

## Operation Section

### Before Operation

#### Mounting and Dismounting

SMCS Code: 6700; 7000

I04021647



Illustration 56

g00037860

Typical example

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

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

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

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

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

#### Machine Access System Specifications

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

#### Alternate Exit

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

I02365130

#### Daily Inspection

SMCS Code: 1000; 6319; 6700; 7000

##### NOTICE

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

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

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

Inspect the following additional components:

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

Correct any leaks in the hydraulic system.

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

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

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

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

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

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

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

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

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

Inspect the cab for the following conditions:

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

Adjust the rearview mirrors (if equipped) for the best operator vision.



## Machine Operation

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### Alternate Exit

SMCS Code: 7310

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

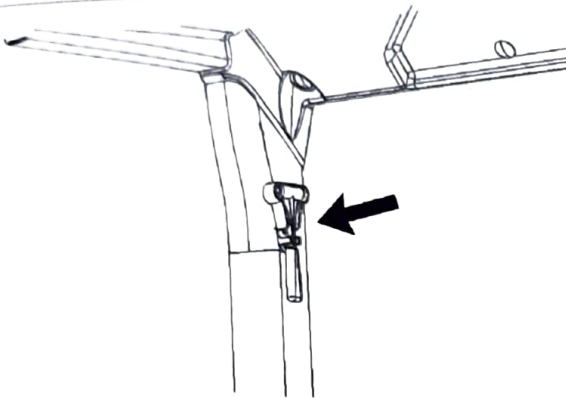


Illustration 57

g03679859

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

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

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### 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.

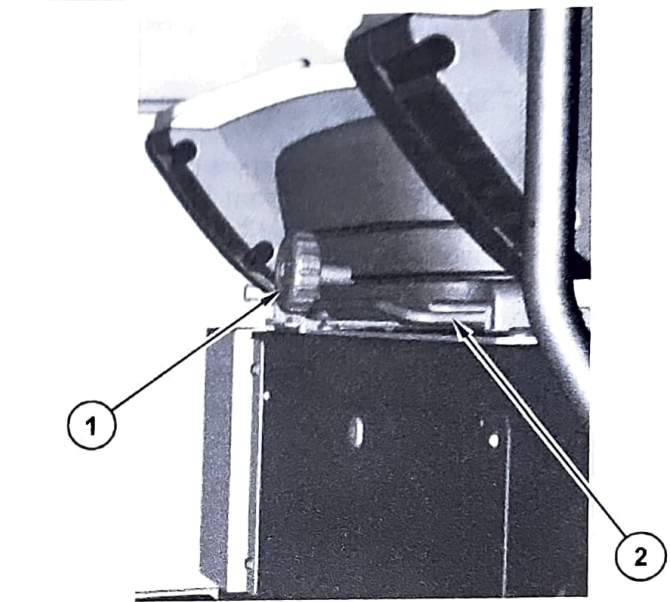


Illustration 58

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Illustration 59

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

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

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

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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 and ISO 6683 standards. Consult your Cat dealer for all replacement parts.

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

### Seat Belt Adjustment

#### Fastening The Seat Belt

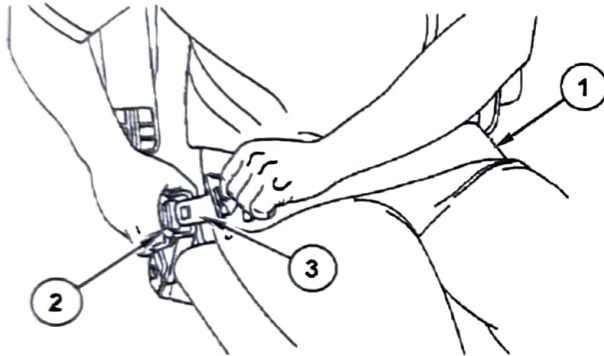


Illustration 60

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Pull seat belt (1) out of the retractor in a continuous motion.

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

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

### Releasing The Seat Belt

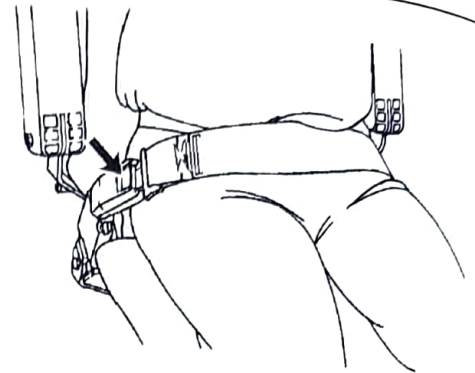


Illustration 61

g00039113

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

### Extension of the Seat Belt

#### **! WARNING**

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

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

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

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## 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 to allow an active regeneration.



### (C) Audible Alarm



### (A) Engine Emissions System (DPF)



### (B) Alert

## Warning Symbols and Alerts



Table 58

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 7 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		

**NOTICE**

The engine and emissions control system shall be operated, used, and maintained in accordance with the instructions provided. Failure to follow the instructions could result in emissions performance that does not meet the requirements applicable to the category of the engine. No deliberated tampering with, or misuse of the engine emissions control system should take place. Prompt action is critical to rectify any incorrect operation, use, or maintenance of the emissions control system.

**Carbon Dioxide (CO<sub>2</sub>) Emissions Statement**

Table 59

EU Stage V Engine Emission Compliant CO <sub>2</sub> Values		
Machine Model	Engine Model	CO <sub>2</sub> Value (g/kWh)
303.5E2 CR	C1.7	938.3
304E2 CR305E2 CR	C2.4	858.7

Emissions regulations require that the value of the CO<sub>2</sub> emissions be reported to the end user. Refer to Table 59 for the determined CO<sub>2</sub> value during the EU type approval process. This value was recorded in EU type approval certificate. This CO<sub>2</sub> measurement results from testing over a fixed test cycle, under laboratory conditions, with a parent engine representative of the engine family. This value shall not imply or express any guarantee of the performance of a particular engine.

**EU Stage V Emissions Control System (European Union)**

**Operation and Maintenance of the Stage V Emissions Control System**

The engine, including the emissions control system, shall be operated, used, and maintained in accordance with the instructions provided to the end users to maintain the emissions performance of the engine within the requirements applicable to the engine category.

No deliberate tampering with or misuse of the engine emissions control system should take place; in particular regarding deactivating (or not maintaining) an exhaust gas recirculation (EGR) or a reagent dosing system if equipped.

Taking prompt action to rectify any incorrect operation, use or maintenance of the emissions control system in accordance with the rectification measures indicated by the unique warning diagnostic codes outlined below is essential.

### **Failure Warnings and Operator Inducement Strategy**

The EU Stage V Emissions Control system detects failures of the system by PM control diagnosis (PCD) and NOx control diagnosis (NCD). The system logs warning codes in the engine electronic control module (ECM) and signals the operator of system failure detection via a combination of visual and audible warnings in the machine operator station. Ignoring the operator warning signals will lead to the activation of the operator inducement system, which may result in an effective disablement of the machine.

**EU Stage V Emissions Control System Failure Warnings**

Table 60

Emission Failure Cause	Control Diagnostics System	Warning Code (SPN-FMI)	Event Level	Visual Warning (Display)	Audible Warning (Cab Alarm)	Inducement Response
Removal of the DPF system	PCD (Particulate Matter)	3936-7	3	DPF Alert Indicator <sup>(1)</sup> Diagnostic Pop-Up	Yes	None
Loss of function of the DPF system		3936-2	2		No	
Failure of the PCD system		3251-3	2		No	
Removal of the EGR system	NCD (NOx Emission)	523578-2	2		No	2-Stage Engine Derate
Removal of the MAF sensor		132-4	3		Yes	

<sup>(1)</sup> Refer to "Warning Symbols and Alerts" for more information.

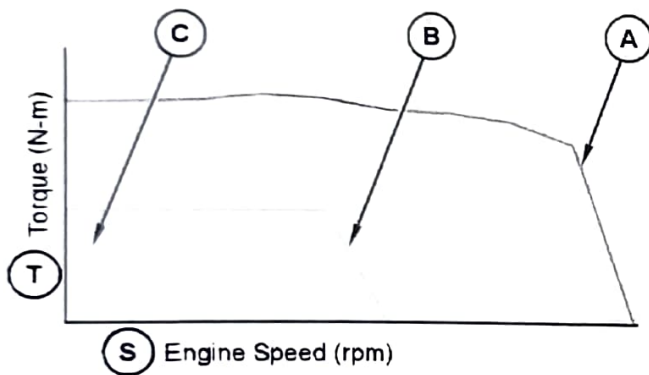


Illustration 62

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**Inducement Levels**

- (A) No fault code - normal operation range
- (B) Stage 1 inducement
- (C) Stage 2 inducement
- (S) Engine Speed (rpm)
- (T) Torque (N-m)

**Stage 1 Inducement**

**Response** – Engine De-rated to within 50% Max Torque, 60% Rated Speed

**Occurrence** – After 3 hours 15 minutes of active fault

**Stage 2 Inducement**

**Response** – Engine delivers nearly No Net Torque  
Engine Speed near Low Idle

**Occurrence** – After 4 hours of active fault

**DPF Service Operator Notification**

The Diesel Particulate Filter (DPF) traps particulate matter in the form of both soot and ash. Soot is burned off periodically during the regeneration process, but ash will continue to accumulate slowly over time. Eventually, the DPF will become fully loaded with ash and will need to be serviced (cleaned or replaced) by an authorized Cat dealer.

The EU Stage V emissions control system estimates the DPF's ash loading to provide maximum DPF life. When the ash load reaches an estimated 100%, the machine control system will generate an active event code and display a message to the operator. At this point, servicing the DPF is recommended. The message can be dismissed from the display and will reappear every 8 hours or each key cycle. After 50 hours without a service tool reset, the active event code will escalate and display a similar message every 15 minutes or each key cycle. If the message is continually ignored, the high ash content within the DPF will cause a high frequency of DPF regeneration triggering a diagnostic that is accompanied with an engine derate.



Table 61

**Machine System Event Identifier (EID) Codes**

EID	Level	Description	Possible Cause
997	1	High Diesel Particulate Filter #1 Ash Loading	Event is active when the machine ECM reads 100% ash load from the engine ECM for 30 seconds.
997	2	High Diesel Particulate Filter #1 Ash Loading	Event is active when the machine ECM reads 100% ash load from the engine ECM for 50 hours of key on time.

**Engine Manufacturer Contact Information**

Kubota Europe SAS  
19-25, Rue Jules Vercrey, Z.I. BP88  
95101 Argenteuil Cedex  
France

Kubota Europe SAS Italy Branch  
Via Grandi, 29  
20068 Peschiera Borrome (MI)  
Italy

Kubota (Deutschland) GmbH  
Senefelder Str. 3-5  
63110 Rodgau / Nieder-Roden  
Germany

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**Operator Controls**

**SMCS Code:** 7300; 7301; 7451

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

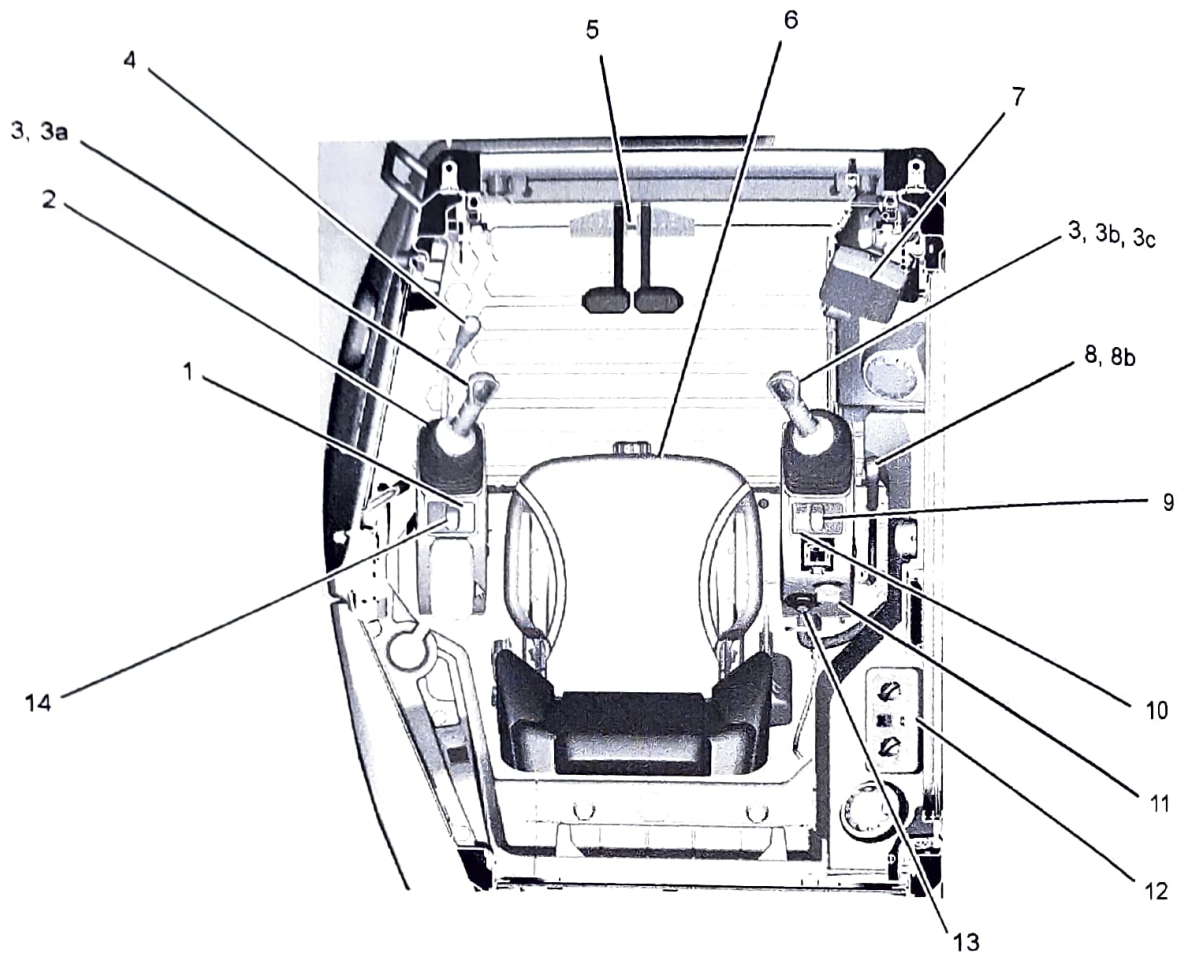


Illustration 63

- (1) Travel Alarm Cancel Switch (If equipped)
- (2) Service Hour Meter
- (3) Joystick Controls
- (3a) Swing Boom Control
- (3b) Horn
- (3c) Angle Blade Control (If Equipped)
- (4) Hydraulic Lockout Control

- (5) Travel Controls
- (6) Operator's Seat
- (7) Monitoring System
- (8) Dozer Blade Control
- (8b) Travel Speed Control
- (9) Wiper/Washer (If equipped)
- (10) Work Light Switch

- (11) Engine Speed Control
- (12) Air Conditioning and Heater Control
- (13) Engine Start Switch
- (14) Overload Warning Cancel Switch (If Equipped)

## Travel Alarm Cancel Switch (If Equipped) (1)



**Travel Alarm Cancel Switch** – This switch is used to stop the travel alarm from sounding. Press the switch 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.

## Service Hour Meter (2)

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.

### Joystick Controls (3)

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

### Swing Boom Control (3a)

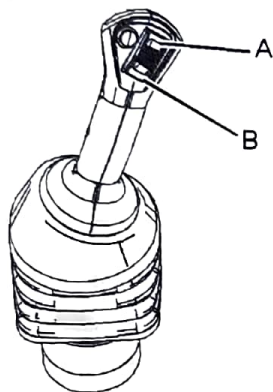


Illustration 64

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



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

### Horn (3b)

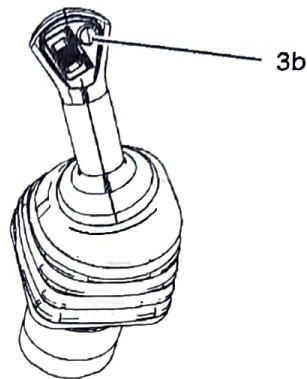


Illustration 65

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

### Angle Blade Control (If Equipped)

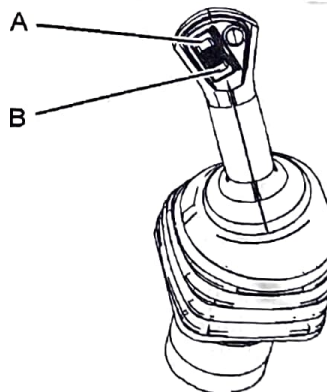


Illustration 66

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**Angle Blade Left (A)** – Move the switch that is on top of the right joystick upward to angle the blade to the left.





**Angle Blade Right (B) – Move the switch that is on top of the right joystick downward to angle the blade to the**

right.

## Hydraulic Lockout Control (4)

### WARNING

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

Personal injury or death may occur from sudden machine movement.



**Locked – Pull the hydraulic lockout control upward to the RAISED position 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.**

## Travel Controls (5)

**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 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

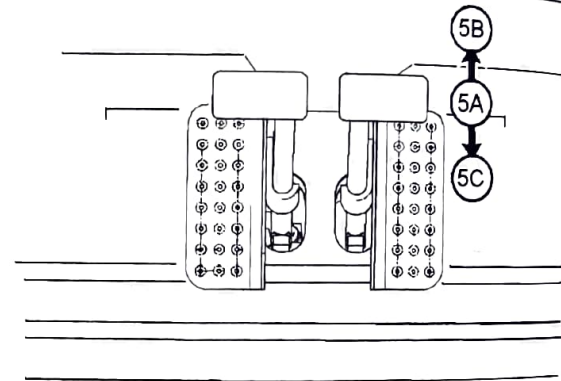


Illustration 67

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

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

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

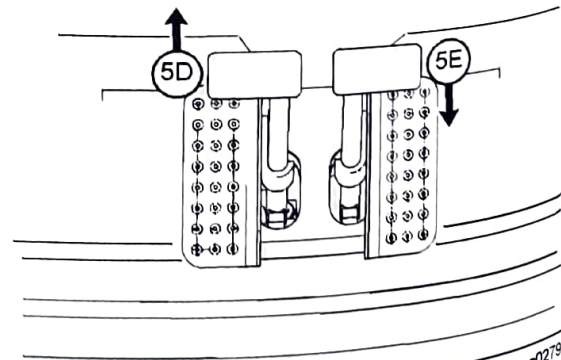


Illustration 68

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**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

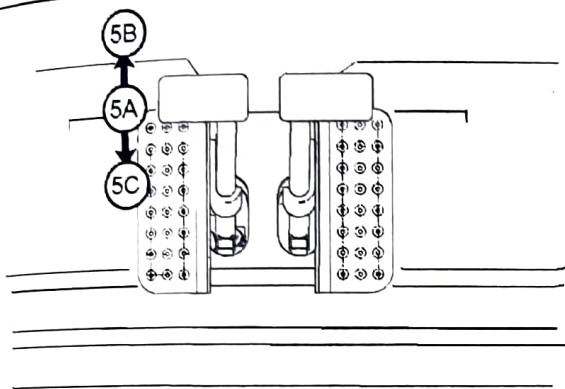


Illustration 69

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

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

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

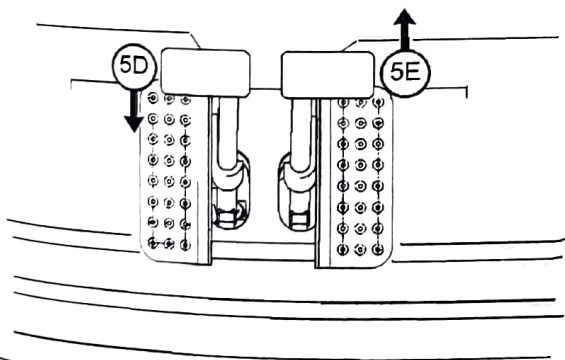


Illustration 70

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**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.

## Operators Seat (6)

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

## Monitoring System (7)

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

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

## Dozer Blade Control (8)



**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 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 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 (8b)

Use the button on the blade control lever to change the travel speed.



**Low** – Press the button and check the monitor for the Travel Speed Control status to travel at low speed.



**High** – Press the button and check the monitor for the Travel Speed Control status 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 (9)

### 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 to turn on the wiper. Push the bottom of the switch 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 to spray washer fluid onto the window. Release the switch to stop the flow of washer fluid. The switch will return to the middle position.

## Work Light Switch (10)



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

## Beacon

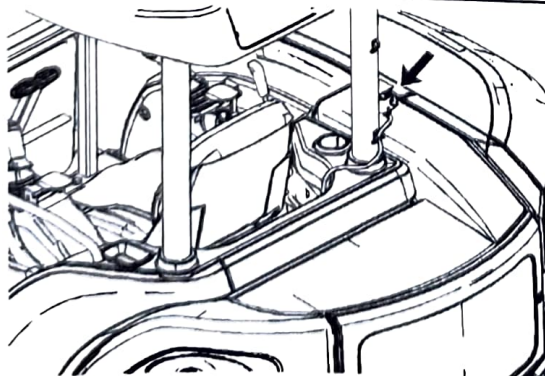


Illustration 71

Canopy

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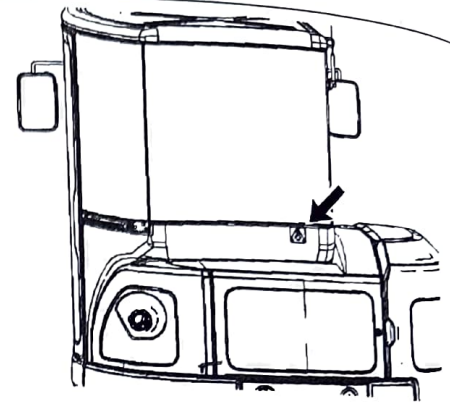


Illustration 72

Cab

g0112263

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

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

## Cab Dome Light

**"ON"** – Toggle the cab dome light switch to the left or right position to turn on the cab dome light.

**"OFF"** – Toggle the cab dome light switch to the middle (neutral) position to turn off the cab dome light.

## Engine Speed Control (11)



**Engine Speed** – Turn the engine speed dial 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 to decrease the engine speed (engine rpm).





