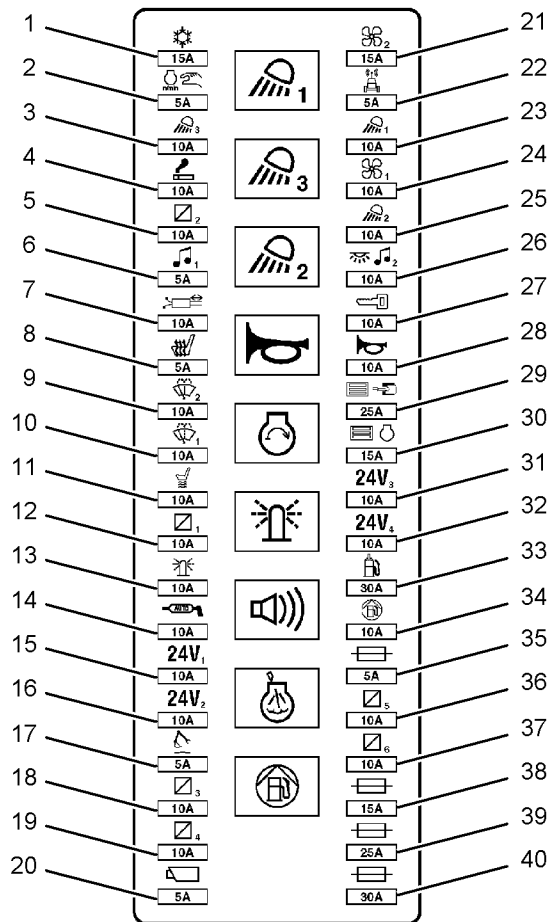


Illustration 402

g01628094

- (1) Air Conditioner – 15 Amp
- (2) Automatic Engine Speed Control (AEC) – 5 Amp
- (3) Chassis Light – 10 Amp
- (4) Cigar Lighter – 10 Amp
- (5) 12 Volt Converter 2 – 10 Amp
- (6) Switch Panel And Radio – 5 Amp
- (7) Attachment Solenoid – 10 Amp
- (8) Seat Heater – 5 Amp
- (9) Window Wiper And Window Washer – 10 Amp
- (10) Lower Window Wiper and Lower Window Washer – 10 Amp
- (11) Air Suspension Seat – 10 Amp
- (12) 12 Volt Converter – 10 Amp
- (13) Beacon – 10 Amp
- (14) Automatic Lubricator – 10 Amp

- (15) **Inspection Lamp 1** – 10 Amp
- (16) **Inspection Lamp 2** – 10 Amp
- (17) **Boom Float** – 5 Amp
- (18) **12 Volt Converter 3** – 10 Amp
- (19) **12 Volt Converter 4** – 10 Amp
- (20) **Camera** – 5 Amp
- (21) **Heater and Air Conditioner Blower Fan** – 15 Amp
- (22) **Product Link** – 5 Amp
- (23) **Boom Light** – 10 Amp
- (24) **Air Conditioner Condenser Blower** – 10 Amp
- (25) **Cab Light** – 10 Amp
- (26) **Cab Dome Light and Radio Memory** – 10 Amp
- (27) **Engine Start Switch** – 10 Amp
- (28) **Horn** – 10 Amp
- (29) **Machine Control Module** – 25 Amp
- (30) **Engine Control Module (ECM)** – 15 Amp
- (31) **Inspection Lamp 3** – 10 Amp
- (32) **Inspection Lamp 4** – 10 Amp
- (33) **Electric Refueling Pump** – 30 Amp
- (34) **Fuel Pump** – 10 Amp
- (35) **Spare** – 5 Amp
- (36) **12 Volt Converter 5** – 10 Amp
- (37) **12 Volt Converter 6** – 10 Amp
- (38) **Spare** – 15 Amp
- (39) **Spare** – 25 Amp
- (40) **Spare** – 30 Amp

Relays

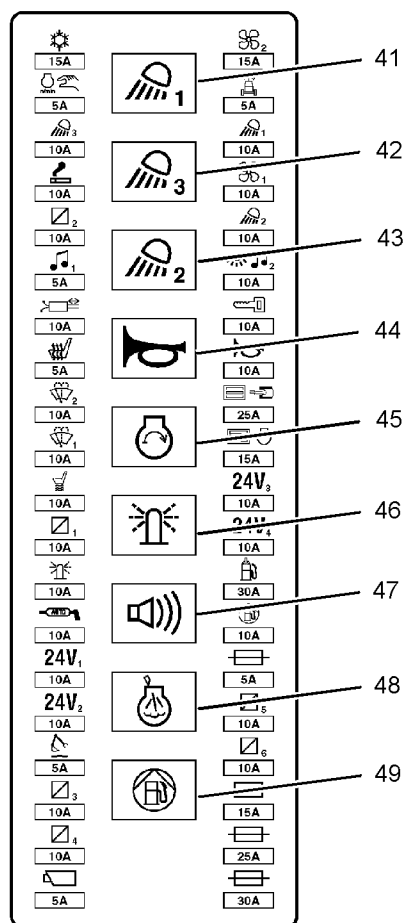


Illustration 403

g01628095

- (41) Boom Light** – Relay
- (42) Chassis Lamp** – Relay
- (43) Cab Lamp** – Relay
- (44) Horn** – Relay
- (45) Neutral Start** – Relay
- (46) Beacon (If Equipped)** – Relay
- (47) Backup alarm** – Relay
- (48) Ether Starting Aid** – Relay
- (49) Fuel Pump** – Relay

i07349182

High Intensity Discharge Lamp (HID) - Replace (If Equipped)

SMCS Code: 1434-510

WARNING

HID lamps operate at very high voltages. To avoid electrical shock and personal injury, disconnect power before servicing HID lamps.

WARNING

HID bulbs become very hot during operation. Before servicing, remove power from lamp for at least five minutes to ensure lamp is cool.

NOTICE

Although HID bulb materials may change over time, HID bulbs produced at the time of the printing of this manual contain mercury. When disposing of this component, or any waste that contains mercury, please use caution and comply with any applicable laws.

1. Remove the electrical power from the high intensity discharge lamp (HID). The electrical power must be removed from the HID lamp for at least five minutes, in order to ensure that the bulb is cool.
2. Disassemble the housing for the HID lamp in order to have access to the bulb.

Note: On some HID lamps, the bulb is an integral part of the lens assembly. The bulb is not removed separately from the lens assembly. Replace the entire lens assembly on these HID lamps.

3. Remove the bulb from the HID lamp.
4. Install the replacement bulb in the HID lamp.

If the bulb is an integral part of the lens assembly, install the replacement lens assembly in the HID lamp.

Note: In order to avoid failure to the bulb that is premature, avoid touching the bulb's surface with your bare hands. Clean any fingerprints from the bulb with alcohol prior to operation.

5. Reassemble the housing for the HID lamp. Ensure that any printing on the lens is oriented correctly with respect to the HID lamp's mounting position on the machine.

6. Reattach the electrical power to the HID lamp.

7. Check the HID lamp for proper operation.

Note: Consult your Cat dealer for additional information on HID lamps.

i04271279

Hydraulic System Filter Element (Fine Filtration) - Replace (If Equipped)

SMCS Code: 5068-510

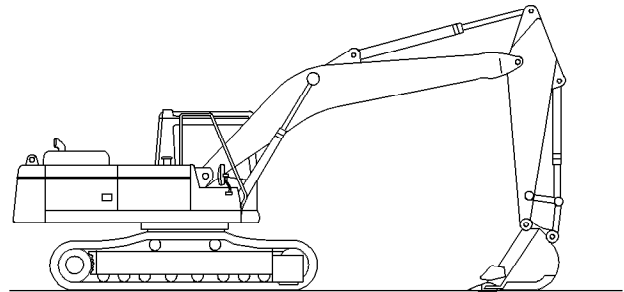


Illustration 404

g00101508

1. Place the machine in the servicing position.
2. Move the hydraulic lockout control to the LOCKED position. Stop the engine.

i02883549

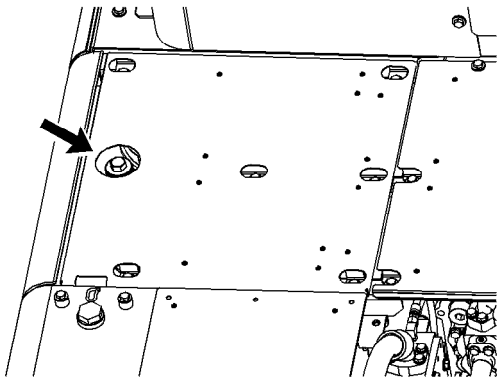


Illustration 405

g01097883

3. Slowly loosen the filler plug in order to relieve any pressure.
4. Tighten the filler plug after the pressure is relieved.
5. Open the access door on the right side of the machine.

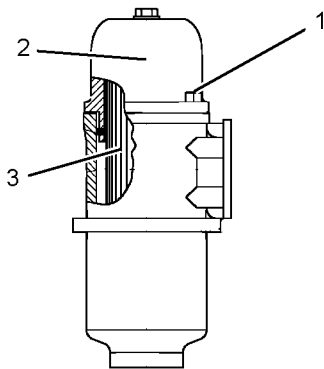


Illustration 406

g02175170

6. Remove four bolts (1) and cover (2) from the fine filtration filter.
7. Remove element (3) from the filter assembly.
8. Install a new filter element.
9. Close the access door.

Hydraulic System Oil (If Equipped with Fine Filtration Filter) - Change

SMCS Code: 5056-044

5000 Hour Oil Change Interval

A 5000 hour maintenance interval for hydraulic oil (change) is available. The extended interval requires S·O·S monitoring of the hydraulic oil. The interval for S·O·S monitoring is every 500 hours. The maintenance interval for the hydraulic oil filter is not changed. If S·O·S monitoring is not performed, the 2000 hour maintenance interval must be used.

Machines with hammers are not included in the 5000 hour maintenance interval. Machines with hammers must use the intervals that are listed in the Maintenance Interval Schedule. Machines that are used in severe conditions are not included in the 5000 hour maintenance interval. Machines that are used in severe conditions must use the interval in the Maintenance Interval Schedule.

Oil Change

Refer to Operation and Maintenance Manual, "Hydraulic System Oil - Change" for the procedure to change the hydraulic oil.

i06899648

Hydraulic System Oil - Change

SMCS Code: 5056-044

Cat HYDO Advanced Oil Change interval

The standard Cat HYDO Advanced oil change interval is every 6000 service hours or 3 years.

The 6000 service hour or 3 year maintenance interval for hydraulic oil (change) is strongly recommended with S·O·S monitoring of the hydraulic oil after 3000 service hours. The interval for S·O·S monitoring is every 500 hours. An oil change is strongly recommended when the oil deterioration or contamination is detected. The maintenance interval for the hydraulic oil filter is not changed.

Machines with hammers are not included in the 6000 service hour or 3 year maintenance interval. Machines with hammers must use the intervals that are listed in the Maintenance Interval Schedule. Machines that are used in severe conditions are not included in the 6000 service hour or 3 year maintenance interval. Machines that are used in severe conditions must use the 3000 service hour or 3 year maintenance interval.

Note: If Cat HYDO Advanced hydraulic oil is not used, the normal interval of 6000 hours is decreased to 2000 service hours or 1 year.

Consult your Cat dealer for details.

