SMCS - 7310

i09859994

WARNING

Personal injury may occur when removing and installing windows in the operator station.

The windows may break during removal or installation.

Broken or cracked windows may have sharp edges that can cause cuts or lacerations.

To avoid injury always ensure adequate personal protective equipment (protective glasses, face shield and gloves) are worn.

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

Not following the recommendations found in this manual can lead to reduced performance and compartment failure.

Rear Window with Ring Seal (If Equipped)

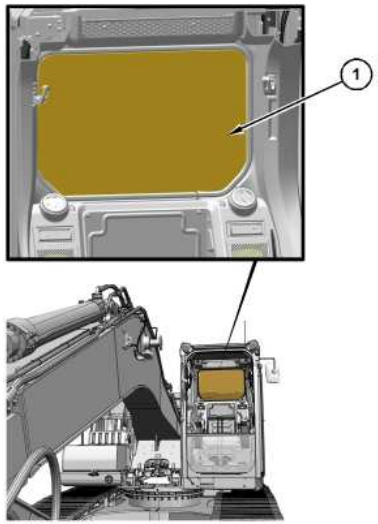

Illustration 1 g07616015
Front view of the machine
(1) Rear window

Rear window (1) is located behind the operator seat.

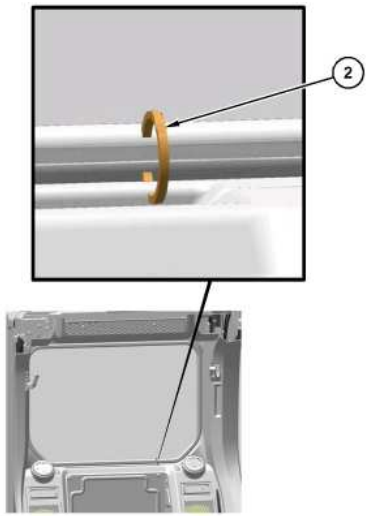

Illustration 2 g07616045
Some parts removed for better clarity
(2) Ring

Alternate Exit

- If the primary exit is blocked, rear window (1) can be used as an alternate exit.

To remove rear window (1), pull ring (2) and completely remove the seal of rear window (1), then push out the glass. Climb through rear window (1) opening to exit the cab.

Rear Window with Lever (If Equipped)

The rear window can be opened from inside or outside the cab.

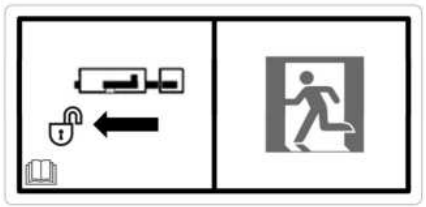

Illustration 3 g07616142
Alternate exit message is located on the rear window

Rear Window Opening from Inside the Cab

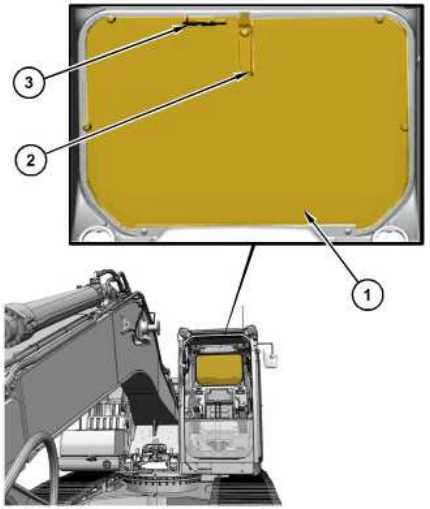

Illustration 4 g07616097

Front view of the machine
(1) Rear window
(2) Handle
(3) Latch

Rear window (1) is located behind the operator seat.

Alternate Exit

- If the primary exit is blocked, rear window (1) can be used as an alternate exit.

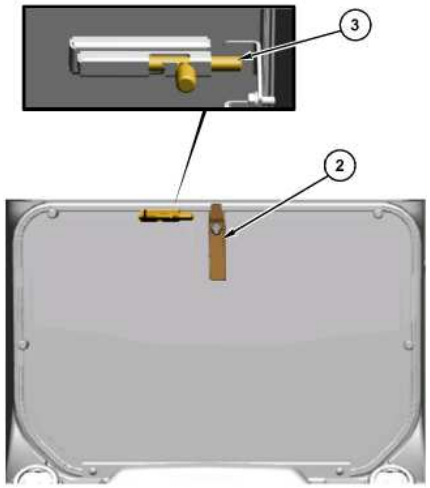

Illustration 5 g07616184
Rear window (1) in LOCKED position
(2) Handle
(3) Latch

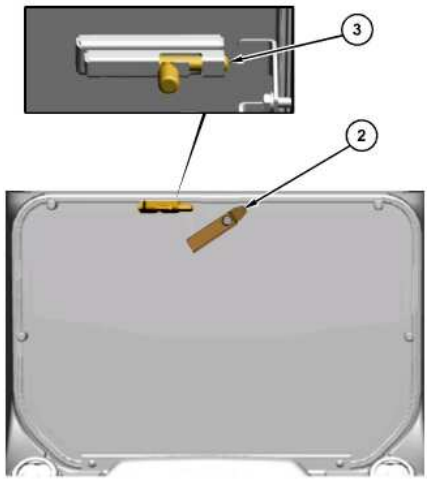

Illustration 6 g07616205
Rear window (1) in UNLOCKED position
(2) Handle
(3) Latch

To unlock rear window (1) from inside the cab, rotate handle (2) either clockwise or counterclockwise and move latch (3) to UNLOCKED position. Refer to Illustration 6 for more information.

To open rear window (1) from inside the cab, push rear window (1) outward.

Rear Window Opening from Outside the Cab

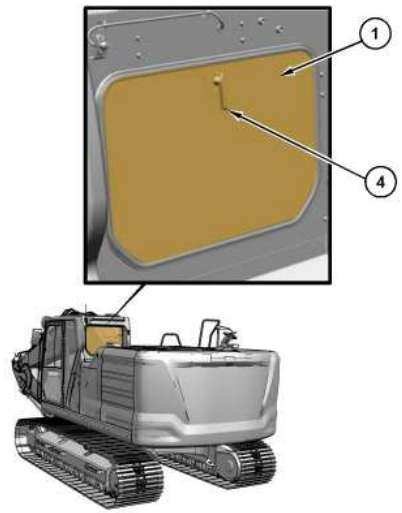

Illustration 7 g07616219
Back view of the machine
(1) Rear window
(4) Handle

To unlock rear window (1) from outside the cab, rotate handle (4) either clockwise or counterclockwise for UNLOCKED position.

Note: Before operating the machine, unlock rear window (1) from inside the cab. Refer to Illustration 6 for rear window (1) in UNLOCKED position.

Note: Opening rear window (1) from outside the cab is possible only when rear window (1) is in UNLOCKED position inside the cab.

To open rear window (1) from the outside of the cab, pull rear window (1) outward.

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2023/11/10 **Battery Disconnect Switch (M0113012-09)**

SMCS - 1411

i10026329

Illustration 1 g06496674

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

Disconnect Switch Type 1

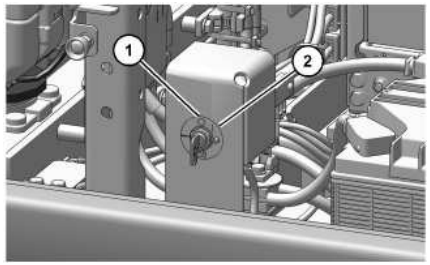

Illustration 2 g07706669

Battery disconnect switch type 1
(1) OFF position
(2) ON position

Disconnect Switch Type 2

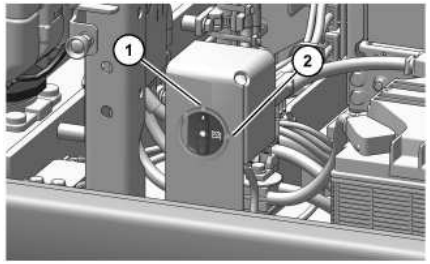

Illustration 3 g07706666
Battery disconnect switch type 2
(1) OFF position
(2) ON position

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.

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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SMCS - 7000

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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.

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

If this machine is used to lift objects within Japan , Japanese regulations require the machine to be equipped with a shovel crane configuration.

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.

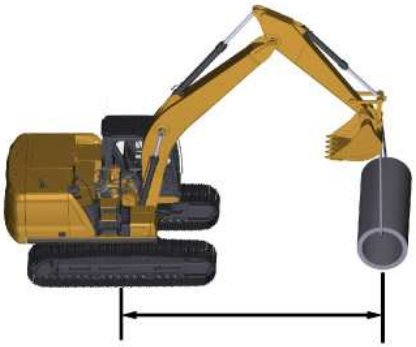

Illustration 12 g06212539

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. So 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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SMCS - 6001, 6101, 6102, 6523

i06978374

Removal Procedure

WARNING

Failure to follow the instruction below for the installation of a work tool may result in personal injury or death. Special care must be taken if more than one person is installing the work tool.

- **Confirm the verbal communication and the hand signals that will be used during the installation.**
- **Be alert for sudden movement of the front linkage and the work tool.**
- **Do not insert fingers into the bores of the support pins when the support pins and the bores are being aligned.**

NOTICE

To facilitate removal of the bucket pins without causing damage to the pins, the bearings, and/or the O-ring seals put the bucket on the floor and the stick in a vertical position, as shown.

Illustration 1 g06181120

1. Start the engine. Park the machine on a hard, level surface. Position the bucket, the stick, and the bucket control linkage, as shown. Shut off the engine.

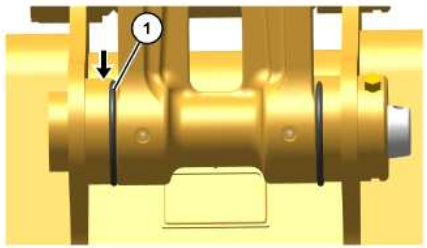

Illustration 2 g06192508

2. Slide O-ring seals (1) off the pin joints and onto the flanges of the bucket.

WARNING

When the pin assembly is removed, the linkage assembly may swing out of the bucket. To prevent possible personal injury, do not stand in front of the linkage assembly when the pin assembly is being removed.

Note: Removing the support pin may be difficult due to excessive pressure on the support pin. Remove the pressure on the support pin by adjusting the front linkage.

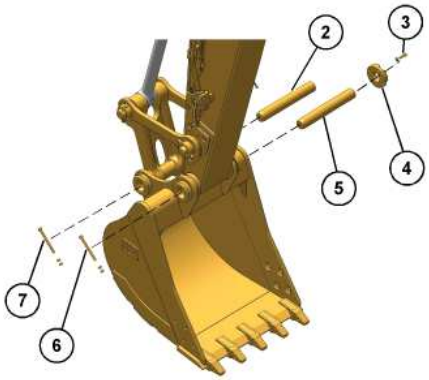

Illustration 3 g06186090

3. Remove nuts and retaining bolt (7) from support pin (2). Remove the support pin .
4. Remove bolts (3) and adapter plate (4). Remove the shims.
5. Remove nuts and retaining bolt (6) from support pin (5). Remove the support pin.
6. Start the engine and raise the stick out of the bucket.
7. Remove the O-ring seals (1) from the flanges on the bucket.

