

Operation Section

Before Operation

i04021647

Mounting and Dismounting

SMCS Code: 6700; 7000



Illustration 59

g00037860

Typical example

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

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

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

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

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

Machine Access System Specifications

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

Alternate Exit

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

i04912145

Daily Inspection

SMCS Code: 1000; 6319; 6700; 7000

NOTICE

Accumulated grease and oil on an engine is a fire hazard.

Remove this debris with steam cleaning or high pressure water each time any significant quantity of oil (or other fluid) is spilled on or near the engine.

Wipe clean all fittings, caps and plugs before servicing.

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

Perform the following procedures on a daily basis.

- 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, "Track Adjustment - Adjust"
- 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.

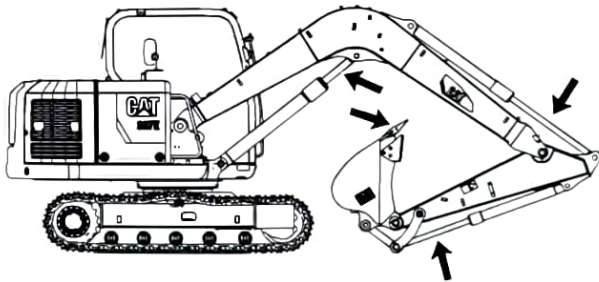


Illustration 60

g03080779

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

Inspect couplers and attachments for damage or excessive wear. Remove any debris. 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.

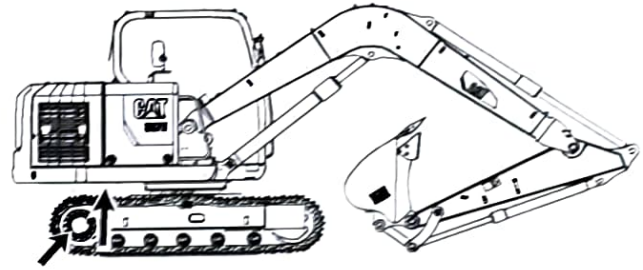


Illustration 61

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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 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.

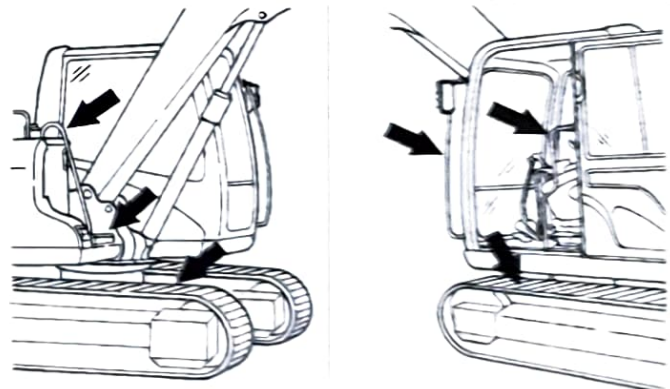


Illustration 62

g00732408

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.

Machine Operation

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Alternate Exit

SMCS Code: 7310

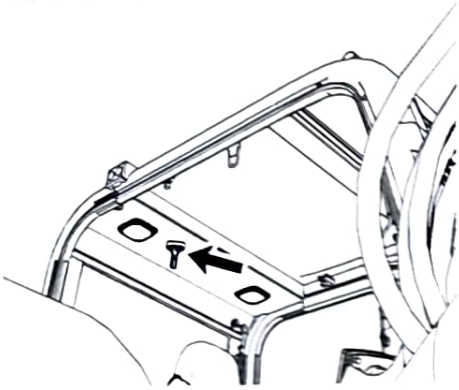


Illustration 63

g02864486



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



Break Glass – Perform the following procedure in order to exit through the rear window. A hammer is mounted on the rear roof 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.

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

i07212681

Seat

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

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

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

Always use the seat belt when you operate the machine.

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

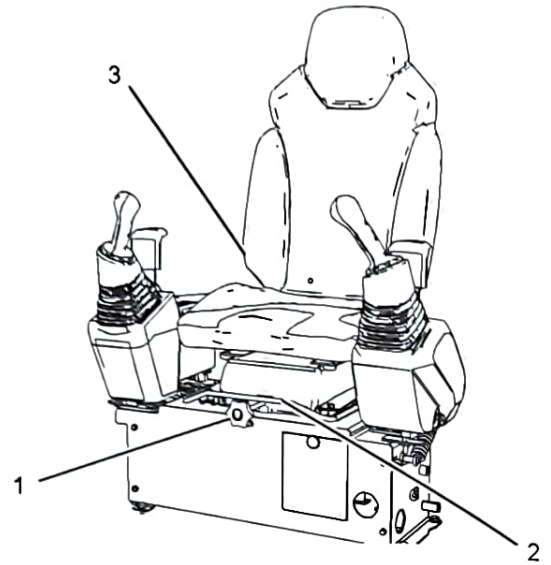


Illustration 64

g02869981



Illustration 65

g01193061

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

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

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

Air Suspension Seat (If Equipped)

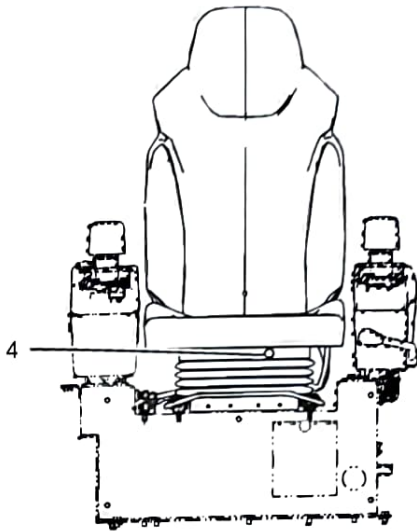


Illustration 66

g02869985



Seat Adjustment

Push in knob (4) to increase the stiffness of the suspension. Pull the knob to decrease the stiffness of the suspension.

Note: The engine start switch key must be in the ON position to increase the stiffness of the seat.

Seat Heater (If Equipped)

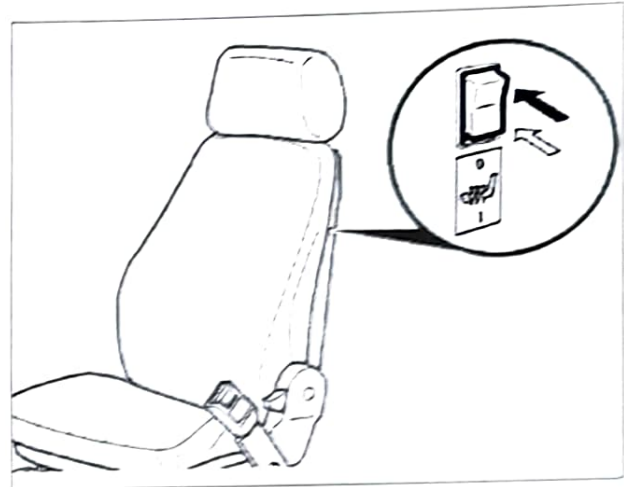


Illustration 67

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Seat Heater – Press the switch to turn on or turn off the seat heater. Press the top of the switch to switch OFF the Seat heater. Press the switch bottom of the switch to switch ON the Seat heater. Refer to the illustration 67.

WARNING

Heat-induced burns can occur when some people use a seat heater. Do not use the seat heater if you have a reduced ability to sense temperature changes, a reduced ability to feel pain, or have sensitive skin.

Note: Consult your Cat dealer for further information.

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Seat Belt

SMCS Code: 7327

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

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

Seat Belt Adjustment

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

Lengthening the Seat Belt

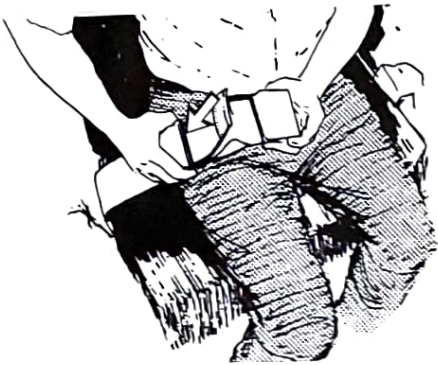


Illustration 68

g00100709

1. Unfasten the seat belt.

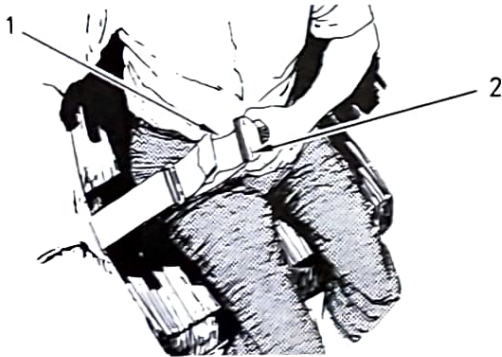


Illustration 69

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

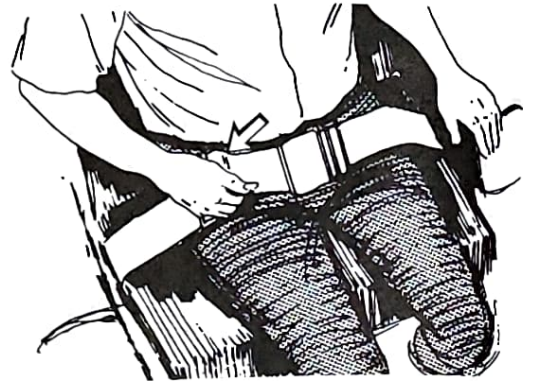


Illustration 70

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

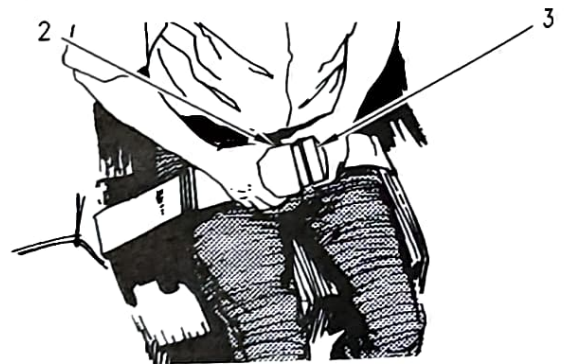


Illustration 71

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 72

g00100717

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

Extension of the Seat Belt

WARNING

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

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

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

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

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

i05439349

Diesel Particulate Filter Regeneration

SMCS Code: 108F

General Information

Regeneration is the removal of soot from the Diesel Particulate Filter (DPF). Active and passive regeneration are used to regenerate the DPF. The DPF traps both soot and ash. The soot is removed during regeneration. The ash is removed through a cleaning process. Refer to the Operation and Maintenance Manual, "Diesel Particulate Filter - Clean/Replace" for more information on the service of the DPF.

Modes of Regeneration

Passive – Passive Regeneration occurs when the exhaust temperature is high enough for regeneration to occur. Passive regeneration may occur unnoticed by the operator. No operator action is required. Operating the machine above mid throttle and under load allows for passive regeneration during normal operation. Low idle and low load applications will have lower exhaust temperatures, where passive regeneration is not possible.

Active – An active regeneration is a late injection of fuel into the combustion chamber, which sufficiently raises the exhaust temperature for an active regeneration. The engine ECM uses multiple inputs from the engine to determine when an active regeneration is needed. All applications, even high load, will require active regenerations. However, active regeneration will not occur as frequently as low idle and low load applications

There will be a slight change in the exhaust noise during an active regeneration. Active regenerations may require increased engine speed. The active regeneration may take up to 30 minutes to complete.

When an active regeneration is required with the hydraulic lockout control lever in the LOCKED position, the engine speed may be increased by the ECM.

When an active regeneration is required and the machine is being operated below the active regeneration threshold, the DPF alert indicator may illuminate. The operator can increase the engine speed to high idle with the Engine Speed Control Dial. An active regeneration will occur and the DPF light will turn off.

Note: If increasing the engine speed is not acceptable, the operator can allow a parked regeneration. In order for a parked regeneration to occur. Bring the machine to a stop. Move the hydraulic lockout control lever to the LOCKED position and set the engine speed to low idle. Do not operate the hydraulic controls. If those conditions are met for approximately 2 minutes, the ECM will slowly increase the engine speed and an active regeneration will begin. After completing the active regeneration the engine speed will slowly decrease back down to low idle.

The following chart describes the alert indicators and what actions, if any, the operator needs to perform in order to allow an active regeneration.

Warning Symbols and Alerts



(A) Engine Emissions System (DPF)



(B) Alert



(C) Audible Alarm

Table 11

Warning Symbol	Warning Message	Machine Action	Operator Action
None	None	If the hydraulic lockout control lever is in the LOCKED position, the ECM may increase the engine speed.	No action required
(A)	(A) Increase Engine Speed recommended	If the machine is operated and the engine speed is below high idle, the DPF light may illuminate.	Increase the engine speed to high idle. High idle is position 10 on the engine speed dial. The DPF light will turn OFF. Continue to operate the machine.
(A) + (B)	(A) Parked Regeneration Required	The engine will derate until an active regeneration is completed	Stop the machine.. Move the hydraulic lockout control lever to the LOCKED position. The ECM will automatically increase the engine speed. The regeneration may take up to 30 minutes.
	(B) Parked Regeneration Required		
(A) + (B) + (C)	(A) Dealer Service Required	Engine will remain derated.	A regeneration can only be done through Cat Electronic Technician (ET), by an authorized Cat dealer. Consult your local Cat dealer immediately. If the engine is run through these warning indicators, the DPF will require servicing and may require replacement. Engine damage can occur.
	(B) Dealer Service Required		

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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.

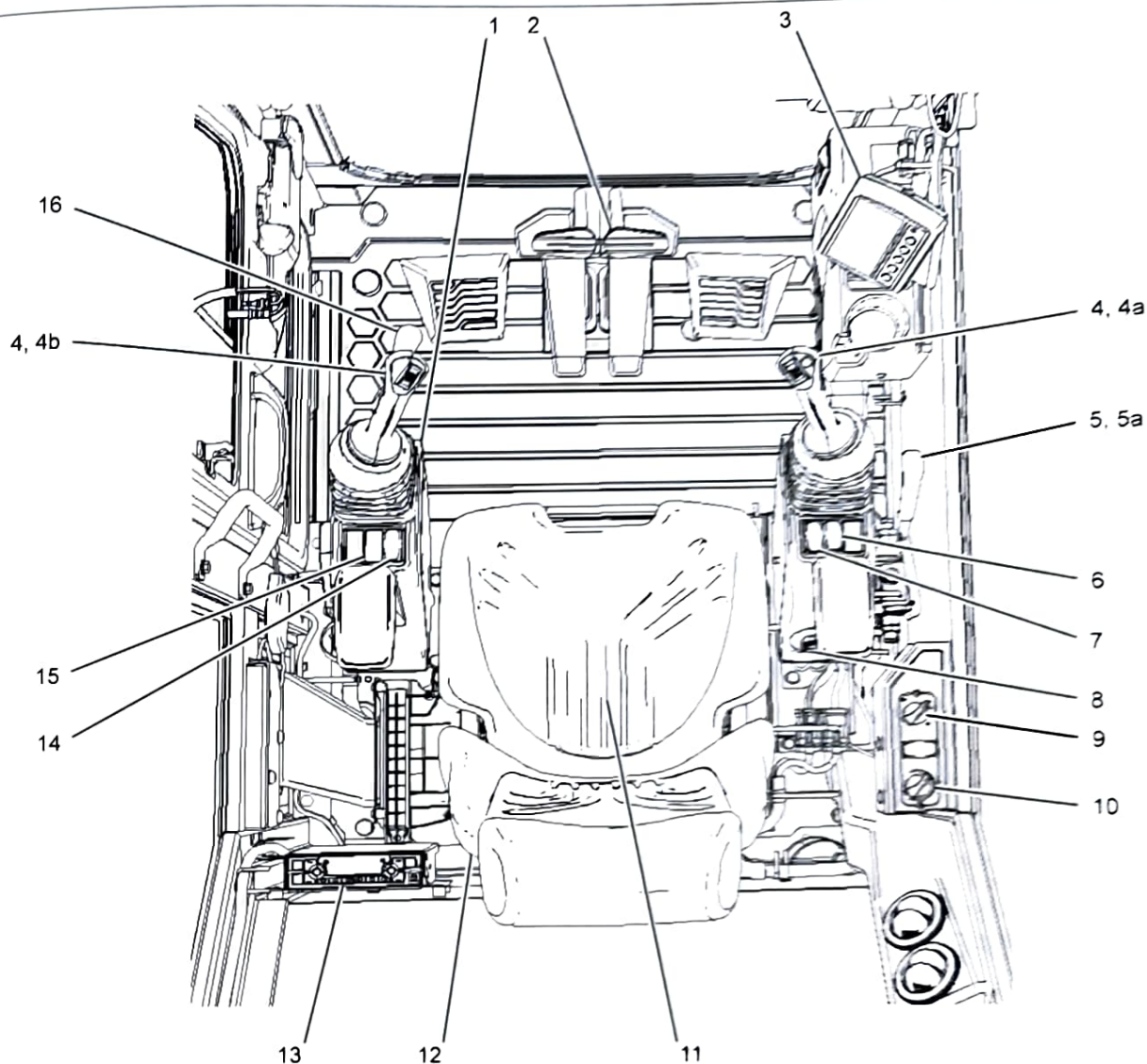


Illustration 73

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(1) Service Hour Meter
 (2) Travel Controls
 (3) Monitoring System
 (4) Joystick Controls
 (4a) Horn
 (4b) Swing Boom Control
 (5) Dozer Blade Control

(5a) Travel Speed Control
 (6) Wiper/Washer
 (7) Work Light Switch
 (8) Engine Speed Control
 (9) Engine Start Switch
 (10) Air Conditioning and Heater Control
 (11) Operator's Seat

(12) Seat Heater (If Equipped)
 (13) Radio (If Equipped)
 (14) Travel Alarm Cancel Switch (If Equipped)
 (15) Overload Warning Cancel Switch (If Equipped)
 (16) Hydraulic Lockout Control

Service Hour Meter (1)

The service hour meter is located below the left side of the operators seat.



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

Travel Controls (2)

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

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

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

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

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

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

Right Travel Lever

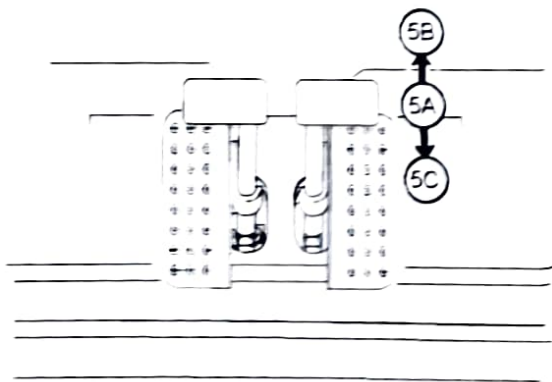


Illustration 74

g02792324

STOP (5A) – Release the right travel lever in order to stop the right track.

FORWARD (5B) – Move the right travel lever forward in order to operate the right track in a forward direction.

REVERSE (5C) – Move the right travel lever backward in order to operate the right track in a reverse direction.

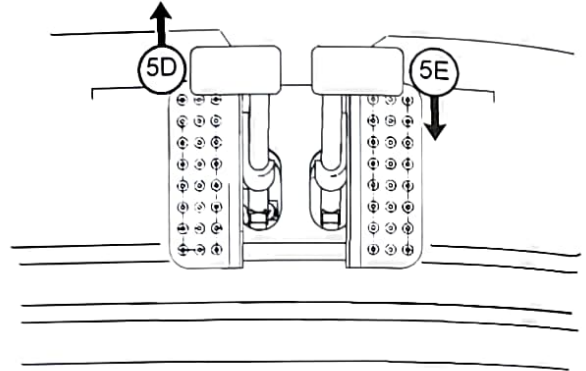


Illustration 75

g02792325

Spot Right Turn – Move the right travel lever (5E) backward. Move the left travel lever (5D) forward at the same time. This will turn the machine quickly to the right.

Pivot Right Turn – Move the left travel lever (5D) forward. This will turn the machine to the right.

Left Travel Lever

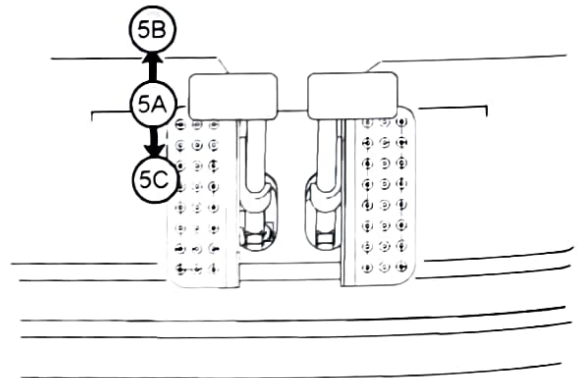


Illustration 76

g02792326

STOP (5A) – Release the left travel lever in order to stop the left track.