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

### Air Conditioning and Heating Control (12)

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".

### Engine Start Switch (13)

#### 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 to stop the engine.



**ON** – Turn the engine start switch key to the ON position. Hold the key in this position 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 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 to attempt to start the engine again.

### Overload Warning Device (If Equipped) (14)

The switch for the overload warning device is on the left 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 up on the switch to deactivate the overload warning device.

**OFF** – Push down on the switch to activate the overload warning device.

i07389747

## 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

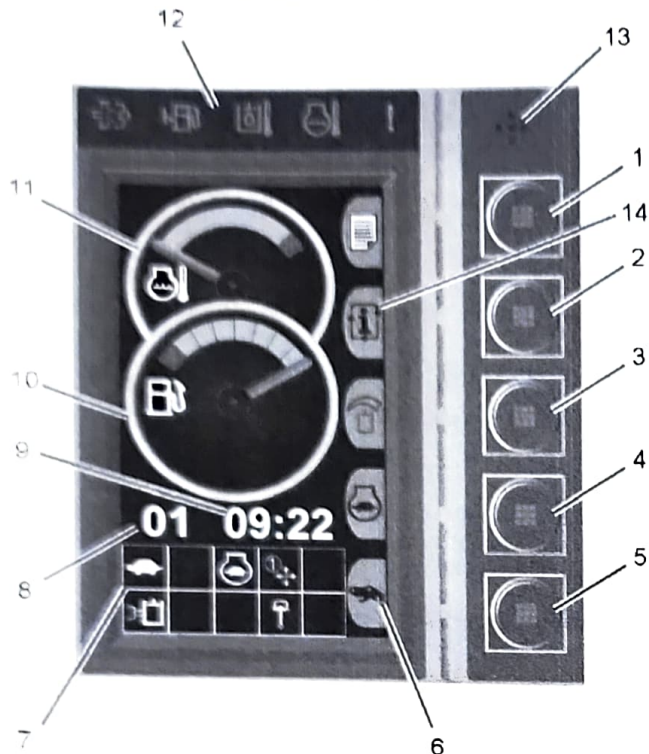


Illustration 73

g06076870

- (1) **MAIN MENU** - Press this button for access to settings, control mode, work tool, maintenance and performance info, security system and service settings.
- (2) **WORK MODE** - Press this button to change the Auto Engine Idle setting on/off
- (3) **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.
- (4) **CONTROL PATTERN** - This button changes between Excavator and Backhoe loader patterns.
- (5) **AUX 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 Menu" to adjust the auxiliary flow.
- (6) **BUTTON INDICATOR** - Icon displays the current shortcut assigned to the button.
- (7) **STATUS ICONS**
- (8) **ENGINE SPEED DIAL INDICATOR** - Indicates the engine RPM from 1 to 10. The engine RPM is changed on the rotary dial next to the ignition.

(9) **12-HR OR 24-HR CLOCK** - The time can be adjusted in the service menu. For more information refer to "Adjust the Clock".

(10) **FUEL GAUGE** - Indicates the fuel level in the tank. The exact percentage can be found in the performance info.

(11) **COOLANT TEMPERATURE GAUGE** - Indicates the machine coolant temperature. The exact temperature can be found under the performance info feature.

(12) **ACTION LAMPS** - HYDRAULIC OIL TEMP, COOLANT TEMP, FUEL LOW, AND SERVICE REQUIRED.

(13) **ACTION ALARM**

(14) **"I" BUTTON** - Site Reference (Power On Demand, Courtesy Light, Rear View Camera, Auto Engine Shut Off)

**Note:** Button #5 will be the Quick Coupler control if the hydraulic quick coupler lines are installed from the factory. Buttons 2 through 5 can be changed in the system settings. See "Change the Shortcut Buttons" for further information.

## Status Icons

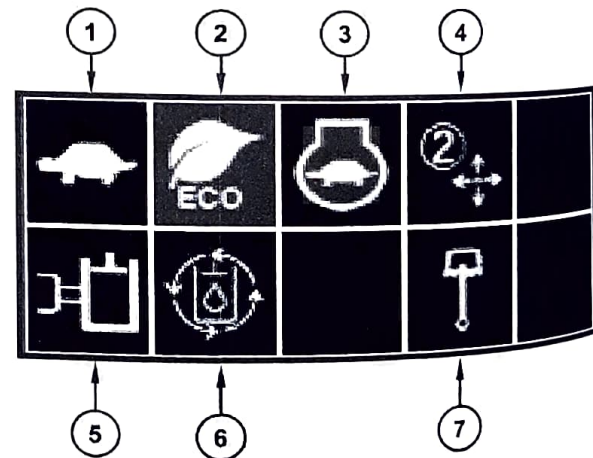


Illustration 74

g03694691

- (1) Low Speed (turtle) or High Speed (Rabbit)
- (2) Economy Mode (If Equipped)
- (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)

### Home Screen Layout

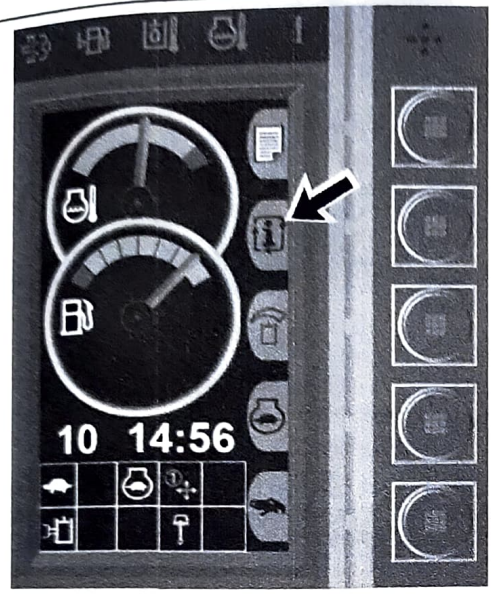


Illustration 75 g03842339

The home screen may be changed to several different layouts. The user may change the display by selecting the **Home Screen** button.

**Note:** The **Home Screen** button may be assigned to button 2 through button 5. Refer to "Change the Shortcut Buttons" for more information.



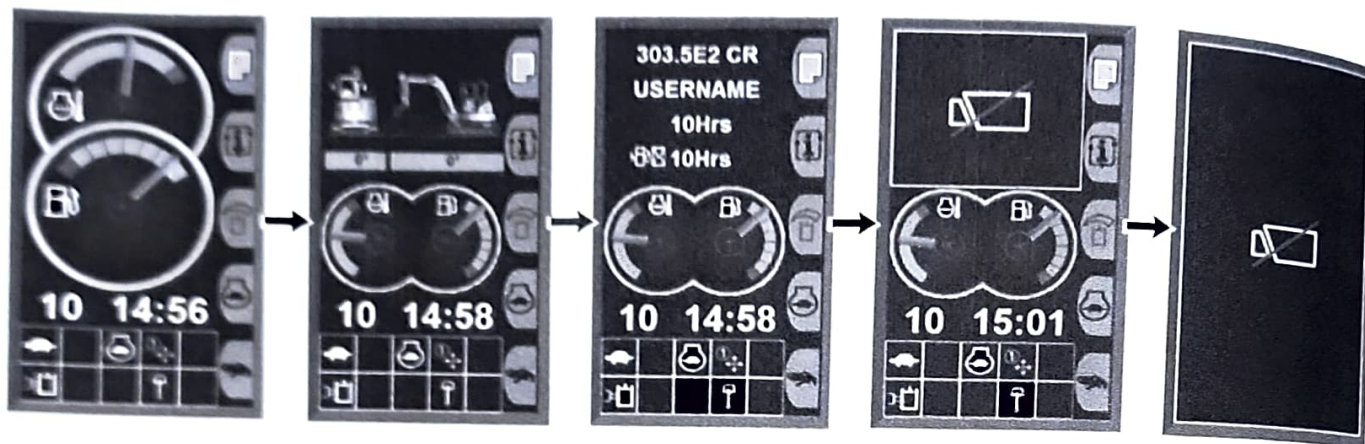


Illustration 76

g03842348

Press the **Home Screen** button to cycle through the displays.

## Prestart Monitoring Function

Turn the engine start switch to the ON position.



Illustration 77

g00928810

After approximately one second, Illustration 77 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 to view all 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.

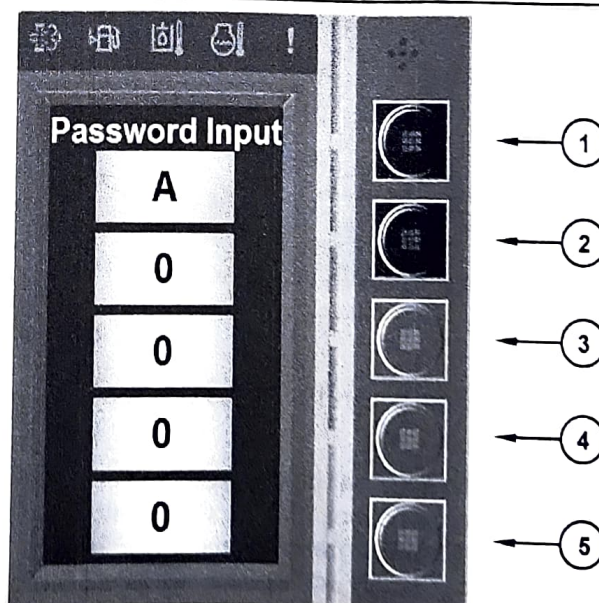


Illustration 78

g02920837

1. Press the button 1 (1). Press the button 2 (2). Press the button 3 (3). Press the button 4 (4). Press the button 5 (5) 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)

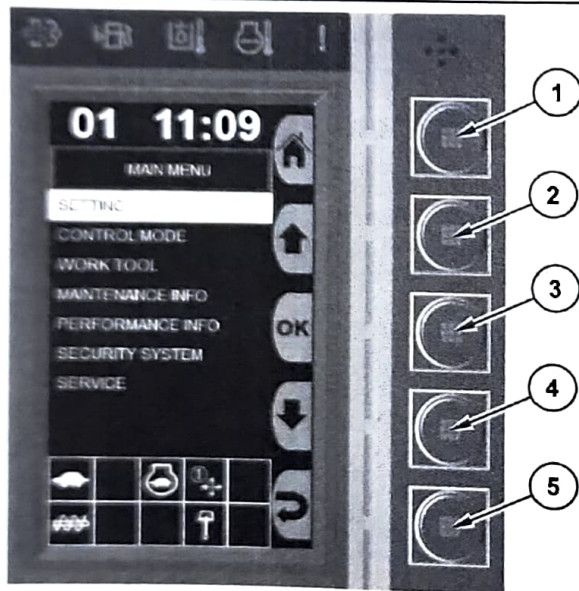


Illustration 79

g03841298

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 to highlight the desired menu. Press button 3 to open the desired menu.

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

## Status Icons

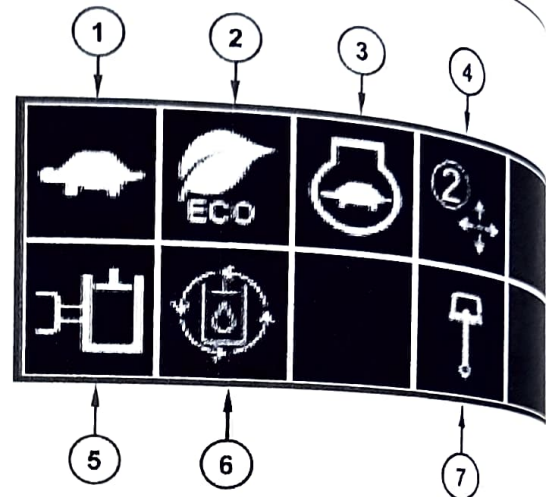


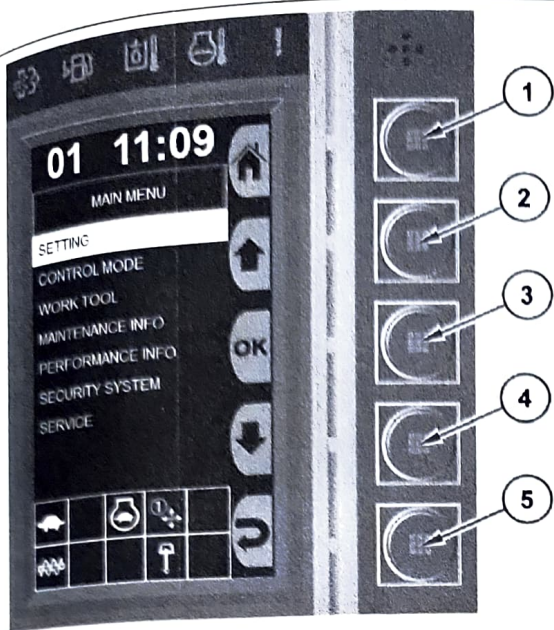
Illustration 80

- (1) Low Speed (turtle) High Speed (Rabbit)
- (2) Economy Mode (If Equipped)
- (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.





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

### Camera Setting

The camera options can be adjusted on the monitor screen through the "CAMERA SETTING" feature.

Illustration 81

g03841298

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



Illustration 82

g03841301

3. The "SETTING" menu will be displayed with five new menu options: Camera setting, Display setting, Continuous flow setting, User Name Setting, and Job Clock Reset. For more information on these menus, refer to the respective descriptions below.
4. Press button 2 or button 4 to highlight the desired menu. Press button 3 to open the desired menu.

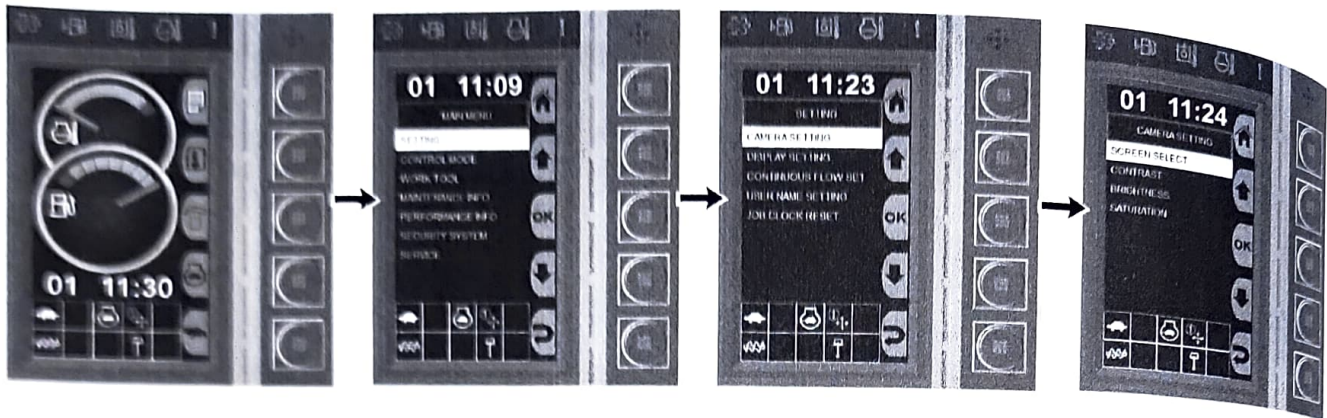


Illustration 83

g03841315

1. Press the top button (1) to access the main menu.
2. Select "SETTING" then "CAMERA SETTING".
3. Three new options are presented to the user:  
Screen Select, Contrast, Brightness, and Saturation.

#### Screen Select

1. Select "SCREEN SELECT" to change the camera display.



Illustration 84

g03841324

**Note:** Two new options will appear: "FULL SCREEN" and "WIDE SCREEN".

2. Use buttons 2 and 4 to highlight the desired option.  
Select an option by using button 3.
3. Press the top button (1) to return to the main menu.

#### Contrast

**Note:** The contrast for the camera display can be adjusted between 0 and 127. The default contrast value is set to 2.





Illustration 85

g03842409

Use button 2 to increase the contrast level and button 5 to decrease.

Select "OK" to save the adjusted level and return to the "CAMERA SETTING" menu.

### Brightness

**Note:** The camera display brightness can be adjusted between -64 and 63. The default brightness value is set to 3.



Illustration 86

g03842413

Use button 2 to increase the brightness level and button 5 to decrease.

Select "OK" to save the adjusted level and return to the "CAMERA SETTING" menu.

### Saturation

**Note:** The camera display saturation can be adjusted to a maximum of 127. The default saturation level is set to 4.



Illustration 87

g03842415

Use button 2 to increase the saturation level and button 5 to decrease.

Select "OK" to save the adjusted level and return to the "CAMERA SETTING" menu.

### Display Settings

#### Adjust the Clock

The clock can be set to any time on a 24-hr or 12-hr format.

The clock format and current time may be changed by the following steps:



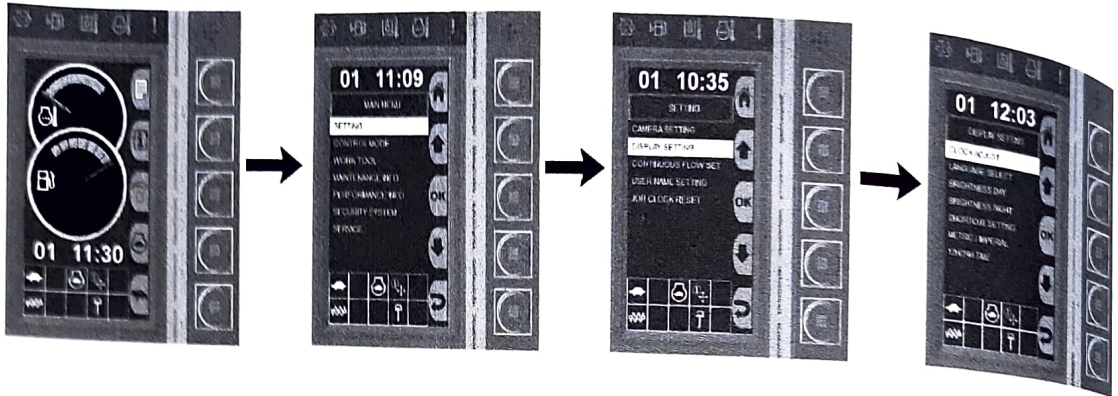


Illustration 88

1. Press the top button to access the main menu. Select "SETTING", "DISPLAY SETTING" then "12H/24H TIME".

g03841248



Illustration 89

g03841357

2. Use buttons 2 or 3 to select the desired format.
3. Return to the "DISPLAY SETTING" menu by pressing button 5.
4. Select "CLOCK ADJUST" to change the current time.

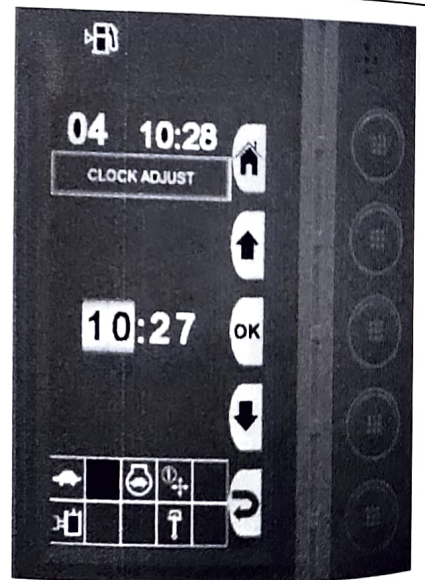


Illustration 90

g02819826

5. Adjust the hour to the desired time by using the arrows and press "OK".
6. The minutes will now be selected. Adjust the minutes to the desired time by using the arrows. Press "OK" to save and return to the home screen.

**Language Select**

The user may change the language preference of the monitor display.

Change the system language by following these steps:

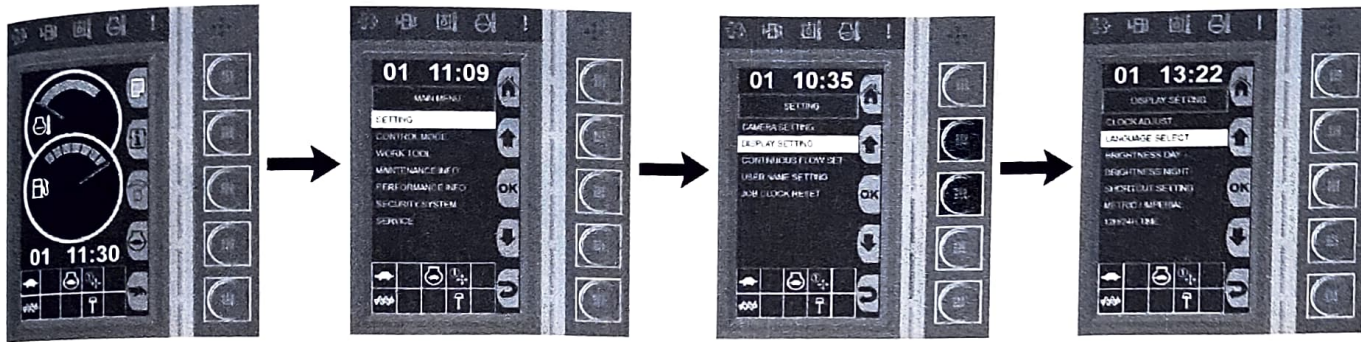


Illustration 91

g03841396

1. Press the top button to access the main menu.  
Select "SETTING", "DISPLAY SETTING", then "LANGUAGE SELECT".



Illustration 92

g03841393

2. Use buttons 2 and 4 to navigate to the desired language and select "OK" when highlighted.

**Brightness**

The monitor screen brightness may be adjusted through the display settings options.