Procedure to Change the Hydraulic Oil

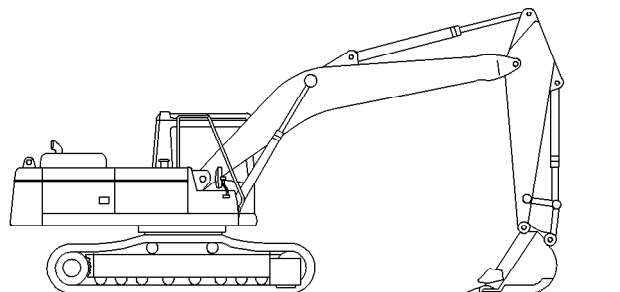


Illustration 407

g00101435

1. Park the machine on level ground. Lower the bucket to the ground so that the stick is vertical.

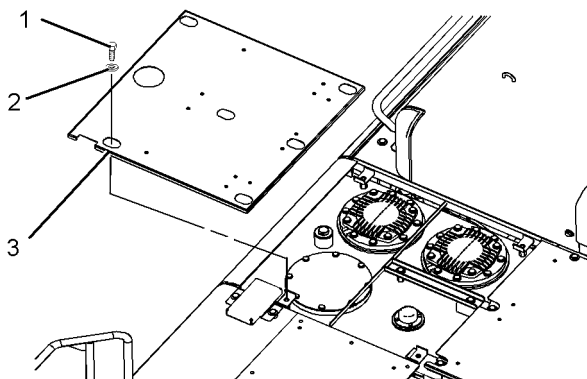


Illustration 408

g01124015

- (1) Bolts
(2) Washers
(3) Cover

2. Remove bolts (1), washers (2) and cover (3) from the top of the hydraulic tank.

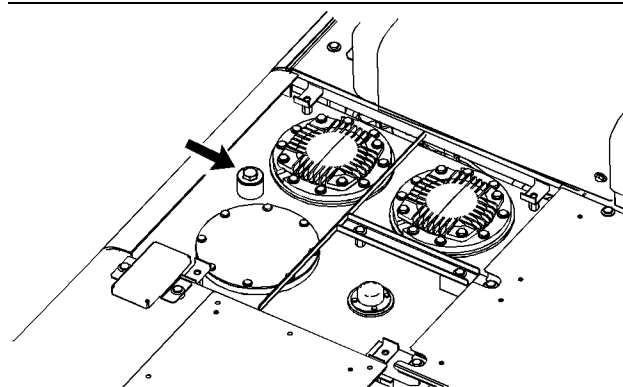


Illustration 409

g01124016

3. Clean the area thoroughly in order to keep dirt out of the screen cover. Clean the area thoroughly in order to keep dirt out of the fill/vent plug.
4. Relieve the internal pressure from the hydraulic tank by loosening the fill/vent plug. After the pressure is relieved, remove the fill/vent plug.

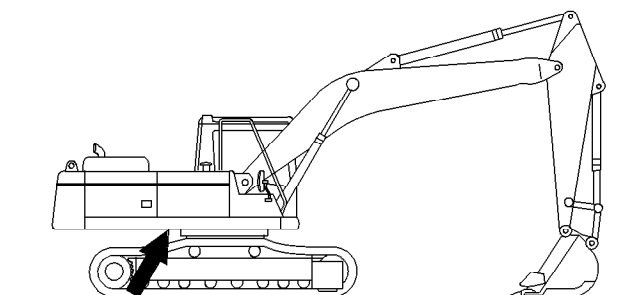


Illustration 410

g00101446

The oil drain valve is located under the hydraulic tank.

5. Remove the hydraulic tank access cover that is located under the upper structure. This will allow access to the drain valve.

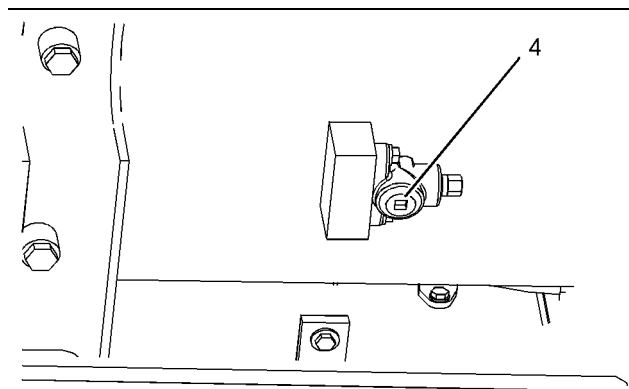


Illustration 411

g01124017

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

6. Remove plug (4).

7. Inspect the O-ring. Replace the O-ring if wear or damage is evident.

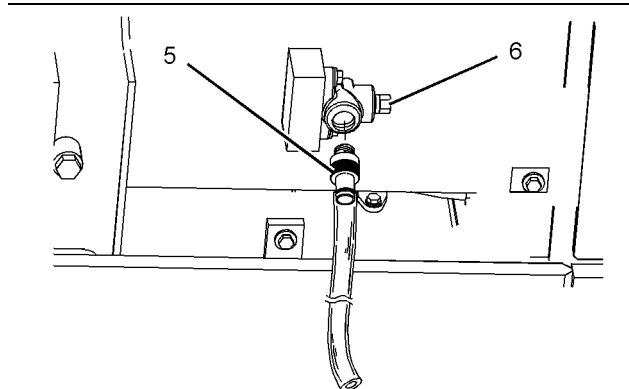


Illustration 412

g01124018

8. Install swivel hose (5) with clear plastic tubing.

9. Loosen drain plug (6) in order to drain the oil.

10. Drain the oil into a suitable container.

11. After the oil has been drained, tighten drain plug (6) to a torque of $110 \pm 15 \text{ N}\cdot\text{m}$ ($81 \pm 11 \text{ lb ft}$).

12. Remove the swivel hose.

13. Clean plug (4) and install the plug. Tighten the plug to a torque of $90 \pm 8 \text{ N}\cdot\text{m}$ ($66 \pm 6 \text{ lb ft}$).

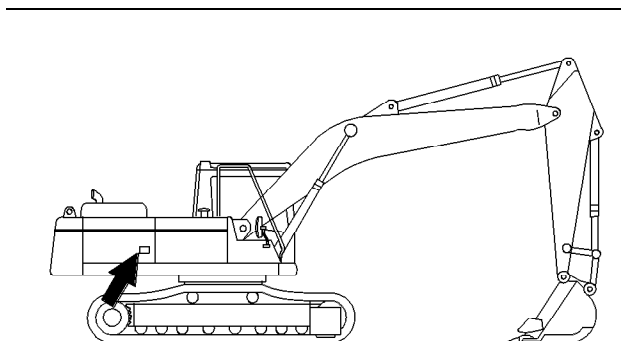


Illustration 413

g00101449

14. Open the access door that is located on the right side of the machine.

15. Clean the pump, the hydraulic lines, and the hydraulic tank.

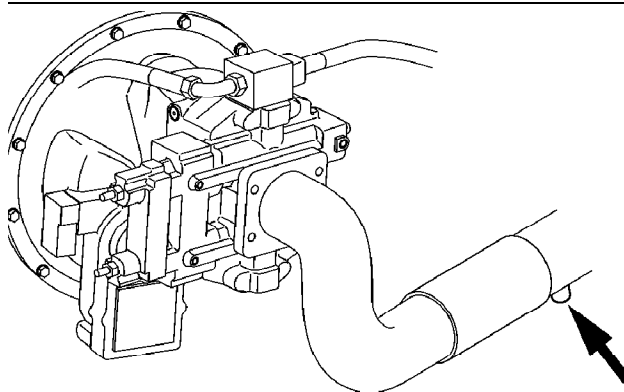


Illustration 414

g00833606

16. Remove the plug from the tube. Allow the oil to drain into a container.

Note: Dispose of used filters and used fluids according to local regulations.

17. Inspect the O-ring. Replace the O-ring if wear or damage is evident.

18. Clean the plug. Install the plug and the O-ring into the drain port.

Maintenance Section
Hydraulic System Oil - Change

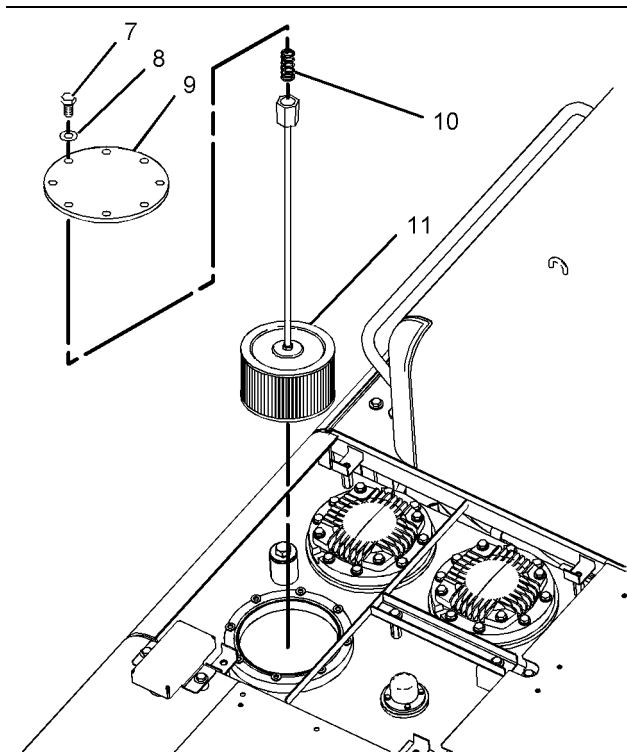


Illustration 415

g01124019

- (7) Bolts
- (8) Washers
- (9) Cover
- (10) Spring
- (11) Screen

19. Remove bolts (7), washers (8) and cover (9).

Note: Dispose of used filters and used fluids according to local regulations.

Note: Do not allow spring (10) to fall back into the tank.

20. Remove spring (10) and screen (11).

Note: Refer to Operation and Maintenance, "General Hazard Information" for information on containing fluid spillage.

21. Wash the screen in a clean nonflammable solvent. Allow the screen to dry. Inspect the screen. Replace the screen, if the screen is damaged.

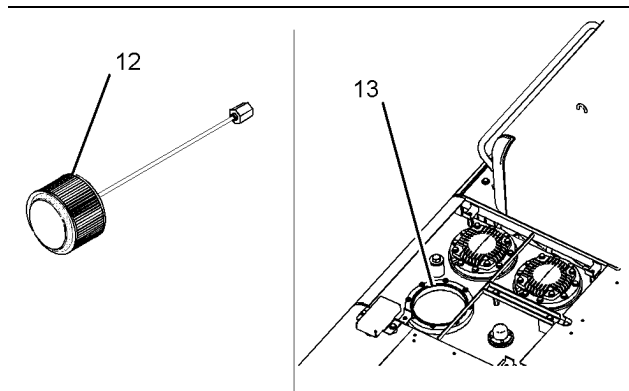


Illustration 416

g01124020

- (12) O-ring seal
- (13) O-ring seal

22. Inspect O-ring seals (12) and (13). Replace the O-ring seals if wear or damage is evident.

23. Install screen (11) and spring (10). Then install cover (9), washers (8), and bolts (7).

Note: Make sure that the O-ring seals and the spring are properly positioned during installation.

24. Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, "Capacities (Refill)".

25. Inspect the O-ring seal on the filler plug for damage. Replace the O-ring, if necessary. Clean the filler plug. Install the filler plug.

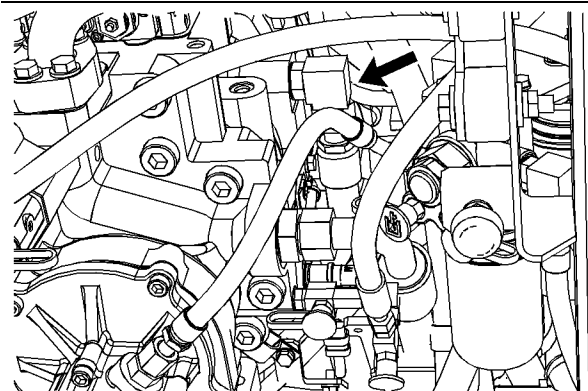


Illustration 417

g01124021

Note: Make no attempt to start the engine until the pump has been filled with hydraulic oil. Serious damage to the hydraulic components can result.

26. When the hydraulic oil has been replaced, the air must be removed from the hydraulic oil system. Use the following procedure to remove the air from the hydraulic oil system.

- a. While the engine is stopped, loosen the hose coupling on the side of the pump. Leave the hose coupling unattached for several minutes until the pump is filled with hydraulic oil. After the pump is filled with hydraulic oil, tighten the hose coupling. Start the engine. When the engine is at low idle, fully raise the boom. Hold the boom in this position.
- b. Stop the engine. Slowly lower the boom until the bucket is on the ground. This pressurizes the hydraulic tank.
- c. Slowly loosen the hose coupling until the hydraulic oil flows out of the hose coupling. This indicates that the air has been released from the pump. Tighten the hose coupling.