FORWARD (5B) – Move the left travel lever forward in order to operate the left track in a forward direction.

REVERSE (5C) – Move the left travel lever backward in order to operate the left track in a reverse direction.

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

Joystick Controls (4)

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".

Horn (4a)

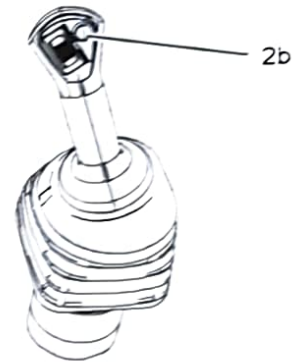


Illustration 78

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Horn (2b) – The horn button is located on the right side joystick. Depress the horn button in order to sound the horn.

Use the horn for alerting personnel or for signaling personnel.

Swing Boom Control (4b)

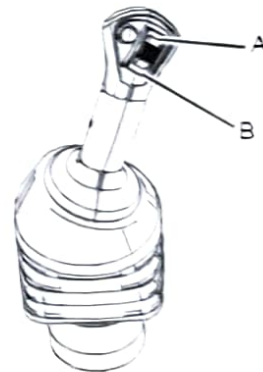


Illustration 79

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

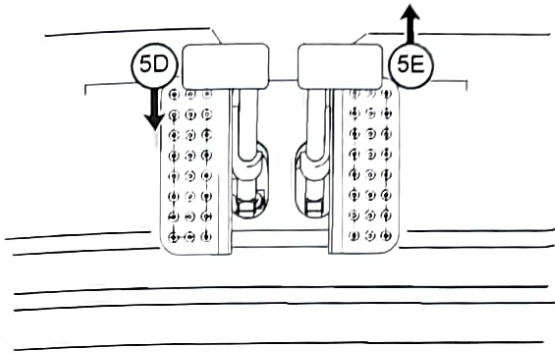


Illustration 77

g02792327

Spot Left Turn – Move the left travel lever (5D) backward. Move the right travel lever (5E) forward at the same time. This will turn the machine quickly to the left.

Pivot Left Turn – Move the right travel lever (5E) forward. This will turn the machine to the left.

Monitoring System (3)

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



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

Dozer Blade Control (5)



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



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

Hold – The lever will return to the HOLD position when the lever is released from the RAISED or LOWERED position.



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

Travel Speed Control (5a)

Use the switch in order to change the travel speed.



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



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

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

Window Wiper/Washer Switch (6)

NOTICE

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

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



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

NOTICE

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



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

Work Light Switch (7)

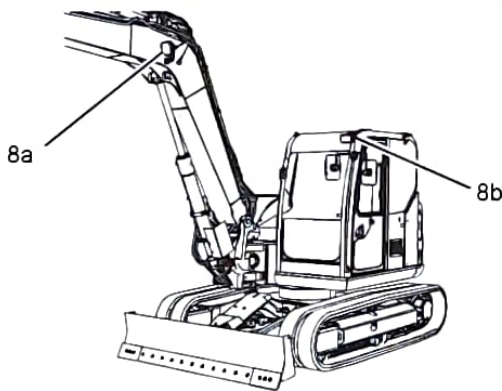


Illustration 80

g02874564



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

Engine Start Switch (8)

NOTICE

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

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



OFF – Insert the engine start switch key only from the OFF position and remove the engine start switch key only from the OFF position. In the OFF position, there is no power to most electrical circuits in the cab.

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



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



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

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

Engine Speed Control (9)



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).

Air Conditioning and Heating Control (10)

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

Operators Seat (11)

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

Seat Heater (12) (If Equipped)

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.

Radio (13)

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

Travel Alarm Cancel Switch (If Equipped) (14)



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

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

Overload Warning Device (15) (If Equipped)

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



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 deactivate the overload warning device.

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

Hydraulic Lockout Control (16)

WARNING

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

Personal injury or death may occur from sudden machine movement.



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

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

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



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

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Product Link

SMCS Code: 7490; 7606

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

The Cat Product Link communication device utilizes cellular and/or satellite technology to communicate equipment information. This information is communicated to Caterpillar, Cat dealers, and Caterpillar customers. The Cat Product Link communication device uses Global Positioning System (GPS) satellite receivers.

The capability of two-way communication between the equipment and a remote user is available with the Cat Product Link communication device. The remote user can be a dealer or a customer.

Data Broadcasts

Data concerning this machine, the condition of the machine, and the operation of the machine is being transmitted by Cat Product Link to Caterpillar and/or Cat dealers. The data is used to serve the customer better and to improve upon Cat products and services. The information transmitted may include: machine serial number, machine location, and operational data, including but not limited to: fault codes, emissions data, fuel usage, service meter hours, software, and hardware version numbers and installed attachments.

Caterpillar and/or Cat dealers may use this information for various purposes. Refer to the following list for possible uses:

- Providing services to the customer and/or the machine
- Checking or maintaining Cat Product Link equipment

- Monitoring the health of the machine or performance
- Helping maintain the machine and/or improve the efficiency of the machine
- Evaluating or improving Cat products and services
- Complying with legal requirements and valid court orders
- Performing market research
- Offering the customer new products and services

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

Operation in a Blast Site for Product Link Radios

WARNING

This equipment is equipped with a Cat® Product Link communication device. When electric detonators are being used for blasting operations, radio frequency devices can cause interference with electric detonators for blasting operations which can result in serious injury or death. The Product Link communication device should be deactivated within the distance mandated under all applicable national or local regulatory requirements. In the absence of any regulatory requirements Caterpillar recommends the end user perform their own risk assessment to determine safe operating distance.

Refer to your products Operation and Maintenance Manual Supplement, "Regulatory Compliance Information" for more information.

For information regarding the methods to disable the Cat Product Link communication device, please refer to your specific Cat Product Link manual listed below:

- Operation and Maintenance Manual, SEBU8142, "Product Link - 121SR/321SR/420/421/522/523"
- Operation and Maintenance Manual, SEBU8832, "Product Link PLE601, PL641, PL631, PL542, PL240, PL241, PL141, PL131, PL161, and G0100 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, "Installation Procedure for Product Link PLE640 Systems" REHS7339
- Special Instruction, "Installation Procedure for the Elite Product Link PLE601, PLE641, and PLE631 Systems" REHS8850
- Special Instruction, "Installation Procedure for the Product Link PL131, PL141, and PL161 Systems" SEHS0377
- Special Instruction, "Installation Procedure for the Pro Product Link PL641 and PL631 Systems" REHS9111

i04768805

Power Receptacle (If Equipped)

SMCS Code: 1436; 7451

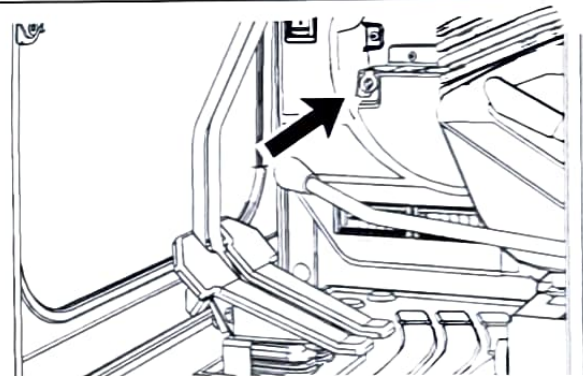


Illustration 81

g02367115

Power Receptacle – A 12V 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.

i06159020

Monitoring System

SMCS Code: 7451; 7490

NOTICE

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

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

General Information

NOTICE

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

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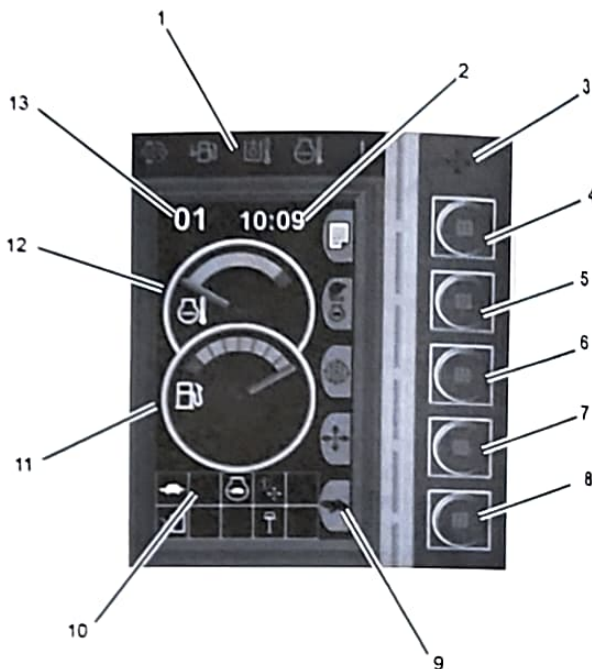


Illustration 82

g02957817

- (1) Action Lamp
- (2) Clock
- (3) Action Alarm
- (4) Main Menu
- (5) Work Mode
- (6) Continuous Flow
- (7) Pattern Changer
- (8) Aux. Flow Control (If Hydraulic Quick Coupler is not equipped)
- (9) Button Indicator
- (10) Status Icons
- (11) Fuel Level Gauge
- (12) Coolant Temperature Gauge
- (13) Engine Speed Dial Indicator

Note: Button #5 will be the Quick Coupler control if the hydraulic quick coupler lines are installed from the factory. All five top-level buttons can be changed by changing the "shortcut" icons.

Status Icons

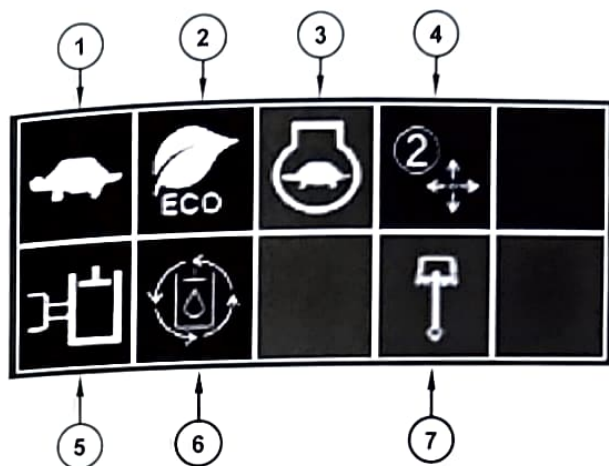


Illustration 83

g03694691

- (1) Low Speed (turtle) or High Speed (rabbit)
- (2) Economy Mode
- (3) Auto Engine Idle
- (4) Pattern Changer selection
- (5) Work-tool select (this symbol is **user define**)
- (6) Continuous Flow
- (7) Left roller switch selection, Boom Swing, or Second Auxiliary (if equipped)

Prestart Monitoring Function

Turn the engine start switch to the ON position.



Illustration 84

g00928810

After approximately one second, Illustration 84 appears in the display and the alert indicator turns on.

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

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 Operation and Maintenance Manual, "Maintenance Interval Schedule" for more information. This message will disappear after 5 seconds.

Warning Operation

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 Action Lamp.
- 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 Action Lamp and Action Alarm.

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 5 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.



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



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

Warning Category 2



"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, "Belts - Inspect/Adjust/Replace". Make any necessary repairs.



"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.



"ECM ERROR" – The ECM has malfunctioned. Contact your Cat Dealer.



"MONITOR ERROR" – The monitor has malfunctioned. Contact your Cat Dealer.



"SERVICE REQUIRED" – The machine has detected a malfunction. Contact your Cat Dealer.

Warning Category 3



"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

Miscellaneous



"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.



Glow Plug – This indicator will appear in the message display when the engine start switch is in the ON position.

Security System Password Entry

Turn the key to ON and the monitoring system boots up. The password needs to be put into the monitor so the monitor may shift to the default screen outside the moratorium of the security system.

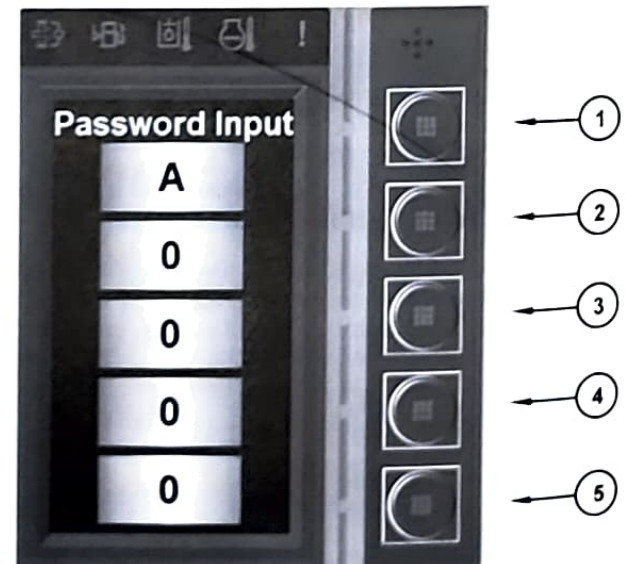


Illustration 85

g02920837

1. Press the button 1 (4). Press the button 2 (5). Press the button 3 (6). Press the button 4 (7). Press the button 5 (8) in order to select the desired character.

Note: The password is alphanumeric. With button 1, you can choose "A" to "E". With button 2 through button 5, you can choose "0" to "9".

Note: When the machine leaves the factory, the owner password is initially set as A1234.

2. After you enter five characters, the monitoring system checks the password. If the password is correct, you will have access to the default display.
3. If the password is incorrect, or, if you do not operate the button during the Security Time Delay, "A0000" will be displayed. Retry the password entry.

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

Main Menu (Menu Description)



Illustration 86

g02920757

1. Push the menu button 1 when the default display is active.
2. The "MAIN MENU" will be displayed with the seven following menu options: Setting, Control mode, Work tool, Maintenance information, Performance information, Service and Security system (Owner Mode Only). For more information on these menus, refer to the respective descriptions below.
3. Press button 2 or button 4 in order to highlight the desired menu. Press button 3 in order to open the desired menu.

Note: Press button 5 or button 1 in order to exit this menu and return to the default display.



Illustration 87

- (1) 24 HR CLOCK. The time can be adjusted in the service menu
- (2) ENGINE RPM - Indicates the engine RPM from 1 to 10. The engine RPM is changed on the rotary dial next to the ignition.
- (3) COOLANT TEMPERATURE GAUGE - Indicates the machine coolant temperature. The exact temp can be found in the performance info.
- (4) FUEL GAUGE - Indicates the fuel level in the tank. The exact percentage can be found in the performance info.
- (5) STATUS ICONS
- (6) ACTION LAMPS - Hydraulic oil temp, coolant temp, fuel low, and service required.
- (7) MAIN MENU - Press this button to get to settings, control mode, work tool, maintenance and performance info, security system and service settings.

(8) WORK MODE - Press this button to change the Eco mode and Auto Engine idle settings (on/off).

(9) CONTINUOUS FLOW - Press this button to Enable or Disable continuous flow. When turned on, continuous flow must then be engaged by using the roller switch on the right-hand joystick.

(10) PATTERN CHANGER - This button changes between Excavator and Backhoe loader pattern.

(11) AUXILIARY FLOW CONTROL - Press this button to change the auxiliary flow from a setting of 1 to 15. * (If equipped with Hydraulic Coupler from the factory, see (Work Tool, Auxiliary Flow Adjust) to adjust the auxiliary flow).

Status Icons

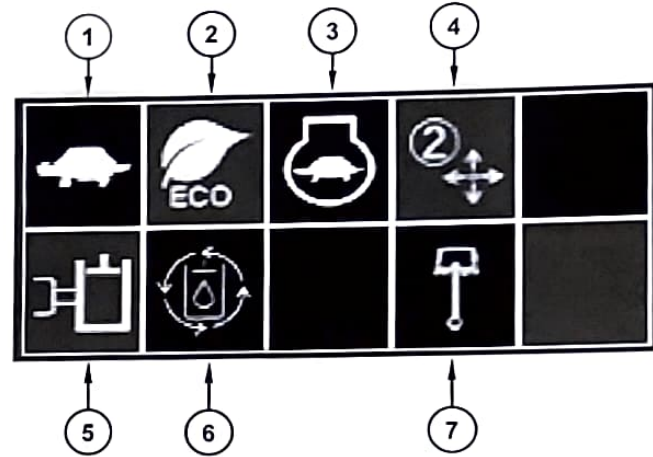


Illustration 88

g03694691

(1) Low Speed (turtle) High Speed (rabbit)

(2) Economy Mode

(3) Auto Engine Idle

(4) Pattern Changer selection

(5) Work-tool-select (this symbol will change according to the tool chosen)

(6) Continuous Flow

(7) Left roller switch selection (Boom Swing or Second Auxiliary if equipped)

Settings Menu

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

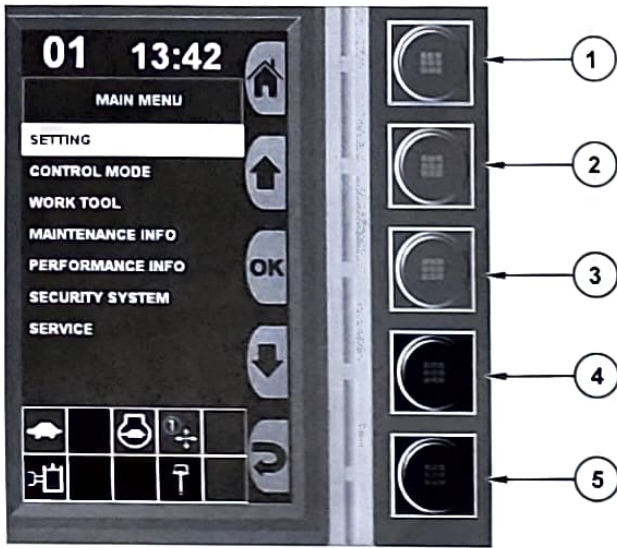


Illustration 89

g02920996

Note: Press button 1 in order to return to the default display.

Adjust the Clock

The clock can be set to any time on a 24 hr format.

Note: Change the clock by following these steps:

(Step 1) Press the top button for main menu. Select setting, Display Setting, then Clock adjust.

1. Press button 1.
2. Press button 2 or button 4 in order to highlight the "SETTING" menu. Press button 3.

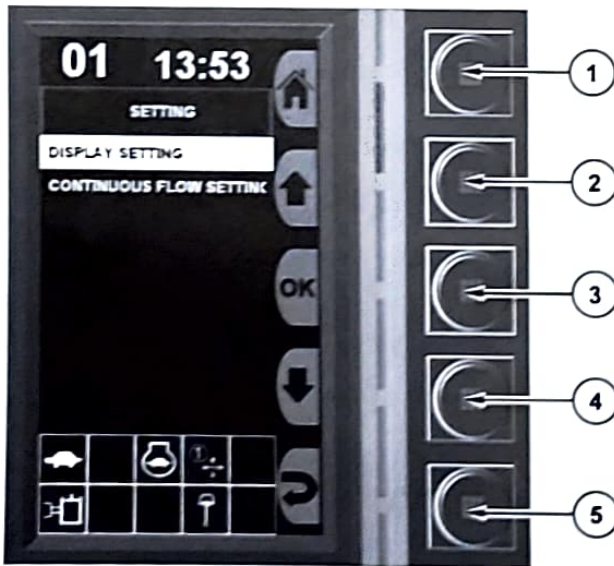


Illustration 90

g02921077

3. The "SETTING" menu will be displayed with two new menu options: Display setting and Continuous flow setting. For more information on these menus, refer to the respective descriptions below.
4. Press button 2 or button 4 in order to highlight the desired menu. Press button 3 in order to open the desired menu.