Change the brightness by use of the following steps:



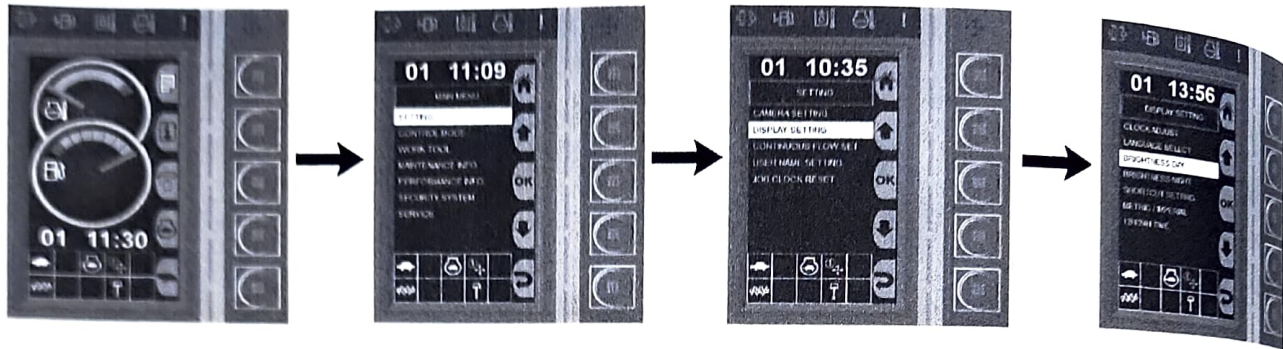


Illustration 93

1. Press the top button to access the main menu. Select "SETTING", "DISPLAY SETTING", then "BRIGHTNESS NIGHT" or "BRIGHTNESS DAY".

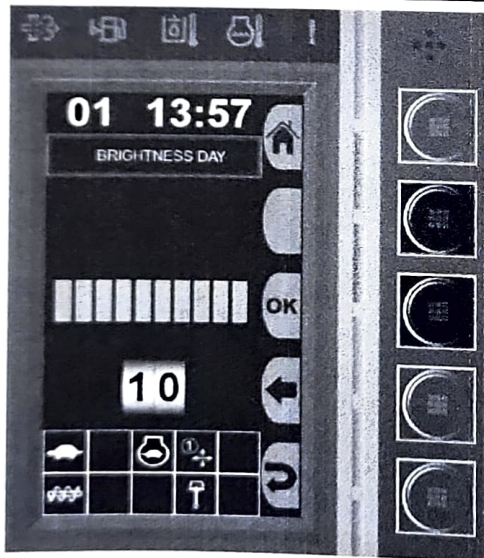


Illustration 94

g03841435

2. Use button 2 to increase the brightness level and button 4 to decrease.

**Note:** The green indicator meter displays the current set brightness level. May be increased to a maximum of 10.

3. Select "OK" when the desired level is reached.

### 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:



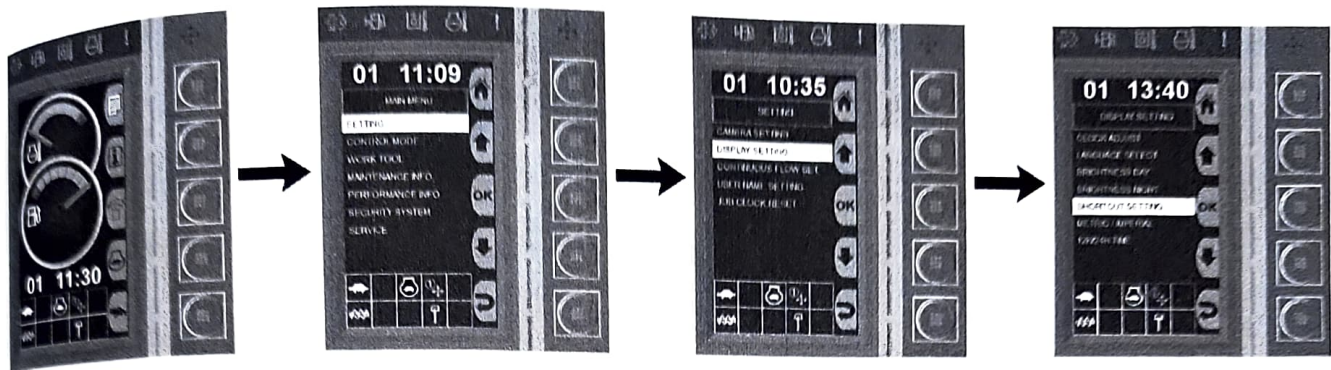


Illustration 95 g03841417

1. Press the top button for main menu. Select "SETTING", "DISPLAY SETTING" then "SHORTCUT SETTING".

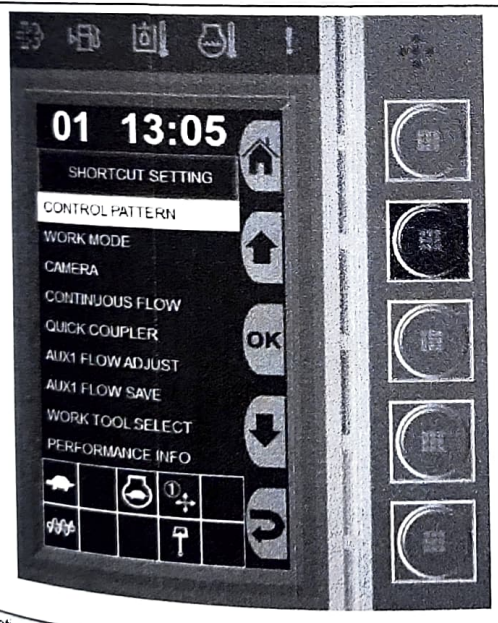


Illustration 96 g03841379

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



Illustration 97 g03843387

3. Choose the button you would like this option to be a preset for and press "OK".

**Metric / Imperial**

Measured units may be displayed in either metric or imperial format.

The user may change the unit preference by the following steps:

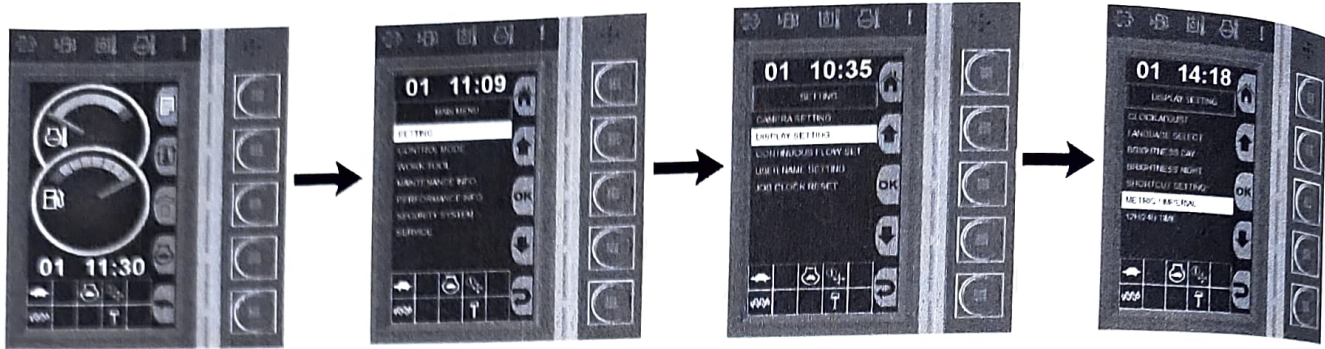


Illustration 98

g03841457

1. Press the top button to pull up the main menu.  
Select "SETTING", "DISPLAY SETTING" then  
"METRIC / IMPERIAL".

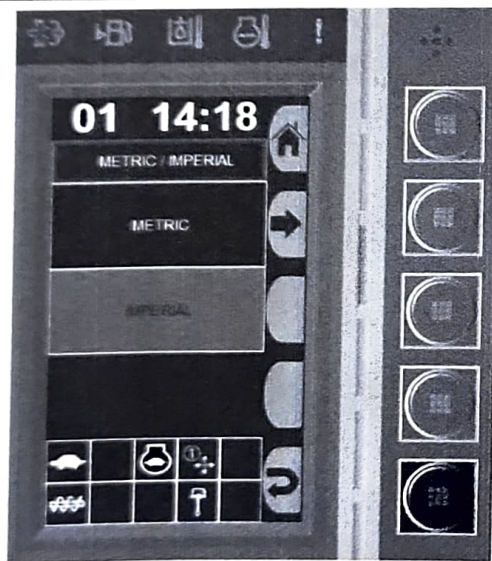


Illustration 99

g03841458

2. Use the enable button next to the desired measurement unit. The display will return to the home screen when option is selected.

### Continuous Flow Set

**Note:** The continuous flow set may be adjusted between 1 second and a maximum 5 seconds with an increment of 0.5 seconds.



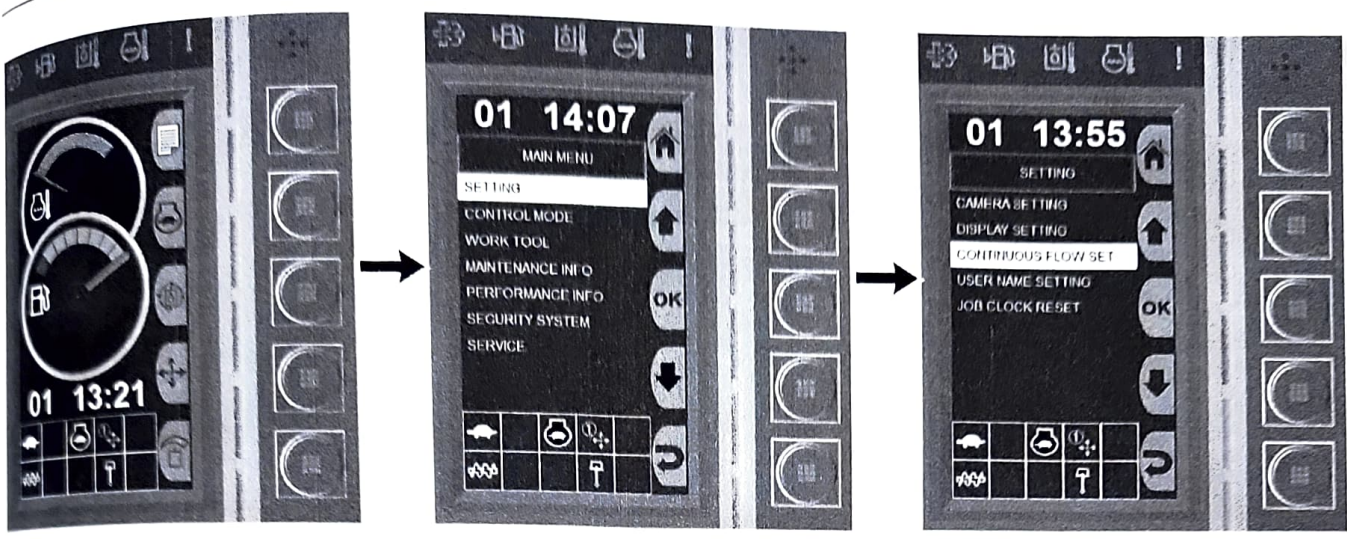


Illustration 100

g03842443

1. Press the top button to access the main menu.
2. Select "SETTING" then "CONTINUOUS FLOW SET".

### User Name Setting

The user may set a desired system name when logged into the monitor display.

This user name can be set by the following steps:



Illustration 101

g03842446

3. Use button 2 to increase the time and button 4 to decrease.
4. Select "OK" to save the desired level and return the home screen.

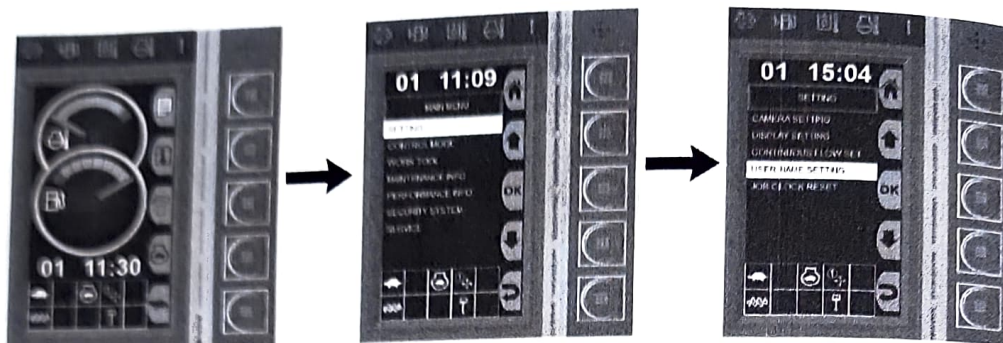


Illustration 102

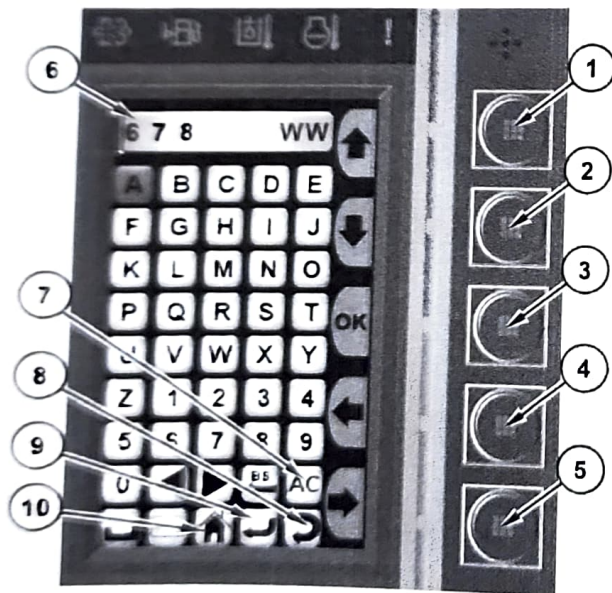
g03841497

1. Press the top button to access the main menu.  
Select "SETTING" then "USER NAME SETTING" to display the user name change screen.

2. Use buttons 1 through 5 to navigate the screen.

**Note:** The character that is selected will be highlighted in blue.

3. Save and exit by selecting the return icon (8) once the desired user name is entered.



### Control Mode Menu

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

Illustration 103

g03841497

#### User name setting screen

- (1) Move Up
- (2) Move Down
- (3) Select
- (4) Move Left
- (5) Move Right
- (6) User name display
- (7) Clear all
- (8) Return to "SETTING" menu without saving changes
- (9) Save changes and return to "SETTING" menu
- (10) Return to home screen



Illustration 104

g03841497

1. Press button 1 to pull up the main menu.



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

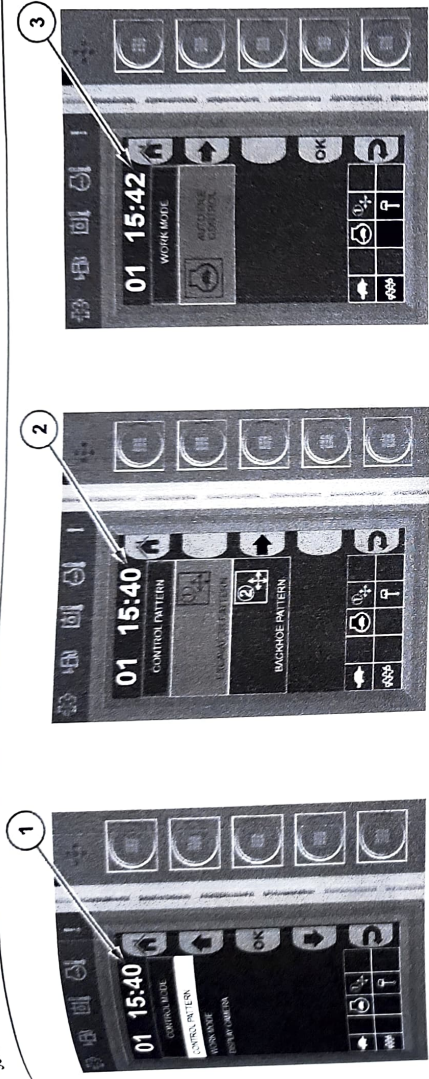


Illustration 105

903841528

3. The "CONTROL MODE" menu (1) will be displayed with the three following menu options: Control-pattern (2), Work-mode-select: Auto Idle Mode (3) and Display Camera. 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 to access the main menu.

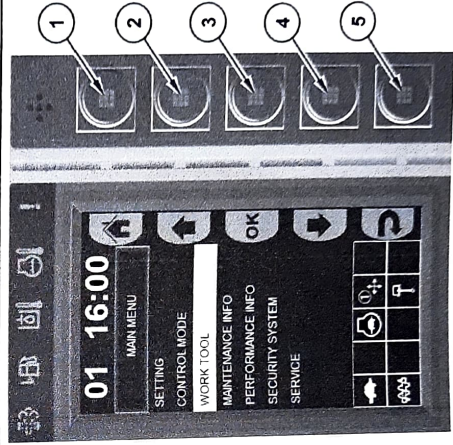


Illustration 106

903841546

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



Illustration 107

g03841557

3. The **"WORK TOOL"** menu will be displayed with the seven following menu options: Continuous Flow, Quick Coupler, AUX1 Flow Adjust, AUX1 Flow Save, AUX2 Flow Adjust, AUX2 Flow Save and Work Tool Select.

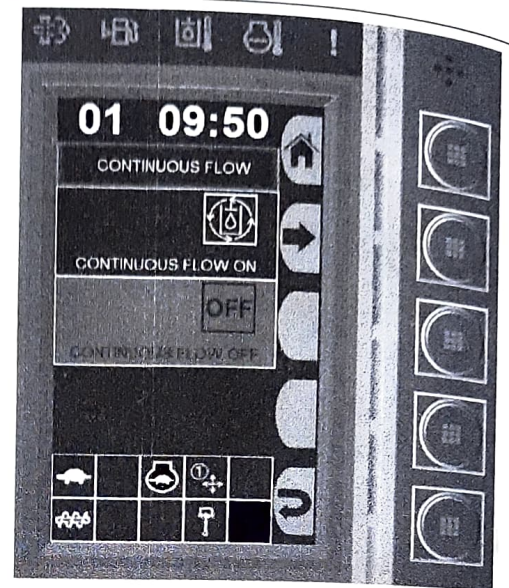


Illustration 108

g03843368

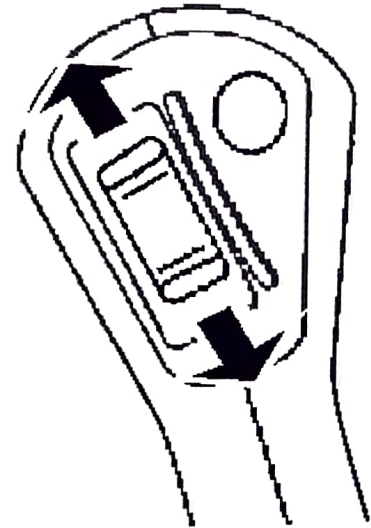


Illustration 109

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.





Illustration 110 g03843369

5. The Auxiliary 1 and Auxiliary 2 Flow Adjust can be set between 1 and 15. Press button 2 to increase the flow. Press button 4 to decrease the flow then press OK.
6. Auxiliary 1 and Auxiliary 2 Save: When the "user define" tool is selected, the Auxiliary Flow can be saved to any desired setting. To save the Auxiliary Flow, follow these steps:

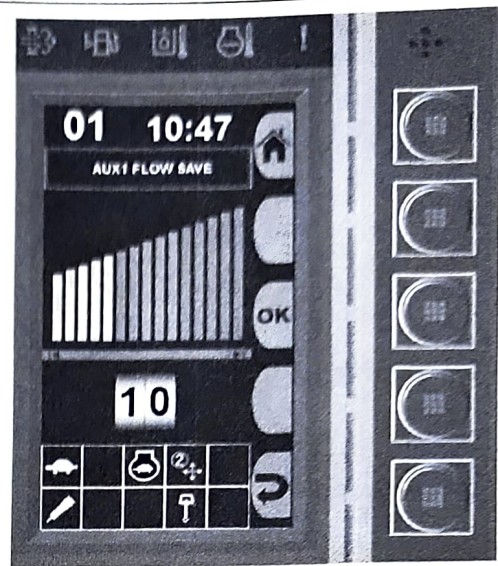


Illustration 112 g02964956

- b. Go to "AUX1 FLOW ADJUST" or "AUX2 FLOW ADJUST", Set flow, Press "OK", go to "AUX1 Flow Save" or "AUX2 Flow Save" and press "OK".

