SMCS - 7304, 7320, 7337

i08259327

Refer to Maintenance Interval Schedule for Periodic Maintenance of the heating and air conditioning system.

Illustration 1 g06348804
(1) Jog dial
(2) Heating and air conditioning button
(3) Home button

Air conditioning and heating functions are controlled through the monitor. The heating and cooling menu can be directly accessed by pressing button (2) on the right side switch panel. Input selections can be made using jog dial (1) or using the monitor. Home button (3) can be used to return to the main screen.

Illustration 2 g06348808

Press the Air Conditioning and Heating button (2) to go directly to the air conditioner screen.

To navigate to the air conditioner screen from the main screen, press menu button (4).

Illustration 3 g06334491

Access the screen by selecting the "HVAC" box on the display screen. The jog dial is standard on any machine with HVAC or radio since those functions require the jog dial to operate them.

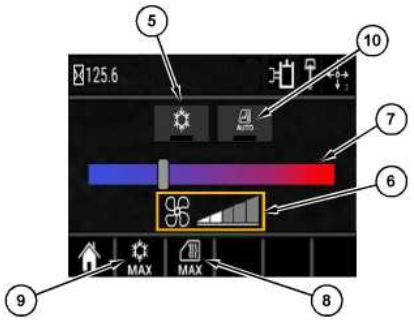

Illustration 4 g06605342
Air conditioner screen
(5) Air Conditioning indicator
(6) Fan blower speed control
(7) Temperature control
(8) Maximum defrost
(9) Maximum A/C
(10) Auto temperature control

Air Conditioning indicator (5) - Illuminates when the air conditioning system is ON.

Fan blower speed control (6) - The blower control is used to increase or decrease the desired blower speed.

Temperature control (7) - The temperature control is used to raise or lower the air temperature coming out of the vents.

Maximum Defrost (8) - Pressing this button sets the blower fan to max speed, turns the air conditioning on and changes the temperature to the hottest setting. Use this setting to remove steam and frost from the windows.

Maximum A/C (9) - Pressing this button sets the blower fan to max speed, turns the air conditioner on and changes the temperature to the coldest setting.

Auto temperature control (10) - Illuminates when the automatic temperature control feature is active.

Automatic Temperature Control

The control will automatically adjust the air conditioner, heater, and fan control to achieve the desired temperature. The fan can be adjusted manually while in this mode by adjusting the setting using the jog dial, while the system will still control the heater and air conditioning settings.

Illustration 5 g06348812

When automatic temperature control is active, the digital temperature setting is displayed.

Selection Method

Most settings can be made using the display screen or by using the jog dial. Some radio and some air conditioning/heating controls can only be performed using the jog dial.. When using the display screen, simply press the button below the icon you want to select. When using the jog dial, rotate the dial to switch to different selections within the screen. Press the jog dial downward to choose a selection.

When using the jog dial to set the temperature or blower speed, rotate the dial clockwise to increase and counter-clockwise to decrease. Press downward on the dial to enter the desired setting.

Air Vent Locations

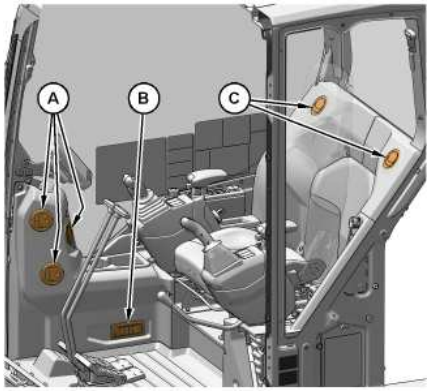

Illustration 6 g06278002
(A) Front air vents
(B) Floor air vents
(C) Rear air vents

Redirect the louvers for air outlets (A), (B), and (C) by hand to the desired direction.

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2018/03/06 **Alternate Exit (M0118365-11)**

SMCS - 7310

i07291771

Illustration 1 g06276524

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

Break Glass - Perform the following procedure to exit through the rear window. A hammer is mounted on the rear of the cab. Strike the rear window with the hammer to break the glass. Climb through the opening of the rear window to exit the cab.

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

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SMCS - 1411

i10262188

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

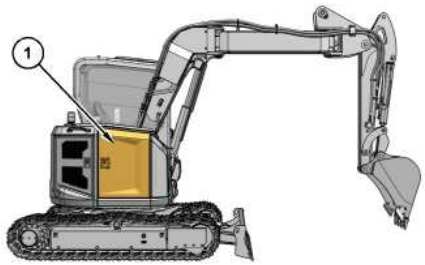

Illustration 1 g07813947
(1) Access door

Open access door (1) on right side of the machine. Refer to Operation and Maintenance Manual, "Access Doors and Cover Locations" for more information.

Disconnect Switch Type 1

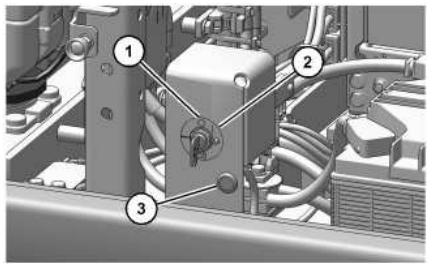

Illustration 2 g07699581
Battery disconnect switch type 1
(1) OFF position
(2) ON position
(3) DEF purge lamp (if equipped)

Disconnect Switch Type 2

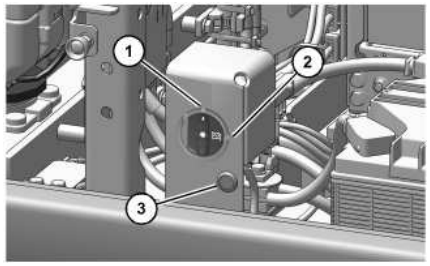

Illustration 3 g07699584
Battery disconnect switch type 2
(1) OFF position
(2) ON position
(3) DEF purge lamp (if equipped)

Battery Disconnect Switch - The battery disconnect switch can be used to disconnect the battery from the machines electrical system. For Type 1 Disconnect Switches, the key must be inserted into the battery disconnect switch before the switch can be turned.

(1) OFF - To deactivate the electrical system, turn the battery disconnect switch counterclockwise to the OFF position.

(2) ON - To activate the electrical system, turn the battery disconnect switch clockwise. The battery disconnect switch must be turned to the ON position to enable battery power to start the engine.

(3) DEF Purge lamp (if equipped) - When illuminated, the DEF purge lamp indicates that the DEF system is still powered and active.

NOTICE
Do not conduct any service procedures on the DEF system until the DEF purge indicator lamp is not illuminated. The indicator lamp may remain illuminated for several minutes, even though the battery disconnect switch is OFF and the engine start switch is OFF. When the indicator lamp is on, the DEF system is still powered.

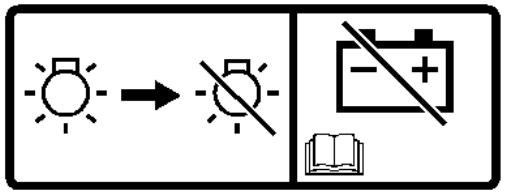

Illustration 4 g07702170
DEF wait to disconnect film

Note: Do not turn off the battery disconnect switch until 5 seconds have elapsed after turning the engine start switch to the OFF position. Do not turn off the battery disconnect switch while the "Lock Security?" screen is displayed on the monitor. Both conditions would prevent the Diesel Exhaust Fluid (DEF) system from being purged and could cause DEF fluid to freeze in the lines.

The battery disconnect switch and the engine start switch perform different functions. The entire electrical system is disabled when you turn the battery disconnect switch to the OFF position. The battery remains connected to the electrical system when you turn the engine start switch to the OFF position.

Turn the battery disconnect switch to the OFF position and remove the key when you service the electrical system or any other machine components. If installed with a cover lock (type 1), close the cover and install a padlock. If no cover lock is present (type 2), align holes on disconnect switch and install padlock.

Turn the battery disconnect switch to the OFF position and remove the key if you do not operate the machine for extended periods of a month or more. Turning off the disconnect switch will prevent the battery from being discharged.

A good practice is to use the disconnect switch after you operate the machine. Turning off the disconnect switch will prevent the battery from being discharged. The following problems can cause battery discharge:

- Short circuits
- Current draw via some components
- Vandalism

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2001/10/12 **Blade Operation (M0118365-11)**

SMCS - 6060

i01582993

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.

SMCS - 7000

i08530323

Digging

Illustration 1 g06212506

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

Illustration 2 g06212513

2. Position the bucket cutting edge at a 120 degree angle to the ground. Maximum breakout force can now be exerted with the bucket.

Illustration 3 g06222533

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

Illustration 4 g06222535

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

Illustration 5 g06222538

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

Illustration 6 g06223077

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

Illustration 7 g06223078

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

Lifting Objects

WARNING

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

NOTICE

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

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

Note: Regional regulations may require the use of an overload warning device and boom and stick lowering control valves during object handling applications.

Contact your Cat dealer for additional information.

Short slings will prevent excessive load swing.

Illustration 8 g06212526

Use the lifting eye that is provided on the linkage to lift objects.

If the lifting eye is used, the connection must be made with a sling or with a shackle.

Illustration 9 g06212532

An unstable condition can exist if a load exceeds the machine load rating or if a heavy load is swung over an end or over a side.

Illustration 10 g06212530

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

Illustration 11 g06212535

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

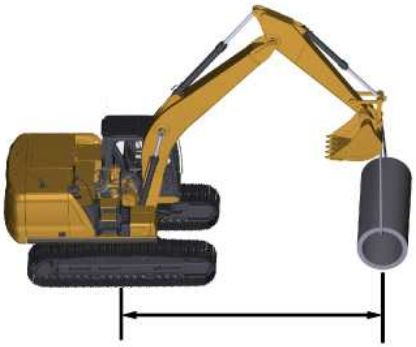

Illustration 12 g06212539

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

Machines that are Equipped with a Long Reach Configuration

Machines with a long reach configuration require larger swing drift than standard machines when stopping, because inertial force in time of swing is large. Taking this into account, adjustments are made in timing for applying the swing brakes and speed of swinging.

Machines with a long reach configuration could be damaged and stability of the machine would be adversely affected if a control was suddenly operated, because inertial force of work tool is large.

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2024/03/25 **Daily Inspection (M0118365-11)**

SMCS - 1000, 6319, 6700, 7000

i10021042

WARNING

Access to this service point may require climbing on the equipment. Slipping or falling while climbing on the equipment could result in personal injury or death. Refer to the Operation and Maintenance Manual, "Mounting and Dismounting" topic, for safety information.

WARNING

Crush Hazard!

Machine access doors can pinch, trap, or crush personnel when being closed.

Use caution while closing machine access doors. Ensure that all personnel are clear of the machine before closing the access doors.

WARNING

Personal injury or death can result from escaping fluid under pressure.

Escaping fluid under pressure, even a very small pin-hole size leak, can penetrate body tissue and cause 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.

Always use a board or cardboard when checking for a leak.

WARNING

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

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

Steam can cause personal injury.

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

Remove the cooling system pressure cap slowly to relieve pressure.
Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

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

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

Initial 100 Hours

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

- Operation and Maintenance Manual , "Blade Linkage - Lubricate"
- Operation and Maintenance Manual , "Boom and Stick Linkage - Lubricate"

Severe Applications

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

- Operation and Maintenance Manual , "Blade Linkage - Lubricate"

Daily Basis

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

- Operation and Maintenance Manual , "Bucket Linkage - Lubricate"
- Operation and Maintenance Manual , "Bucket Lifting Eye - Inspect"
- Operation and Maintenance Manual , "Cooling System Coolant Level - Check"
- Operation and Maintenance Manual , "Engine Air Filter Service Indicator - Inspect"
- Operation and Maintenance Manual , "Engine Oil Level - Check"
- Operation and Maintenance Manual , "Fuel System Water Separator - Drain"
- Operation and Maintenance Manual , "Fuel Tank Water and Sediment - Drain"
- Operation and Maintenance Manual , "Hydraulic System Oil Level - Check"

- Operation and Maintenance Manual , "Indicators and Gauges - Test"
- Operation and Maintenance Manual , "Quick Coupler - Lubricate"
- Operation and Maintenance Manual , "Seat Belt - Inspect"
- Operation and Maintenance Manual , "Thumb - Lubricate"
- Operation and Maintenance Manual , "Track Adjustment - Inspect"
- Operation and Maintenance Manual , "Travel Alarm - Test"
- Operation and Maintenance Manual , "Undercarriage - Check"

Refer to Operation and Maintenance Manual, "Maintenance Interval Schedule" for all maintenance recommendations.

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

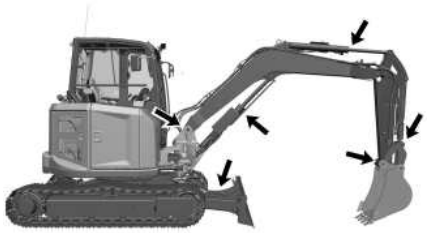

Illustration 1 g06779612
305 CR Excavator inspection points (cylinders)

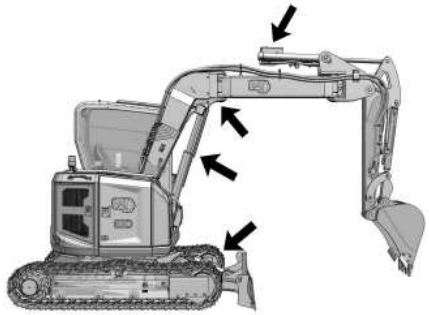

Illustration 2 g06779539
305 SR Excavator inspection points (cylinders)

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

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

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

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

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

Illustration 3 g06779613
305 CR Excavator inspection points (hydraulic system)

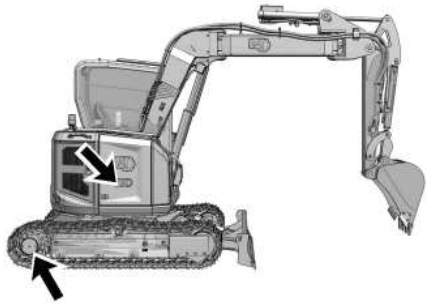

Illustration 4 g06779544
305 SR Excavator inspection points (hydraulic system)

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

Inspect the tubes and hoses along the boom and stick for wear and leaks. Replace any hoses or tubes that are worn or leak.

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

Inspect the swing drive for leaks.

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

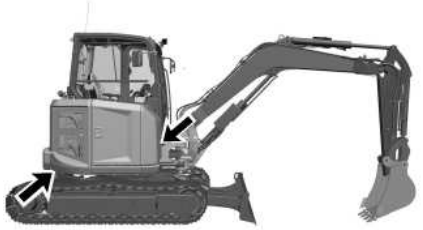

Illustration 5 g06779614
305 CR Excavator inspection points (covers and guards)

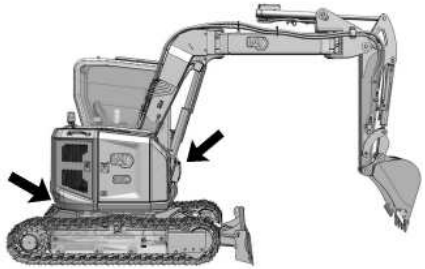

Illustration 6 g06779559
305 SR Excavator inspection points (covers and guards)

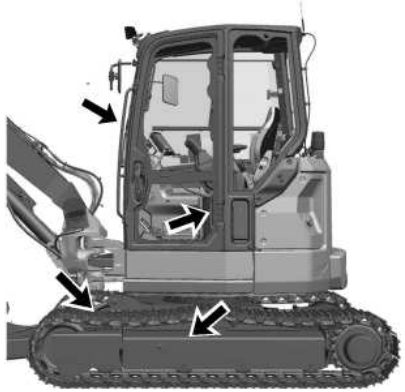

Illustration 7 g06779615
305 CR Excavator inspection points (walkways and handholds)

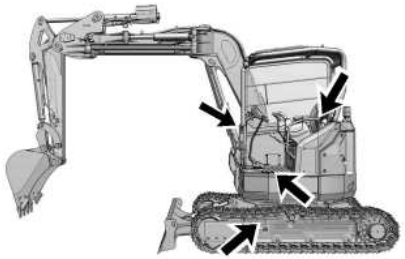

Illustration 8 g06779587
305 SR Excavator inspection points (walkways and handholds)

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

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

Adjust the mirrors to achieve the best visibility. Refer to Operation and Maintenance Manual , "Mirror" for more information.

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General Information

Regeneration is the removal of soot from the Diesel Particulate Filter (DPF). The DPF traps both soot and ash. Soot is removed during regeneration, but ash cannot be removed and will remain in the DPF. The DPF on the C1.7 engine has been sized such that an ash service will not be required before an engine overhaul under normal operating conditions.

Regeneration occurs when the temperatures in the DPF are favorable. This typically happens during normal running and no operator action is required. Low speed and load applications will have lower exhaust temperatures and continuous operation in these conditions may require changes in operation to allow regeneration to occur. There may be a slight change in the exhaust noise during an active regeneration. The regeneration may take between 15 and 45 minutes to complete. Normal operation can continue unless warnings indicate otherwise.

Note: When regeneration is required, the engine may automatically elevate the idle speed to 1200 RPM to improve regeneration conditions in the DPF. This is part of the normal operation and will only occur when hydraulic lockout control lever is in the LOCKED position.

Under certain conditions, the Diesel Particulate Filter Indicator may appear. This indicates that conditions have not been favorable for regeneration to occur under the current operation, and that a change in machine operation is needed. In this case, either increase the engine speed and load and avoid short durations of operation or place the hydraulic lockout control lever in theLOCKED position and allow the engine to elevate idle until the Diesel Particulate Filter Indicator Lamp has extinguished.

Note: In conditions where the Diesel Particulate Filter Indicator lamp has appeared, the engine will elevate idle to 2000 RPM when it safe to do so. This requires the hydraulic lockout control lever to be in theLOCKED position.

Note: Failure to allow the DPF to complete regeneration will lead to a reduction in engine performance and could lead to premature failure of the aftertreatment system.

Air Conditioning (AC) /Heater Fan - Elevated engine temperatures are required for regeneration. In colder ambient conditions, the AC/heater fan speed may be limited to as low as fan speed. Speed is reduced to reduce the amount of heat removal from the engine by the Heating, ventilation, and Air Conditioning heater core (HVAC heater core). This is to ensure that the engine maintains sufficient heat to complete the regeneration cycle. The fan speed reduction is variable and changes based on the ambient temperature and machine operating conditions.

Engine Emissions Notifications

1- Diesel Particulate Filter Lamp - This indicator appears on the Liquid Crystal Display (LCD) screen on the monitor.

2- Engine Malfunction Indicator - This indicator appears on the lower right side of the dash.

3- Action Lamp - This indicator appears on the center top position of the dash.

4- Action Audible Alarm - Repetitive alarm inside the cab.

Some conditions and applications may not provide favorable conditions in the DPF for regeneration to occur during normal operation. If regeneration has not been possible during normal operation, this will be indicated to the operator through the warning lamps shown.

Note: Additional pop-up messages may be displayed and will provide the operator with additional information or instructions.

Engine Emissions Notifications

Illustration 1 g06710763
(1) Diesel Particulate Filter Lamp

If the Diesel Particulate Filter Lamp (1) is illuminated and solid or flashing, then regeneration has been unable to be completed and action needs to be taken. If possible, operate at higher engine speed and load and avoid short periods of engine running. If this is not possible, place the machine in a safe location, place the hydraulic lockout control lever in the LOCKED position, and allow the engine to elevate speed to 2000 RPM until regeneration has been completed. When Diesel Particulate Filter Lamp has extinguished and engine speed has returned to idle, the machine can resume normal operation. Action should be taken at this stage to avoid increased escalation of the warning system.

Illustration 2 g06710764
(1) Diesel Particulate Filter Lamp
(2) Engine Malfunction Indicator
(3) Action Lamp

If a soot regeneration has not been completed successfully, and the soot level has increased further, the following lamps will be displayed. Diesel Particulate Filter Lamp (1) is illuminated and flashing, Engine Malfunction Indicator (2) is on solid and Action Lamp (3) is flashing. In this condition the operator must take action to protect the hardware and avoid a further increase in soot. Place the machine in a safe location, place the hydraulic lockout control lever in the LOCKED position, and allow the engine to elevate speed to 2000 RPM until regeneration has been completed. When warning lights have extinguished and engine speed has returned to idle, the machine can be operated again. Failure to do so will activate an engine power derate.

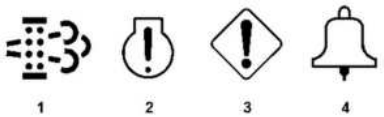

Illustration 3 g06710765

(1) Diesel Particulate Filter Lamp
(2) Engine Malfunction Indicator
(3) Action Lamp
(4) Audible Alarm

If the soot level continues to increase the following lamps will be displayed. Diesel Particulate Filter Lamp (1) is illuminated and flashing, Engine Malfunction Indicator (2) is solid, Action Lamp (3) is flashing and an Audible Alarm (4) is pulsing. In this condition regeneration of the DPF by the control software is no longer possible and a controlled regeneration by a Caterpillar Service Technician using a Caterpillar Electronic Technician Software tool will be required. In this state, park the machine in a safe condition and contact your Caterpillar Dealer for troubleshooting in order to return the machine to an operational condition.

Note: Failure to do so will result in a significant reduction in engine performance and may lead to permanent damage to the aftertreatment system.

Engine Emission Alert

The following chart describes the alert indicators and actions the operator needs to perform to allow an active regeneration.

Table 1

Warning Symbol	Machine Action	Operator Action
No Lights	Regeneration process will begin automatically when required with no impact to machine functionality. A change in the engine and hydraulic noise signatures may be noted.	No action required.
Diesel Particulate Filter Lamp (1) - Solid/Flashing	The regeneration process will continue, though higher speeds and/or loads are required. Engine speed may elevate to 2000 rpm when the arm bar is raised.	Increase the throttle dial to high idle if possible, otherwise park the machine in a safe location, raise the arm bar and allow the engine to elevate idle.
Diesel Particulate Filter Lamp (1) - Flashing	The engine has been unable to successfully regenerate during operation. A ramping engine power derate will be applied until a regeneration completes successfully.	Park the machine in a safe location, raise the arm bar and allow the engine to elevate idle.
Engine Malfunction Indicator (2) - Solid		
Action Lamp (3) - Flashing		
Diesel Particulate Filter Lamp (1) - Flashing	An engine power derate will be applied. Regeneration can only be done through Cat® Electronic Technician (ET), by an authorized Cat® dealer.	Consult your local Cat® dealer. If the engine is run through these warning indicators, the DPF will require servicing and may require replacement.
Engine Malfunction Indicator (2) - Solid		
Action Lamp (3) - Flashing		
Audible Alarm (4) - Audible Alarm		

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.

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SMCS - 1000, 7000

i08330438

NOTICE

Always run the engine at low idle for at least ten minutes before performing any other operations in cold conditions or each time the engine oil and oil filter are changed in order to protect your engine and hydraulic components.

NOTICE

Depending on the ambient temperature, in order to prevent the machine operation with high speed without sufficient lubrication at the turbo bearing, the engine speed may be set to low speed and the hydraulic power minimized for a pre-determined time after the engine starts. Refer to turbo protection feature.

To accelerate engine and hydraulic warmup in cold ambient temperature or high altitude for an extended time, the engine may automatically change speeds when the machine is stationary and the implements are LOCKED. During this warmup the hydraulic system will activate a warmup process that will cause hydraulic oil to flow through the valve to heat the hydraulic system. All accelerated warmup processes are automatic and will disable when the machine has warmed or the operator places the implements in the UNLOCKED position.

Hydraulic System

WARNING

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

---

1. Make sure that the area is clear of personnel and equipment.
   Note: The hydraulic lockout control must be in the UNLOCKED position before the hydraulic controls will function.

2. Allow the engine to warmup at low idle for at least 5 minutes.
   Note: Leave the implements LOCKED during this warmup process.

   When you idle the machine for warmup, observe the following recommendations:

   - If the temperature is greater than 0°C (32°F), warm up the engine for approximately 15 minutes.

- If the temperature is less than 0°C (32°F), warm up the engine for approximately 30 minutes.
- If the temperature is less than − 18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

NOTICE

The hydraulic oil temperature should be higher than 25 °C (77 °F) before performing work with the machine. Make sure that the warm-up procedure is performed.

If the hydraulic oil temperature is less than 25 °C (77 °F) and the machine is operated abruptly, serious damage to the hydraulic components may occur.

Note: The recommended operating temperature of the hydraulic fluid for this machine is 55 °C (131 °F).

3. To warmup the hydraulic oil, turn the engine speed dial to the medium engine speed.
4. Run the engine for approximately 5 minutes and continually cycle the stick from fully extended to fully retracted at maximum command.
5. Turn the engine speed dial to the maximum engine speed and repeat Step 4.
6. Cycle all controls to circulate warm oil through all hydraulic cylinders and all hydraulic lines, and through the swing motor and travel motors.
7. Observe the gauges and the indicators frequently during the operation.

Turbo Protection

Turbo Protection Power Derate - After an engine start, the engine speed will be set to low speed and the hydraulic power limited for a time period. To protect the turbo, the engine speed may be slow to respond while the engine warms (maximum time to engine speed changes is 5 minutes). After the turbo bearing lubrication is sufficient, the engine speed goes to the setting dial speed.

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2022/04/11 **Engine Starting with Jump Start Cables - If Equipped (M0118365-11)**

SMCS - 1000, 7000

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WARNING

Batteries give off flammable fumes which can explode.

To avoid injury or death, do not strike a match, cause a spark, or smoke in the vicinity of a battery.

WARNING

Failure to properly service the batteries may cause personal injury.

Prevent sparks near the batteries. They could cause vapors to explode. Do not allow the jump start cable ends to contact each other or the machine.

Do not smoke when checking battery electrolyte levels.

Electrolyte is an acid and can cause personal injury if it contacts skin or eyes.

Always wear eye protection when starting a machine with jump start cables.

Improper jump start procedures can cause an explosion resulting in personal injury.

Always connect the battery positive (+) to battery positive (+) and the battery negative (−) to battery negative (−).

Jump start only with an energy source with the same voltage as the stalled machine.

Turn off all lights and accessories on the stalled machine. Otherwise, they will operate when the energy source is connected.

WARNING

Crush Hazard!

Machine access doors can pinch, trap, or crush personnel when being closed.

Use caution while closing machine access doors. Ensure that all personnel are clear of the machine before closing the access doors.

NOTICE
When starting from another machine, make sure that the machines do not touch. This could prevent damage to engine bearings and electrical circuits.

Turn on (close) the battery disconnect switch prior to the boost connection to prevent damage to electrical components on the stalled machine.

Severely discharged maintenance free batteries do not fully recharge from the alternator after jump starting. The batteries must be charged to proper voltage with a battery charger. Many batteries thought to be unusable are still rechargeable.

This machine has a 12 volt starting system. Use only the same voltage for jump starting. Use of a welder or higher voltage damages the electrical system.

Refer to Special Instruction, Battery Test Procedure, SEHS7633, available from your Caterpillar dealer, for complete testing and charging information.

NOTICE
Do not allow positive cable clamps to contact any metal except for battery terminals.

Prepare the machine for maintenance. Refer to Prepare the Machine for Maintenance for more information.

1. Move all controls to the HOLD position in stalled machine. Move the hydraulic lockout control to the LOCKED position in stalled machine. Refer to Operator Controls for more information.
2. Turn the engine start switch on the stalled machine to the OFF position. Refer to Operator Controls for more information.
3. Turn the battery disconnect switch on the stalled machine to the ON position. Refer to Battery Disconnect Switch for more information.
4. Move the machine that is being used as an electrical source near the stalled machine so that the jump-start cables reach the stalled machine. **Do not allow the machines to contact each other.**
5. Stop the engine of the machine that is being used as an electrical source. Refer to Stopping the Engine for more information.

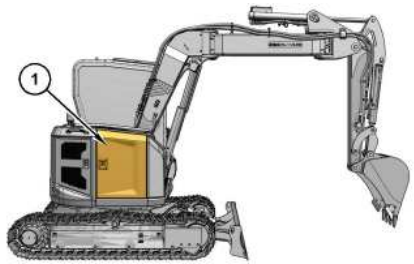

Illustration 1 g06780429
(1) Access door

6. Open access door (1) on right side of the machine. Refer to Access Door and Cover Locations for more information.

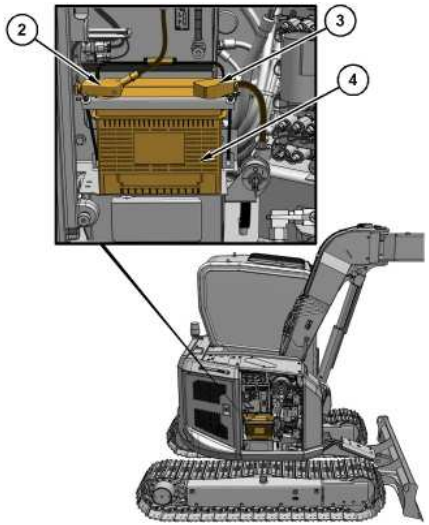

Illustration 2 g06780437
Some components removed for better clarity
(2) Positive terminal (connects to starter)
(3) Negative terminal (connects to battery disconnect switch)
(4) Battery

7. Ensure that battery caps on both machines are tight and correctly placed. Ensure that battery (4) in the stalled machine are not frozen. Make sure that battery (4) in stalled machine and battery (4) in source machine have enough electrolyte.
Note: Positive terminal (2) of the 12 V system of the source machine and negative terminal (3) of the 12 V system of the source machine must be identified correctly before the jumper cables are connected. Positive terminal (2) of the 12 V system of discharged battery (4) must be identified correctly before the jumper cables are connected.

8. The positive ends of the jump-start cable are red. Connect one positive end of the jump-start cable to positive terminal (3) of discharged battery (4) in stalled machine. Some machines have battery sets.
Note: Batteries that are in series may be in separate compartments. Positive terminal (2) of battery (4) is connected to starter solenoid.

   Do not allow the positive cable clamps to contact any metal except for the battery terminals.

9. Connect the other positive end of the jump-start cable to positive terminal (2) in battery (4) of source machine.

10. Connect one negative end of the jump-start cable to negative terminal (3) in battery (4) of source machine.
11. Finally, connect the other negative end of the jump-start cable to the frame of the stalled machine. Do not connect the jump-start cable to the battery post. Do not allow the jump-start cables to contact the battery cables, the fuel lines, the hydraulic lines, or any moving parts.
12. Start the engine of the source machine. Refer to Engine Starting for more information.
13. Wait at least 2 minutes before you attempt to start the stalled machine. This pause will allow battery (4) in the stalled machine to charge partially.
14. Attempt to start the stalled engine. Refer to Engine Starting for more information.
15. Immediately after you start the stalled engine, disconnect the jump-start cables in reverse order.
16. Close access door (1) on right side of the machine. Refer to Access Door and Cover Locations for more information.

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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 until the glow plug lamp on the display turns OFF to preheat the glow plugs.
   Note: It is not necessary to preheat the glow plugs on a warm engine.
4. All 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.
5. Before you start the engine, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the horn before you start the engine.

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.

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

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

8. If the engine does not start, turn the key to the OFF position. Repeat step 6 and step 7.

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Machines without a Boom Lowering Control Valve

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

If the boom does not lower, the accumulator has been depleted. 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.

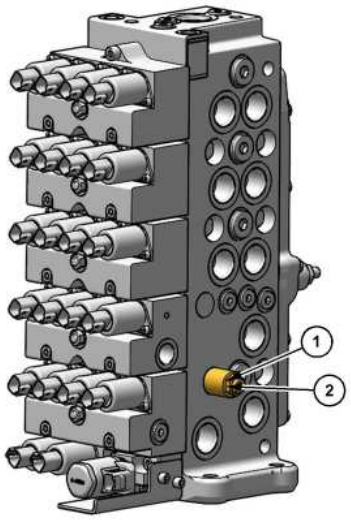

Illustration 1 g06711426
(1) Locknut
(2) Valve

1. Open the access door on the right side of the machine.
2. While holding valve (2), loosen lock nut (1).
3. Slowly turn boom manual lowering valve (2) to lower the boom.
4. Make sure that the work tool has lowered all the way to the ground. Tighten boom manual lowering valve (2) and lock nut (1).
5. Make the necessary repairs before you operate the machine.
6. Close the access door.

Machines with a Boom Lowering Control Valve

If the engine or the hydraulic system is disabled and the boom is up, the boom can be lowered manually. The boom lowering control valve allows the boom to be manually lowered. The boom lowering control valve is on the head end port on the boom cylinder. Use the following procedure if the machine is equipped with a boom lowering control valve:

WARNING

Boom load may cause cylinder oil pressure to reach relief pressure of the boom lowering control device when the boom is supported by one cylinder. Boom can lower suddenly, causing possible injury or death.

To avoid possible injury or death, be sure no one is under or near the work tool before manually lowering the boom. Keep all personnel away from the boom drop area when lowering the boom with the engine stopped.

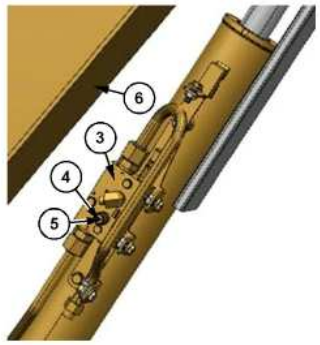

Illustration 2 g06711430
(3) Boom lowering control valve
(4) Locknut
(5) Set screw
(6) Boom

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

1. Release the pressure in the hydraulic system. Refer to Operation and Maintenance Manual , "System Pressure Release" for instructions.
2. Loosen locknut (4).
3. Slowly, turn set screw (5) counterclockwise until the boom begins to lower onto the ground.
   Note: Once the boom begins to lower, stop turning set screw (5).
4. After the boom has lowered completely onto the ground, turn set screw (5) back to the original position.
5. Tighten locknut (4).
6. Make any necessary repairs before placing the excavator back into service.
   Note: For further information, consult your Cat dealer.

Blade (If Equipped)

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

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

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

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2018/03/06 **Final Drive Sun Gear Removal (M0118365-11)**

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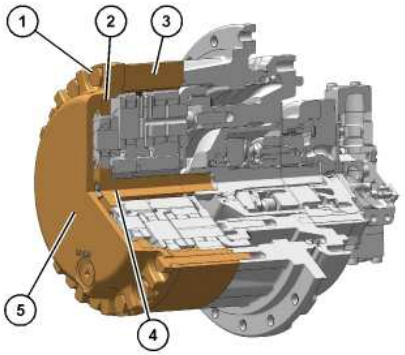

Illustration 1 g06188195
(1) Bolt
(2) Ring gear
(3) Ring gear
(4) Sun gear
(5) Final drive cover

WARNING

Without the sun gear in place, the brakes are ineffective. Personal injury or death could result. Provide other means to hold or stop the machine.