27. Close the access door.

28. Start the engine. Operate the engine at idling speed for five minutes.

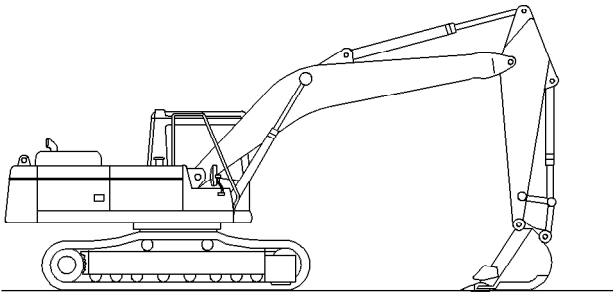


Illustration 418

g00101435

- 29.** Operate the control levers in order to circulate the hydraulic oil. Lower the bucket to the ground so that the stick is vertical to the ground. Stop the engine.
- 30.** Open the access door that is located on the right side of the machine.

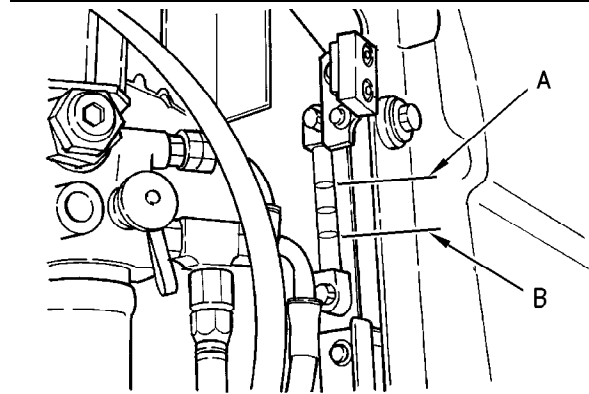


Illustration 419

g00687286

- (A) High temperature range
(B) Low temperature range

31. Maintain the oil level between the marks on the sight gauge in the appropriate temperature range.

32. Close the access door.

i02424845

Hydraulic System Oil Filter (Case Drain) - Replace

SMCS Code: 5068-510; 5091-510

- 1.** Open the access door on the right side of the machine.

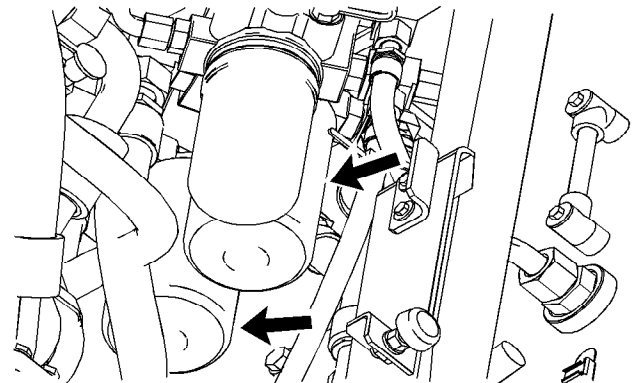


Illustration 420

g01098297

- 2.** Clean the area in order to keep dirt out of the filter base.
- 3.** Remove the used case drain filter from the filter base.

Note: Dispose of used filters according to local regulations.

- 4.** Clean the filter base.

Maintenance Section
Hydraulic System Oil Filter (Pilot) - Replace

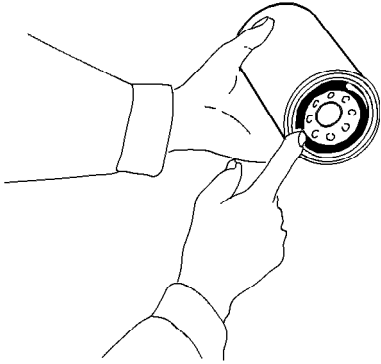


Illustration 421

g00101502

5. Coat the seal of a new case drain filter with clean hydraulic oil.

6. Install the new case drain 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. Drive the machine slowly for 10 to 15 minutes. Move each cylinder evenly through several cycles.

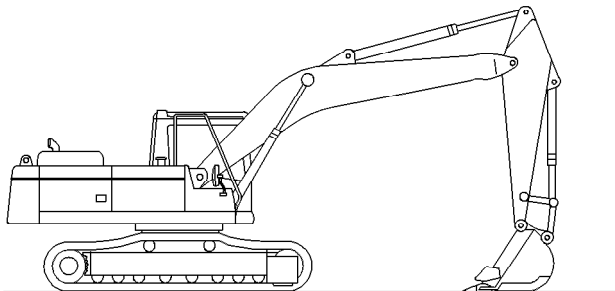


Illustration 422

g00101508

8. Return the machine to the position that is shown above. Check the machine for oil leaks.
9. Stop the engine.
10. Open the access door on the right side of the machine in order to access the sight gauge.

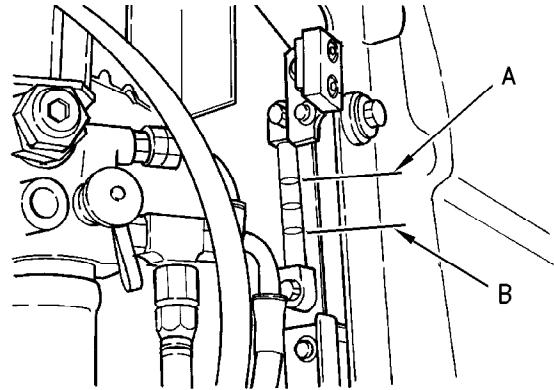


Illustration 423

g00687286

(A) High Temperature Range. (B) Low Temperature Range.

11. Maintain the oil level in the low temperature range for a cold machine. Maintain the oil level in the high temperature range for a machine that is at a normal operating temperature.

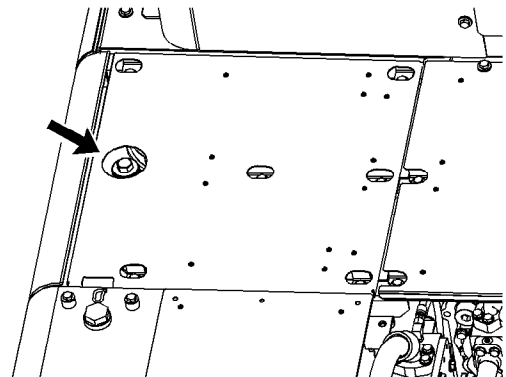


Illustration 424

g01097883

12. Slowly loosen the filler plug in order to relieve any pressure. Remove the filler plug in order to add oil, if necessary. See Operation and Maintenance, "Lubricant Viscosities".

13. Clean the filler plug. Install the filler plug.

14. Close the access door.

i02424842

Hydraulic System Oil Filter (Pilot) - Replace

SMCS Code: 5068-510; 5068-510-PS; 5092-510

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

i02586670

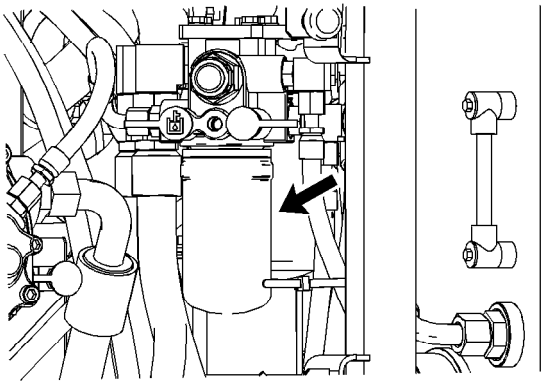


Illustration 425

g01098305

2. Clean the area in order to keep dirt out of the filter base.
3. Remove the used pilot filter element from the filter base.

Note: Dispose of used filters according to local regulations.

4. Clean the filter base.

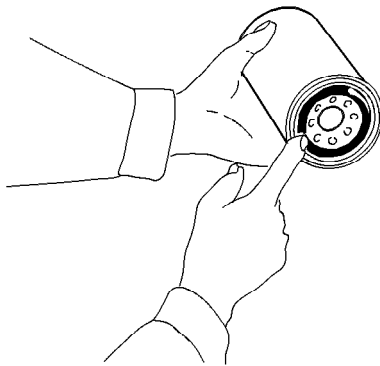


Illustration 426

g00101502

5. Coat the seal of a new pilot filter with clean hydraulic oil.
6. Install the new pilot 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. Close the access door.

Hydraulic System Oil Filter (Return) - Replace

SMCS Code: 5068-510-RJ

WARNING

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

The return filter is a cartridge type filter. The return filter reduces the amount of foreign material that enters the hydraulic system when the filter element is replaced.

Note: If the message display shows that the hydraulic return filter is plugged, turn off the machine. After you make sure that the warning has disappeared, start the machine and run the machine on level ground for approximately 10 minutes. If the warning still appears in the message display, inspect the filter and replace the filter, if necessary.

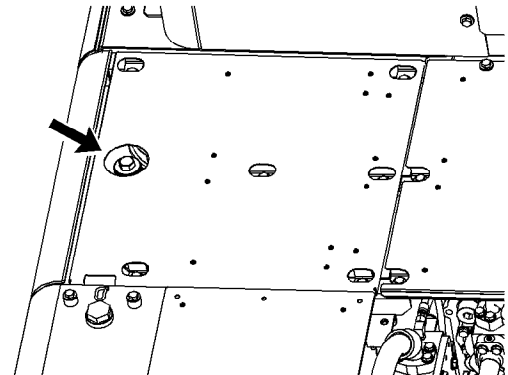


Illustration 427

g01097883

1. Loosen the filler plug in order to relieve the hydraulic tank pressure. Tighten the filler plug after the hydraulic tank pressure is relieved.

Maintenance Section
Hydraulic System Oil Filter (Return) - Replace

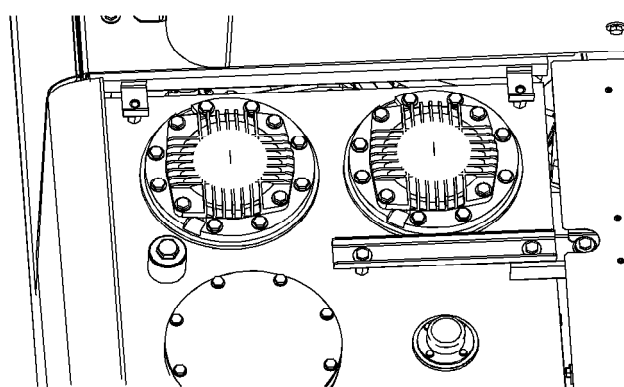


Illustration 428

g01097884

Note: The return filters are located in the hydraulic tank.

2. Remove the filter cartridge. Perform Step 2a through Step 2f in order to remove the filter cartridge.

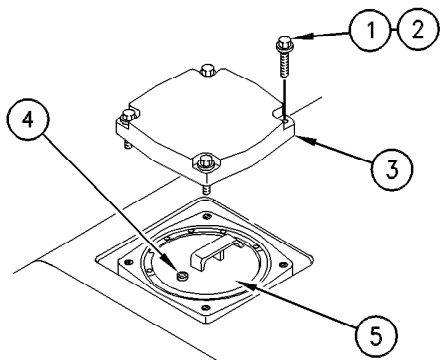


Illustration 429

g00102211

- (1) Bolts
- (2) Washers
- (3) Cover
- (4) Plug
- (5) Filter cartridge

- a. Remove bolts (1), washers (2), and cover (3).

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

- b. Remove plug (4) in order to release the pressure in filter cartridge (5).

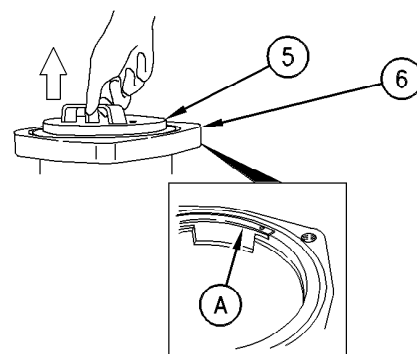


Illustration 430

g00102212

- (5) Filter cartridge
- (6) Filter case
- (A) Guide

- c. Pull up the handle at the top of filter cartridge (5) until the filter cartridge contacts guide (A) on filter case (6).