**Note:** A message will pop up to confirm the saved changes. The "User Define" work tool is now saved at the desired flow and will remain at that setting until changed.



Illustration 111 g02964877

- a. Press main menu and go to "Work Tool".



Illustration 113

g03843420

7. Quick Coupler: See Operation and Maintenance Manual. SEBU8746 Select "**ENGAGE**" button 2 on the monitor and confirm that the buzzer is sounding with an intermittent pattern of one beep per second. Select "**DISENGAGE**" button 4 on the monitor and confirm that the buzzer is sounding with an intermittent pattern of one beep per second.



Illustration 114

g03842055

8. Select "Work Tool Select".



Illustration 115

g03842055

9. Select the work tool that will be used.

**Note:** A message box will pop up to confirm the work tool change.

Table 62

Default Settings	Flow
Auger	15
Brushcutter	15
Compactor Plate	15
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 or Auxiliary 2 Flow Adjust. Save by selecting Auxiliary 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 to access the main menu.



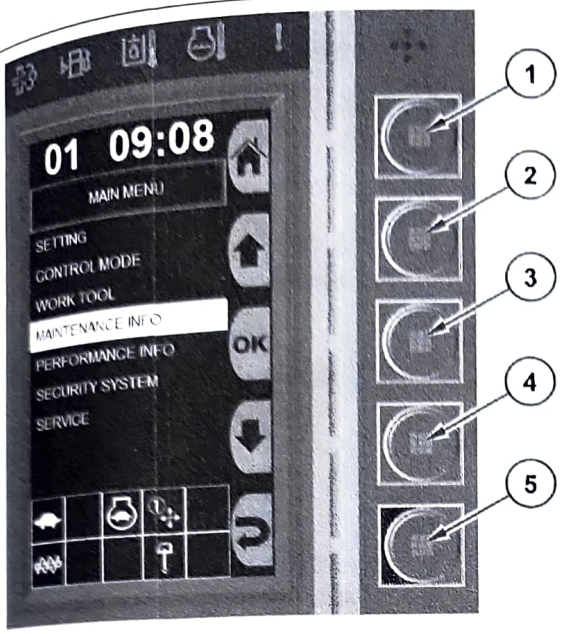


Illustration 116 g03841709

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

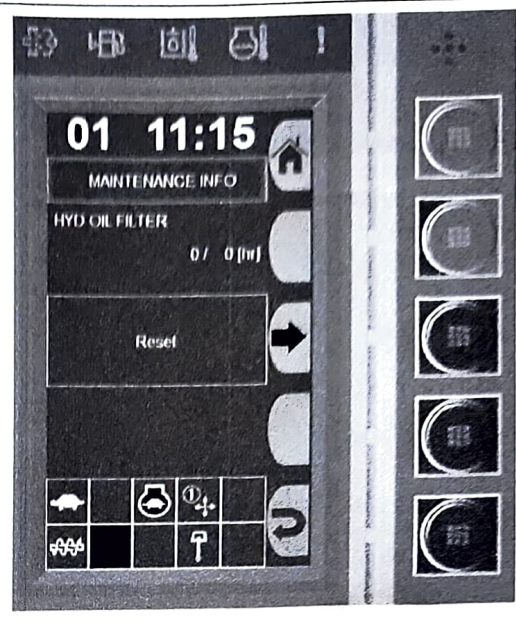


Illustration 118 g03843421

5. Press "Reset" .

**Note:** Press button 1 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 to access the Main Menu.



Illustration 117 g03841713

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

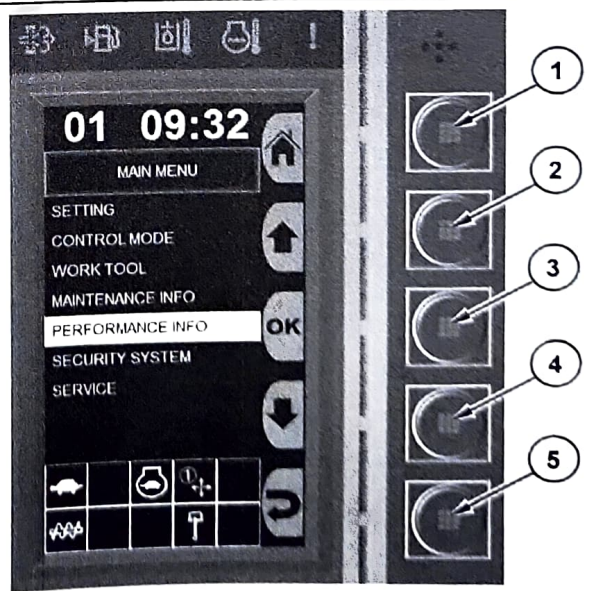


Illustration 119 g03841720

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



Illustration 120

g03841722

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

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

## Service Menu

### Service Password Entry

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

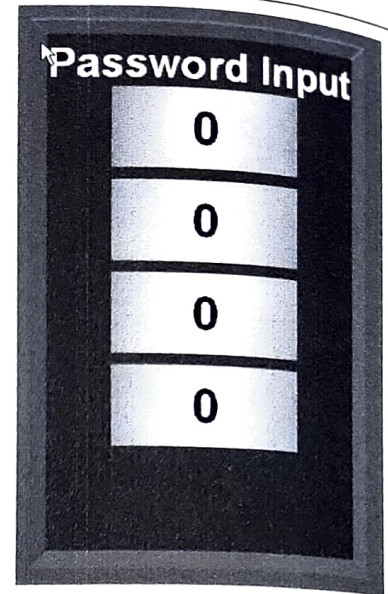


Illustration 121

g02822210

1. Press button 1 through button 4 to select the desired character.

**Note:** When the machine leaves the factory, the password is initially set as FFF2.

### 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

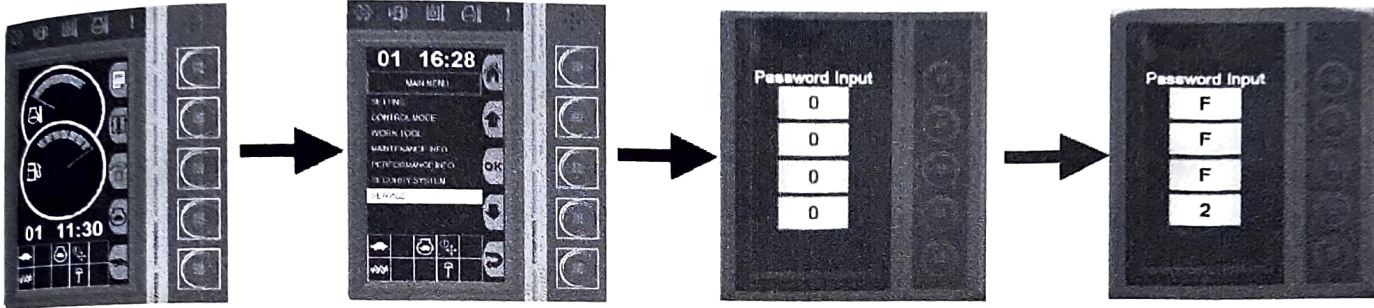


Illustration 122

g03842070

1. Press the top button to access the main menu.  
Highlight "Service" and press "OK". Enter FFF2 under the password input.

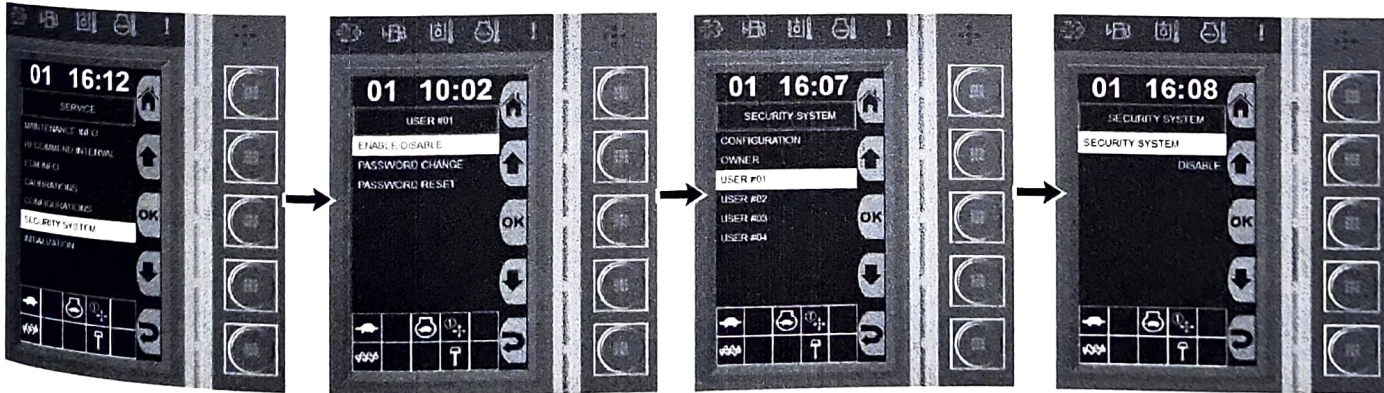


Illustration 123

g03841772

2. Highlight "SECURITY SYSTEM" and press "OK".  
Highlight "USER #01" and press "OK" for the following two screens as seen above.



Illustration 124

g02918859

3. Select the arrow next to "ENABLE" to activate User 1.

**Note:** User 1 is now enabled. The default password is B1234. You can then set each individual user password as long as you have started the machine by using the owner password.

**Note:** Follow the same steps to set up additional users 2 to 4 and to disable users as desired.

### Change the User Password

The default user passwords are listed in the following table.

**Note:** The owner password always begins with the letter **A**. The 4-digit PIN can be changed to contain any number between 0 to 9.

Table 63

Default User Passwords	
User	Password
Owner	A1234
User #01	B1234
User #02	C1234
User #03	D1234
User #04	E1234



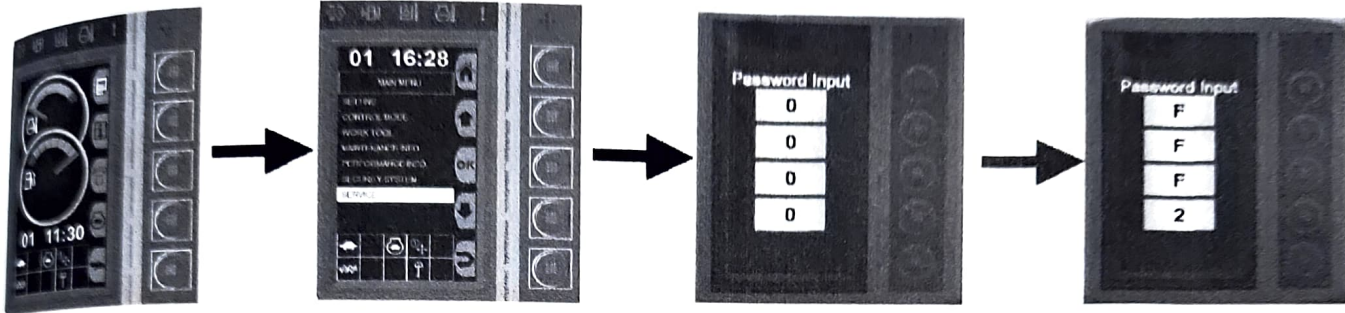


Illustration 125

g03842070

1. Press the top button to access the main menu.  
Highlight "SERVICE", press "OK" and enter FFF2.
2. Highlight "SECURITY SYSTEM" and press "OK".

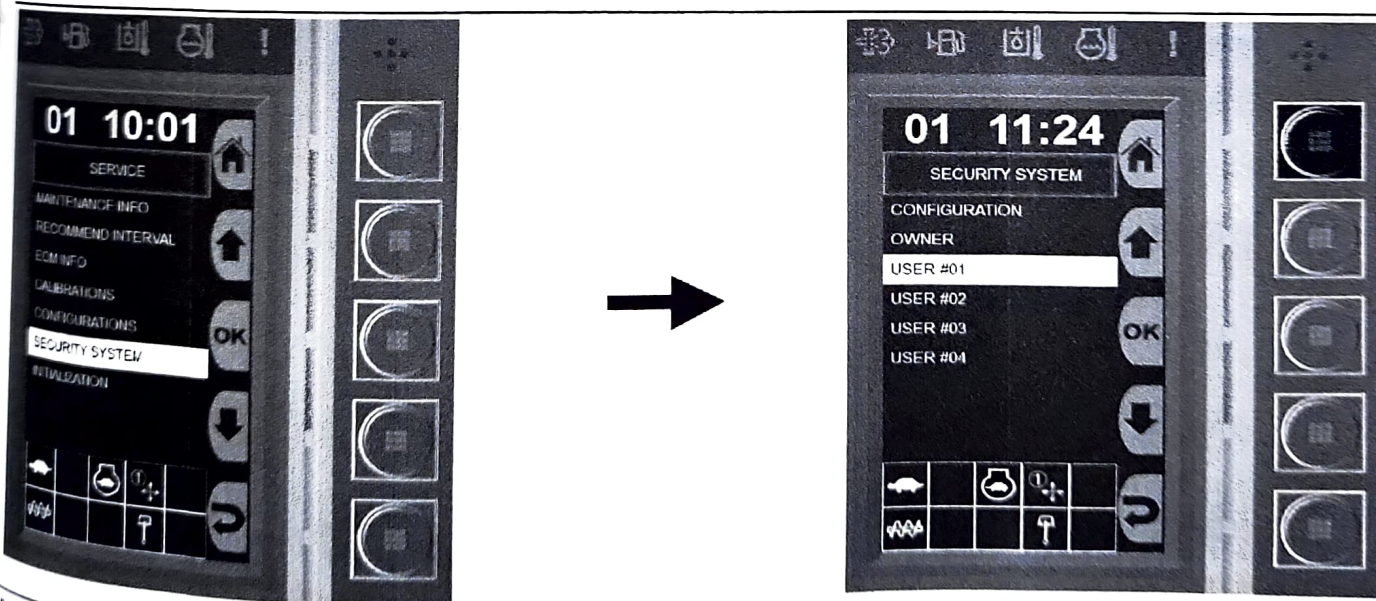


Illustration 126

g03841838

3. Select "USER #01" and press "OK".



Illustration 127

g02985079

4. Select "PASSWORD CHANGE" and press "OK". Then change each digit to the desired password character and press "OK" each time.

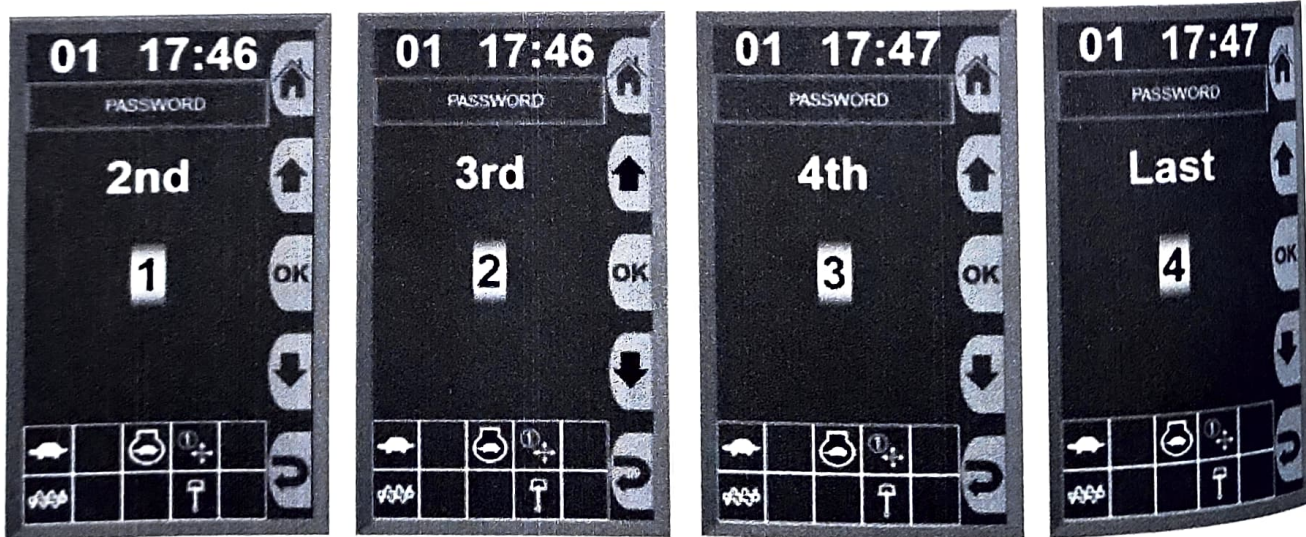


Illustration 128

g03842014

5. You will be asked to re-enter the password to confirm the change. This is to ensure that an incorrect button was not selected.



**Note:** Remember this password. If the user password is forgotten, the owner can change as desired. To change the user password, log in to the machine with the owner password and redo the steps above.

## Security System

The new E series MHE's come with a standard password protected Anti-theft device. The system is disabled on machines from the factory to prevent locking the machine during delivery. This system can be installed by following a few simple steps.

### Install the security system

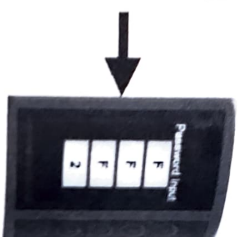
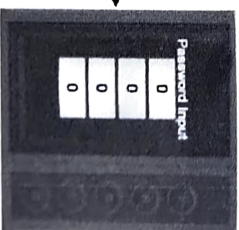
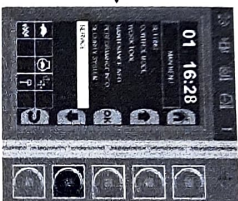
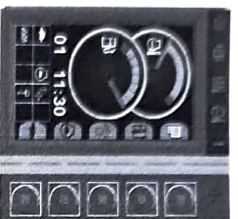


Illustration 129

1. Press the top button to access the main menu. Highlight "SERVICE" and press "OK" and enter FFF2 for the password.

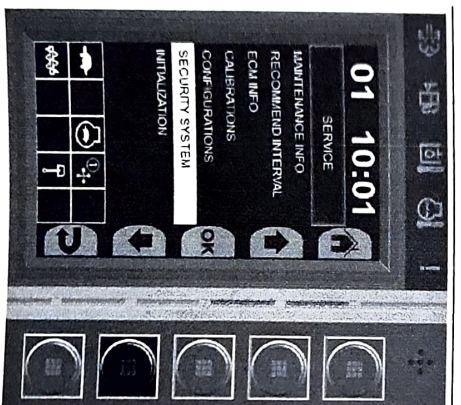


Illustration 130

2. Highlight "SECURITY SYSTEM" and press "OK" on the next two screens.





Illustration 131

g03841886

3. Press the button next to either "INSTALLED WITH NO OPTION" or "INSTALLED WITH OPTION" .

The Security System is now installed. The default owner password from the factory is A1234.

**Note:** When the security system is installed, only the owner can enter Service mode, change passwords, enable users, change clock settings, and reset maintenance intervals.

### Change the Owner Security System Password

The default owner password is A1234. The owner password always begins with the letter A. The 4-digit PIN can be changed to any number between 0 and 9.

The 4-digit password can be changed by following these steps:

i07435900

# Air Conditioning and Heating Control

SMCS Code: 7304; 7320; 7337



Illustration 155  
Reference screen

g06040679

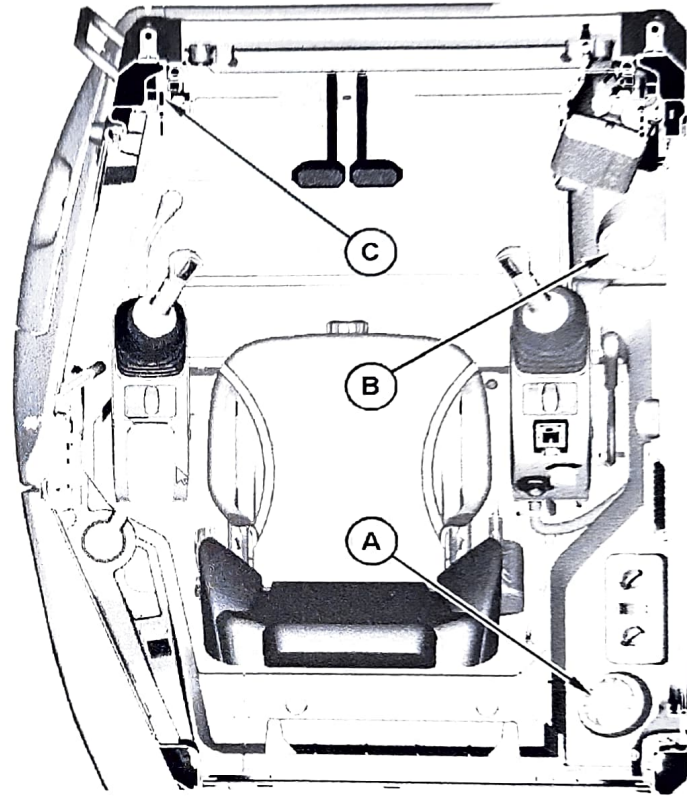


Illustration 156

g06323810

- (A) Vent for upper body (if equipped) (air conditioning only)
- (B) Vent for face (air conditioning/heater)
- (C) Defroster vent (air conditioning/heater)



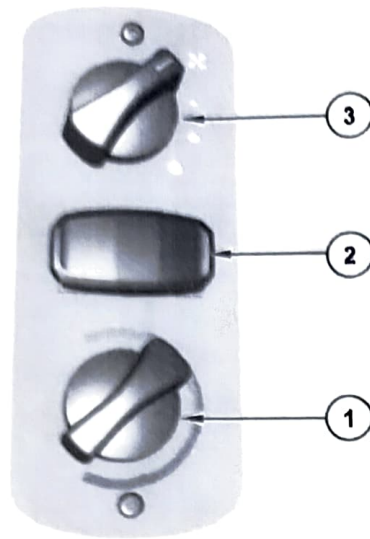


Illustration 157

g03843494

- (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 to increase the temperature. Move the Knob to the left to decrease the temperature.