1. Thoroughly clean the area around the final drive. Make sure that you also clean the track shoes that are positioned above the final drive.
   Note: Refer to Operation and Maintenance Manual, "General Hazard Information" for information on containing fluid spillage.
2. Drain the final drive oil into a suitable container. See Operation and Maintenance Manual, "Final Drive Oil - Change" for the procedure.
3. Remove 14 of 16 cover bolts (1) from final drive cover (5). Do not leave a bolt in the top hole of the cover.
4. Insert an alignment dowel through the top hole of the cover and into the threads in the final drive housing. This is necessary to support ring gear (2) and ring gear (3) while you are removing the final drive cover.
5. Remove one track shoe to allow access to the face between final drive cover (5) and ring gear (2).
6. Loosen remaining two cover bolts (1).
7. Use a hammer and a wedge to separate final drive cover (5) and ring gear (2). Make sure that ring gear (2) and ring gear (3) stay in place.
8. Remove remaining two cover bolts (1) and final drive cover (5).

9. Remove sun gear (4) from final drive.
10. Install final drive cover (5) and 16 cover bolts (1).
11. Fill the final drive with new oil. See Operation and Maintenance Manual, "Final Drive Oil - Change" for the procedure.
12. Repeat Steps 1 through 11 for the other final drive.
13. Refer to the Service Manual for information on the installation of the final drive sun gear.

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2018/03/06 **Freezing Conditions (M0118365-11)**

SMCS - 7000

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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 1 g06188791

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

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WARNING

If the Front Control System does not function as described in the Operation and Maintenance Manual, stop machine operation with the system ON. Unexpected machine motion could result in serious injury or death. Contact your Caterpillar Dealer for repair instructions.

WARNING

The Front Control System is calibrated with the installed boom, stick, bucket or worktool. Any machine configuration change could result in unexpected machine motion which could result in serious injury or death. Contact your Caterpillar dealer for calibration instructions.

WARNING

Stop any operation when the system shows any abnormity, and report it to Cat dealer.

If you continue operation with abnormal condition, critical incidents or fatal accident can happen.

Do not remove or disassemble the control devices, position sensors, or wires.

After replacing attachments, stick, or boom, the function may not function properly. Consult Cat dealers.

If larger bucket than standard bucket is used, it can hit cab.

When replacing bucket, consult Cat dealer.

When position center for front equipment is soaked in water, or when it is hit, and if you find any damage on it, perform operation check of front control device.

Note: The front control system will work only with the factory installed Swing Reach (SR) bucket with extension edge or with appropriate hammer. To activate the cab avoidance feature, select the appropriate work tool by using the monitor. Refer to Monitoring System for more information.

The machine is equipped with front linkage control device, which secure operators safety, as an additional device.

The front linkage control device consists of four functions.

- Cab avoidance (stop/interference prevention) feature
- Display of distance
- Cylinder rod end cushion
- Self-Diagnostic, Service function

Cab Avoidance Feature

WARNING

The Front Control System is an aid for operation of the standard control system. Even with the Front Control System enabled, the operator must ensure that the work tool/bucket does not contact the cab or other obstacles. Unexpected work tool/bucket contact could result in serious injury or death.

WARNING

Perform operational inspection to the system before using the machine. Critical accidents can occur if the machine is operated with unhealthy conditions.

Do not operate the machine relying only on the collision prevention system.

If some abnormality is found, immediately lower the work tool and stop operation. And consult Cat dealer.

Note: The cab avoidance feature does not stop the attachment at a constant position every time. The cab avoidance feature depends on hydraulic oil temperature and operation.

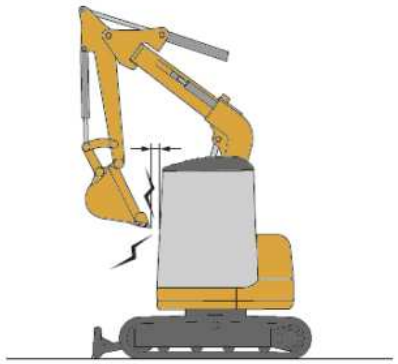

Illustration 1 g06334865

When the stick or boom is retracted and boom is offset to the left, cab avoidance feature stops the front linkage or moves the linkage so interference to the cab is prevented.

Note: The system does not prevent the linkage from hitting blade and tracks.

Boom, Stick, or Offset boom Slow Down/Stop Boundary, Countermove Boundary

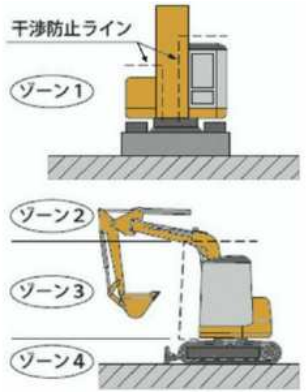

Illustration 2 g06644620

When boom, stick or offset boom is operated, when the work tool approaches to the interference prevention boundary in zone 1, 2, 3, or 4, audible warning comes out and boom, stick, or offset boom slows down or stops.

The slow-down of the boom, stick, or offset boom reduces shock when stopping.

When boom or offset boom commands cause the work tool to approach the interference prevention boundary, the control system may automatically command a stick out function to prevent interference from occurring.

Note: Automatic stick out commands will only occur if there are not active stick commands.

Auto Stop

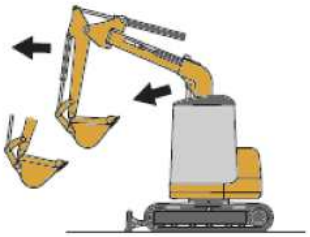

Illustration 3 g06334874

When the cab avoidance feature activates the boom, stick or offset boom operation may be temporarily inhibited to prevent interference with the cab or machine.

If the work tool is moved away from the interference zone, operation returns to normal.

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2018/03/06 **Frozen Ground Conditions (M0118365-11)**

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Illustration 1 g06278746

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.

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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.

Note: Joystick Controls Alternate Patterns are not available when the joystick steer mode is ON.

To access the pattern changer screen, press the "Menu" button, select "Machine Settings", "Control Mode", then "Pattern Changer".

The Joystick-Mapping Installation Status configuration must be set to installed in Cat® Electronic Technician (ET) and the Pattern Changer must be configured as Enabled in the display for the Pattern Changer to be available. Then modifying the Machine Application Configuration and the Joystick Mapping Group Selection in Cat ET will impact the available patterns as summarized below.

When the Machine Application Configuration is set to Standard and the Joystick Mapping Group Selection is configured as Two Way, the following pattern changer selections are available:

- Excavator
- Backhoe

When the Machine Application Configuration is set to Inside Japan (ISJ) Common and the Joystick Mapping Group Selection is configured as Disabled or Two Way, the following pattern changer selections are available:

- Excavator
- SCM

When the Machine Application Configuration is set to Standard or ISJ Common and the Joystick Mapping Group Selection is configured as Four Way, the following pattern changer selections are available:

- Excavator
- "SCM"
- "MHI"
- "KOB"

Backhoe Joystick Pattern

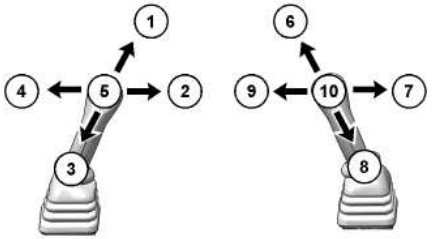

Illustration 1 g06349078

BOOM LOWER (1) - Move the joystick to this position to lower the boom.

SWING RIGHT (2) - Move the joystick to this position to swing the upper structure to the right.

BOOM RAISE (3) - Move the joystick to this position to raise the boom.

SWING LEFT (4) - Move the joystick to this position to swing the upper structure to the left.

HOLD (5) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

STICK OUT (6) - Move the joystick to this position to move the stick outward.

BUCKET DUMP (7) - Move the joystick to this position to dump the bucket or the work tool.

STICK IN (8) - Move the joystick to this position to move the stick inward.

BUCKET CLOSE (9) - Move the joystick to this position to close the bucket or the work tool.

HOLD (10) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

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

SCM Joystick Pattern

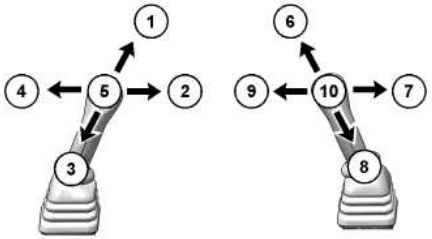

Illustration 2 g06349078

SWING RIGHT (1) - Move the joystick to this position to swing the upper structure to the right.

STICK IN (2) - Move the joystick to this position to move the stick inward.

SWING LEFT (3) - Move the joystick to this position to swing the upper structure to the left.

STICK OUT (4) - Move the joystick to this position to move the stick outward.

HOLD (5) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

BOOM LOWER (6) - Move the joystick to this position to lower the boom.

BUCKET DUMP (7) - Move the joystick to this position to dump the bucket or the work tool.

BOOM RAISE (8) - Move the joystick to this position to raise the boom.

BUCKET CLOSE (9) - Move the joystick to this position to close the bucket or the work tool.

HOLD (10) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

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

"MHI" (Mitsubishi) Joystick Pattern

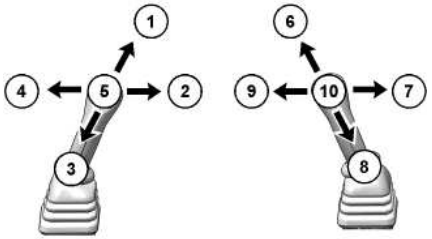

Illustration 3 g06349078

BOOM LOWER (1) - Move the joystick to this position to lower the boom.

BUCKET CLOSE (2) - Move the joystick to this position to close the bucket or the work tool.

BOOM RAISE (3) - Move the joystick to this position to raise the boom.

BUCKET DUMP (4) - Move the joystick to this position to dump the bucket or the work tool.

HOLD (5) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

STICK IN (6) - Move the joystick to this position to move the stick inward.

SWING RIGHT (7) - Move the joystick to this position to swing the upper structure to the right.

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

SWING LEFT (9) - Move the joystick to this position to swing the upper structure to the left.

HOLD (10) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

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

"KOB" (Shin-Ko) Joystick Pattern

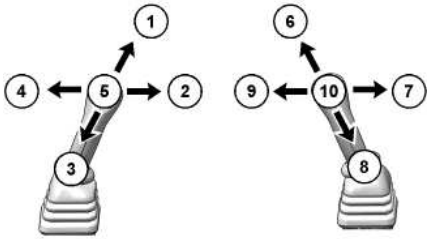

Illustration 4 g06349078

BOOM LOWER (1) - Move the joystick to this position to lower the boom.

BUCKET CLOSE (2) - Move the joystick to this position to close the bucket or the work tool.

BOOM RAISE (3) - Move the joystick to this position to raise the boom.

BUCKET DUMP (4) - Move the joystick to this position to dump the bucket or the work tool.

HOLD (5) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

STICK OUT (6) - Move the joystick to this position to move the stick outward.

SWING RIGHT (7) - Move the joystick to this position to swing the upper structure to the right.

STICK IN (8) - Move the joystick to this position to move the stick inward.

SWING LEFT (9) - Move the joystick to this position to swing the upper structure to the left.

HOLD (10) - When you release the joystick from any position, the joystick will return to the HOLD position. Movement of the structure will stop.

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

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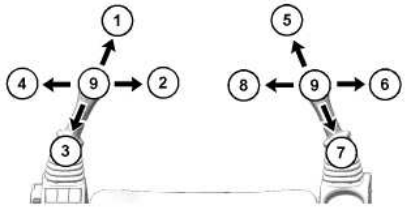

Illustration 1 g06180324

(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

When you release the joysticks from any position, the joysticks will return to HOLD position (9). Movement of the upper structure will stop.

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 excavator pattern, 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 Joystick Controls Alternate Patterns for more information.

Joystick Configurations

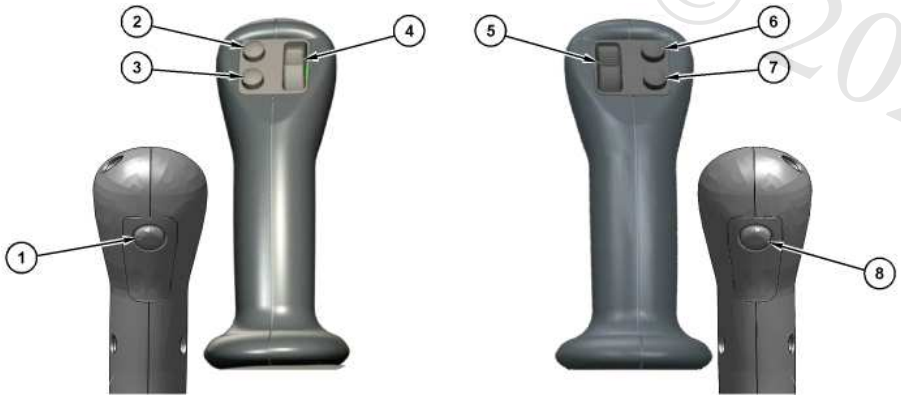

Illustration 2 g06285624
Vertical Slider Joystick Controls
(1) Left joystick trigger switch
(2) Left joystick switch 1
(3) Left joystick switch 2
(4) Left joystick thumbwheel
(5) Right joystick thumbwheel
(6) Right joystick switch 1
(7) Right joystick switch 2
(8) Right joystick trigger switch

Table 1

Joystick Configurations		
Switch Location	**Machine Configuration**	
	Joystick Steering Mode OFF	**Joystick Steering Mode ON**
1	Inactive	Cruise Control
2	Boom Swing or Boom Offset/ Aux 2 Select	House Swing / Aux 2 Select
3	Joystick Steering Mode On/Off	Joystick Steering Mode On/Off
4	Boom Swing or Boom Offset/ Aux 2 Flow Control	House Swing / Aux 2 Flow Control
5	Aux 1 Flow Control	Aux 1 Flow Control / Stick Control (Configurable)
6	Horn	Horn
7	Travel Speed	Travel Speed
8	Inactive	Inactive / Blade Float / Thumbwheel (5) toggle
Left Joystick	Stick / Swing	Travel
Right Joystick	Boom / Bucket	Boom / Bucket / Blade (Configurable)

Note: Joystick controls alternate patterns are not available when joystick steer mode is ON. Blade control on right joystick when "joystick steering mode" ONisnot available on machines equipped with shovel crane.

Left Joystick Controls

Trigger Switch (1)

Button (1) will only function in Joystick Steering Mode . When in Joystick Steering Mode this button activates cruise control. Cruise control maintains forward or reverse ground speed when the joystick is in the hold position.

Cruise control is available using the Monitor (see "Monitoring System" for details). Cruise control must first be enabled using the monitoring system.

WARNING

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

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.

Cruise control is disabled by any of the following:

- moving the left joystick forward or reverse after placing the joystick in the hold position.
- pressing button (1).
- moving the travel pedals.
- pressing button (3).
- hydraulic lockout control lever is raised to the lockout position.

Boom Swing or Boom Offset/ 2nd Auxiliary Button (2)

Button (2) will determine which function thumb wheel (4) controls.

The default setting of thumb wheel (4) is boom swing function.

Joystick Steering Mode Button (3)

Push button (3) to activate Joystick Steering Mode, then press the confirmation button on the monitoring system using the jog dial or touch screen (if equipped). The confirmation process must be completed after every key cycle of the machine.

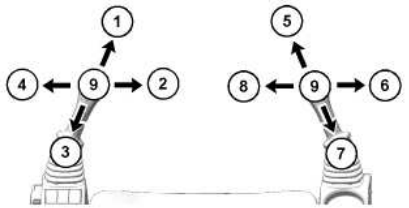

Illustration 3 g06180324
Joystick Steering Pattern A
(1) TRAVEL FORWARD
(2) COUNTER-ROTATE CLOCKWISE
(3) TRAVEL REVERSE
(4) COUNTER-ROTATE COUNTERCLOCKWISE
(5) BOOM LOWER
(6) BUCKET DUMP
(7) BOOM RAISE
(8) BUCKET CLOSE
(9) HOLD

Once activated, the joystick steering light will illuminate as defined in the “Monitor System” section. The left joystick functionality is modified as shown in Illustration 3. This control pattern is identified as Joystick Steering Pattern A.

Note: Refer to Table 1 for additional control changes.

In Joystick Steering Mode, machine swing is available on the left thumb roller in place of boom swing (if equipped). Machine swing and aux 2 (if equipped) can toggle function control on the left thumbwheel while in Joystick Steering Mode.

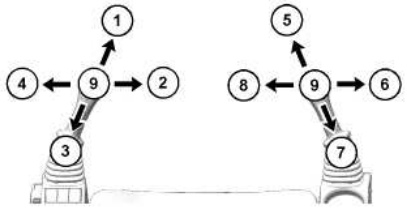

Illustration 4 g06180324
Joystick Steering Pattern B
(1) TRAVEL FORWARD
(2) COUNTER-ROTATE CLOCKWISE
(3) TRAVEL REVERSE
(4) COUNTER-ROTATE COUNTERCLOCKWISE
(5) BLADE LOWER
(6) BLADE TILT CLOCKWISE
(7) BLADE RAISE
(8) BLADE TILT COUNTERCLOCKWISE
(9) HOLD

While in Joystick Steering Mode, changing an alternate control pattern for the right joystick is possible. This pattern is identified as joystick steering pattern B. The following image details the control of the machine using blade control on the right joystick lever.

To change the joystick steering pattern between A and B, press the "Menu" button, select "Machine Settings", "Control Mode", "Joystick Steering Pattern". Excavator (pattern A) or Blade (pattern B) can be selected.

While in joystick steering mode with pattern B, the blade can be placed into float by moving the right joystick FORWARD and then pressing the right joystick trigger switch (8) while the right joystick is still FORWARD. The blade will remain in float after returning the right joystick to the HOLD position. Pressing the right joystick trigger switch again, moving the right joystick out of HOLD or moving the dozer blade lever out of HOLD will disable blade float.

Note: Joystick steer pattern B is not available on machines equipped with shovel crane.

Advanced Joystick Steering Mode: An advanced control pattern is available in Joystick Steering Mode using the service mode of the display (see “Monitoring System – Thumbwheel Mode” for setup details). When Thumbwheel Mode is set to enabled and Joystick Steering Pattern A is selected, the trigger on the right joystick can allow for toggling between aux 1 and stick function on the right joystick thumbwheel.

Boom Swing or Boom Offset/ 2nd Auxiliary Flow Control (4)

If thumb wheel (4) is changed to second auxiliary control, the thumb wheel is used to operate work tools such as a grapple. Refer to Work Tool Control for more information.

The boom swing or offset control is used to swing the boom to the right or to the left.

Swing or Offset Left - Pull downward on the left thumbwheel to swing or offset the boom to the LEFT.

Swing or Offset Right - Push upward on the left thumbwheel to swing or offset the boom to the RIGHT.

Note: Operate the boom swing thumbwheel carefully until you become familiar with how boom swing reacts to the controls.

Right Joystick Controls

Note: If the machine is equipped with shovel crane, the right joystick will always control the boom/bucket when joystick steer is ACTIVE. Joystick steer pattern B is not available on machines equipped with shovel crane.

Primary Auxiliary Control (5)

The primary auxiliary control thumb wheel is used to control the work tools. For more information on the auxiliary controls, refer to Work Tool Control .

This thumbwheel can be toggled to activate the stick using button (8) while in Joystick Steering Mode if right joystick is configured to Boom/Bucket.

Horn (6)

Horn (6) - The horn button is on the right side joystick. Depress the horn button to sound the horn. Use the horn before starting the engine, or for alerting or signaling personnel.

Travel Speed Control (7)

Depress the travel speed button to change between low and high travel speed. When high travel speed is selected, the high-speed indicator will illuminate on the monitor.

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2018/03/06 **Leaving the Machine (M0118365-11)**

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Illustration 1 g06278943

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.

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WARNING

Improper lifting and tie-down techniques can allow the load to shift or fail resulting in personal injury or property damage. Use only properly rated cables and slings with lift and tie down points provided on the machine. Keep the deck of the transport vehicle clean and use anti-slip mats on steel decks.

Follow the instructions in Operation and Maintenance Manual, "Lifting and Tying Down the Machine" for the proper technique for securing the machine. Refer to Operation and Maintenance Manual, "Specifications" for specific weight information.

Positioning the Machine for Lifting

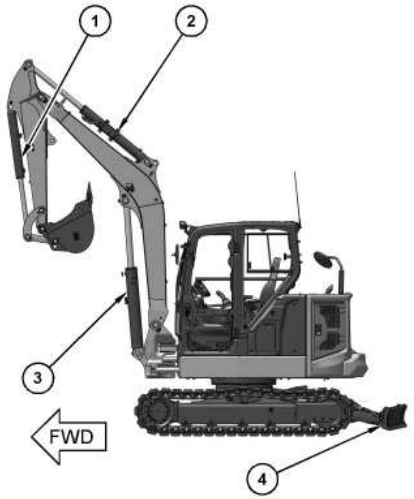

Illustration 1 g06702275
(1) Work tool cylinder
(2) Stick cylinder
(3) Boom cylinder
(4) Blade

1. Raise blade (4) from ground surface and swing the upper structure so blade (4) is to the rear of the machine.

2. Position the boom in a straight ahead position. Refer to Illustration 1 for position of boom.

3. Retract boom cylinder (3), extend stick cylinder (2), and extend work tool cylinder (1) to the end of the stroke.
4. Engage the parking brake in the machine. Refer to Stopping the Machine for more information.
5. Stop the engine. Refer to Stopping the Engine for more information.
6. Raise the hydraulic lockout control. Refer to Operator Controls for more information.
7. Dismount the machine and lock the cab door. Refer to Mounting and Dismounting for more information.

Lifting the Machine

Lifting Point - To lift the machine, attach the lifting devices to the lifting points.

Note: The exact position of each lifting point may vary slightly by model. Only utilize locations identified with lifting point films. Do not use any other locations including handles, steps, or work tools to lift the machine.

When lifting the machine, use properly rated cables and properly rated slings to lift the machine. Utilize a spreader bar sufficient in size to prevent the lifting cables or lifting straps from contacting the machine.

Note: The machine shipping weight that is listed in Specifications is the weight of the most common configuration of the machine. If attachments have been installed on the machine, the weight of machine and the center of gravity of machine may vary.

Note: Ensure that the undercarriage is fully expanded before lifting the machine. Ensure that an empty standard bucket is installed on the machine.

Note: Obey all local and regional governmental regulations.

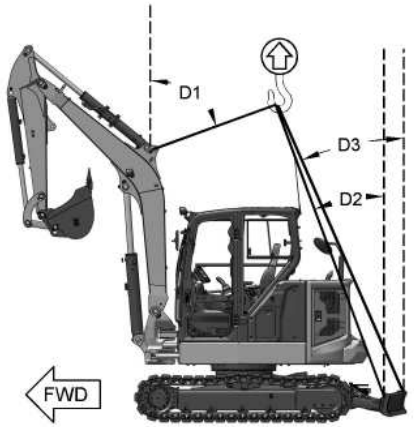

Illustration 2 g06702284
Lifting the machine
(D1) Sling angle with the boom
(D2) Sling angle with left side of the blade
(D3) Sling angle with right side of the blade

Table 1

Lifting Attachment Point	Sling Angle	Proof Load Value	Braking Load Value
Boom (D1)	37.37 degrees	39808.7 N (8949.35 lb)	106156.4 N (23864.91 lb)
Left Side of Blade (D2)	24.37 degrees	34731.9 N (7808.04 lb)	92618.4 N (20821.44 lb)
Right Side of Blade (D3)	24.83 degrees	34859.7 N (7836.81 lb)	92959.2 N (20898.06 lb)

1. Refer to Table 1 for cable capacities and cable orientations limits.
2. Remove any structures that may obstruct the lifting cable routing between the lifting points and spreader bar.
   Position the crane or lifting device to lift the machine in a level position.

   Do not allow any personnel in the area around the machine.
3. Attach one lifting cable to the boom of the machine. There is one lifting eye on each side of the boom of the machine. Refer to Illustration 2.
4. Attach two lifting cables to the blade of the machine. There is one eye on each side of the blade of the machine. Refer to Illustration 2.
5. If equipped, secure any attachments. Refer to Work Tools for more information.
6. Lift the machine. Move the machine to the desired position.
7. When the machine is positioned, place the blocks behind the undercarriage.

Lifting the 305 SR Excavator Machine

Lifting Point - To lift the machine, attach the lifting devices to the lifting points.

Note: The exact position of each lifting point may vary slightly by model. Only utilize locations identified with lifting point films. Do not use any other locations including handles, steps, or work tools to lift the machine.

When lifting the machine, use properly rated cables and properly rated slings to lift the machine.

Note: The machine shipping weight that is listed in Specifications is the weight of the most common configuration of the machine. If attachments have been installed on the machine, the weight of machine and the center of gravity of machine may vary.

Note: Ensure that the undercarriage is fully expanded before lifting the machine. Ensure that an empty standard bucket is installed on the machine.

Note: Obey all local and regional governmental regulations.

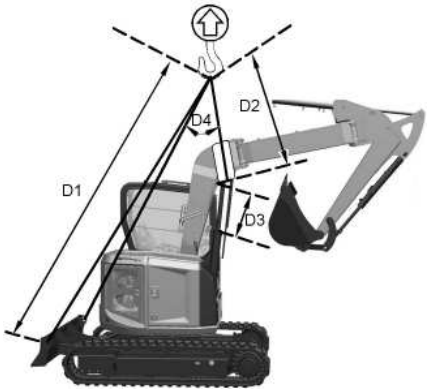

Illustration 3 g07567592
Lifting the machine
(D1) Sling length between lifting point and blade
(D2) Sling angle between lifting point cushion material
(D3) Sling length of stick cylinder stroke
(D4) Sling angle with the boom

Table 2

Dimension	Specification
(D1)	4300 mm (169.3 inch)
(D2)	2000 mm (78.7 inch)
(D3)	740 ± 10 mm (29.1 ± 0.4 inch)
(D4)	40 degrees

1. Refer to Table 2 for cable capacities and cable orientations limits.
2. Refer to Illustration 3 below for the length/ angle of cables and boom position
3. Remove any structures that may obstruct the lifting cable routing between the lifting points and spreader bar. Position the crane or lifting device to lift the machine in a level position. Do not allow any personnel in the area around the machine.
4. Put fabric cushion material on the boom not to damage the machine or sling belt. Attach one lifting cable to the cushion material on the boom of the machine. Refer to Illustration 3.
5. Attach two lifting cables to the blade of the machine. There is one eye on each side of the blade of the machine. Refer to the Illustration 3.
6. If equipped, secure any attachments. Refer to Work Tools for more information.
7. When the machine is positioned, place the blocks behind the undercarriage

Tying Down the Machine

Tie Down Point - To tie down the machine, attach the tie-downs to the tie-down points.

There may be more than one way to tie down the machine. Local regulations should be used to determine the best method. Obey all local and regional governmental regulations.

Note: Use only the specified location for tying down the machine. The locations are identified on the machine by a label depicting a tie-down symbol. Do not use any other location including handles, steps, or work tools to tie down the machine.

Secure the machine at the tie-down positions. Use properly rated cables and shackles for tying down the machine. The cables and shackles should not come in contact with the machine. When necessary, use a clevis or corner protection to prevent contact with sharp edges. Install tie downs at all specified positions for your machine.

Note: The machine shipping weight that is listed is the weight of the most common configuration of the machine. If attachments have been installed on machine, the weight of the machine and the center of gravity of machine may vary. Refer to Specifications for the dimensions and weight of the machine.

Note: Do not allow anyone in the machine during the transport of the machine.

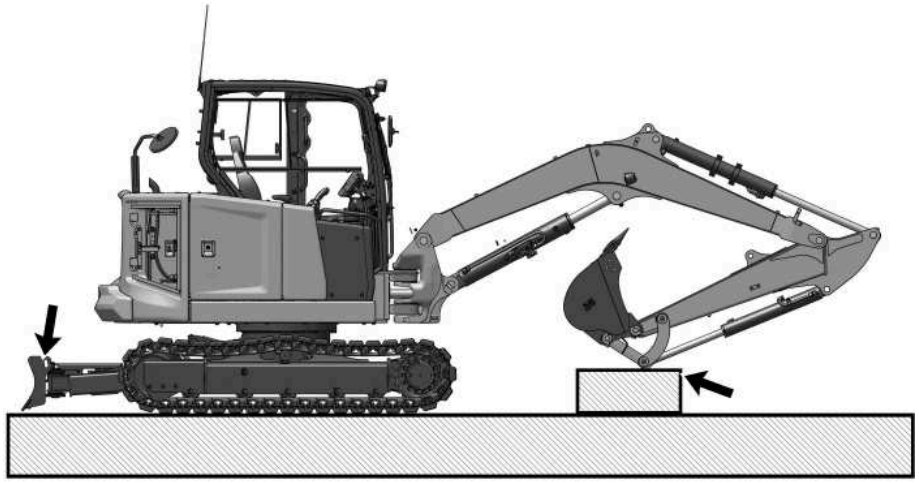

Illustration 4 g06702927
Machine in parking position

1. Lower the blade to the trailer. Refer to Operator Controls for more information.
2. Extend the work tool and stick cylinders to end of the stroke. Refer to Illustration 4 for more information.
3. Lower the boom slowly to rest the bucket control linkage on a block of wood.
4. Stop the engine. Refer to Stopping the Engine for more information.
5. Turn the engine start switch key to the ON position. Refer to Engine Starting for more information.
6. Move all the hydraulic control lever to relieve any trapped pressure. Refer to System Pressure Release for more information.
7. Turn the engine start switch key to the OFF position. Refer to Stopping the Engine for more information.
8. Move the hydraulic control to RAISED position. Refer to Operator Controls for more information.
9. Lock the cab door and the access covers. Refer to Access Door and Cover Locations for more information.

10. Chock the tracks and install tie-downs to prevent shifting in machine transit.
    Note: Use protectors between the machine and the tie-downs.