Note: After the support pins have been removed, make sure that the support pins do not become contaminated with sand or dirt. Make sure that the seals on the end of the stick and the seals on the end of the link do not become damaged.

Installation Procedure

1. Clean each pin and each pin bore. Lubricate each pin bore with molybdenum grease.

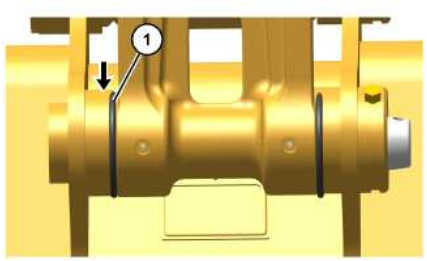

Illustration 4 g06192508

2. Position the O-ring seals (1) onto the flanges of the bucket.
3. Start the engine and lower the stick into the bucket until the pin bores are in alignment with each other. Stop the engine.

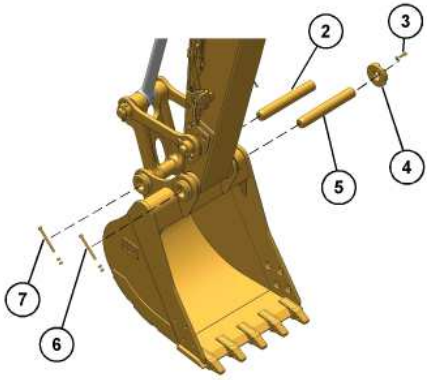

Illustration 5 g06186090

4. Install support pin (5). Align the retaining bolt hole in the support pin with the retaining bolt hole in the bucket.
5. Install the retaining bolt and nuts (6). Install adapter plate (4) without the shims, and without bolts (3) that hold the adapter plate.
6. Refer to Operation and Maintenance Manual, "Bucket Linkage - Inspect/Adjust" to adjust the bucket clearance.
7. Slide O-ring seals (1) in position over the pin joints between the bucket and the stick.

8. Start the engine and position the bucket linkage into the bucket until the pin bores are in alignment with each other. Stop the engine.
9. Install support pin (2). Align the retaining bolt hole in the bucket pin with the retaining bolt hole in the bucket.
10. Install retaining bolt and nuts (7).
11. Slide the O-ring seals (1) over the pin joints between the bucket and the link assembly.

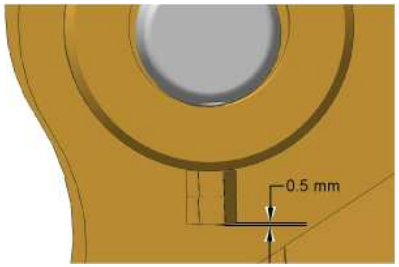

Illustration 6 g06192530

12. Tighten retaining nuts (6) and (7). Position the outside nut even with the end of the retaining bolt or 0.5 mm (0.02 inch) beyond the end of the retaining bolt. Tighten the inside nut against the outside nut.
13. Lubricate the bucket pins. Refer to Operation and Maintenance Manual, "Bucket Linkage - Lubricate".

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2017/06/23 **Cab Door (M0113012-09)**

SMCS - 7308

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Illustration 1 g06180275

To open the cab door from the outside of the cab, pull outward on the door handle.

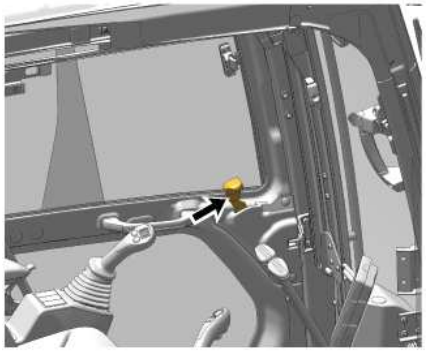

Illustration 2 g06179959

To open the cab door while inside the cab, push forward on the lever for the cab door latch.

For additional ventilation, open the cab door all the way to engage the catch on the exterior wall of the cab.

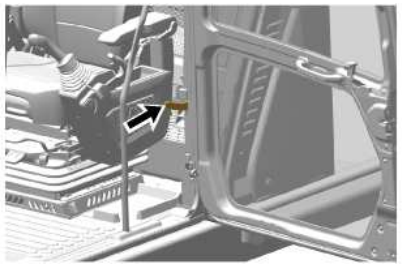

Illustration 3 g06180267

To release the cab door from the catch, pull downward on the cab door release lever.

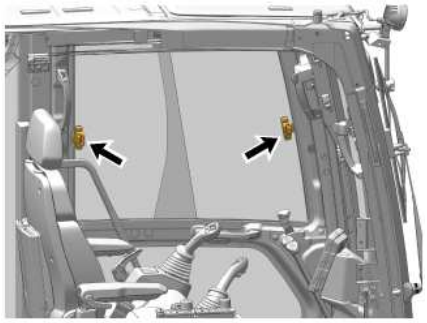

Illustration 4 g06179957

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

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Rear View Camera

Illustration 1 g06396304

The rear view camera system consists of a camera that is located in the middle of the top of the counterweight.

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

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

Right Side View Camera

Illustration 2 g06396305

The side view camera system consists of a camera mounted on the panel next to the pump compartment.

Note: The side view camera system has been set up by the factory or by a Cat dealer to provide views which comply with specified machine side views. Consult your Cat dealer before any adjustments are made to the system.For more information refer to Operation and Maintenance Manual, "Monitoring System".

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2023/01/24 **Compartment Light - If Equipped (M0113012-09)**

SMCS - 1429

i09682615

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.

The compartment lights in the various compartments can be activated by turning on the compartment light switch.

Illustration 1 g07546721
(1) Left access door

1. Open left access door (1). Refer to Access Door and Cover Locations for more information.

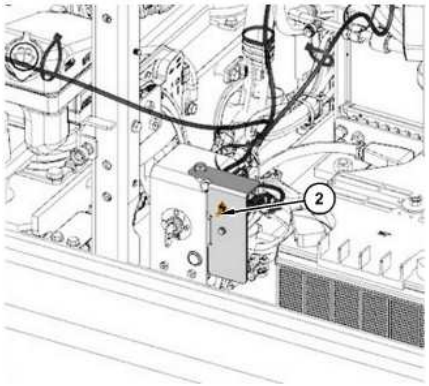

Illustration 2 g07546777
(2) Compartment light switch

2. Compartment light switch (2) is located near the battery disconnect switch. Move compartment light switch (2) upward in order to illuminate the lights in following compartments.
   - Battery compartment
   - Engine compartment
   - Pump compartment
3. Move compartment light switch (2) upward again to turn off the lights in each compartment.
   Note: Compartment lights are equipped with timer relay function. Compartment lights will turn off automatically in 30 minutes, if not manually turned off.

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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.

First 100 Hours

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

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

Daily Basis

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

- Operation and Maintenance Manual, "Bucket Lifting Eye - Inspect"
- Operation and Maintenance Manual, "Cooling System Coolant Level - Check"

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

Refer to 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.

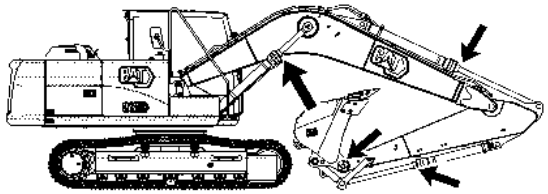

Illustration 1 g07770198

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.

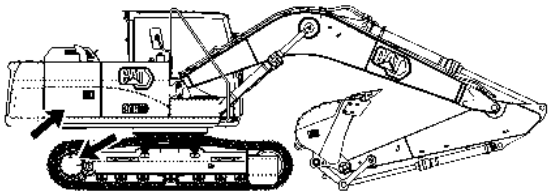

Illustration 2 g07770202

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 3 g07770207

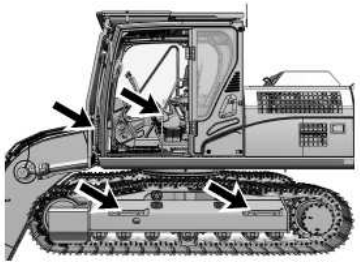

Illustration 4 g07770209

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.

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NOTICE
Keep engine speed low and do not operate until the message 'Warm-Up Mode Power Derate" on the monitor goes out. If it does not go out within thirty seconds, stop the engine and investigate the cause before starting again. Failure to do so, can cause engine damage.

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

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

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

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

During extended idling in cold ambient conditions, engine speed may operate between 900 rpm and 1000 rpm. Operation at 1000 rpm is minimal and will only last for up to 20 minutes.

Hydraulic System

Automatic Warm-Up

This machine comes with an automatic warm-up feature that can be enabled or disabled. If the feature is enabled, and the hydraulic oil temperature is below the threshold that has been set, a prompt will appear on the monitor after starting the machine. Follow the prompts on the monitor. If this feature is disabled or you would like to change the temperature setting, refer to Operation and Maintenance Manual, Monitoring System.

Illustration 1 g06219830

Manual Warm-Up

WARNING

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

1. Make sure that the area is clear of personnel and equipment.
   Note: The hydraulic lockout control must be in the UNLOCKED position before the hydraulic controls will function.
2. Allow the engine to warm up at low idle for at least 5 minutes. Engage the work tool controls and disengage the work tool controls. This will speed up the warm-up of the hydraulic components. When you idle the machine for warm-up, observe the following recommendations:
   - If the temperature is greater than 0°C (32°F), warm up the engine for approximately 15 minutes.
   - If the temperature is less than 0°C (32°F), warm up the engine for approximately 30 minutes.
   - If the temperature is less than − 18°C (0°F) or if hydraulic functions are sluggish, additional time may be required.

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 warm up the hydraulic oil, turn the engine speed dial to the medium engine speed. Run the engine for approximately 5 minutes and move the joystick intermittently from the BUCKET DUMP position to the HOLD position. Do not hold the joystick in the BUCKET DUMP position with the bucket cylinder fully extended for more than 10 seconds.
   This allows the oil to attain relief pressure, which causes the oil to warm up more rapidly.
4. Turn the engine speed dial to the maximum engine speed and repeat Step 3.
5. Cycle all controls to circulate warm oil through all hydraulic cylinders and all hydraulic lines, and through the swing motor and travel motors.
6. Observe the gauges and the indicators frequently during the operation.

Turbo Protection Power Derate - After an engine start, the engine speed will be set to low speed and the hydraulic power limited for a time period . During this period, the monitor displays the message "Warm -Up Mode Power Derate". (Maximum is around 30 seconds). After the turbo bearing lubrication is sufficient, the engine speed goes to the setting dial speed and the monitor stops to display the message.

Improve Cold-Weather Performance

Covers installed over the vents in the radiator compartment door will help to control overcooling in ambient temperatures below −15° C (5° F).

The materials used for the covers and the method used to install the covers is at the installers discretion.