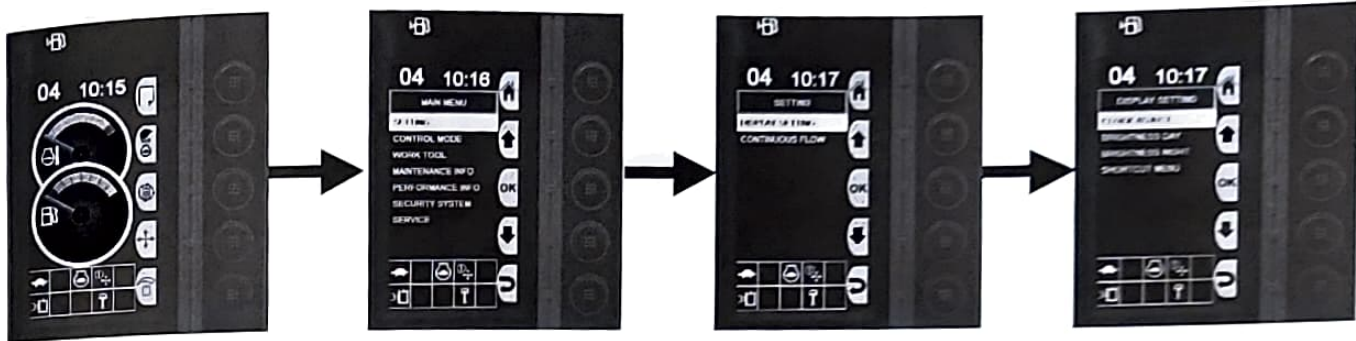


Illustration 91

g02919856

(Step 2) Adjust the clock to the desired time by using the arrows and press OK.

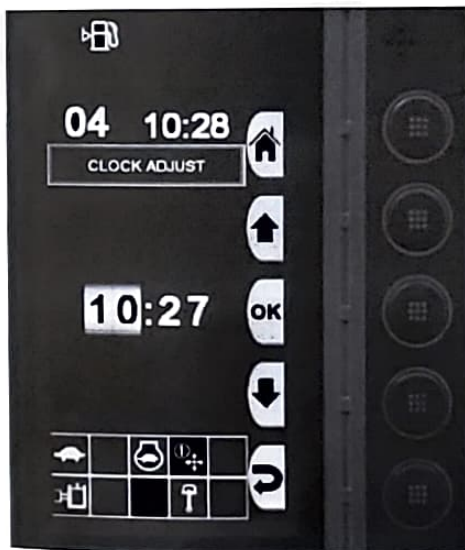


Illustration 92

g02919936

Change the Shortcut Buttons

The monitor comes with preset shortcuts for each button. These buttons can be changed to be a shortcut for several different features.

Note: Change the shortcuts to the customers preference by following these steps:

(Step 1) Press the top button for main menu. Select setting, Display Setting, then Shortcut Menu.

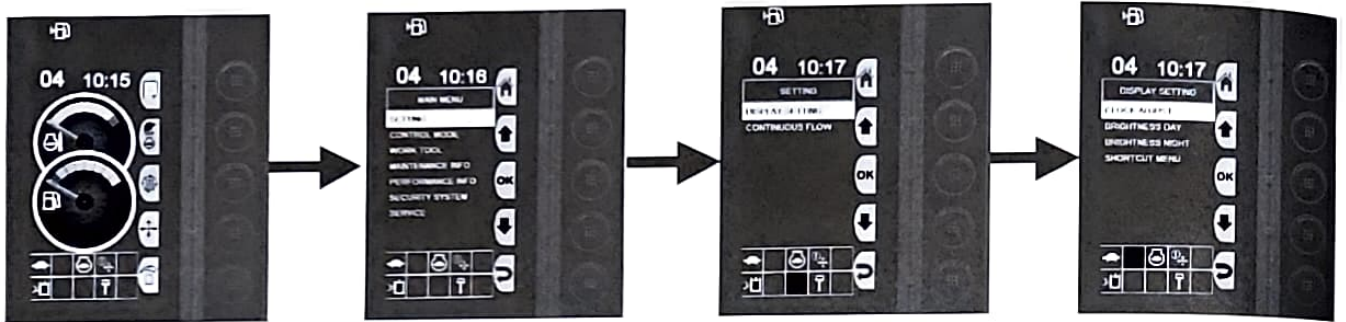


Illustration 93

g02919996

(Step 2) Choose one of the options from the list to set up a shortcut and press OK.



Illustration 94

g02920122

(Step 3) Choose the button you would like this option to be a pre-set for and press OK.

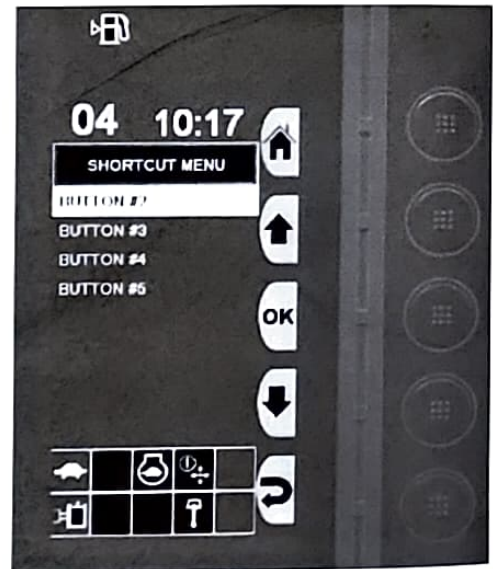


Illustration 95

g02920139

Control Mode Menu

The "CONTROL MODE" menu allows the operator to change the various control modes.

1. Press button 1.

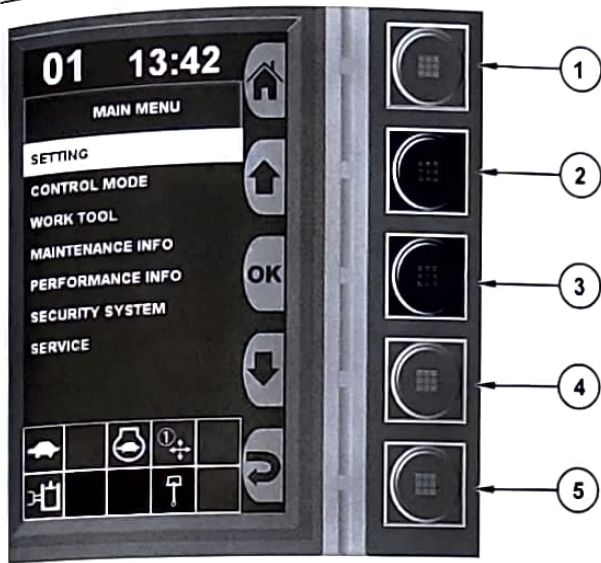


Illustration 96

g02920996

2. Press button 2 or button 4 to highlight the "CONTROL MODE" menu. Press button 3.

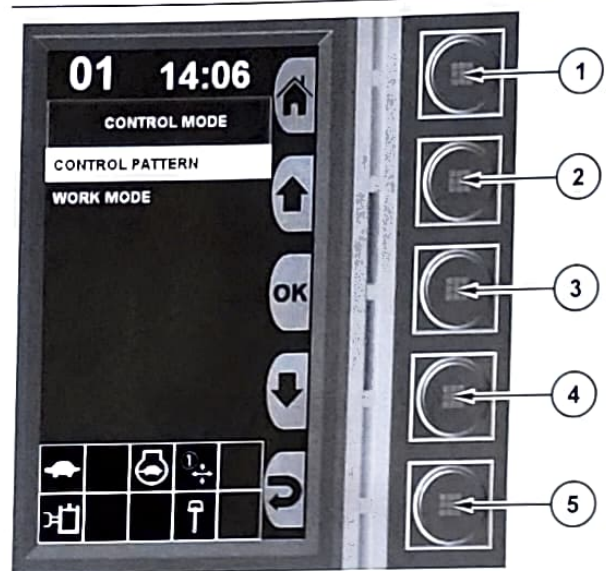


Illustration 97

g02921177



Illustration 96

g02958137

3. The "CONTROL MODE" menu will be displayed with the two following menu options: Control-pattern and Work-mode-select: Auto Idle Mode or Economy Mode. For more information on these menus, refer to the respective descriptions.
4. Press button 2 or button 4 to highlight the desired menu. Press button 3 to open the desired menu.

Note: Press button 1 to return to the default display.

Work Tool Menu

The "WORK TOOL" menu allows the operator to change the various work tool settings.

1. Press button 1.

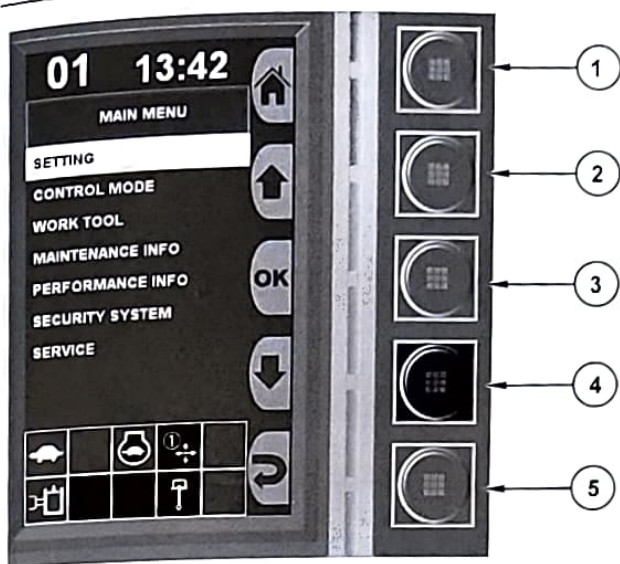


Illustration 99

g02920996

2. Press button 2 or button 4 in order to highlight the "WORK TOOL" menu. Press button .

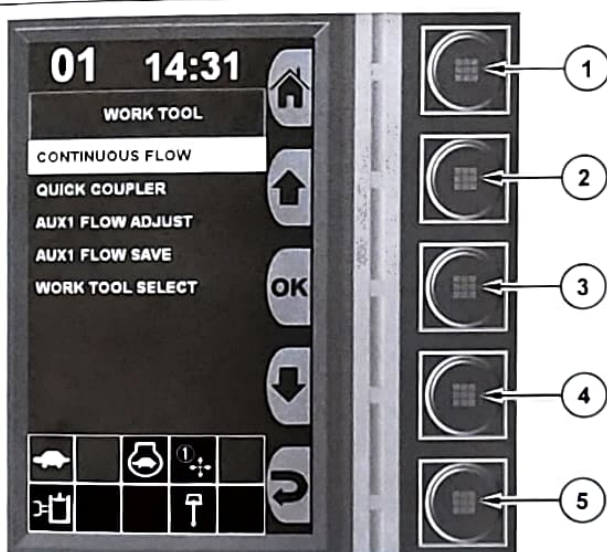


Illustration 100

g02921277

3. The "WORK TOOL" menu will be displayed with the five following menu options: **Continuous flow**, **Quick coupler**, **Auxiliary 1 Flow Adjust**, **Auxiliary 1 Flow Save** and **Work-tool-select**.



Illustration 101

g02963797

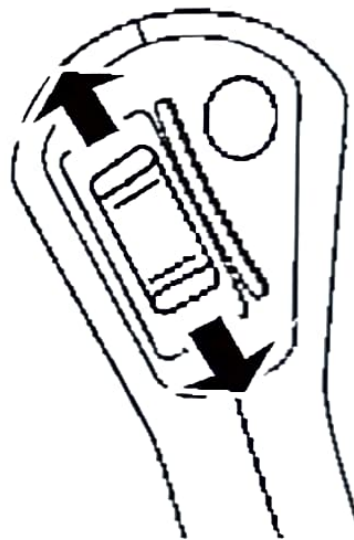


Illustration 102

g02963898

4. **Continuous Flow**: Select Continuous Flow ON or Continuous Flow OFF. Continuous Flow "ON": The operator controls the modulation and the "ON" and "OFF" function with the switch on the right-hand joystick. To set continuous flow, hold the switch to the desired modulation until continuous flow turns on. Once the continuous flow begins, release the switch. Continuous flow will stop operating when the switch is moved or the hydraulic lockout is lifted, and when the machine is turned off.

- 5. The **Auxiliary 1 Flow Adjust** can be set between 1 and 15. Press button 2 in order to increase the flow. Press button 4 in order to decrease the flow then press OK.



Illustration 103

g02964799

- 6. **Auxiliary 1 Save:** When the "user define" tool is selected, the Auxiliary Flow can be saved to any desired setting. In order to save the **Auxiliary flow**, follow these steps:



Illustration 104

g02964877

- a. Press main menu and go to Work Tool

Note: The "User Define" work tool is now saved at the desired flow and will remain at that setting until changed.



Illustration 105

g02964956

- b. Go to **Auxiliary 1 Flow Adjust**, Set flow, Press **OK**, go to **Auxiliary Flow Save** and press **OK**.



Illustration 106

g02965263

- 7. **Quick Coupler:** See Operation and Maintenance Manual, "Quick Coupler Operation".



Illustration 107

g02965297

8. Select Work Tool Select



Illustration 108

g02965317

9. Select Work Tool

Table 12

Default Settings	Flow
Auger	15
Brushcutter	15
Compactor Plate	15

(continued)

(Table 12, contd)

Hammer	10
Shear	12
Thumb	12
Tilting Bucket	12
Tilting Coupler	12
User Define	"User Define"

Note: To set "User Define": choose "User Define". Set Auxiliary 1 Flow Adjust. Save Auxiliary1 Flow Save. Press OK.

Maintenance Information Menu

The "MAINTENANCE INFO" menu allows the operator to view the current hours of use and the recommended change intervals for various system components. The intervals can also be reset.

1. Press button 1.

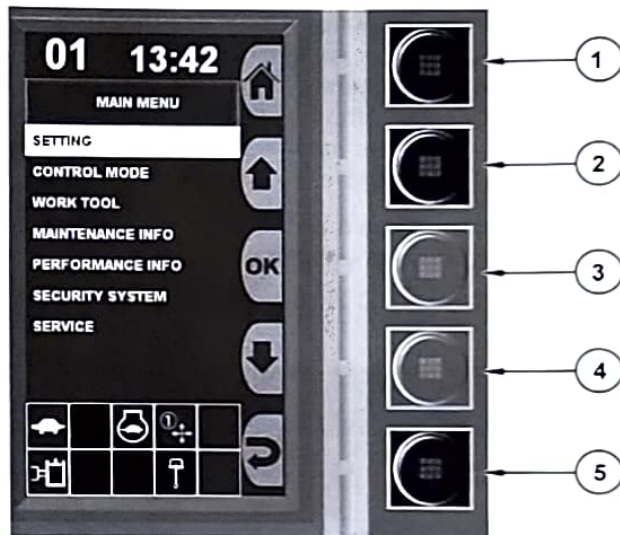


Illustration 109

g02920996

2. Press button 2 or button 4 in order to highlight the "MAINTENANCE INFO" menu. Press button 3.

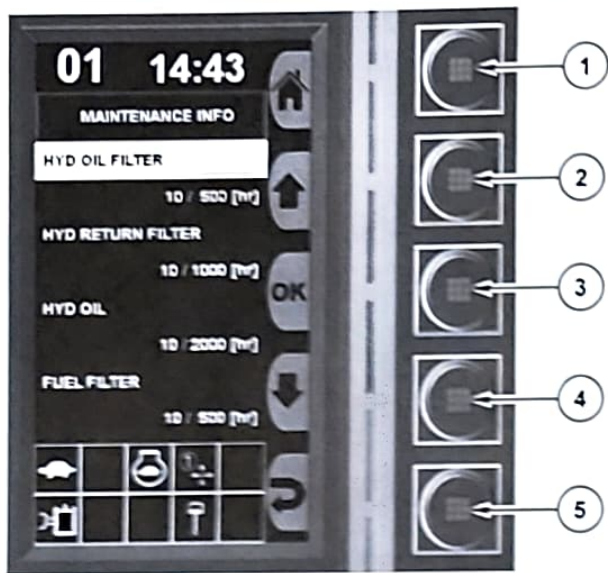


Illustration 110

g02921296

3. A list of system components will be displayed. Press button 2 or button 4 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.
4. In order to reset the maintenance hours, highlight the system component and press button 3.

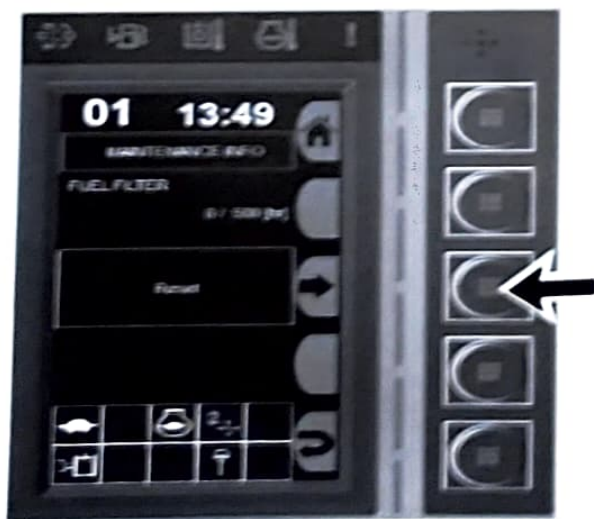


Illustration 111

g03691675

Note: Press button 1 in order to return to the default display or button 5 to return to the Main Menu.

Performance Information Menu

The "PERFORMANCE" menu allows the operator to view measurements of various system components.

1. Press button 1.

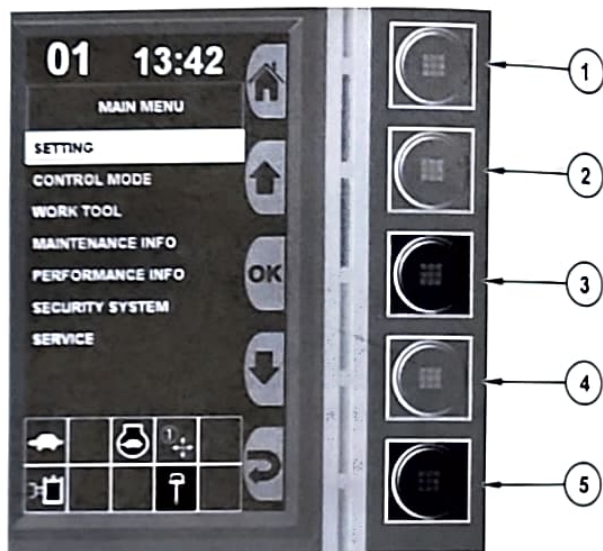


Illustration 112

g02920998

2. Press button 2 or button 4 in order to highlight the "PERFORMANCE INFO" menu. Press button 3.

5. Press "Reset"

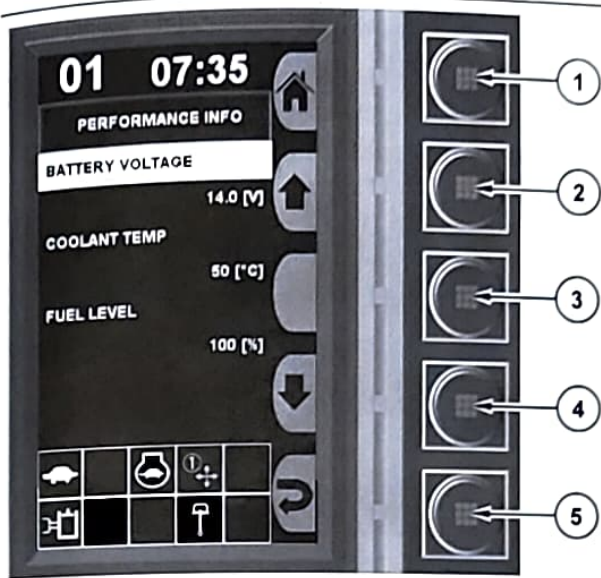


Illustration 113

g02922636

3. The "PERFORMANCE INFO" menu will be displayed with a list of system components and measurements.
4. Press button 2 or button 4 in order to scroll through the list.

Note: Press button 1 in order to return to the default display or button 5 to return to the Main Menu.

Service Menu

Enable additional users with different passwords

Up to five additional users can be installed with individual passwords. The additional passwords can be given to rental customers, jobsite foremen, superintendents, and additional operators.

Enable additional users by following these steps:

(Step 1) Press the top button for "Main Menu". Highlight "Service" press OK and enter FFF2.