11. Separately tie down the work tools that will accompany the machine. Refer to Work Tools for more information.

Blade Tie-Down

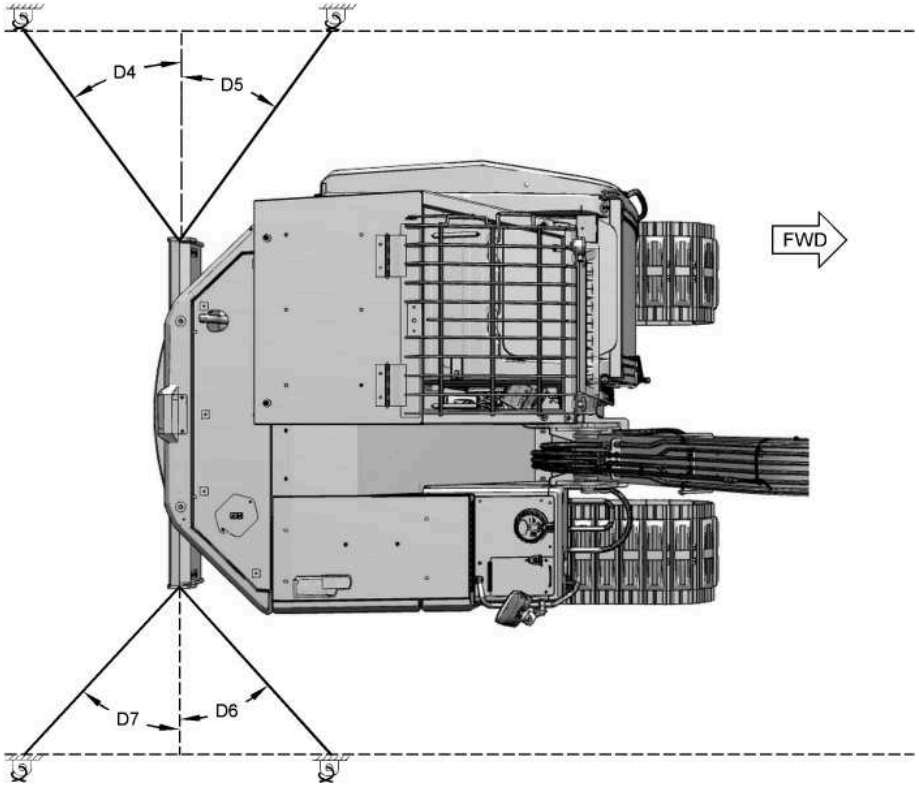

Illustration 5 g06702337
Top view of the machine
Blade tie-down points
(D4) Rear blade tie-down on left side of machine
(D5) Front blade tie-down on left side of machine
(D6) Front blade tie-down on right side of machine
(D7) Rear blade tie-down on right side of machine

Table 3

Blade Tie - Down Points	Sling Angle	Proof Load Value	Braking Load Value
Rear blade tie-down on left side of machine (D4)	34.6 degrees	33042 N (7428.1 lb)	52868 N (11855.2 lb)
Front blade tie-down on left side of machine (D5)	50 degrees	57559 N (12939.8 lb)	92094 N (20703.6 lb)
Front blade tie-down on right side of machine (D6)	50 degrees	57559 N (12939.8 lb)	92094 N (20703.6 lb)

Rear blade tie-down on right side of machine (D7)	34.5 degrees	33042 N (7428.1 lb)	52868 N (11855.2 lb)

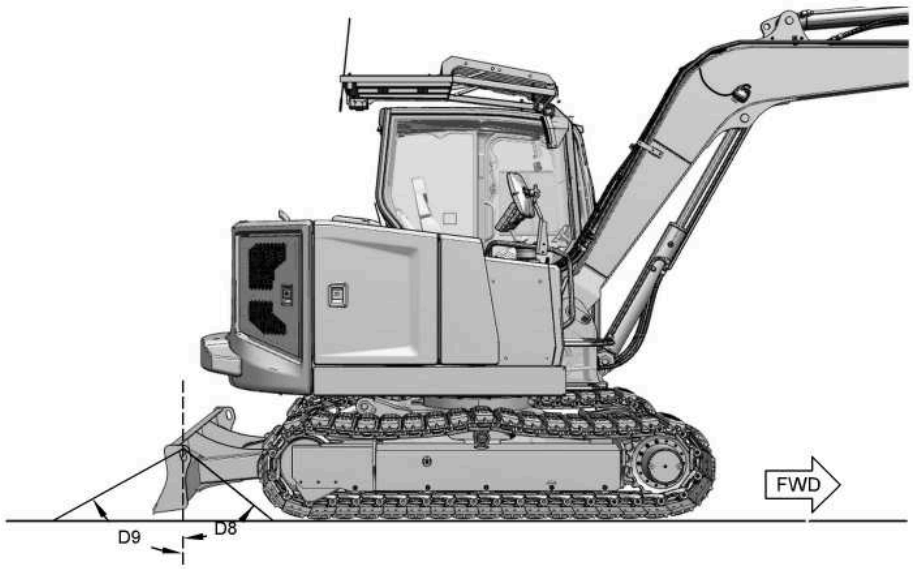

Illustration 6 g06702347
Right side of the machine
(D8) Lateral front tie-down on right side of the machine
(D9) Lateral rear tie-down on right side of the machine

Table 4

Blade Tie - Down Points	Sling Angle	Proof Load Value	Braking Load Value
Lateral front tie-down on right side of the machine (D8)	60 degrees	57559 N (12939.8 lb)	92094 N (20703.6 lb)
Lateral rear tie-down on right side of the machine (D9)	30 degrees	33042 N (7428.1 lb)	52868 N (11855.2 lb)

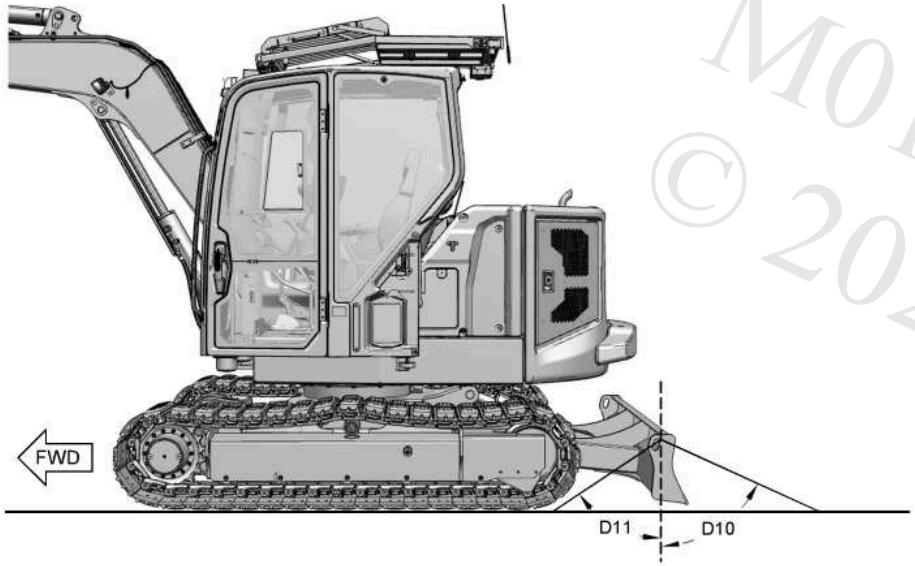

Illustration 7 g06702371
Left side of the machine
(D10) Lateral front tie-down on left side of the machine
(D11) Lateral rear tie-down on left side of the machine

Table 5

Blade Tie - Down Points	Sling Angle	Proof Load Value	Braking Load Value
Lateral front tie-down on left side of the machine (D10)	60 degrees	57559 N (12939.8 lb)	92094 N (20703.6 lb)
Lateral rear tie-down on left side of the machine (D11)	30 degrees	33042 N (7428.1 lb)	52868 N (11855.2 lb)

Track Roller Frame Tie-down

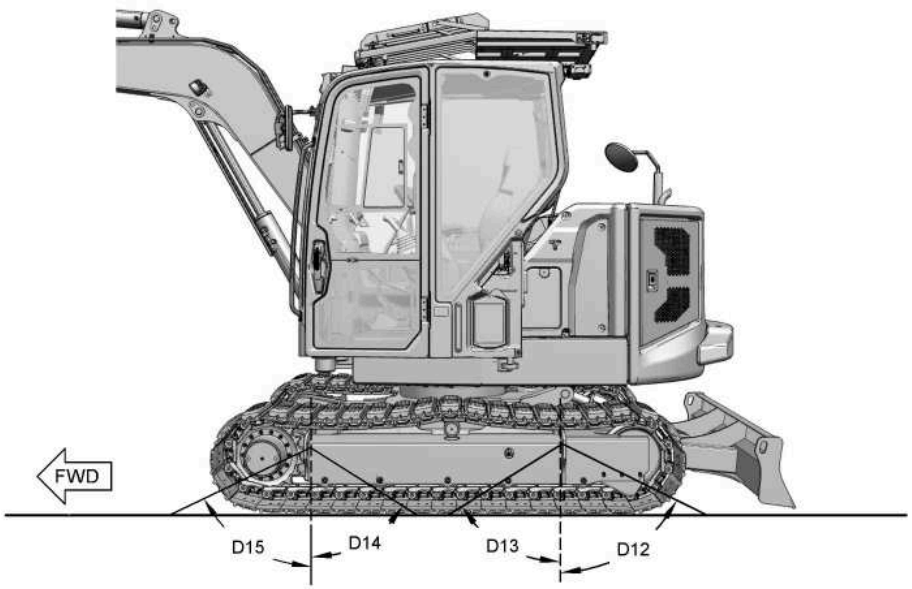

Illustration 8 g06702513
Left side of the machine
(D12) Lateral rear tie-down on rear of track roller frame
(D13) Lateral front tie-down on rear of track roller frame
(D14) Lateral rear tie-down on front of track roller frame
(D15) Lateral front tie-down on front of track roller frame

Table 6

Track Roller Frame Tie - Down Points	Sling Angle	Proof Load Value	Braking Load Value
Lateral rear tie-down on rear of track roller frame (D12)	30 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)
Lateral front tie-down on rear of track roller frame (D13)	60 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)
Lateral rear tie-down on front of track roller frame (D14)	60 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)
Lateral front tie-down on front of track roller frame (D15)	30 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)

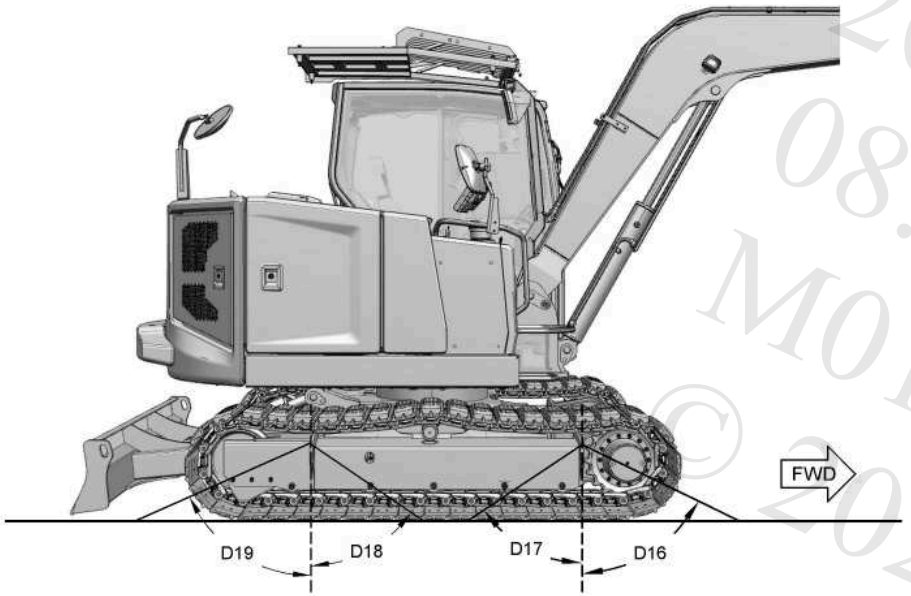

Illustration 9 g06702757
Right side of the machine
(D16) Lateral front tie-down on front of track roller frame
(D17) Lateral rear tie-down on front of track roller frame
(D18) Lateral front tie-down on rear of track roller frame
(D19) Lateral rear tie-down on rear of track roller frame

Table 7

Track Roller Frame Tie - Down Points	Sling Angle	Proof Load Value	Braking Load Value
Lateral front tie-down on front of track roller frame (D16)	30 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)
Lateral rear tie-down on front of track roller frame (D17)	60 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)
Lateral front tie-down on rear of track roller frame (D18)	60 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)
Lateral rear tie-down on rear of track roller frame (D19)	30 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)

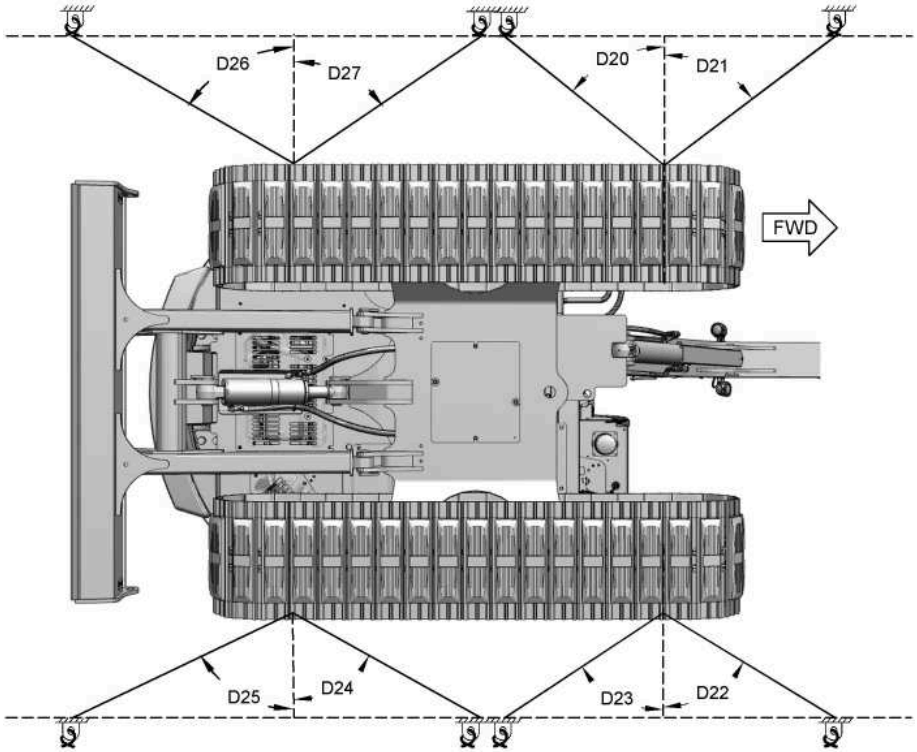

Illustration 10 g06702797
Bottom view of the machine
(D20) Rear tie-down on left side of front of machine
(D21) Front tie-down on left side of front of machine
(D22) Front tie-down on right side of front of machine
(D23) Rear tie-down on right side of front of machine
(D24) Front tie-down on right side of rear of machine
(D25) Rear tie-down on right side of rear of machine
(D26) Rear tie-down on left side of rear of machine
(D27) Front tie-down on left side of rear of machine

Table 8

Track Roller Frame Tie - Down Points	Sling Angle	Proof Load Value	Braking Load Value
Rear tie-down on left side of front of machine (D20)	41.4 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)
Front tie-down on left side of front of machine (D21)	27 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)
Front tie-down on right side of front of machine (D22)	41.4 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)
Rear tie-down on right side of front of machine (D23)	27 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)
Front tie-down on right side of rear of machine (D24)	41.4 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)
Rear tie-down on right side of rear of machine (D25)	27 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)
Rear tie-down on left side of rear of machine (D26)	27 degrees	31685 N (7123.1 lb)	50695 N (11396.7 lb)
Front tie-down on left side of rear of machine (D27)	41.4 degrees	53873 N (12111.1 lb)	86197 N (19377.9 lb)

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Machine Storage

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

The Operation Section of this Operation and Maintenance Manual contains information for short-term storage of this machine, including engine shutdown, parking, and instructions for leaving the machine.

For detailed steps on long-term storage refer to Special Instruction, SEHS9031 , "Storage Procedure for Caterpillar Products".

Specified Storage Period

The specified storage period of this machine is 1 year.

After the specified storage period has expired, consult your Cat dealer for inspect, repair, rebuild, install remanufactured, or install new components, and disposal options, and to establish a new specified storage period.

If a decision is made to remove the machine from service, refer to Decommissioning and Disposal for further information.

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WARNING

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

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

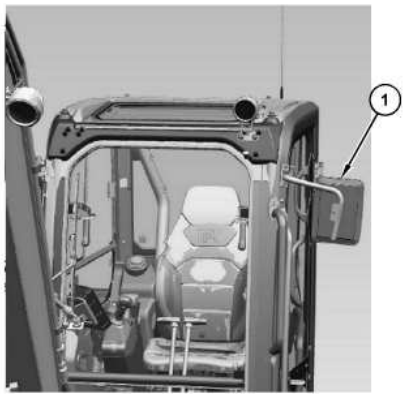

Illustration 1 g06656241
(1) Cab mirror

Illustration 2 g06656245

(2) Rear mirror
(3) Right side mirror

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

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

Mirror Adjustment

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position. For further details on this procedure, refer to Operation and Maintenance Manual, "Operator Controls".
- Stop the engine.
- Adjust rear view mirrors to provide visibility behind the machine at a maximum distance of 30 m (98 ft) from the rear corners of the machine.

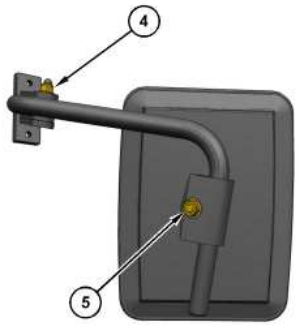

Illustration 3 g06636951
(4) Bolt closer to the cab
(5) Bolt on back of the mirror

Periodically tightening the mirror mounting bolts may be necessary. Tighten bolt closer to the cab (4) to 23 ± 2 N·m (17 ± 1.5 lb ft).

Tighten bolt on back of the mirror (5) to 3.5 N·m (2.9 lb ft).

Left Side View Mirror on the Cab (1)

Illustration 4 g06223279

If equipped, adjust the left side view mirror on the cab (1). Adjust the mirror so the left side of the cab, access door, and rear of left track can be seen from the operator seat. A view of at least 1 m (3.3 ft) from the side of the machine should be seen from the operator seat. Also, provide as much visibility to the rear as possible.

Rear Mirror (2)

Illustration 5 g06285593
Cab-mounted mirror (If Equipped)

If equipped, adjust the rear mirror on the cab (2) so the right track can be seen from the operator seat. A view of at least 1 m (3.3 ft) from the rear of the machine should be seen from the operator seat.

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WARNING

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

The monitoring system alerts the operator of a problem or of an impending problem. The monitoring panel is designed to alert the operator of faulty machine systems. When powering on the panel, there will be an LED test for the first 2 seconds (all LEDs on). The monitoring system consists of the following components:

- Display (with numerous screens and menus)
- Indicators

Two display options are available :

- Performance : Analog gauges and LCD with push-button interface.
- Premium : Full LCD with touchscreen interface.

Most display images in this document are from the performance display. However, the navigation and general functionality is common between two displays for most features. When the functionality is different, supplemental screen images and details are provided.

Reference: For more information on the monitor functions, refer to Systems Operation, M0090757 , "Monitoring System", "Performance Display".

Reference: For more information on the monitor functions, refer to Systems Operation, M0091327 , "Monitoring System", "Premium Display".

Performance Display

Illustration 1 g06347988
(1) Action Lamps
(2) Status Indicator Area
(3) Gauge Area
(4) Status Information Area
(5) Cabin Status Area
(6) Navigation Buttons

Action Lamps (1)

The action lamps illuminate to show that a problem has occurred with the machine.

Status Indicators (2)

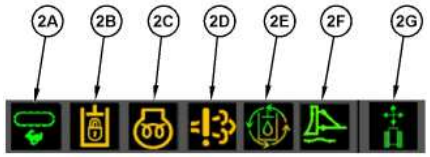

Illustration 2 g06274544

Travel Speed Indicator (2A)

(2A) Travel Speed

- If the travel speed switch is moved to the high-speed position, the high-speed travel indicator illuminates.

Hydraulic Pilot Supply Solenoid Status Indicator (2B)

(2B) Hydraulic Pilot Supply Solenoid

- Indicator (2B) will illuminate when the hydraulic system is locked out (left arm bar raised).

Glow Plug Indicator (2C)

(2C) Glow Plug

- The alert indicator will illuminate when the engine start switch key is turned to the RUN position. After the glow plugs warm up, the LED will go out and the engine can be started. Refer to Operation and Maintenance Manual, "Engine Starting". If the alert indicator does not turn off, consult your Cat® dealer.

Engine Emission System Indicator (2D)

(2D) Engine Emission System Malfunction

- Indicator (2D) will illuminate when there is a fault with the engine emission system.

Continuous Flow (2E)

(2E) Continuous Flow

- Indicator (2E) will illuminate in amber color when continuous hydraulic oil flow is ENABLED. The icon will appear green when continuous flow is active.

Blade Float Indicator (2F)

(2F) Blade Float

- Indicator (2F) will illuminate when the blade float feature is ACTIVE.

Joystick Steering Indicator (2G)

(2G) Joystick Steering Control

- Indicator (2G) will illuminate when joystick steering control status is ACTIVE. This indicator is located between the gauges in area (3).

Gauge Area (3)

Illustration 3 g06274545

Fuel Level (3A)

Fuel Level

- This gauge indicates the amount of fuel that is remaining in the fuel tank. When the fuel gauge is in the red range, add fuel immediately.

Engine Coolant Temperature (3B)

Engine Coolant Temperature

- This gauge indicates the temperature of the engine coolant. The normal operating range is when the indicator is below the red area and not resting in the full left position. Refer to Operation and Maintenance Manual, "Engine and Machine warmup". If the gauge reaches the red range, stop the machine and investigate the cause of the problem.

Status Information Area (4)

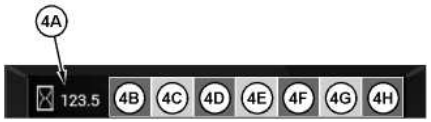

Illustration 4 g06346172
(4A) Service Hour meter

There are seven icon locations to the right of service hour meter (4A). All possible indicators for each location are shown below.

Service Hour Meter (4A)

(4A) Service Hour Meter

- Shows the total operating hours of the engine. Use the display to determine the service-hour maintenance intervals.

Location (4B)

(4B) Cruise Control

- ON

(4B) Cruise Control

- SET

Location (4C)

(4C) Throttle Dial Position

- Indicates the engine speed dial setting.

(4C) Auto Idle Control

- Auto Idle Control has lowered the engine speed or the DPF is automatically regenerating.

(4C) Auto Idle Control

- Auto Idle Control is enabled, but not currently active.

Auto Idle Control

- Automatically reduce the engine speed to low idle when no active commands are given for 3 seconds. Turn ON or turn OFF this feature using the monitor.

The auto idle control feature allows the operator to reduce the rpm without touching the engine speed dial. Auto idle control is useful when operator wants to reduce the engine speed to talk to someone or while operator is waiting for truck.

Location (4D)

(4D) Security System Immobilizer

- This indicator will cover the smart code icon if a security system immobilizer request has been received from product link.

(4D) Smart Mode

- This indicator shows that the machine is set to operate in Power On Demand (POD).

Location (4E)

(4E) Shovel Crane (if equipped)

- This indicator will illuminate when the shovel crane feature is ON.

(4E) Thumbwheel Mode

- This indicator will illuminate when this feature is ACTIVE.

(4E) Hammer

- This indicator will illuminate when this work tool is chosen.

(4E) Shear

- This indicator will illuminate when this work tool is chosen.

(4E) User Defined

- This indicator will illuminate when this work tool is chosen.

(4E) Tilt Bucket

- This indicator will illuminate when this work tool is chosen.

(4E) Plate Compactor

- This indicator will illuminate when this work tool is chosen.

(4E) Auger

- This indicator will illuminate when this work tool is chosen.

(4E) Thumb

- This indicator will illuminate when this work tool is chosen.

(4E) Mulcher

- This indicator will illuminate when this work tool is chosen.

(4E) Brush Cutter

- This indicator will illuminate when this work tool is chosen.

(4E) Tilt Coupler

- This indicator will illuminate when this work tool is chosen.

Location (4F)

(4F)

- In Call

(4F)

- Bluetooth Connected

(4F)

- Bluetooth Enabled

Location (4G)

(4G)

- Boom Swing – This icon appears if this function is controlled with the left thumbwheel.

(4G)

- Swing Valve – This icon appears if this function is controlled with the left thumbwheel.

(4G)

- Auxiliary Valve 2 – This icon appears if this function is controlled with the left thumbwheel.

(4G)

- Offset Boom – This icon appears if this function is controlled with the left thumbwheel.

Location (4H)

(4H) Joystick Pattern

- This icon position combines Pattern Changer and Joystick Steering Pattern. The number on the upper left represents the Pattern Changer. The number in the upper left portion of the icon indicates if an alternate control pattern is selected. The letter in the upper right corner reflects the joystick steer control pattern for the right joystick. Refer to "Joystick Controls" and "Joystick Controls Alternate Patterns" sections for more information.

Cabin Status (5)

Depending upon installed features various information is available in this area. Use of the jog dial can also scroll information between the various available screens.

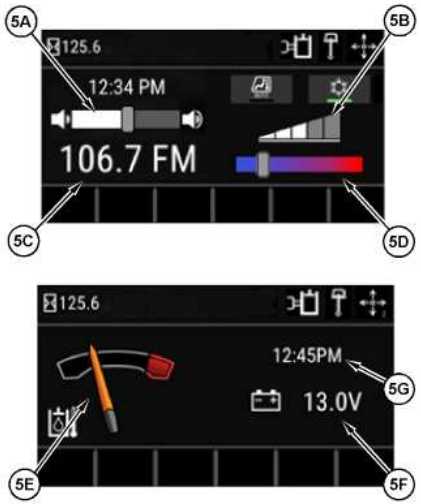

Illustration 5 g06390246
View of status area
With and without Radio and HVAC installed

Radio Volume (5A)

Radio Volume (5A)

- The radio volume function displays the current volume.

Air Conditioning Fan Speed (5B)

Air Conditioning Fan Speed (5B)

- The air conditioning fan speed function displays the current fan speed.

Radio Display (5C)

Radio Display (5C)

- The radio display area will display radio station, Bluetooth audio, Aux audio input, or DAB information.

Air Temperature (5D)

Air Temperature (5D)

- The air temperature function controls the temperature of the air coming out of the vents.

Hydraulic Temperature (5E)

Hydraulic Temperature (5E)

- The current temperature of the machine hydraulic oil.

Battery Voltage (5F)

Note: The hydraulic temperature gauge and battery voltage are accessible on the machines with a radio and heat / air conditioning. To access, either highlight the heat / air conditioning on the cabin status screen and use the jog dial to jog to the right. Highlight the radio on the cabin status screen and use the jog dial to jog to the left.

Battery Voltage (5F)

- The current voltage of the machine battery.

Clock (5G)

Clock (5G)

- If equipped, will display the time of day.

Navigation Buttons (6)

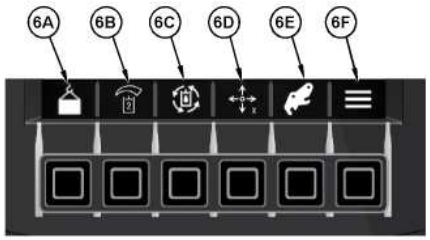

Illustration 6 g06330261

Navigation buttons (6A) through (6E) are programmable shortcuts. The shortcuts will be automatically populated based on how the machine is configured. To view the complete list or change a shortcut, navigate to the "Shortcut Settings" under the "Display Settings" menu on the monitor. Button (6F) accesses the main menu options available in the Monitoring System. The following sections detail the available options.

Premium Display

Illustration 7 g06564012
(1) Action Lamps
(2) Status Information Area
(3) Camera View Area
(4) Cabin Status Area
(5) Gauge Area
(6) Menu
(7) Shortcuts

The monitoring system displays various warnings and information about the condition of the machine, and the machines surrounding with the rear view camera (if equipped). There are gauges and several alert indicators included on monitoring system display. Each gauge is dedicated to a parameter within a machine system. The monitoring system will allow the user to do the following:

- View surroundings
- Interpret status information
- Interpret parameters
- Troubleshoot machine systems

Action Lamps (1)

The action lamps illuminate to show that a problem has occurred with the machine.

Status Information Area (2)

Illustration 8 g06617613

(2A) Service Hour Meter - Shows the total operating hours of the machine.

(2B) Clock

(2C) Machine Roll Indicator – Shows the side to side angle degree of the machine. The angle indication is limited to ± 10 degrees.

(2D) Machine Pitch Indicator – Shows the fore and aft angle degree of the machine. The angle indication is limited to ± 10 degrees.

Camera View Area (3)

Illustration 9 g07800693
Image from side view camera in monitor display

The camera view area shows live feed of the rear view camera and side view camera (if equipped).

When the arm bar is lowered or a hydraulic function is activated, the display will automatically return to the home screen to show the camera view area.

When navigating away from the home screen, the display will automatically return to the home screen to show the camera view area after 10 seconds of no display interaction.

Cabin Status Area (4)

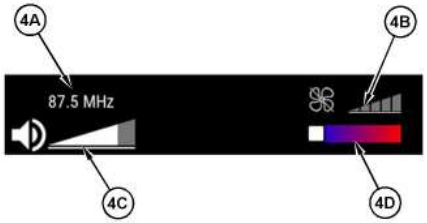

Illustration 10 g06565233

The cabin status screens will change based on the machine configuration. The example shown above is for a machine equipped with both a radio and heat/air conditioning. If the machine is not equipped with one or both of those options, the corresponding area will be blank.

Radio Station (4A)

Radio Station (4A)

- The radio station function displays station that is playing.

Air Conditioning Fan Speed (4B)

Air Conditioning Fan Speed (4B)

- The air conditioning fan speed function displays the current fan speed.

Radio Volume (4C)

Radio Volume (4C)

- The radio volume function displays the current volume.

Cab Temperature (4D)

Cab Temperature (4D)

- The cab temperature function displays the temperature setting of the air coming out of the vents.

Gauge Area (5)

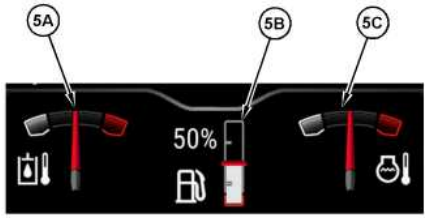

Illustration 11 g06617616

Hydraulic Oil Temperature (5A)

Hydraulic Oil Temperature

- This gauge indicates the temperature of the hydraulic oil. If the gauge reaches the red range, stop the machine and investigate the cause of the problem.

Fuel Level (5B)

Fuel Level

- This gauge indicates the amount of fuel that is remaining in the fuel tank. When the fuel gauge is in the red range, add fuel immediately.

Engine Coolant Temperature (5C)

Engine Coolant Temperature

- This gauge indicates the temperature of the engine coolant. If the gauge reaches the red range, stop the machine and investigate the cause of the problem.

Menu Button (6)

Menu Button (6)

- Press the menu button to go to the main menu of display to adjust various machine and display settings.

Shortcuts (7)

Navigation buttons (7) are programmable shortcuts. The shortcuts will be automatically populated based on how the machine is configured. To view the complete list or change a shortcut, navigate to the "Shortcut Settings" under the "Display Settings" menu on the monitor.

Main Menu

The following sections detail available options within the menu structure of the display.

Machine Settings

Machine settings adjust various options which control machine functions. Certain settings may require the engine to be OFF for adjustment.

Included in machine settings are the following:

- Control Mode
- Aux/Work Tool
- Auto Idle Control

- Machine Lighting
- Factory Defaults
- Job Clock

Control Mode

Control mode contains several settings that affect machine operation.

Included in this subsection is descriptions of Pattern Changer, Joystick Steering Pattern, Fine Grading, Engine Idle Shutdown (if equipped), Implement Speed, Joystick Response, Cruise Control, Forward Travel Trim, and Reverse Travel Trim.

Pattern Changer

Illustration 12 g07800702
Pattern changer

Select pattern changer icon on the monitor display.

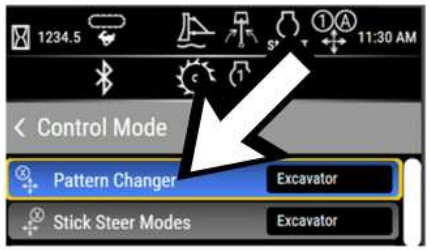

Illustration 13 g07800703

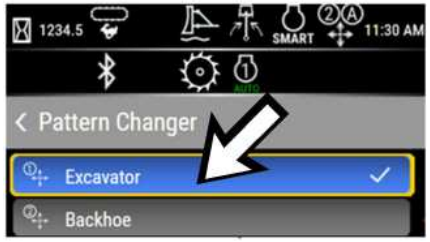

Illustration 14 g07800705

Illustration 15 g07800717

To access the pattern changer screen, press pattern changer shortcut or through menu->machine settings->control mode ->pattern changer. Once selecting a new pattern, there is a popup screen with 10 seconds timer will appear.

Illustration 16 g07800595

Button to confirm "Pattern Changer" on the left side joystick control

Press the button on left side joystick control to enable pattern changer. Refer to Illustration 16 for more information. If timer expires, the request to change the pattern will fail and will continue with the existing pattern and return to home screen.

The pattern changer allows the selection of various control patterns for the left and right joystick. Refer to “Joystick Controls Alternate Patterns” for details of available patterns.

Joystick Steering Pattern

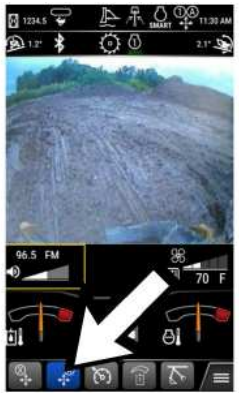

Illustration 17 g07800708

Stick Steer Pattern changer

Select stick steer pattern changer icon on the monitor display.

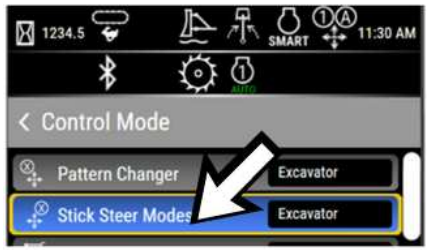

Illustration 18 g07800710

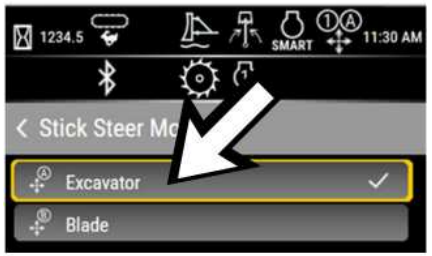

Illustration 19 g07800712

Illustration 20 g07800717

To access the pattern changer screen, press pattern changer shortcut or through menu->machine settings->control mode -> stick steer pattern changer. Once selecting a new pattern, there is a popup screen with 10 seconds timer will appear.

Illustration 21 g07800595

Button to confirm "Stick Steer Pattern Changer" on the left side joystick control

To activate the stick steer pattern changer screen, press stick steer pattern changer shortcut or through menu->machine settings->control mode ->stick steer mode. Once selecting a new pattern, there is a popup screen with 10 seconds timer will appear. Press the button on left side joystick control to enable stick steer mode. Refer to Illustration 21 for more information. If timer expires, the request to change the pattern will fail and will continue with the existing pattern and return to home screen.

Joysticks steering Pattern allows for the selection of desired function of the right joystick lever while in Stick-Steer mode. Refer to “Joystick Controls” for more details.

Fine Grading

The Fine Grading mode increases the fine control of the machine implement functions. When Enabled, the pump will generally operate at a higher pressure to help achieve greater fine control.

To access Fine Grading, press the "Menu" button, select "Machine Settings", "Control Mode", then "Fine Grading".

Press "OK" to toggle between Enabled and Disabled.

Implement Speed

Implement speed allows the operator to adjust the joystick sensitivity and function maximum speeds. This parameter is adjusting both the joystick sensitivity and speed of the boom, stick, bucket, and swing together. The Advanced settings menu allows for individual adjustment.

To access the Implement Speed options, press the "Menu" button, select "Machine Settings", "Control Mode", then "Implement Speed".

The implement speed can be added to the shortcut menu in the monitor if desired.

Select the desired option using the up and down arrows, then press "OK".

Advanced

To access the Advanced options, press the "Menu" button, select "Machine Settings", "Control Mode", "Implement Speed", then "Advanced".

Illustration 22 g06333802

Select the desired option using the up and down arrows, then press "OK".

The following are the options within each:

- Normal

- Fast
- Slow

Joystick Response

Joystick response allows the operator to adjust the implement response to the joystick inputs. This parameter is adjusting the joystick response of the boom, stick, bucket, and swing together. The Advanced settings menu allows for individual adjustment.

Adjusting the implement response rate will change how abrupt the implements start and stop, affecting the smoothness of operation of the machine.

To access the Joystick Response options, press the "Menu" button, select "Machine Settings", "Control Mode", then "Joystick Response".

The joystick response can be added to the shortcut menu in the monitor if desired.

Select the desired option using the up and down arrows, then press "OK".

Advanced

To access the Advanced options, press the "Menu" button, select "Machine Settings", "Control Mode", "Joystick Response", then "Advanced".

Illustration 23 g06333802

Select the desired option using the up and down arrows, then press "OK".

The following are the options within each:

- Normal
- Slow
- Fast

Cruise Control

To enable the cruise control feature in the monitor press "Menu" button, select "Machine settings", "Control mode", "Cruise control", then press "OK". Once enabled, cruise control can be activated as indicated in the "Joystick controls" section.

The cruise control can be added to the shortcut menu in the monitor if desired. Each time the machine is powered ON, the cruise control feature must be enabled.

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.

Forward Travel Trim

Forward travel trim allows operator to make fine adjustments between left and right track speed in FORWARD direction to correct any drift or wandering.

To access the Forward Travel Trim options, press the "Menu" button, select "Machine Settings", "Control Mode", then "Forward Travel Trim".

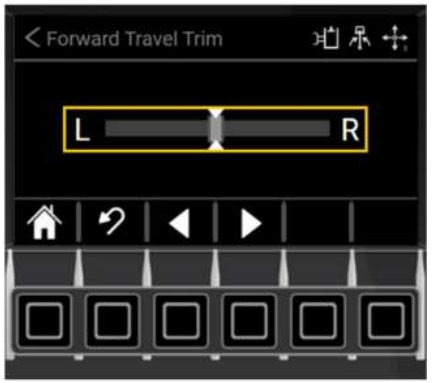

Illustration 24 g06333952

To adjust the forward travel trim, use the right and left arrows.

If your machine drifts RIGHT, then move the arrow to the LEFT.

Reverse Travel Trim

Reverse travel trim allows operator to make fine adjustments between left and right track speed in REVERSE direction to correct any drift or wandering.

To access the Reverse Travel Trim options, press the "Menu" button, select "Machine Settings", "Control Mode", then "Reverse Travel Trim".

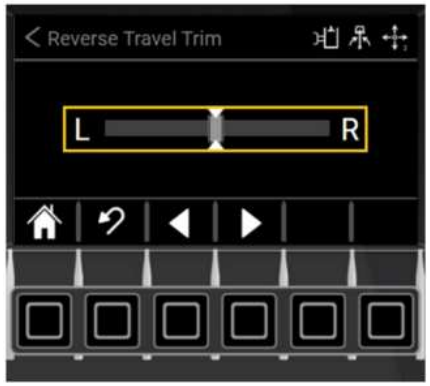

Illustration 25 g06333956

To adjust the reverse travel trim, use the right and left arrows.