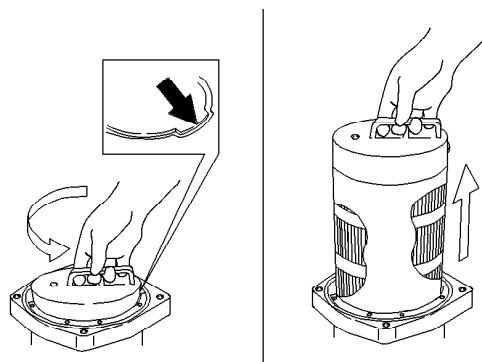


Illustration 431

g00102214

- d. Turn the filter cartridge counterclockwise by 180 degrees in order to align the projection of the filter cartridge with the notch of the filter case. Pull out the filter cartridge.

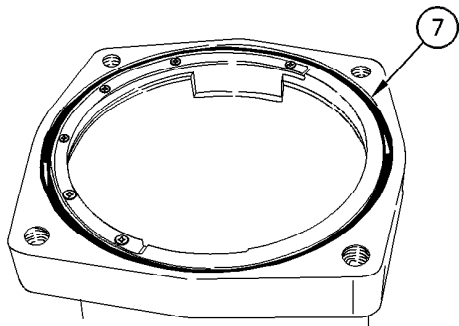


Illustration 432

g00102219

(7) O-ring

- e. Inspect the cover and O-ring (7). If either part is damaged, replace the part.
- f. Inspect the filter cartridge for debris and for damage. If necessary, replace the filter cartridge.

3. Remove the filter element. Perform Steps 3a through 3f in order to remove the other filter element.

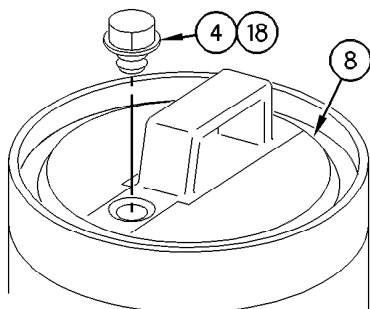


Illustration 433

g00104507

(4) Plug
(8) Plate
(18) O-ring

- a. Make sure that plug (4) is removed. Make sure that all of O-ring (18) is removed from plate (8).

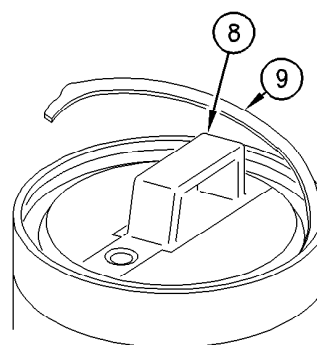


Illustration 434

g00918893

(8) Plate
(9) Spiral retaining ring

- b. Remove spiral retaining ring (9).

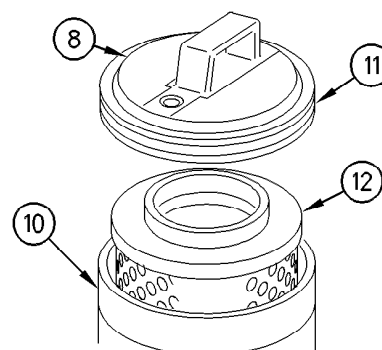


Illustration 435

g00104510

(8) Plate
(10) Shell
(11) O-ring
(12) Filter element

- c. Hold the filter cartridge with one hand. Grasp the grip of plate (8) with your other hand. Lift plate (8) in order to separate plate (8) from the filter cartridge.
- d. Remove O-ring (11) from plate (8).
- e. Lift filter element (12) from shell (10).
- f. Pour the remaining oil into a suitable container.

Note: Dispose of used oil according to local regulations.

- g. Repeat Step 3a through Step 3f for the other filter.

4. Clean the shell of the filter cartridge. Perform Step 4a through Step 4d in order to clean the shell of the filter cartridge.

Maintenance Section
Hydraulic System Oil Filter (Return) - Replace

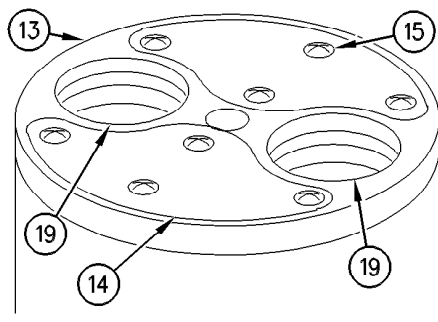


Illustration 436

g00104511

- (13) Slide plate
- (14) Pads
- (15) Screws
- (19) Port

- a. Turn shell (10) upside-down.
- b. Remove screws (15).
- c. Remove pads (14) from slide plate (13).
- d. Wash the following parts in a clean nonflammable solvent: plug (4), plate (8), spiral retaining ring (9), shell (10) and pads (14). Dry the parts.
- e. Repeat Steps 4a through 4d for the other filter.

5. Install the filter elements. Perform Step 5a through Step 5k in order to install the filter elements.

Note: Consult a Caterpillar dealer for the Service Kit that is needed to install the filter element and the filter cartridge.

- a. Apply spray type oil to the inside of shell (10) in order to prevent rust.
- b. Apply grease to a new O-ring (11).
- c. Plate (8) will contact the inside of shell (10). Apply grease to this point.
- d. Apply grease to O-rings inside ports (19) at the bottom of shell (10).
- e. Install new pads (14). Tighten screws to a torque of 4 N·m (35 lb in).
- f. Apply spray type oil into the clearance between shell (10) and slide plate (13).

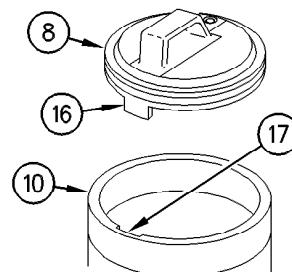


Illustration 437

g00104512

- (8) Plate
- (10) Shell
- (16) Boss
- (17) Notch

- g. Turn over shell (10). Apply grease to the two O-rings on new element (12). Install element (12) into shell (10).
- h. Move boss (16) in alignment with notch (17). Install plate (8) into shell (10).
- i. Install spiral retaining ring (9) into the groove in shell (10).
- j. Apply grease to new O-ring (18). Install O-ring (18) on plug (4).
- k. Install plug (4) into plate (8).
- l. Repeat Steps 5a through 5k for the other filter.

6. Install the filter cartridge. Perform Step 6a through Step 6e in order to install the filter cartridge.

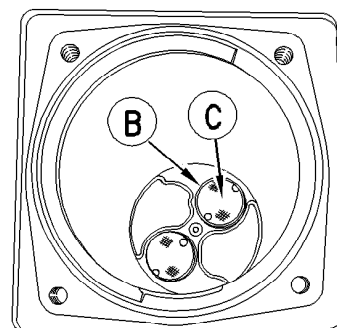


Illustration 438

g00102220

- (B) Port
- (C) Slide plate

- a. Check that ports (B) at the bottom of the filter case are closed.

Note: If the ports are open, rotate slide plate (C) counterclockwise to the stopper in order to fully close the ports. When the ports are fully closed, any remaining oil in the filter case should be completely removed.

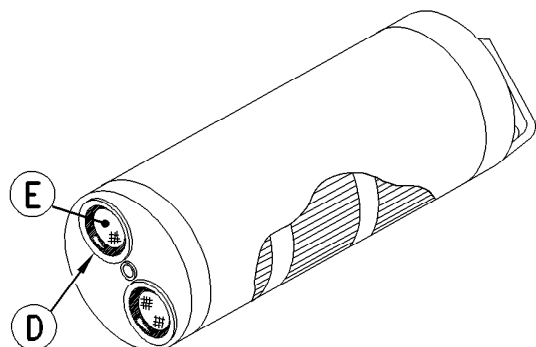


Illustration 439

g00102221

(E) Slide plate
(D) Port

- b. Check that ports (D) of the filter cartridge are fully closed.

Note: The filter cartridge cannot be installed unless the ports are fully closed. If the ports are open, rotate slide plate (E) counterclockwise to the stopper in order to fully close the ports.

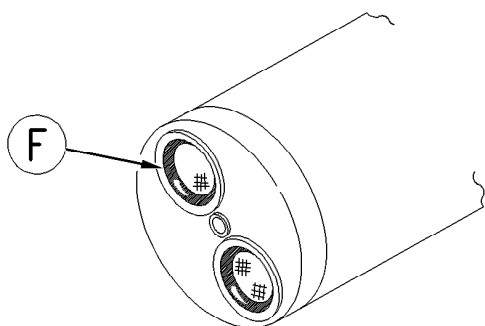


Illustration 440

g00102222

(F) O-rings

- c. Check that O-rings (F) have been installed and that oil has been applied to O-rings (F).

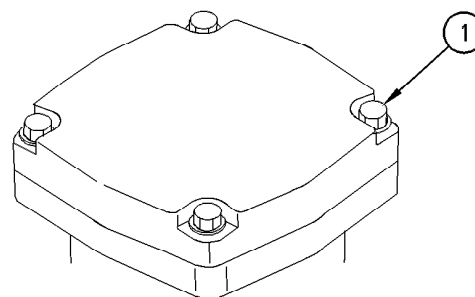


Illustration 441

g00102225

(1) Bolts

- d. Install the filter cartridge into the filter case. Turn the filter cartridge clockwise by 180 degrees and push down the filter cartridge when the filter cartridge contacts guide (A).
- e. Install plug (4), cover (3), washers (2), and bolts (1). Tighten bolts (1) to a torque of $29 \pm 5 \text{ N}\cdot\text{m}$ ($22 \pm 4 \text{ lb ft}$).

7. Repeat Steps 6a through 6e for the other filter.

i02424841

Hydraulic System Oil Level - Check

SMCS Code: 5050-535

NOTICE

Never remove the fill/vent plug from the hydraulic tank if the oil is hot.

Air can enter the system and cause pump damage.

The hydraulic oil tank is on the right side of the machine.

Maintenance Section

Hydraulic System Oil Sample - Obtain

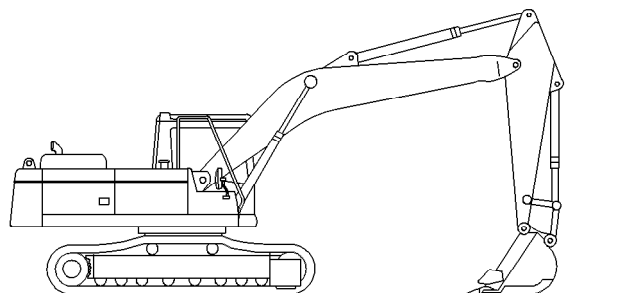


Illustration 442

g00101435

1. Park the machine on level ground. Lower the bucket to the ground with the stick in a vertical position, as shown.
2. Open the access door on the right side of the machine.

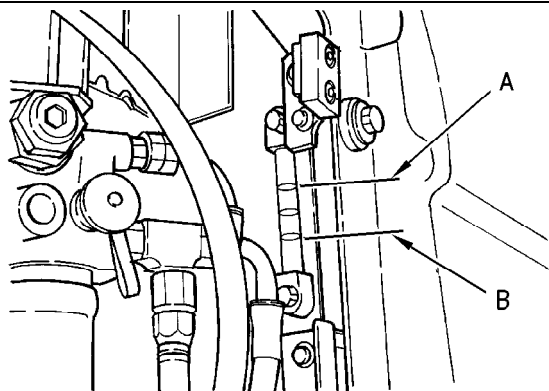


Illustration 443

g00687286

- (A) High temperature range
(B) Low temperature range

3. For a cold machine, maintain the hydraulic oil level in the low temperature range. For a machine that is at normal operating temperature, maintain the hydraulic oil level in the high temperature range.
4. Close the access door.

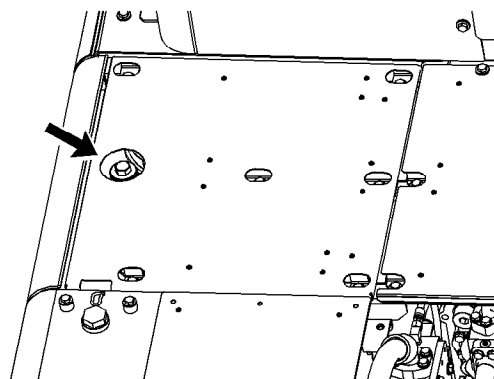


Illustration 444

g01097883

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

5. Slowly loosen the filler plug in order to relieve any pressure. Add oil, if necessary. See Operation and Maintenance, "Lubricant Viscosities".
6. Check the O-ring seal of the filler plug. Replace the O-ring seal if the O-ring seal is damaged.
7. Clean the filler plug and install the filler plug.
8. Close the access door.

i06224195

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008-OC; 5095-SM; 5095-008; 7542-008; 7542

Note: If Cat HYDO Advanced hydraulic oils are used, the hydraulic oil change interval is extended to 6000 hours. S·O·S services after 3000 hours is strongly recommended. Consult your Cat dealer for details.