### Air Conditioning Control (If Equipped)

**"A/C" On/Off Switch (2)** – Push the switch to turn on the compressor or push the switch 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 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 to turn off the air conditioning and the heater.



LO

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



ME

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



HI

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

### Air Inlet Lever

The air inlet lever selects the flow of fresh air into the cab.

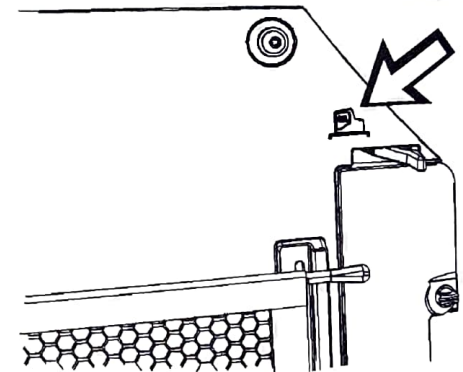


Illustration 158

g061673

Air recirculation symbol

**Note:** The symbol above the lever indicates the function of the air inlet lever. The symbol does not indicate the position of the air inlet lever for recirculation.

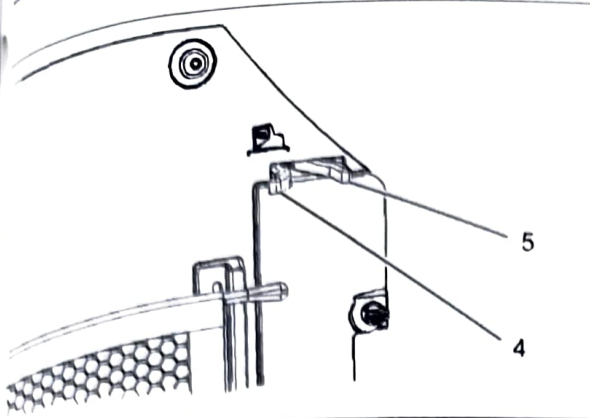


Illustration 159

g03681581

Air inlet lever

- 4) Fresh air position
- 5) Recirculate position

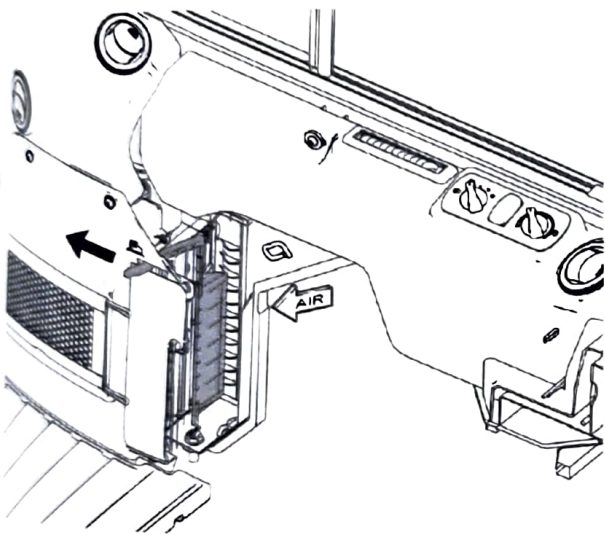


Illustration 160

g06167931

**Fresh Air (4)** – When this position is selected, the air inlet is open. Fresh air will enter into the cab.

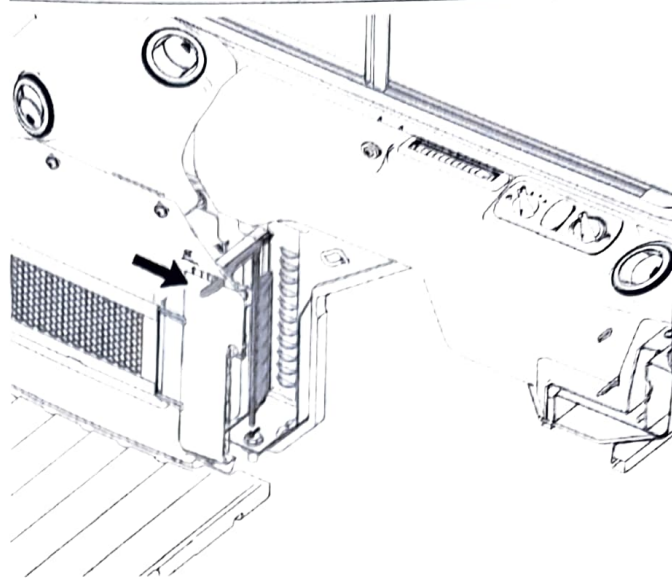


Illustration 161

g06167950

**Recirculate (5)** – When this position is selected, the air inlet is closed. The air will recirculate inside the cab.

Use the recirculate position for air recirculation and the most efficient heating or cooling.

i06175472

## Window (Front)

SMCS Code: 7310-FR

### Front Window

#### **WARNING**

**Crushing Hazard! Stay clear (extremities, clothing) of the window run and of the window. Always open and close the front window using both handles. Always make sure the window locks into the recesses as the window is open and closed. Be careful not to hit the front window with your head as the front window is opened and closed.**

**Stop the engine before opening or closing the front window in order to avoid any unintentional operation or movement of the machine.**

Do not change the position of the front window until the following items have been done:

- Park the machine on a level surface.
- Lower the work tools and the blade to the ground.
- Move the hydraulic lockout control to the RAISED position.



**Perform the following procedure in order to vent the front window.**

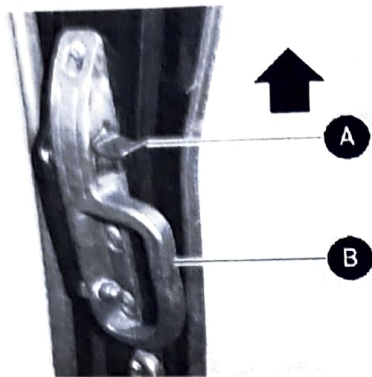


Illustration 162

g02735039

1. Press and hold levers (A) on the left and right, and pull the front window in with both handles (B).
2. Release levers (A) until the pin locks in the vent position.

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

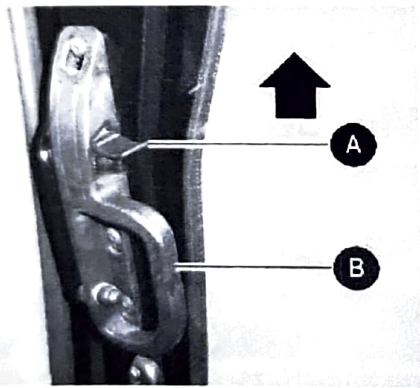


Illustration 163

g02735039

1. Press and hold levers (A) on the left and right, and pull the front window upwards with both handles (B).

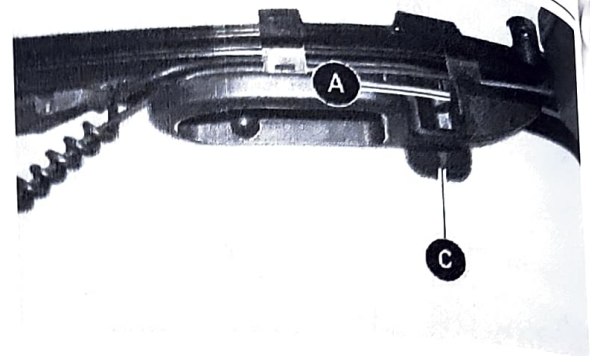


Illustration 164

g02735039

2. Release levers (A) and make sure that the levers lock into both recesses (C).

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

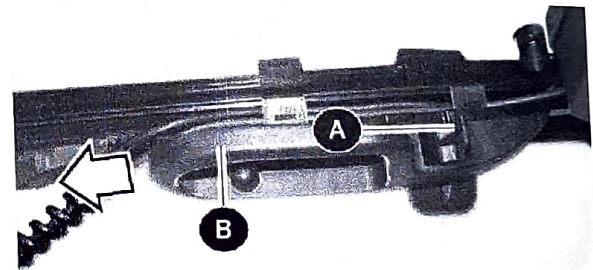


Illustration 165

g02735039

1. Press levers (A) on the left and right, and pull the front window downwards with both handles (B).

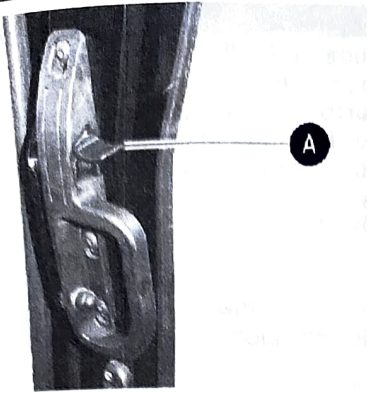


Illustration 166

g02735056

2. Press the levers (A) on either side and make sure that the levers lock into place.

## Lower Front Window

To provide full ventilation inside the cab, the lower front window can be attached to the (upper) front window, in order to open both together.

**Note:** Ensure that the Upper Front Window is in the fully closed position prior attaching or installing the Lower Front Window.

**Perform the following procedure in order to attach the lower front window to the (upper) front window.**

### NOTICE

Do not change the position of the lower front window until the following items have been done:

Park the machine on a level surface.

Lower the work tools and the blade to the ground.

Move the hydraulic lockout control to the RAISED position.

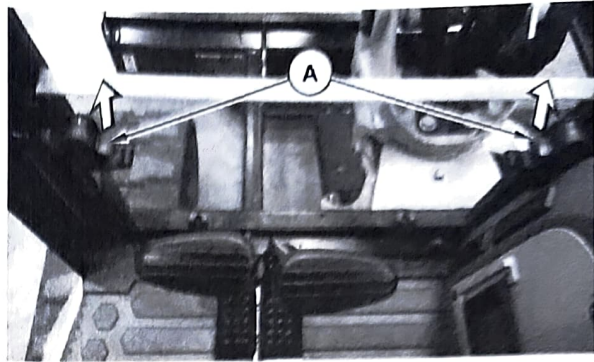


Illustration 167

g03842970

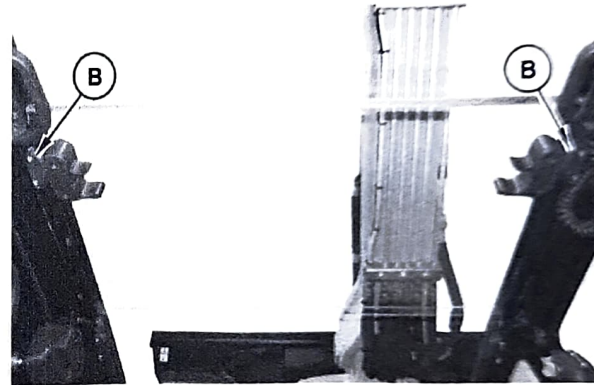


Illustration 168

g03844410

1. Press and hold levers (A) on the left and right, and pull the lower front window upwards.
2. Release levers (A) and make sure that the levers lock into both recesses (B).

**Perform the following procedure in order to install the lower front window.**



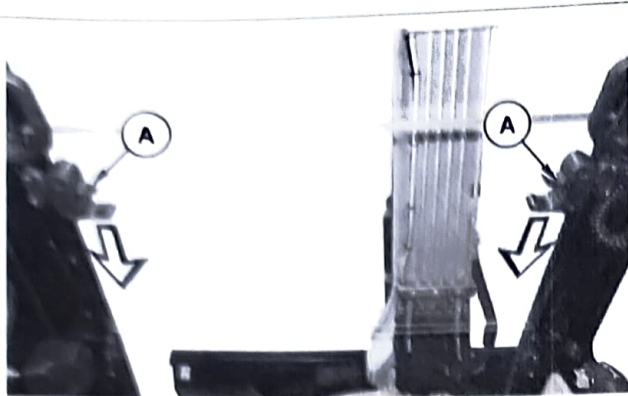


Illustration 169

g03844413

1. Press levers (A) on the left and right, and pull the lower front window downwards.

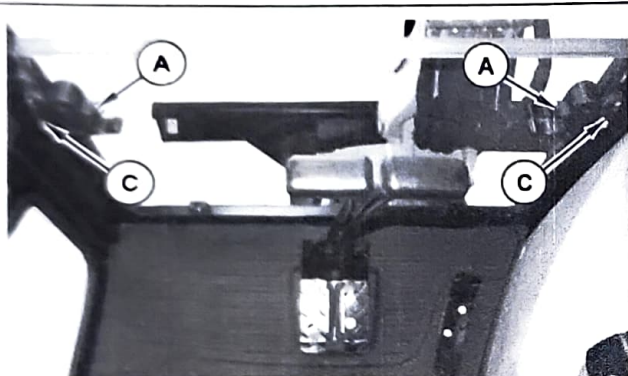


Illustration 170

g03844416

2. Press the levers (A) on either side and make sure that the levers lock into both recesses (C).

i05815957

## Mirror (If Equipped)

SMCS Code: 7319

### WARNING

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

### WARNING

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

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

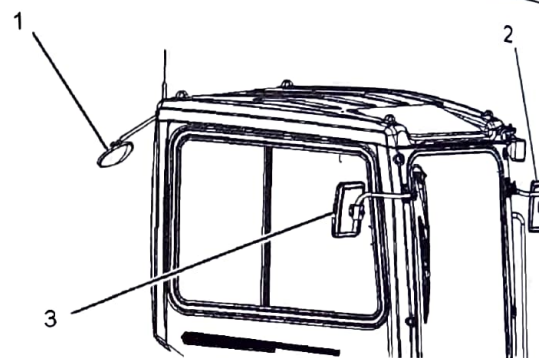


Illustration 171

g03681521

- (1) Rear mirror for viewing the rear of the machine.
- (2) Left side mirror for viewing the rear of the machine
- (3) Right side mirror for viewing the rear of the machine

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

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

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

## Adjustment of the Mirrors

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

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

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

### Rear Mirror (1)

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

### Left Side Rear View Mirror (2)

If equipped, adjust the left side rear view mirror so that the left side of the machine can be seen from the operator seat. Additionally, adjust the mirror in order to provide operator visibility to the rear of the cab.

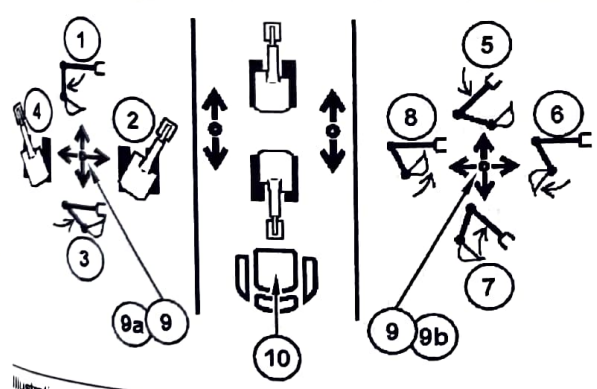
### Right Side Rear View Mirror (3)

If equipped, adjust the right side rear view mirror so that the right side of the machine can be seen from the operator seat. Additionally, provide as much visibility to the rear as possible.

i06506844

## Joystick Controls

SMCS Code: 5705



- Illustration 172
- (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

g02792207

## 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.

i07937391

## Work Tool Control

SMCS Code: 6700

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

1. Operate the machine to charge the accumulator.
2. Lower implements to the ground.
3. Turn off the engine and turn the key switch to the START position without starting the engine.
4. Ensure that the Hydraulic Lockout control is in the UNLOCKED position to provide function to the hydraulic circuits.
5. Actuate the auxiliary circuit in both directions several times.

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



## One-Way Flow

The following information pertains to work tools that require hydraulic oil flow in one direction. Hydraulic hammers are an example of work tools that require hydraulic oil flow in one direction.

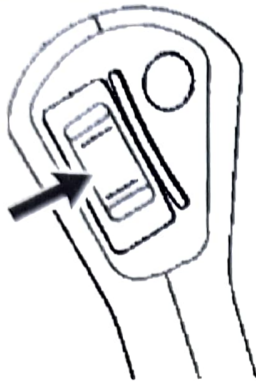


Illustration 173

g02792266

Right joystick thumb wheel

**Variable Speed** – Move the thumb wheel upward to activate the work tool. Move the thumb wheel further to increase the speed of the work tool.

### Hammer Control

**Hydraulic Hammer ON** – Push the right joystick switch upward to activate the hydraulic hammer.

**Hydraulic Hammer OFF** – Release the right joystick switch to deactivate the hydraulic hammer.

### Two-Way Flow

The following information pertains to work tools that require hydraulic oil flow in two directions. These work tools can also be equipped with a rotate circuit. Hydraulic shears, pulverizers, crushers, and grapples are examples of work tools that require hydraulic oil flow in two directions.

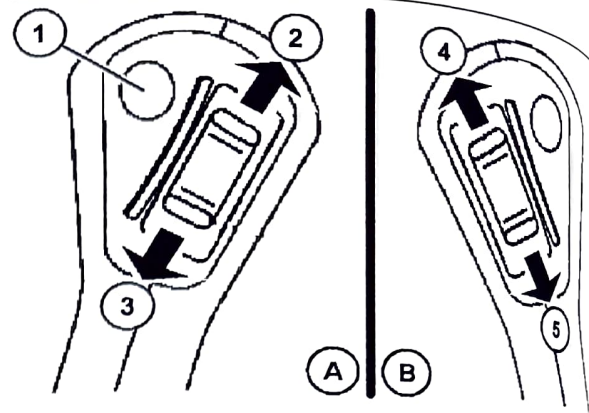


Illustration 174

(A) Left joystick  
(B) Right joystick

Press button (1) once to activate the second auxiliary flow control. Press button (1) again to deactivate the second auxiliary flow control.

The second auxiliary flow control must be activated to operate the following controls.



**(2) ROTATE CLOCKWISE** – Move the thumb wheel upward to rotate the work tool clockwise.



**(3) ROTATE COUNTERCLOCKWISE** – Move the thumb wheel downward to rotate the work tool counterclockwise.



**(4) CLOSE** – Move the thumb wheel upward to close the work tool.



**(5) OPEN** – Move the thumb wheel downward to open the work tool.

### Continuous Flow

**Note:** The continuous flow can be enabled and disabled through the monitoring system. Refer to Operation and Maintenance Manual, "Monitoring System" for additional information.

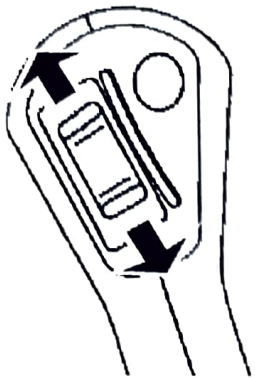


Illustration 175

g02793487

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.

### Work Tool Flow Mode Control

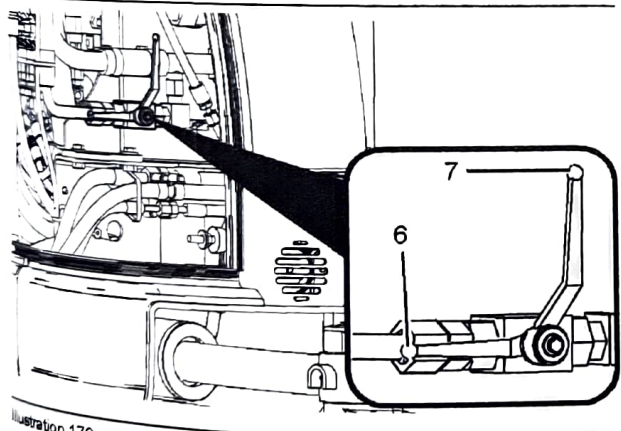


Illustration 176

g02792316

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



**One-Way Flow (6) – Move work tool flow control lever to this position when one-way flow is required.**



**Two-Way Flow (7) – Move work tool flow control lever to this position when two-way flow is required.**

i04680569

## 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

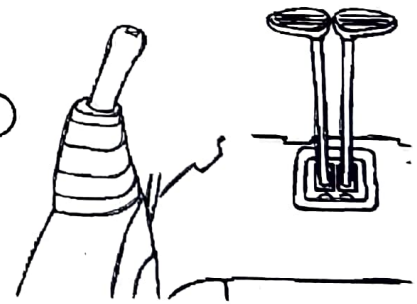
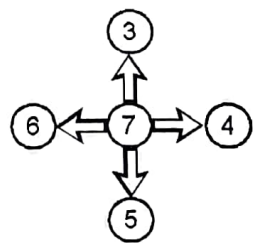


Illustration 177

g01193186

Left hand joystick



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



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



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



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



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

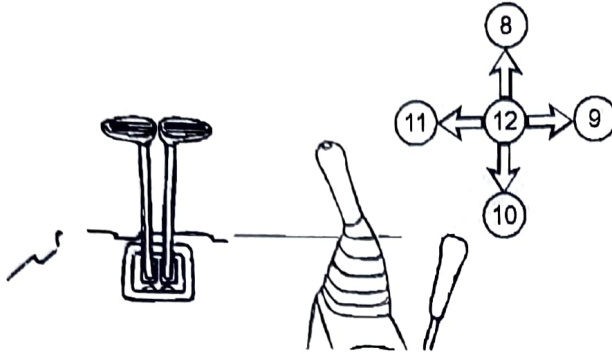


Illustration 178

g01193187

Right hand joystick



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



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



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



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

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

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

# Engine Starting

105269768

## 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.

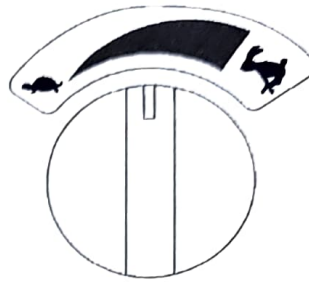


Illustration 179

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.