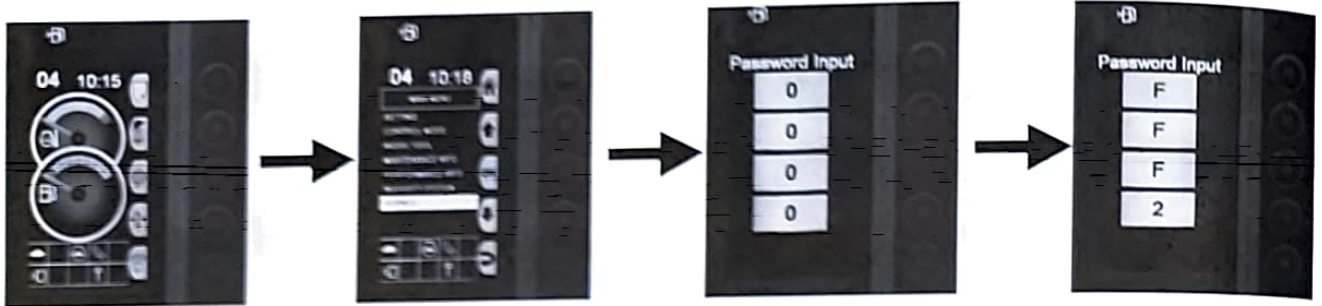


Illustration 114

g02919721

(Step 2) Highlight "Security System" and press OK, highlight "user 1" and press OK and press OK for two more screens as shown below:

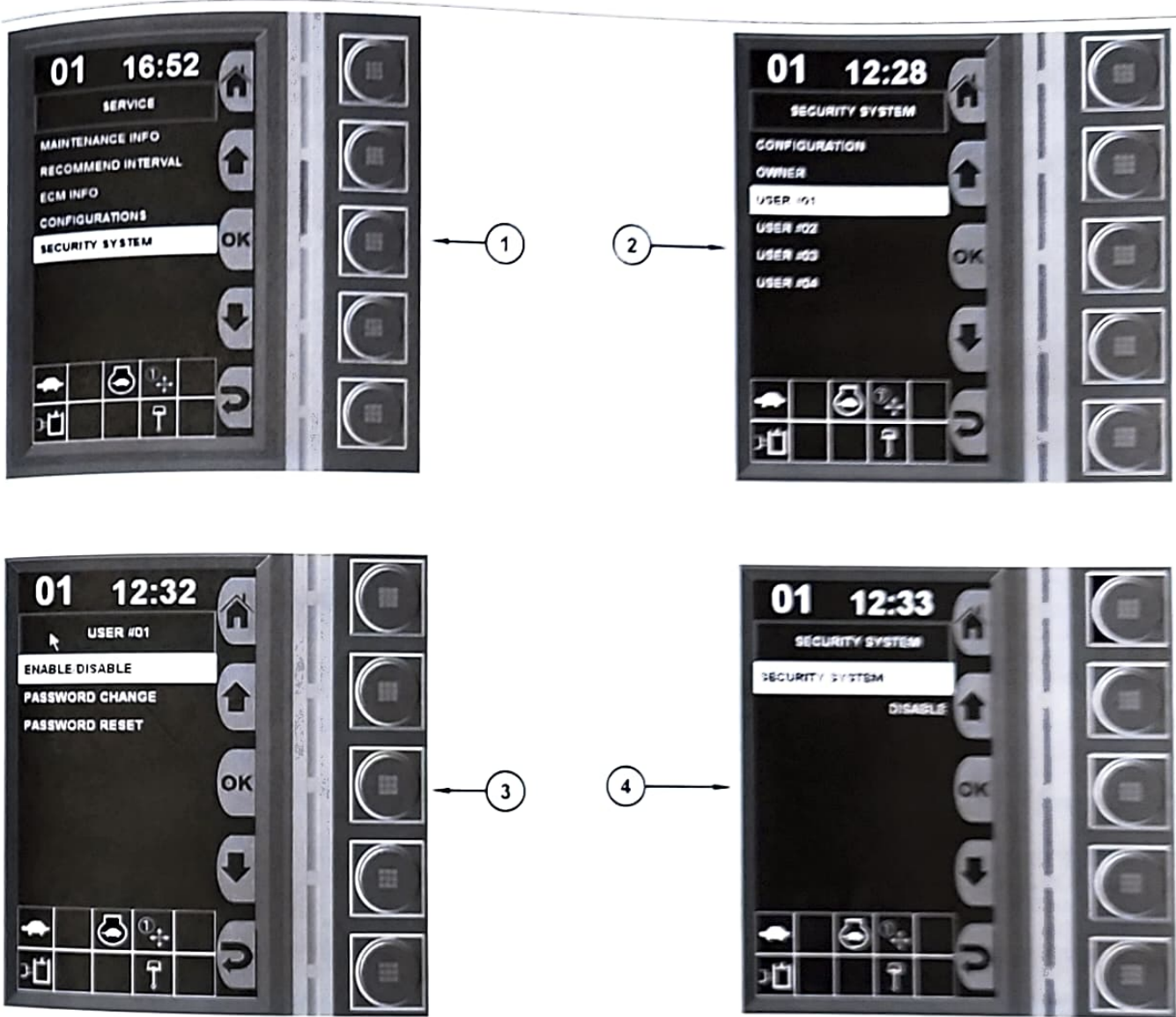


Illustration 115

2020/03/14

(Step 3) Press OK next to "enable" in order to enable User 1.

Note: If the Security System is not engaged, no screen will appear.

i06218391

Fuel Transfer Pump (Refueling) (If Equipped)

SMCS Code: 1256

Use the following procedure to pump fuel and store hose.

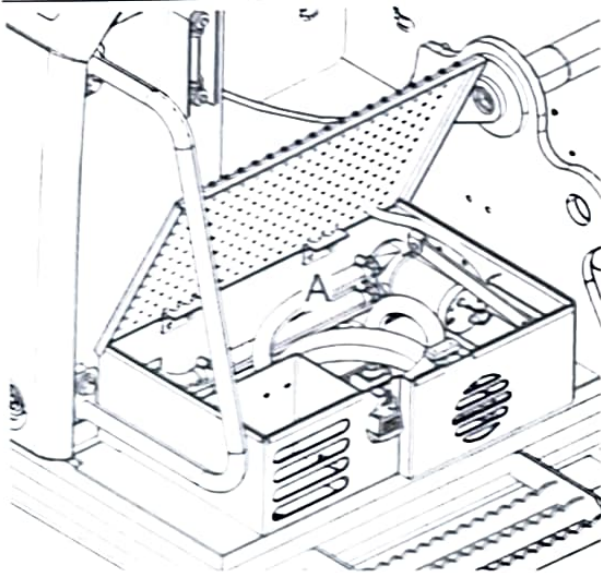


Illustration 129

g03859107

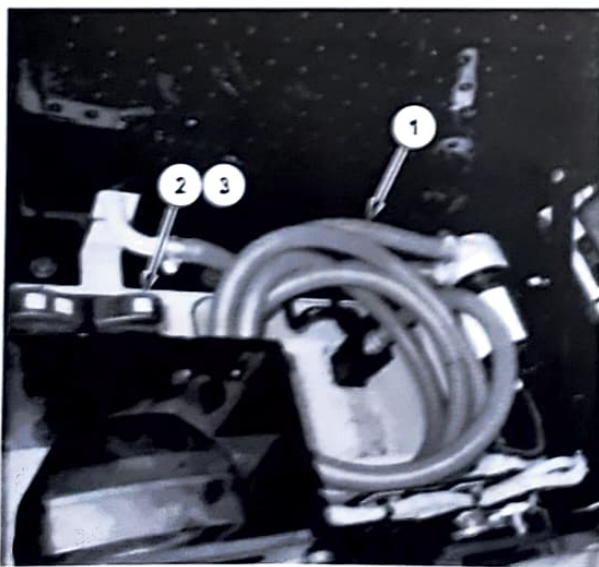


Illustration 130

g03859102

View of area A

Open the tool box located on right side of the machine.

The electric refueling pump 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 the switch in order to activate the refueling pump.



Off – Push the switch in order to deactivate the refueling pump.

1. Remove the cap from the fuel tank.
2. Properly insert the free end of suction hose (1) into a container of fuel.
3. Press power switch (2) in order to activate the refueling pump.
4. Push switch (3) in order to supply the fuel to the tank. When the tank is full, the pump stops refueling.
5. After refueling, install the cap on to the fuel tank.
6. Make sure that excess fuel is drained from suction hose (1) before storing the suction hose.
7. When you store suction hose (1), 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.

8. Close the access cover.

i05258724

Radio (If Equipped)

SMCS Code: 7338

The radio is located behind the seat on the rear cab wall



Illustration 131

g03347782

- (1) Power Control/Mute
- (2) Source/Sound Styles
- (3) Auxiliary Plug
- (4) USB
- (5) AM/FM band selector
- (6) Search Up
- (7) AST/Set
- (8) Search Down
- (9) Preset Buttons
- (10) LCD Display
- (11) Volume Control Decrease
- (12) Volume Control Increase

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.

(1) Power Control/Mute – Push the power switch in order to turn on the radio. Push and hold the power switch again in order to turn off the radio. While the radio is turned on, short press the "POWER/MUTE" button to mute the radio.

(2) Source/Sound Styles – Press and hold the "SRC/SOUND" the button to move between different style of music. Press the volume up or down button in order to toggle between the different selections (ROCK, CLASSIC, POP, etc.). Short press the "SRC/SOUND" button in order to change the bass, treble, balance, fader, and loud.

(3) Auxiliary Plug – The front auxiliary plug allows for the connection of a portable audio device. Select "AUX" mode by pressing "SRC" button after plugging external audio device via 3.5 mm plug.

(4) USB Port – Insert USB disk, will display "USB PLUG". Short press "SRC" button, get into USB Mode. Use left/right arrow buttons to select tracks/files. Press SCAN to preview each track for 10 seconds. Support formats: MP3 32M-4G Flash Memory File Format: FAT16 & FAT32 Sample Frequency: 8kH-48kH Bit rate: 8k-320kbps

(5) AM/FM Band selector – Press the band selector button in order to select AM or FM radio.

(6) Search Up – Push the search up button in order to advance to the next available radio frequency. Push the search up button in order to advance to the next track/file in "USB" mode.

(7) AST/SET – Select radio band by short pressing BAND button. Short press "AST". The first six stations will be stored automatically. Long press "AST/SET" button to enter or exit setup menu. Short press "SET" button to adjust Hour or Minute position. Use left/right arrow to change number. Long press "SET" button at least 2 seconds to leave "SETUP" menu.

(8) Search Down – Push the search down button in order to go back to the previous radio frequency. Push the search down button in order to go back to the previous track/file in "USB" mode.

(9) Preset Buttons – The circuitry in the memory system allows you to preset six radio stations. Tune to the desired radio station and press and hold one of the preset buttons. The station will be saved to memory.

(10) LCD Display – The display shows various functions such as the station frequency, band, and the volume level.

(11) Volume Decrease – Push the volume control in order to decrease the sound level.

(12) Volume Increase – Push the volume control in order to increase the sound level.

Note: Do not unplug the disk drive from the USB port while the disk is playing. Do not use a USB extension cable.

i05516270

Air Conditioning and Heating Control

SMCS Code: 7304; 7320; 7337

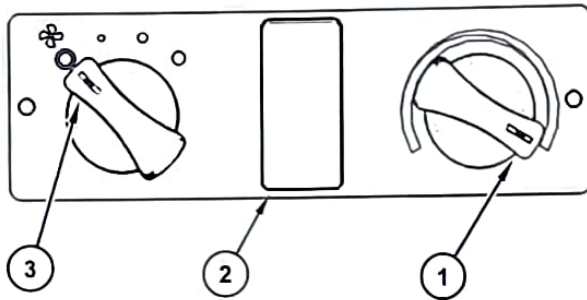


Illustration 132

g03490457

- (1) Temperature control Knob
(2) Compressor switch
(3) On/Off and fan speed switch

Temperature Control

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

Air Conditioning Control (If Equipped)

"A/C" On/Off Switch (2) – 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. Weekly operation will help to maintain the compressor in optimum working order.**

Fan Control

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



Off

Move the Switch to this position in order to turn off the air conditioning and the heater.



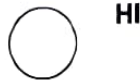
LO

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



ME

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



HI

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

i04988796

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

When you are adjusting the mirrors, failure to use the proper access systems for machine maintenance could result in slipping and falling which could result in personal injury or death. Be sure to use the proper access systems for machine maintenance when you are adjusting the mirrors.

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

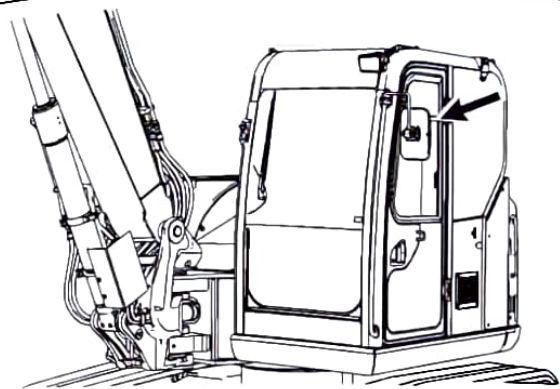


Illustration 133

g03168203

Mirror provides additional visibility around your machine. Make sure that the mirror is in proper working condition and that the mirror is clean. Adjust the mirror at the beginning of each work period and adjust the mirror when you change operators. Always adjust the mirror for maximum visibility around your machine.

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.
- Adjust the mirror view in order to provide visibility behind the machine at a maximum distance of 30 m (98 ft) from the rear corners of the machine.

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

Left Side View Mirror

If equipped, adjust the left side rear view mirror so the left side of the machine can be seen from the operator seat.



Illustration 134

g01626201

i04768560

Window (Front)

SMCS Code: 7310-FR

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 hydraulic lockout control to the LOCKED position.
- Stop the engine.

Perform Step 1 through Step 4 in order to open the upper window.

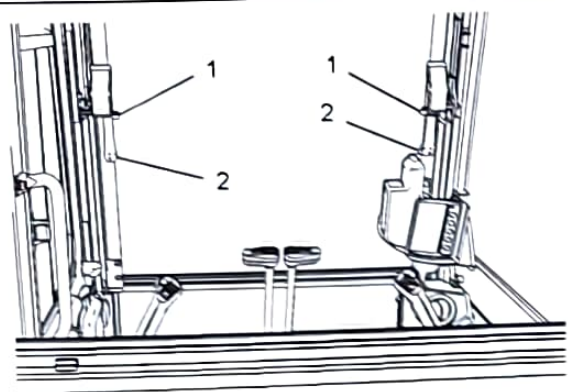


Illustration 135

g02866496

1. Release both latches (1) on the sides of the front window in order to release the front window.
2. Hold both grips (2) that are provided on the front window frame. Move the front window upward into the STOWED position until the auto-lock latch is engaged.

Perform the steps that follow in order to close the upper window.

3. Use latches (1) in order to unlock the front window when the front window is in the STOWED position.
4. Securely hold grips (2), and slowly pull the front window downward until the front window locks in the DOWN position.
5. Perform Steps 6 through 8 in order to open the lower window and close the lower window.

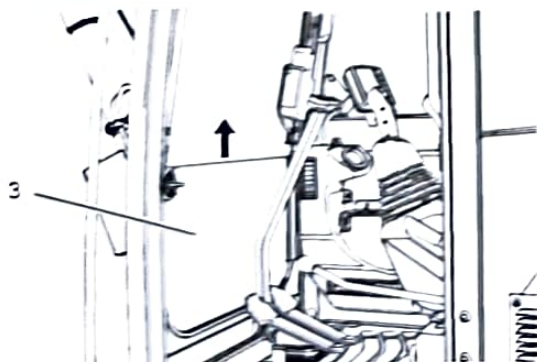


Illustration 136

g02866577

6. Raise the lower window out of the window frame.

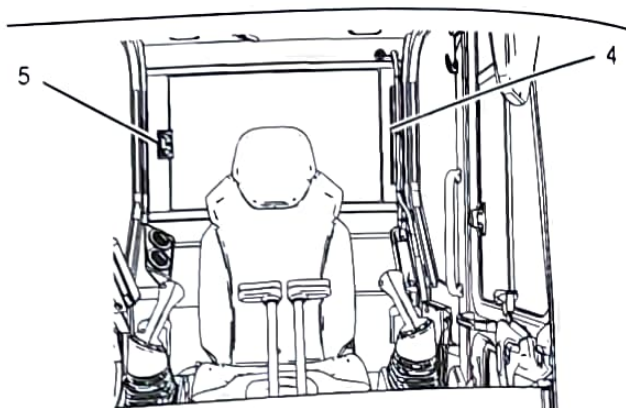


Illustration 137

g02866596

7. Store the lower window in the holder that is located in the rear of the cab. To store the lower window, locate one side of the lower window into bracket (4). Secure the opposite side of the lower window with catch (5).
8. 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.

i04764037

Cab Door

SMCS Code: 7308

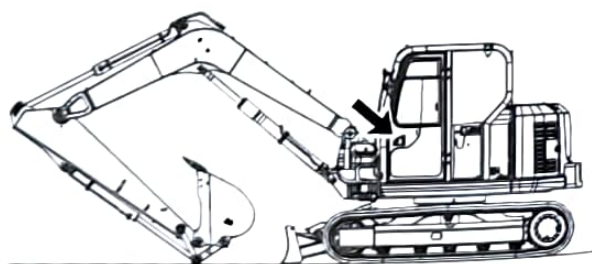


Illustration 138

g02858996

In order to open the cab door from the outside of the cab, pull outward on the door handle.

i06506844

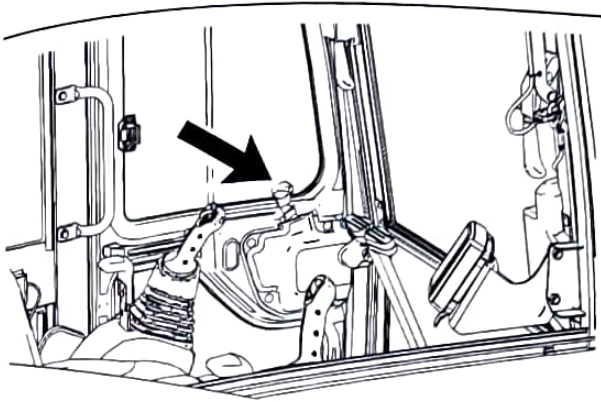


Illustration 139

g02858997

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.

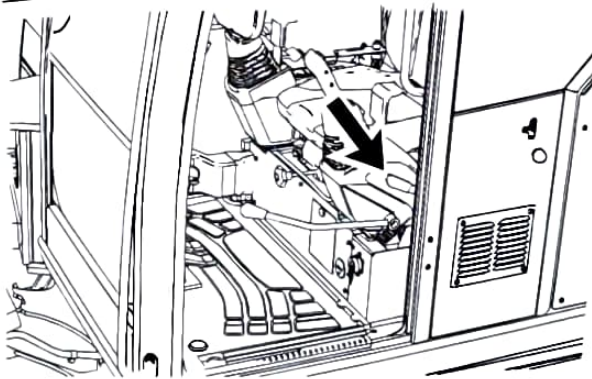


Illustration 140

g02858998

In order to release the cab door from the catch, pull downward on the cab door release lever.

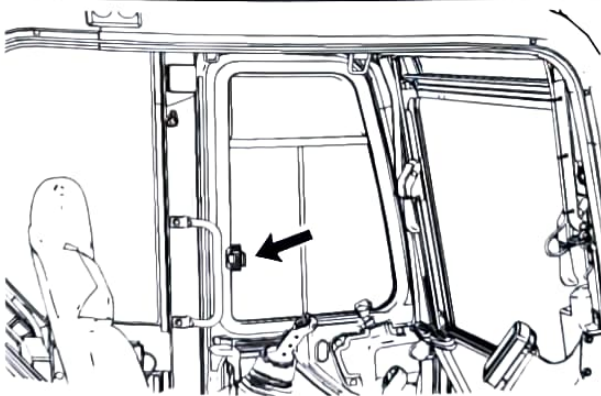


Illustration 141

g02858999

In order to open a window, release the window latch, and then slide the window to the desired position.

Joystick Controls

SMCS Code: 5705

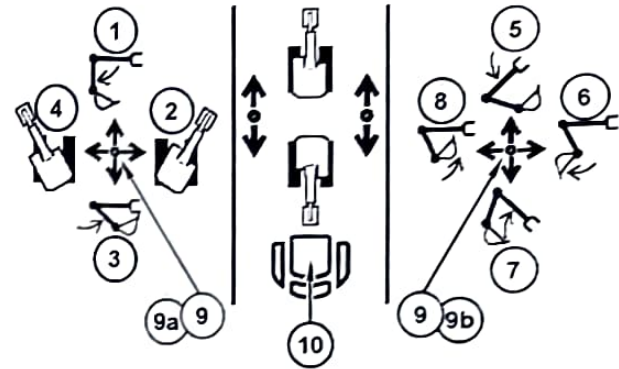


Illustration 142

g02732207

- (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) AUTOMATIC ENGINE SPEED CONTROL SWITCH (IF EQUIPPED)
- (9b) HORN (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.

106972703

Work Tool Control

SMCS Code: 6700

WARNING

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

To avoid unexpected operation of the auxiliary control circuit, always put the auxiliary control pedal in the locked position while traveling or whenever the auxiliary lines are not being used.