If your machine drifts RIGHT, then move the arrow to the LEFT.

Engine Idle Shutdown (If Equipped)

Engine Idle Shutdown feature automatically shuts off the engine when the following conditions are met for 3 to 15 minutes :

- Arm bar is raised
- Coolant temperature is above 50° C (122° F)
- Work lights are OFF
- Auto engine idle feature is enabled
- Throttle dial position is less than seven
- No active DPF regeneration

The engine idle shutdown feature must be enabled for the function to be active. To enable, press the "Menu" button, select "Service Mode", "Machine", "Engine Idle Shutdown", then press OK.

Once enabled, the timer can be adjusted by pressing the "Menu" button, "Machine Settings", "Control Mode", then "Engine Idle Shutdown". The idle time is adjustable from 3 to 15 minutes in increment of 1 minute. Press OK to confirm the selection.

Aux/Work Tool

The Aux/Work Tool submenu allows for configuration of the auxiliary hydraulics of the machine.

Included in this subsection is descriptions of Continuous Flow, Quick Coupler, Aux Flow 1 (if equipped), Aux Flow 1 Balance (if equipped), Aux Flow 2 (if equipped), Aux Flow 2 Balance (if equipped), Tilt-rotator(if equipped), and Work Tool Select.

Continuous Flow

To enable the continuous flow feature in the monitor press the "Menu" button, select "Machine Settings", "Aux / Work Tool", "Continuous Flow" then "OK". Once enabled, continuous flow can be activated as indicated in the "Continuous Flow" section.

The continuous flow enable can be added to the shortcut menu in the monitor if desired. Each time the machine is powered on, the continuous flow feature must be enabled.

Quick Coupler (If Equipped)

Illustration 26 g07800697

Select quick coupler icon on the monitor display.

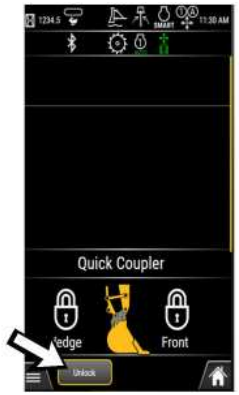

Illustration 27 g07800592

"Unlock" on monitor display

Illustration 28 g07800593
Timer to enable quick coupler on monitor display

Select "UNLOCK" on the monitor display. A pop-up window will appear in the monitor display with a timer for 10 seconds within which the quick coupler operation needs to be enabled.

Illustration 29 g07800595
Button on left joystick to enable quick coupler

Press the button on left joystick to enable the operation. Refer to Illustration 29 for more information. If the operator did not press the button on left joystick to enable the quick coupler operation within 10 seconds, the operation will fail and return back to the unlock request screen. A buzzer is sounding with an intermittent pattern of one beep per second indicates that the quick coupler operation is active. 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.

This menu allows for activation of a hydraulic quick coupler. Two types of couplers are supported including dual lock and single lock couplers. Dual lock couplers will show two screens indicating the status of each individual locking mechanism. Single lock couplers have only a single screen allowing for lock and unlock functions of the coupler.

To access the Hydraulic Quick Coupler in the monitor press the"Menu" button, "Machine Settings" , "Aux / Work Tool", then "Quick Coupler". The Single Lock or Dual Lock quick coupler screen will be selected automatically based on which quick coupler the machine is configured with.

The quick coupler control screen can be added to the shortcut menu in the monitor if desired.

Tilt rotator (If Equipped)

The Tilt rotator is a specialized worktool that can be purchased for the machine. Refer to the Tiltrotator Operation and Maintenance Manual for more details or contact your dealer for information.

Aux Flow 1 (If Equipped)

Aux 1 Flow allows for metering the flow provided to the auxiliary 1 circuit. To adjust the aux 1 flow press the "Menu" button, select "Machine settings", "Aux / Work Tool", "Aux flow 1" then adjust the flow rate. The flow is adjustable from 10% to 100% in increments of 10 percent.

The aux flow 1 can be added to the shortcut menu in the monitor if desired.

Aux Flow 1 Balance (If Equipped)

Aux Flow 1 Balance allows for reducing flow to aux 1 A port or aux 1 B port. Flow is reduced for work tools that require different flow rates in each direction.

To adjust the aux flow 1 balance press the "Menu" button, select "Machine settings", "Aux / Work Tool", "Aux Flow 1 Balance" then adjust the balance as desired. When the slider is in the middle position, the supply flow rate is in the same for both ports. Adjusting the slider to the LEFT will reduce the flow rate to the right (aux 1 A) port. Adjusting the slider maintain same flow rate to the left (aux 1 B) port. Adjusting the slider to the RIGHT will reduce the flow rate to the left (aux 1 B) port. The slider maintains the same flow rate to the right (aux 1 A) port.

Aux Flow 2 (If Equipped)

Aux 2 Flow allows for metering the flow provided to the auxiliary 2 circuit. To adjust the aux 2 flow press the "Menu" button, select "Machine settings", "Aux / Work Tool", "Aux Flow 2" then adjust the flow rate. The flow is adjustable from 10 percentage to 100 percentage in increments of 10 percent.

The Aux flow 2 can be added to the shortcut menu in the monitor if desired.

Aux Flow 2 Balance (If Equipped)

Aux Flow 2 balance allows for reducing the flow to the aux 2 A port or aux 2 B port. Flow is reduced for work tools that require different flow rates in each direction.

To adjust the aux flow 2 balance press the "Menu" button, select "Machine settings", "Aux / Work Tool", "Aux Flow 2 balance" then adjust the balance as desired. When the slider is in the middle position, the supply flow rate is in the same to both ports. Adjusting the slider to the LEFT will reduce the flow rate to the right (aux 2 A) port. Adjusting the slider maintain same flow rate to the left (aux 2 B) port. Adjusting the slider to the RIGHT will reduce the flow rate to the left (aux 2 B) port. The slider maintains the same flow rate to the right (aux 2 A) port.

Work Tool Select

Toggling the work tool select, various work tools are available. Selecting the work tool attached to the machine will pick default settings for Aux 1 Flow metering and configure the valve for utilizing work tools.

To select the work tool press the "Menu" button, select "Machine Settings", "Aux / Work Tool", "Work Tool Select" then select the desired tool.

The work tool select can be added to the shortcut menu in the monitor if desired.

Some work tools are designated as heavy tools. When selected, the controls compensate for the additional load on the linkage to maintain optimal multi-functional operation. The following tools are designated as work tools:

- Shear
- Plate Compactor
- Mulcher
- Brush Cutter

Note: If the Fine Grading mode is Enabled, the controls will operate with the heavy tool settings, regardless of which work tool is selected.

Auto Idle Control

Auto idle control automatically reduces engine speed for 3 seconds, when no implement commands have been issued. To enable, press the "Menu" button, select "Machine settings", "Auto idle control", then press "OK". Auto idle control can be added to the shortcut menu in the monitor if desired.

Machine Lighting

Beacon Light (if equipped)

- Toggles the beacon light ON and OFF. Press the "Menu" button, select "Machine Settings", "Machine Lighting", "Beacon Light", then press OK to toggle between ON and OFF. Beacon light can be added to the shortcut menu in the monitor if desired.

Courtesy Light

- Courtesy light allows the machine lighting to stay ON after turning the key switch OFF. Courtesy lights illuminate If the work lights were ON when the key was switched OFF. Press the "Menu" button, select "Machine Settings", "Machine Lighting", "Courtesy Light". The timer is adjustable from 0 to 100 seconds in increment of 5 seconds. Press OK to confirm the selection.

Job Clock

The job clock displays the number of engine running hours that have been accumulated since the last reset. To reset the job clock back to zero, press the "Menu" button, "Machine Settings", "Job Clock", press the RESET button (icon with two parallel lines at a 45 degree angle).

Job Clock can be added to the shortcut menu in the monitor if desired.

Reset Factory Default

Restores factory default settings for the parameters such as joystick response, implement speed, auxiliary flow 1, auxiliary flow 1 balance, auxiliary flow 2, auxiliary flow 2 balance, courtesy light timer, work tool select, automatic engine idle control, cruise control, beacon light, joystick steering pattern. To reset, press the "Menu" button, select "Machine settings", "Reset factory default", then "OK".

Ease Of Use (If Equipped)

Illustration 30 g07187184

"Ease of Use" menu in monitor

"Ease of Use" is a set features that assists the operator in controlling the machine. "Ease of Use" features simplify the machine operation, enhance the accuracy, and improve the overall productivity of the machine. Most "Ease of Use" features require the premium touchscreen display. Only the "Grade Enable" and "Grade Configuration" are available in the performance display.

Grade Enable

Illustration 31 g06743422
"Grade" menu in monitor

"Grade Enable" feature is used to enable or disable Cat® Grade Control System. On the monitor, select "Menu", "Ease of Use", and select "Grade".

To enable "Grade", select "Grade Enable", then change to "Enabled". On the performance display, a green color indicator light in monitor denotes the "Grade" is "Enabled".

To disable "Grade", select "Grade Enable" again, then change to "Disabled". On the performance display, a green color indicator light in monitor will not illuminate and denotes the "Grade" is "Disabled".

Note: Refer to Service Magazine, M0133643 , "Cat® Grade Control (CGC) Capability Is Now Available for Certain 306 through 310 Mini Hydraulic Excavators" for more information on "Grade Control" using performance display in monitor.

Note: "Grade" features require a secondary display to perform the various "Grade" functions. Secondary display will be included in the Cat® Grade Control System Kit.

Grade Configuration

Illustration 32 g06743423
"Grade Configuration" menu in monitor

"Grade Configuration" feature is used to configure Cat® Grade Control System for the depth and tilt options. On the monitor, select "Menu", "Ease of Use", select "Grade", and select "Grade Configuration".

"Grade Configuration" feature includes "Depth and Tilt", "Depth Only", and "Tilt Only". Use arrows to navigate to desired setting and press "OK".

Bucket / Work Tool

To calculate the bucket position information, the dimensions of each bucket / work tool being utilized on the machine must be entered in the display. The bucket / work tool selection allows for up to five different buckets / work tools to be configured, saved, and recalled.

Measure Up

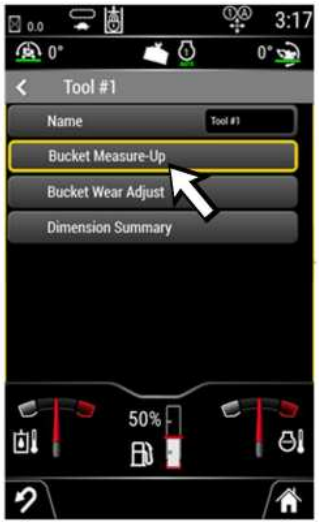

Illustration 33 g06751777

"Bucket Measure-Up" menu in monitor

The "Bucket Measure-Up" function steps the operator through the process of entering the measurements for a new bucket / work tool. To access the "Bucket / Work Tool" menu select "Menu", "Ease of Use" then "Bucket / Work Tool".

Within the "Bucket / Work Tool" menu select "Setup" then select the Tool #1 to Tool #5 that you would like to perform the measure up on. The screen above will be shown for the selected tool.

The name of the tool can be customized by selecting the "Name" button. Once selected, use the keypad to enter the desired name. The new name will now be assigned to this bucket / work tool and will appear in the various screens in the monitor.

Next select "Bucket Measure-Up" within the selected tool menu to perform the bucket measure up process. This will require a tape measure and a calibrated angle gauge and/or plumb line.

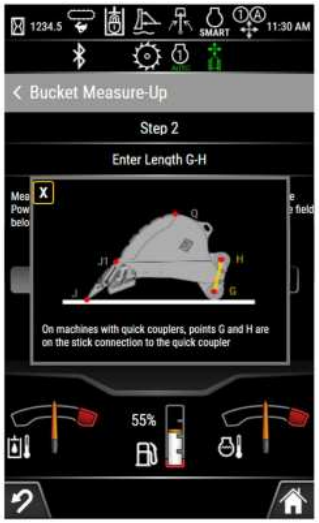

Illustration 34 g07187186
"Bucket Measure-Up" menu in monitor

Illustration 35 g07187210
Incorrect way to position the plumb line with bucket

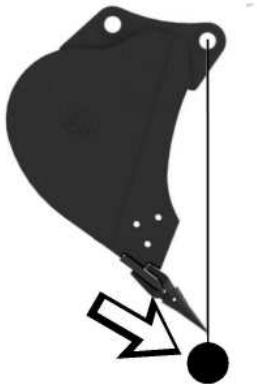

Illustration 36 g07187238
Correct way to position the plumb line with bucket

Follow the on-screen instructions to measure the requested dimensions of the bucket / work tool.

Note: Achieve accurate bucket position readings by proper positioning of work tool for measuring and recording accurate dimensions of the work tool. Use a plumb line or an inclinometer to ensure tip of the teeth in bucket and mounting hole of the bucket are aligned in vertical position. Refer to Illustration 35 for the incorrect way to position the plumb line with work tool to measure the dimensions of work tool. Refer to Illustration 36 for the correct way to position the plumb line with work tool to measure the dimensions of work tool

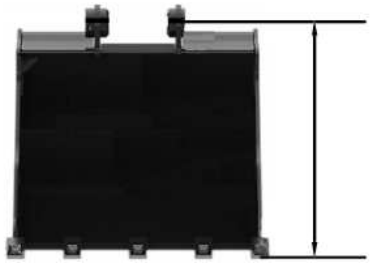

Illustration 37 g07187223
Front view of bucket
G-J Dimension of bucket

Refer to Illustration 37 to measure the G-J dimension of bucket.

Note: All dimensions of the bucket must be measured in the two-dimensional plane.

Illustration 38 g07268403
Rear view of bucket
G-Q Dimension of bucket

Refer to Illustration 38 to measure the G-Q dimension of bucket.

Note: All dimensions of the bucket must be measured in the two-dimensional plane.

Bucket Wear Adjust

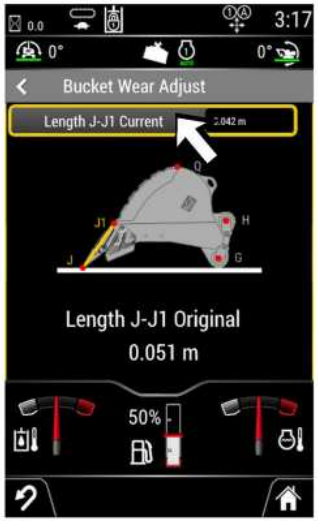

Illustration 39 g06751781
"Bucket Wear Adjust" menu in monitor

Over time the bucket teeth will wear, impacting the accuracy of the bucket position readings. The bucket wear can be accounted for by selecting "Bucket Wear Adjust" within the selected tool menu.

Measure and enter the requested dimension on the screen to adjust for the current wear on the bucket.

Dimension Summary

All bucket measurement inputs and calculated angles can be viewed by selecting "Dimension Summary" within the selected tool menu.

Illustration 40 g06751782
"Dimension Summary" menu in monitor

After, completing the bucket measure up process be sure to select the appropriate active tool so the system utilizes the correct information.

Active Tool Select

The dimensions of up to five buckets / work tools can be stored and selected. To select a tool/bucket that has previously completed the measure up process go to "Menu", "Ease of Use", "Bucket / Work Tool" then "Active Tool Select". The Active Tool Select can be added to the shortcut menu in the monitor if desired.

Illustration 41 g06751783
"Active Tool Select" menu in monitor

The list of available buckets / work tools will be shown. Select the bucket / work tool that is installed on the machine. Once selected, the number 1 to 5 that corresponds with the currently selected bucket / work tool will be shown next to the bucket icon on the top status bar to provide persistent indication.

Note: If the incorrect tool is selected, the bucket / work tool position calculations could be substantially incorrect. Anytime a bucket / work tool is changed, the correct active tool must be selected to get accurate bucket / work tool position information.

Illustration 42 g07532779
"Ease of Use" menu with "No Tool Selected" in monitor

An event code activates upon activating the quick coupler. An event code is triggered if no active tool has been selected for a machine equipped with "Ease of Use" technology. When the quick coupler is operated, the active tool is cleared and must be selected again to clear the event code from the screen. If the bucket measure up process has not been completed for the selected work tool, you must perform the bucket measure up process for the work tool. Refer to Measure Up section for more information on bucket measure up process.

Indicate

Illustration 43 g07833112
"Indicate" menu in monitor

"Indicate" feature provides bucket tip position relative to fixed feature point. On the monitor, select "Menu", "Ease of Use", and select "Indicate".

To enable "Indicate", select "Indicate Enable", then select "Enabled". "Indicate Enable" feature is now "Enabled". Bucket tip height and reach information is now available on the home screen in monitor. "Indicate" feature includes "Height Bench", "Reach Bench", and "Setup" options. Use arrows to navigate to desired setting and press "OK".

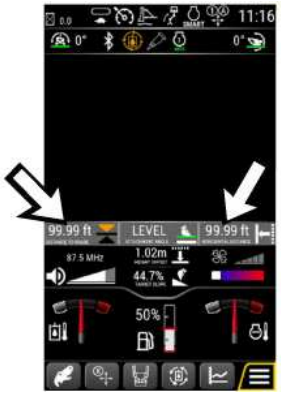

Illustration 44 g07280880
Home screen with Indicate feature enabled showing bucket tip height and reach.

Height Bench

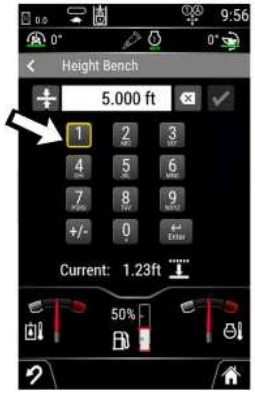

Illustration 45 g06743430
"Height Bench" menu in monitor

"Height Bench" is the reference point for the bucket tip height indicated on home screen of monitor. To adjust "Height Bench", select "Height Bench" within "Indicate" menu.

Illustration 46 g07600829

Alternatively, the "Height Bench" menu can be reached by selecting the Height Offset box on the home screen.

Navigation

- This option is available in "Height Bench" menu in monitor. Click this option to set the current bucket tip height as the 0.0 position. The reference height is now set at 0.0 cm (0.0 ft). Lifting the bucket above this position indicates a positive height measurement. Lowering the bucket below this position indicates a negative height measurement.

Note: Tapping the "Distance to Grade" box on the home screen or pressing the joystick trigger opposite to the Cat Grade® trigger will set the current bucket tip height as the 0.0 position.

Illustration 47 g06743435
"Height Bench" menu in monitor

Alternatively, "Height Bench" can be adjusted to a specific value using the keypad in the monitor.

Ok

- This option is available in "Height Bench" menu in monitor. Click this option to adjust the "Height Bench" in the machine. Enter the desired value using keypad in monitor and click this icon to set the desired measurement of "Height Bench" in the machine.

Reach Bench

Illustration 48 g06743436
"Reach Bench" menu in monitor

"Reach Bench" is the reference point for the bucket tip distance indicated on home screen of monitor. To adjust "Reach Bench", select "Reach Bench" within "Indicate" menu.

Navigation

- This option is available in "Reach Bench" menu in monitor. Click this option to set the current bucket tip distance as the 0.0 position. The reference distance is now set at 0.0 cm (0.0 ft). Extending the bucket

forward indicates a positive reach measurement and retracting the bucket backward indicates a negative reach measurement.

Note: Tapping the "Horizontal Distance" box on the home screen or pressing the joystick trigger opposite to the Cat Grade® trigger will set the current bucket tip height as the 0.0 position.

Illustration 49 g06743439
"Reach Bench" menu in monitor

Ok

- Alternatively, "Reach Bench" can be adjusted to a specific value using the keypad in the monitor. This option is available in "Reach Bench" menu in monitor. Click this option to adjust the "Reach Bench" in the machine. Enter the desired value using keypad in monitor and click this icon to set the desired measurement of "Reach Bench" in the machine.

Heading Bench

The heading direction feature allows the heading to be set to any direction desired. The heading direction establishes the plane for the slope when a non-zero slope value is used. The slope will be aligned with the set heading direction, regardless of the machine house swing or boom swing angle.

The heading direction will also impact the bucket horizontal distance. The horizontal distance is the parallel distance from the bench point along the heading direction.

Note: Heading direction is held relative to the undercarriage position. Changes to the undercarriage angle (i.e. due to turning during travel) will impact the heading direction. It will not change the setting on the machine, however the machine undercarriage will be pointing in a different direction, resulting in a different heading angle.

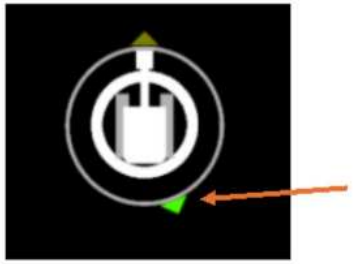

Illustration 50 g07833265

The heading direction is indicated by a green arrow on the Ease of Use swing icon. To set the heading direction, select"Heading Bench" within the Indicate feature menu.

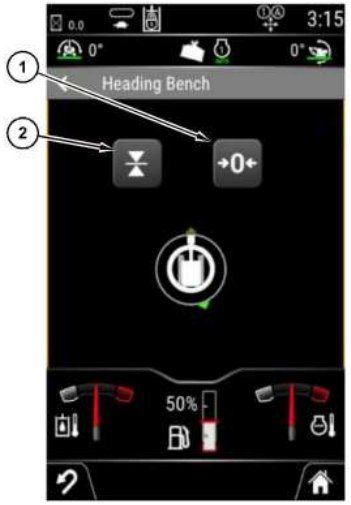

Illustration 51 g07833267

(1) Heading 0
(2) Heading Bench

Position the linkage in the desired direction of the new heading. Once the desired direction is achieved, select the "Heading Bench" button. The heading will change to the direction the linkage is currently pointing.

The heading can be reset to the straight forward (blade position) at any time by selecting the"Heading 0" Button.

The "Ease of Use" swing icon does not accommodate boom swing. The linkage on the icon does not move when the boom swing is moved to the left or right of center. However, when the boom swing is moved, the heading is changing relative to the position of the linkage. To represent this change in heading relative to the linkage position during boom swing, the green arrow moves on the "Ease of Use" swing icon. The arrow moves in the opposite direction of the boom swing.

Slope

The Slope settings allow a prescribed slope to be configured and to define the slope reference. To adjust the Slope settings, select "Slope" within the Indicate feature menu.

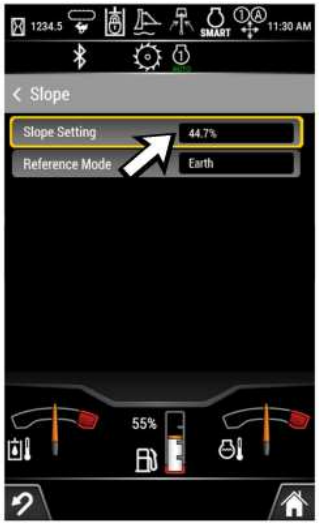

Illustration 52 g06751784
"Slope Setting" menu in monitor

The slope setting is the desired grade that the indicate system will follow. For example, if a 20% grade is selected, the height of the level position will increase, relative to the bench height, as you move the stick away from the machine to match a 20% grade. If the slope is set to a negative value, the height of the level position will decrease as you move the stick away from the machine.

Illustration 53 g06751785
"Slope Setting" menu in monitor

Illustration 54 g07600832

To modify the slope, select "Slope Setting" within the Slope menu. Enter the desired slope then select "Enter". The current selected slope value will also be shown on the home screen (if "Earth" is the selected "Reference Mode") in monitor. Alternatively, the "Slope Setting" menu can be reached by selecting the Target Slope box on the home screen.

Illustration 55 g07280900
Home screen in monitor

Note: The slope units can be configured as either degrees, percentage, or ratio (rise:run). To change the units, select "Menu", "Display Settings", "Units", "Grade Unit Select" then select either degrees or percentage.

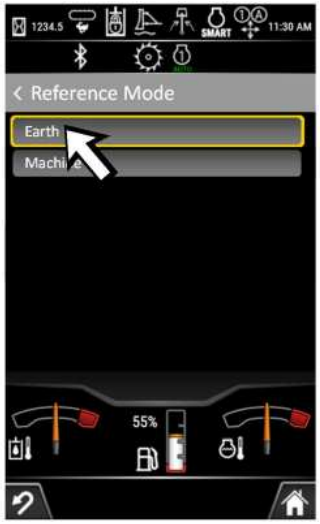

Illustration 56 g06751787
"Reference Mode" menu in monitor

The "Slope Reference" Mode determines whether the slope references Earth gravity or the machine slope. If set to "Earth", the Slope feature functions as described above. If set to "Machine", the Slope settings and home screen values are hidden and the slope feature is effectively disabled. In "Machine" reference mode the indicate system uses a "Zero"' slope target relative to the bottom of the machine tracks.

To modify the reference mode, select "Reference Mode" within the Slope menu. Select the desired reference mode of either "Earth" or "Machine".

Setup

Illustration 57 g07600835
"Setup" menu in monitor

"Setup" menu within the "Indicate" feature provides several options for configuring the user interface.

"Indicator Bars Enable" setting "Enable" or "Disable" the indicate bars on the home screen in the monitor. The indicate bars provide visual indication of the bucket tip position relative to the "Height Bench" position.

"On-Grade Tolerance" allows for different resolution settings for the indicator bars.

"Sound Setup" includes individual settings for audible indication of above grade, on grade, below grade and volume level. The Volume is adjustable between Off, Low, Medium and High. The "Sound Setup" can be added to the shortcut menu in the monitor if desired.

If the accuracy of the Indicate feature has degraded and is not within tolerance, check the following:

- Verify the bucket tooth wear by checking the "Bucket Wear Adjust measurement" within the "Bucket Measure Up".
- Confirm the work tool dimensions and plumb angles are correct within the "Bucket Measure Up".
- Inspect the boom swing position sensor linkage for wear or damage. Refer Combined Manual, M0136953 , "Mini Hydraulic Excavators Electrical Systems" for more information.

E-Fence

Swing E-Fence

Illustration 58 g06751788
"Swing E-Fence" menu in monitor

The "Swing E-Fence" feature allows you to limit the swing angle in the left and right direction. To access the "Swing E-Fence" menu select "Menu", "Ease of Use", "E-Fence" then "Swing E-Fence".

To activate the "Swing E-Fence" feature, place the machine in the desired maximum swing angle. Then select either "Set Left E-Fence" to set the current angle as the maximum swing left angle or "Set Right E-Fence" to set the current angle as the maximum swing right angle. Once selected, this will activate the "Swing E-Fence" and the swing icon will appear on the lower right of the display. The green portion of the circle indicates where swing is allowed, and the white area indicates where the E-Fence has been established and swing is not allowed.

Note: The boom, stick, bucket and boom swing commands may also be limited by the Swing E-Fence feature. If moving the function in the commanded direction causes the linkage to move into the E-Fence region, the command will be limited.

Note: The swing E-Fence set point has a small offset to allow for repositioning of the linkage on machines equipped with boom swing.

After setting the "Swing E-Fence" in one direction, the E-Fence can be set in the opposite direction by placing the machine in the desired maximum swing angle and selecting either "Set Left E-Fence" or "Set Right E-Fence" to set the current angle as the maximum angle in the other direction.

To disable the "Swing E-Fence" feature select "Disable Swing E-Fence". To increase the swing angle limits beyond the current settings, you must also select "Disable Swing E-Fence" and then set the new swing angle limits using the method above.

Note: If a travel command is given while an "E-Fence" feature is active, a warning will become active on the display indicating that the "E-Fence" is no longer valid because the machine has been moved. To clear the warning, the "E-Fence" feature must be disabled, or the limit must be reset.

Note: If the machine is equipped with a Tilt Rotating System (TRS) or tilting bucket/coupler and a tilt or rotate command is given, a warning will become active on the display indicating that the E-Fence is no longer valid because the bucket has been moved. To clear the warning, the E-Fence feature must be disabled, or the limit must be reset.

E-Fence Disable

Illustration 59 g07800722

Select E-Fence icon on the monitor display.

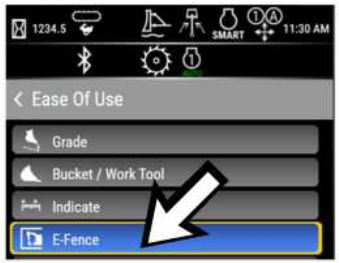

Illustration 60 g07800724

The E-fence option can also be accessed by using Ease of Use menu. Refer to Ease Of Use (If Equipped).

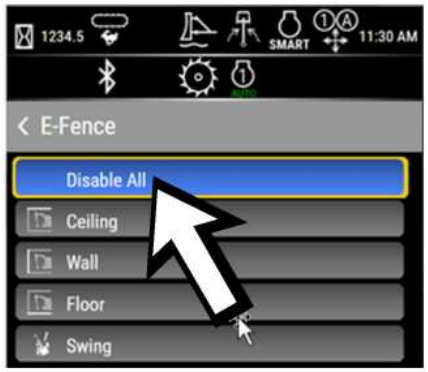

Illustration 61 g07800725

The E-Fence disable option allows us to disable the present E-Fence dimensions that are set. Operator can either either disable the complete E-Fence feature by selecting "Disable All" or the individual E-Fence features can also be disabled.

Illustration 62 g07800729

A pop-up window will appear in the monitor display with a timer for 10 seconds within which the quick coupler operation needs to be enabled.

Illustration 63 g07800595

Press the button on left joystick to enable the operation. Refer to Illustration 63 for more information. If the operator did not press the button on left joystick to enable the quick coupler operation within 10 seconds, the operation will fail and return back to the unlock request screen.

The E-Fence feature allows the operator to set working limits to the bucket operating position and swing angles. When enabled with limits set, the corresponding function command will automatically be reduced and stopped as the linkage approaches the set limit. A warning will become active on the display indicating the feature is limited due to the E-Fence feature. The linkage will not be allowed beyond the set limit until the corresponding function limit is disabled.

The E-Fence feature can be added to the shortcut menu in the monitor if desired.

Ceiling, Wall, Floor E-Fence

Illustration 64 g07600837
"Ceiling E-Fence" menu in monitor

The Ceiling, Wall, and Floor E-Fence features allow you to limit the upper, reach (extension) and lower bucket position. To access the Ceiling, Wall or Floor E-Fence menu select "Menu", "Ease of Use", "E-Fence" then "Ceiling E-Fence", "Wall E-Fence", or "Floor E-Fence".

The example provided is for the "Ceiling E-Fence" feature. The "Wall and Floor E-Fence" features work in the same way. To activate the "Ceiling E-Fence" feature, place the linkage in the desired maximum position. Then select "Set Ceiling" to set the current highest point of the linkage as the maximum allowable height. Once selected, this will activate the "Ceiling E-Fence"and the E-Fence icon will appear on the lower left of the display. The

green portion indicates that the corresponding E-Fence is not active, and the white portion indicates that the corresponding E-Fence is active. Alternatively, the "Ceiling E Fence" and "Floor E Fence" height can be adjusted to a specific value using the keypad in the monitor after the initial fence is set. This adjustment is not available for the "Wall E Fence".

Note: The maximum position of the boom, stick and bucket linkage will be limited by the E-Fence feature. Depending on the position of the machine and the linkage, the maximum position could be set by the bucket, stick or boom. The boom, stick, bucket, house swing, and boom swing commands may be limited by the E-Fence feature.

To disable all or individual e-fence, press shortcut or through menu->machine settings->Ease Of Use ->E-Fence. Once select "Disable All" or individual fence, there is a popup screen to request operator to press the left joystick yellow button to confirm the E-fence is disabled. The popup window has 10 seconds timers, if timer expires, it will keep E-fence activated.

If multiple E-Fences are setup, they can all be disabled from the main E-Fence menu by selecting Disable All.

Note: If a travel command is given while an E-Fence feature is active, a warning will become active on the display indicating that the E-Fence is no longer valid because the machine has been moved. To clear the warning, the E-Fence feature must be disabled, or the limit must be reset.

Note: If the machine is equipped with a TRS or tilting bucket/coupler and a tilt or rotate command is given, a warning will become active on the display indicating that the E-Fence is no longer valid because the bucket has been moved. To clear the warning, the E-Fence feature must be disabled, or the limit must be reset.

Bucket Assist

Illustration 65 g07187190
"Bucket Assist" menu in monitor

The "Bucket Assist" feature automatically commands bucket rack and curl to maintain a constant bucket angle when not being commanded by the operator. The bucket angle will be relative to earth gravity or the machine as configured in the reference mode within the "Slope" menu.

To access the "Bucket Assist" select "Menu", "Ease of Use" then "Bucket Assist". To enable the "Bucket Assist" feature, selected "Enabled". To disable the feature, select "Disabled".

Bucket Assist Disable / Enable

Illustration 66 g07800734

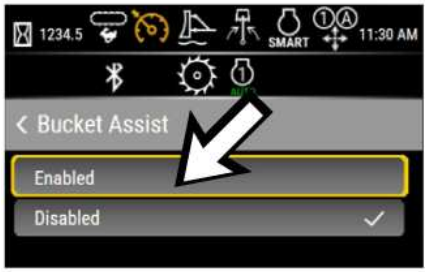

Illustration 67 g07800737

To access the "Bucket Assist" select "Menu", "Ease of Use" then "Bucket Assist". To enable the "Bucket Assist" feature, selected "Enabled". To disable the feature, select "Disabled".

Illustration 68 g07800740

A pop-up window will appear in the monitor display with a timer for 10 seconds within which the bucket assist operation needs to be enabled.

Illustration 69 g07800595
Button on left side joystick

Press the button on left joystick to enable the operation. Refer to Illustration 69 for more information. If the operator did not press the button on left joystick to enable the bucket assist within 10 seconds, the operation will fail and return back to the unlock request screen.

Swing Assist

Illustration 70 g07800743

Illustration 71 g07600839
"Swing Assist" menu in monitor

The "Swing Assist"feature allows you to limit the swing angle in the left and right direction, much like the Swing E-Fence feature. However, with "Swing Assist", swing can be commanded past the set angle limit. This is done by releasing the swing command after coming to the limit and then reapplying a swing command in the same direction.

To access the "Swing Assist" menu select "Menu", "Ease of Use" then "Swing Assist". To activate the "Swing Assist" feature, place the machine in the desired maximum swing angle. Then select either "Set Left Swing Assist" to set the current angle as the swing left angle limit or "Set Right Swing Assist" to set the current angle as the swing right angle limit.

After setting the "Swing Assist" angle limit in one direction, it can be set in the opposite direction by placing the machine in the desired maximum swing angle and repeating the method above for the other direction.

To disable the "Swing Assist" feature select "Disable Left/Right Swing Assist" for the corresponding direction. To increase the"Swing Assist" angle limits beyond the current setting, you must disable the "Swing Assist" and then set the new "Swing Assist" angle limits using the method above.