Open the access door on the right side of the machine in order to access the sampling valve.

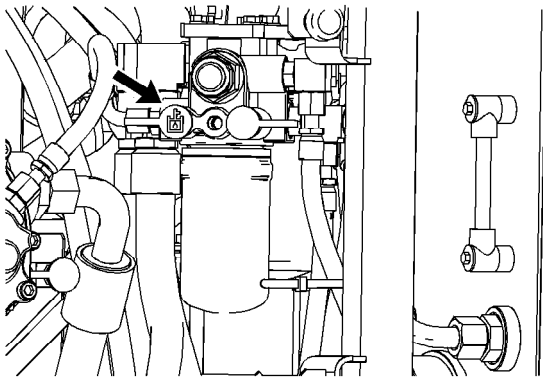


Illustration 445

g01097804

The hydraulic oil sampling valve is located on the housing of the pilot filter.

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, PEGJ0047, "How To Take A Good Oil Sample".

i02116248

Indicators and Gauges - Test

SMCS Code: 7450-081; 7490-081

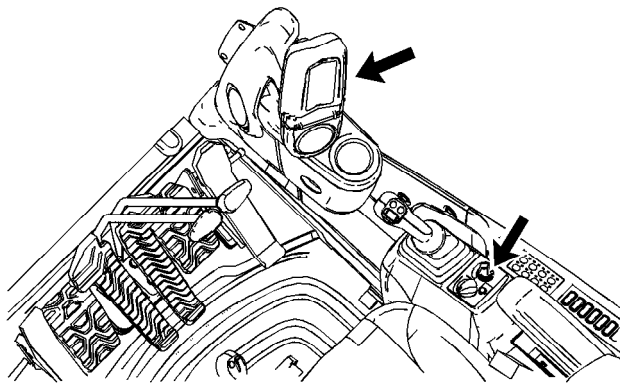


Illustration 446

g01077750

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. Release the travel levers and the travel pedals. The machine should stop.

6. Stop the engine.
7. Make any repairs that are required before operating the machine.

i04797675

Oil Filter (Hydraulic Hammer) - Replace

SMCS Code: 5068-510

WARNING

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

1. Park the machine on level ground in the service position.
2. Move the hydraulic lockout control to the UNLOCKED position.
3. Turn the engine start switch to the ON position.
4. Move the joysticks and the travel levers/pedals to the full stroke positions in order to relieve the pressure in the hydraulic lines.
5. Turn the engine start switch to the OFF position and return the lever for the hydraulic lockout control to the LOCKED position.

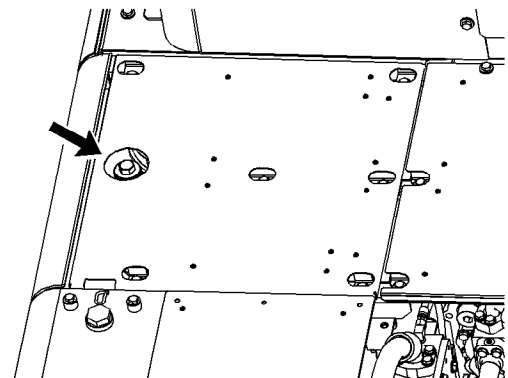


Illustration 447

g01097883

6. Loosen the filler plug in order to relieve the hydraulic tank pressure. Tighten the filler plug after the hydraulic tank pressure is relieved.
7. The oil filter for the hammer is located near the base of the boom.

Maintenance Section
Oil Filter (Hydraulic Hammer) - Replace

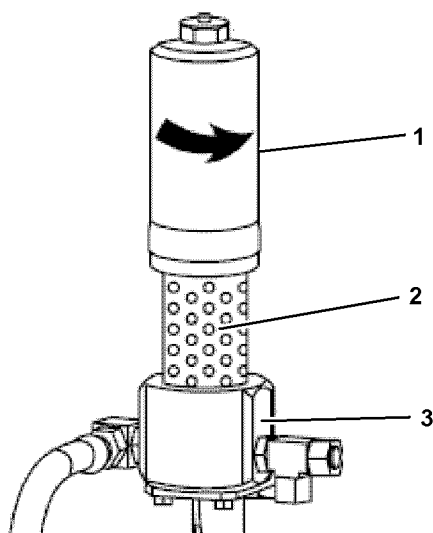


Illustration 448

g02902799

- (1) Filter case
- (2) Filter element
- (3) Filter base

8. Position a suitable container in order to contain the oil.

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.

9. Loosen filter case (1).

10. Lift filter case (1) in order to remove filter element (2).

11. Remove the used filter element from filter base (3).

Note: The element cannot be reused.

Note: Used filter elements should always be disposed of according to local regulations.

12. Clean filter case (1) and inspect the O-ring for damage. Replace the O-ring if necessary.

13. Install the new filter element.

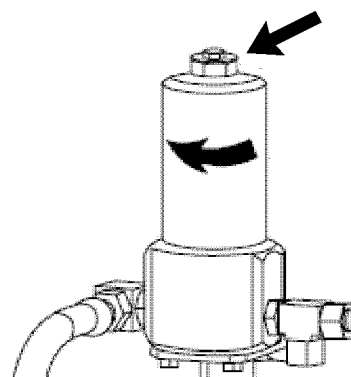


Illustration 449

g02909599

14. Assemble filter case (1). Tighten the nut on the filter case to a torque of $100 \pm 10 \text{ N}\cdot\text{m}$ ($72 \pm 7 \text{ lb ft}$).

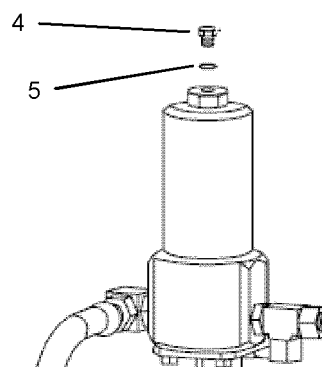


Illustration 450

g02909737

15. Remove plug (4) and inspect O-ring (5) for damage. Replace the O-ring if necessary. Tighten plug (4) to a torque of $13 \pm 2 \text{ N}\cdot\text{m}$ ($10 \pm 1.5 \text{ lb ft}$).

16. Start the engine and operate the machine slowly for 10 to 15 minutes. Move each cylinder evenly through several cycles and operate the hammer.

17. Return the machine to the service position. Check the machine for oil leaks.

18. Stop the engine.

19. Check the hydraulic oil level.

Reference: For the correct procedure, refer to Operation and Maintenance Manual, "Hydraulic System Oil Level - Check".

i02106227

Oil Filter - Inspect

SMCS Code: 1308-507; 5068-507

Inspect a Used Filter for Debris

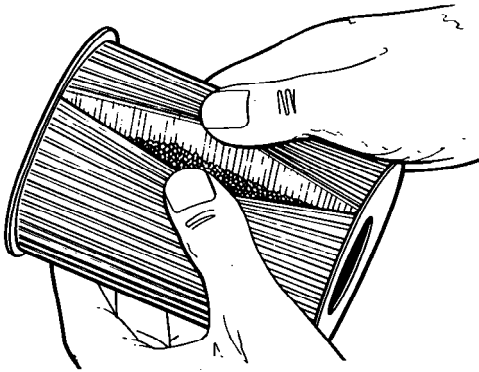


Illustration 451

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.

i02981820

Pump Coupling Oil - Change

SMCS Code: 5062-044

WARNING

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

Note: If the machine is parked on an incline or the engine has been stopped for a short period of time, the oil in the pump coupling will not return to the housing. Park the machine on level ground and drain the oil after the engine has been stopped for at least 15 minutes.

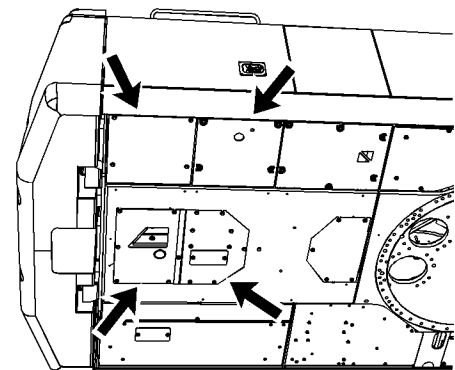


Illustration 452

g01513167

1. Remove the four cover plates in order to gain access to the drain plug.

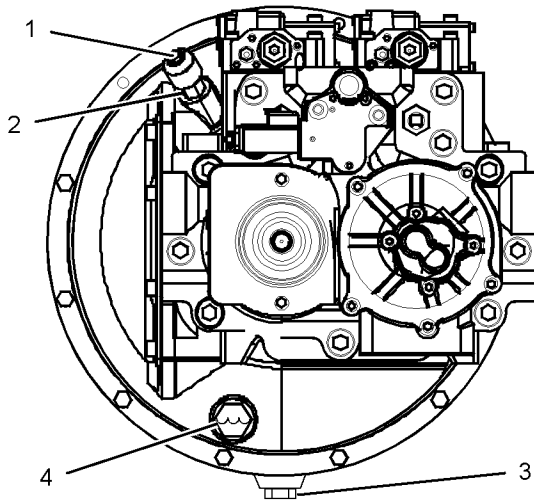


Illustration 453

g01513294

- (1) Breather cap
- (2) Adapter
- (3) Oil drain plug
- (4) Oil level sight gauge

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

2. Remove drain plug (3). Allow the oil to drain into a suitable container.
3. Clean the drain plug and inspect the O-ring seal. If wear or damage is evident, replace the drain plug and/or the O-ring seal.
4. Install drain plug (3).
5. Open the access door on the right side of the machine.

NOTICE

Do not overfill the housing for the pump coupling. Overfilling will cause the engine oil to overheat and engine damage can result.

6. Remove breather cap (1) and adapter (2). Fill the housing with new oil to the middle of oil level sight gauge (4). See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Capacities (Refill)".
7. Clean the breather cap and the adapter. Inspect the O-ring seal. If wear or damage is evident, replace the damaged part.
8. Install the breather cap and the adapter.
9. Check for leaks.

10. Close the access door on the right side of the machine.

11. Install the four cover plates.

i05097229

Pump Coupling Oil Level - Check

SMCS Code: 5062-535

WARNING

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

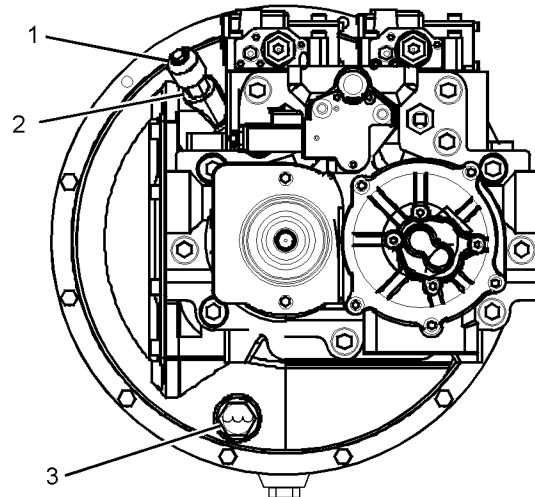


Illustration 454

g01513216

- (1) Breather
- (2) Adapter
- (3) Sight Gauge

Note: Check the oil level for the pump coupling with the machine on a level surface. If the machine is parked on an incline or the engine has been stopped for a short period, the oil in the pump coupling will not return to the housing. The fluid level cannot be checked properly. Park the machine on level ground and check the oil level after the engine has been stopped for at least 15 minutes.