Auxiliary Hydraulic Circuit

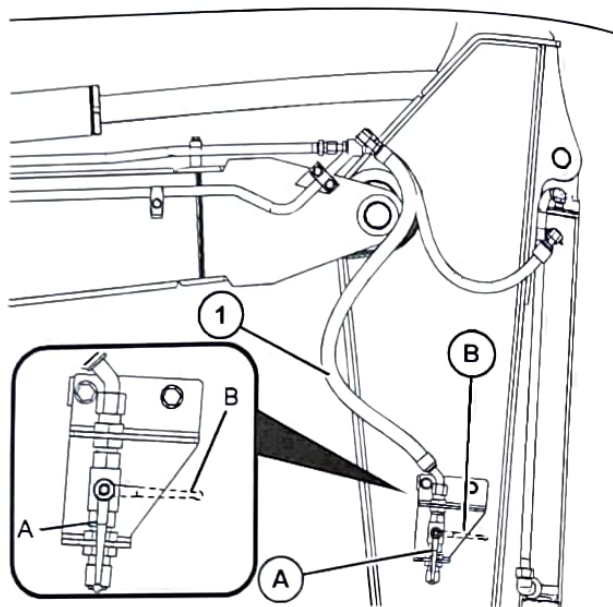


Illustration 143

g06183978

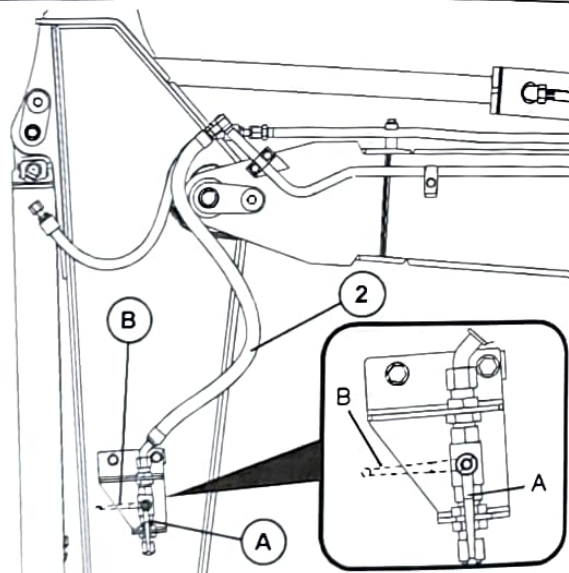


Illustration 144

g06183982

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

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

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

Position (A) shows the valve in the OPEN position. Position (B) shows the valve in the CLOSED position.

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

1. With the accumulator charged and the hydraulic lockout control lowered, turn the engine start key to the ON position. Do not start the engine.
2. Operate the auxiliary control in both directions.
3. Turn the engine start switch key to the OFF position.

Foot Pedal Control

WARNING

With certain attachment combinations, the work tool pedal can have different functions. Always check for work tool pedal function before using the work tool pedal. Improper operation of the work tool pedal could result in serious injury or death.

The control pedal is located to the right of the travel levers.

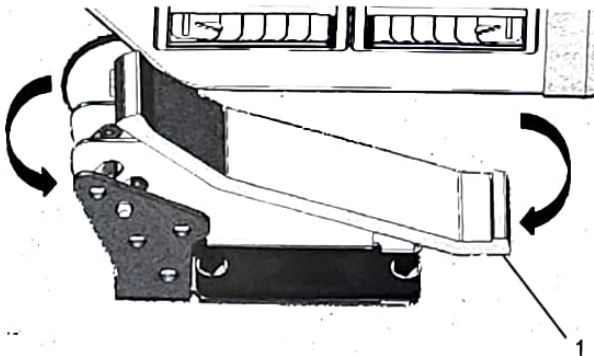


Illustration 145 g03488047

The pedal is shown in the unlocked position.

(1) Pedal

The pedal allows modulation of the speed for the work tool. To cause the work tool to move faster, push down on the pedal more.

The pedal has the following two functions:

ONE-WAY FLOW – Pressing the top of pedal (1) downward allows hydraulic oil to flow in one direction (hydraulic hammer). Releasing pedal (1) stops the hydraulic oil flow.

TWO-WAY FLOW – The function of two-way flow allows you to press the top and the bottom of pedal (1). This will allow hydraulic oil to flow in two directions (hydraulic shear). Pressing the top of the pedal will close the shear. Pressing the bottom of the

pedal will open the shear. Releasing pedal (1) stops the hydraulic oil flow.

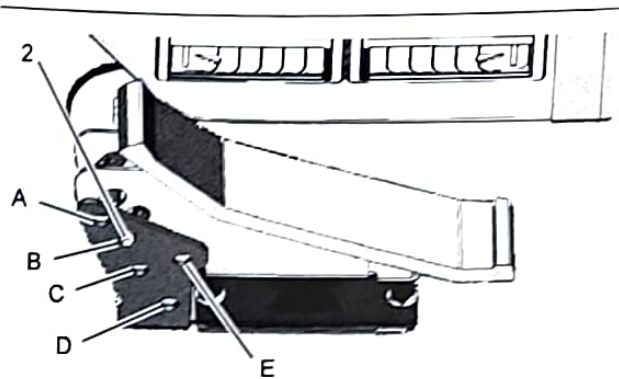


Illustration 146

g03488241

- (2) Lock pin
- (A) SINGLE HALF ACTION position
- (B) DOUBLE HALF ACTION position
- (C) SINGLE FULL ACTION position
- (D) DOUBLE FULL ACTION position
- (E) LOCK position

When you are not using the work tool, put the lock pin (2) in LOCKED position (E). This will lock the work tool pedal to prevent any unexpected operation of the work tool.

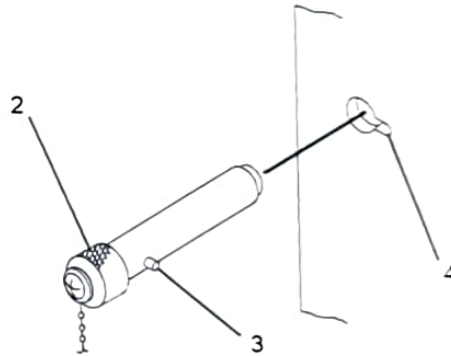


Illustration 147

g03488397

- (2) Lock pin
- (3) Pin
- (4) Notch

Note: To prevent lock pin (2) from being accidentally pulled out, insert pin (3) through notch (4) and turn lock pin (3) by 1/4 turn.

Work Tool Flow Control (If Equipped)

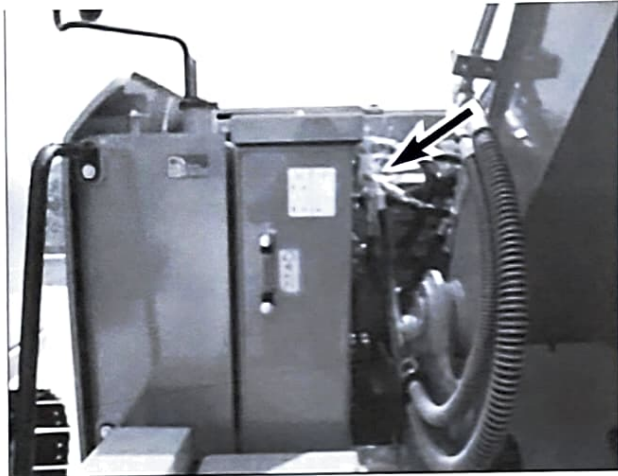


Illustration 148 g03695603
Work tool flow control location (If equipped)

ONE-WAY FLOW position

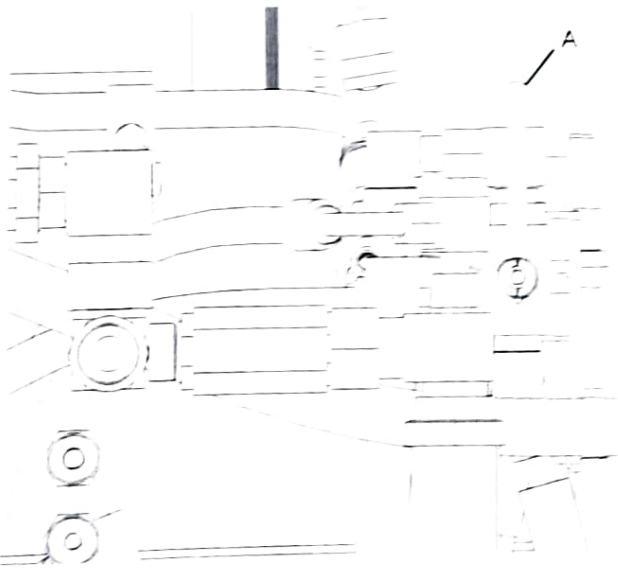


Illustration 149 g03695604
(A) 1 way (Lever up)

When the work tool flow mode control is in position (A), use a work tool that requires one-way flow. To change the flow from two-way flow to one-way flow, Move the lever to position (A).

TWO-WAY FLOW position

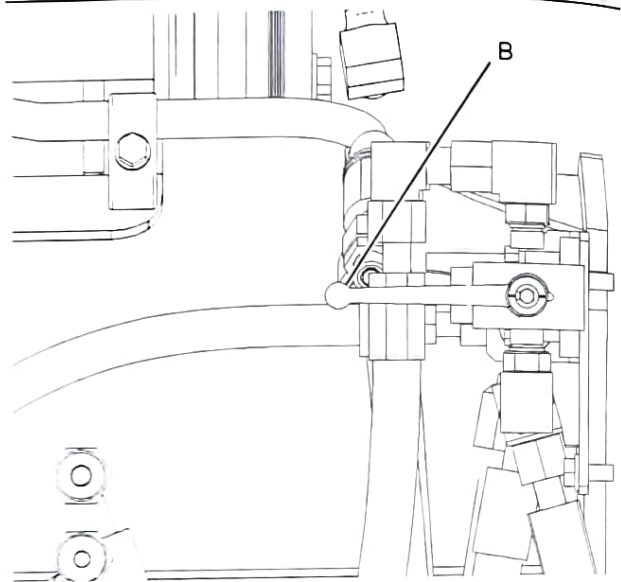


Illustration 150 g03695629
(B) 2 way (Lever down)

When the work tool flow mode control is in position (B), use a work tool that requires two-way flow. To change the flow from one-way flow to two-way flow, Move the lever to position (B).

i04660589

Joystick Controls Alternate Patterns

SMCS Code: 5059; 5137

WARNING

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

Refer to Operation and Maintenance Manual.

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

The machine control pattern can be changed through the monitoring system. Refer to Operation and Maintenance, "Monitoring System" for more information.

Alternate Joystick Control Pattern

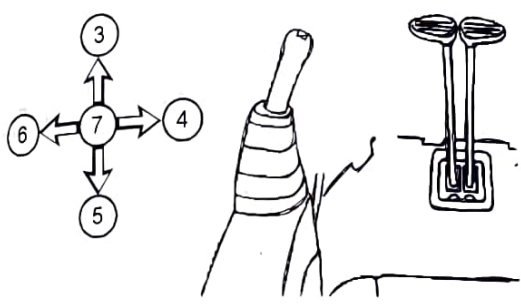


Illustration 151 g01193186
Left hand joystick

- BOOM LOWER (3)** – Move the joystick to this position in order to lower the boom.
- SWING RIGHT (4)** – Move the joystick to this position in order to swing the upper structure to the right.
- BOOM RAISE (5)** – Move the joystick to this position in order to raise the boom.
- SWING LEFT (6)** – Move the joystick to this position in order to swing the upper structure to the left.

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



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



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



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

HOLD (12) – When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

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

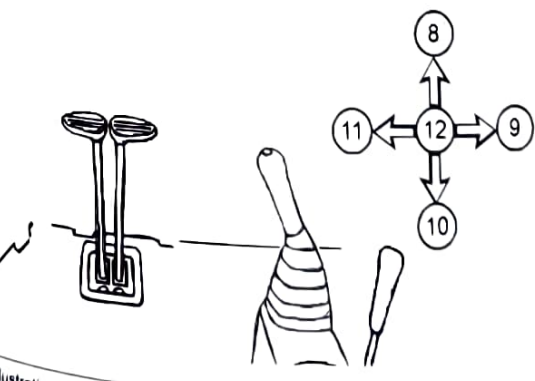


Illustration 152 g01193187
Right hand joystick

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

Engine Starting

I05269766

Engine Starting

SMCS Code: 1000; 1090; 1456; 7000

WARNING

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

NOTICE

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

1. Move the hydraulic lockout control (lever) to the LOCKED position.
2. Move the joysticks to the HOLD position.
3. Turn the engine start switch to the ON position.
During cold weather, leave the engine start switch in the ON position for 10 seconds in order to preheat the glow plugs.

Note: It is not necessary to preheat the glow plugs on a warm engine.

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

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

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

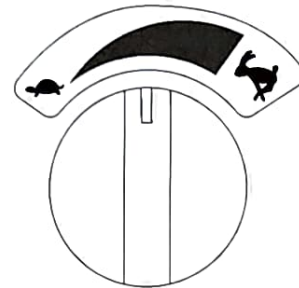


Illustration 153

g00817952

5. Turn the engine speed dial to the MEDIUM SPEED position.
6. Before you start the engine, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the horn before you start the engine.

NOTICE

If the engine fails to start after 10 seconds, disengage the starter. Wait 30 seconds before cranking again.

Do not crank the engine for more than 20 seconds. Cranking the engine for more than 20 seconds may cause damage to the engine and/or hydraulic system.

7. Turn the engine start switch to the START position.
8. Release the engine start switch key after the engine starts.
9. If the engine does not start, turn the key to the OFF position. Repeat step 7 and step 8.

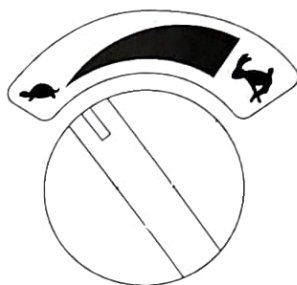


Illustration 154

g00817961

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

i05288209

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

NOTICE

Keep engine speed low until the engine oil pressure registers on the gauge or the engine oil pressure indicator light goes out. If it does not register or the light does not go out within ten seconds, stop the engine and investigate the cause before starting again. Failure to do so, can cause engine damage.

NOTICE

Always run the engine at low idle for at least ten minutes before performing any other operations in cold conditions in order to protect your engine and hydraulic components.

NOTICE

When you operate the machine in ambient temperatures below 4° C (40° F), cooler covers are recommended to maintain normal hydraulic operating temperatures. When the ambient temperature is above 4° C (40° F), the cooler covers are not required.

The engine may automatically change speeds when the machine is stationary and idling in cold ambient temperature for an extended time. This is to:

- Maintain desired coolant temperature.
- Maintain desired operation of engine systems.

- Maintain desired operation of the regeneration system.

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 warm up at low idle for at least 5 minutes. Engage the work tool controls and disengage the work tool controls in order to 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.

3. To warm up the hydraulic oil, turn the engine speed dial to the medium engine speed. Run the engine for approximately 5 minutes and move the joystick intermittently from the BUCKET DUMP position to the HOLD position. Do not hold the joystick in the BUCKET DUMP position with the bucket cylinder fully extended for more than 10 seconds.

4. Turn the engine speed dial to the maximum engine speed and repeat Step 3.

This allows the oil to attain relief pressure, which causes the oil to warm up more rapidly.

Operation Section
Engine and Machine Warm-Up

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

Operation

Operation Information

SMCS Code: 7000

Note: 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.

03653900



Illustration 155

900752-00

3. Turn the engine speed dial to the operating range.
4. Move the hydraulic lockout control to the UNLOCKED position.

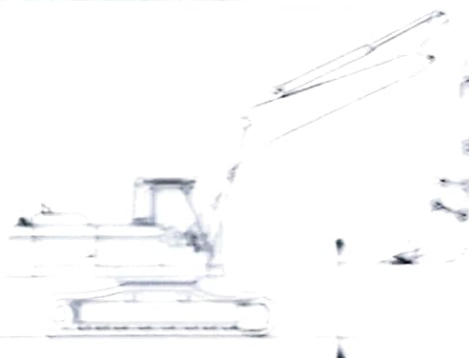


Illustration 156

900752-00

5. Raise the boom enough in order to provide sufficient ground clearance.
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 and the idlers are 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.

Frozen Ground Conditions

SMCS Code: 7000

100059254

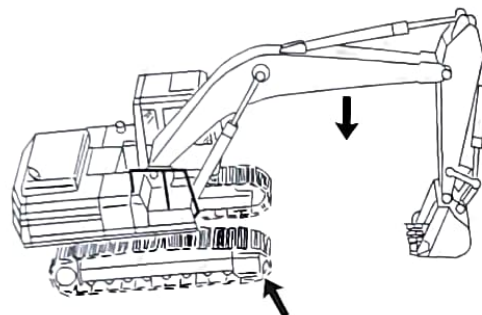


Illustration 157

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.

106218475

Equipment Lowering with Engine Stopped

SMCS Code: 7000

Machines without a Boom Lowering Control Valve

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

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

WARNING

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

WARNING

Personal injury can result from oil under high pressure.

DO NOT allow high pressure oil to contact skin.

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

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

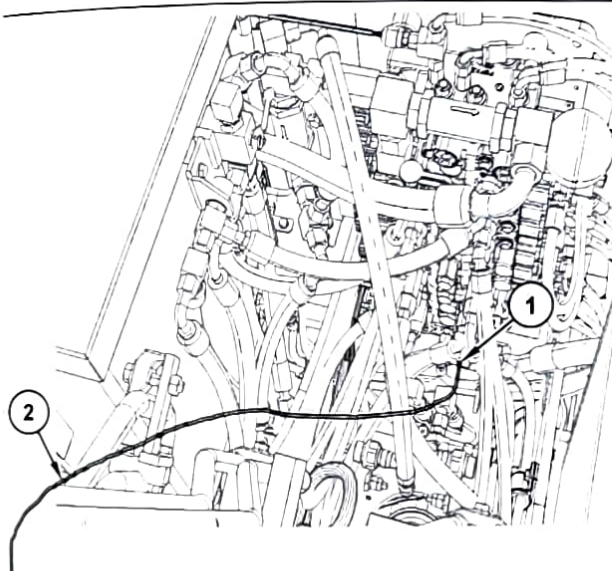


Illustration 158

g03859204

1. Open the access door on the right side of the machine.
2. Connect hose (2) to boom manual lowering valve (1).
3. Slowly open boom manual lowering valve (1) by a maximum of 1/2 turn in order to lower the boom. Drain hydraulic oil into a suitable container.
4. Make sure that the work tool has lowered all the way to the ground. Tighten boom manual lowering valve (1) to a torque of $13 \pm 2 \text{ N}\cdot\text{m}$ ($9 \pm 1 \text{ lb ft}$).
5. Make the necessary repairs before you operate the machine.
6. Check the level of the hydraulic fluid. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Level-Check".

7. Close the access door.

Machines with a Boom Lowering Control Valve

If the engine is stopped 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:

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.

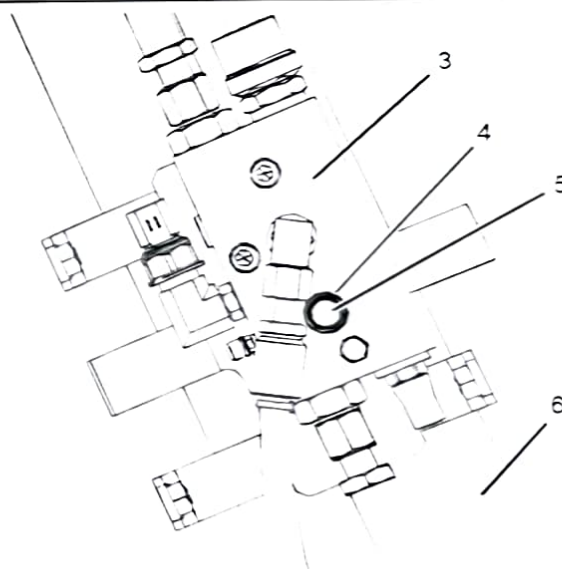


Illustration 159

g03348040

- (3) Boom lowering control valve
- (4) Locknut
- (5) Set screw
- (6) Boom

Note: The boom lowering control valve is at the base of the boom cylinder. The boom lowering control device allows the operator to manually lower the boom if the engine is stopped. The boom lowering control device also prevents a sudden drop of the boom if there is an oil leak in the hydraulic line of the boom.

Operation Section
Equipment Lowering with Engine Stopped

1. Loosen locknut (3).
2. Slowly, turn set screw (5) counterclockwise until the boom begins to lower onto the ground.

Note: Once the boom begins to lower, stop turning set screw (5).

3. After the boom has lowered completely onto the ground, turn set screw (5) back to the original position.
4. Tighten locknut (4).
5. Make any necessary repairs before placing the excavator back into service.