Install the covers if overcooling is observed while the machine is idling in ambient temperatures below −15° C (5° F).

Stop the machine, and remove the covers under the following conditions:

- The ambient temperature is above −15° C (5° F).
- The engine temperature gauge indicates overheating.
- The hydraulic oil temperature gauge indicates overheating.

Installation

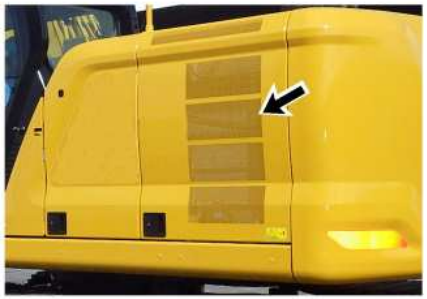

Illustration 2 g06424044
Vent locations on the radiator compartment door.

1. Clean the surface of the radiator compartment door.

2. Install the covers in the locations shown in Illustration 2. The covers should fully cover the door vents.

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2017/06/23 **Engine Starting with Jump Start Cables - If Equipped (M0113012-09)**

SMCS - 1000, 7000

i06953771

WARNING

Failure to properly service the batteries may cause personal injury.

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

Do not smoke when checking battery electrolyte levels.

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

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

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

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

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

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

NOTICE

To prevent damage to engine bearings and to electrical circuits when you jump-start a machine, do not allow the stalled machine to touch the machine that is used as the electrical source.

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

Use only equal voltage for starting. Check the battery and starter voltage rating of your machine. Use only the same voltage for jump starting. Use of a welder or higher voltage will damage the electrical system.

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

Refer to Special Instruction, SEHS7633 , "Battery Test Procedure" for complete testing and charging information. This publication is available from your Cat dealer.

When the auxiliary start receptacles are not available, use the following procedure.

1. Lower the equipment to the ground. Move all controls to the HOLD position. Move the hydraulic lockout control to the LOCKED position.
2. Turn the start switch on the stalled machine to the OFF position. Turn off all accessories.
3. Turn the battery disconnect switch on the stalled machine to the ON position.
4. Move the machine that is being used as an electrical source near the stalled machine so that the jump-start cables reach the stalled machine. **Do not allow the machines to contact each other.**
5. Stop the engine of the machine that is being used as an electrical source. If you are using an auxiliary power source, turn off the charging system.

Illustration 1 g06181546

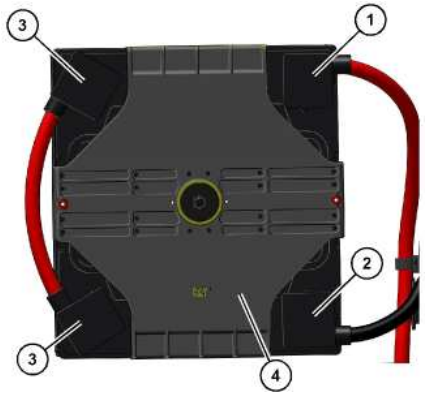

Illustration 2 g06181551
(1) Red positive post to starter
(2) The black negative post connects to the battery disconnect switch.
(3) Do not use these two connections for jump starting. The red positive post is connected in series to the black negative post.
(4) Cover

6. Ensure that battery caps on both machines are tight and correctly placed. Ensure that batteries in the stalled machine are not frozen. Make sure that the batteries have enough electrolyte.

   Note: The positive terminal of the 24 V system of the source and the negative terminal of the 24 V system of the source must be identified correctly before the jumper cables are connected. The positive terminal of the 24 V system of the discharged battery must be identified correctly before the jumper cables are connected.

7. The positive ends of the jump-start cable are red. Connect one positive end of the jump-start cable to the positive cable terminal of the discharged battery. Some machines have battery sets.

   Note: Batteries that are in series may be in separate compartments. Use the terminal that is connected to the starter solenoid. This battery or battery set is normally on the same side of the machine as the starter.

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

8. Connect the other positive end of the jump-start cable to the positive cable terminal of the electrical source.

9. Connect one negative end of the jump-start cable to the negative cable terminal of the electrical source.

10. Finally, connect the other negative end of the jump-start cable to the frame of the stalled machine. Do not connect the jump-start cable to the battery post. Do not allow the jump-start cables to contact the battery cables, the fuel lines, the hydraulic lines, or any moving parts.

11. Start the engine of the machine that is being used as an electrical source or energize the charging system on the auxiliary power source.

12. Wait at least two minutes before you attempt to start the stalled machine. This will allow the batteries in the stalled machine to partially charge.

13. Attempt to start the stalled engine. See Operation and Maintenance Manual, "Engine Starting" for the correct starting procedure.

14. Immediately after you start the stalled engine, disconnect the jump-start cables in reverse order.

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WARNING

Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

NOTICE

Do not crank the engine for more than 10 seconds. If the engine does not start, allow the starter to cool for 2 minutes before cranking again. The engine start switch must be turned to the OFF position before trying to restart.

NOTICE

This machine is equipped with a Cat® Machine Security System (MSS) and may not start under certain conditions.

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: The engine can start in areas that have temperatures as low as −18 °C (0 °F). For areas that are colder, a starting kit for cold weather is available. Refer to Operation and Maintenance Manual, SEBU5898 , "Cold-Weather Recommendations for All Caterpillar Machines" for more information.

1. Move the hydraulic lockout control to the LOCKED position. Refer to Operation and Maintenance Manual, "Operator Controls" for more information.
   This machine is equipped with an engine neutral start system. The system only allows the engine to start when the lever for the hydraulic lockout control is in the LOCKED position. Refer to Operation and Maintenance Manual, "Operator Controls" for more information.
2. Ensure that the joysticks and travel controls are in the HOLD position. Refer to Operation and Maintenance Manual, "Joystick Controls" for more information.

Illustration 1 g07512980
"Engine Start Allowed" indication in monitor display

3. The operator passcode, Bluetooth® key, or Cat® App: Fleet management application must be authenticated before starting the engine. Refer to Operation and Maintenance Manual, "Machine Security System" for more information. Once authenticated, an "Engine Start Allowed" message will appear across the top of the monitor and the start switch Light Emission Diode (LED) will turn green.

4. Bluetooth® devices and passcodes can be registered using the in-cab display if the operator is logged in to the system using a master access account. Contact your Cat® dealer for additional information.
Reference: Refer to Operation and Maintenance Manual, Machine Security System for instructions.

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. Refer to Operation and Maintenance Manual, "Joystick Controls" for the location of horn switch.

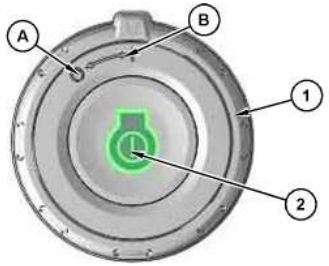

Illustration 2 g07513815
(A) OFF
(B) ON
(1) Engine start ring
(2) Engine start button

6. Turn the engine start ring (1) to ON position (B) from OFF position (A). Refer to Operation and Maintenance Manual, "Operator Controls" for location of engine start button. Press and hold engine start button (2) to start the engine. Release engine start button (2) after the engine has started.
If the engine is having trouble starting, do not crank the engine for more than 30 seconds. Cranking the engine for more than 30 seconds can damage starting system components.

Engine Oil Level Monitoring System

Your machine may be equipped with an automated function for checking Engine Oil level.

1. Turn the engine start ring (1) to ON position (B).
   If fluid level is low, certain event codes will appear on the display. The system will skip the level check if the machine is parked on a slope, or the duration from the last engine shutdown is not enough. The display will show a message in the case that the level check is skipped.

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

If the boom does not lower, the accumulator is empty. Use one of the following procedures to lower the boom.

Machines Equipped with Boom Lowering Control Valves

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.

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 hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the work tools have been lowered to the ground, and the oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

If the engine or the hydraulic system is disabled and the boom is up, the boom can be lowered manually. Boom lowering control valves allow the boom to be manually lowered. The boom lowering control valves are located at the head end port on the boom cylinders.

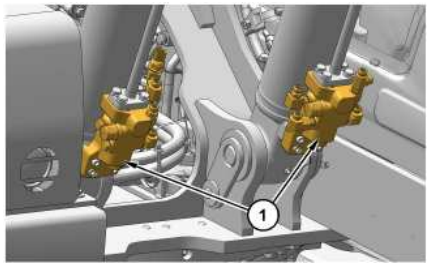

Illustration 1 g06512065
(1) Boom lowering control valve

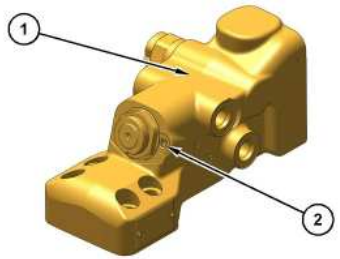

Illustration 2 g06510199
(1) Boom lowering control valve
(2) Emergency Release

Loosen the emergency release (2) at each of the boom lowering control valves to lower the boom.

Before operating the machine, make any necessary repairs.

For additional information, consult your Cat dealer.

Machines without a Boom Lowering Control Valve

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.

Use the following procedure to manually lower the boom due to an engine malfunction.

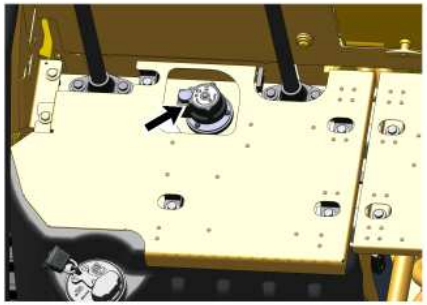

Illustration 3 g06184080
Hydraulic tank filler cap location

WARNING

Pressurized system!

The hydraulic tank contains hot oil under pressure. To prevent burns from the sudden release of hot oil, relieve the tank pressure with the engine off. Relieve pressure by slowly turning the cap until the cap reaches the secondary stop.

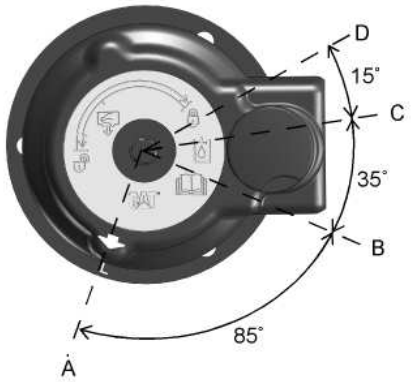

Illustration 4 g06184990
Filler cap
(A) LOCK position
(B) PRESSURE RELEASE - START position
(C) PRESSURE RELEASE - END position
(D) OPEN position

1. Release the pressure that may be present in the return hydraulic circuit with the following procedure. Refer to Illustration 4 for filler cap positions.

a. Turn the filler cap counterclockwise and move the arrow from position (A) to position (B).

b. Release the pressure for a minimum of 45 seconds by moving the arrow from position (B) to position (C).

c. Move the arrow from position (C) to position (D).

d. After the tank pressure is relieved, remove the filler cap.