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

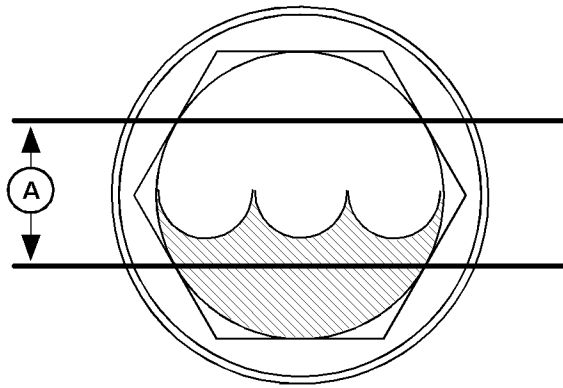


Illustration 455

g03208836

Sight Gauge

2. Maintain the oil level in area (A) of sight gauge (3). If the oil level is low, then add oil. See Operation and Maintenance Manual, "Lubricant Viscosities".

NOTICE

Do not overfill the housing for the pump coupling. Overfilling will cause the engine oil to overheat and engine damage can result.

3. Remove breather cap (1) and adapter (2) and fill to the recommended oil level.
4. Clean the breather cap and the adapter. Inspect the O-ring seal. If wear or damage is evident, replace the damaged part.
5. Replace the breather cap and the adapter.
6. Close the right side access door.

i02817893

Radiator Core - Clean

SMCS Code: 1353-070

**WARNING**

Personal injury can result from air pressure.

Personal injury can result without following proper procedure. When using pressure air, wear a protective face shield and protective clothing.

Maximum air pressure at the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.

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

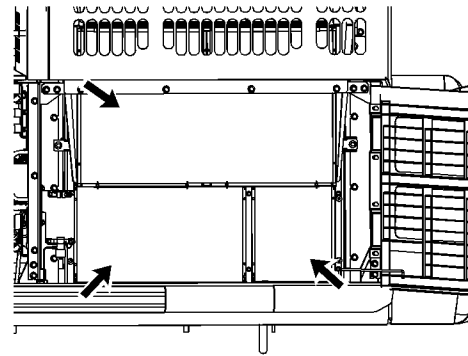


Illustration 456

g01405363

2. Check all of the core fins for debris.
3. Remove dust and debris from all of the core fins and from the screens.

Refer to Operation and Maintenance, "General Hazard Information" for the proper safety precautions that should be followed before compressed air is used.

Compressed air is preferred, but high pressure water or steam can be used to remove dust and general debris from a core.

See Special Publication, SEBD0518, "Know Your Cooling System" for more detailed information about cleaning core fins.

4. Close the rear access door on the left side of the machine.

i05805860

Receiver Dryer (Refrigerant) - Replace

SMCS Code: 7322-710; 7322-510

WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

NOTICE

If the refrigerant system has been open to the outside air (without being plugged) for more than 30 minutes, the receiver-dryer must be replaced. Moisture will enter an open refrigerant system and cause corrosion which will lead to component failure.

Refer to Service Manual, "Air Conditioning and Heating R-134a for All Caterpillar Machines" for the proper procedure to change the receiver-dryer assembly and for the procedure to reclaim the refrigerant gas.

i05252968

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

S/N: FLA1-Up

S/N: YAE1-Up

S/N: KFH1-Up

S/N: RBJ1-Up

S/N: NLM1-Up

S/N: KHS1-Up

S/N: GAX1-Up

S/N: LKY1-Up

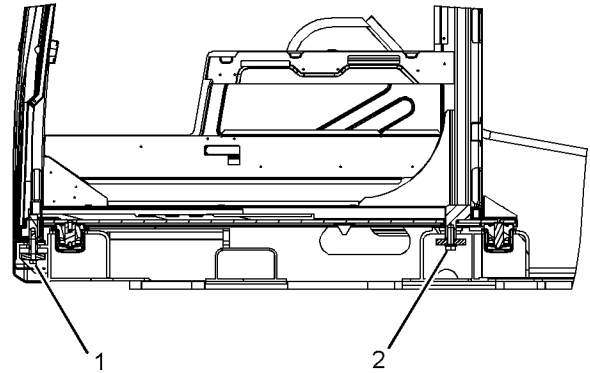


Illustration 457

g02008734

Inspect the ROPS for loose bolts or for damaged bolts. Replace any damaged bolts or missing bolts with original equipment parts only.

- Tighten the M16 bolt (1) to $125 \pm 20 \text{ N}\cdot\text{m}$ ($92 \pm 15 \text{ lb ft}$).
- Tighten the M24 bolt (2) to $425 \pm 50 \text{ N}\cdot\text{m}$ ($315 \pm 40 \text{ lb ft}$).

Do not straighten the ROPS. Do not repair the ROPS by welding reinforcement plates to the ROPS.

Consult your Cat dealer for inspection of any potential damage or repair of any damage to any operator protective structure. (Including ROPS, FOPS, TOPS, OPS, and OPG) Refer to Special Instruction, SEHS6929, "Inspection, Maintenance, and Repair of Operator Protective Structures (OPS) and Attachment Installation Guidelines for All Earthmoving Machinery"

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.

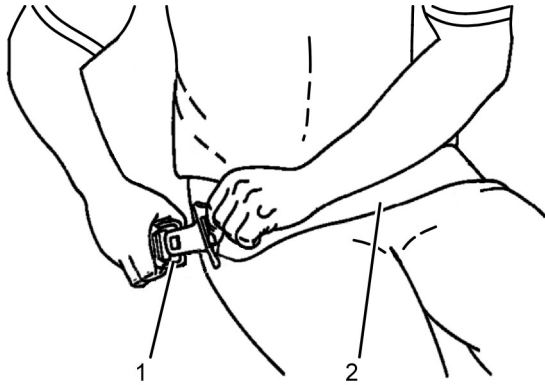


Illustration 458

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).

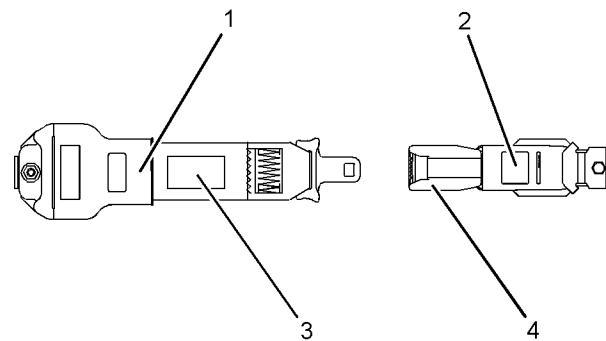


Illustration 459

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.

i03867596

Swing Bearing - Lubricate

SMCS Code: 7063-086

Note: Caterpillar recommends the use of multipurpose lithium grease NLGI Grade 2 for lubricating the swing bearing. Refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" for more information on multipurpose lithium grease.

Note: Do not overgrease the swing bearings. Do not grease more than the recommended maintenance interval. Refer to Operation and Maintenance Manual, "Maintenance Interval Schedule" for more information.

Wipe the fittings before you lubricate the swing bearings.

i03867537

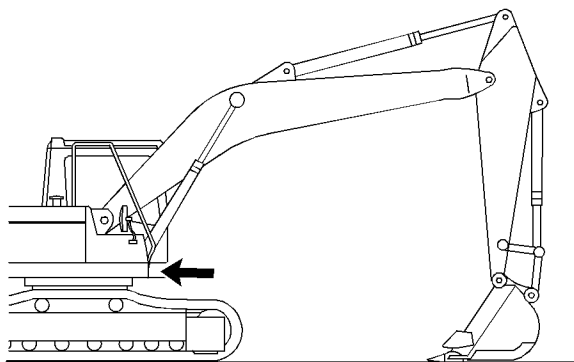


Illustration 460

g02110713

The swing bearings are under the base of the boom.

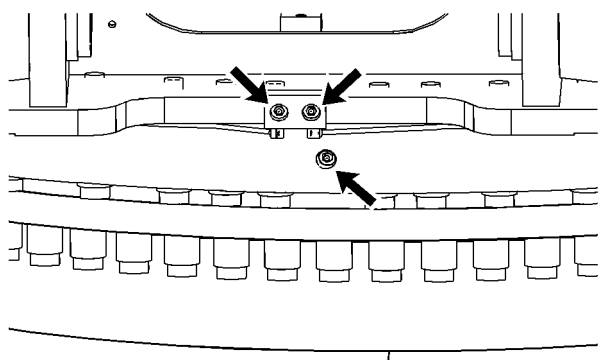


Illustration 461

g01106319

Apply lubricant through the fittings until the lubricant overflows the bearing seals.

Swing Drive Oil - Change

SMCS Code: 5459-044

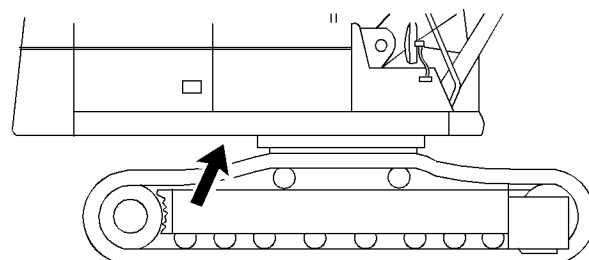


Illustration 462

g02110675

The oil drain hose is under the center of the upper structure.

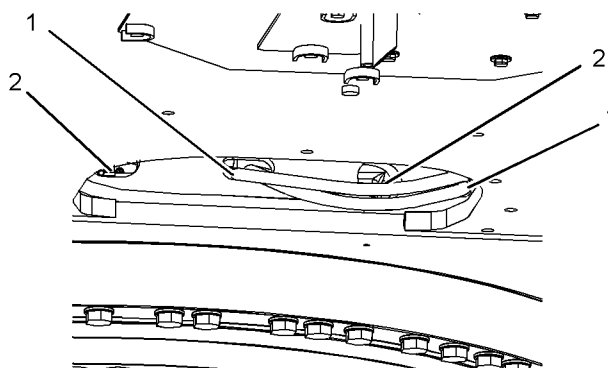


Illustration 463

g01106606

Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information that pertains to containing fluid spillage.

1. Remove drain hose (1) from the hole in the upper frame. Face the end of the hose toward the container.
2. Loosen the drain valve in hole (2). Drain the oil into a suitable container.

Note: Dispose of drained fluids according to local regulations.

Note: There are two swing drives that are located between the swivel joint and the main control valve. Perform the same procedure for both swing drives.

3. Tighten the drain valve. Replace the drain hose (1) into the hole in the upper frame.

i03867532

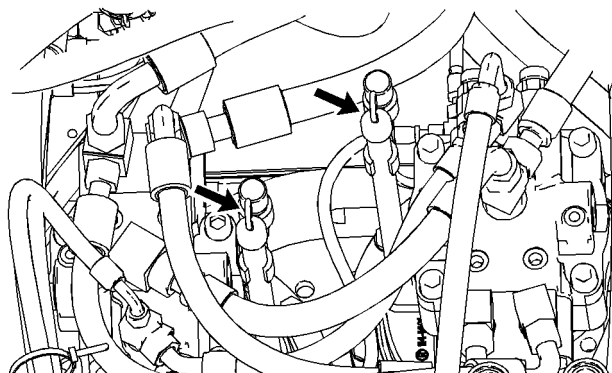


Illustration 464

g01106264

4. Remove the dipstick.
5. Add the specified quantity of oil through the dipstick tube. See Operation and Maintenance, "Capacities (Refill)".

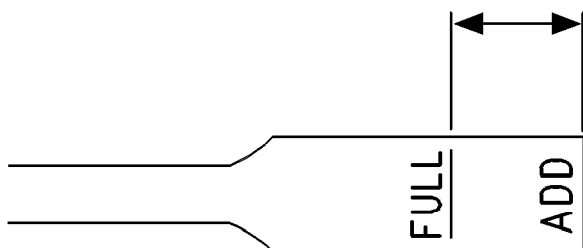


Illustration 465

g01049757

6. Make sure that the oil level is maintained between the marks on the dipstick.
7. Check the oil that has been drained for metal chips or metal particles. Consult your Caterpillar dealer if any metal chips or metal particles are found.

Note: Dispose of drained materials according to local regulations.