Note: Consult your Caterpillar dealer for further information.

Blade (If Equipped)

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

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

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

Operating Techniques

105125989

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

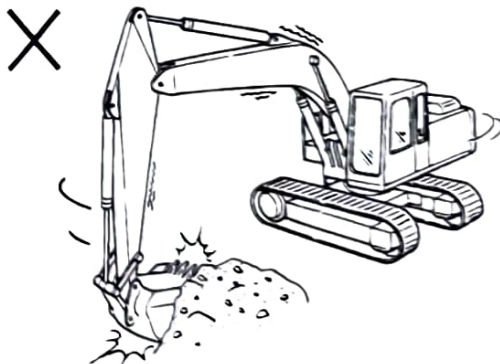


Illustration 160

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.

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

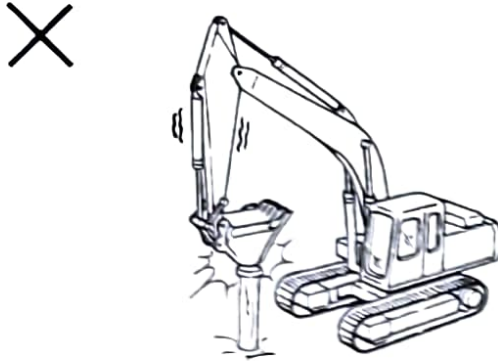


Illustration 161

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.

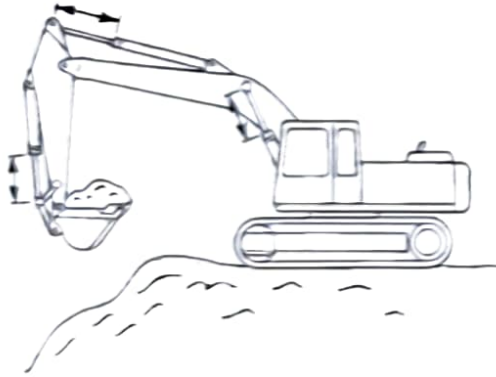


Illustration 162

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.

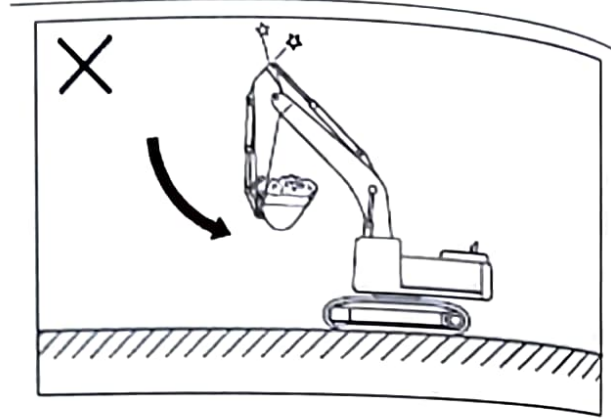


Illustration 163

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.

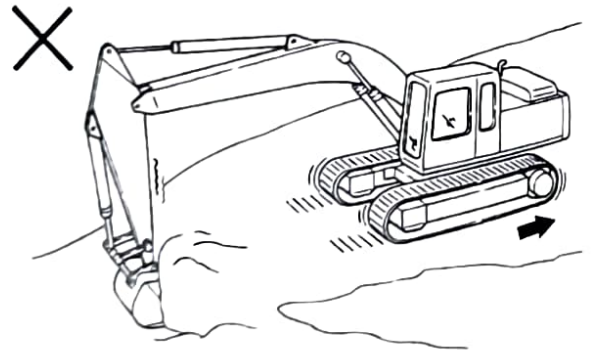


Illustration 164

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.

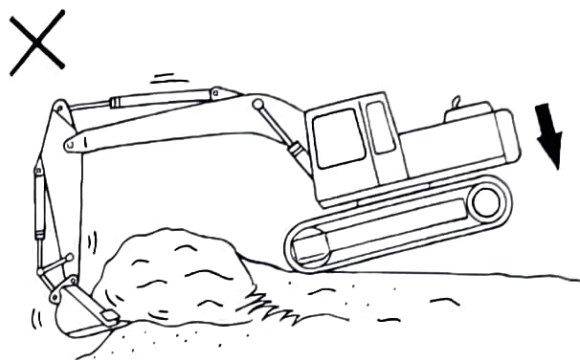


Illustration 165 g00529480

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

Operating Precaution



Illustration 166 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.

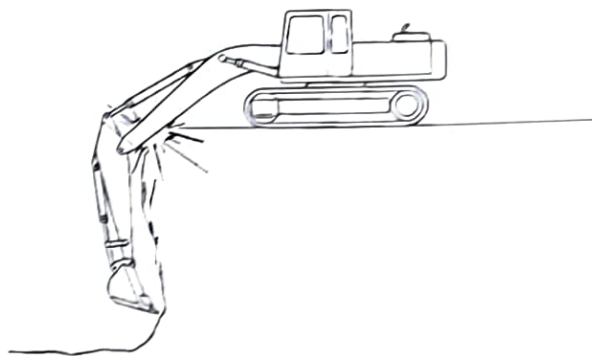


Illustration 167 g00529462

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.

05032265

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.

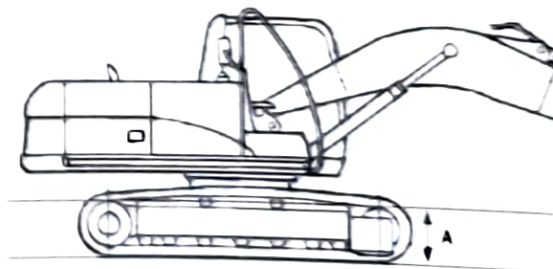


Illustration 168 g00807842
Depth of water to the center of the track carrier roller

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

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.

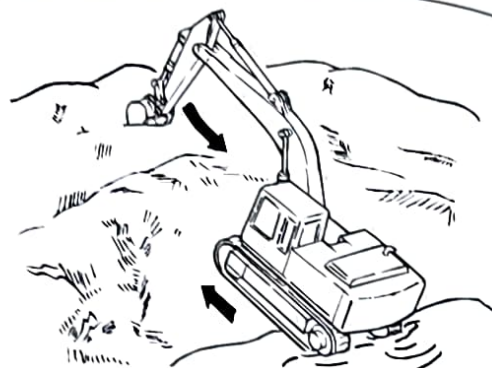


Illustration 169

g00808143

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.

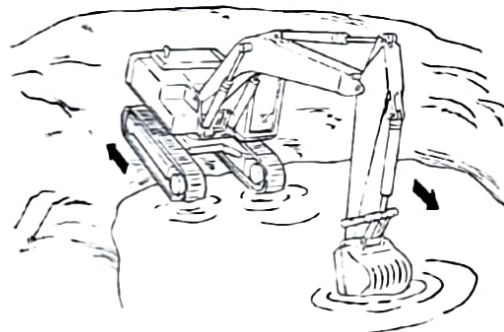


Illustration 170

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.

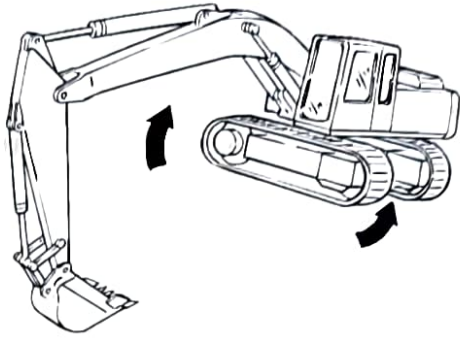


Illustration 171

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

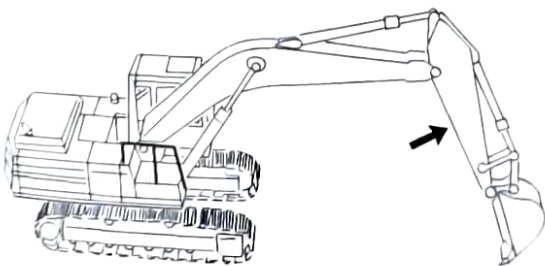


Illustration 172

g00101523

1. Position the stick at a 70 degree angle to the ground.

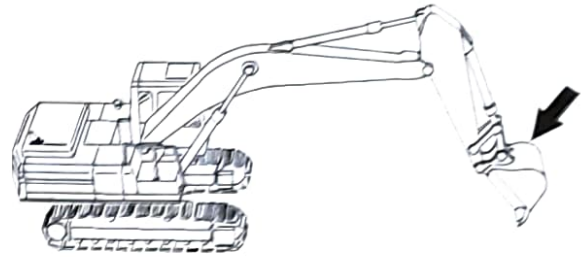


Illustration 173

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.

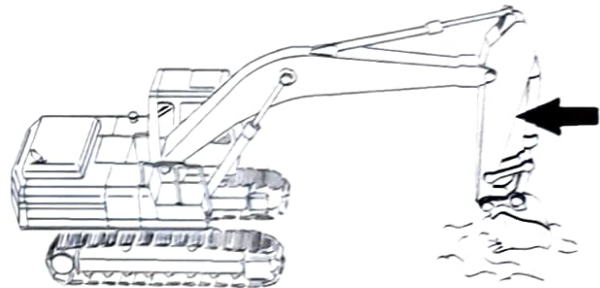


Illustration 174

g00101528

3. Move the stick toward the cab and keep the bucket parallel to the ground.

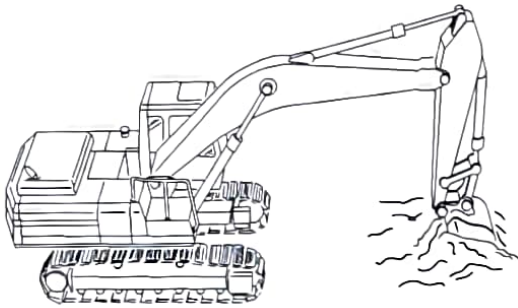


Illustration 175

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.

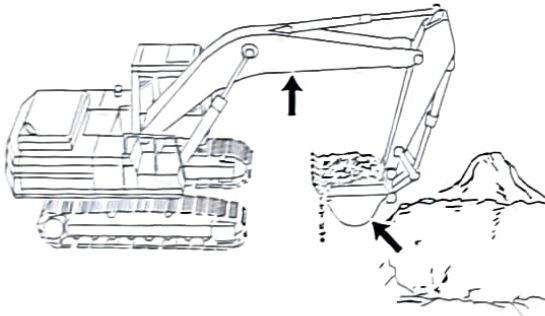


Illustration 176

g00101528

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

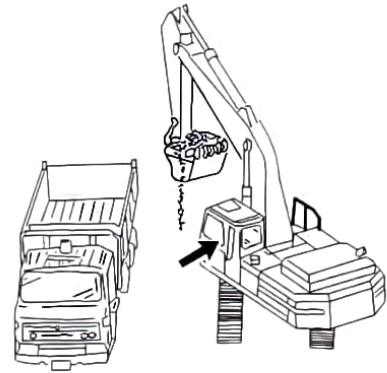


Illustration 177

g00101529

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

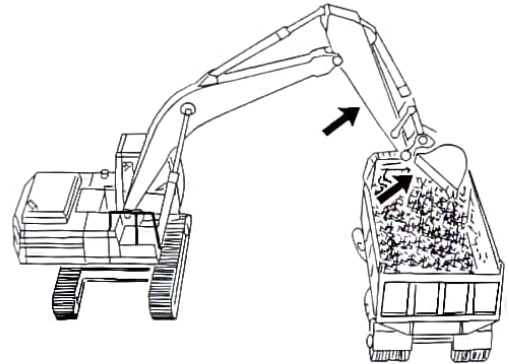


Illustration 178

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.

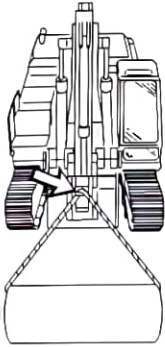


Illustration 179

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.

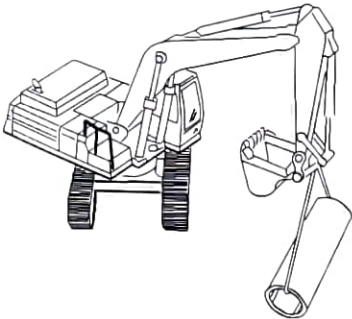


Illustration 180

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.

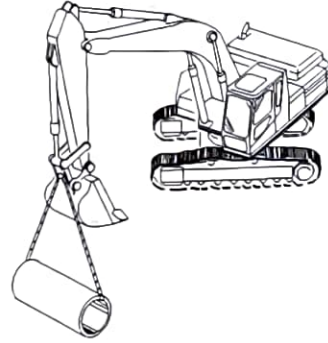


Illustration 181

g00101533

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

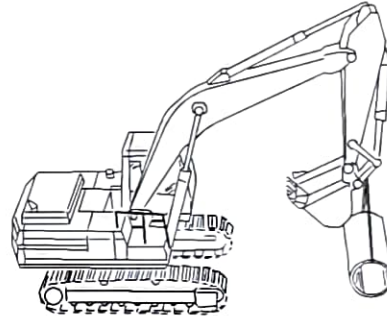


Illustration 182

g00101534

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

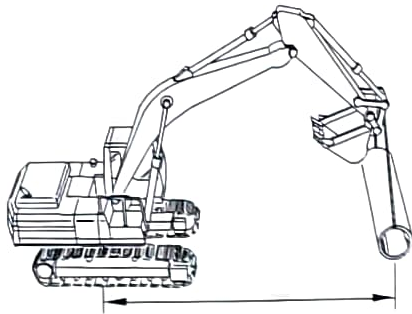


Illustration 183

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.

i04958971

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

SMCS Code: 6129; 6522; 7000

NOTICE

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

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

General Operation

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

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

Installation

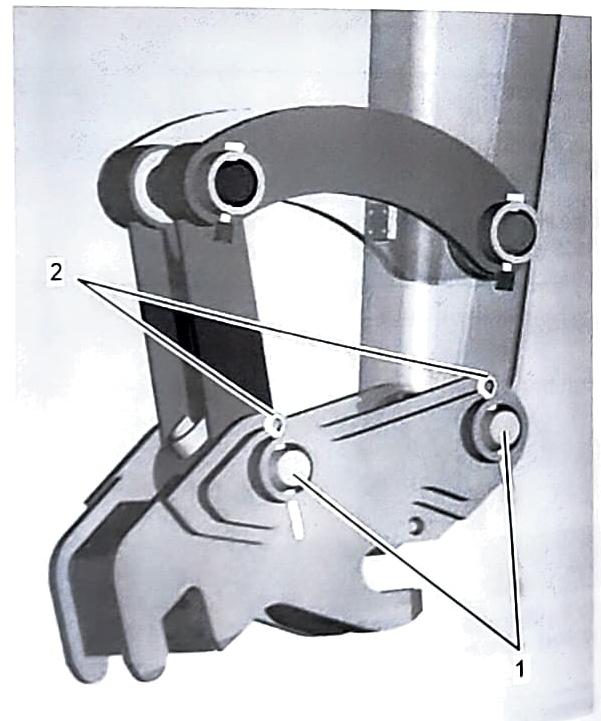


Illustration 184

g02869245

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

3. Install the cotter pins (2).

Coupling the Work Tool

WARNING

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

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

- Visually confirm the engagement of the work tool. Ensure that both the front and rear pin locking mechanisms for the work tool are locked and secure the work tool to the quick coupler.
- Visually confirm positive indication of the ISO Engagement indicator, if equipped.
- Retract the bucket cylinder and drag the work tool on the ground.
- Visually confirm that there is no movement between the work tool and the quick coupler.

WARNING

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

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

WARNING

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

NOTICE

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

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

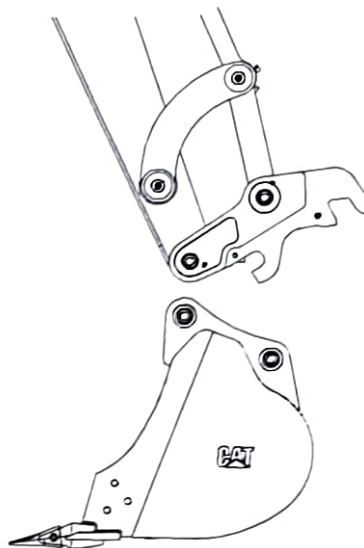


Illustration 185

g02163290

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

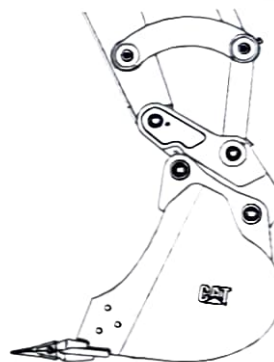


Illustration 186

g02163292

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

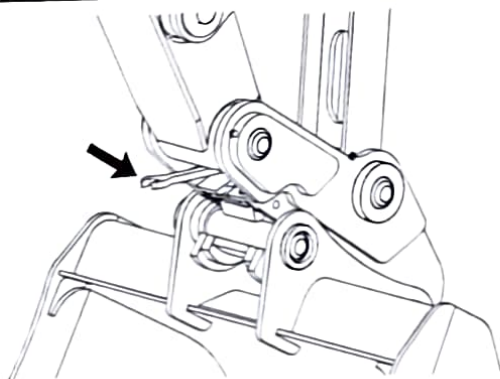


Illustration 187

g02165065

4. Using the supplied wrench, insert the ratcheting end onto the hex drive mechanism. Turn the ratchet in a clockwise direction in order to tighten the rear locking mechanism.
5. In order to verify the engagement of the work tool, perform the following procedure:
 - a. Visually confirm the engagement of the work tool. Ensure that both the work tool front and rear pin locking mechanisms are locked and securing the work tool to the coupler.
 - b. Retract the bucket cylinder and drag the work tool on the ground.
 - c. Visually confirm that there is no movement between the work tool and the quick coupler.

Uncoupling the Work Tool

⚠ WARNING

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

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

NOTICE

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

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

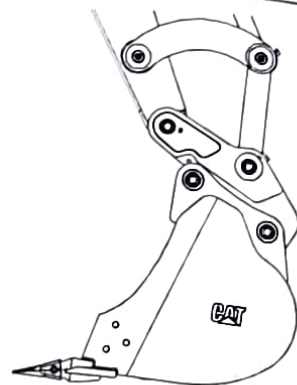


Illustration 188

g02163292

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

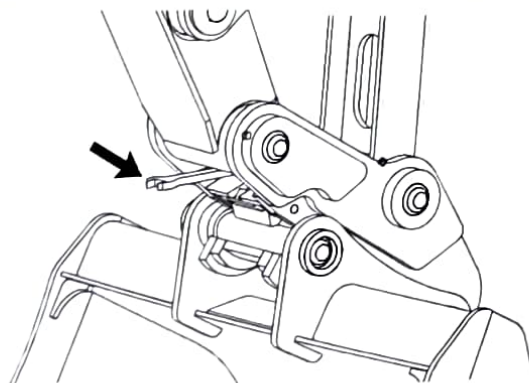


Illustration 189

g02165065

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

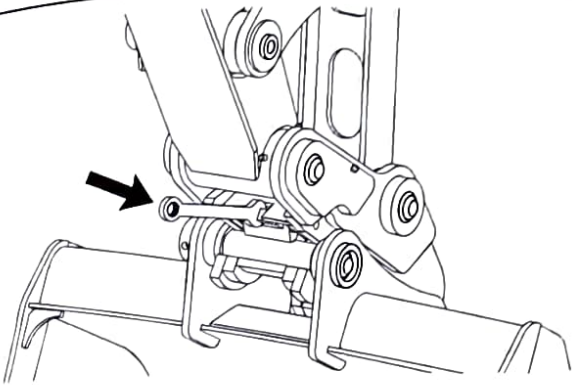


Illustration 190

g02165068

3. Using the supplied wrench, insert the open wrench end onto the front lock actuator. Push down on the wrench to rotate the front lock into an unlocked, detent position.
4. Start the engine. Lower the work tool to the ground.
5. Retract the bucket cylinder in order to rotate the quick coupler away from the work tool until the quick coupler disengages the rear pin of the work tool.
6. Move the stick away from the work tool in order to release the quick coupler from the front pin of the work tool. The front locking mechanism will automatically reset. The quick coupler is now ready to engage the next work tool.