Illustration 72 g07800748

A pop-up window will appear in the monitor display with a timer for 10 seconds within which the swing assist operation needs to be enabled.

Illustration 73 g07800595
Button on left joystick

Press the button on left joystick to enable the operation. Refer to Illustration 73 for more information. If the operator did not press the button on left joystick to enable the bucket assist within 10 seconds, the operation will fail and return back to the unlock request screen.

Note: The swing assist feature does not apply to boom swing. All angle limits are based on the swing position only. Changes to the boom swing angle will not impact the swing angle limits. For example, if a swing assist left angle limit is set, then the boom swing is commanded left, the linkage can extend past the set position when swinging to the left swing assist angle limit.

Display Settings

Display settings configure the monitoring system on the machine. To access the display settings press the "Menu" button, select "Display Settings", then select the desired display setting to be adjusted. Available settings include Show Camera (if equipped), Brightness, Clock Adjust (if equipped), Language, Units, Clock Format (if equipped), Shortcut Settings, and Screen Lock.

The screen lock feature is only available on the premium touchscreen monitor. On cab machines, enabling the screen lock feature will keep the screen locked until unlocked by the operator. It will remain unlocked until the screen lock is enabled again within the display settings.

On canopy machines the screen lock feature is always active. To unlock the screen, tap the touchscreen and touch the unlock button for 2 seconds. The screen will automatically lock again 10 seconds after that last touch of the display.

The jog dial module can always be used to navigate and activate display functions, even when the screen is locked.

Shortcut Settings

- Shortcut settings are configurable allowing for direct access to submenu options on the monitoring system using the Navigation Buttons. The following shortcut settings such as pattern changer, quick coupler, performance, camera, auto idle, continuous flow, work tool select, aux flow 1, aux flow 2, HVAC, radio, audio source, shovel crane, bluetooth, tilt rotator, cruise control, beacon light, joystick steering pattern, job clock can be selected.

To access the display settings, press the "Menu" button, select "Display settings", then select the desired display setting to be adjusted.

HVAC (If Equipped)

Accesses the cab climate control system. Refer to the Air Conditioning and Heating Control section for more information.

Radio (If Equipped)

Accesses the radio controls of the machine. Refer to the Radio section for more details on how to operate.

Information

Accesses the performance and ECM summary submenus.

Performance

- Displays sensor parameters available on the machine such as engine speed and pump pressure.

ECM Summary

- To access the ECM summary press the "Menu" button, select "Information", then "ECM summary"

Service

Includes submenus showing diagnostics and service mode.

Contact your dealer for more information about menu items not disclosed in this manual.

Diagnostics

Reports fault code information used for troubleshooting.

Maintenance Intervals

The Maintenance feature allows the tracking of machine running hours on various routine service items on the machine. The number of machine running hours since the last reset is accumulated individually for each service item. Maintenance interval hours are stored to the machine ECM, if you change or upgrade your display, the current maintenance interval hours will be retained and shown in the new display.

Illustration 74 g06711006

To access the Maintenance options, press the "Menu" button, select "Service", then "Maintenance".

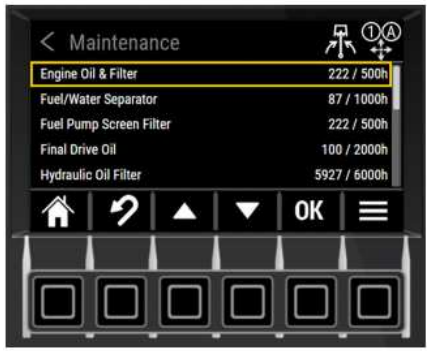

Illustration 75 g06711007

The Maintenance menu shows the various service items along with the total machine running hours accumulated since last reset on the left and the recommended service interval on the right.

When any of maintenance items are within 20 hours of being due, there will be a "Maintenance Due" popup alerting the operator. The pop-up will appear every time the key is turned on. Once cleared, it will not appear again until the key is turned on again.

When any of the maintenance items are past due, there will be a "Maintenance Past Due" popup alerting the operator. The pop-up will appear every time the key is turned on. Once cleared, it will not appear again until the key is turned on again.

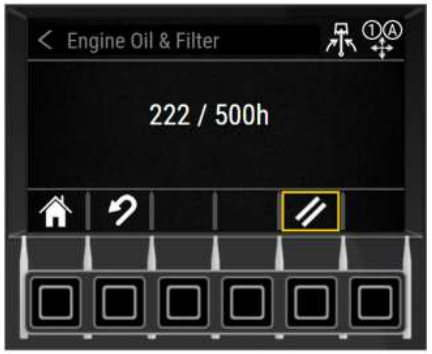

Illustration 76 g06711008

To reset a maintenance item, highlight the desired item in the menu and press "OK". Within the screen for that items is a reset option (button with two parallel lines). Select the reset button.

Illustration 77 g06711012

Press "OK" to confirm the reset. After pressing "OK", the number of machines running for that item will be set to 0.

Note: If machine security is enabled, you must be logged in as a Master user to reset a maintenance item. If logged in as a Standard user, a Master Level Access Required message will appear when pressing "OK" and the value will not be reset.

Service Mode

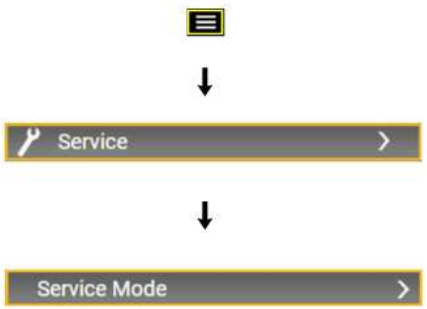

Illustration 78 g06334877

To access the Service Mode Menu options, press the "Menu" button, select "Service", then "Service Mode".

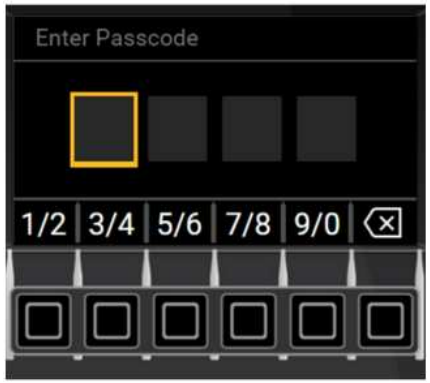

Illustration 79 g06334880

Enter the four-digit service entry password.

Note: Factory set default code is 1234 or 1925.

Thumbwheel Mode

Thumbwheel Mode allows stick to toggle to right thumb roller when in sticks steer mode. Refer to Operation and Maintenance Manual , "Joystick Controls" for more information.

This parameter must be ENABLED for the joystick thumbwheel controls to be used.

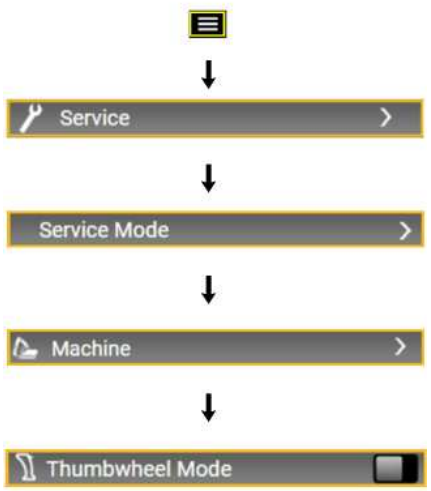

Illustration 80 g06334888

To access the Thumbwheel Mode options, press the "Menu" button, select "Service", "Service Mode", "Machine", then "Thumbwheel Mode".

Illustration 81 g06334998

To enable the Thumbwheel Mode function, select "Thumbwheel Mode" and press "OK".

Note: When the indicator is green and the slide is to the right, the feature is activated.

Auxiliary Flow Command Direction Inversion

Auxiliary Invert allows the Aux 1 and Aux 2 commands to be inverted so that rolling the thumbwheel up will send flow to the A port (right side of stick). Rolling to the thumbwheel down will send flow to the B port (left side of stick).

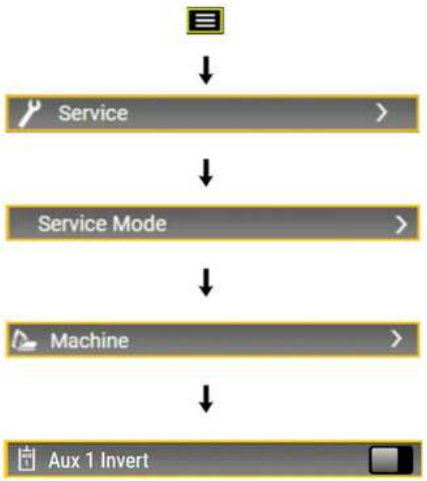

Illustration 82 g06711017

To access the Auxiliary Invert options, press the "Menu" button, select "Service", "Service Mode", "Machine", then "Aux 1 Invert" or "Aux 2 Invert".

Illustration 83 g06711019

To enable the Auxiliary inversion, arm bar needs to be up, select "Aux 1 invert" or "Aux 2 invert" or "Aux 3 invert" or "TRS Rotate Invert " or "TRS Tilt Invert" or "TRS Extra 1 Invert" or "TRS Extra 2 Invert", and pressure OK. IF arm bar is down, there is a banner to tell operator to put arm bar up.

Note: When the indicator is green and the slide is to the right, the feature is activated.

Security

Machine security can be configured to prevent unregistered access to your machine. Additional security features can be configured using the Monitoring System. Press the "Menu" button, select "service", "service mode", then "security". If security is disabled or a standard security level passcode or bluetooth key was used to access the machine, you will be prompted to enter a master security level passcode when accessing the security screens. The default master passcode from the factory is "1 1 1 1". This default passcode can be removed after creating a master passcode.

If security is enabled and a master security level passcode or bluetooth key was used to access the machine, it will proceed directly to the security screens.

Security Enable

Toggling this setting will turn the security system ON or OFF.

Grace Period

This setting is used to set the duration after key off that the registered user stays logged on to the machine. If the machine is turned ON within this time range, the machine will bypass security access without the use of a Bluetooth key or passcode.

Users / Keys

The Users / Keys category from the Security Menu allows the owner / technician to enter unique passcodes (PINs) and/or Bluetooth keys (each with a unique ID) which allow those authorized users to start and operate the machine. Also, the owner or authorized technician can delete passcode PINs and Bluetooth key IDs of authorized keys and users.

Illustration 84 g06334983

To access the User / Keys options, press the "Menu" button, select "Service", "Service Mode", "Security", then "Users / Keys".

Illustration 85 g06390456

Add PIN

Illustration 86 g06345288

To add new 4-digit PIN to the passcode list of authorized users, select "Add PIN" from the "Users / Keys" menu.

Illustration 87 g06345290

Only a user with a "Master" passcode can enter new "Standard" passcodes.

Note: Standard passcodes are for operators and technicians - Master passcodes are intended for owners or authorized personnel

Multiple Master passcodes can be added to the Master Passcode list. The default master passcode from the factory is "1 1 1 1". This default passcode can be removed after creating a master passcode.

This same strategy applies to the Bluetooth system, with a Master Bluetooth key used to add or remove Bluetooth keys from respective lists.

Consult your Cat® dealer for more information.

Note: A maximum total of 25 passcodes and keys can be added to the machine.

Illustration 88 g06345300

From the Add PIN entry screen, use the number buttons to enter a unique 4-digit passcode number.

Note: Each button can enter two numbers. To enter the number two (2), press the left-most "1/2" button twice, then the highlight will move to the next entry field to the right.

Each time a number is entered, the highlight will automatically move to the next space to the right.

Once all four numbers have been entered, the new passcode will be added to the list of authorized PINs. The display will then return to the Keys/Users Menu.

In the example above, when the operator turns the key start switch to ON, the monitor will display the startup passcode entry screen. When the operator enters "1111", the MSS will allow the engine to be started.

Remove PIN

Illustration 89 g06345316

To remove a 4-digit PIN to the passcode list of authorized users, select "Remove PIN" from the "Users / Keys" menu.

From the "Remove PIN" entry screen, use the number buttons to enter the 4-digit passcode number that you wish to remove if equipped with the Performance display or select the 4-digit passcode number you wish to remove if equipped with the Premium display.

Press the "OK" button or tap the center of the Jog Dial (if equipped) to remove the 4-digit passcode number from the list of authorized passcodes.

Add Bluetooth Key

Illustration 90 g06345355

To add new Bluetooth key ID to the list of authorized Bluetooth keys, select "Add Bluetooth Key" from the "Users / Keys" menu.

From the "Users / Keys" menu, use the arrow buttons to highlight the "Add Bluetooth Key" option, then press the "OK" button. The "Add Bluetooth Key" confirmation screen will appear.

Illustration 91 g06345356

Use the arrow buttons to highlight the "Standard" or "Master" option, then press the "OK" button. The "Add Bluetooth Key" screen will be displayed.

Illustration 92 g06345359

Use a combination of number buttons and Jog Dial Module (if equipped) to enter the unique 12-digit alpha-numeric ID assigned to Bluetooth key chip.

The "Add Bluetooth Key" screen is first displayed with all 12 ID spaces blank and the left-most space highlighted. Use the arrow buttons scroll up and down through the numbers 0-9, then alpha characters A-F, which are displayed in the space. When the desired character is displayed in the highlighted space, move to the next space.

Note: The highlight can also be moved left to change a number previously entered.

Repeat this process for all 12 spaces. When all 12 spaces have been filled with the unique 12-digit Bluetooth key ID, press the "OK" button or tap the center of the Jog Dial (if equipped) to enter the Bluetooth key ID to the list of authorized Bluetooth IDs.

The display will return to the "Users / Keys" Menu.

Remove Bluetooth Key

Illustration 93 g06345381

To remove a 12-digit Bluetooth key ID from the list of authorized Bluetooth key IDs, select "Remove Bluetooth Key" from the "Users / Keys" menu.

Enter the unique 12-digit alpha-numeric ID assigned to the Bluetooth key ID that you wish to remove if equipped with the Performance display or select the Bluetooth Key ID that you wish to remove if equipped with the Premium display.

Press the "OK" button or tap the center of the Jog Dial (if equipped) to remove the Bluetooth key ID from the list of authorized Bluetooth IDs.

The display will return to the "Users / Keys" Menu.

Display System Mode

The Display System Mode can be changed between Normal and Simplified. When the mode is set to Normal, all available display settings are shown and available for adjustment. When the mode is set to Simplified, the display settings below are hidden and not available for adjustment:

- Fine Grading
- All joystick response settings
- Advanced implement speed settings (overall setting still available)
- Forward travel trim
- Reverse travel trim
- Auxiliary 1 flow balance
- Auxiliary 2 flow balance
- Job clock

- ECM summary
- Machine configurations within service mode

The Simplified Display System Mode is intended for customers who want to limit the adjustability of the machine.

To access the Display System Mode options, press the "Menu" button, select "Service", "Service Mode", then "Display System Mode".

Seat Belt Reminder System (If Equipped)

If the machine is fitted with the operator presence seat belt assembly, the seat belt reminder system will be active on the machine. Consult your Cat® dealer for more information.

The red seat belt warning symbol is always present on the top status bar when the seat belt is not fastened. Once the seat belt is fastened, the red seat belt warning symbol disappears and there will be no other seat belt notifications while the seat belt remains fastened.

Illustration 94 g06751792
Seat Belt Indicator in Monitor

Illustration 95 g06721427

If the belt is not fastened while the engine is running and the arm bar is lowered, there will be a pulsing audible tone for 10 seconds every minute and a pop-up message stating "Seat Belt Unfastened – Fasten Belt" will display on monitor. Consult your Cat® dealer for more information.

Monitor Wake-up Feature

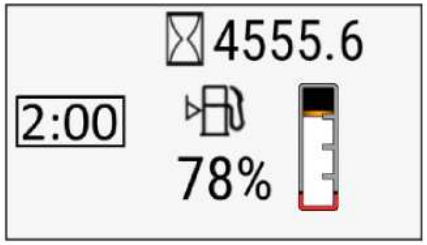

Illustration 96 g06366070
Monitor wake-up screen example

Pressing any navigation button on the monitor will display the service hours of the machine and actual fuel level for 2 minutes. This feature will function when the key is in the OFF position and the battery disconnect switch is in the ON position.

Note: This feature can also be activated by pressing the monitor wake-up button located below the cup holder in the cab (if equipped).

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Illustration 1 g06278943
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".

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WARNING

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

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

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

NOTICE

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

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

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

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

With certain combinations of work tools, the third pedal can have different functions. Always check the function of the third pedal before you use the third pedal.

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

Consult your Cat dealer for special work tool tips that are available for use in severe applications.

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

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

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

Use a comfortable travel speed while you operate the machine.

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

Never swing a load over a truck cab or workers.

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

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

Coaching Tips

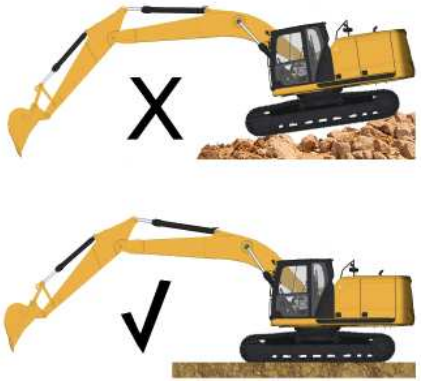

Illustration 1 g06223763

Digging with a stable machine increases productivity. Create a stable work platform.

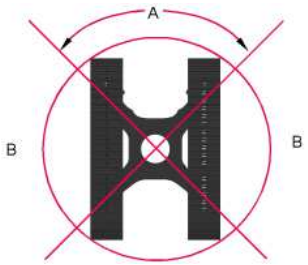

Illustration 2 g06210141

(A) Most stable dig
(B) Dump

For improved stability: Do not dig over the drives or perpendicular to the tracks.

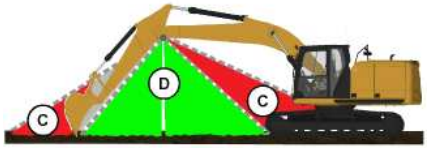

Illustration 3 g06212328
(C) Weak crowd force
(D) Ideal crowd force

Dig from the top down in layers. Try to have a full bucket by the time the stick is vertical, but do not reach too far with the stick. The most crowd force is generated with the stick +/- 30 degrees from vertical.

Minimize unneeded movement. Only curl/dump the bucket as much as required to hold/dump material.

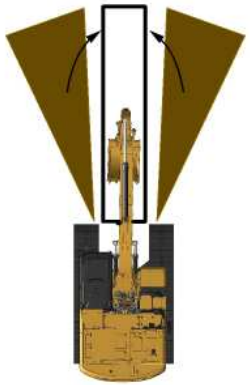

Illustration 4 g06210334

Minimize unneeded movement. During backfilling, start with the material closest to the trench.

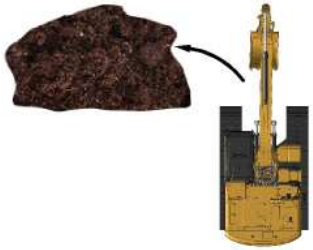

Illustration 5 g06210343

Watch your surroundings. Swing left to dump material for better visibility.

Watch the bucket. The bucket can contact the tracks or the cab.

Concentrate on being smooth, speed will come with practice.

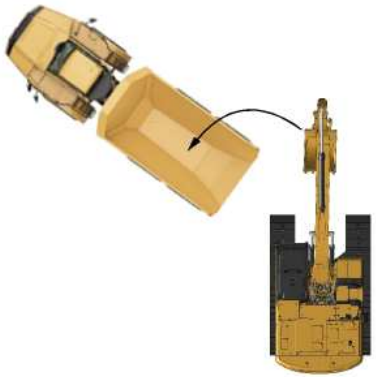

Illustration 6 g06212604

Truck placement will affect efficiency: 45 degree truck loading is more efficient than 90 degree. Spotting the truck too far from the excavator causes excessive motion.

Load from a bench when possible. Bench loading is more efficient.

Restricted Operation

Illustration 7 g06222487

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

- Soil compaction
- Ground breaking
- Demolition

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

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

Illustration 8 g06212594

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

Illustration 9 g06222492

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 practice 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.

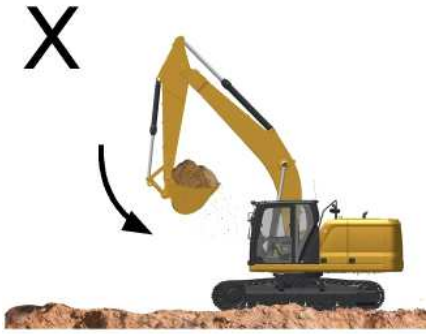

Illustration 10 g06222498

If the stick IN function is operated at full speed with a fully loaded bucket or heavy work tool attachment to the end of the cylinder stroke, excessive force will occur inside the stick cylinder. This action will reduce the life of the stick cylinder. To avoid this problem, always operate a stick IN function with moderate speed towards the end of cylinder stroke.

Illustration 11 g06222500

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.

X

Illustration 12 g06222505

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

Operating Precaution

Illustration 13 g06222507

NOTICE

Do not allow the machine to swing from the force of traveling when you use the bucket , the stick, or the boom to assist in travel. If the force from traveling causes the machine to swing, damage may occur to the swing motor and to the swing drive.

Do not use the force of the bucket, the stick, or the boom to assist in turning the machine while the machine is traveling. This technique is referred to as “jump steering”. This technique will damage the swing motor and the swing brake.

Illustration 14 g06222509

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.

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WARNING

The bucket can interfere with the cab on machines equipped with a VA boom or a one piece boom with a long stick.

Know the machine's linkage movement extremes. Keep bucket and other work tools away from the cab at all times to avoid personal injury.

Some work tools can swing in all directions. Personal injury may result if the work tool swings into the cab or into a person in the work area.

The VA cylinder can interfere with the raised stabilizer. Know the linkage movement extremes and keep the VA cylinder away from raised stabilizers at all times to avoid possible personal injury.

Know the maximum height and 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 the distance at least 3000 mm (118 inch) plus an additional 10 mm (0.4 inch) for each 1000 volts over 50000 volts.

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

Make sure that no personnel are on the machine or near the machine to prevent any personal injury. Always keep the machine under control to prevent injury.

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

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

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

When you travel for any distance, keep the stick inward and carry the boom in a low position.

When you drive up a steep grade, keep the boom as close to the ground as possible.

When you travel uphill or you travel downhill, keep the boom on the uphill side of the machine.

1. Adjust the operator seat.
2. Fasten the seat belt.

Illustration 1 g06181515

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

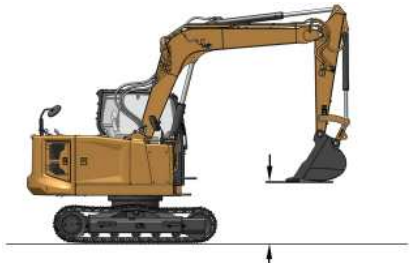

Illustration 2 g06278743

5. Raise the boom enough to provide sufficient ground clearance.
6. Select the desired travel speed by operating the travel speed control switch.
7. Make sure that the position of the upper structure and of the undercarriage is known before you move the machine. The drive sprockets should be at the rear of the machine.
   Note: The directional steering controls will operate normally if the drive sprockets are at the rear of the machine and the idlers are at the front of the machine and under the cab. When the sprockets are under the cab, the travel controls will operate backward.
8. Turn the engine speed dial to increase the engine speed (rpm) to the desired speed.
9. Push both travel levers forward at the same time to travel forward. If both travel levers are pushed farther, the travel speed at the selected engine speed (rpm) will be faster.
   Note: If the machine does not operate or if the machine does not travel in a straight line, consult your Caterpillar dealer.
10. See Operation and Maintenance Manual, "Operator Controls" for information about spot turning and about pivot turns.
11. When you make turns in soft material, travel in a forward direction occasionally to clear the tracks.
12. Slowly move both of the travel levers or both of the travel pedals to the CENTER position to stop the machine.

Lifting Objects

Regional regulations may require the use of an overload warning device and boom and stick lowering control valves when used to lift objects.

The overload warning device (if equipped) must be adjusted for the bucket linkage and bucket size that is installed on the machine. Adjust the overload warning device for proper operation.

The setting for the overload warning device (if equipped) should be checked by an authorized dealer.

Contact your Cat dealer for additional information.

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

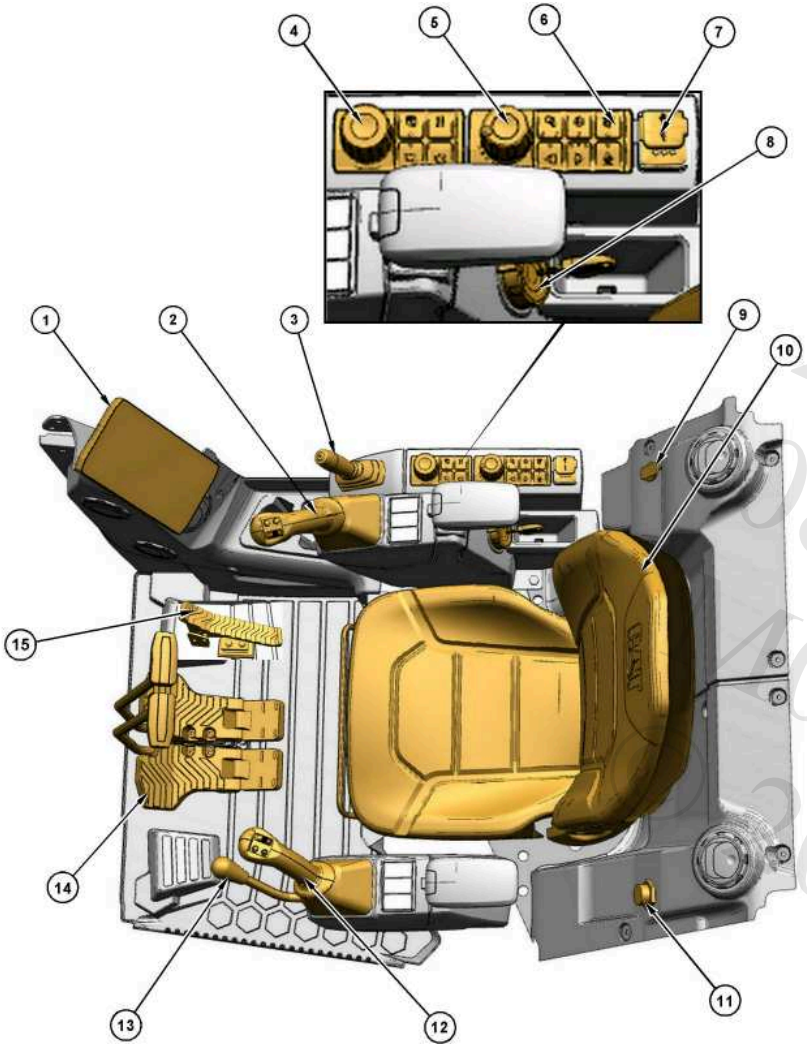

Illustration 1 g07197165

(1) Monitor
(2) Right side joystick controls
(3) Dozer blade lever (if equipped)
(4) Jog dial
(5) Engine speed dial
(6) Right side switch panel

(7) Universal Serial Bus (USB) port (if equipped)
(8) Engine start switch
(9) Power outlet (12V)
(10) Operator seat
(11) Diagnostic Port
(12) Left side joystick controls
(13) Hydraulic lockout control
(14) Travel control lever (if equipped)
(15) Auxiliary control pedal (if equipped)

Monitor (1)

Monitor - Monitor (1) is used to display various operating information of the machine. For more information on the operation of monitor (1), refer to Monitoring System .

Right Side Joystick Controls (2)

Right Side Joystick - Right side joystick controls (2) are used to control the functions of the machine implements. For more information on the individual functions of the joysticks, refer to Joystick Controls .

Dozer Blade Lever (3) (If Equipped)

Float - Push dozer blade lever (3) fully forward. The blade will lower to the ground. The blade will float with the contour of the ground. Dozer blade lever (3) will return to the HOLD position.

Lower - Push dozer blade lever (3) forward to lower the blade. Dozer blade lever (3) will return to the HOLD position when the operator release dozer blade lever (3). The blade will remain in the selected position.

Hold - Dozer blade lever (3) will return to the HOLD position when dozer blade lever (3) is released from the RAISED position or LOWERED position.

Raise - Pull dozer blade lever (3) backward to raise the blade. Dozer blade lever (3) will return to the HOLD position when the operator releases dozer blade lever (3). The blade will remain in the selected position.

High-Speed Travel Switch (3A) (If Equipped)

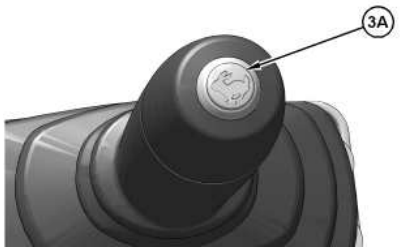

Illustration 2 g06277194
(3A) High-speed travel switch

High-speed travel switch (3A) is on dozer blade lever (3). Use high-speed travel switch (3A) to change the travel speed.

Push the switch again to make the machine travel in high speed. The indicator light on the instrument panel is active when the machine is in the high-speed mode. Push the switch again to return to low speed.

Always travel at slow speeds on slopes and rough ground.

Jog Dial (4)

Jog Dial - Turn jog dial (4) to choose the desired item in the monitor and depress jog dial (4) to activate the selection. Refer to Monitoring System for more information.

Engine Speed Dial (5)

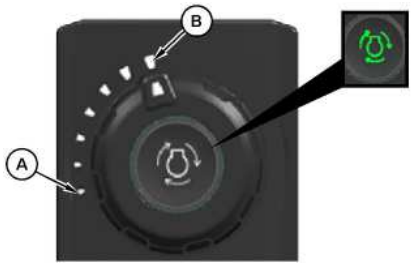

Illustration 3 g07264243
(A) Low engine idle
(B) High engine idle

Turn engine speed dial (5) to control the engine speed (engine rpm). Select desired position from the seven positions that are available. Turn engine speed dial (5) counterclockwise to decrease the engine speed (engine rpm). Turn engine speed dial (5) clockwise to increase the engine speed (engine rpm).

Low Engine Idle (A) - The engine operates in the low rpm range.

High Engine Idle (B) - The engine operates in the high rpm range.

Pressing the center of the engine speed dial can change the engine operation mode from "Power On Demand" mode to "Standard" mode (if equipped). A green illuminator on the center of the throttle dial indicates if the "Power On Demand" mode is active.

In addition to the green illuminator on the dial, a "SMART" Mode indicator, which is the indicator for "Power On Demand", will illuminate on the monitor. When the machine is in "Standard" Mode, the "Power On Demand" Mode indicator will not be illuminated on the monitor.

The default state of "Power On Demand" at key on can be changed by changing The Engine Speed Power Mode Power Up Default Configuration. Contact your Cat® dealer for more information. Three settings are available:

ON - Will always default to the ON position when the key is turned on (this is the default state from the factory). Power on demand can be cycled ON or OFF by pressing the center of the engine speed dial.

OFF - Will always default to the OFF position when the key is turned on. Power on demand can be cycled ON or OFF by pressing the center of the engine speed dial.

ALWAYS ON - Forced to ON position all the time, pressing the center of the engine speed dial does nothing.

Note: Some machines may prohibit toggling of the "Power On Demand" mode.

Note: The default power mode setting can be set within the monitor. For more information, refer to Monitoring System .

Right Side Switch Panel (6)

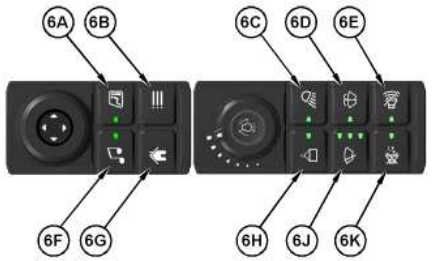

Illustration 4 g06285454
(6A) Heating ventilation air conditioning (HVAC) control button
(6B) Display menu shortcut button
(6C) Work light control button
(6D) Window washer control button
(6E) Travel alarm cancel control button
(6F) Radio control button
(6G) Home screen control button
(6H) Overload warning or shovel crane ON and OFF control button
(6J) Window wiper control button
(6K) Radio mute button

Heating Ventilation Air Conditioning (HVAC) Control Button (6A)

HVAC - Press this button to bring up the air conditioning and heating menu. The indicator light will illuminate when the heating and cooling system is active. The jog dial (4) can be used to make selections. If equipped with a touch screen, the selections can be made by touching the monitor. Refer to Air Conditioning and Heating Control for more information.

Display Menu Shortcut Button (6B)

Display Menu - Pressing display menu shortcut button (6B) navigates to the display menu in the monitor. Refer to Monitoring System for more information.

Work Light Control Button (6C)

Lights - Pressing work lights control button (6C) once turns on all work lights. Pressing the work light button again turns off all work lights.

Window Washer Control Button (6D)

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

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

Window Washer - Push window washer control button (6D) to activate the window washer. The LED will illuminate while window washer control button (6D) is pressed. Two wiper cycles will be completed after releasing window washer control button (6D).

Travel Alarm Cancel Control Button (6E)

Travel Alarm Cancel - LED will illuminate while travel alarm is canceled. Travel alarm cancel control button (6E) must be pressed every time travel command is initiated to mute the travel alarm.

Note: The travel alarm will sound when the travel levers or the travel pedals are activated.

Radio Control Button (6F)

Radio Control - Pressing radio control button (6F) will navigate the monitor to display the relevant screen for radio controls. Refer to Radio for more information.

Home Screen Control Button (6G)

Home Screen - Press home screen control button (6G) to return back to the home menu on the monitor. Refer to Monitoring System for more information.

Overload Warning or Shovel Crane ON and OFF Control Button (6H)

Overload Warning or Shovel Crane ON and OFF - If equipped with Overload Warning control button (6H), this feature functions as the ON / OFF button for that feature. When ON, the overload warning system activates if the boom pressure exceeds a threshold. If equipped with Shovel Crane, this feature functions as the ON / OFF button for that feature. When ON, the machine will display the actual load and load limit. If the actual load approaches or exceeds the limit, a warning is activated.

ON - When the LED is lit, the overload warning or shovel crane feature is ON.

OFF - When the LED is not lit, the overload warning or shovel crane feature is OFF.

Refer to Shovel Crane Control for more information.

Window Wiper Control Button (6J)

Window Wiper - Pressing window wiper control button (6J) once turns the wiper ON with a 6 second delay. Pressing window wiper control button (6J) again changes the delay to 3 seconds. Pressing window wiper control button (6J) turns on the wiper continuously. Pressing window wiper control button (6J) again turns OFF the wiper. If the front window is open, the wipers will not turn ON. If the window is opened while the wiper is ON, the wiper will stop until the window is closed.

No LEDs - Wipers are OFF

1 LED - 6 second intermittent delay

2 LEDs - 3 second intermittent delay

3 LEDs - Full ON

Radio Mute Button (6K)

Radio Mute - Press radio mute button (6K) to mute the radio. The indicator lamp will turn ON while the radio is muted.