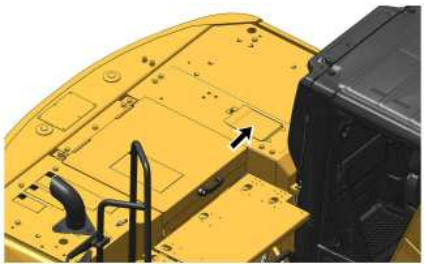

Illustration 5 g06497169

2. Open the reservoir hatch next to the engine hood.

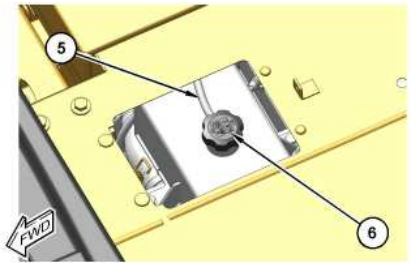

Illustration 6 g06497173
(5) Hose
(6) Cap

3. Loosen cap (6) and disconnect hose (5) from the reservoir. Remove the clamps and the cable straps that secure the hose to the machine.

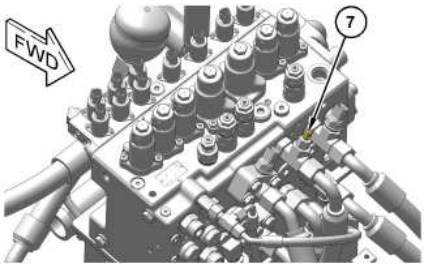

Illustration 7 g06497182
Main control valve
(7) Screw

4. Connect one end of the radiator hose to screw (7). Put the other end of the hose into the hydraulic tank opening. The screw is located at the front, right side of the main control valve.
5. Slowly loosen screw (7) by a maximum of 1/2 turn. This allows the hydraulic oil in the boom circuit to drain into the hydraulic tank. The boom will now start to lower.
6. Make sure that the work tool has lowered all the way to the ground. Tighten screw (7) to 13 ± 2 N·m (9 ± 1 lb ft).
7. Disconnect the hose from the screw. Do not allow the oil that is contained in the hose to spill. Drain the oil into a suitable container.
8. Connect the hose to the original position on the radiator and install the hydraulic tank filler cap.
9. Tighten the reservoir cap and close the reservoir hatch.

After completion of the manual boom lowering, make necessary repairs before you operate the machine again.

Pressure Release of Auxiliary Lines

WARNING

Personal injury can result from hot oil spray and raised work tools.

Make sure all the work tools have been lowered, the oil is cool and the pressure has been released from the hydraulic system before removing any components or lines.

Do not allow hot oil or components to contact skin.

Note: Refer to Operation and Maintenance, "General Hazard Information" for information on containing fluid spillage.

Refer to the procedure below before any of the following conditions.

- The work tool is changed.
- The position of the ball valve is changed.

1. Turn the engine start switch to the OFF position.
2. Place the hydraulic lockout lever in the UNLOCKED position.
3. Release the pressure in the auxiliary lines by pressing the auxiliary control buttons or the auxiliary control pedal three times.
4. Place the hydraulic lockout lever in the LOCKED position.
   Release hydraulic system pressure in the attachment circuits:

   a. Start the engine to charge pilot accumulator.

   b. Shut off the engine.

   Note: Perform Step 4c through Step 4e immediately after the engine is shut off to insure adequate pilot system pressure is available to release the pressure in the hydraulic circuits.

c. Turn the engine start switch to the ON position without starting the engine. Refer to Engine Starting.

d. Place the hydraulic activation control lever in the UNLOCKED position. Refer to Operator Controls.

e. Activate the switch or pedal for the attachment circuit.

f. Place the hydraulic activation control lever in the LOCKED position. Refer to Operator Controls.

g. Start the engine to recharge pilot accumulator.

Note: Do not activate any controls when recharging pilot accumulator.

h. Shut off the engine.

Repeat Step 4c through Step 4f for each attachment circuit.

5. Change the work tool.

Note: Perform Step 4c through Step 4e immediately after the engine is shut off to insure adequate pilot system pressure is available to release the pressure in the hydraulic circuits.

For additional information, consult your Cat dealer.

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2017/06/23 **Final Drive Sun Gear Removal (M0113012-09)**

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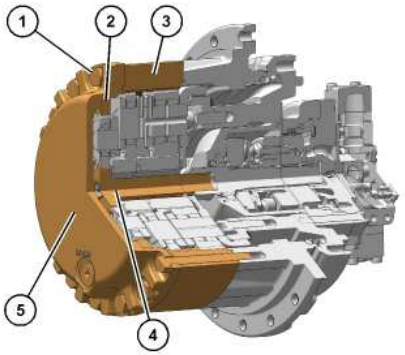

Illustration 1 g06188195
(1) Bolt
(2) Ring gear
(3) Ring gear
(4) Sun gear
(5) Final drive cover

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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2017/07/24 **Freezing Conditions (M0113012-09)**

SMCS - 7000 i07088536

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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2017/07/24 **Frozen Ground Conditions (M0113012-09)**

SMCS - 7000

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Illustration 1 g06185895

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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2020/02/03 **Fuel Tank Shutoff and Drain Control (M0113012-09)**

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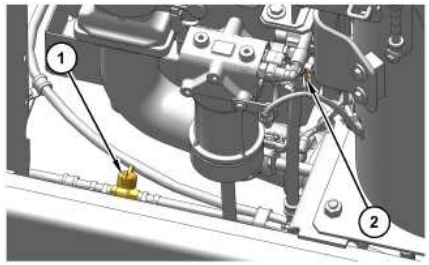

Illustration 1 g06497059
Fuel tank drain valve

Fuel Tank Drain Valve (1) - The drain valve for the fuel tank is located behind the right side access door. To drain the water and sediment from the fuel tank, turn the fuel drain valve counterclockwise. To close the fuel tank drain valve, turn the drain valve clockwise.

Fuel Shutoff Valve (2) - The fuel shutoff valve is located behind right side access door. To shut off the fuel supply, pull out the fuel shutoff valve, the red tab, and turn clockwise. To turn on the fuel supply, turn the fuel shutoff valve counterclockwise.

Note: For more detailed information that pertains to draining the water and sediment from the fuel tank, refer to Operation and Maintenance Manual, "Fuel Tank Water and Sediment - Drain".

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Use the following procedure to pump fuel and store the hose.

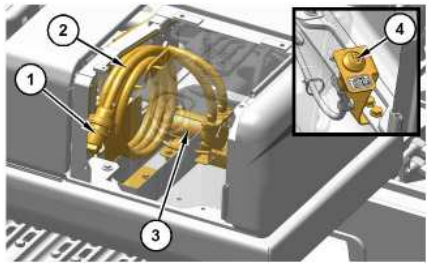

Illustration 1 g06496707
(1) Suction valve
(2) Suction hose
(3) Electric refueling pump
(4) ON/OFF switch

ON/OFF Switch - Push the ON/OFF switch to activate or deactivate the fuel transfer pump. A red indicator on the switch will illuminate when the fuel transfer pump is activated.

If one of the following conditions occur, the fuel transfer pump will not activate and/or stop operating:

- Battery disconnect switch is in the OFF position
- Engine is operating
- Engine start switch is moved to the START position.
- Engine start switch is in the OFF position
- Hydraulic lockout control is not in the LOCKED position
- Fuel tank level is full
- Fuel is not detected at the suction valve.
- 30 seconds following a detection of no fuel at the suction valve.

Use the following procedure to pump fuel and store the hose.

1. Park the machine on a level surface. Move the hydraulic lockout control to the LOCKED position. Stop the engine
2. Turn the engine start switch to the ON position without starting the engine.
3. Remove the fuel tank cap from the fuel tank.

4. Open the access that is on the right side of the machine.

Illustration 2 g06180748
Suction valve (1) is at the end of hose (2).
Turn the end of the suction valve clockwise to open the valve

5. Uncoil the hose and turn the end of the suction valve clockwise to open the suction valve.
6. Properly insert the end of the suction valve into a container of fuel.
7. Push switch (4) to activate the fuel transfer pump and supply the fuel to the tank. A red indicator on the switch will illuminate when the fuel transfer pump is activated. When the fuel tank is full, the fuel transfer pump will automatically stop.

   When the fuel container is empty, push the switch again to stop refueling. If additional fuel is needed, wait 30 seconds and return to step 6.

   Note: The red indicator on the switch will no longer illuminate when the fuel transfer pump has stopped refueling.

   Note: The fuel transfer pump will not activate for 30 seconds following a detection of no fuel at the suction valve.
8. Push the switch at any time to deactivate the fuel transfer pump.
   Note: The red indicator on the switch will no longer illuminate when the fuel transfer pump has stopped refueling.
9. Drain excess fuel from the hose and turn the end of the suction valve counter-clockwise to close the suction valve.
10. Wind the hose and store in the hose container.

NOTICE
To prevent hose damage, do not coil the hose in a tight radius.

11. Close the access door.
12. Install the fuel tank cap onto the fuel tank.
13. Turn the engine start switch to the OFF position.

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Changing Machine Control Pattern(If Equipped)

WARNING

Whenever a change is made to the machine control pattern, also exchange the pattern card in the cab to match the new pattern.

Check the machine control pattern for conformance to the pattern on the card in the cab. If the pattern does not match, change the card to match the machine control pattern before you operate the machine. Failure to do so could result in personal injury.

The machine control pattern can be changed to the ISO/JIS pattern, BHL pattern, MHI pattern, KOBE pattern, or the former SCM pattern. To change the joystick controls between the patterns, refer to Operation and Maintenance Manual, Monitoring System for more information.

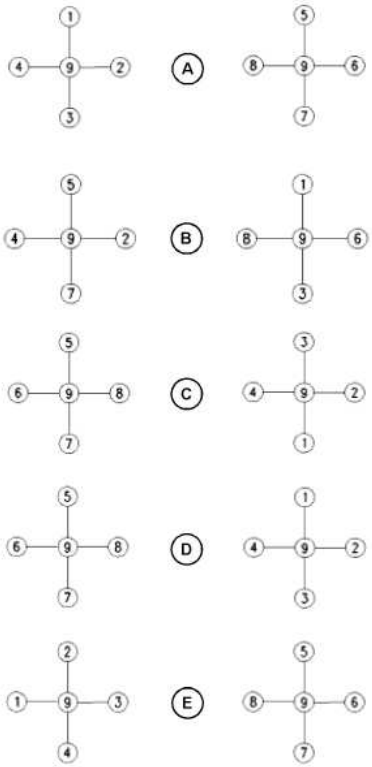

Illustration 1 g06136699
(A) ISO/JIS machine control pattern
(B) BHL machine control pattern
(C) MHI machine control pattern
(D) KOBE machine control pattern
(E) Former SCM machine control pattern

The patterns on the left side of the Illustration show the possible configurations for the left control lever. The patterns on the right side of the Illustration show the possible configurations for the right control lever.

STICK OUT (1)

- Move the control lever to this position to move the stick outward.

SWING RIGHT (2)

- Move the control lever to this position to swing the upper structure to the right.

STICK IN (3)

- Move the control lever to this position to move the stick inward.