Swing Drive Oil Level - Check

SMCS Code: 5459-535-FLV

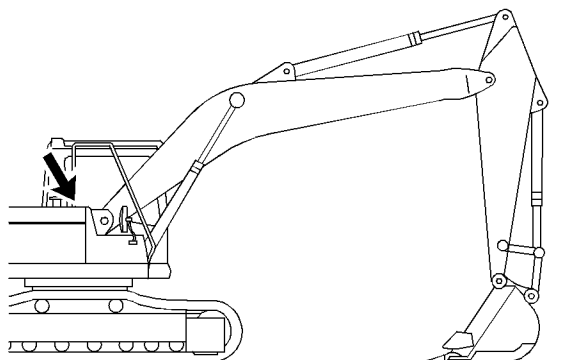


Illustration 466

g02110464

The dipstick for the swing drive oil is on the swing drive at the rear base of the boom.

Note: There are two swing drives that are located between the swivel joint and the main control valve. Perform the same procedure for both swing drives.

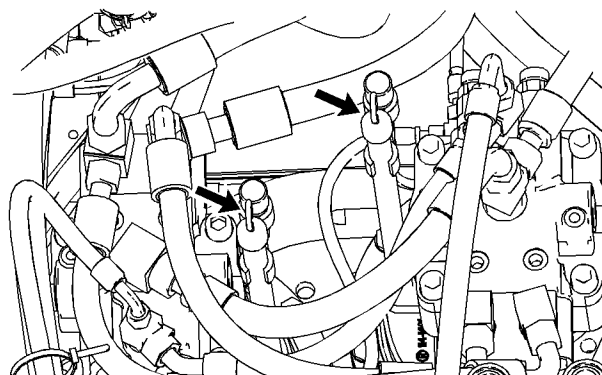


Illustration 467

g01106264

1. Remove the dipstick.

i04787571

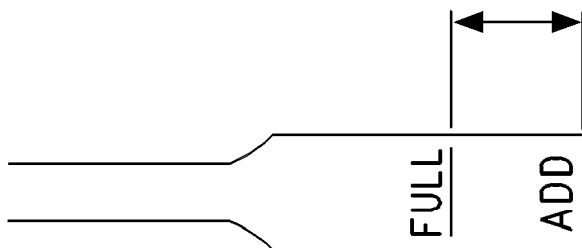


Illustration 468

g01049757

Note: Refer to Operation and Maintenance Manual, “General Hazard Information” for information that pertains to containing fluid spillage.

2. Check the dipstick. Maintain the oil level between the tip of the dipstick and the “FULL” mark on the dipstick. Add oil through the dipstick tube, if necessary. When the oil level becomes close to the “ADD” mark, add approximately 500 cc of oil. See Operation and Maintenance, “Lubricant Viscosities”.
3. Insert the dipstick.
4. Check the dipstick again.
5. Reinsert the dipstick.

Swing Drive Oil Sample - Obtain

SMCS Code: 5459-OC; 5459-008; 5459-554-OC; 5459-008-OC; 7542-008

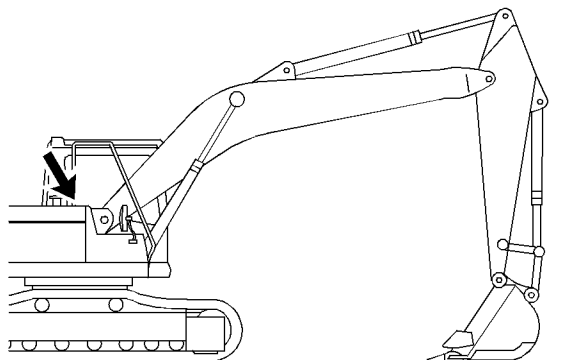


Illustration 469

g02110464

The dipstick for the swing drive oil is on the swing drive at the rear base of the boom.

Note: There are two swing drives that are located between the swivel joint and the main control valve. Perform the same procedure for both swing drives.

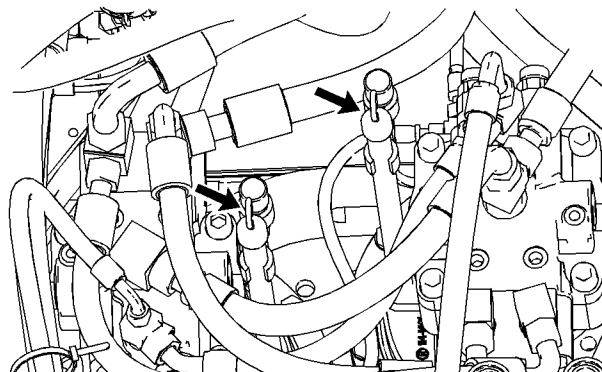


Illustration 470

g01106264

Obtain an oil sample of the swing drive oil through the opening for the dipstick. Refer to Special Publication, SEBU6250, “S-O-S Oil Analysis” for information that pertains to obtaining an oil sample from the swing drive housing. Refer to Special Publication, PEGJ0047, “How To Take A Good Oil Sample” for more information about obtaining an oil sample from the swing drive housing.

i03804517

Swing Gear - Lubricate

SMCS Code: 7063-086

NOTICE

Improper lubrication can cause damage to machine components.

To avoid damage, make sure that the proper amount of grease is applied to the swing drive.

When the amount of grease in the compartment becomes too large, the agitation loss becomes large, thereby accelerating grease deterioration.

Grease deterioration can cause damage to the pinion gear of the swing drive and swing internal gear.

Not enough grease will result in poor gear lubrication.

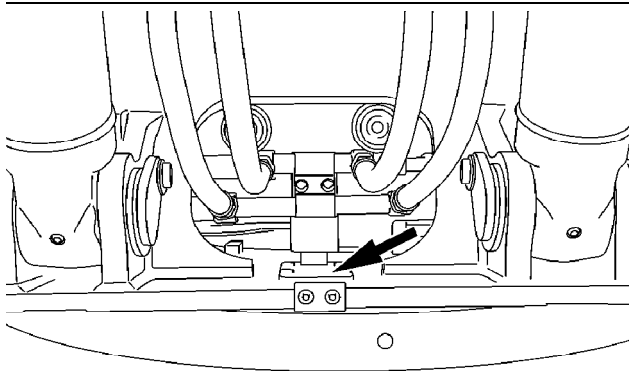


Illustration 471

g00834990

Remove the inspection cover that is located near the boom base. Inspect the grease.

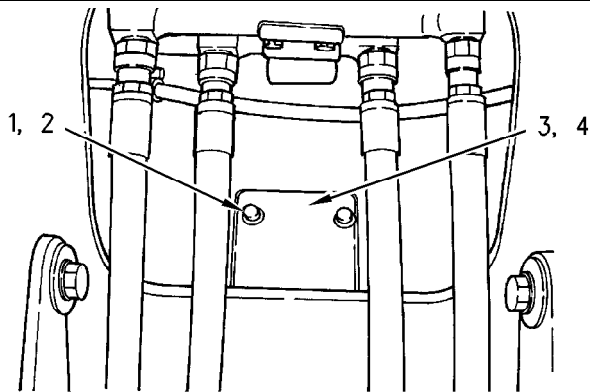


Illustration 472

g00688056

1. Remove bolts (1) and washers (2). Remove cover (3) and gasket (4).

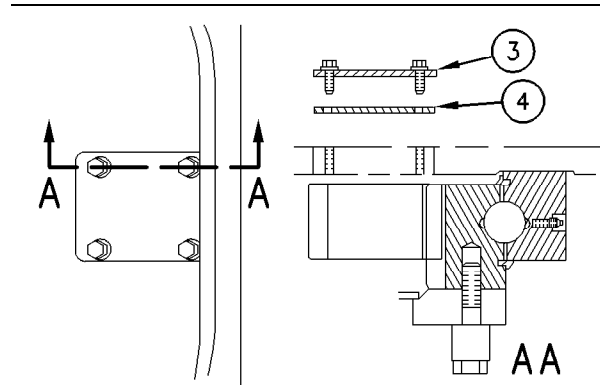


Illustration 473

g00115464

2. Inspect gasket (4). Replace the gasket if damage is evident.
3. Check the level of the grease. The grease should be evenly distributed on the floor of the pan.

Refer to Operation and Maintenance Manual, "Capacities (Refill)" for the capacity of the swing gear.

Add grease, as needed. Remove grease, as needed. Too much grease will result in the deterioration of the grease that is caused by excessive movement of the grease. Too little grease will result in poor lubrication of the swing gear.

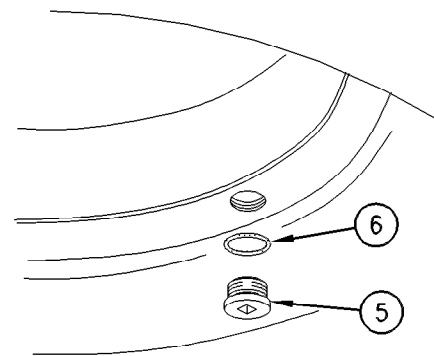


Illustration 474

g00101653

4. Check for contamination and for discolored grease.
5. If the grease is contaminated or discolored with water, change the grease. Remove plug (5) in order to allow the water to drain. When you reinstall plug (5), inspect O-ring seal (6). Replace the O-ring seal if damage is evident.

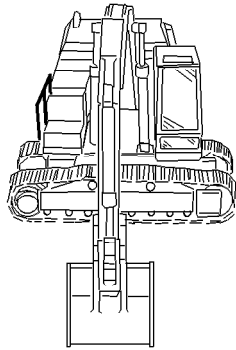


Illustration 475

g00101644

6. Raise the boom and turn the upper structure by 90 degrees. Lower the bucket to the ground.
7. Repeat Step 6 at every 90 degrees in 4 places.
Add grease, as needed.

i05647259

Track Adjustment - Adjust

SMCS Code: 4170-025

WARNING

Personal injury or death can result from grease under pressure.

Grease coming out of the relief valve under pressure can penetrate the body causing injury or death.

Do not watch the relief valve to see if grease is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

Loosen the relief valve one turn only.

If track does not loosen, close the relief valve and contact your Caterpillar dealer.

NOTICE

Keeping the track properly adjusted will increase the service life of the track and drive components.

Note: The track tension must be adjusted according to the current operating conditions. Keep the track as slack as possible if the soil is heavy.

Measuring Track Tension

1. Operate the machine in the direction of the idlers.

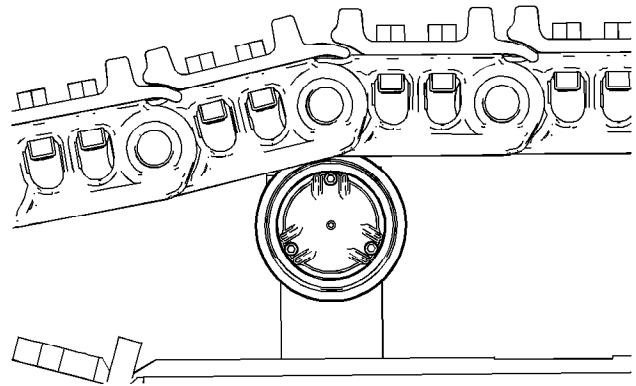


Illustration 476

g01103855

2. Stop with one track pin directly over the front carrier roller. Park the machine and turn off the engine.

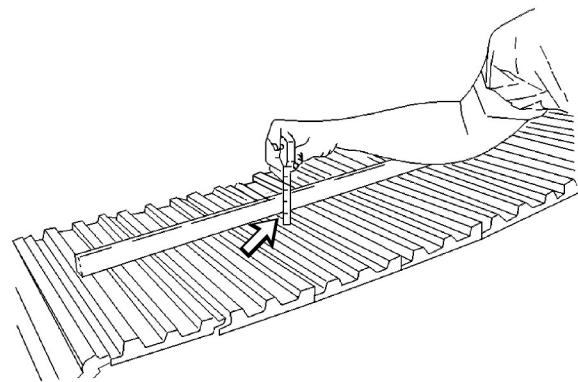


Illustration 477

g03472827

3. Place a straight edge on top of the track grousers between the front carrier roller and the idler. The straight edge should be long enough to reach from the front carrier roller to the idler.

Note: If your machine is equipped with three carrier rollers, place a straight edge on the tracks between the carrier rollers. The straight edge should be long enough to reach from one carrier roller to another carrier roller.