USB Port (7) (If Equipped)

USB - USB port (7) is available to charge compatible electronic devices.

Note: the port is for charging purposes only.

Engine Start Switch (8)

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

Note: Always place the hydraulic lockout lever in the RAISED position while starting the engine. Engine start switch (8) will not function if the left hydraulic control is in the LOWERED position.

Key Switch (If Equipped)

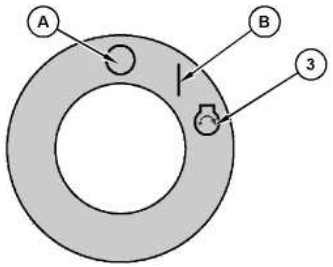

Illustration 5 g07264238
(A) OFF position
(B) ON position

(C) Start position

OFF - Insert the engine start switch key only while engine start switch (8) is in the OFF position (A). Remove the engine start switch key only while engine start switch (8) is in the OFF position (A). Turn engine start switch (8) to the OFF position (A) before the operator attempts to restart the engine. Turn engine start switch (8) to the OFF position to stop the engine (A). Refer to Stopping the Engine for more information.

ON - To activate the electrical circuits in the cab, turn the key clockwise to the ON position (B). Refer to Engine Starting for more information.

START - To start the tractor engine, turn the key clockwise to the START position (C). After the engine starts, release the key. The key will return to the ON position (B).

Note: If the engine fails to start, return engine start switch key to the OFF position (A). Return the engine start key to the start position before the operator attempts to start the engine again.

Refer to Engine Starting for more information.

Push to Start (If Equipped)

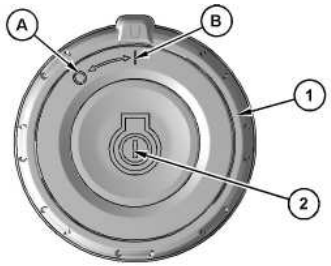

Illustration 6 g07264235

(A) Off
(B) On
(1) Engine start ring
(2) Start button

Note: The Bluetooth key must be inside the cab to active the electrical circuits.

OFF - Turn engine start ring (1) to the OFF position (A) to stop the engine. Refer to Stopping the Engine for more information.

ON - To activate the electrical circuits in the cab and enable engine starting, turn the engine start ring (1) clockwise to the ON position (B). Refer to Engine Starting for more information.

START - To start the engine, enter pass code in the monitor (only required if machine security is enabled). Press start button (2). After the engine starts, release the button. Refer to Engine Starting for more information.

Push to Start with Bluetooth Key Fob

If the machine is equipped with push to start and the Bluetooth key fob system, the machine will attempt to detect a Bluetooth key fob when the machine is turned on. If an authorized key fob is detected, the display will immediately proceed to the home screen and the engine will be allowed to start.

Note: the Bluetooth key can be detected when it is outside the cab if it is near the machine. Ensure that the Bluetooth key is in a sufficient distance from the machine when not in use to prevent unauthorized access to the machine.

Note: The Bluetooth key fob features a sleep mode to preserve battery life. If the key detects no movement for 90 seconds, it will go into sleep mode and stop communicating. While in sleep mode, it cannot be used to access a machine. The Bluetooth key will exit sleep mode and begin communicating after movement of the key is detected. When not in sleep mode, the Bluetooth key communicates every 5 seconds.

Note: If multiple key fobs are present, the first valid key fob detected by the transceiver will be read. If the machine is not able to detect a key fob when it is turned on, the display will prompt the user to enter a 4-digit numerical passcode.

If the voltage of the Bluetooth key fob used to access the machine is low (below 2.5V), a pop-up message will appear on the display indicating the low battery condition and recommend battery replacement. If this message appears, replace the battery within the Bluetooth key fob to ensure proper functionality of the key.

Illustration 7 g07264239
Indication in monitor for low battery condition

Power Outlet (12V) (9)

12V Power Outlet - Power outlet (9) can be used to power automotive electrical equipment or accessories. Power outlet (9) only operates when engine start switch (8) is in the ON position.

Operator Seat (10)

Operator Seat - Operator seat (10) has various adjustments to meet a wide range of operators. For more information, refer to Seat .

Diagnostic Port (11)

Diagnostic Port - This service port allows service personnel to connect a laptop computer to the machine electronics. This connection will allow service personnel to interrogate the machine systems and engine systems.

Consult with your Cat® dealer for additional information.

Left Side Joystick Controls (12)

Left side joystick - Left side joystick controls (12) are used to control the functions of the machine implements. For more information on the individual functions of the joysticks, refer to Joystick Controls for more information.

Hydraulic Lockout Control (13)

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.

The lever for hydraulic lockout control (13) is at the left side of the machine.

Locked - Move the travel levers/pedals and move the joysticks to the HOLD (center) position. Move the lever for the hydraulic lockout control (13) backward to the LOCKED position. All the factory installed hydraulic controls will become inoperable.

Note: Make sure that the lever for the hydraulic lockout control (13) is in the LOCKED position before attempting to start the engine. If the lever is in the UNLOCKED position, the engine start switch will not function.

Unlocked - Move the lever for the hydraulic lockout control (13) forward to the UNLOCKED position. All the factory installed hydraulic controls will become operable.

Tilt - For machines equipped with the tilt-up console, pull the lever to the rear most position to release the console lock and tilt the console upward for easier exit and entry.

Travel Lever Controls (If Equipped) (14)

Illustration 8 g06349484
Position for normal travel
(A) Rear of machine
(B) Final drive
(C) Idler

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

Stop - Release the travel levers/pedals to stop the machine. When the operator releases the travel levers/pedals from any position, the travel levers/pedals will return to the CENTER position. The travel brakes will be applied.

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

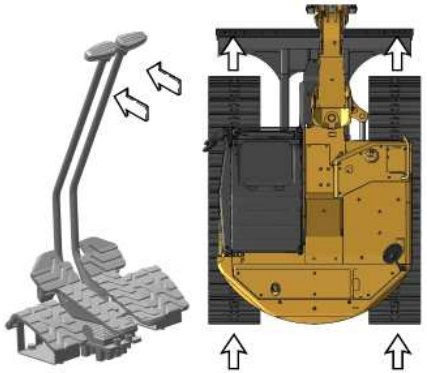

Illustration 9 g06338693
FORWARD travel

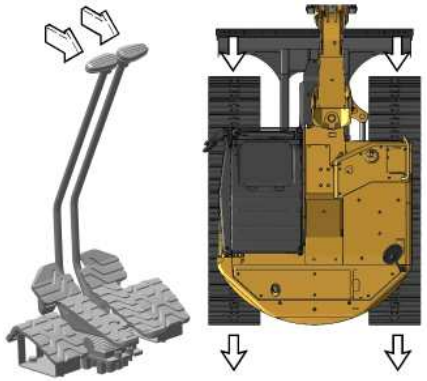

Illustration 10 g06338696
REVERSE travel

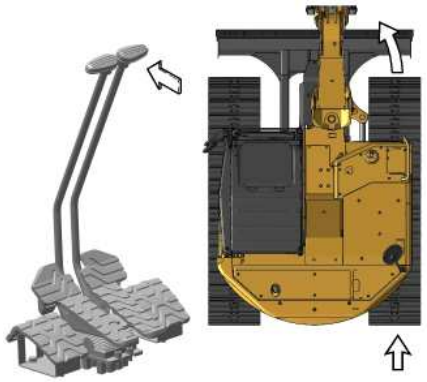

Illustration 11 g06338702
Pivot left turn (FORWARD)

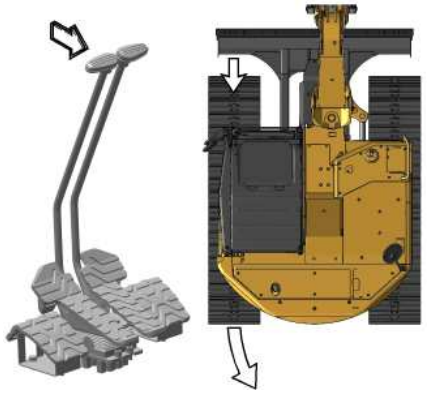

Illustration 12 g06338705
Pivot Left Turn (REVERSE)

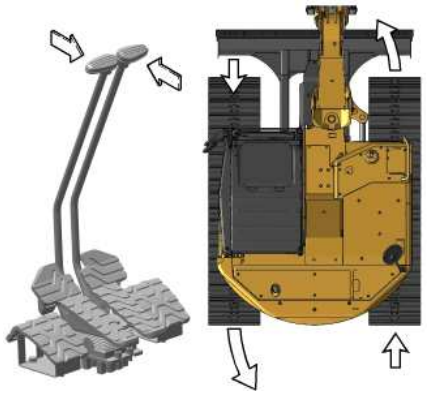

Illustration 13 g06338709
Counter rotate turn (LEFT)

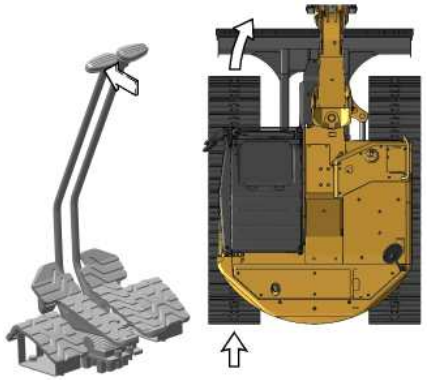

Illustration 14 g06338713
Pivot right turn (FORWARD)

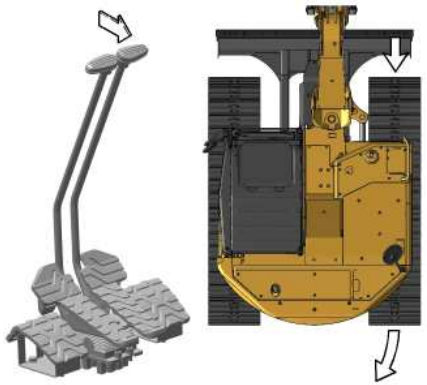

Illustration 15 g06338716
Pivot right turn (REVERSE)

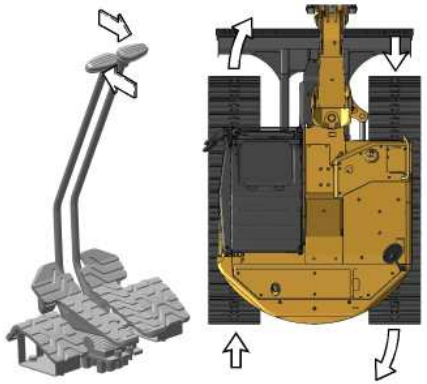

Illustration 16 g06338735
Counter rotate turn (RIGHT)

Auxiliary Control Pedal (15) (If Equipped)

The auxiliary control pedal is used to control the work tools. For more information on the auxiliary controls, refer to Work Tool Control .

The auxiliary control pedal can also be used to control the variable angle boom (if equipped). Refer to VA Boom Controls within this manual for more information.

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

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

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

Data Broadcasts

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

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

- Providing services to the customer and/or the equipment
- Checking or maintaining Cat Product Link equipment
- Monitoring the health of the equipment or performance
- Helping maintain the equipment and/or improve the efficiency of the equipment
- Evaluating or improving Cat products and services
- Complying with legal requirements and valid court orders
- Performing market research
- Offering the customer new products and services

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

Operation in a Blast Site for Product Link Radios

WARNING

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

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

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

- Operation and Maintenance Manual, SEBU8142 , "Product Link - PL121, PL321, PL522, and PL523"
- Operation and Maintenance Manual, SEBU8832 , "Product Link PLE702, PLE602, PLE602P, PLE601, PL671, PL641, PL641V2, PL631, PL631V2, PL542, PL542V2, PL243, PL241, PL240, PL240B, PL161, PLG641, PL143, PL141, PL131, PL542V3, PL243V3, PL083, PL042 and PL444 Systems"

Note: If no radio disable switch is installed and the equipment will be operating near a blast zone, a Product Link radio disable switch may be installed on the equipment. The switch will allow the Cat Product Link communication device to be shut off by the operator from the equipment control panel. For more details and installation procedures, refer to the following:

- Special Instruction , REHS7339 , "Installation Procedure for Product Link PLE640 Systems"
- Special Instruction , REHS8850 , "Installation Procedure for the Elite Product Link PLE601, PLE641, and PLE631 Systems"
- Special Instruction , SEHS0377 , "Installation Procedure for the Product Link PL131, PL141, and PL161 Systems"
- Special Instruction , REHS9111 , "Installation Procedure for the Pro Product Link PL641 and PL631 Systems"
- Special Instruction , M0098124 , "Installation Procedure for Pro Product Link PL243 Cellular Radio Systems"
- Special Instruction , M0109130 , "Installation Procedure for the Elite Product Link PLE602, PLE602p, PLE702, PLE643, PLE643p, and PL743 Systems"
- Combined Manual, M0111044 , "Product link Elite PLE643 and PLE743 Systems"
- Combined Manual, M0099595 , "Product Link Dual-Mode Systems PLE683, PLE683p, and PLE783"

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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.

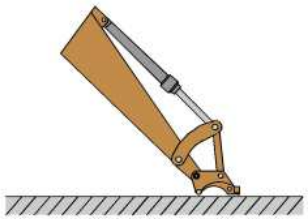

Illustration 1 g06286468

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

Quick Coupler Removal Procedure

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

WARNING

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

Always use a board or cardboard when checking for a leak. Escaping air or fluid under pressure, even a pin-hole size leak, can penetrate body tissue causing serious injury, and possible death.
If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

NOTICE

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

Refer to Special Publication, 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.

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

Daily Inspection

⚠ WARNING

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

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

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

NOTICE

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

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

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

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

Operation

Coupling the Work Tool

WARNING

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

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

WARNING

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

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

Quick Coupler with Hydraulic Coupling

WARNING

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

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

NOTICE

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

NOTICE

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

NOTICE

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

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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

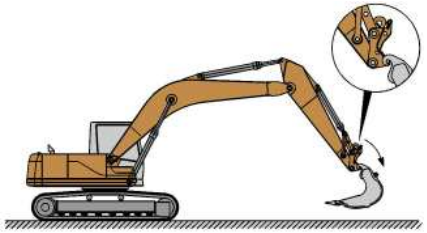

Illustration 2 g06286473

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

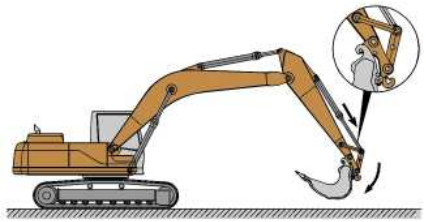

Illustration 3 g06286475

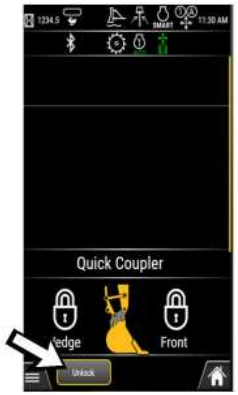

Illustration 4 g07800592
"Unlock" on monitor display

Illustration 5 g07800593
Timer to enable quick coupler on monitor display

Illustration 6 g07800595
Button on left joystick to enable quick coupler

2. Select "UNLOCK" on the monitor display. A pop-up window will appear in the monitor display with a timer for 10 seconds within which the quick coupler operation needs to be enabled. Press the button on left joystick to enable the operation. Refer to Illustration 6 for more information. If the operator did not press the button on left joystick to enable the quick coupler operation within 10 seconds, the operation will fail and return back to the unlock request screen. A buzzer is sounding with an intermittent pattern of one beep per second indicates that the quick coupler operation is active. 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. 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.

4. 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.

5. 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.

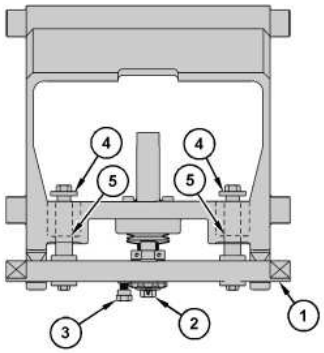

Illustration 7 g06334920

2. To move wedge (1) to the UNLOCKED position, perform the following steps:
3. Loosen lock bolt (3) until you can turn spindle (2).
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

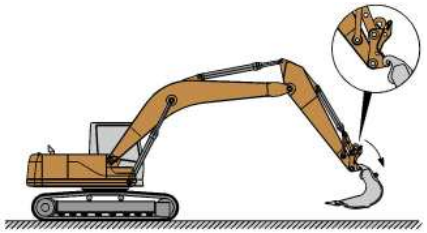

Illustration 8 g06286473

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

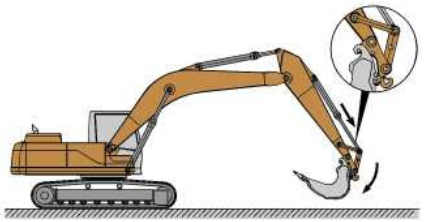

Illustration 9 g06286475

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.

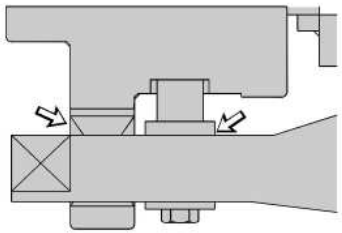

Illustration 10 g06334926

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. Retract the bucket cylinder. The work tool is now suspended by the front pivot.
3. Place the work tool on the ground.
4. 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)

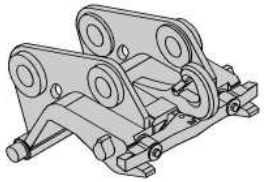

Illustration 11 g06286477

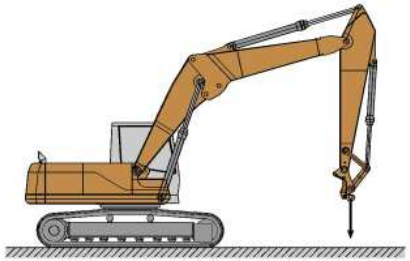

Illustration 12 g06286480

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 1

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

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

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

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

Regional regulations may require the use of an overload warning device and boom and stick lowering control valves when used to lift objects.

The overload warning device (if equipped) must be adjusted for the bucket linkage and bucket size that is installed on the machine. Adjust the overload warning device for proper operation.

The setting for the overload warning device (if equipped) should be checked by an authorized dealer.

Contact your Cat dealer for additional information.

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

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2018/03/06 **Quick Coupler Operation - Dual Lock Tilt Coupler (If Equipped) (M0118365-11)**

SMCS - 6129, 6522, 7000

i07330204

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 1 g06286461

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

Actuate Tilt Coupler to the Left (2) - Push the thumb wheel on the right joystick downward 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. Auxiliary lines must be connected at all times to provide pressure relief.

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SMCS - 6129, 6522, 7000

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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. 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.

Installation

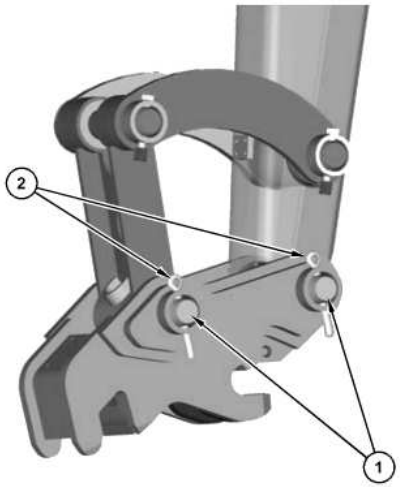

Illustration 1 g06286309

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.

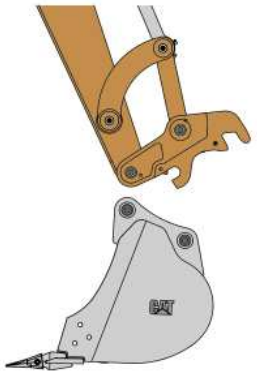

Illustration 2 g06286320

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 3 g06286326

2. Select "UNLOCK WEDGE" 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 rear of the quick coupler is rotated toward the work tool and contacts the work tool rear pin. Position the work tool so that it is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket.

3. Select "LOCK WEDGE" 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.

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

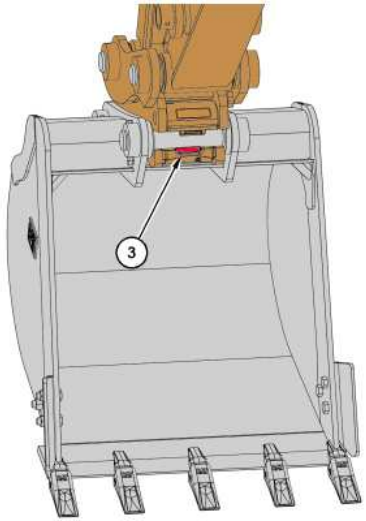

Illustration 4 g06286450

a. Visually confirm the engagement of the work tool. Ensure that both the work tool front and rear pin locking mechanisms are locked and securing the work tool to the coupler.

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

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

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

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

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

Uncoupling the Work Tool

WARNING

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

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

NOTICE

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

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

NOTICE

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

Illustration 5 g06286326

1. To unlock the coupler, position the work tool so that it is slightly above the ground, with the front pin of the work tool higher than the rear pin of the work tool. If the work tool is a bucket, verify that the cutting edge is slightly higher than the bottom of the bucket.
2. 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.

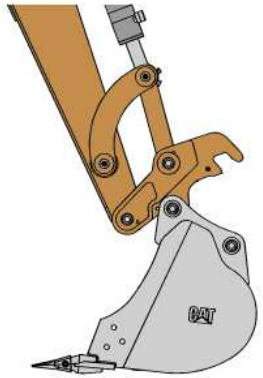

Illustration 6 g06286443

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. Select "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.

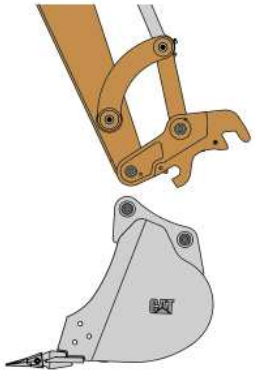

Illustration 7 g06286320

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

6. Select "LOCK WEDGE"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.

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.

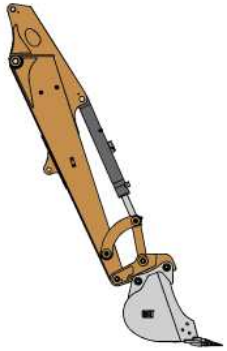

Illustration 8 g06286375

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.

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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

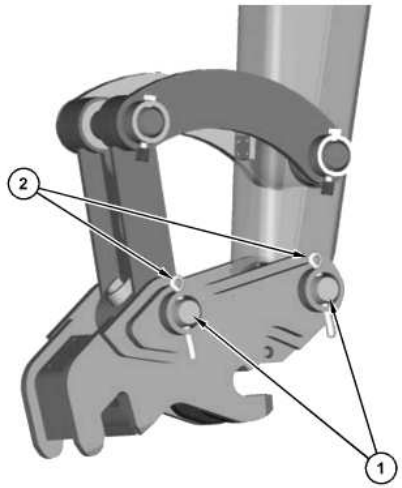

Illustration 1 g06286309

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.

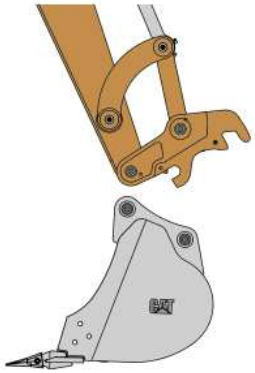

Illustration 2 g06286320

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 3 g06286326

3. Extend the bucket cylinder 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.

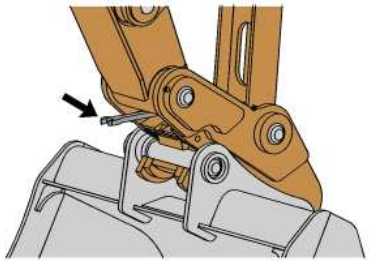

Illustration 4 g06286366

4. Using the supplied wrench, if equipped, and insert the ratcheting end onto the hex drive mechanism. Turn the ratchet in a clockwise direction to tighten the rear locking mechanism.

5. 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 5 g06286326

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. Other work tools may need to be lowered to the ground. Stop the engine.

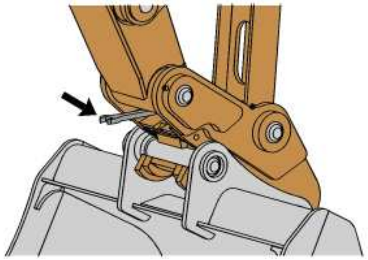

Illustration 6 g06286366

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

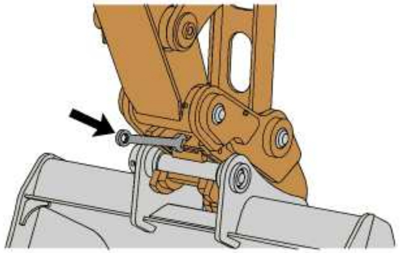

Illustration 7 g06286373

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 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 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 8 g06286375

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.

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2023/01/04 Quick Coupler Operation - Pin Puller Quick Coupler (If Equipped) (M0118365-11)

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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

Inspect the quick coupler engagement before operating the machine.

Serious injury or death may result from improperly engaged coupler.

WARNING

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

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

Inspect the quick coupler engagement before operating the machine.

Verify that the quick coupler is engaged per the procedure in the Operation and Maintenance Manual. Verify prior to operating the machine, after every engine start, and after an extended time of inactivity.

Serious injury or death may result from improperly engaged coupler.

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.

WARNING

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

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.

WARNING

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

NOTICE

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.

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 quick coupler.

Prepare the machine for maintenance. Refer to Prepare the Machine for Maintenance .

Installation of Pin Puller Quick Coupler

Ensure that pin puller quick coupler is compatible with the excavator. Refer to Caterpillar Approved Work Tools for more information. Consult your Cat® dealer for more information.

Park the machine on the flat and level surface. The 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.

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

1. Clean each pin and each pin bore in stick. Lubricate each pin bore in stick with molybdenum grease. Refer to Lubricant Viscosities for more information.

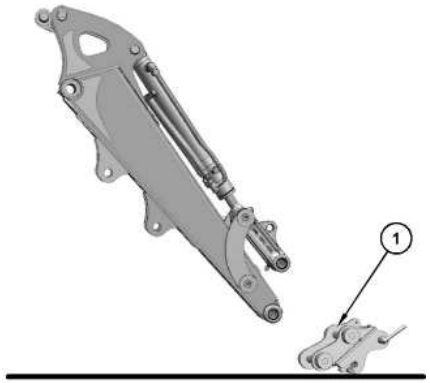

Illustration 1 g07534588
(1) Pin puller quick coupler

2. Position pin puller quick coupler (1) on the ground in front of the host machine. Make sure that the hook is oriented towards the machine. Align pin puller quick coupler (1) with the end of the stick. Refer to Illustration 1 for more information.

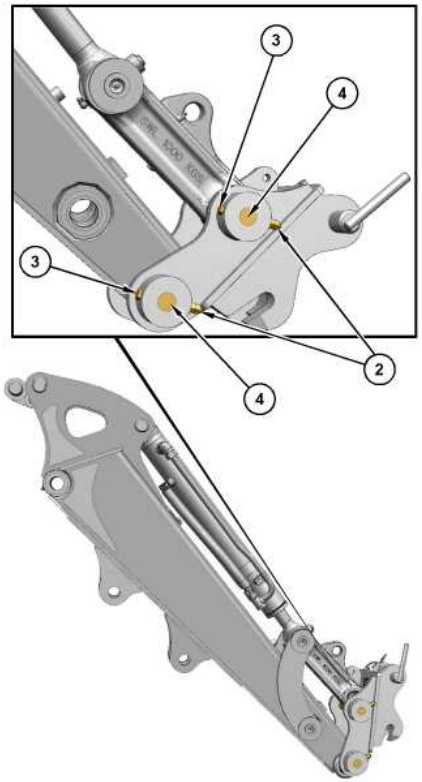

Illustration 2 g07534580
(2) Nut
(3) Bolt
(4) Mounting pin

3. Remove two mounting pins (4), two bolts (3) and four nuts (2) from pin puller quick coupler (1).

4. Secure pin puller quick coupler (1) with stick.

5. Install two mounting pins (4), two bolts (3) and four nuts (2) of pin puller quick coupler (1) with stick. Tighten four nuts (2). Refer to Specifications, SENR3130 , "Torque Specifications" for more information on torque values.

6. Lubricate two mounting pins (4) of pin puller quick coupler (1) with a grease gun. Refer to Lubricant Viscosities for more information.

Removal of Pin Puller Quick Coupler

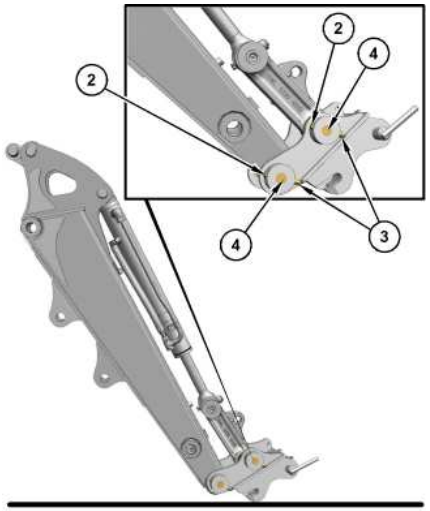

Illustration 3 g07534623
(2) Nut
(3) Bolt
(4) Mounting pin

1. Position pin puller quick coupler (1) on the ground in front of the machine. Refer to Illustration 3 for more information.
2. Remove four nuts (2) and two bolts (3) of pin puller quick coupler (1).
3. Remove two mounting pins (4) to remove pin puller quick coupler (1) from stick.
4. Remove pin puller quick coupler (1) from stick.

Coupling Pin Puller Quick Coupler with Work Tool

Note: Pin puller quick couplers use work tool with pin on attachment.

1. Position pin puller quick coupler (1) on the ground in front of the machine. Refer to Illustration 3 for more information.

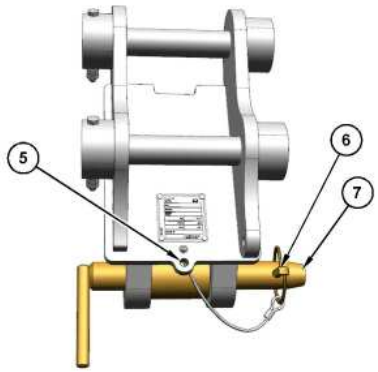

Illustration 4 g07545687
(5) Integrated holder
(6) Lock pin
(7) Quick coupler engagement pin

2. Ensure lock pin (6) is removed from pin puller quick coupler (1).
3. Remove quick coupler engagement pin (7) from pin puller quick coupler (1).
4. Secure lock pin (6) in integrated holder (5) of pin puller quick coupler (1).
5. Secure quick coupler engagement pin (7) before starting the engine.
6. Start the engine. Refer to Engine Starting for more information.

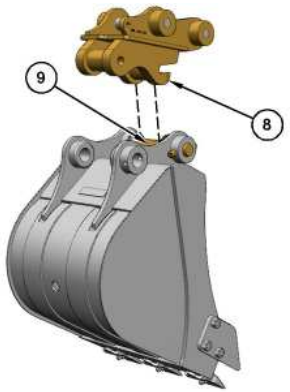

Illustration 5 g07553833
(8) Hook
(9) Pivot pin

7. Retract the bucket cylinder. Refer to Joystick Controls for more information.
8. Position hook (8) of pin puller quick coupler (1) over pivot pin (9) of the work tool. Refer to Illustration 5 for more information.

9. Move the stick inward and lower the stick until hook (8) of pin puller quick coupler (1) engage with pivot pin (9) of the work tool. Refer to Joystick Controls for more information on stick movement.

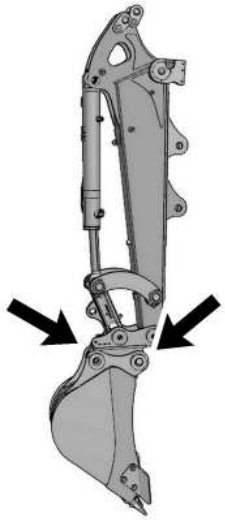

Illustration 6 g07536706
Position of pin puller quick coupler (1) and work tool

10. Extend the bucket cylinder of the machine to rotate pin puller quick coupler (1) towards the work tool. Refer to Joystick Controls for more information.

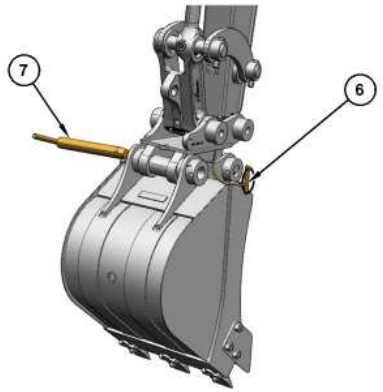

Illustration 7 g07539751
(6) Lock pin
(7) Quick coupler engagement pin

11. Raise the work tool above ground approximately 25 mm (1.0 inch) and ensure that work tool is cradled with hook (8) angled in upward direction.

12. Stop the engine. Refer to Stopping the Engine for more information.

13. Remove lock pin (6) from integrated holder (5).

14. Secure pin puller quick coupler (1) with work tool using quick coupler engagement pin (7).

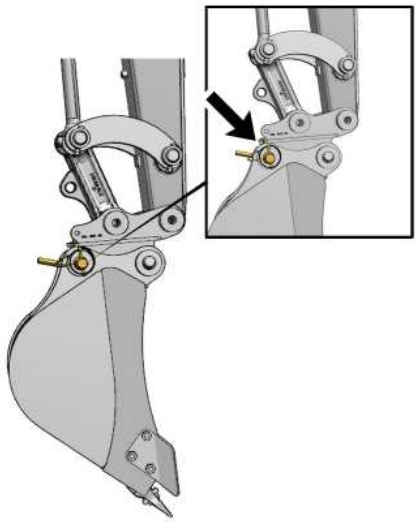

Illustration 8 g07541872
Pin puller quick coupler (1) engaged with work tool

15. Install lock pin (6) in quick coupler engagement pin (7) to secure quick coupler engagement pin (7) with pin puller quick coupler (1). Refer to Illustration 8 for more information.

16. To verify the engagement of pin puller quick coupler (1) with the work tool, perform the following procedure.

    a. Retract the bucket cylinder and drag the bucket on ground. Refer to Joystick Controls for more information.

    b. Visually confirm that there is no movement between the work tool and pin puller quick coupler (1).