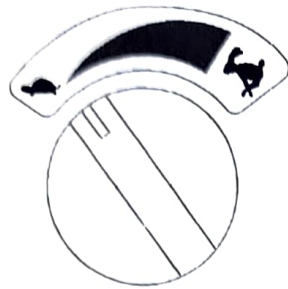


Illustration 180

g00817961

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

i03636436

## Engine and Machine Warm-Up

**SMCS Code:** 1000; 7000

### NOTICE

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

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

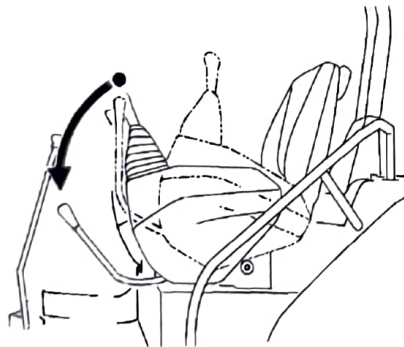


Illustration 181

g00818250

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

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

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

- If the temperature is greater than 0°C (32°F), warm up the engine for approximately 15 minutes.
  - If the temperature is less than 0°C (32°F), warm up the engine for approximately 30 minutes.
  - If the temperature is less than -18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.
2. To warm up the hydraulic oil, turn the engine speed dial to the medium engine speed. Run the engine for approximately five minutes and move the joystick intermittently from the BUCKET DUMP position to the HOLD position. Do not hold the joystick in the BUCKET DUMP position with the bucket cylinder fully extended for more than 10 seconds.
  3. Turn the engine speed dial to the maximum engine speed and repeat Step 2.  
  
This allows the oil to attain relief pressure, which causes the oil to warm up more rapidly.
  4. Cycle all controls in order to circulate warm oil through all hydraulic cylinders and all hydraulic lines, and through the swing motor and travel motors.

### WARNING

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

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

# Operation

102400329

## Operation Information

SMCS Code: 7000

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

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

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

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

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

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

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

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

## Operating Procedure

1. Adjust the operator seat.
2. Fasten the seat belt.
3. Start the machine and refer to Operation and Maintenance Manual, "Engine and Machine Warm-Up" for information about warming the engine and warming the hydraulic oil.
4. Raise the boom enough in order to provide sufficient ground clearance.
5. Select the desired travel speed by operating the travel speed control switch.
6. Make sure that the position of the upper structure and of the undercarriage is known before you move the machine. The dozer blade should be in front of the machine.

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

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

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

9. See Operation and Maintenance Manual, "Operator Controls" for information about spot turning and about pivot turns.
10. When you make turns in soft material, travel in a forward direction occasionally in order to clear the tracks.
11. Slowly move both of the travel levers to the center position in order to stop the machine.

100059294

## Frozen Ground Conditions

SMCS Code: 7000

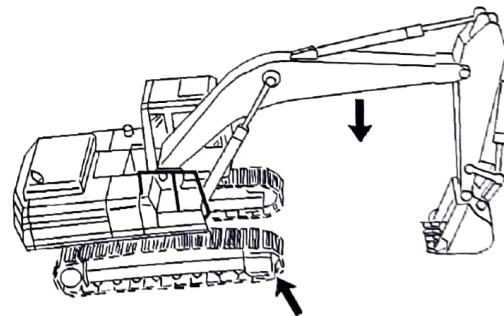


Illustration 182

900101468

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.



i05933848

## Equipment Lowering with Engine Stopped

**SMCS Code:** 7000

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

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

### WARNING

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

### WARNING

Personal injury can result from oil under high pressure.

**DO NOT** allow high pressure oil to contact skin.

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

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

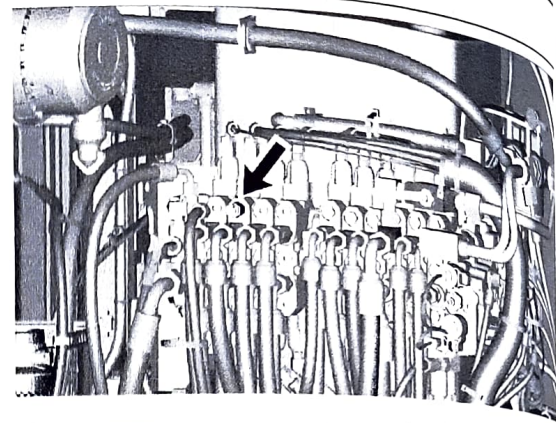


Illustration 183

g0372626

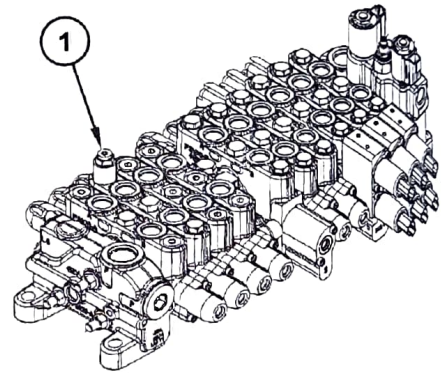


Illustration 184

g0372627

1. Remove plug (1) on end of valve with 5 mm hex wrench.
2. Turn screw clockwise with 4 mm hex wrench until the relief is forced open and the boom begins to lower.
3. Make sure that the work tool has lowered all the way to the ground. Reset the valve by turning the screw counter clockwise until it returns to the original position.
4. Replace the plug.
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".

### 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.

SEBU9418-18

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

106529669

### Operating Technique Information

SMCS Code: 7000

#### WARNING

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

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

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

#### NOTICE

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

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

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

Whenever the tracks of the machine raise off the ground while digging, lower the machine back to the ground smoothly. **DO NOT DROP OR CATCH IT WITH THE HYDRAULICS.** Damage to the machine can result.

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

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

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

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

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

Use a comfortable travel speed while you operate the machine.

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

Never swing a load over a truck cab or workers.

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

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

### Restricted Operation

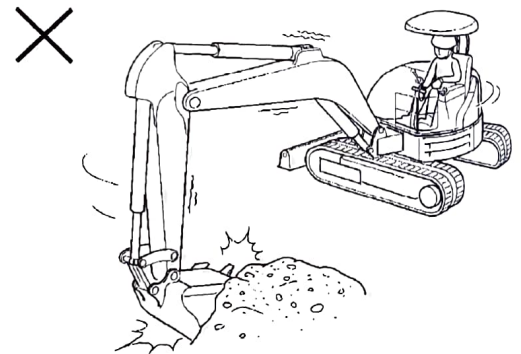


Illustration 185

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

- Soil compaction
- Ground breaking
- Demolition

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

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

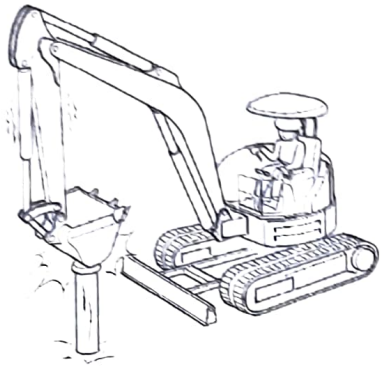


Illustration 186

g00818699

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

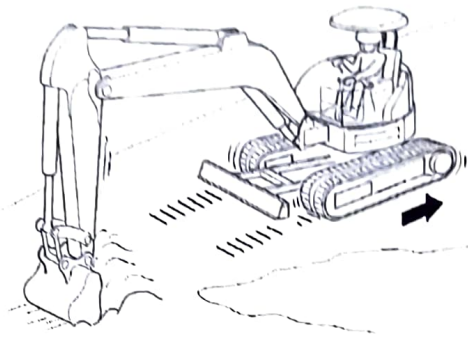


Illustration 188

g00818707

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

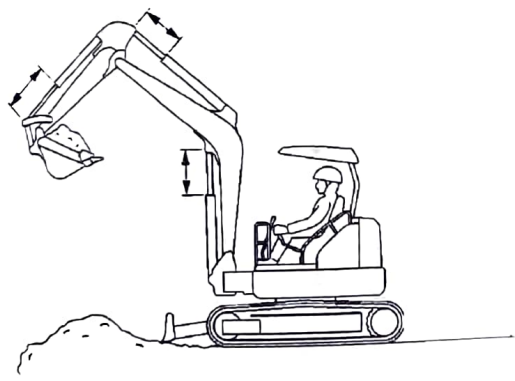


Illustration 187

g00818702

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



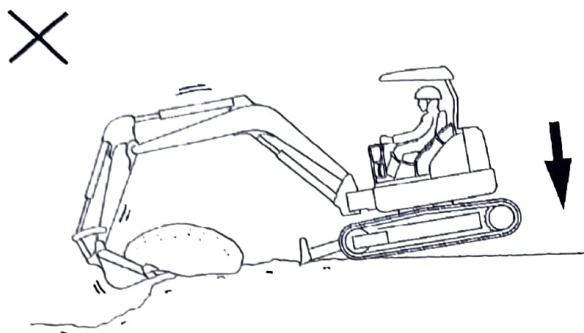


Illustration 189

g00818711

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

## Operating Precaution

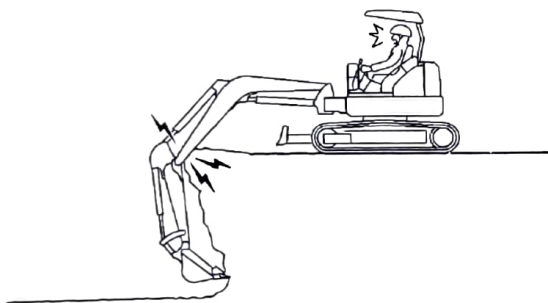


Illustration 190

g00818715

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

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

## Travel in Water and Mud

SMCS Code: 7000-V6

105035328

### 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.

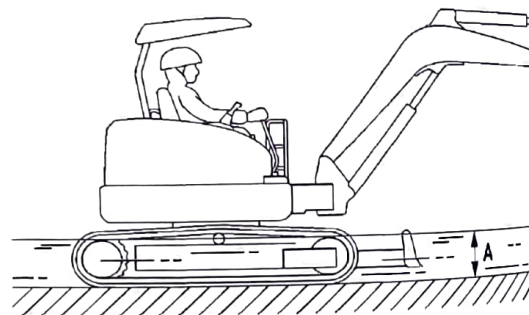


Illustration 191

g00818689

Depth of water to the center of the track carrier roller

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

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

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

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

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

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

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

### Procedure for Removing the Machine from Water or Mud

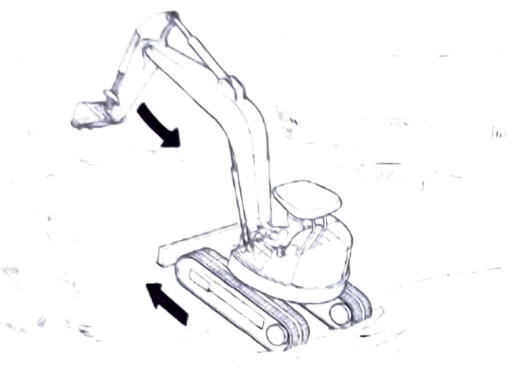


Illustration 192 g00818886

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

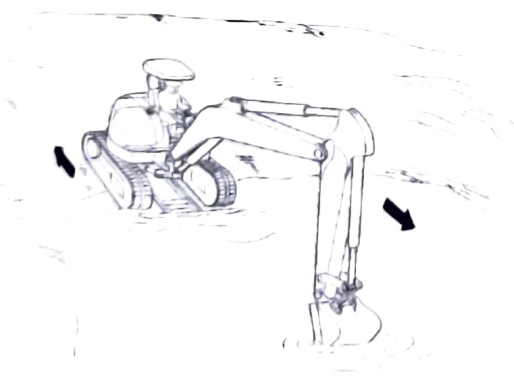


Illustration 193 g00818890

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

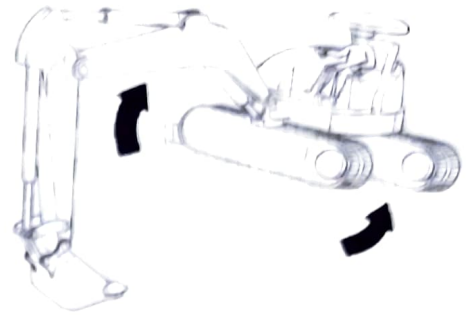


Illustration 194 g00818893

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

02434743

## Boom, Stick and Bucket Operation

SMCS Code: 7000

### Digging

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



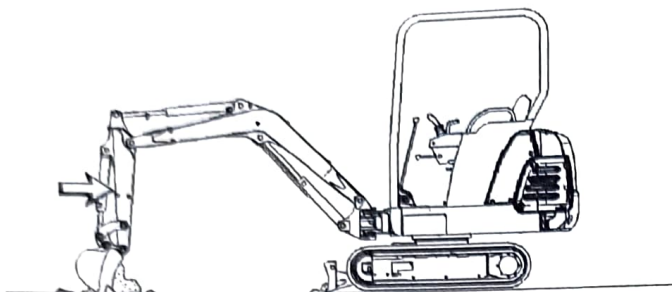


Illustration 195

g00394783

4. Move the stick toward the cab and keep the bucket parallel to the ground.
5. If the stick stops due to the load, raise the boom and/or perform a curl in order to adjust the depth of the cut.
6. To apply the greatest force at the cutting edge, decrease the down pressure as you move the stick toward the cab.
7. Maintain a bucket attitude that ensures a continuous flow of material into the bucket.
8. Continue the pass in a horizontal direction so that material peels into the bucket.

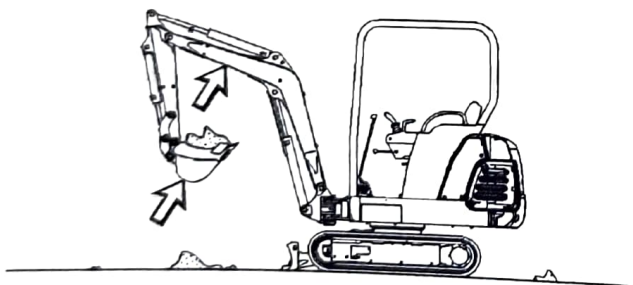


Illustration 196

g00394917

9. Close the bucket and raise the boom when the pass has been completed.
10. Engage the swing control when the bucket is clear of the excavation.

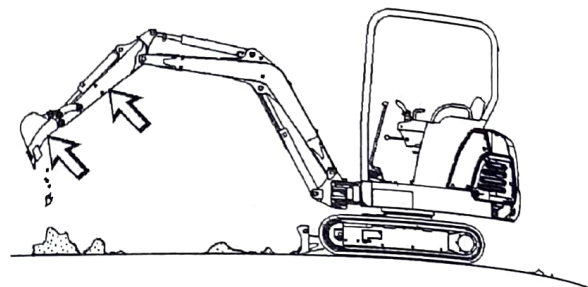


Illustration 197

g00394857

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

## Lifting Objects

### WARNING

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

### WARNING

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

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

### NOTICE

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

Short slings will prevent excessive load swing.

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

Only use the lifting point (if equipped) that has been supplied on the power link in order to lift objects. Lifting capacities are calculated from this point. Adjust to this capacity accordingly. Refer to Operation and Maintenance Manual, "Lifting Capacities" for more information on lifting objects with the machine.

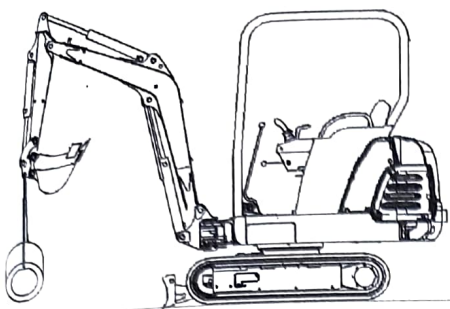


Illustration 198 g01216478

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

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

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

Lift capacity decreases as the distance from the swing centerline is increased.

i04775787

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

SMCS Code: 6129; 6522; 7000

S/N: HY21-Up

#### Installation

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

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

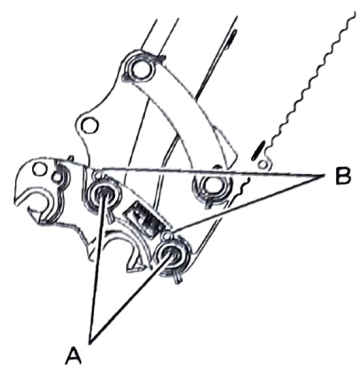


Illustration 199 g02878319

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

### Coupling the Work Tool

**WARNING**

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

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

1. Position the work tool on the ground.
2. Apply slight down pressure on the work tool.
3. Retract and extend the stick cylinder in order to push the work tool against the ground. Visually confirm that there is no movement between the coupler and the work tool.

**WARNING**

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

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



**WARNING**

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

**NOTICE**

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

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

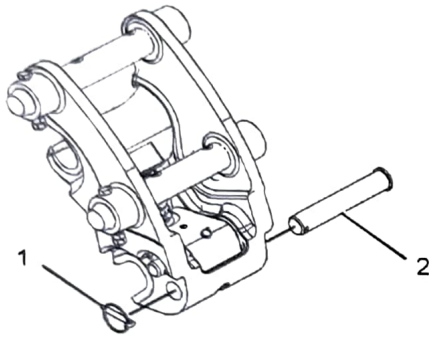


Illustration 200

g02165934

2. Remove lynch pin (1) and the safety pin (2).
3. Retract the work tool cylinder. Position the open hook on the quick coupler over the top pin of the work tool.

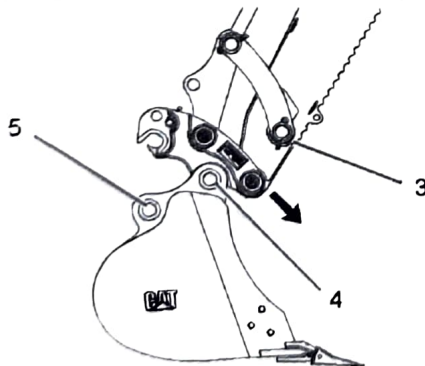


Illustration 201

g02165936

4. Move stick (3) inward and lower the stick until the hook engages the top pivot pin (4) of the work tool.
5. Rotate the quick coupler toward the machine and lift the bucket from the ground.

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

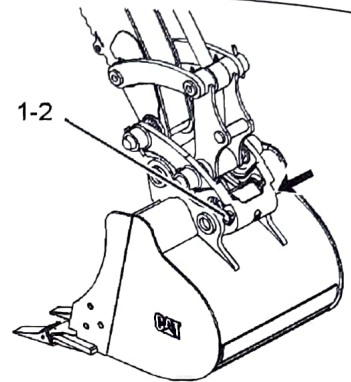


Illustration 202

g02193894

7. Fully insert the safety pin (2) into the bore of the quick coupler. Install the lynch pin (1) in order to secure the safety pin.
8. In order to verify the engagement of the work tool, perform the following procedure.
  - a. Start the engine. Retract and extend the stick cylinder in order to push the work tool against the ground.
  - b. Ensure that there is no movement between the work tool and the quick coupler.
  - c. Visually confirm the engagement of the work tool.

**Uncoupling the Work Tool****WARNING**

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

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

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

**NOTICE**

Auxiliary hoses for work tools must be disconnected before the Hydraulic Quick Coupler is disengaged. Pulling the work tool with the auxiliary hoses could result in damage to the host machine or the work tool.

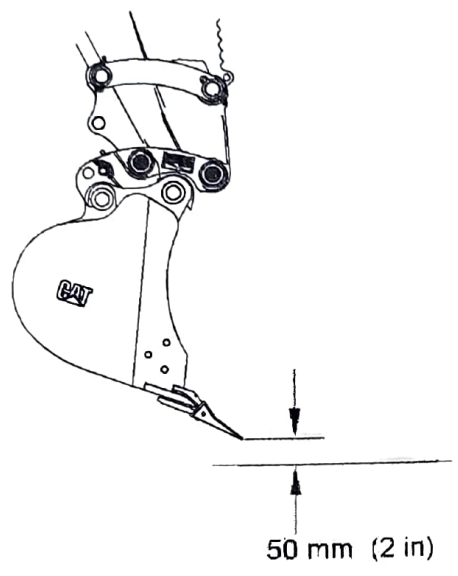


Illustration 203 g01502436

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

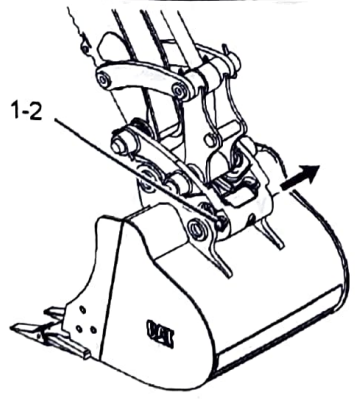


Illustration 204 g02165954

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

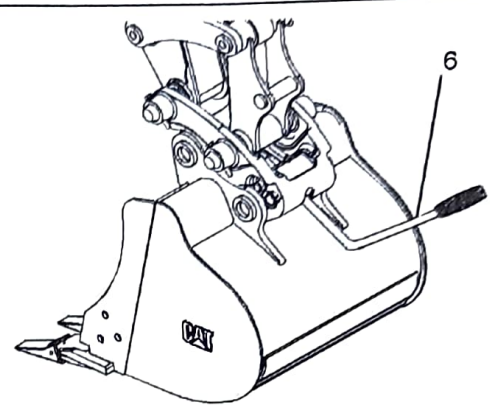


Illustration 205 g02165973

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



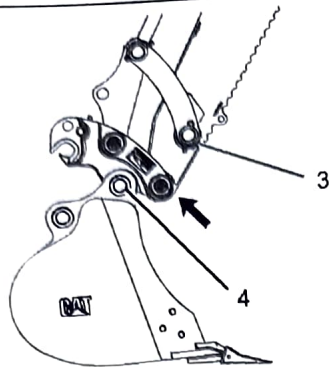


Illustration 206

g02193895

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

## Coupling the Hammer

### WARNING

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

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

1. Position the work tool on the ground.
2. Apply slight down pressure on the work tool.
3. Retract and extend the stick cylinder in order to push the work tool against the ground. Visually confirm that there is no movement between the coupler and the work tool.