Quick Coupler use with a Bucket that is Reversed

NOTICE

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

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

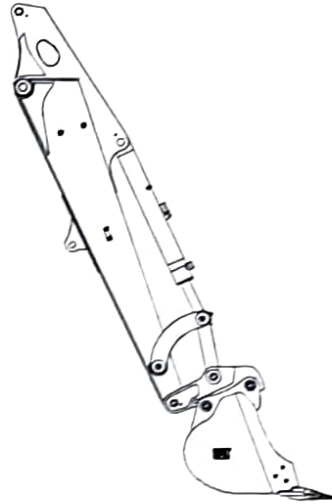


Illustration 191

g02163425

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

i07174894

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

SMCS Code: 6129; 6522; 7000

NOTICE

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

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

General Operation

The quick coupler is used to change work tools while the operator remains in the cab. The quick coupler can be used with a broad range of buckets and work tools. Each work tool must have a set of pins in order for the quick coupler to work properly.

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

Quick Coupler Operation

Description of the Instruction Film

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

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

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

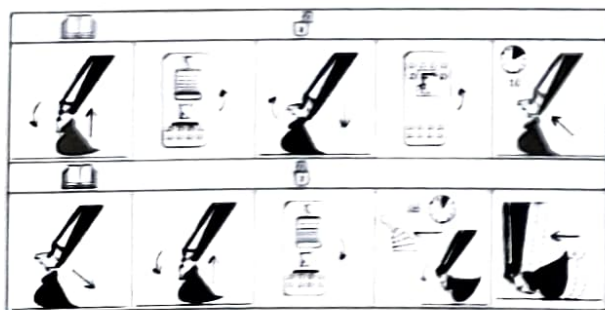


Illustration 192
Instruction film

g02165534

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

1. Position the work tool so that it is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket.

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

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

1. Align the quick coupler front locking mechanism over the front pin of the work tool. Extend the stick cylinder until the automatic front locking mechanism of the quick coupler engages and secures the front pin of the work tool.
2. Extend the bucket cylinder until the rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. Position the work tool so that it is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket.
3. Move electric switch (1) to the LOCK position.
4. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds after the electric switch has been locked.
5. Ensure that the quick coupler pins are engaged. Retract the bucket cylinder and drag the attachment on the ground. Visually confirm that there is no movement between the work tool and the quick coupler.
6. Visually confirm positive indication of the ISO Engagement indicator, if equipped.

WARNING

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

NOTICE

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

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

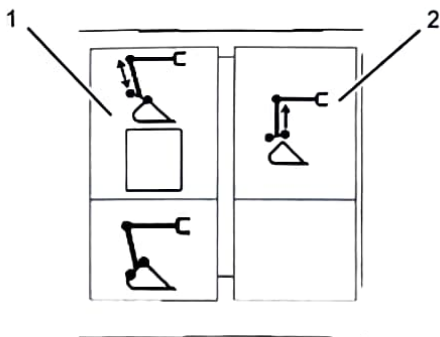
Electric Switch Operation

Illustration 193

g03881026

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

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

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



UNLOCK – To unlock the coupler, position the work tool so that it is slightly above the

ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket. Move electric switch (1) to the UNLOCK position. Confirm that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer. Retract the bucket cylinder, ensuring that the work tool rear pin locking mechanism is unlocked. The rear of the quick coupler should be rotated away from the work tool. Place the work tool in a stable and safe position on the ground. Depress the electric momentary switch (2). Confirm that the buzzer is sounding with an intermittent pattern of two beeps per second. This will unlock the work tool front pin locking mechanism. This locking mechanism will remain unlocked for 10 seconds. Within the 10 second time period, retract the stick cylinder until the quick coupler is disengaged from the work tool. Ensure that the work tool is in a stable and safe storage position on the ground.



LOCK – To lock the coupler, align the quick coupler front locking mechanism over the

front pin of the work tool. Extend the stick cylinder until the automatic front locking mechanism of the quick coupler engages and secures the front pin of the work tool. Confirm that switch (1) is in the UNLOCK position and that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer. Extend the bucket cylinder until the rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. Position the work tool so that it is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket. Move electric switch (1) to the LOCK position. The buzzer will no longer sound. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds after the electric switch has been locked. To verify the engagement of the work tool, perform the following procedure. Visually confirm the engagement of the work tool. Ensure that both the work tool front and rear pin locking mechanisms are locked and securing the work tool to the coupler. Retract the bucket cylinder and drag the attachment on the ground. Visually confirm that there is no movement between the work tool and the quick coupler. Visually confirm positive indication of the ISO Engagement indicator, if equipped.

Coupling the Work Tool

WARNING

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

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

- Visually confirm the engagement of the work tool. Ensure that both the front and rear pin locking mechanisms for the work tool are locked and secure the work tool to the quick coupler.
- Visually confirm positive indication of the ISO Engagement indicator, if equipped.
- Retract the bucket cylinder and drag the work tool on the ground.
- Visually confirm that there is no movement between the work tool and the quick coupler.

WARNING

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

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

WARNING

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

NOTICE

The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm that the quick coupler locking system is properly engaged with the attachment pins. Visually confirm positive indication of the ISO Engagement Indicator, if equipped. A physical test is required by dragging the work tool on the ground to confirm that the coupler pins are engaged.

NOTICE

Always confirm that the buzzer sounds when the switch is in the unlock position. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

NOTICE

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

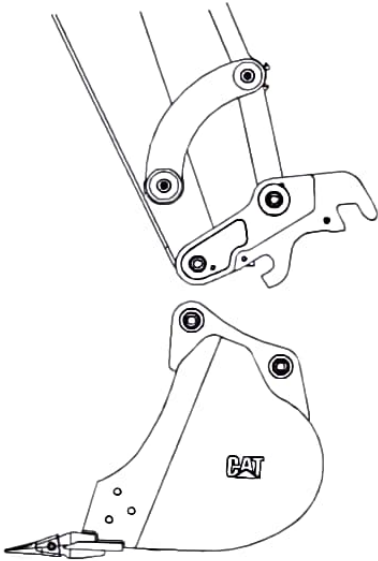


Illustration 194

g02163290

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

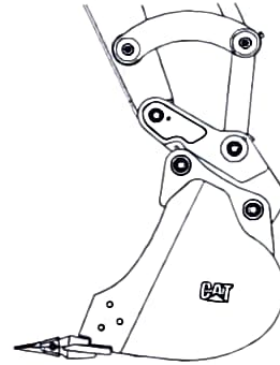


Illustration 195

g02163292

2. Confirm that switch (1) is in the UNLOCK position and that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer. Extend the bucket cylinder until the rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. Position the work tool so that it is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket.
3. Move electric switch (1) to the LOCK position. The buzzer will no longer sound.

⚠ WARNING

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

4. Hold the control lever for the bucket cylinder in the EXTEND position for 5 seconds after the electric switch has been locked.
5. To verify the engagement of the work tool, perform the following procedure:

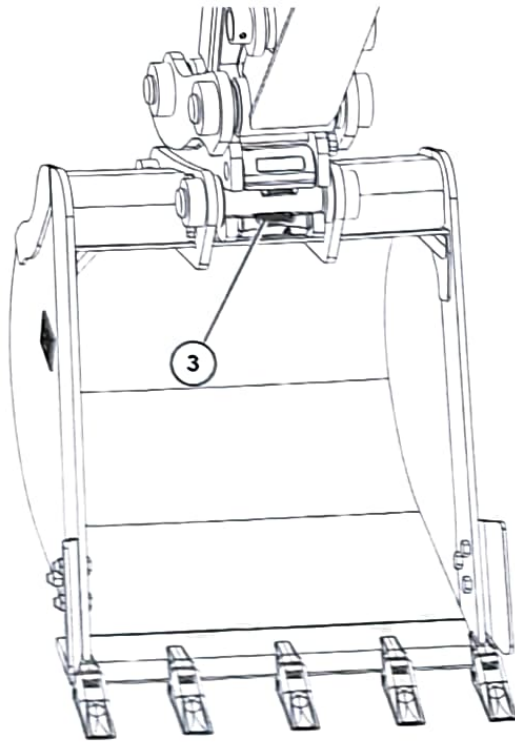


Illustration 196

g06222081

- a. Visually confirm the engagement of the work tool. Ensure that both the work tool front and rear pin locking mechanisms are locked and securing the work tool to the coupler.
- b. Visually confirm positive indication of the ISO Engagement indicator (3), if equipped.
- c. Retract the bucket cylinder and drag the work tool on the ground.
- d. Visually confirm that there is no movement between the work tool and the quick coupler.

NOTICE

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

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

Uncoupling the Work Tool**⚠ WARNING**

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

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

NOTICE

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

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

NOTICE

Always confirm that the buzzer sounds when the switch is in the unlock position. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

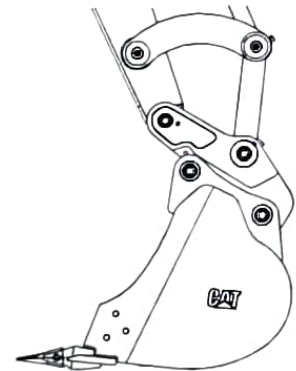


Illustration 197

g02163292

1. To unlock the coupler, position the work tool so that it is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket.
2. Move electric switch (1) to the UNLOCK position. Confirm that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

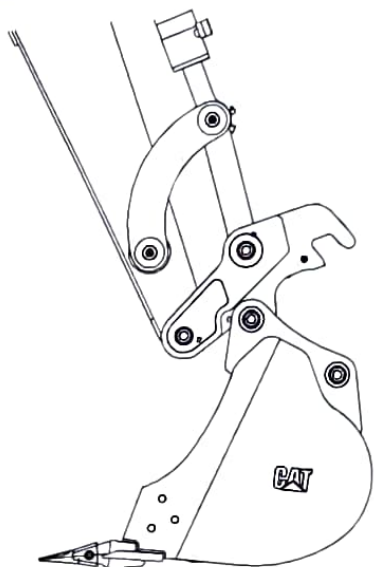


Illustration 198

g02163415

3. Retract the bucket cylinder, ensuring that the work tool rear pin locking mechanism is unlocked. The rear of the quick coupler should be rotated away from the work tool. Place the work tool in a stable and safe position on the ground.
4. Depress the electric momentary switch (2). Confirm that the buzzer is sounding with an intermittent pattern of two beeps per second. The work tool front pin locking mechanism will unlock. This locking mechanism will remain unlocked for 10 seconds.

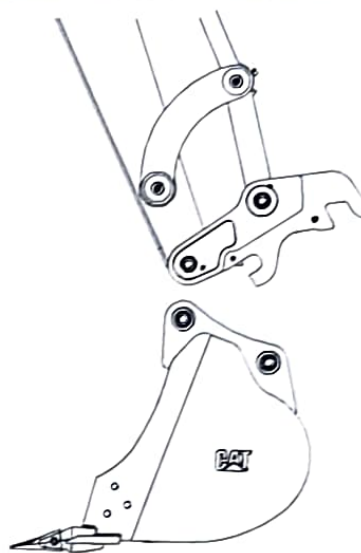


Illustration 199

g02163290

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

Coupling a Bucket that is Reversed

NOTICE

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

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

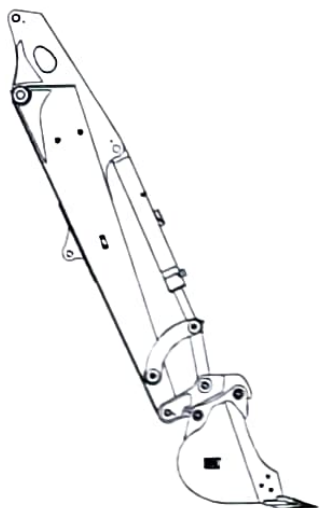


Illustration 200

g02163425

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

i07396465

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

SMCS Code: 6129; 6522; 7000

NOTICE

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

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

General Operation

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

Installation Procedure

WARNING

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

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

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

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

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

Perform this procedure as described in the following steps:

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

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

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

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

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

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

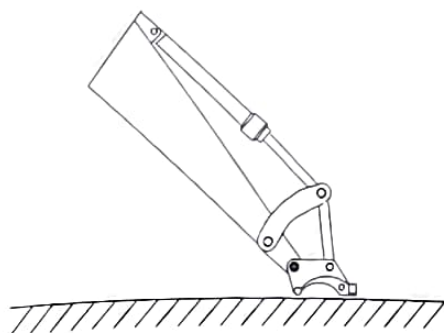


Illustration 201

g00741430

1. Position the quick coupler on the ground in front of the host machine. Make sure that the wedge faces away from the host machine.
2. Install the mounting pins.
3. Lubricate all the mounting points.
4. Connect the hydraulic lines to the quick coupler (if equipped).
5. After mounting the quick coupler on the excavator, or after working on the quick coupler hydraulic system, it is necessary to purge all the air from the cylinder and the control system. Refer to the "Hydraulic System Air Purge" for additional information.

Quick Coupler Removal Procedure

1. Lay the quick coupler flat on the ground.
2. Release the pressure from the hydraulic lines (if equipped).
 - a. Extend the wedge to the UNLOCKED position.
 - b. Stop the engine on the host machine. Turn the ignition to OFF.
 - c. Turn the ignition to the ON position without starting the engine.
 - d. Move the hydraulic control levers repeatedly through the full range of motion. This will release any pressure that may be present in the hydraulic system. Actuate the quick coupler using the machine control monitor. Cycle through locking and unlocking the quick coupler several times to release trapped hydraulic pressure within the quick coupler circuit.
 - e. The wedge should begin to move inward due to the spring force.

- f. Turn the ignition to the OFF position.
- g. Release the pressure in the host machine's hydraulic tank.

WARNING

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

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

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

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, 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.

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

Daily Inspection

WARNING

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

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

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

NOTICE

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

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

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

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

Operation

Coupling the Work Tool

WARNING

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

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

WARNING

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

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

Quick Coupler with Hydraulic Coupling

WARNING

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

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

NOTICE

The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm that the quick coupler locking system is properly engaged with the attachment pins. Visually confirm positive engagement of the locking system. A physical test is required by dragging the work tool on the ground to confirm that the coupler is properly engaged with the work tool.

NOTICE

Always confirm that the buzzer sounds when the switch is in the unlock position. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.

NOTICE

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

1. Verify that the wedge is in the unlocked position. If the wedge is not extended, extend the bucket cylinder. Then, extend the wedge.

WARNING

Ensure that the wedge is extended before coupling the work tool. Severe damage may occur. Failing to extend the wedge before coupling the work tool could result in a poorly coupled work tool or an uncoupled work tool.

Serious injury or death may result from an improperly coupled work tool.

2. Ensure that the mounting bracket of the work tool is in line with the host machine. The work tool must be facing the host machine. The mounting bracket must be at the top of the work tool.

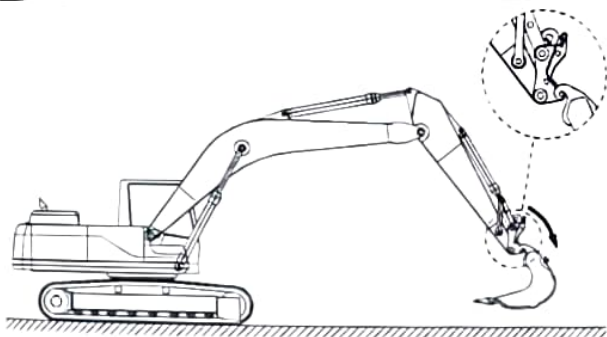
Coupling a Bucket

Illustration 202

g01285027

1. Hook the forward pivot of the quick coupler into the hooks of the mounting bracket.

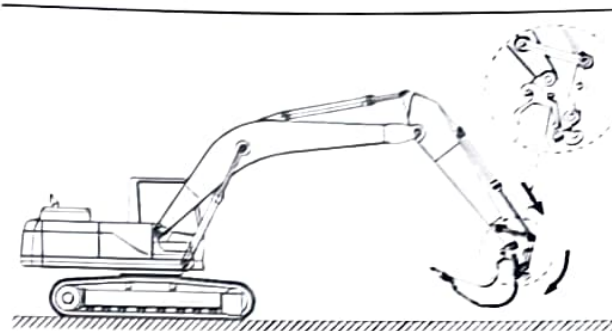


Illustration 203

g01285028

2. Select "UNLOCK" on the monitor display and confirm that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer. Extend the bucket cylinder until the coupler contacts the work tool.
3. Tilt the quick coupler against the work tool by extending the bucket cylinder.
4. Select "LOCK" on the monitor display and the beep will stop and the rear lock (wedge) will slide back into place. The monitor will return to the home screen.
5. Visually confirm that the wedge has engaged the work tool hook and is properly locked. If this visual confirmation cannot be performed from the machine cab due to obstruction, lighting, etc., place the machine in a safe state, exit the cab, and visually confirm proper engagement at the quick coupler.

WARNING

Inspect the quick coupler engagement before operating the machine.

Serious injury or death may result from improperly engaged coupler.

NOTICE

Visually confirm that the quick coupler engagement system is properly locked to the work tool. Confirm that the wedge has engaged the work tool hook and is properly locked.

6. Verify the engagement of the quick coupler and the work tool.

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

- Place the work tool on the ground.
- Apply pressure to the work tool against the ground.
- Drag the work tool forward and backward.

Quick Coupler with Mechanical Coupling

WARNING

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

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

- Ensure that the work tool mounting bracket is in line with the host machine. The work tool must be facing the host machine. The mounting bracket must be at the top of the work tool.

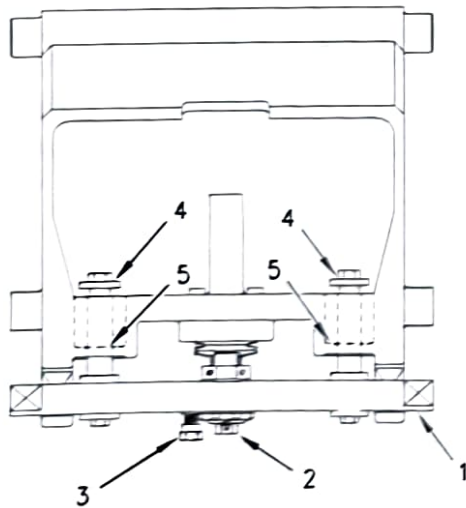


Illustration 204

g00928845

- To move wedge (1) to the UNLOCKED position, perform the following steps:

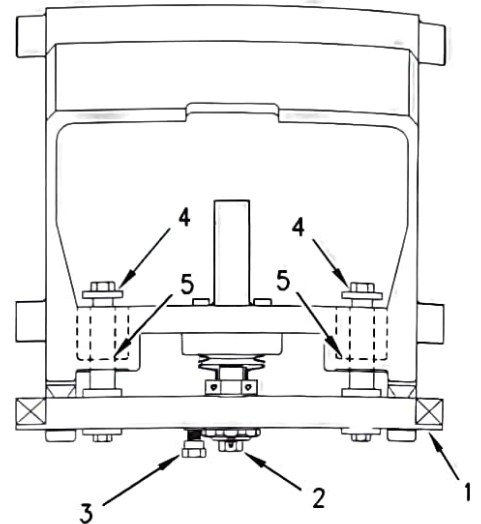


Illustration 205

g00928845

- Loosen lock bolt (3) until you can turn spindle (2).

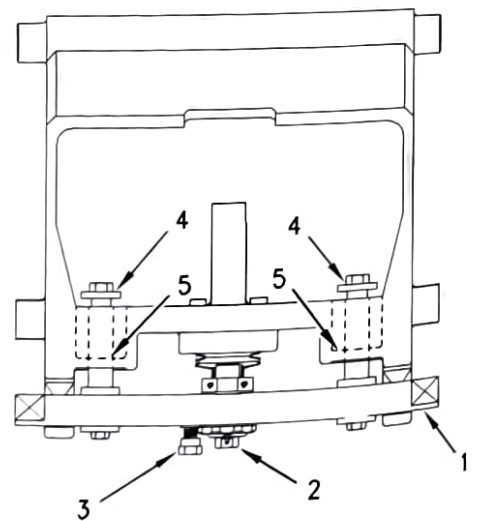


Illustration 206

g00928845

- Turn spindle (2) until the bolts (4) lightly contact the coupler (5).
- Position the coupler with the wedge in an UPWARD position.