Uncoupling Pin Puller Quick Coupler from Work Tool

1. Lower the work tool onto a level surface. Make sure that the work tool is in full contact with the ground.

2. Stop the engine. Refer to Operation and Maintenance Manual, "Stopping the Engine" for more information.

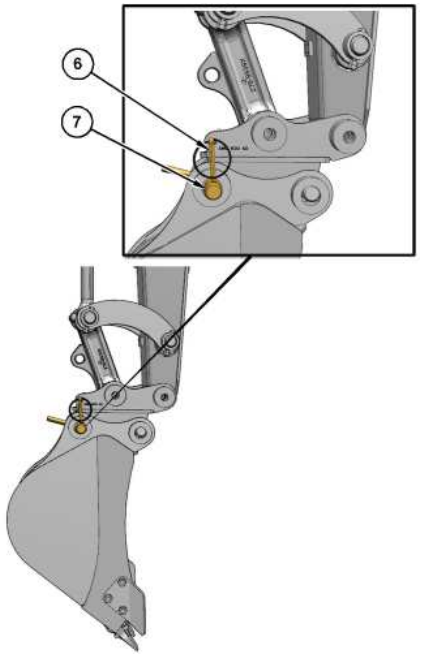

Illustration 9 g07541920
(6) Lock pin
(7) Quick coupler engagement pin

3. Remove lock pin (6) from quick coupler engagement pin (7) and secure lock pin (6) in integrated holder (5).

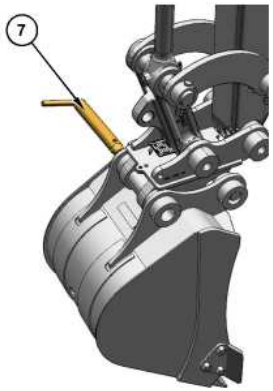

Illustration 10 g07539835
Removal of quick coupler engagement pin (7) from pin puller quick coupler (1).
(7) Quick coupler engagement pin

4. Remove quick coupler engagement pin (7) from pin puller quick coupler (1). Refer to Illustration 10 for the direction to remove quick coupler engagement pin (7) from pin puller quick coupler (1).

5. Secure quick coupler engagement pin (7) in a secured location for later usage.

6. Start the engine. Refer to Engine Starting for more information.

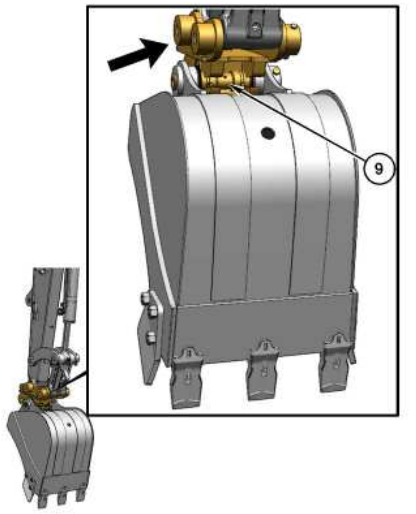

Illustration 11 g07539840
(9) Pivot pin

7. Rotate pin puller quick coupler (1) away from pivot pin (9) of the work tool.

8. Move the machine linkage away from the work tool. Refer to Joystick Controls for more information.

9. Remove pin puller quick coupler (1) from the work tool.

10. Install quick coupler engagement pin (7) and lock pin (6) in pin puller quick coupler (1) and secure pin puller quick coupler (1).

Note: If no work tool is to be attached to pin puller quick coupler (1), install quick coupler engagement pin (7) and lock pin (6) in pin puller quick coupler (1) and secure pin puller quick coupler (1) safely by grounding pin puller quick coupler (1). Refer to Joystick Controls for more information on grounding pin puller quick coupler (1).

Lifting Loads

NOTICE
If used to lift loads, then the excavator must comply with the requirements for lifting machinery. For more information, refer standard "EN 474-5EN 474-5", and consult your Cat® dealer.

Lifting Eye

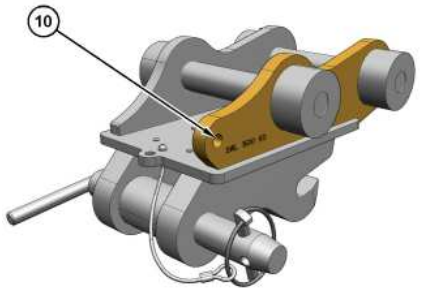

Illustration 12 g07549805
(10) Lifting eye

1. Remove work tool from pin puller quick coupler (1). Refer to Bucket - Remove and Install for more information.
   Fully extend the bucket cylinder of the excavator. Refer to Joystick Controls for more information.
2. Fasten an appropriate lifting shackle to lifting eye (10) of pin puller quick coupler (1). Do not perform any lifting operation if the lifting eye is damaged. Contact your Cat® dealer.

Lifting Objects

Pin puller quick coupler (1) 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.

Table 1

Machine Platform	**Mini Hydraulic Excavator (MHE) 1 ton to 2 tons (30mm)**	**MHE 2 tons (35 mm)**	**MHE 3 ton to 4 tons (40 mm)**	**MHE 5 ton to 6 tons (45 mm)**	**MHE 5 ton to 6 tons (45 mm)**	**MHE 7 ton to 9 tons (50 mm)**	**Back Hoe Loader (BHL) (50 / 45 mm)**
Attachment Interface	**MHE 1 ton to 2 tons (30 mm)**	**MHE 2 tons (35 mm)**	**MHE 3 ton to 4 tons (40 mm)**	**MHE 3 ton to 4 tons (40 mm)**	**MHE 5 ton to 6 tons (45 mm)**	**MHE 7 ton to 9 tons (50 mm)**	**MHE 7 ton to 9 tons (50 mm)**
Lift Eye Rating - Kg (lbs)	1000 kg (2204.6 lb)	1500 kg (3306.9 lb)				3250 kg (7165 lb)	
Lift Eye Diameter	11.6 mm (0.46 inch)	13.2 mm (0.52 inch)				19.6 mm (0.77 inch)	

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 excavator. Refer to table 1 for more information.

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.

Regional regulations may require the use of an overload warning device and boom and stick lowering control valves when used to lift objects.

The overload warning device (if equipped) must be adjusted for the bucket linkage and bucket size that is installed on the machine. Adjust the overload warning device for proper operation.

Refer to Boom, Stick and Bucket Operation for information on lifting the objects. Contact your Cat® dealer for additional information.

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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.

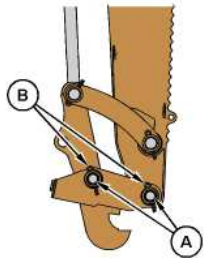

Illustration 1 g06286231

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).

Securing the Work Tool

WARNING

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

Do not operate this machine until you have positive indication that the 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 work tool on a level surface.

1. Start the engine.

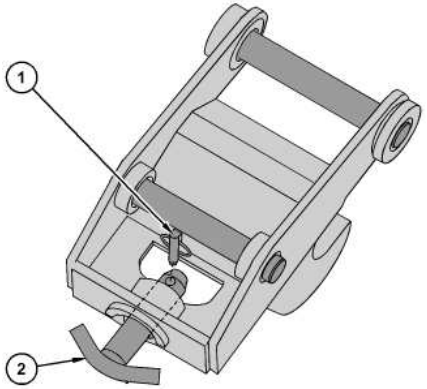

Illustration 2 g06286235

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

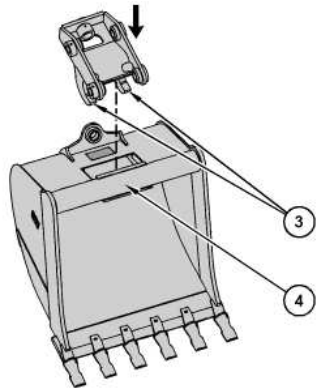

Illustration 3 g06286248

4. Move the stick inward and lower the stick until the hooks (3) engage the top pivot pin (4) of the work tool.

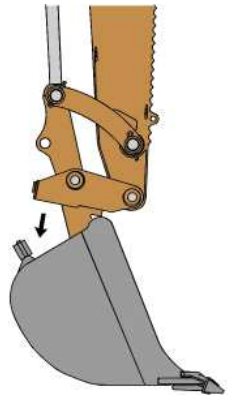

Illustration 4 g06286262

5. Extend the work tool cylinder to rotate the quick coupler toward the work tool. Line up the pin receiver of the work tool with the pin receiver of the quick coupler. Stop the engine.
6. Fully insert the quick coupler pin (2) into the pin receiver of the quick coupler and the work tool.

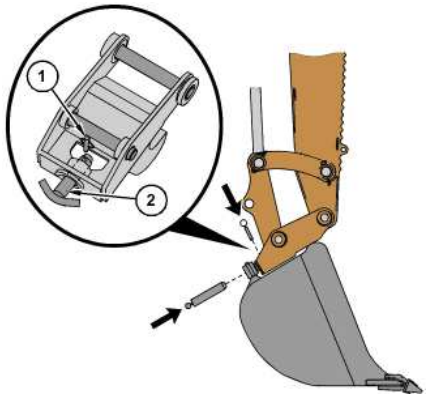

Illustration 5 g06286266

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

Releasing the Work Tool

WARNING

Disengaging the 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.

---

1. Lower the work tool onto a level surface. Make sure that the work tool is in full contact with the ground.
2. Remove the lock pin from the quick coupler pin.
3. Remove the quick coupler pin from the quick coupler.
4. Rotate the quick coupler out of the top pivot pin of the work tool.

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i09596974

(If Equipped)

The radio is integrated into the monitoring system. All the radio controls are adjusted using the monitor. Refer to Monitoring System for more information. The actual radio amplifier module is located in the headliner behind the operator seat.

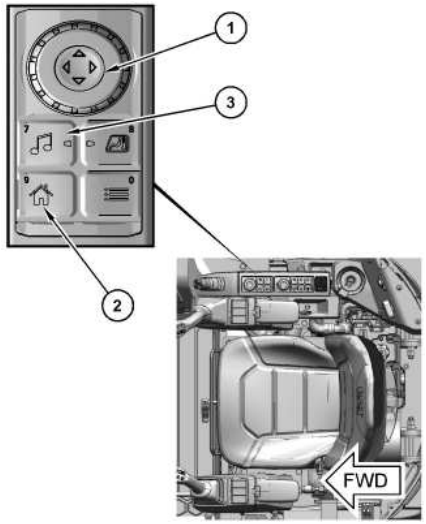

Illustration 1 g06644125
(1) Jog dial
(2) Home button
(3) Radio button

The audio menu can be directly accessed by pressing radio button (3) on the right side switch panel. Input selections can be made using jog dial (1) or using the monitor navigation buttons. Home button (2) can be used to return to the main screen.

Illustration 2 g06348419
(4) Home screen

Pressing radio button (3) will go directly to the radio screen.

Using jog dial (1), select the radio portion of home screen (4) and press jog dial (1) inward to navigate to the radio screen.

Illustration 3 g06334467

To navigate to the radio screen from the main screen, press the menu button and select "Radio".

Illustration 4 g06334464
Radio screen
(5) Station
(6) Seek
(7) "Source" list menu
(8) "Scan"
(9) Preset stations
(10) "Settings" menu
(11) Volume control

Station (5) - Identifies the current station setting.

Seek (6) - Seek (6) is used to automatically find the next radio station with a strong/clear signal.

Source list menu (7) - Allows the user to change the source of input. (Amplitude Modulation (AM), Frequency Modulation (FM), Auxiliary (AUX), Digital Audio Broadcasting (DAB) (if equipped), or Bluetooth)

Scan (8) - Automatically sweeps through the broadcast frequencies looking for signal.

Preset stations (9) - Preset stations (9) store favorite radio stations for the operator. To set a station, tune to the desired station. Press and hold the preset number you want to assign to that station. Once a beep is heard, release the button. The button will indicate the preset frequency.

Radio settings menu (10) - Pressing this button leads to the radio "Settings" menu.

Volume control (11) - Volume control (11) is used to raise or lower the audio volume.

Radio Settings Menu

To access the radio settings menu, select "Settings" (10) from the radio screen.

The following selections are available in the radio settings menu:

- Equalizer
- Bluetooth (Audio)

Illustration 5 g06334476

The "Equalizer" menu consists of the following items:

Treble - Allows the user to adjust the treble.

Bass - Allows the user to adjust the bass.

Balance - Allows the user to adjust the balance between speakers.

Bluetooth

Includes setup option for pairing devices to your machine radio.

Toggle switch enables bluetooth for audio pairing.

Pairing

This setting makes the machine radio discoverable for pairing on Bluetooth devices.

A maximum of 8 user devices can be paired to the machine.

Paired Devices

This setting provides a list of previously paired devices supported by your machine. The previously paired devices can also be removed using this menu option.

Selection Method

Most settings can be made using the monitor screen or by using jog dial (1). Some radio and some air conditioning/heating controls can only be performed using the jog dial. When using the monitor screen, simply touch the button below the icon you want to select. When using jog dial (1), rotate the dial to switch to different selections within the screen. Press jog dial (1) downward to choose a selection.

When using jog dial (1) to set the volume or tuner, rotate the dial clockwise to increase and counter-clockwise to decrease. Press inward on jog dial (1) to enter the desired setting.

AUX Operation

Illustration 6 g06277738

1. To play music from a device such as an MP3 player or a phone, connect the device using an auxiliary cable.
2. Select AUX to play the music from the device. The music should be playing over the radio speakers if properly connected. Adjust the volume as necessary.
   Note: The USB port is for charging purposes only.

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SMCS - 7327 i07092308

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

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

Seat Belt Adjustment for Retractable Seat Belts

Fastening The Seat Belt

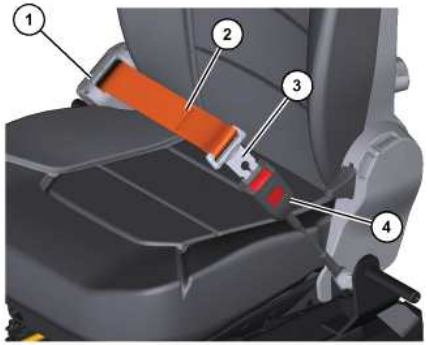

Illustration 1 g06223891

Pull seat belt (2) out of retractor (1) in a continuous motion.

Fasten seat belt catch (3) into buckle (4). 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 2 g06223894

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

Extension of the Seat Belt

WARNING

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

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

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

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

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

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Standard Seat

Illustration 1 g06285915
(1) Recline Lever
(2) Seat Fore and Aft Lever

Comfort Level Seat (If Equipped)

Illustration 2 g06276793
(1) Recline Lever
(2) Weight Adjustment Lever (or knob)
(3) Seat Fore and Aft Lever

Use lever (1) to change the angle of the backrest.

To adjust for your weight, turn lever or knob (2) on the front of the seat.

Lift on fore and aft lever (3) to release the seat from the locked position. Adjust the seat forward or rearward to the desired position and then release the lever to lock the seat.

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2020/01/22 **Securing the Machine (M0118365-11)**

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

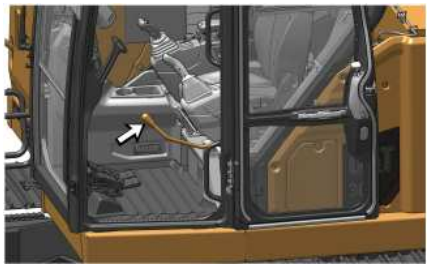

Illustration 1 g06278949

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

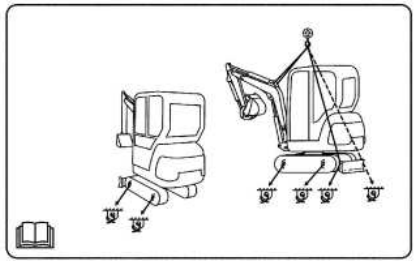

Illustration 2 g06513472

4. Chock the tracks and secure the machine with tie-downs. Make sure that you use the proper rated wire cable.
   Use the holes on each end of the blade and on the lower frame.

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

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

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SMCS - 7000, 7500

i09769575

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

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

NOTICE

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

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

Observe all regulations governing wide loads.

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

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

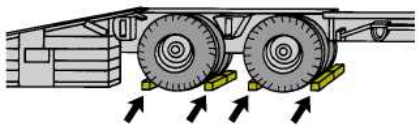

Illustration 1 g06404980

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

Machine With A Long Stick That Has Two Pin Holes (If Equipped)

WARNING

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

NOTICE

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

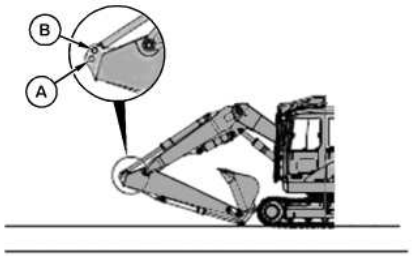

Illustration 2 g06404995

Make the following changes before shipping the machine.

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

NOTICE

Never use pinhole (B) for operation. Incorrect boom longstick-bucket combination could cause the bucket to hit the cab.

Use the following procedure to connect the stick cylinder rod to pin hole (B).

1. Fully extend the stick cylinder and the bucket cylinder. Lower the boom to the ground.
2. Remove the linkage pin from pin hole (A).
3. Align the pin hole of the stick cylinder rod with pin hole (B). Insert the linkage pin into pin hole (B). Use the linkage pin that was removed in Step 2.

Machine With A Long Stick That Has Two Pin Holes (If Equipped) - variable Angle Boom (VAB)

NOTICE
We recommend only using the operating pin position for long stick equipped VAB machines.

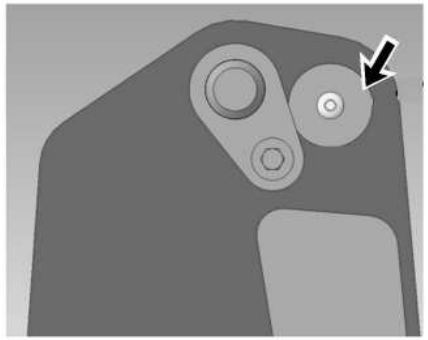

Illustration 3 g07586429

1. Operating the long stick with pin located in the shipping position, can cause contact and/or damage between the boom and stick components in certain positions.
2. 306 machine with VAB long stick option machine configurations should be fitted with shipping pin position plug to prevent using this pin position.

Loading The Machine

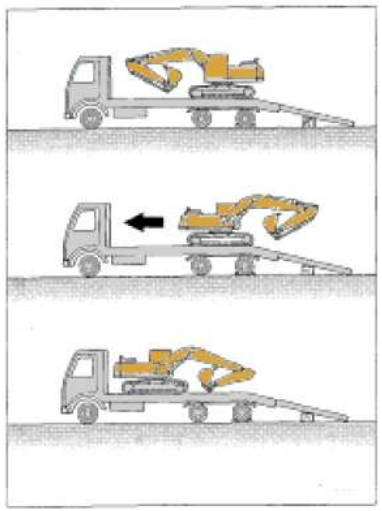

Illustration 4 g06435164

1. Position the machine so that the machine can drive straight up the loading ramps. Position the machine so that the front linkage and the dozer blade will be the first machine components to travel up the loading ramps. Make sure that the dozer blade is raised up.
2. Extend the front linkage forward over the trailer bed to help maintain balance.
3. Use caution when you travel over the areas around the loading ramp joints. Maintain the balance point of the machine.
4. After you load the machine onto the trailer be sure that the machine is properly positioned on the trailer bed.
5. Slowly, swing the upper structure for 180 degrees and carefully move the machine toward the front of the trailer or the rail car.
6. Refer to the Operation and Maintenance Manual, "Lifting and Tying Down the Machine" for information on tying down the machine.

Unloading The Machine

1. Position the machine so that the machine can drive straight down the loading ramps. Position the machine so that the front linkage will be the first machine component to travel down the loading ramps. Position the machine so that the dozer blade will be the last machine component to travel down the loading ramps. Make sure that the dozer blade is raised up.
2. Extend the front linkage forward over the ramps. While you travel down the loading ramps, adjust the front linkage to allow the work tool to remain close to the ground. This will prevent the machine from tipping forward.
3. Use caution when you travel over the areas around the loading ramp joints to maintain the balance point of the machine.

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WARNING

Do not perform a lifting operation with the shovel crane on a slope greater than 5 degrees. Lifting on a slope greater than 5 degrees may cause the machine to become unstable or roll over. Lifting with the shovel crane on a slope greater than 5 degrees may result in property damage, personal injury, or death.

WARNING

Do not operate the shovel crane with a hook that has cracks or deformities. Failure to follow these instructions may cause the load to fall and result in injury or death. Replace the shovel crane hook if there are any signs of cracks of deformities.

WARNING

Do not operate the bucket without securing the shovel crane hook. Operating the bucket without properly securing the hook may result in personal injury or machine damage.

NOTICE

Do not perform a lifting operation if the monitors external display light does not come on. Do not perform a lifting operation if the monitor does not display the suspended load information.

NOTICE

Lifting capacities are different than rated load capacities. Lifting capacities should not be used to determine the rated load of the shovel crane function. Only use the rated load capacities found in Operation and Maintenance Manual, "Specifications" to determine the rated load capacity for the shovel crane function.

NOTICE
Do not operate the shovel crane if the beacon light does not function properly. Before operation, check that the beacon light is flashing/rotating properly.

Note: Check the joystick control pattern before activating the shovel crane to ensure that the load can be controlled to maintain machine stability. The control pattern is changed when Joystick Steering Control mode is ON. Refer to Operation and Maintenance Manual, "Joystick Controls" for more information.

In some regions, regulations require a shovel crane configuration to lift certain objects. Always obey the local regulations in your region.

Refer to Shovel Crane Operation for additional information regarding the operation of the shovel crane.

Operate the machine according to the rated load table for your machine. Refer to Operation and Maintenance Manual, "Specifications (Shovel Crane Specifications)" for more information.

Activating the Shovel Crane

Illustration 1 g06394071

On machines with the shovel configuration, "Shovel Crane Mode" can be activated/deactivated by pressing the button on the key pad.

On the monitor, navigate to the "Control Mode" menu within "Machine Settings". Once in the "Control Mode" menu, select "Shovel Crane".

 **Shovel Crane Indicator**

Activation with overload warning of shovel crane can also be done by selecting the short cut from the home screen if applied.

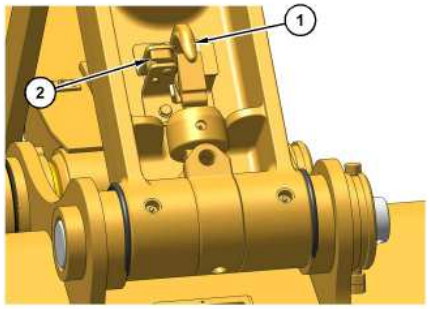

Illustration 2 g06334844
(1) Shovel crane hook
(2) Shovel crane latch

1. Release shovel crane latch (2). Lower shovel crane hook (1) into operating position.
   Inspect the shovel crane hook for damage. Refer to Shovel Crane - Inspect .

2. Move the hydraulic lockout control to the UNLOCKED position. Start the engine. Refer to Operation and Maintenance Manual, "Engine Starting".

Illustration 3 g06390954

3. Follow the on-screen instructions for enabling the shovel crane feature.
   Hold Bucket Rack to Enable Shovel Crane.

Illustration 4 g06390955

Once in the crane mode, the monitor displays the actual load and rated load, and the beacon warning lamp on the top of the cab comes on.

The following functions are also limited while shovel crane is active:

- Bucket dump commands are disabled
- Throttle is limited to 3
- Travel speed is limited to LOW
- Swing speed is reduced

Note: The rated load icon will turn yellow and a track will appear when the machine is traveling.

Note: If the hydraulic lockout control is moved to the LOCKED position, the shovel crane will become inoperable.

Refer to Shovel Crane Operation for additional information regarding the operation of the shovel crane.

Deactivating the Shovel Crane

Illustration 5 g06191883

"Shovel Crane Mode" can be disabled by pressing the button on the key pad or selecting "Shovel Crane" in the display. Once disabled, the following functionality is restored:

- Bucket dump commands are enabled
- Throttle no longer limited
- Travel speed no longer limited
- Swing speed no longer reduced

Position the stick so that the stick is perpendicular to the ground and slowly lower the boom until the bucket contacts the ground.

Return the hook to the stored position and latch the hook.

Indicators and Warnings

Below is a list of indicators and warnings that may appear on the monitor during the shovel crane operation.

Illustration 6 g07603763

Actual Load over 90% of Rated Load - If the suspended load is 90% of the rated load, the monitor will display this warning and an alarm will sound periodically. If this warning occurs, stop operation until the machine center of gravity becomes stable or reduce the suspended load.

Illustration 7 g07603765

Actual Load over 100% of Rated Load - If the suspended load is 100% of the rated load, the monitor will display this warning and an alarm will sound continuously. If this warning occurs, stop operation until the machine center of gravity becomes stable or reduce the suspended load.

Load Interfering with Bucket. Adjust Linkage - When the bucket interferes with the lift, the monitor will display this warning. If this warning is present, stop lifting and adjust the linkage.

Lower Boom - When the boom cylinder is extended to the point near stroke end, the monitor will display this warning. If this warning is present, lower the boom.

i07329018

SMCS - 6500

i07310871

WARNING

Operating the machine using the correct method when performing a lifting operation is important. Incorrectly operating the machine may result in serious injury or death. Be sure to observe the following precautions.

Refer to this Operation and Maintenance Manual, "Shovel Crane Control" for additional information regarding machine controls for the shovel crane.

Operate the machine according to the rated load table of your machine. Refer to Operation and Maintenance Manual, "Lifting Capacities (Shovel Crane)" for more information.

Traveling with a Suspended Load

Illustration 1 g06222543

The rated load when traveling while suspending a load is limited to 50 percent of a stationary suspension. Make sure that the suspending load weight is within this limit before starting to move.

When traveling while suspending a load:

1. Make sure that the load is in the front of the machine, and operate within the maximum operating radius of 70° or less.
2. The height below the suspended load shall be 30 cm (12 inch) or less above ground.
3. The traveling speed shall be 3 km/h or less.
4. The traveling ground shall be level and of firm ground.

Traveling while suspending a swinging load may cause the machine to roll over. Wait until the load stops swinging before starting to move.

Dragging of load is prohibited.

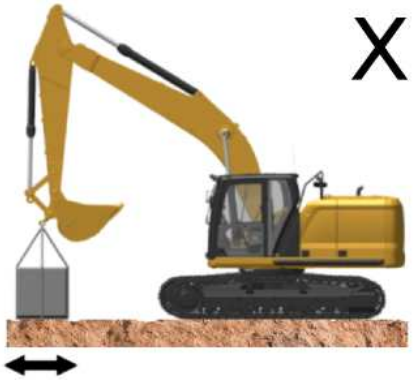

Illustration 2 g06222544

Horizontally, vertically or diagonally dragging a load may cause the machine to roll over, the wire rope to break, or the load to collapse, resulting in personal injuries.

Be sure to lift the load directly above.

Lifting operation on a slope is prohibited.

Illustration 3 g06222549

Performing an operation on a slope of 5° or more and on a soft ground may cause the machine to roll over or the load to collapse, resulting in personal injuries. Make sure that the machine is on level and firm ground before performing the operation.

Place an iron plate or other appropriate material on a soft ground.

Use in non-standard specification conditions is prohibited.

Illustration 4 g06222553

Use of the machine in non-standard specification conditions is prohibited as the lifting load and the operation range cannot be accurately displayed.

Sudden lifting operation is prohibited.

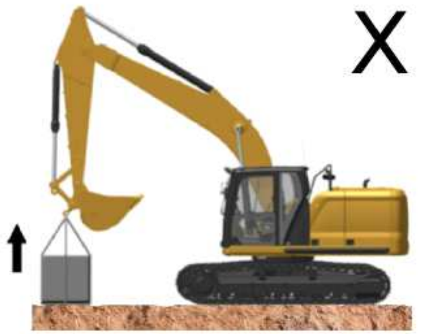

Illustration 5 g06222555

WARNING

Suddenly lifting a suspended load will apply an abnormal force on the hook and cause the hook to break, resulting in serious injuries or death. Never perform such an operation.

Sudden swinging operation while suspending a load is prohibited.

Illustration 6 g06222561

WARNING

Never perform a swinging operation suddenly while suspending a load. Doing so may cause the suspended load to be pulled with a centrifugal force, causing the machine to roll over.

Never suddenly swing, and stop or lower the hook suddenly, as doing so may cause the wire rope to come off the hook latch.

Factors that cause the wire rope to come off

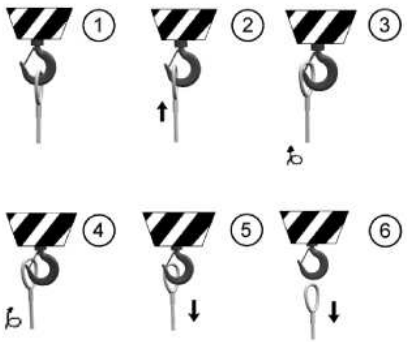

Illustration 7 g06222768

(1) Wire rope in normal condition.

(2) The wire rope gets raised when the hook is lowered too suddenly.

(3) If the wire rope gets twisted and gets untwisted in the direction of the arrow, the wire rope will go beyond the tip of the hook.

(4) The wire rope goes around the back of the hook.

(5) The hook goes up or the wire rope goes down.

(6) The wire rope simply falls off.

Diagonal dragging operation is prohibited.

Illustration 8 g06222769

WARNING

Diagonal dragging operation applies an abnormal force on the hook and may cause the hook to break, resulting in serious injuries or death. Never perform such an operation.

Leaving the seat while suspending a load is prohibited.

Illustration 9 g06222773

Do not leave the operator seat while a load is being suspended. The load may fall, resulting in personal injuries. Do not allow a slinging operator or another worker under the load.

Temporarily stopping the lifting operation.

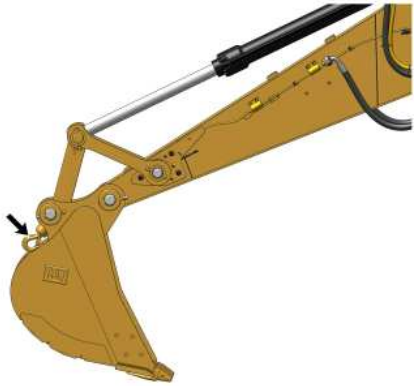

Illustration 10 g06191918

When there is a large area to stop the machine, fully retract the stick cylinder and slowly lower the boom until the bucket contacts the ground.

Note: Make sure that the lifting tool does not get caught under the bucket.

Illustration 11 g06191883

When there is small area to stop the machine, press the shovel crane button on the switch panel in order to disable the operation. Position the stick so that it is perpendicular to the ground and slowly lower the boom until the bucket contacts the ground.

Note: Make sure that the lifting tool does not get caught under the bucket.

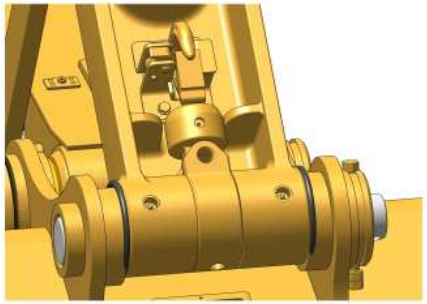

Illustration 12 g06191925
Hook in latched position

Be sure to store the hook during a bucket use. Otherwise, the bucket, the hook, and other parts may be damaged.

Wire rope suspension angle

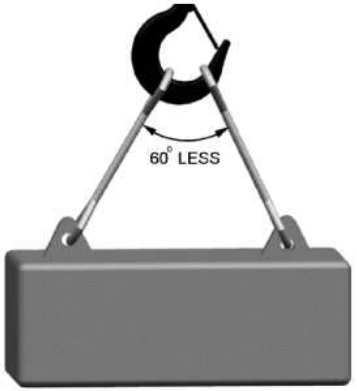

Illustration 13 g06222775

As a rule, try to set the wire rope suspension angle at 60° or below.

Keep out of the area under a suspended load.

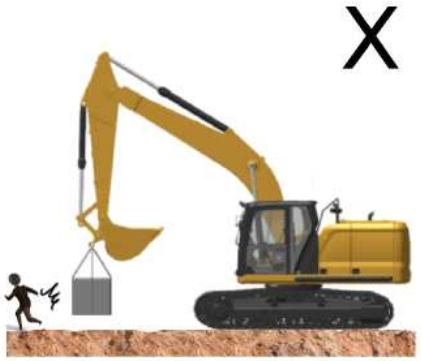

Illustration 14 g06222777

Never allow anyone to enter an area under a suspended load.

Lifting operation with a quick coupler device is prohibited.

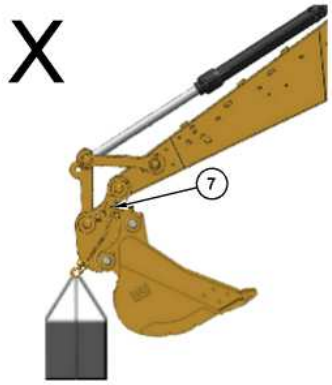

Illustration 15 g06222779
(7) Quick Coupler

Accurate lifting load and operation range cannot be displayed in a lifting operation equipped with a quick coupler. Furthermore, never perform a lifting operation with a quick coupler attached, as doing so causes the hook to contact the quick coupler, applies an abnormal force on the hook, and causes the hook to become damaged and/or the machine to roll over.

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2022/03/18 Stopping the Engine (M0118365-11)

SMCS - 1000, 7000

i08786758

WARNING

Crush Hazard!

Machine access doors can pinch, trap, or crush personnel when being closed.

Use caution while closing machine access doors. Ensure that all personnel are clear of the machine before closing the access doors.

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.

NOTICE

Never turn the battery disconnect switch to the OFF position while the engine is running. Serious damage to the electrical system may result.

NOTICE

Perform a walk around inspection after actuation of a shutdown device.

Take necessary corrective action to resolve the cause of the shutdown.

Ensure that no additional damage has been done or could occur before returning to operation.

1. Park the machine on level ground. Refer to Stopping the Machine and Prepare the Machine for Maintenance for recommended procedures.

2. Move the hydraulic lockout control to the LOCKED position. Refer to Operator Controls for more information.
3. While the machine is stopped, run the engine for 5 minutes at low idle. Idling the engine allows hot areas of the engine to cool gradually.
4. Turn the engine start switch to the OFF position. Refer to Engine Starting for more information.