SWING LEFT (4)

- Move the control lever to this position to swing the upper structure to the left.

BOOM LOWER (5)

- Move the control lever to this position to lower the boom.

BUCKET DUMP (6)

- Move the control lever to this position to dump the bucket.

BOOM RAISE (7)

- Move the control lever to this position to raise the boom.

BUCKET CLOSE (8)

- Move the control lever to this position to close the bucket.

HOLD (9)

- When the control lever is released from any position, the control lever will return to the HOLD position. Movement of the upper structure will stop.

Two functions may be performed at the same time by moving a control lever diagonally.

If the machine is equipped with a hydraulic hammer, the function of position (6) and of position (8) is different.

HYDRAULIC HAMMER RAISE (6)

- Move the control lever to this position to raise the hydraulic hammer.

HYDRAULIC HAMMER LOWER (8)

- Move the control lever to this position to lower the hydraulic hammer.

If the machine is equipped with a grapple, the function of position (6) and of position (8) is different.

GRAPPLE OPEN (6)

- Move the control lever to this position to open the grapple arms.

GRAPPLE CLOSE (8)

- Move the control lever to this position to close the grapple arms.

If the machine is equipped with a clamshell, the function of position (6) and of position (8) is different when in "Clamshell" mode.

Note: When in "Clamshell" mode, the work tool can only be operated if Work Tool Select also has clamshell selected.

CLAMSHELL OPEN (6)

- Move the control lever to this position to open the clamshell.

CLAMSHELL CLOSE (8)

- Move the control lever to this position to close the clamshell.

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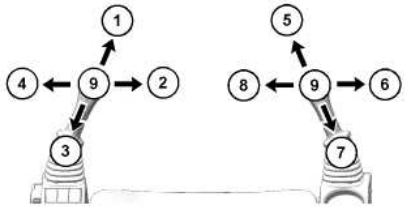

Illustration 1 g06180324
(1) STICK OUT
(2) SWING RIGHT
(3) STICK IN
(4) SWING LEFT
(5) BOOM LOWER
(6) BUCKET DUMP
(7) BOOM RAISE
(8) BUCKET CLOSE
(9) HOLD

WARNING

The joystick and controls on the joystick can be configured with different functions. Always make sure to check the joystick configuration on the monitor before using the machine to avoid unexpected machine movement. These unexpected machine movements could cause a hazard resulting in serious injury or death.

When you release the joysticks from any position, the joysticks will return to HOLD position (9). Movement of the upper structure will stop unless the fine swing control (if equipped) is ON. When the fine swing control is ON, the swing parking brake will not activate until 6.5 seconds after the joystick control for the swing function returns to the HOLD position.

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

The machine control pattern is initially set at the factory to the SAE system, as shown. The pattern on the left pertains to the left joystick and the pattern on the right pertains to the right joystick.

The machine control pattern can be varied. Refer to Operation and Maintenance Manual, "Joystick Controls Alternate Patterns" for more information.

Manual Low Idle - Activate the manual low idle to reduce the engine speed to approximately 1000 rpm. Pressing the switch again will allow the engine speed to return to the original setting of the engine speed dial.

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

3 Button Joystick Controls

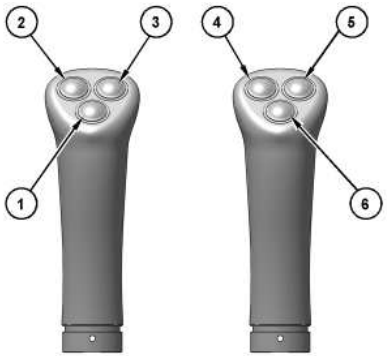

Illustration 2 g06223512
3 Button Joystick Controls
(1) Left joystick switch 1
(2) Left joystick switch 2
(3) Left joystick switch 3
(4) Right joystick switch 2
(5) Right joystick switch 3
(6) Right joystick switch 1

Table 1

Joystick Configurations	
Switch Location	**3 Button Joystick**
1	Horn
2	Configurable
3	Configurable
4	Configurable
5	Configurable
6	Configurable

Vertical Slider Joystick Controls (If Equipped)

Note: The following functions can be assigned to the configurable buttons: radio mute, one-touch low idle, work tool select, and HVAC.

Illustration 3 g06225116
Vertical Slider Joystick Controls
(7) Left joystick switch 3
(8) Left joystick switch 4
(9) Left joystick switch 1
(10) Left joystick switch 2
(11) Left joystick thumbwheel
(12) Right joystick thumbwheel
(13) Right joystick switch 2
(14) Right joystick switch 1
(15) Right joystick switch 4
(16) Right joystick switch 3

Table 2

Joystick Configurations	
Switch Location	**Joystick With Tool Control Sliders**
7(1)	Hammer
8	Configurable
9	Horn
10	Configurable
11(1)	Work Tool Rotation
12(1)	Work Tool Open / Close
13	Configurable
14	Configurable
15	Configurable
16	Configurable

(1) Button is configurable on machines without tool control.

Medium Pressure (If Equipped)

Rotating Tool Control

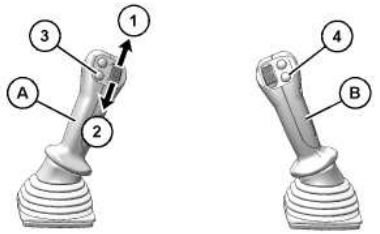

Illustration 4 g06260903
(A) Left joystick
(B) Right joystick
(1) Thumb wheel (Clockwise)
(2) Thumb wheel (Counterclockwise)
(3) Horn switch
(4) AEC switch

(1) ROTATE CLOCKWISE - Move the thumb wheel upward to rotate the work tool clockwise.

(2) ROTATE COUNTERCLOCKWISE - Move the thumb wheel downward to rotate the work tool counterclockwise.

(3) HORN - Press the horn switch on the left joystick to activate the horn.

(4) AEC SWITCH - Press the AEC switch on the right joystick to activate low engine speed. Press the switch again to activate high engine speed.

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WARNING

Verify the joystick control pattern before operating the machine.

Refer to Operation and Maintenance Manual.

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

Ensure that the joystick control film on the cab window matches the control functions of your machine. Consult your Cat® dealer for additional information regarding the joystick control film.

Become familiar with the joystick controls before operating the machine.

Note: Joystick steering cannot be used with shovel crane mode.

Joystick Steering

Enable the joystick steering function using the monitor screen. Once the function is enabled, joystick will be activated by pressing the configured joystick button. Refer to Operation and Maintenance Manual, M0109053 , "Next Generation Hydraulic Excavator Monitoring System Supplement" for more information.

The following three modes are available in joystick steering function:

- Joystick steering mode
- Cruise control mode
- Blade control mode (normal and float)

Left Joystick Control Patterns

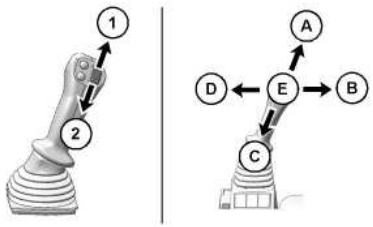

Illustration 1 g06720799
Left Joystick

Table 1

Joystick Control	Left Joystick Patterns		
	Standard Mode (ISO)	Joystick Steer Mode	Cruise Control Mode
E	Hold		
A	Stick Out	Travel Forward	Cancel Cruise
B	Right Swing	Turn Right	Turn Right
C	Stick In	Travel Backward	Cancel Cruise
D	Left Swing	Turn Left	Turn Left
1(1)	Right Swing		
2(1)	Left Swing		

(1) Thumb wheel is configured with swing or stick operation only when the joystick steer mode is on.

Refer to Operation and Maintenance Manual, M0109053 , "Next Generation Hydraulic Excavator Monitoring System Supplement" for more information.

Right Joystick Control Patterns

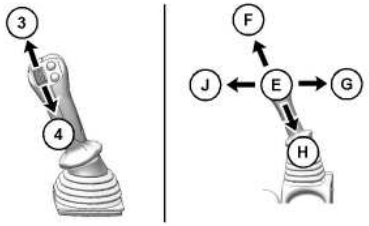

Illustration 2 g06720802
Right Joystick

Table 2

Joystick Control	Right Joystick Patterns		
	Standard Mode (ISO)	Joystick Steer Mode	Cruise Control Mode
E	Hold		
F	Boom Down		
G	Bucket Dump / Heel Down		
H	Boom Up		
J	Bucket Close / Heel Up		
3(1)	Stick Out		
4(1)	Stick In		

(1) Thumb wheel is configured with swing or stick operation only when the joystick steer mode is on.

Refer to Operation and Maintenance Manual, M0109053 , "Next Generation Hydraulic Excavator Monitoring System Supplement" for more information.

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2017/07/24 **Leaving the Machine (M0113012-09)**

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Illustration 1 g06224270

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.
5. If the machine will not be operated for a month or more, remove the battery disconnect switch key.
6. Lock all compartments and all vandalism covers (if equipped).

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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.

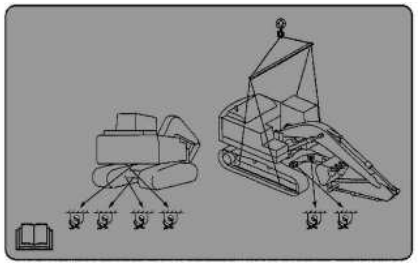

Illustration 1 g07492200
Lift and tie-down film

The lift and tie-down film is located near the base of the boom.

Lifting the machine

Illustration 2 g06184026
Lifting the machine
The machine center of gravity is located at the center of the swing gear.

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

The weight and the instructions that are given herein describe the machine as the machine is manufactured by Caterpillar.

Refer to the Specifications for specific weight information.

Note: Only lift objects from approved lifting points and with approved lifting devices

1. Use proper rated cables and slings for lifting. The crane should be positioned so that the machine is lifted parallel to the ground.
2. To prevent contact with the machine, lifting cables should have sufficient length.
3. Move the hydraulic lockout control to the LOCKED position. Refer to Operator Controls for more information.
4. Thread the cable between the first and second rollers at each end of the track.
5. Do not use the foot step as a lifting point.

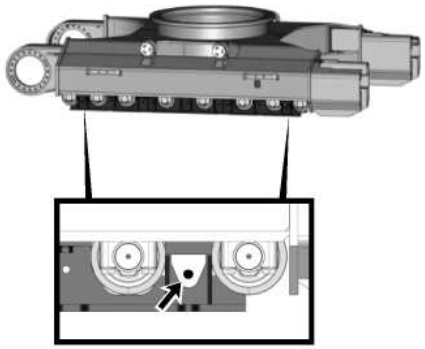

Illustration 3 g06279536
Hole in the full length roller guard

6. If the full length roller guard is equipped, there are holes at the ends of the guard for lifting cables. Refer to Illustration 3 for more information.

7. Apply the proper protector to prevent machine or wire damage and slippage. Make sure that the rollers are not affected by the load.

Tying Down the Machine

Note: Obey all local and regional governmental regulations.