Position the hammer horizontally on the ground.

1. Start the engine.
2. Remove lynch pin (1) and safety pin (2).
3. Retract the work tool cylinder. Position the open hook on the quick coupler over the top pin of the hammer.

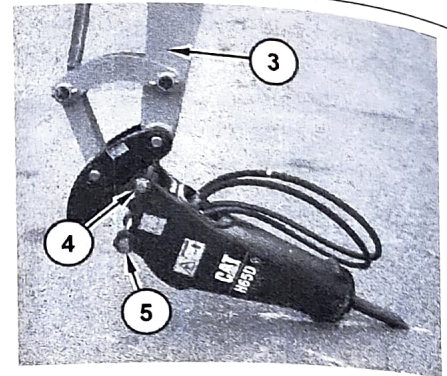


Illustration 207

g02166033

4. Move the stick (3) inward and lower the stick until the hook engages the top pivot pin (4) of the hammer.
5. Extend the work tool cylinder in order to rotate the quick coupler toward the hammer until the quick coupler engages the lower pin (5) of the hammer. Stop the engine.

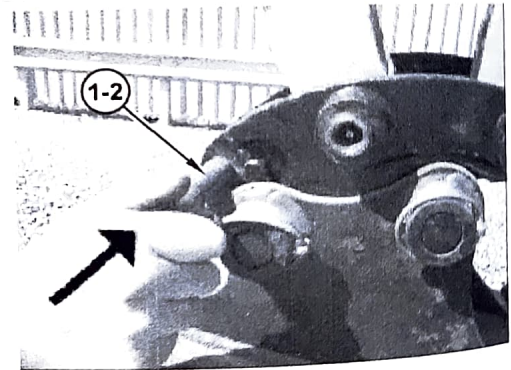


Illustration 208

g02166013

6. Fully insert safety pin (2) into the bore of the quick coupler and hammer. Install the lynch pin in order to secure the safety pin.
7. In order to verify the engagement of the hammer, perform the following procedure.
  - a. Start the engine. Retract and extend the stick cylinder in order to push the hammer against the ground.
  - b. Ensure that there is no movement between the hammer and the quick coupler.
  - c. Visually confirm the engagement of the hammer.

8. Connect the two hammer lines.

### Uncoupling the Hammer

#### **WARNING**

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

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

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

#### **NOTICE**

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

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



Illustration 209

g01216467

1. Disconnect the two hammer lines.

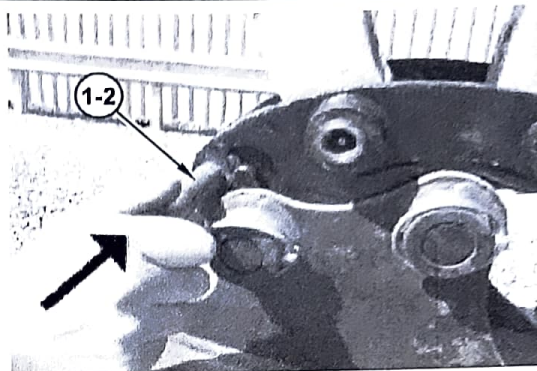


Illustration 210

g02166013

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

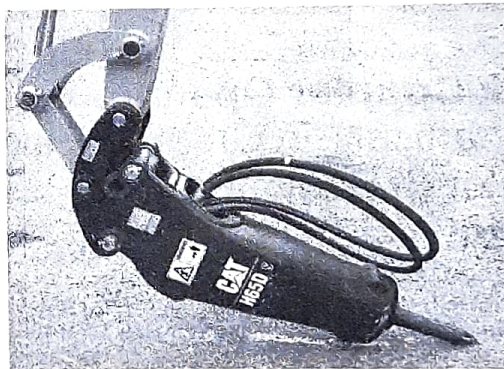


Illustration 211

g01215423

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

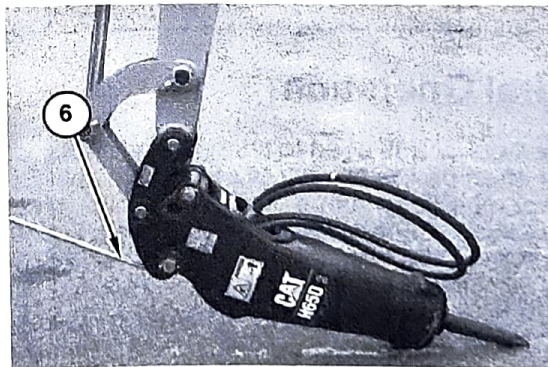


Illustration 212

g02166054

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





Illustration 213

g01215618

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

i05505856

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

**SMCS Code:** 6129; 6522; 7000

### NOTICE

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

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

## General Operation

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

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

## Installation

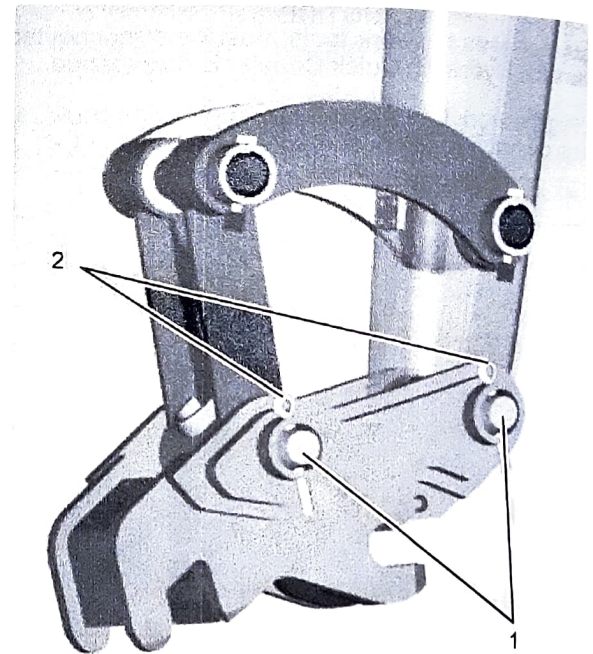


Illustration 214

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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.

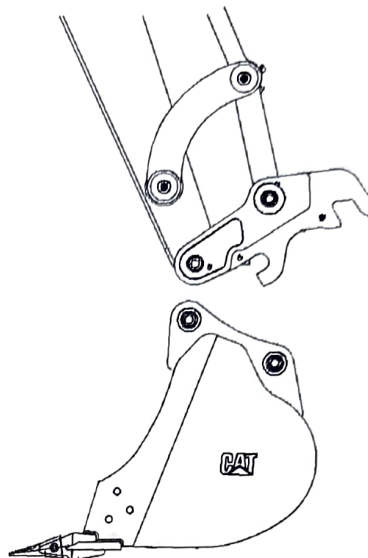


Illustration 215

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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.

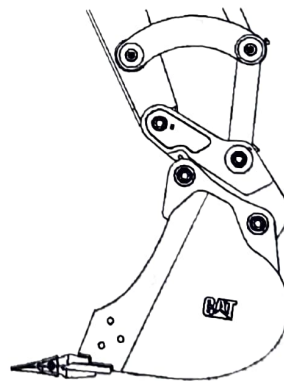


Illustration 216

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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.



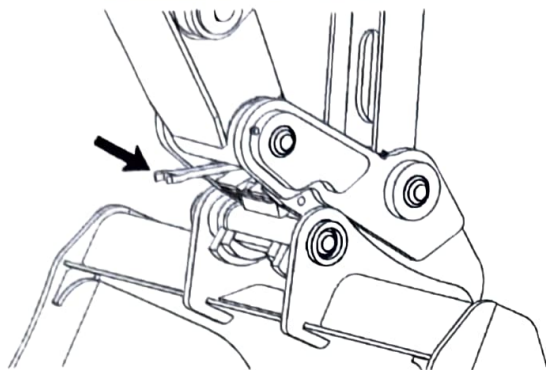


Illustration 217

g02165065

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

## Uncoupling the Work Tool

### WARNING

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

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

### NOTICE

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

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

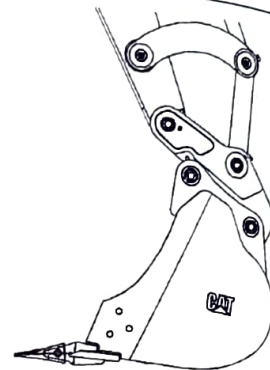


Illustration 218

g02165065

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.

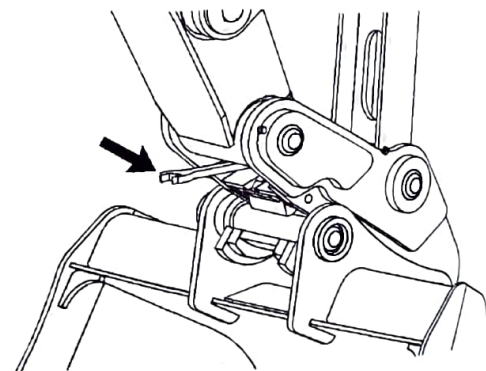
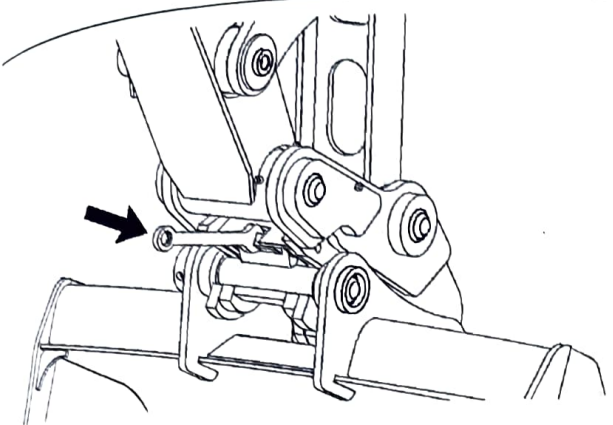


Illustration 219

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



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Illustration 220

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

### Quick Coupler use with a Bucket that is Reversed

#### NOTICE

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

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

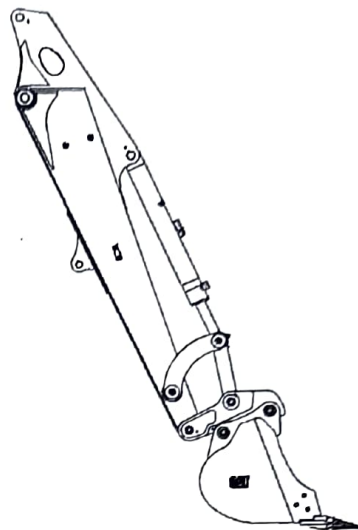


Illustration 221

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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.

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

SMCS Code: 6129; 6522; 7000

The quick coupler is used to change work tools while the operator remains in the cab. The quick coupler can be used with a broad range of buckets and work tools. Each work tool must have a set of pins in order for the quick coupler to work properly. The Dual Lock Tilt Quick Coupler also allows the work tool to rotate through a 180 degree arc.

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



**⚠ WARNING**

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

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

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

**⚠ WARNING**

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

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

**⚠ WARNING**

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

**NOTICE**

Before beginning installation, operating of machine, or repair of the Dual Lock Tilt Coupler:

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

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

**NOTICE**

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

**NOTICE**

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

**NOTICE**

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

**Quick Coupler Operation**

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

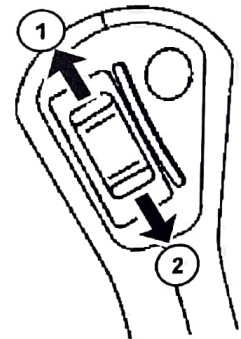


Illustration 222

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

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

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

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

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## 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.

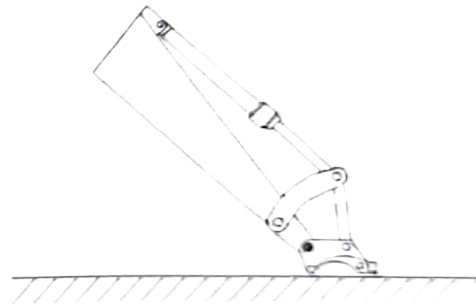


Illustration 223

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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).



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

- 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

- Lay the quick coupler flat on the ground.
- Release the pressure from the hydraulic lines (if equipped)
  - Extend the wedge to the UNLOCKED position.
  - Stop the engine on the host machine. Turn the ignition to OFF.
  - Turn the ignition to the ON position without starting the engine.
  - 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.
  - The wedge should begin to move inward due to the spring force.
    - Turn the ignition to the OFF position.
    - Release the pressure in the host machine's hydraulic tank.

#### WARNING

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

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

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

#### NOTICE

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

Refer to Special Publication, PERJ1017, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat® products.

Dispose of all fluids according to local regulations and mandates.

- 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.
- Dispose of the hydraulic oil in a suitable manner.
- Remove the pins from the quick coupler.

### Daily Inspection

#### WARNING

**Personal injury or death can result from improper 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.

- 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.



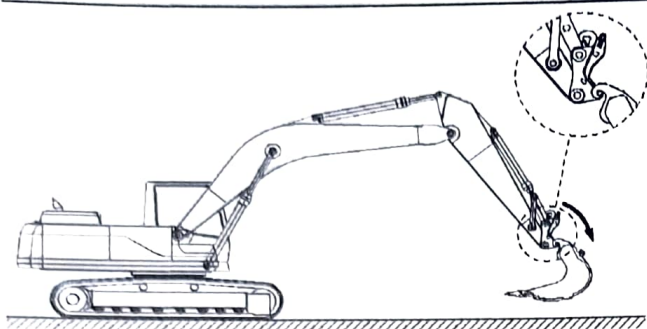
**Coupling a Bucket**

Illustration 224

g01285027

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

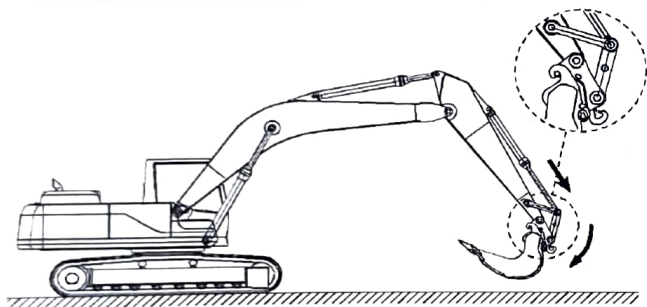


Illustration 225

g01285038

2. Select "UNLOCK" on the monitor display and confirm that the buzzer is sounding with an intermittent pattern of one beep per second. If no sound is heard while in this condition, ensure that the work tool is placed in a stable and safe position. Turn off the engine. Consult your Cat dealer. Extend the bucket cylinder until the coupler contacts the work tool.
3. Tilt the quick coupler against the work tool by extending the bucket cylinder.
4. Select "LOCK" on the monitor display and the beep will stop and the rear lock (wedge) will slide back into place. The monitor will return to the home screen.

5. Visually confirm that the wedge has engaged the work tool hook and is properly locked. If this visual confirmation cannot be performed from the machine cab due to obstruction, lighting, etc., place the machine in a safe state, exit the cab, and visually confirm proper engagement at the quick coupler.

**WARNING**

**Inspect the quick coupler engagement before operating the machine.**

**Serious injury or death may result from improperly engaged coupler.**

**NOTICE**

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

6. Verify the engagement of the quick coupler and the work tool.
  - a. Place the work tool on the ground.
  - b. Apply pressure to the work tool against the ground.
  - c. Drag the work tool forward and backward.

**Quick Coupler with Mechanical Coupling****WARNING**

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

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

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

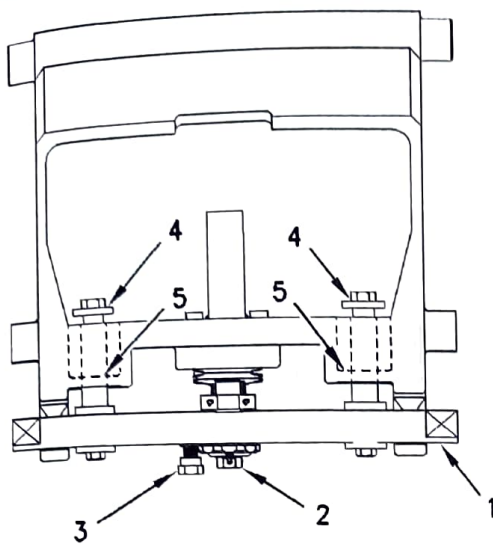


Illustration 226

g00928845

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

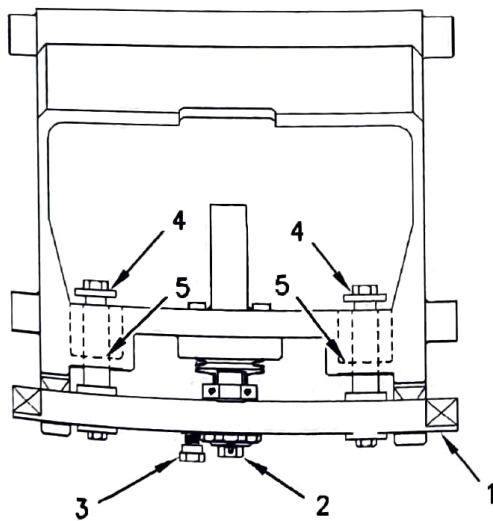


Illustration 227

g00928845

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

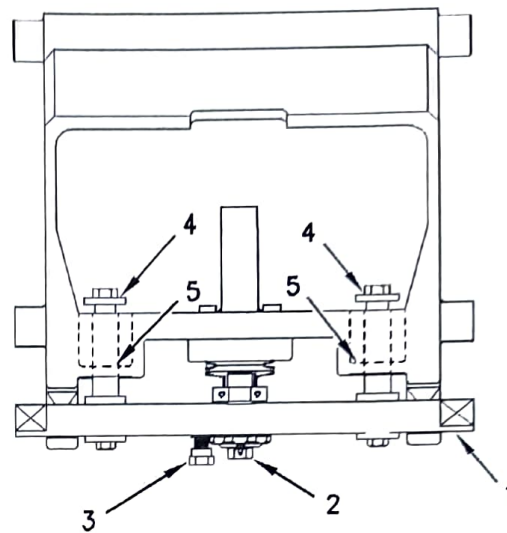


Illustration 228

g00928845

4. Turn spindle (2) until the bolts (4) lightly contact the coupler (5).

5. Position the coupler with the wedge in an UPWARD position.

### Coupling a Bucket

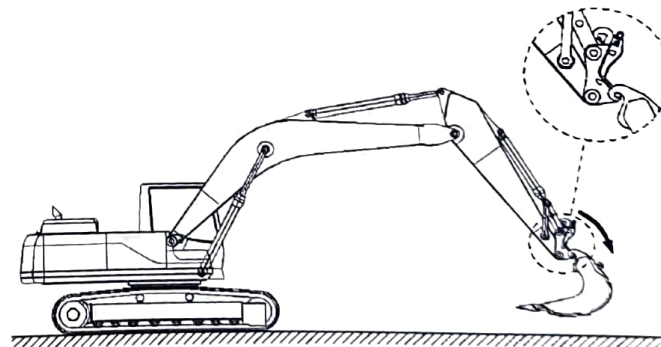


Illustration 229

g01285027

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



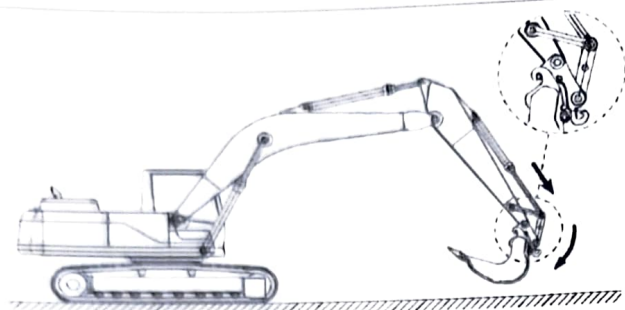


Illustration 230

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.