Engine Shutdown Switch

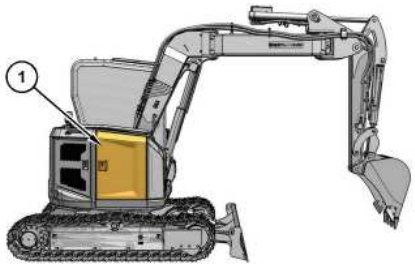

Illustration 1 g06779999
305 SR Excavator
(1) Access door

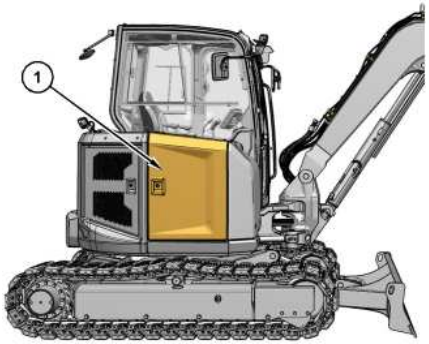

Illustration 2 g06780016
305 CR Excavator
(1) Access door

1. Open access door (1) on right side of the machine. Refer to Access Door and Cover Locations for more information.

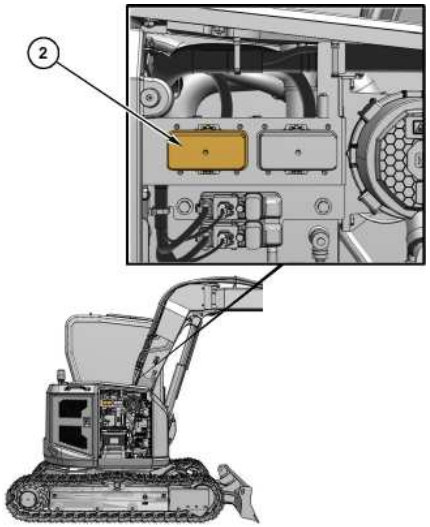

Illustration 3 g06780005
305 SR Excavator
(2) Cover

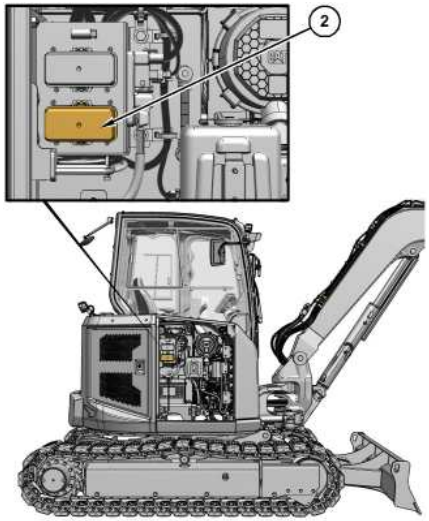

Illustration 4 g06780021
305 CR Excavator
(2) Cover

2. Remove cover (2) from the fuse panel.

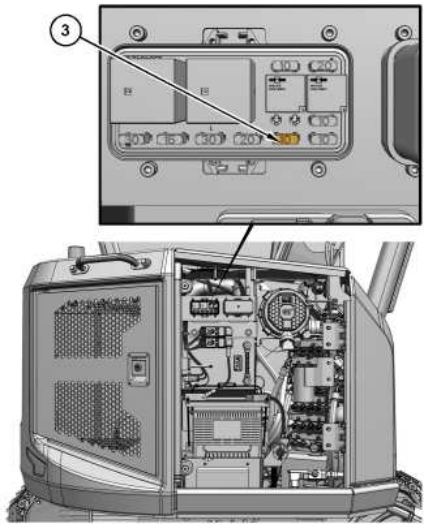

Illustration 5 g06780012
305 SR Excavator
(3) Fuse

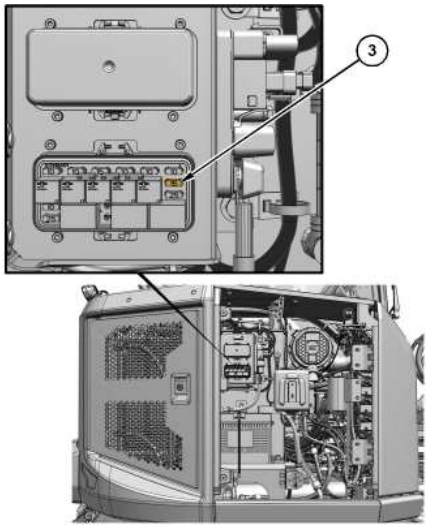

Illustration 6 g06780030
305 CR Excavator
(3) Fuse

3. Remove fuse (3) from the fuse panel.

4. Close access door (1) on right side of the machine. Refer to Access Door and Cover Locations for more information.

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2018/03/06 **Stopping the Machine (M0118365-11)**

SMCS - 7000

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WARNING

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

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

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

Note: The swing parking brake is automatically applied when the machine is stopped. The swing parking brake is released when the engine is running and the joystick is activated.

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

Illustration 1 g06181402

2. Release the travel levers/pedals to stop the machine.
3. Lower the work tool to the ground. Apply a slight downward pressure.
4. Move the hydraulic lockout control to the LOCKED position.

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2018/09/21 **Towing the Machine (M0118365-11)**

SMCS - 7000

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WARNING

Personal injury or death could result when towing a disabled machine incorrectly.

Block the machine to prevent movement before final drives are disengaged. The machine can roll free if it is not blocked. With final drives disengaged, the machine cannot be stopped or steered.

Follow the recommendations below, to properly perform the towing procedure.

Relieve the hydraulic tank and line pressure before any disassembly.

Even after the machine has been turned off, the hydraulic oil can still be hot enough to burn. Allow the hydraulic oil to cool before draining.

NOTICE

To tow the machine, both final drives must be disengaged.

Do not operate the travel motors with the final drives disengaged. Damage could result.

These towing instructions are for moving a disabled machine for a short distance at low speed. Move the machine at a speed of 2 km/h (1.2 mph) or less to a convenient location for repair. Always haul the machine if long distance moving is required.

Shields must be provided on both machines. This will protect the operator if the tow line or the tow bar breaks.

Do not allow an operator to be on the machine that is being towed.

Before you tow the machine, make sure that the tow line or the tow bar is in good condition. Do not use a wire rope that is kinked, twisted, or damaged. Make sure that the tow line or the tow bar has enough strength for the towing procedure that is involved. The strength of the tow line or of the tow bar should be at least 150 percent of the gross weight of the towed machine. This requirement is for a disabled machine that is stuck in the mud and for being towed on a grade.

Do not use a chain for pulling a disabled machine. A chain link can break. This may cause personal injury. Use a wire rope with ends that have loops or rings. Put an observer in a safe position to watch the pulling procedure. The observer can stop the procedure if the wire rope starts to break. Stop pulling whenever the towing machine moves without moving the towed machine.

During towing, do not allow anyone to step between the towing and the towed machines.

Do not allow the wire rope to be straddled while the machine is being towed.

Keep the tow line angle to a minimum. Do not exceed a 30 degree angle from the straight ahead position.

Avoid towing the machine on a slope.

Quick machine movement could overload the tow line or the tow bar. This could cause the tow line or the tow bar to break. Gradual, steady machine movement will be more effective.

Prior to releasing the brake of the final drive, firmly lock both tracks to prevent the machine from moving suddenly. When the machine is ready to be towed, release the brake of the final drive. Refer to Operation and Maintenance Manual, "Final Drive Ring Gear Removal".

Normally, the towing machine should be as large as the disabled machine. Make sure that the towing machine has enough brake capacity, enough weight, and enough power. The towing machine must be able to control both machines for the grade that is involved and for the distance that is involved.

You must provide sufficient control and sufficient braking when you are moving a disabled machine downhill. This may require a larger towing machine or additional machines that are connected to the rear of the disabled machine. This will prevent the machine from rolling away out of control.

All situation requirements cannot be listed. Minimal towing machine capacity is required on smooth, level surfaces. Maximum towing machine capacity is required on an incline or on a surface that is in poor condition.

Do not tow a loaded machine.

Consult your Cat dealer for the equipment that is necessary for towing a disabled machine.

Retrieval and Towing of Machine

Illustration 1 g06335059

Note: Shackles must be used for towing the machine. The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. The permissible force for the lower frame is 100 percent of the gross weight of the towed machine.

Note: To prevent damage to the wire rope or the lower frame of the machines, use protective sleeves on the corners of the lower frame.

Retrieve the disabled machine carefully. The applied load for each wire rope should be equal. The angle (A) between each wire rope should be 60 degree maximum. Operate the machine at a low speed.

Lightweight Towing

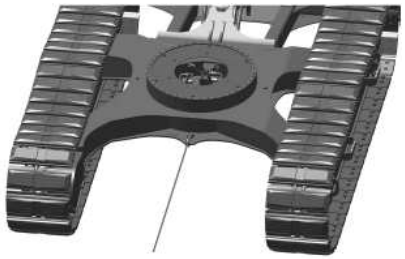

Illustration 2 g06335066

The wire rope should be horizontal and straight to the track frame.

Install a properly rated wire rope to the lower frame of the towing machine and the lower frame of the towed machine. Operate the machine at a low speed.

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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 1 g06223764
Depth of water to the center of the track carrier roller.

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

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

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

NOTICE
Do not allow the fan on the engine to contact the water while the machine travels through the water. Do not allow the fan on the engine to contact the water during a swing while the machine is in the water. Damage to the fan may occur if the fan contacts the water.

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

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

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

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

Procedure for Removing the Machine from Water or Mud

NOTICE

Do not allow the machine to swing from the force of traveling when you use the bucket , the stick, or the boom to assist in travel. If the force from traveling causes the machine to swing, damage may occur to the swing motor and to the swing drive.

Illustration 2 g06222519

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 3 g06222525

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 4 g06212337

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 to remove the mud and the gravel.

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

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.

WARNING

When opening or closing the windows, be extra careful to prevent any personal injury. The hydraulic lockout control must be in the LOCKED position in order to prevent any possibility of sudden movement of the machine due to inadvertent contact with the hydraulic control(s).

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

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position.
- Stop the engine.

Perform the following procedure to vent the upper window.

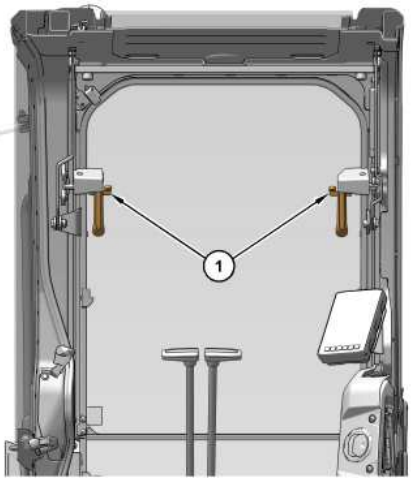

Illustration 1 g06278182
(1) Release lever

1. Release the auto-lock latches by pulling release levers (1) on the window handles.
2. Holding both handles on the window frame, pull the window upward.
3. Hold both handles and move the window into the storage position until the auto-lock latches near the ceiling are engaged.

Perform the following procedure to close the upper window.

1. Release the auto-lock latches by pulling release levers (1) on the window handles.
2. Holding both handles on the window frame, pull the window downward.
3. Hold both handles and move the window into the closed position until the auto-lock latches near the front of the machine engage.

Perform the following procedure to vent the lower window.

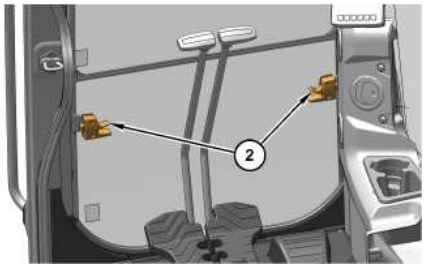

Illustration 2 g06278187

(2) Release lever

1. Release the auto-lock latches by pushing release levers (2) on the window handles.
2. Holding both handles on the window frame, pull the window upward.
3. Hold both handles and move the window into the storage position until the auto-lock latches near the top window are engaged.

Perform the following procedure to close the upper window.

1. Release the auto-lock latches by pulling release levers (2) on the window handles.
2. Holding both handles on the window frame, pull the window downward.
3. Hold both handles and move the window into the closed position until the auto-lock latches near the front of the machine engage.

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WARNING

Unintended operation of the switch for the Auxiliary Control can cause injury or death.

To prevent unintended activation of the switch for the Auxiliary Control while traveling or whenever the auxiliary line is not being used, make sure that the thumb is not placed on or near the switch for the Auxiliary Control.

Auxiliary lines are equipped with coupler assemblies. Wipe all coupler assemblies before connecting the work tools. The auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Refer to System Pressure Release for more information.

Note: Pressure can build up in the auxiliary lines if the work tool 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.

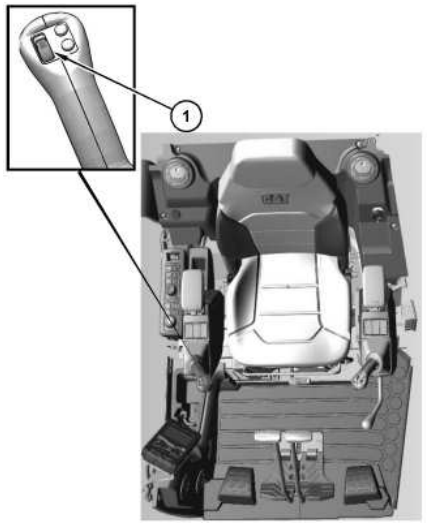

Illustration 1 g06786043
Interior of the machine
(1) Right joystick thumb wheel

Variable Speed - Move right joystick thumb wheel (1) upward to activate the work tool. Move right joystick thumb wheel (1) further to increase the speed of the work tool.

Hammer Control

Hydraulic Hammer ON - Move right joystick thumb wheel (1) upward to activate the hydraulic hammer.

Hydraulic Hammer OFF - Move right joystick thumb wheel (1) downward 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.

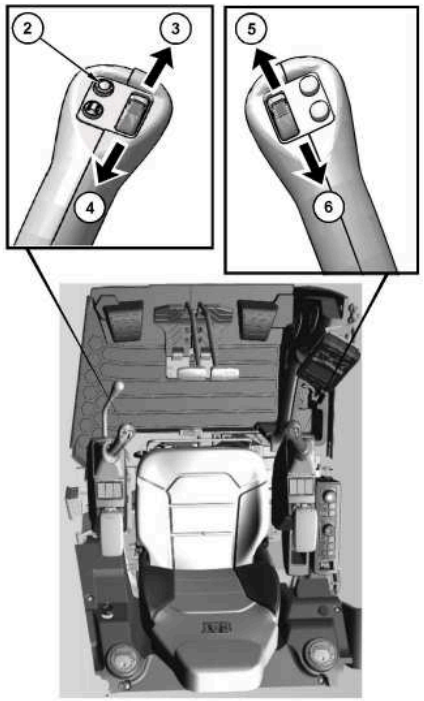

Illustration 2 g06786047

Interior of the machine
(2) Button
(3) Upward movement of left joystick thumb wheel
(4) Downward movement of left joystick thumb wheel
(5) Upward movement of right joystick thumb wheel
(6) Downward movement of right joystick thumb wheel

Primary Auxiliary Hydraulic Circuit (AUX 1)

Variable Speed - Move right joystick thumb wheel (1) in the direction of desired flow to activate the work tool. Upward movement of right joystick thumb wheel (5) : Aux 1B. Downward movement of right joystick thumb wheel (6) : Aux 1A. Move right joystick thumb wheel (1) further to increase the speed of the work tool. Release right joystick thumb wheel (1) to stop the work tool.

Secondary Auxiliary Hydraulic Circuit (AUX 2)

Variable Speed - Press button (2) in left joystick once to activate the secondary auxiliary flow control. Press button (2) in left joystick again to deactivate the secondary auxiliary flow control to engage boom swing (default if equipped). The secondary auxiliary flow control must be activated to operate the circuit.

1. Move left joystick thumb wheel in the direction of desired flow to activate the work tool.
2. Upward movement of left joystick thumb wheel (3) : Aux 2B.
3. Downward movement of left joystick thumb wheel (4) : Aux 2A.
4. Move left joystick thumb wheel further to increase the speed of the work tool.
5. Release left joystick thumb wheel to stop the work tool.
   Note: Refer to Joystick Controls for more information.

Primary Auxiliary Hydraulic Circuit (AUX 1)

WARNING

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

A RAISED hydraulic lock lever does not mean that the auxiliary control function is locked out.

In order to prevent unexpected operation of the auxiliary control circuit, make sure that the foot is not placed on or near the work tool control pedal.

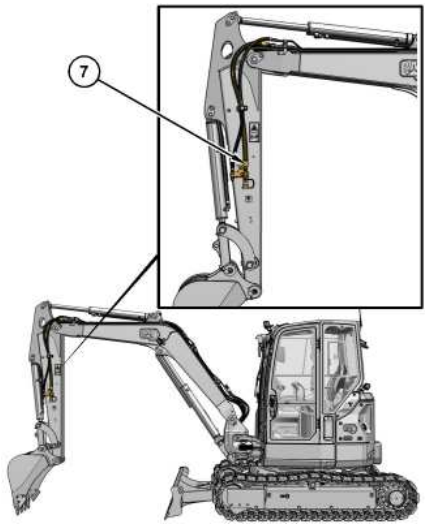

Illustration 3 g06779856
305 CR Excavator
Left side view of stick
(7) Primary auxiliary line on left side of stick

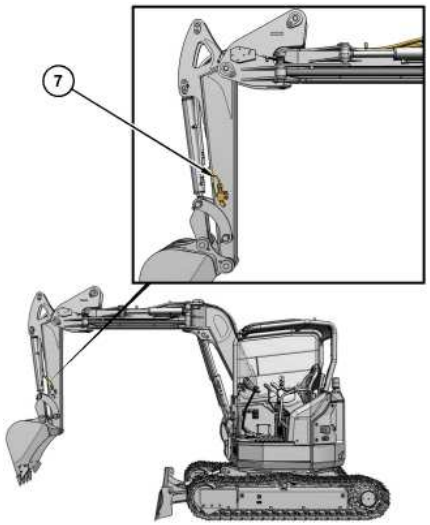

Illustration 4 g06779756
305 SR Excavator
Left side view of stick
(7) Primary auxiliary line on left side of stick

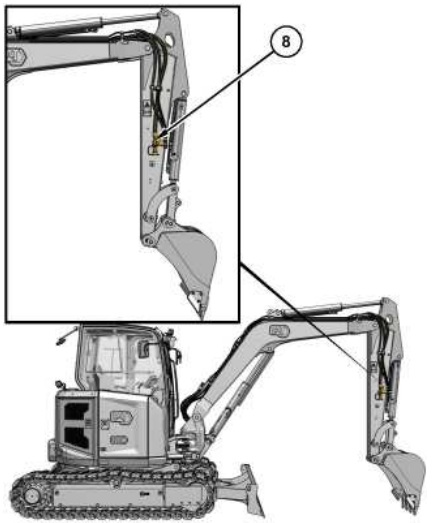

Illustration 5 g06779862
305 CR Excavator
Right side view of stick
(8) Primary auxiliary line on right side of stick

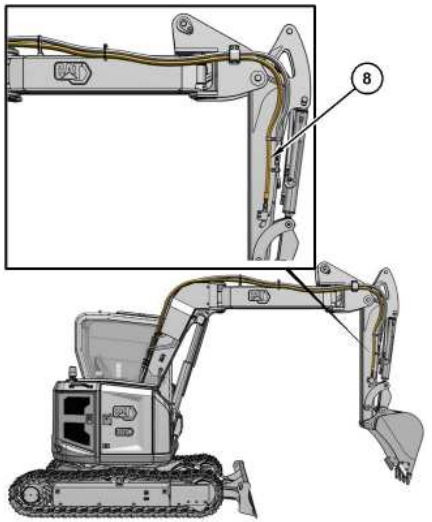

Illustration 6 g06779760
305 SR Excavator
Right side view of stick
(8) Primary auxiliary line on right side of stick

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

Primary auxiliary line on left side of stick (7) is an oil feed line. Primary auxiliary line on right side of stick (8) is an oil return line.

The primary auxiliary lines can be equipped with coupler assemblies. Wipe all coupler assemblies before connecting the work tools.

The primary auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Refer to System Pressure Release for more information. Relieve the pressure in the primary auxiliary hydraulic lines by performing the following steps:

1. Turn the engine start switch key to the ON position with the engine OFF. Refer to Engine Starting for more information.
2. Lower the hydraulic lockout control lever. Refer to Operator Controls for more information.
3. Move the control levers and thumb wheels in both directions repeatedly. Refer to for more information.
   Note: The hydraulic accumulator must have pressure to relieve a circuit. If needed, start engine and engage the hydraulic lockout control lever for 5 seconds to charge the accumulator. After the accumulator has been pressurized, repeat Steps 1 through 3.
4. Uncouple the work tool immediately after the pressure has been released.
   Note: Pressure can build up in the primary auxiliary lines if the work tool is not coupled or uncoupled immediately after the pressure has been released.

Secondary Auxiliary Hydraulic Circuit (AUX 2) (If Equipped)

WARNING

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

In order to prevent unexpected operation of the secondary auxiliary control circuit, make sure that the thumb is not placed on or near the switch on the left joystick.

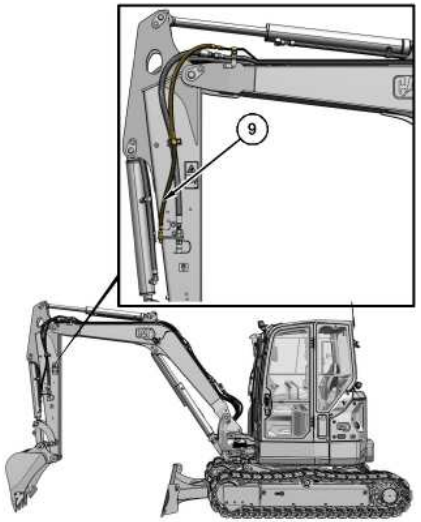

Illustration 7 g06779881

305 CR Excavator
Left side view of stick
(9) Secondary auxiliary line on left side of stick

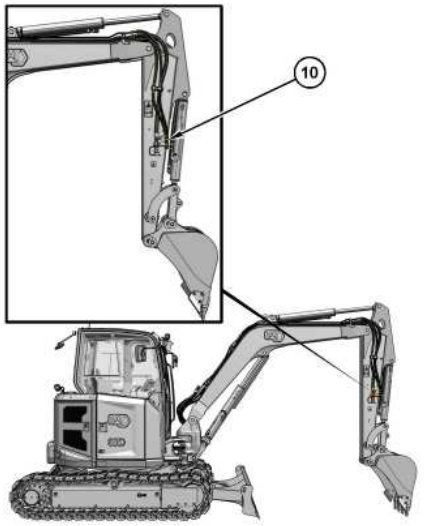

Illustration 8 g06779866
305 CR Excavator
Right side view of stick
(10) Secondary auxiliary line on right side of stick

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

Secondary auxiliary line on left side of stick (9) is an oil feed line. Secondary auxiliary line on right side of stick (10) is an oil return line.

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

The secondary auxiliary lines must be relieved of pressure to connect the coupler assemblies to the work tool. Refer to System Pressure Release for more information. Relieve the pressure in the secondary auxiliary hydraulic lines by performing the following steps:

1. Turn the engine start switch key to the ON position with the engine OFF. Refer to Engine Starting for more information.
2. Using button (2) on the joystick, change the mode from Boom Swing to Aux 2. Refer to Joystick Controls for more information.
3. Lower the hydraulic lockout control lever. Refer to Operator Controls for more information.
4. Move the control levers and thumb wheels in both directions repeatedly. Refer to Joystick Controls for more information.
   Note: The hydraulic accumulator must have pressure to relieve a circuit. If needed, start engine and engage the hydraulic lockout control lever for 5 seconds to charge the accumulator. After the accumulator has been pressurized, repeat Steps 1 through 4.
5. Uncouple the work tool immediately after the pressure has been released.
   Note: Pressure can build up in the primary auxiliary lines if the work tool is not coupled or uncoupled immediately after the pressure has been released.

Auxiliary Tool Case Drain (if equipped)

The case drain is necessary for certain tools with hydraulic motors such as mulchers and flail mowers.

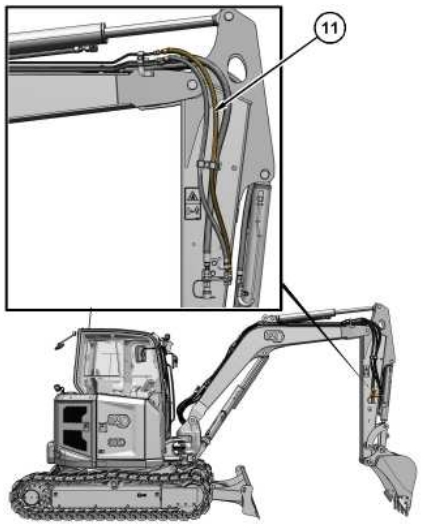

Illustration 9 g06779868
305 CR Excavator
Right side view of stick
(11) Case drain coupling

Wipe and clean the quick connectors before attaching case drain coupling (11) to the machine.

Continuous Flow

Note: Enable the continuous flow feature in monitor. Refer to Monitoring System for additional information.

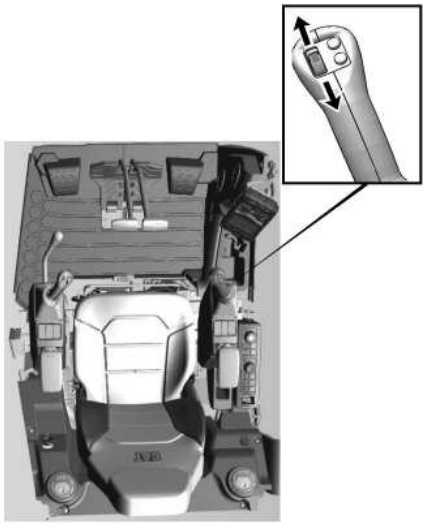

Illustration 10 g06786050
Interior of the machine

1. The operator controls the hydraulic flow rate with right joystick thumb wheel (1) on the right-hand joystick.
2. To set continuous flow, first set the continuous flow feature to ON in monitor. Refer to Monitoring System for additional information.
3. Use right joystick thumb wheel (1) to command Aux 1 until the desired hydraulic flow rate is achieved.
4. Hold right joystick thumb wheel (1) at the desired command for 2.5 seconds. After 2.5 seconds, the continuous flow indicator on the monitor will turn green indicating that continuous flow is ACTIVE.
5. Once the continuous flow begins, release right joystick thumb wheel (1).
6. Continuous flow will stop operating when right joystick thumb wheel (1) is moved or the hydraulic lockout is lifted or when the machine is turned OFF.

Work Tool Flow Mode Control

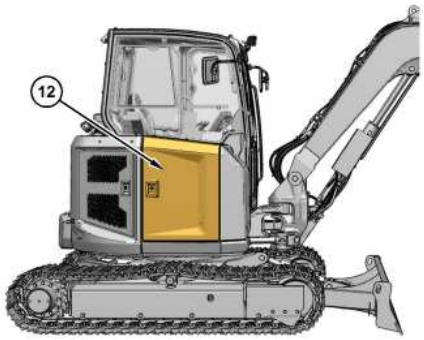

Illustration 11 g06710236
305 CR Excavator
Right side view of the machine
(12) Right side access door

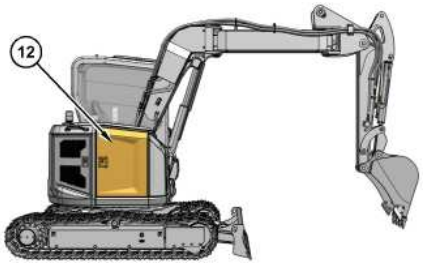

Illustration 12 g06779767
305 SR Excavator
Right side view of the machine
(12) Right side access door

Open right side access door (12) to gain access to manual flow control valve. Refer to Access Door and Cover Locations for more information.

One-Way Flow

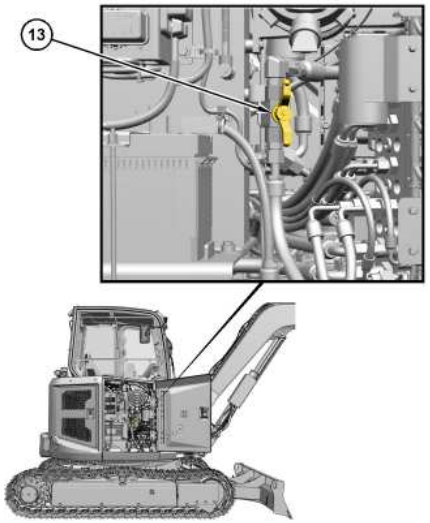

Illustration 13 g06710019
305 CR Excavator
Some components removed for better clarity
(13) One-way flow in manual flow control valve

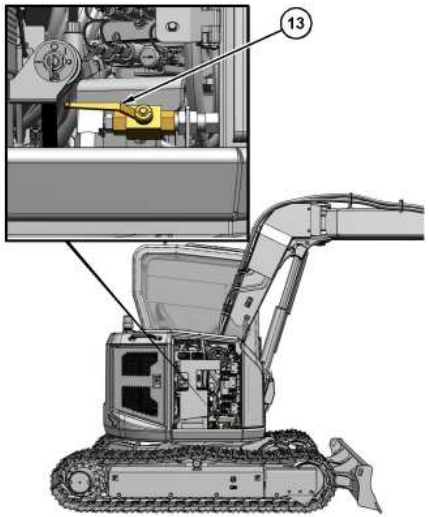

Illustration 14 g06779775
305 SR Excavator
Some components removed for better clarity
(13) One-way flow in manual flow control valve

The flow control manual valve is located next to the battery. Refer to Illustration 13 and 14 for the position of manual flow control valve to attain one-way flow in manual flow control valve (13) .

Two-Way Flow

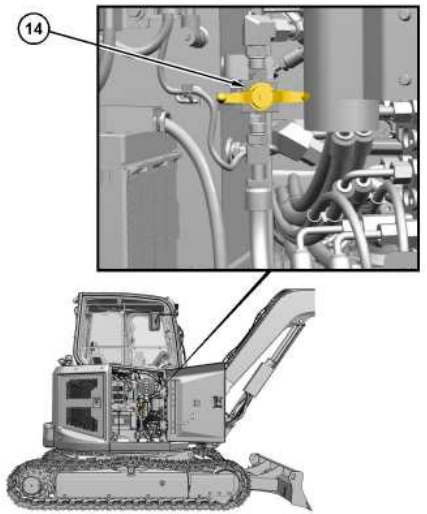

Illustration 15 g06710027
305 CR Excavator
Some components removed for better clarity
(14) Two-way flow in manual flow control valve

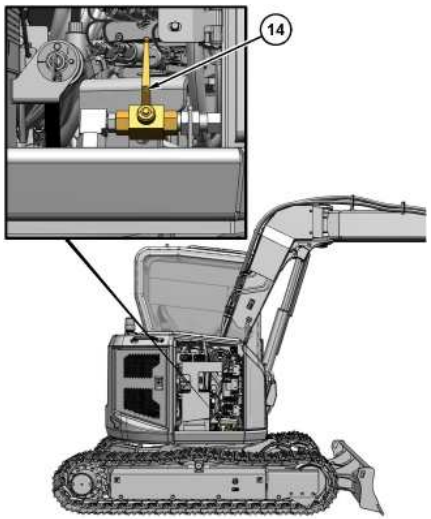

Illustration 16 g06779785
305 SR Excavator
Some components removed for better clarity

(14) Two-way flow in manual flow control valve

The flow control manual valve is located next to the battery. Refer to Illustration 15 and 16 for the position of manual flow control valve to attain two-way flow in manual flow control valve (14).

Close right side access door (12). Refer to Access Door and Cover Locations for more information.

Adjustable Primary Auxiliary Valves

This feature enables the ability to adjust pressures allowing for customized and improved performance of work tools.

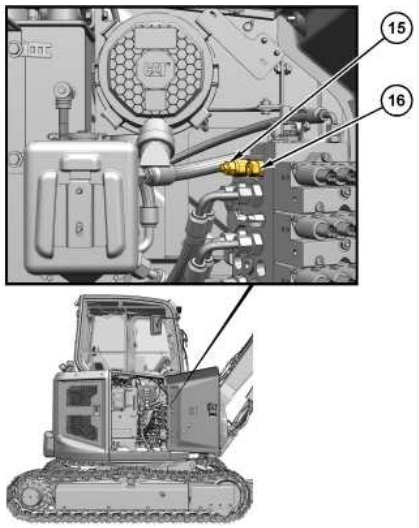

Illustration 17 g06709945
305 CR Excavator
Some components removed for better clarity
(15) Adjustable Relief Valve for Aux 1B
(16) Adjustable Relief Valve for Aux 1A

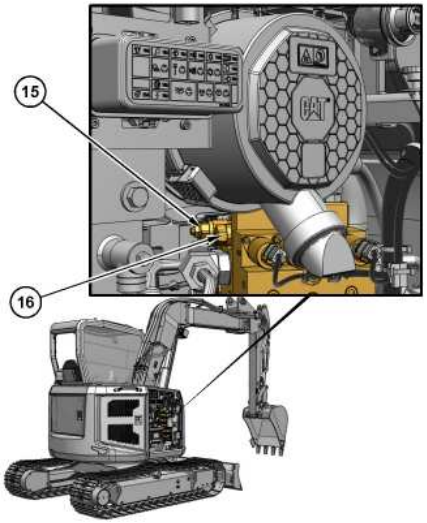

Illustration 18 g06779788
305 SR Excavator
Some components removed for better clarity
(15) Adjustable Relief Valve for Aux 1B
(16) Adjustable Relief Valve for Aux 1A

1. Open right side access door (12) to gain access to adjustable primary auxiliary valves. Refer to Access Door and Cover Locations for more information.
2. Adjustable Relief Valve for Aux 1B (15) and adjustable Relief Valve for Aux 1A (16) are on the main control valve.
3. Close right access door (12). Refer to Access Door and Cover Locations for more information.

Auxiliary Control Pedal (AUX 1) (Two-Way Flow) (If Equipped)

WARNING

Unintended operation of the Auxiliary Control pedal can cause injury or death. A RAISED hydraulic lock lever does not mean that the auxiliary line is locked out.

To Prevent unintended activation of the Auxiliary Control pedal while traveling or whenever the auxiliary line is not being used, make sure the foot is not placed on or near the Auxiliary Control pedal.

Note: Operate the Auxiliary Control pedal carefully until you become familiar with how AUX 1 reacts to the controls. Refer to Joystick Controls for more information.

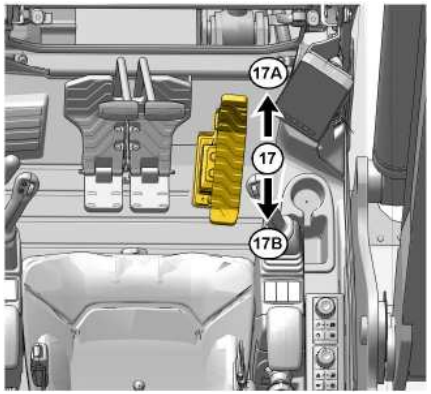

Illustration 19 g06656639
Interior of the machine
(17) Right auxiliary control pedal
(17A) Front of right auxiliary control pedal
(17B) Rear of right auxiliary control pedal

1. Right Auxiliary Control pedal (17) controls the two-way flow auxiliary line circuit (AUX 1).

2. To pressurize the line that is connected to the left-hand side of the stick, apply pressure to front of right auxiliary control pedal (17A).

3. To pressurize the line that is connected to the right-hand side of the stick, apply pressure to rear of right auxiliary control pedal (17B)

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