Diagonal Lashing

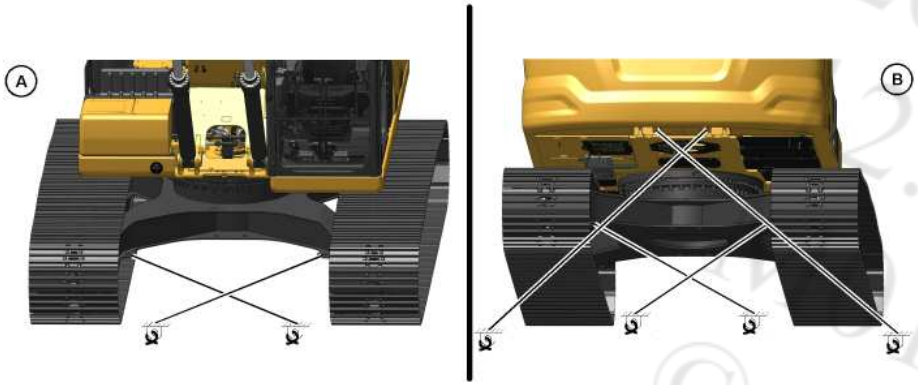

Illustration 4 g06435607
(A) Front of the machine
(B) Rear of the machine

There are two methods that can be used to tie down a machine. Local and/or regional regulations will determine which method to use.

- Tying with undercarriage - Applicable for all machines

- Tying with upper frame (if required) - Applicable only for some machines or configurations

Tying Down the Machine

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

The weight and the instructions that are given herein describe the machine as the machine is manufactured by Caterpillar.

Refer to the Specifications for specific weight information.

1. Use proper rated cables and shackles for tying down the machine.
2. Use the rear eyes and the front eyes that are provided on the lower frame to fasten tie-downs. Use corner protectors for sharp corners.
3. Move the hydraulic lockout control to the LOCKED position. Refer to Operator Controls for more information.
4. If there is a requirement of diagonal lashing for tying down, use the proper tie-down point on the lower frame. Set the lashing angle which is on the longitudinal axis of the machine and the cable, at 30 degrees to 50 degrees.
5. Keep the surface of the transport vehicle clean.
6. For steel deck transport vehicles use skid-inhibiting or anti-slip mats with a friction coefficient of minimum 0.3.

Tying Down Force

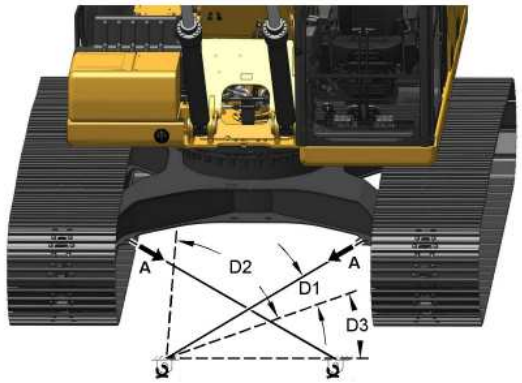

Illustration 5 g07491378
Machine tie-down angles

Table 1

Type of Frame	Tying Force (A)	D1	D2	D3
Base Frame	185 kN (41589 lb)	30 degrees	50 degrees	40 degrees
Upper Frame	Not required			

Lifting the Machine Segments

Bucket

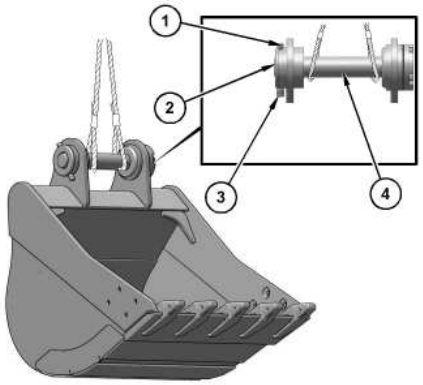

Illustration 6 g07532692
(1) Nut
(2) Pin
(3) Bolt
(4) Sleeve

1. Install pin (2) and install sleeve (4) in the brackets of the bucket.

2. Illustration 6 indicates the method to secure pin (2) with bolts (3) and nuts (1). Refer to Specifications, SENR3130 , "Torque Specifications" for more information.

3. Fasten two proper rated wire cables to pin (2).

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General Information

NOTICE
This machine may be equipped with a Cat® Machine Security System (MSS) and may not start under certain conditions.

Illustration 1 g06223917

Machines that are equipped with Cat MSS can be identified by a decal in the operator station Read the following information and know your machines settings. Your Cat dealer can identify your machine settings.

The Cat Machine Security System (MSS) discourages unwanted operation of a machine. When armed, the MSS requires operator login to start the engine. The following methods of operator login to disarm the security system are available:

- Cat Bluetooth® key fob
- Passcode

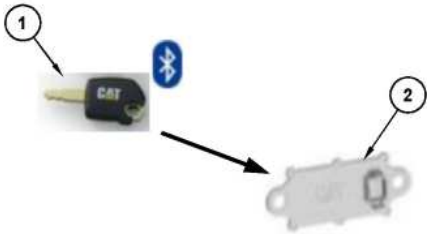

Illustration 2 g07663432
Bluetooth Connections
(1) Cat Bluetooth key fob (CATBTFOB)
(2) Cat Bluetooth transceiver (CATBTNT)

The Cat Bluetooth key fob (1) contains an electronic chip. The electronic chip has a unique identification number (ID). A Bluetooth transceiver is mounted in the cab to read the ID of the key. The Bluetooth transceiver module translates the information received from the key fob into a J1939 message. This message is sent to the Electronic Control Module (ECM) that is connected to the MSS. The ECM is typically the Machine ECM. The ECM is set

up with the ID of the keys of the intended users.

When the MSS is armed, the ECM validates the ID of the key fob. If the key ID is on the list of authorized keys in the ECM and the key is valid, the machine will operate normally. If the key ID is not on the list of authorized keys in the ECM or is not valid, the MSS will keep the critical machine functions disabled.

If the MSS is not installed, the operator can skip the login and the machine will operate normally.

Components

The Machine Security System (MSS) consists of the following components:

- Electronic Control Module (ECM)
- Cat Bluetooth key fob (CATBTFOB)
- Machine display
- Bluetooth transceiver module (CATBTNT)
- Engine start switch

System Overview

The Machine Security System (MSS) is designed to restrict operation of a machine. A list of the authorized electronic keys and passcodes for a machine is contained in the ECM for the MSS. A valid Bluetooth key fob or passcode can disarm the MSS. If the MSS is disabled or not installed, any operator may access critical machine functions.

The Cat ® Electronic Technician (Cat ET) Service Tool can be used to program the ECM with the authorized keys and passcodes. Bluetooth devices and passcodes can be registered using the in-cab display if the operator is logged in to the system using a master access account.

When the engine start switch is turned to the ON position, the display boots up. If Bluetooth detection is enabled, the transceiver will receive a signal from any Bluetooth key that is present. The ECM will then compare this ID to the list of authorized keys.

Note: If multiple devices are present, the first valid device detected by the transceiver will be read.

If the ID of the key matches an authorized key, the status indicator on the engine start switch will turn a green color and the MSS will disarm. This disarming will allow the operator access to critical functions of the machine.

If the ID of the key that is read does not match the list in the ECM, the status indicator will remain a red color. The MSS remains in the "armed" state and the machine will remain disabled.

If the MSS is disabled and the ID of the key matches an authorized key, the operator will be identified and allowed access to the critical machine functions. The operator will be able to save configurations and start the machine.

If the MSS is disabled and the ID of the key that is read does not match an authorized key, the operator must log in as a guest. The operator will not be able to save custom configurations but will have access to starting the engine.

Activating Bluetooth Functionality

For shipping purposes, Bluetooth functionality is deactivated. Ensure that Bluetooth functionality is active on your machine using the following procedure:

1. Ensure that the function is active from the radio screen:

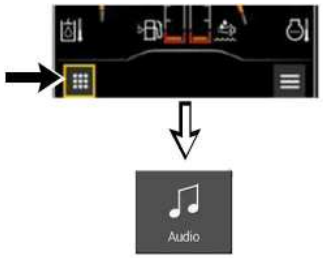

Illustration 3 g07542565

a. From the home screen, press the navigation button in the lower left corner, then select "Audio".

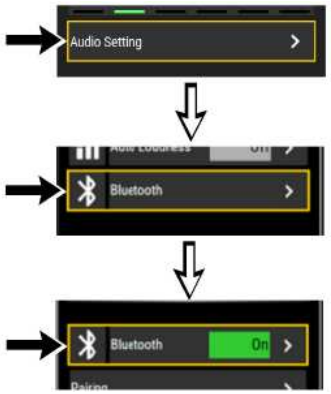

Illustration 4 g07656851

b. Select "Audio Setting", then select "Bluetooth". Ensure that "Bluetooth" is set to "ON".

The "Bluetooth" settings can also be accessed from the "Home" screen by selecting the navigation button, then selecting "Setting", "Audio", "Bluetooth".

Pairing Your Device to the Machine

Use to following procedure to pair your device to the machine:

1. From the home screen, press the navigation button in the lower left corner, then select "Audio".
2. Select "Audio Setting", then "Bluetooth".

The "Bluetooth" settings can also be accessed from the "Home" screen by selecting the navigation button, then selecting "Setting", "Audio", "Bluetooth".

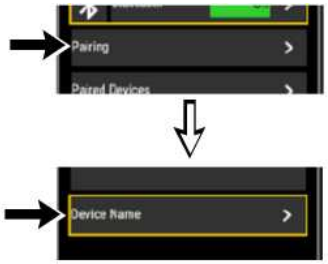

Illustration 5 g06319676

3. Select "Pairing", then "Device Name".

Illustration 6 g06319681
Machine name on monitoring system and operator device

4. Find your device on the list and pair the devices. Ensure that the devices are paired on your phone as well.

   Note: The device name on your phone should be "## CAT RADIO", with the number being from "00" to "99".

Reading the ID of a Key

The Machine Security System (MSS) must identify a valid passcode or Bluetooth key fob ID.

When the engine start switch ring is turned to the ON position, the MSS will check the ID of any key fob. If the ID matches a key ID stored in the machine ECM, the critical ECM functions are enabled. An enable message is also sent via the Cat® data link or J1939 data link to the other ECMs on the machine. The machine will operate normally.

Note: If the machine ECM has failed or has been removed, the critical machine operations controlled by the other electronic control modules will not operate.

Armed

When the MSS is armed, critical machine functions are disabled. The MSS disables the power that is supplied to each component that is powered by the output drivers. The machine will not be able to operate normally.

There are two states of operation within the "armed" mode:

Engine Start Switch Ring Position OFF
- When no power is applied to the MSS, the MSS will default to "armed" state. When power is applied to the MSS and the grace period has expired, the MSS will return to the "MSS Armed".

Engine Start Ring Switch Position ON

- When the engine start switch ring is first moved to the ON position, the display boots up and the system attempts to detect a Bluetooth key ID. The ECM will continue reading until a valid key ID is read or a passcode is entered. If a valid key ID or passcode is not read, the MSS status indicator will remain red and the MSS remains armed.