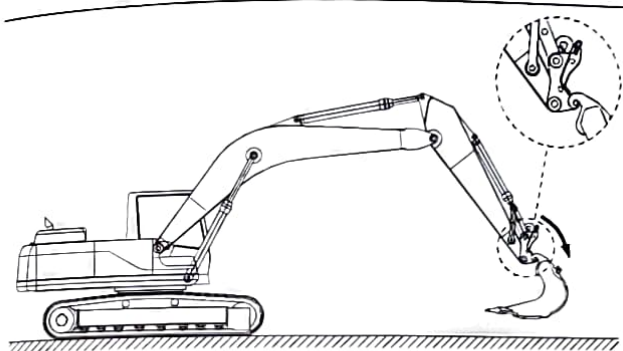
Coupling a Bucket

Illustration 207

g01285027

1. Hook the front pivots into the hooks of the mounting bracket on the work tool.

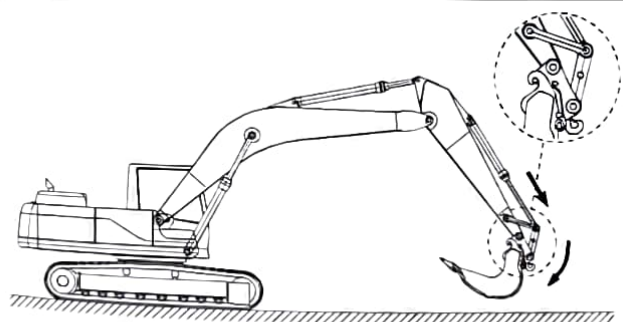


Illustration 208

g01285038

2. Tilt the quick coupler against the work tool by extending the bucket cylinder. Stop the engine of the host machine.

3. Turn the spindle inward. Tighten the spindle.

Note: If necessary, tighten the spindle until the next notch is aligned with the locking bolt.

4. Tighten the locking bolt.

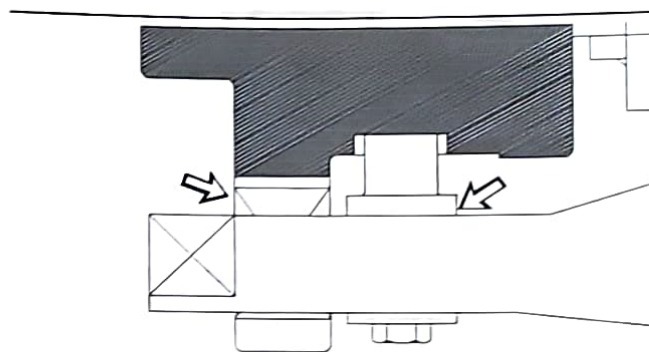


Illustration 209

g00583309

5. Ensure that there is a visible space between the wedge and the quick coupler frame. If there is not a space, the mounting bracket or the quick coupler may be damaged.

! WARNING

Inspect the quick coupler engagement before operating the machine.

Serious injury or death may result from improperly engaged coupler.

6. Verify the engagement of the quick coupler and the work tool.

- a. Place the work tool on the ground.
- b. Apply pressure to the work tool against the ground.
- c. Drag the work tool forward and backward.

Uncoupling the Work Tool

Use the following steps to prepare the quick coupler for uncoupling.

NOTICE

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

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

1. Disconnect any auxiliary hoses from the work tool (if equipped).
2. Ensure that the work tool is clear of the ground.
3. Fully extend the bucket cylinder. Extend the stick cylinder until the wedge is pointing downward. The load is now released from the wedge.

Quick Coupler with Hydraulic Coupling**⚠ WARNING**

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

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

1. Extend the wedge cylinder.
2. Select UNLOCK on the monitor display and confirm that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer.
3. Retract the bucket cylinder until the coupler is no longer in contact with the work tool. The work tool is now suspended by the front pivot.
4. Place the work tool on the ground.
5. Unhook the quick coupler from the mounting bracket.

Quick Coupler with Mechanical Coupling**⚠ WARNING**

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

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

1. Stop the engine of the host machine.
2. Loosen the locking bolt until you can turn the spindle.
3. Turn the spindle outward. If necessary, strike the wedge with a hammer to release the wedge.
4. Retract the bucket cylinder. The work tool will be suspended by the front pivot.
5. Place the work tool on the ground.
6. Unhook the quick coupler from the mounting bracket.

Lifting Loads**⚠ WARNING**

Lifting loads with the quick coupler is only permitted when there is no work tool attached. Lifting loads when there is a work tool attached may result in serious injury or death.

NOTICE

If used to lift loads, then the excavator must comply with the requirements for lifting machinery. These are given in standard EN 474-5. For more information, consult your Caterpillar dealer.

Note: When you lift loads with the lifting yoke or the lifting hook, the wedge must be retracted or the wedge must be removed from the coupler.

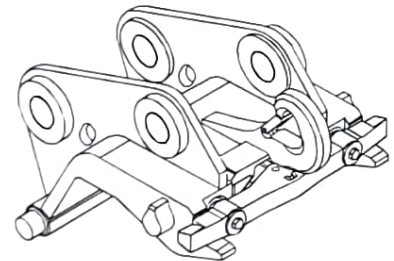
Lifting Hook (If Equipped)

Illustration 210

g03219216

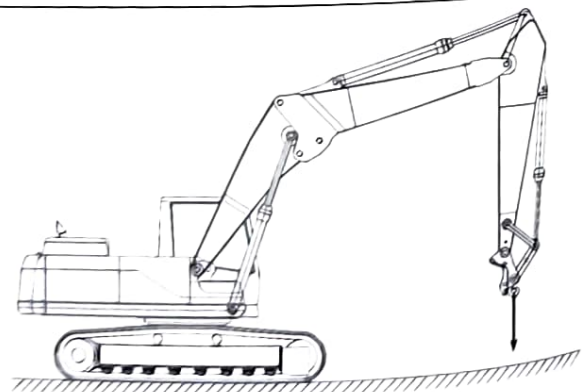


Illustration 211

g01285467

1. Fully extend the bucket cylinder.
2. Make sure that the wedge has been retracted or that the wedge has been removed.

WARNING

Use an appropriate lifting device that is rated for the specific load. Failure to do so can result in serious injury or death.

3. Fasten an appropriate chain, cable, or a lifting strap to the lifting hook. Do not perform any lifting operations if the safety latch is missing. Do not perform any lifting operations if the safety latch is damaged. Contact your supplier.

Lifting Objects**WARNING**

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

The quick coupler and attached lifting hook have unique rated load capacities. Each capacity is marked on the corresponding component. Do not exceed the maximum capacity of any component used in a lifting operation. Quick coupler capacities are listed in the table below:

Table 13

Quick Coupler Rated Capacities ⁽¹⁾	
Quick Coupler Model	Rated Capacity
CW05	600 kg (1322 lb)
CW10	1400 kg (3086 lb)

⁽¹⁾ Capacities rated in accordance with EN 474-1:2006+A4:2013 Annex E and ASS 1418.8-2008 standards

Refer to the load charts in the Operation and Maintenance Manual of the host machine. Use the load charts and account for the mass of the work tool. Calculate the load capacity relative to the location of the lifting point on your specific host machine.

Use a sling or a shackle to attach to the lifting point and lift the object. The sling or the shackle must have a rated capacity that is greater than the mass of the load.

If the machine is equipped with the CE plate per requirements for the European Union, and used to lift objects, then the machine must be equipped with the optional boom and stick lowering control valves and an overload warning device.

A fit for purpose test was completed to confirm that a properly equipped machine meets the requirements of the European Union Machinery Directive "2006/42/EC" for lifting objects.

The setting for the overload warning device should be checked by an authorized dealer.

1052A4824

Bucket - Remove and Install

SMCS Code: 6001-011; 6001-012; 6001; 6101; 6102; 6523

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 212

g03349613

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.

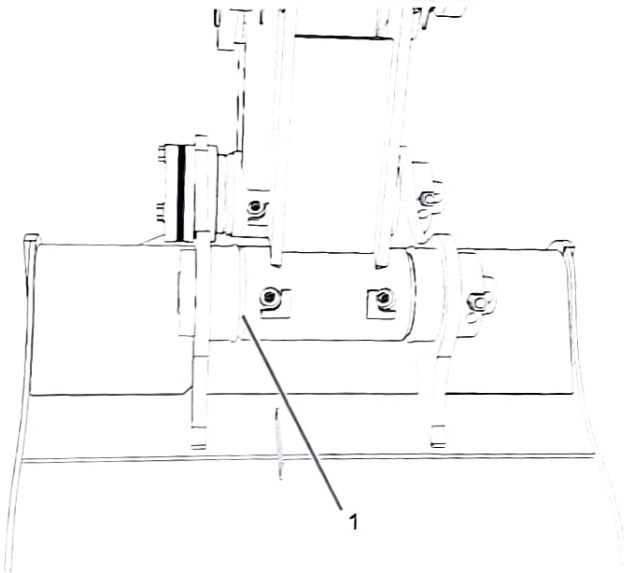


Illustration 213

g03695050

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.

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.

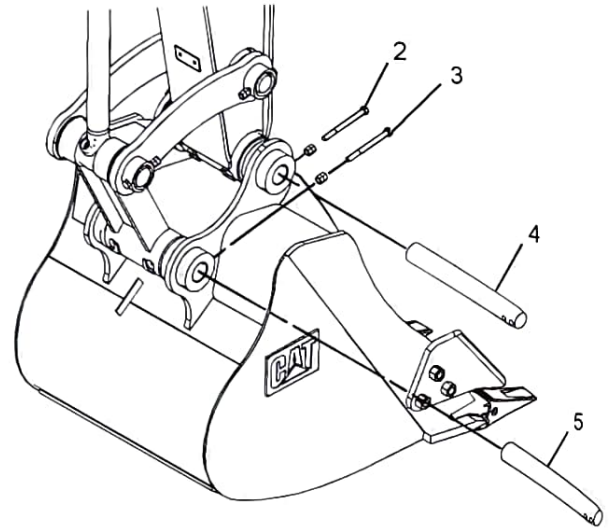


Illustration 214

g03695052

3. Remove nuts and retaining bolt (3) from support pin (5). Remove support pin (5).
4. Remove nuts and retaining bolt (2) from support pin (4). Remove support pin (4).
5. Remove the shims if present.
6. Start the engine and raise the stick out of the bucket.
7. 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.

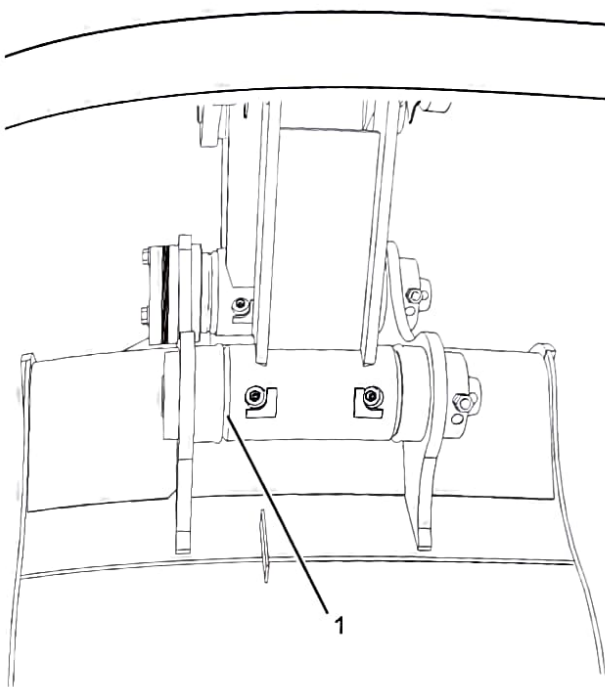


Illustration 215

g03695050

2. Position the O-ring seals (11) 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.

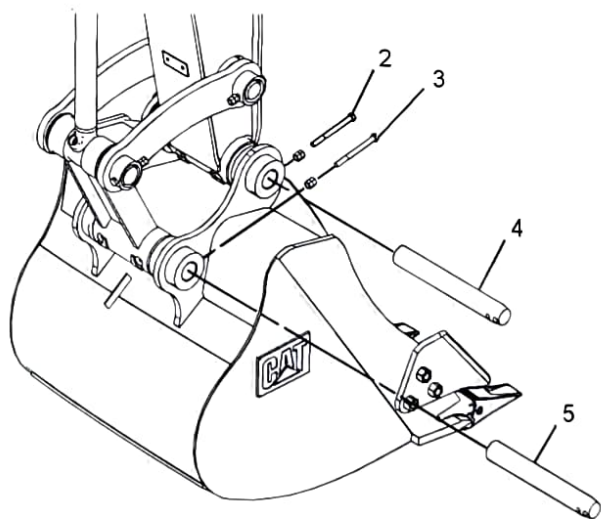


Illustration 216

g03695052

4. Install support pin (4) and the shims. Put the retaining bolt hole that is in support pin (4) in alignment with the retaining bolt hole that is in the bucket.
5. Install the retaining bolt and nuts (2).

6. Refer to Operation and Maintenance Manual, "Bucket Linkage - Inspect/Adjust" in order to adjust the bucket clearance.
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. Install support pin (5). 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 (3).
11. Slide the O-ring seals (1) over the pin joints between the bucket and the link assembly.

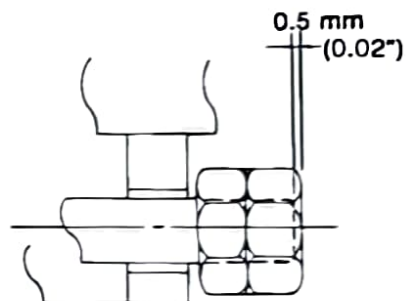


Illustration 217

g00510030

12. Tighten retaining nuts (2) and (3). 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".

104908291

Hammer Operation (If Equipped)

SMCS Code: 5705-WTL



Illustration 218

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 result in structural damage to the host machine.

Consult your Cat 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. May indicate 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. Could allow the stick cylinder to vibrate excessively.

Operate the attachment control levers carefully in order to keep the hydraulic hammer 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. 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".

I01582993

Blade Operation

SMCS Code: 6060

NOTICE

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

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

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

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

Parking

i04176310

Stopping the Machine

SMCS Code: 7000

WARNING

Leaving the machine unattended when the engine is running may result in personal injury or death. Before leaving the machine operator station, neutralize the travel controls, lower the work tools to the ground and deactivate all work tools, and place the lever for the hydraulic lockout control in the LOCKED position.

Note: There may be regulations that define the requirements for the operator and/or support personnel to be present when the engine is running.

Park on a level surface. If the machine must be parked on a grade, chock the tracks securely.

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.

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

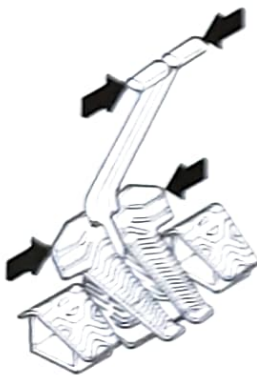


Illustration 219

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

Freezing Conditions

i01871055

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.

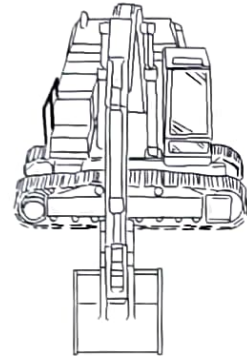


Illustration 220

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.
6. Lower the work tool onto a wood plank in order to prevent the work tool from touching the ground.

i04764034

Stopping the Engine

SMCS Code: 1000; 7000

NOTICE

Stopping the engine immediately after it has been working under load can result in overheating and accelerated wear of engine components.

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

1. Stop the machine and lower the work tool to the ground.
2. Move the hydraulic lockout control to the LOCKED position.
3. Run the engine at low idle for 5 minutes.
4. 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.

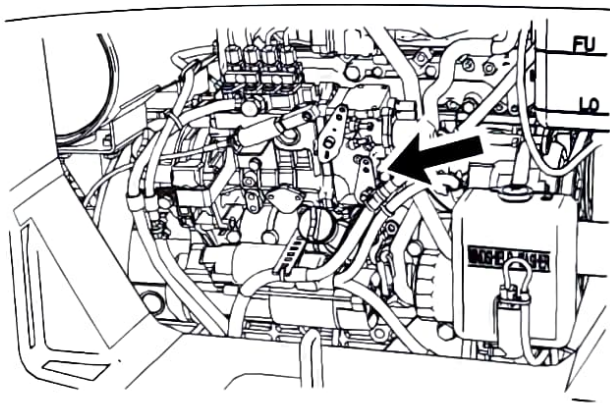


Illustration 221

g02858959

1. Open the engine access door.
2. Hold the engine stop control until the engine shuts off.

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

3. Close the engine access door.

i06218439

Stopping the Engine

SMCS Code: 1000; 7000

NOTICE

Stopping the engine immediately after it has been working under load can result in overheating and accelerated wear of engine components.

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

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

2. Move the hydraulic lockout control to the LOCKED position.
3. Run the engine at low idle for 5 minutes.
4. 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.

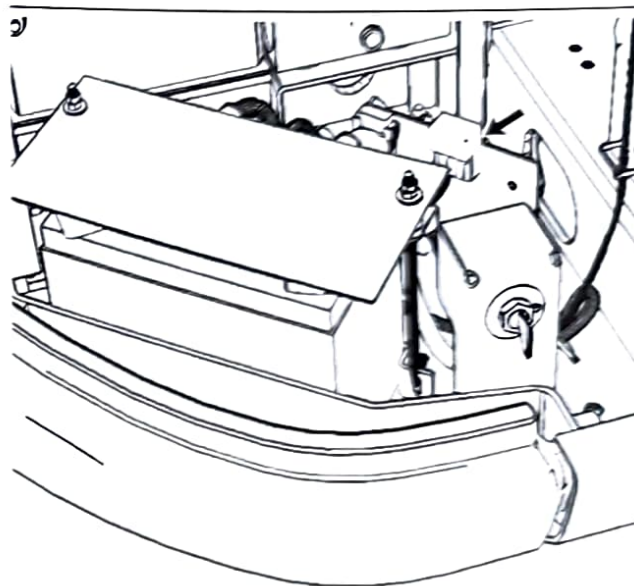


Illustration 222

g03859192

1. Open the engine access door.
2. Open the fuse cover located on the right side of the battery and remove the fuse marked "STOP".

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

3. Close the engine access door.

I01584089

Leaving the Machine

SMCS Code: 7000

Illustration 223

g00037860

1. Use the steps and the handholds when you dismount. When you dismount, face the machine and use both hands.
2. Inspect the engine compartment for debris. Clean out any debris in order to avoid a fire hazard.
3. Remove all flammable debris from the front bottom guard through the access doors in order to reduce a fire hazard. Discard the debris properly.
4. Lock all compartments.

Transportation Information

107199078

Shipping the Machine

SMCS Code: 7000; 7500

Investigate the travel route for overpass clearances. Make sure that there will be adequate clearance for the machine.

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

NOTICE

Obey all state and local laws governing the weight, width and length of a load.

Make sure the cooling system has proper antifreeze if moving machine to a colder climate.

Observe all regulations governing wide loads.

Do not use a fork lift to lift the machine. Using a fork lift to move your machine can result in property damage.

Choose the flattest ground when you load the machine or when you unload the machine.

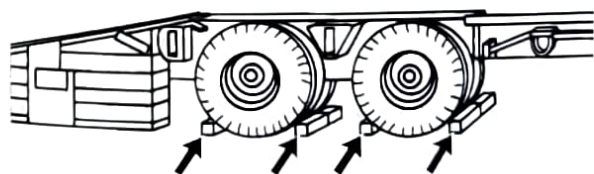


Illustration 224

g00040011

1. Before you load the machine and before you unload the machine, chock the trailer wheels or chock the rail car wheels.

2. When you use loading ramps, make sure that the loading ramps have adequate length, adequate width, and adequate strength. In addition, make sure that the surfaces of the loading ramps are clean. This will help prevent the machine from sliding in all types of weather conditions. This will allow the machine to move on the ramps smoothly.
3. Maintain the slope of the loading ramps within 15 degrees of the ground.
4. Minimize any step between the base of the loading ramps and the ground.
5. Clean the tracks on the machine to prevent any slippage.

Machine With A Long Stick That Has Two Pin Holes

WARNING

Incorrect pin location of stick cylinder rod could cause the bucket to hit the cab resulting in personal injury or death, or damage to the machine. Please confirm the stick cylinder rod pin location prior to the start of work.

NOTICE

During digging operations with this front linkage, there is a possibility of extending the upper boom cylinder by relief.

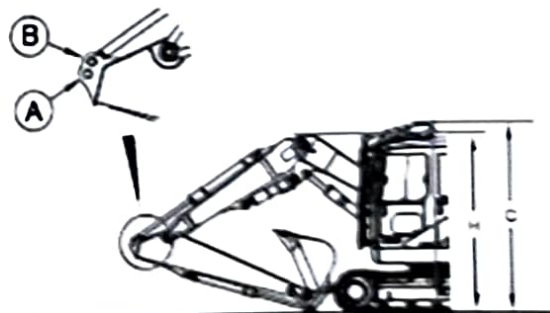


Illustration 225

g03431089

Make the following changes before shipping the machine.

Use pin hole (B) in machine transportation. Use pin hole (A) for machine operation.