4. Measure the maximum amount of sag in the track. The sag is measured from the highest point of the track grouser to the bottom of the straight edge. A track that is properly adjusted will have a sag of 40.0 to 55.0 mm (1.57 to 2.17 inch).

5. If the track is too tight, or if the track is too loose, adjust the track tension according to the appropriate procedure below.

Adjusting Track Tension

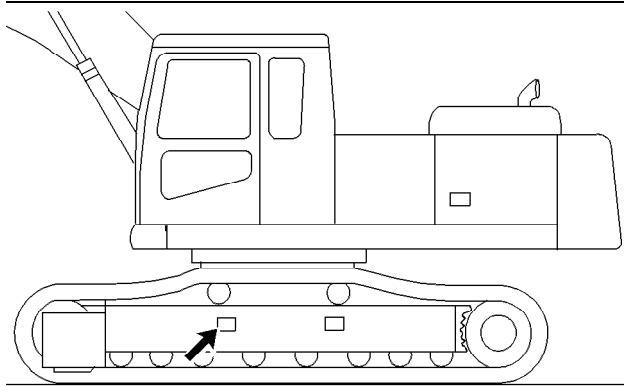


Illustration 478

g00270405

Typical example

The track adjuster is located on the track frame.

Tightening the Track

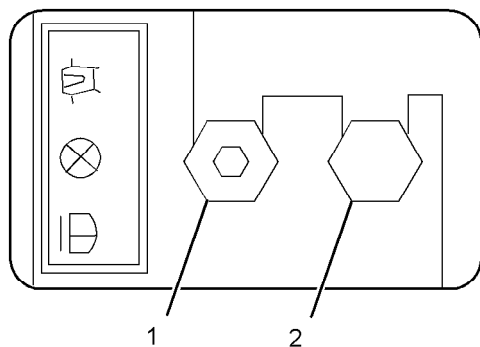


Illustration 479

g01091134

- (1) Grease fitting
(2) Relief valve

Wipe the fitting before you add grease.

1. Add grease through grease fitting (1) until the correct track tension is reached.
2. Operate the machine back and forth in order to equalize the pressure.
3. Check the amount of sag. Adjust the track, as needed.

Loosening the Track

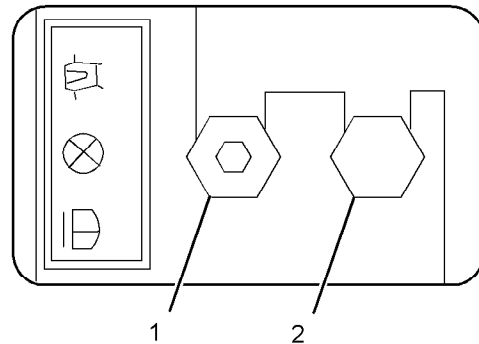


Illustration 480

g01091134

- (1) Grease fitting
(2) Relief valve

1. Loosen relief valve (2) carefully until the track begins to loosen. One turn should be the maximum.
2. Tighten relief valve (2) to $34 \pm 5 \text{ N}\cdot\text{m}$ ($25 \pm 4 \text{ lb ft}$) when the desired track tension is reached.
3. Operate the machine back and forth in order to equalize the pressure.
4. Check the amount of sag. Adjust the track, as needed.

i00370385

Track Adjustment - Inspect

SMCS Code: 4170-040

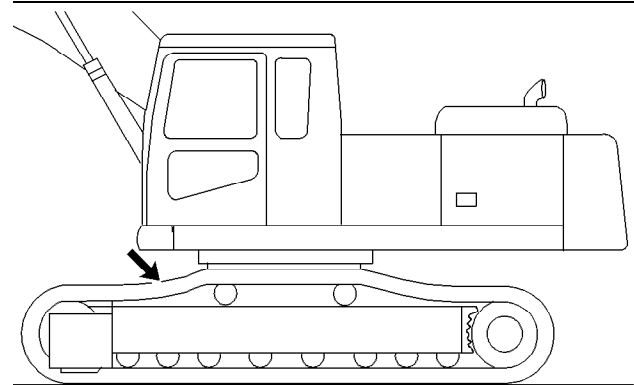


Illustration 481

g00270359

Check the track adjustment. Check the track for wear and for excessive dirt buildup.

If the track appears to be too tight or too loose, see Operation and Maintenance Manual, "Track Adjustment - Adjust".

i05182562

Travel Alarm - Test (If Equipped)

SMCS Code: 7429-081

You must move the machine in order to test the travel alarm.

1. Start the engine. Move the hydraulic lockout control to the UNLOCKED position.
2. Raise the work tool in order to avoid any obstacles. Make sure that there is adequate overhead clearance.

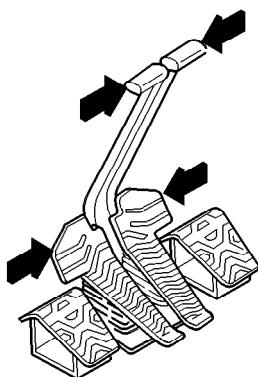


Illustration 482

g00560313

3. Use the travel levers or the travel pedals to move the machine forward. The travel alarm should sound.
4. Release the travel levers and the travel pedals in order to stop the machine.
5. Use the travel levers and the travel pedals to move the machine backward. The travel alarm should sound.

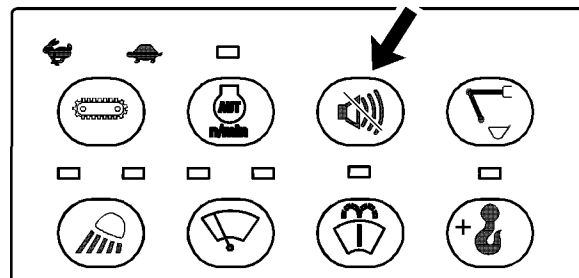


Illustration 483

g03322920

6. Push the alarm cancel switch. The travel alarm should shut off.
7. Stop the machine. Lower the work tool to the ground. Move the Hydraulic lockout control to the LOCKED position. Stop the engine.

i03934011

Undercarriage - Check

SMCS Code: 4150-535

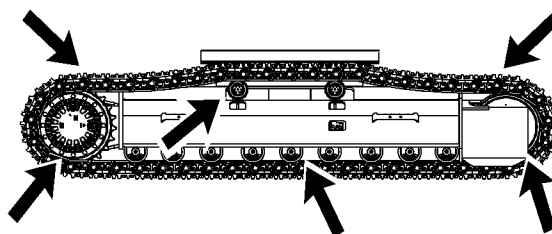


Illustration 484

g02154815

1. Check the carrier rollers, the track rollers, and the idler wheels for possible leakage.
2. Check the surface of the track, the carrier rollers, the track rollers, the idler wheels, the track shoes, and the drive sprockets. Look for signs of wear and loose mounting bolts.
3. Listen for any abnormal noises while you are moving slowly in an open area.
4. If abnormal wear exists or abnormal noises or leaks are found, consult your Caterpillar dealer.

i01458697

Window Washer Reservoir - Fill

SMCS Code: 7306-544-KE

NOTICE

When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.

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

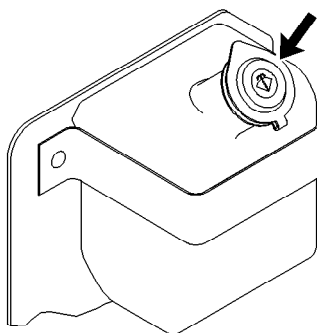


Illustration 485

g00688996

2. Remove the filler cap.
3. Fill the window washer reservoir with washer fluid through the filler opening.
4. Install the filler cap.
5. Close the access door.

i01258249

Window Wiper - Inspect/Replace

SMCS Code: 7305-040; 7305-510

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; 7340-070

Clean the outside of the windows from the ground, unless handholds are available.

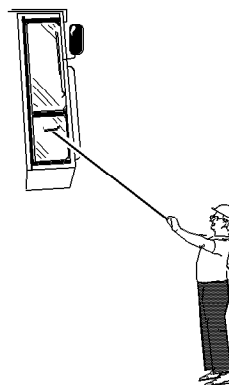


Illustration 486

g00566124

Typical example

Cleaning Methods

Aircraft Window Cleaner

Apply the cleaner with a soft cloth. Rub the window with moderate pressure until all the dirt is removed. Allow the cleaner to dry. Wipe off the cleaner with a clean soft cloth.

Soap and Water

Use a clean sponge or a soft cloth. Wash the windows with a mild soap or with a mild detergent. Also use plenty of lukewarm water. Rinse the windows thoroughly. Dry the windows with a moist chamois or with a moist cellulose sponge.

Stubborn Dirt and Grease

Wash the windows with a good grade of naphtha, of isopropyl alcohol, or of Butyl Cellosolve. Then, wash the windows with soap and with water.

Polycarbonate Windows (If equipped)

Wash polycarbonate windows with a mild soap or detergent. Never use a cleaning solvent on polycarbonate windows.

Wash polycarbonate windows with warm water and a soft sponge, or damp cloth. Never use a dry cloth or paper towels on polycarbonate windows.

Rinse the windows with a sufficient amount of clean water.

Warranty Section

Warranty Information

i06044323

Emissions Warranty Information

SMCS Code: 1000

The certifying engine manufacturer warrants to the ultimate purchaser and each subsequent purchaser that:

1. New non-road diesel engines and stationary diesel engines less than 10 liters per cylinder (including Tier 1 and Tier 2 marine engines < 37 kW, but excluding locomotive and other marine engines) operated and serviced in the United States and Canada, including all parts of their emission control systems ("emission related components"), are:

- a. Designed, built, and equipped so as to conform, at the time of sale, with applicable emission standards prescribed by the United States Environmental Protection Agency (EPA) by way of regulation.
- b. Free from defects in materials and workmanship in emission-related components that can cause the engine to fail to conform to applicable emission standards for the warranty period.

2. New non-road diesel engines (including Tier 1 and Tier 2 marine propulsion engines < 37 kW and Tier 1 through Tier 4 marine auxiliary engines < 37 kW, but excluding locomotive and other marine engines) operated and serviced in the state of California, including all parts of their emission control systems ("emission related components"), are:

- a. Designed, built, and equipped so as to conform, at the time of sale, to all applicable regulations adopted by the California Air Resources Board (ARB).
- b. Free from defects in materials and workmanship which cause the failure of an emission-related component to be identical in all material respects to the component as described in the engine manufacturer's application for certification for the warranty period.

3. New non-road diesel engines installed in construction machines conforming to the South Korean regulations for construction machines manufactured after January 1, 2015, and operated and serviced in South Korea, including all parts of their emission control systems ("emission related components"), are:

- a. Designed, built, and equipped so as to conform, at the time of sale, with applicable emission standards prescribed in the Enforcement Rule of the Clean Air Conservation Act promulgated by South Korea MOE.
- b. Free from defects in materials and workmanship in emission-related components that can cause the engine to fail to conform to applicable emission standards for the warranty period.

The aftertreatment system can be expected to function properly for the lifetime of the engine (emissions durability period) subject to prescribed maintenance requirements being followed.

A detailed explanation of the Emission Control Warranty that is applicable to new non-road and stationary diesel engines, including the components covered and the warranty period, is found in a supplemental Special Publication. Consult your authorized Cat dealer to determine if your engine is subject to an Emission Control Warranty and to obtain a copy of the applicable Special Publication.

Reference Information Section

Reference Materials

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

i07743978

Decommissioning and Disposal

SMCS Code: 1000; 7000

When the product is removed from service, local regulations for the product decommissioning will vary. Disposal of the product will vary with local regulations.

Improperly disposing of waste can threaten the environment. Obey all local regulations for the decommissioning and disposal of materials.

Utilize appropriate personal protective equipment when decommissioning and disposing product.

Consult the nearest Cat dealer for additional information. Including information for component remanufacturing and recycling options.

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Product and Dealer Information

Note: For product identification plate locations, see the section “Product Identification Information” in the Operation and Maintenance Manual.

Delivery Date: _____

Product Information

Model: _____

Product Identification Number: _____

Engine Serial Number: _____

Transmission Serial Number: _____

Generator Serial Number: _____

Attachment Serial Numbers: _____

Attachment Information: _____

Customer Equipment Number: _____

Dealer Equipment Number: _____

Dealer Information

Name: _____ Branch: _____

Address: _____

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

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