Disarmed

When the MSS is disarmed, normal machine operation is allowed. A message is sent to the other machine ECMs over the Cat data link. or J1939 data link. The machine will be able to start. The green LED on the status indicator will illuminate.

There are multiple ways to disarm the machine:

- Use a valid passcode
- Use a valid Bluetooth key fob
- Use the Cat ® Electronic Technician (Cat ET) Service Tool to configure the MSS bypass schedule to allow machine operations during scheduled periods of time during the week.

Grace Period

After a machine has been started successfully, the operator will have a grace period after the machine is turned off before the MSS is automatically armed. The operator is not required to arm the system manually.

During the grace period an operator can start the machine without a key ID or passcode. When the grace period expires, the MSS will rearm automatically.

If the MSS is unable to read a key ID, the system will remain armed. When the MSS identifies a key with an invalid key ID, the system will remain armed.

The grace period for a machine can be configured with Cat ET if a factory password or master level account is available.

Navigating the User Interface Touchscreen Display

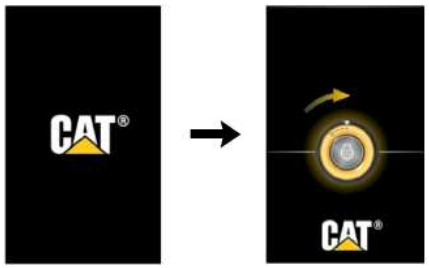

Illustration 7 g06210561
Startup sequence screens

The display will start up automatically after turning the battery disconnect switch to the ON position. The screen will prompt the operator to turn the engine start ring to the ON position. When the engine start ring is turned to the ON position, the display will navigate to the passcode entry screen.

If the operator has not turned the engine start ring to the ON position, the display will time out after 1 minute.

If the battery disconnect switch is already on and the display is off, the display will start up automatically after the engine start ring is powered on. The Cat screen will appear for a short time and then login keypad will appear.

Note: Avoid touching the screen with sharp objects.

The access level assigned to the operator can limit or expand the amount of freedom the user has to manage the system. The following paragraphs explain access levels.

There are three levels of operator access recognized by the touchscreen display. The following levels are available:

- Guest
- Standard
- Master

Guest

- If an operator does not have an authenticated key or passcode, the user is able to bypass log in as a guest. Some menu features will not be available such as the options for saving configurations and operator management. If the Machine Security System (MSS) is enabled, guest operators cannot start the machine.

Standard

- A standard operator is a registered user of the machine. Operators with this access level can start the engine whether or not the MSS is installed. This user may save a control configuration for future application.

Master

- Master accounts can perform operator management in addition to all standard level functions.
Any "Standard" or "Master" account may be created or removed by a "Master" level operator.

Table 1

Selections and Access for the Touchscreen Display	
Access Level	**Operator Setting**
Guest	"Operator Input Configuration" "Response" "Change Operator"
Standard	"Operator Input Configuration" "Response" "Controls Setup" "Change Operator"
Master	"Operator Input Configuration" "Response" "Controls Setup" "Change Operator" "Manage Operator"

Operation of Status Indicator

Illustration 8 g06215426
Engine start switch with integrated MSS indicator

The Machine Security System (MSS) uses a status indicator that is integrated into the engine start switch in the cab. This indicator provides a visible alert for the security system.

The operator can use the status indicator to determine the status of the system or for troubleshooting.

Illustration 9 g06226442
Status indicator when the MSS is armed

When the MSS is armed, the status indicator will be red. The red light warns the operator that the machine is armed with the security system and that an operator login is required. The red LED will remain ON until a valid key is read while the key switch or engine start switch ring is in the ON position.

Illustration 10 g06226444
Status indicator when the MSS is disarmed or uninstalled

When the MSS is disarmed, the status indicator will be green. The green light notifies the operator that an operator is logged on the machine and the security system has been disarmed. The status indicator will be green if the MSS is not installed on the machine. Also, the green LED will remain ON after power down during the grace period. After the grace period, the MSS automatically returns to the "armed" mode.

For machines with a standard key switch, a separate status indicator will be available.

Operator Login

Any user may start the engine if the Machine Security System (MSS) is disabled.

If the MSS is active, only a "Standard" or "Master" account can start the machine engine. Before starting the machine engine, the security system must identify a registered operator. An operator can access the machine display using one of the following methods:

- Passcode
- Cat Bluetooth key

Passcode Entry

To log in using a passcode, refer to the following steps:

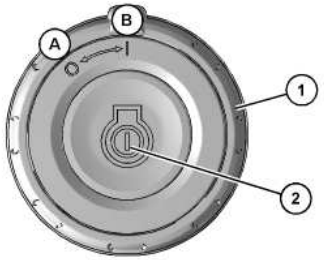

Illustration 11 g06180554
(A) Off
(B) On
(1) Engine start switch ring
(2) Engine start button

1. Turn engine start switch (1) to the ON position (B).

Illustration 12 g06209470

2. Enter a registered passcode using the monitor keypad and then press "Enter".

   Note: The jog dial or the numbered buttons on the right-side switch panel can also be used to enter the code.

Illustration 13 g06211194

3. Select "Enter" to confirm the passcode. If a registered passcode is recognized, the operator information screen will appear on the display. If the MSS is not installed, the passcode screen will be bypassed automatically after 10 seconds. The operator will be logged in to the system as a guest. Refer to Illustration 13.

4. Select "OK" to continue to the display homescreen.

Illustration 14 g06209482

5. After an operator logs in to the system successfully, an "Engine Start Allowed" message will appear across the top of the monitor. Refer to Operation and Maintenance Manual, Engine Starting for instructions on starting the engine.

Invalid Passcode

Illustration 15 g06209472
Invalid passcode screen

If a passcode is not recognized, the display will notify the user with an "Invalid code" message. Refer to Illustration 15.

The operator has five tries to enter a valid passcode successfully. After a fifth unsuccessful attempt, a lockout screen will appear and remain on the display for a duration of 5 minutes.

Note: If the Machine Security System (MSS) is not active, the user can select the "Skip Login" button to avoid the lockout period. Refer to the "Bypass login" section for further information.

Bypass login

Operator login can be bypassed if the user selects the "Skip Login" button on the display. The operator will be logged in to the machine with "Guest" level access.

If the MSS is inactive, the operator will be able to start the engine as normal and view all display screens.

If the MSS is active on the machine, the operator is able to view all display screens but will not have access to starting the engine.

Bluetooth Entry

Alternatively, a Bluetooth Operator ID can be used to log in to the machine. For a Bluetooth key to be detected by the system, ensure that the following qualifications are met:

- The key must be registered with the machine
- The key must be within the cab
- Bluetooth setting must be enabled on the display

Refer to the following steps when logging in to a machine using the Bluetooth key:

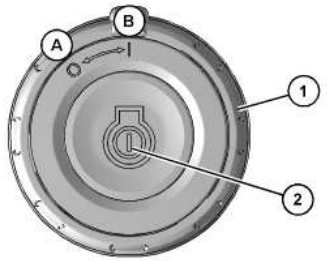

Illustration 16 g06180554
(A) Off
(B) On
(1) Engine start switch ring
(2) Engine start button

1. Turn engine start switch (1) to the ON position (B).
2. Wait several seconds for the system to detect the key when the passcode dialog appears. Once the key is detected, the "Operator Information" screen will display.

Illustration 17 g06209615
Bluetooth operator information screen

3. Select the "OK" button if the proper operator has been displayed.

Illustration 18 g06209482

4. After an operator logs in to the system successfully, an "Engine Start Allowed" message will appear across the top of the monitor. Refer to Operation and Maintenance Manual, Engine Starting for instructions on starting the engine.

NOTICE
The access level will change to a "Guest" account automatically if the key is removed from the cab at any time. If the MSS is enabled and the engine is on when the key is removed from the cab, the operator will not be able to start the engine if turned off. To turn on the engine again without the Bluetooth key, the operator will need to log in a registered account using a passcode.

Note: If multiple Bluetooth devices are within the cab, the system will select the first device detected by the Bluetooth transceiver as the active operator.

Engine Start Switch Troubleshooting

Table 2

Switch Status	Possible Cause	Resolution
Engine start switch is not illuminated	Engine start accessory power not on	Turn engine start switch ring to ON position
	Power management triggered	Cycle engine start switch ring and try to restart
Engine start switch is green	Starting component failure	Contact your Cat dealer
Engine start switch is red	Machine interlock conditions not met	Hydraulic lock in LOCKED position
	Engine shut down without cycling start switch ring	Cycle engine start switch ring and try restart
	Operator not authenticated (Passcode login)	Add operator to machine authorized user list
		Switch operator from guest mode using display
	Operator not authenticated (Bluetooth key)	Add operator to machine authorized user list
		Replace key fob battery
		Ensure more than 4.5 m (15 ft) from other Bluetooth equipped machine
		Alternately, log in with display passcode or contact your local Cat dealer

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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 g06501098
(1) Left side view mirror on the cab

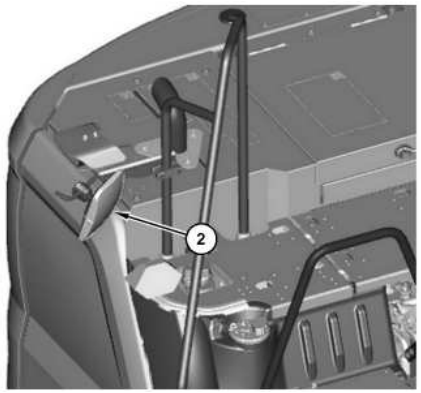

Illustration 2 g06611953
(2) Tank mirror

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 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.

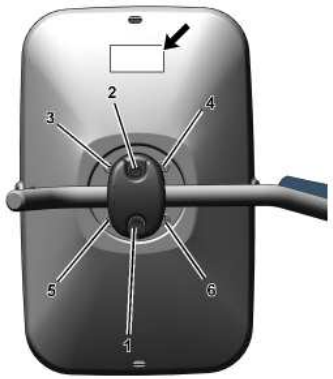

Illustration 3 g06220634
Tightening sequence

After adjustment of the mirror angle, make sure that the Cat® logo is at the top.

Periodically tightening the mirror mounting bolts may be necessary. If the bolts are loose, tighten the bolts in the sequence shown in Illustration 3. Tighten bolts (1) and (2) to 11 ± 2 N·m (97 ± 18 lb in).

Tighten bolts (3) through (6) to 2.0 ± 0.4 N·m (17.7 ± 3.5 lb in).

Left Side View Mirror on the Cab (1)

Illustration 4 g06591787

Adjust the left side view mirror on the cab (4) so the left side of the cab, access door, and rear of left track can be seen as the Illustration 4 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. Additionally, provide as much visibility to the rear as possible.

Tank Mirror (2)

Illustration 5 g06591788

Adjust the tank mirror so the fuel tank and the hydraulic tank can be seen as the Illustration 5 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.

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WARNING

Do not operate the machine if the monitor is not functioning (for example, monitor has a black screen or is not responding) when the key switch is in the ON position.