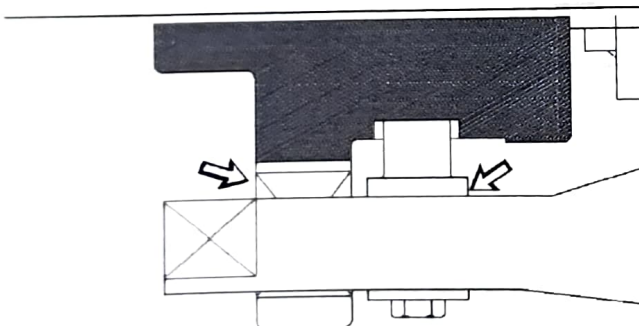


Illustration 231

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)

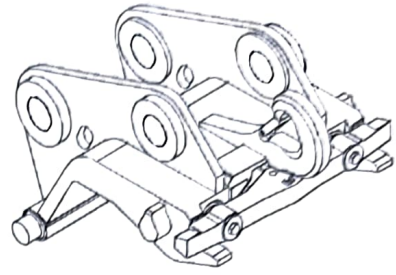


Illustration 232

g03219218

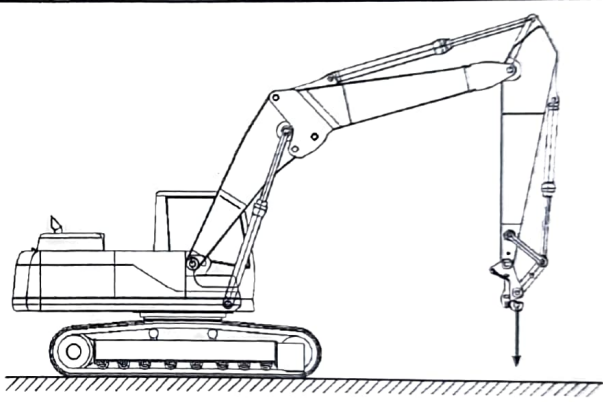


Illustration 233

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 64

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

<sup>(1)</sup> 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.

## 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 locks are controlled through a menu on the monitor system. Refer to Operation and Maintenance, "Monitoring System" for more information. 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.

## Installation

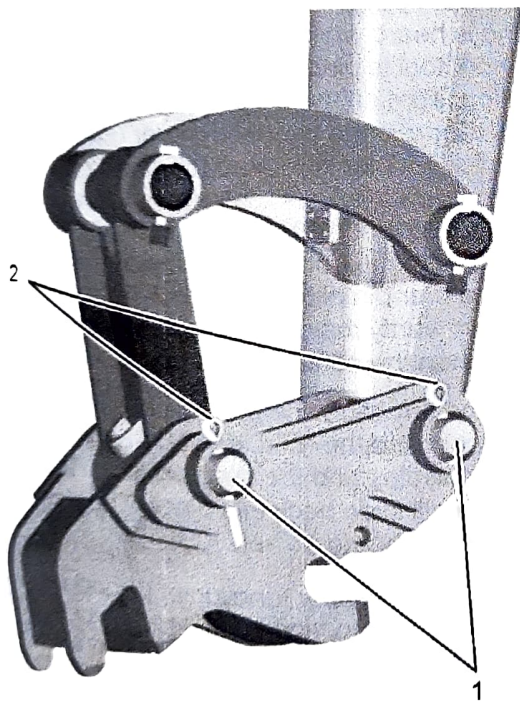


Illustration 234

g06294044

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).

## Quick Coupler Operation

### Coupling the Work Tool

#### **! WARNING**

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

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

- 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.

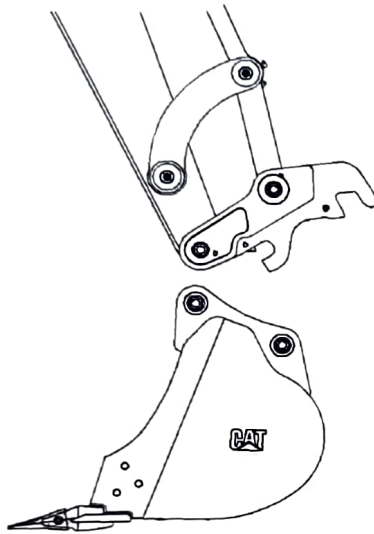


Illustration 235

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.

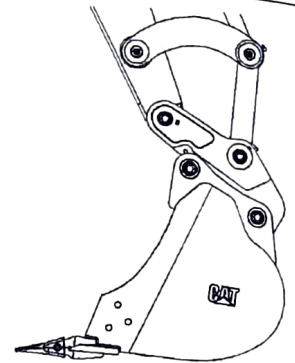


Illustration 236

g02163292

2. Select "UNLOCK WEDGE" on the monitor 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 rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. 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.
3. Press the arrow beside the top coupler icon that corresponds to the "LOCK WEDGE" on the monitor display and the beep will stop. The rear (wedge) will slide back into place. The monitor will return to the home screen.

**Note:** To ensure proper function of the locking wedge, stalling a function such as blade or bucket may be required to provide sufficient hydraulic flow to the locking mechanism.

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

## 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.

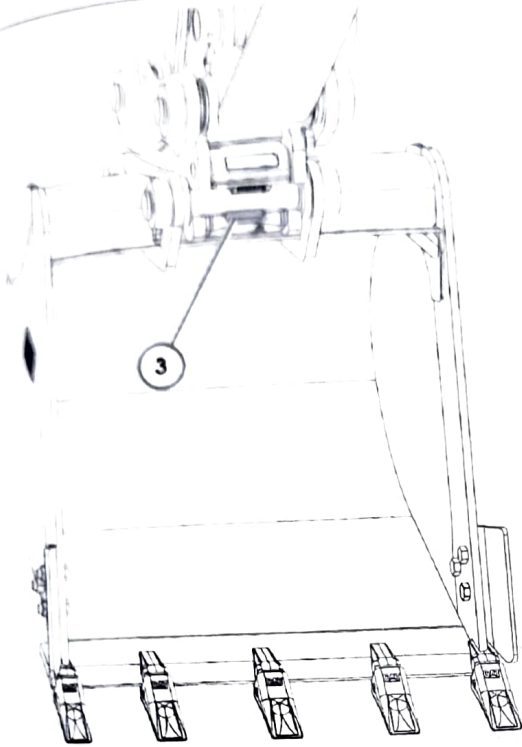


Illustration 237

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.

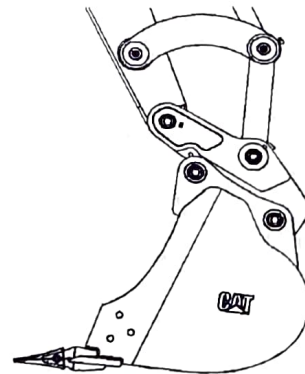


Illustration 238

g02163292

1. 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.
2. Press the button for the "UNLOCK WEDGE". 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.



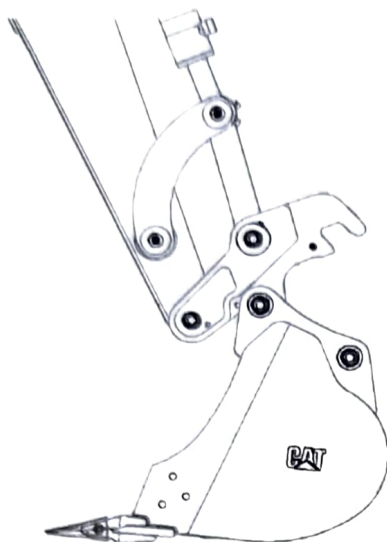


Illustration 239

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. Hold the control lever for the bucket cylinder in the RETRACT position for 5 seconds.
5. Press the arrow besides the bottom coupler icon that corresponds to the "UNLOCK FRONT" on the monitor display. 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.

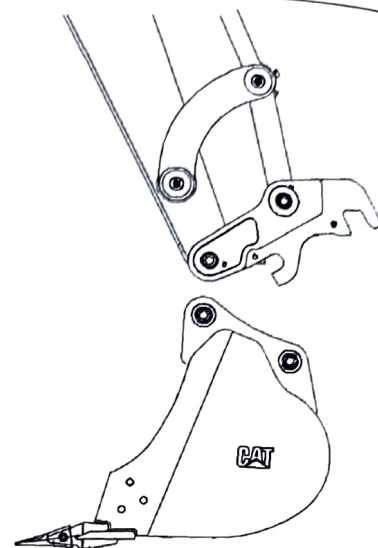


Illustration 240

g02163290

6. 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.
7. Press the arrow beside the coupler icon on the monitor display and the beep will stop and the rear (wedge) will slide back into place. The monitor will return to the home screen.

### 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.

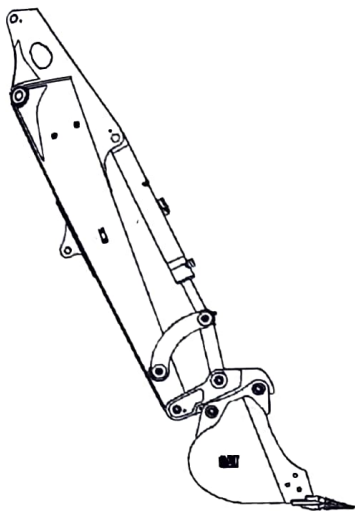


Illustration 241

g02163425

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

i05261243

## Hammer Operation (If Equipped)

SMCS Code: 5705-WTL

### WARNING

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

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

1. Position the work tool on the ground.
2. Apply slight down pressure on the work tool.
3. Retract and extend the stick cylinder in order to push the work tool against the ground. Visually confirm that there is no movement between the coupler and the work tool.

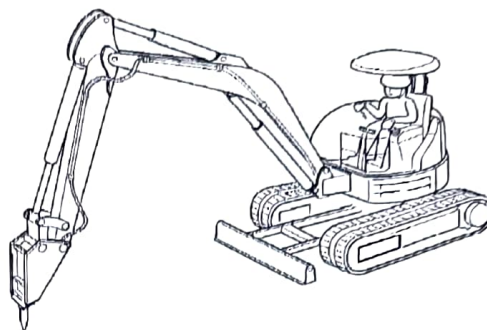


Illustration 242

g00821410

### NOTICE

Selection of a hydraulic hammer must be done with extra care. Use of a hydraulic hammer not recommended by Caterpillar could result in structural damage to the machine. Consult your Caterpillar dealer for hydraulic hammer information.

Only use the hydraulic hammer to break rocks, concrete, and other hard objects. Before you start hydraulic hammer operation, place the machine on a level, stable surface. If the machine must be placed on a slope or on a rough surface, be careful during operation.

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

### NOTICE

In order to avoid structural damage to the host machine or the hydraulic hammer, comply with the following:

Do not attempt to break rocks or concrete by burying the hammer tool completely into the rocks or concrete.

Do not apply a prying force to the hammer tool in order to remove the hammer tool from the material.

### NOTICE

Frequent idle strokes (blank firing) have a deteriorating effect on the hammer. Do not operate the hammer without proper down pressure against the object.

Do not allow the hydraulic hammer to continuously operate at one location and for more than 15 seconds. Change the location of the machine and repeat the procedure. Failure to change the location of the machine could cause the hydraulic oil to overheat. Overheated hydraulic oil could cause damage to the accumulator or to the cylinder seals.



Stop hydraulic hammer operation immediately if any of the hydraulic hoses are twisting rapidly. This indicates that the accumulator is punctured. Consult your Caterpillar dealer for the necessary repairs.

**NOTICE**

Do not use the dropping force of the hydraulic hammer to break rocks or other hard objects. This could cause structural damage to the machine.

Do not use the sides or back of the hydraulic hammer to move rocks or other hard objects. Doing this could cause damage not only to the hammer but to stick or boom cylinder.

Do not operate the hydraulic hammer with any of the cylinders fully retracted or extended. Doing this could cause structural damage to the machine, resulting in reduced machine life.

Do not use the hydraulic hammer to lift an object.

Do not operate the hydraulic hammer while the stick is vertical to the ground. This could allow the stick cylinder to vibrate excessively.

Do not operate the hydraulic hammer on objects in water. This could cause the chisel to rust and the seal on the sliding section to be damaged.

Operate the attachment control levers carefully in order to keep the hydraulic hammer's chisel from hitting the boom.

Do not operate the hydraulic hammer with the upper structure sideways to the undercarriage. Before you start hydraulic hammer operation, place the upper structure in the recommended position that is shown in the following illustration. Any other operating positions could make the machine unstable. Any other operating positions could place excessive loads on the undercarriage.

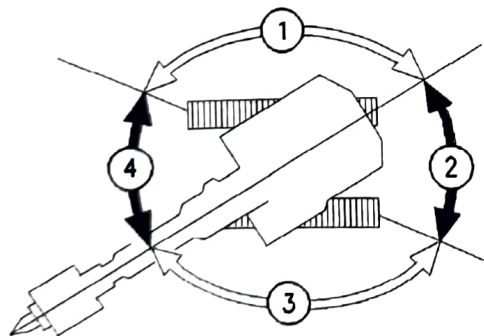


Illustration 243

g00101503

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

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

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

This list was completed at the time of publication. There may be additional work tools that have been approved since that time. Consult your Cat dealer for an updated list of approved work tools.

101582993

## 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.

102045841

## Rubber Belt Track Operation (If Equipped)

**SMCS Code:** 4198

The rubber part of the track assembly can easily be damaged during operation. Operate the machine with the rubber belt only if damage to the rubber belt is shallow and the damage is not harmful. However, any harmful damage to the rubber can cause the following serious problems to the entire track assembly:

- Early wear of iron core.
- Early wear of track grousers.
- Fracture of iron core.
- Fracture of track grousers.
- Cuts of steel cords

SEBU9418-18

- Rubber flaking off
- Disengagement of sprocket
- Such a failed track assembly needs to be replaced as a unit. In order to minimize the replacement of the track, observe the following items. In order to maximize the performance of the track, observe the following items:
  - Avoid travelling at sites for demolition.
  - Travelling at these sites should be avoided particularly when the machine is being swung at the same time.
  - Avoid operation under salty conditions.
  - Avoid combined operation of travel and swing with excessive load at rough terrain.
  - Avoid operation at rocky sites.
  - Avoid suddenly swinging the machine when the machine is travelling on pavement.
  - Use the rubber belt tracks at temperatures within  $-25\text{ }^{\circ}\text{C}$  ( $-13\text{ }^{\circ}\text{F}$ ) to  $55\text{ }^{\circ}\text{C}$  ( $131\text{ }^{\circ}\text{F}$ ). Avoid operation on hot surfaces.
  - Rubber belt tracks are less stable than steel tracks. Side-to-side movement of the machine should be done very carefully.
  - If the sprockets are badly worn, use a new sprocket for replacement.
  - Be sure that the tracks are free of oily materials such as fuel, hydraulic oil, grease, etc.
  - Avoid going over sharp obstacles. Decreased life of the track, fracture of the track grousers and cut steel cords can occur.
  - Track Tension must be correctly maintained and checked regularly.
  - Disengagement of the track could occur if the track gets clear of the track roller. This could happen while the machine travels over an obstacle.



## Parking

I02388306

### Stopping the Machine

SMCS Code: 7000

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

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

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

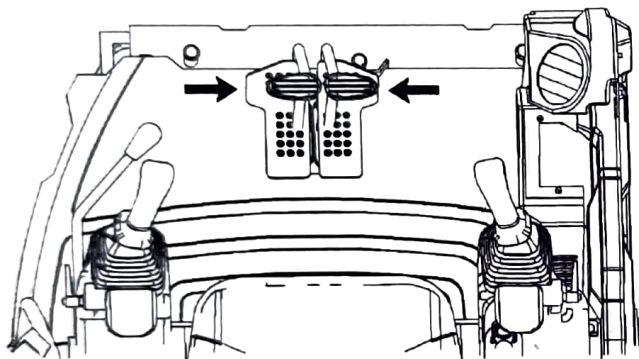


Illustration 244

g01192386

2. Move the left and right travel levers slowly to the STOP position in order to stop the machine.

**Note:** Avoid sudden stops. Sudden stops can cause damage to the machine. Slow down and bring the machine to a smooth stop.

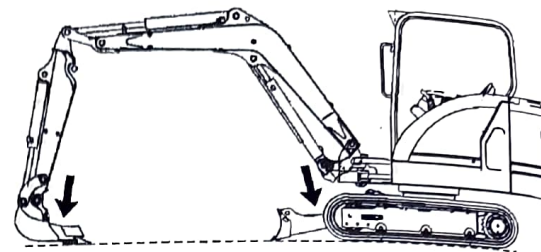


Illustration 245

g01192390

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

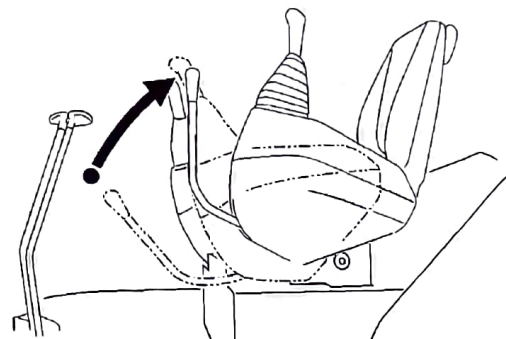


Illustration 246

g00817901

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

### WARNING

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

Personal injury or death may occur from sudden machine movement.

i01584067

# Freezing Conditions

SMCS Code: 7000

If freezing temperatures are expected, remove the mud and the dirt from each track roller frame. Park the machine on wood planks. Use the following procedure to clean each track roller frame.

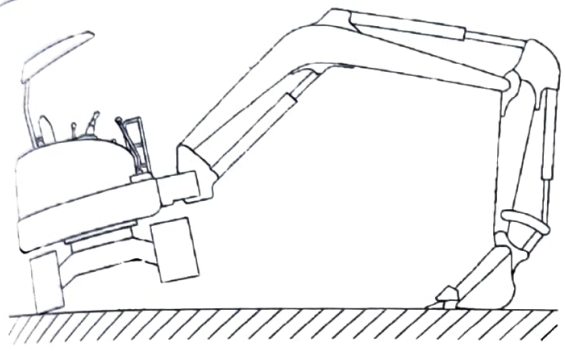


Illustration 247

g00821797

1. Position the boom over one side of the machine.
2. Use boom down pressure in order to lift the track on one side off the ground. Operate the track in the forward direction. Then operate the track in reverse. Continue this procedure until the maximum amount of material is thrown off the track.
3. Lower the track onto the wood planks.
4. Repeat the procedure for the other track.
5. Clean the area around the carrier rollers and around the track rollers.
6. Lower the implement onto a wood plank.

i06177779

# 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.

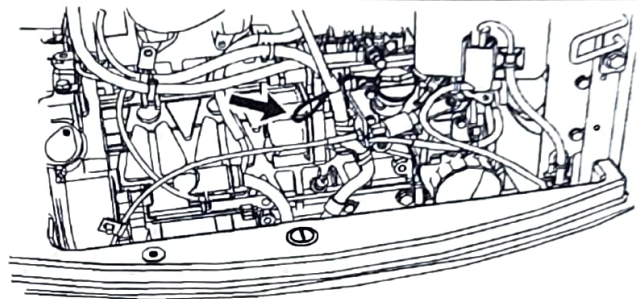


Illustration 248

g02792523

1. Open the engine access door.
  2. Pull the cord and hold the cord until the engine shuts off.
- Note:** Do not operate the machine again until the malfunction has been corrected.
3. Close the engine access door.

# Stopping the Engine if an Electrical Malfunction Occurs

## Inside Cab

The fuse panel is located inside the access cover below the operators seat.



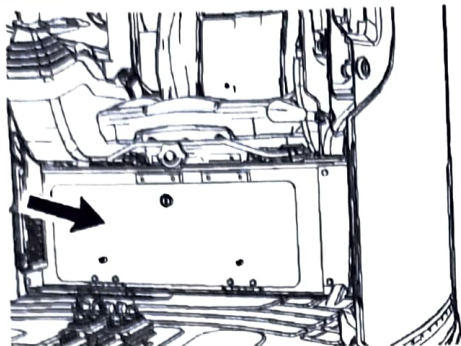


Illustration 249

g02161886

Open the access cover for fuse access.

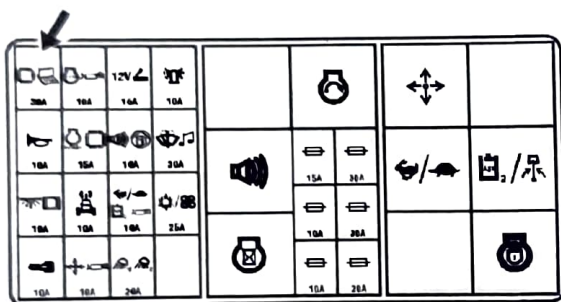


Illustration 250

g03838306

Remove the ECM fuse in order to stop the engine.

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

## Leaving the Machine

SMCS Code: 7000

10658947



Illustration 251

g00037660

1. Use the steps and the hand holds when you dismount. When you dismount, face the machine and use both hands.
2. Inspect the engine compartment for debris. Clean out any debris to avoid a fire hazard.
3. Remove all flammable debris from the front bottom guard through the access doors to reduce a fire hazard. Discard the debris properly.
4. Always turn the battery disconnect switch to the OFF position before leaving the machine (if equipped).
5. If the machine will not be operated for a month or more, remove the battery disconnect switch key (if equipped).
6. Turn off all lights (courtesy lights will remain ON for set time).
7. Lock all compartments.

## Machine Storage and Specified Storage Period

SMCS Code: 7000

### Machine Storage

The Safety Section of this Operation and Maintenance Manual contains storage information for fuels, lubricants, and ether (if equipped).

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