The monitor provides images from the camera system and other information for safe machine operation. Operating the machine without a properly functioning monitor may result in injury or death. If the monitor is not functioning, place the machine in a safe state by following the procedures for stopping and parking the machine. Determine the cause of the monitor malfunction and correct before returning the machine to service.

NOTICE

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

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

General Information

Reference: For complete monitoring system information, refer to Operation and Maintenance Manual, M0109053 , "Next Generation Hydraulic Excavator".

The monitoring system is an input and an output of the Machine Control System. The monitor has a multi-touch 8 inch or 10 inch display. The Machine Control System communicates back and forth on the data link. The monitoring system consists of the following components:

- Display (with numerous screens and menus)
- Indicators
- Gauges
- Soft Switch Panel
- Jog Dial

Illustration 1 g06720205
(1) Action Lamps
(2) Status Information Area
(3) Notification Center Icon
(4) Camera View Area
(5) Gauge Area
(6) Navigation Area
(7) Function List
(8) Shortcuts

The monitoring system displays various warnings and information about the condition of the machine, and the machines surrounding with various camera views. 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
- View "Operation and Maintenance Manual"
- View service intervals
- Perform calibrations
- Troubleshoot machine systems

Action Lamps (1)

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

Status Information Area (2)

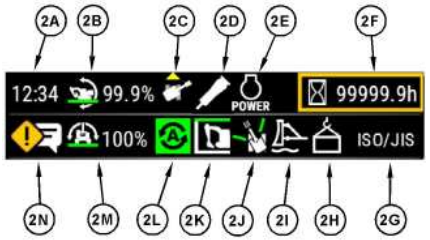

Illustration 2 g06735325
(2A) Clock
(2B) Machine Pitch Angle (if equipped)
(2C) Machine Rotation Angle (if equipped)
(2D) Work Tool
(2E) Seatbelt Switch Status (if equipped) / Power Mode
(2F) Multi Status Information
(2G) Lever Pattern / Fuel Level
(2H) Heavy Lift / Cat Dig Boost (if equipped)
(2I) Blade Float Status
(2J) Fine Swing / 2D E-Fence Right, Left, Active Status, Cab Avoidance (if equipped)
(2K) Smart Boom / 2D E-Fence Ceiling, Floor, Front Status, Cab Avoidance (if equipped)
(2L) Automatic Status
(2M) Machine Roll Angle (if equipped)
(2N) Notification Center Dashboard (if equipped)

Reference: For complete status information, refer to Operation and Maintenance Manual, M0109053 , "Next Generation Hydraulic Excavator Monitoring System Supplement".

Notification Center Icon (3)

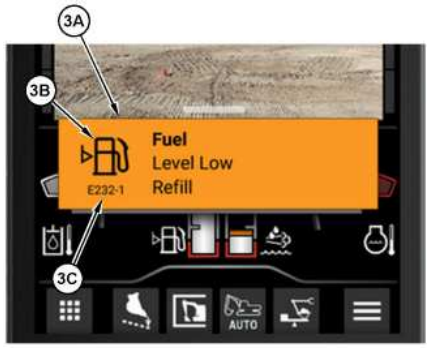

Illustration 3 g06720210
(3A) Event Description
(3B) Event Symbol
(3C) Event ID

Event Description (3A)

- This area will display the description of pop-up message of the impending problem.

- Line 1 : System
- Line 2 : Condition
- Line 3 : Action to be taken

Event Symbol (3B)
- This area will display the symbol of the problem
Event ID (3C)

- The identification number for the event will be shown here.

Camera View (4)

This area on the monitor displays the view of the cameras. A rear view camera mounted on top of the counterweight and an optional side view camera mounted in the side panel next to the hydraulic tank.

If both rear view camera and side view camera are equipped, the monitor screen can be toggled to show:

- Rear only
- Side only
- Split vertically
- Split horizontally

The camera view can be toggled when the cursor is on the camera view area and the area is touched or the jog dial is turned.

Gauge Area (5)

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.

Hydraulic Oil Temperature

- This gauge indicates the temperature of the hydraulic oil. The normal operating range is the green range. If the gauge is in the white range, the engine and machine warm-up is required. Refer to Operation and Maintenance Manual, "Engine and Machine Warm-up". If the gauge reaches the red range, reduce the load on the system. If the gauge stays in the red range, stop the machine and investigate the cause of the problem.

Engine Coolant Temperature

- This gauge indicates the temperature of the engine coolant. The normal operating range is the green range. If the gauge is in the white range, the engine and machine warm-up is required. Refer to Operation and Maintenance Manual, "Engine and Machine Warm-up". If the gauge reaches the red range, stop the machine and investigate the cause of the problem.

Diesel Exhaust Fluid (DEF) Gauge (If Equipped)

- This gauge indicates the level of DEF fluid in the DEF tank. When the DEF gauge is in the red range, add DEF immediately.

Navigation Bar (6)

Apps Key

- Allows you to display different information in the gauge area related to operation. Also contains air conditioner and audio controls. This key includes the settings screen allowing change of a multitude of parameters, some password protected.

Function List Key

- Allows you to turn on and off various functions related to the active screen. This icon only appears in certain screens where additional settings are necessary.

Shortcuts

- Allows you to set certain shortcuts on the navigation bar.

Machine Warnings

Illustration 4 g06774993
Notifications
(1) Notification Icon
(2) Notification Dashboard

The Monitor will display warnings, and log events for machine conditions that are not within normal operating parameters.

The event warnings are classified into three warning levels. Warning Level 1 represents the least severe problem and Warning Level 3 represents the most severe problem. The warning levels, monitor response, and the required operator actions are given below.

Warning Level 1 (Gray)

- Requires operator awareness. The icon and pop-up message will both appear gray.

Warning Level 2 (Amber)

- Requires a change in the operation of the machine or a change in the maintenance of the machine to correct the condition. The icon and pop-up message will both appear amber and the action lamp will blink.

Warning Level 3 (Red)

- Requires immediate shutdown of the machine to prevent damage to the machine or personnel. The icon and pop-up message will both appear red, the action lamp will blink, and the buzzer will sound.

When multiple warnings are present in the system, the highest warning is shown first. Swipe the message up or down to view all the logged warnings.

Reference: For complete machine warning information, refer to Operation and Maintenance Manual, M0109053 , "Next Generation Hydraulic Excavator Monitoring System Supplement".

Logging In

Illustration 5 g06242074

There are different ways to access the monitor which include:

- Guest access
- Passcode access
- Bluetooth access
- Cat® Fleet Management app

For more information on logging in, refer to Operation and Maintenance Manual, Machine Security System - Operator Login.

Navigation

Illustration 6 g06464384
Right side switch panel
(1) Operator information button
(2) Jog dial
(3) Air conditioner button
(4) Next menu button
(5) Home button
(6) Audio button
(7) Mute button

The monitor can be navigated by touch screen or the switch panel. Switch panel components can be used to interface with the monitor in the following ways:

Operator information button (1)

- Press and hold this button to access the operator information screen. This screen shows information such as operator settings.

Jog dial (2) (if equipped)

- Rotate the jog dial to highlight menu items in the monitor. Push the jog dial down to select the highlighted item.

Air conditioner button (3) (if equipped)

- Press the button to access the air conditioner controls.

Next menu button (4) (if equipped)

- This button is equivalent to the function list key on the monitor. This button can only be used on screens where the function list key is shown.

Home button (5) (if equipped)

- Press this button to return to the main screen.

Audio button (6) (if equipped)

- Press this button to access the audio controls.

Mute button (7)

- Press this button to mute the audio. Press the button again to unmute the audio.

Each of the buttons is also assigned a number which is imprinted in the top corner of the button. These buttons can be used to enter the numerical passcodes used to log in to the monitor.

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2017/07/24 **Mounting and Dismounting (M0113012-09)**

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Illustration 1 g06224270
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

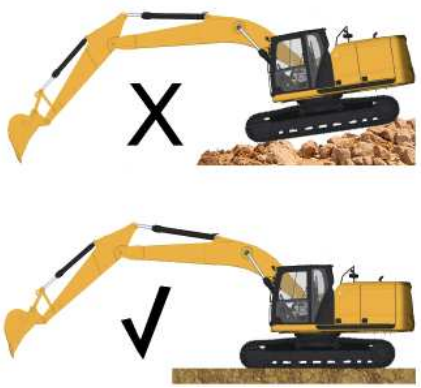

Illustration 1 g06223763

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

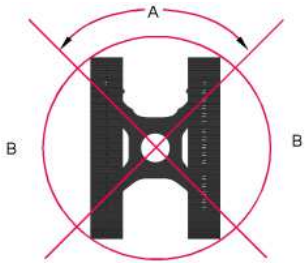

Illustration 2 g06210141
(A) Most stable dig
(B) Dump

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

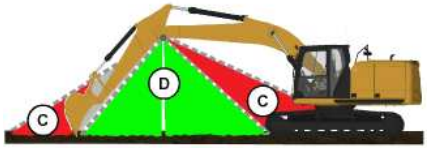

Illustration 3 g06212328
(C) Weak crowd force
(D) Ideal crowd force

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.

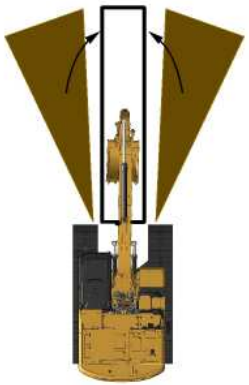

Illustration 4 g06210334

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

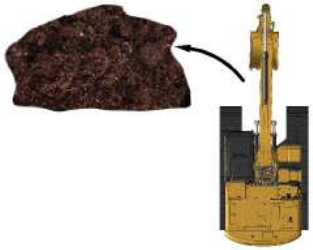

Illustration 5 g06210343

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.

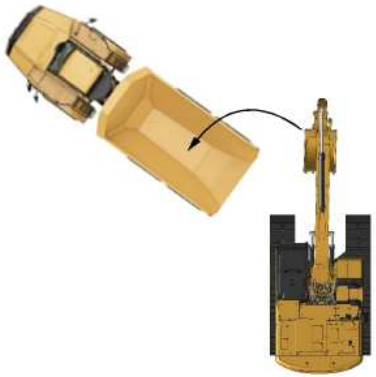

Illustration 6 g06212604

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 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 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.

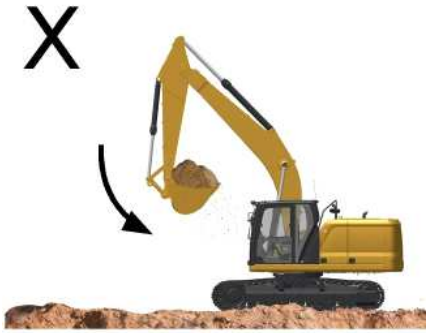

Illustration 10 g06222498

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.

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.

Grade and Assist Operating Tips

The following image displays proper stick speeds for accurate grading. One of the factors to accuracy is the grade assist speed setting. The setting can be set to Quick, Normal, or Fine. The settings are found in the Grade Assist screen on the monitor.

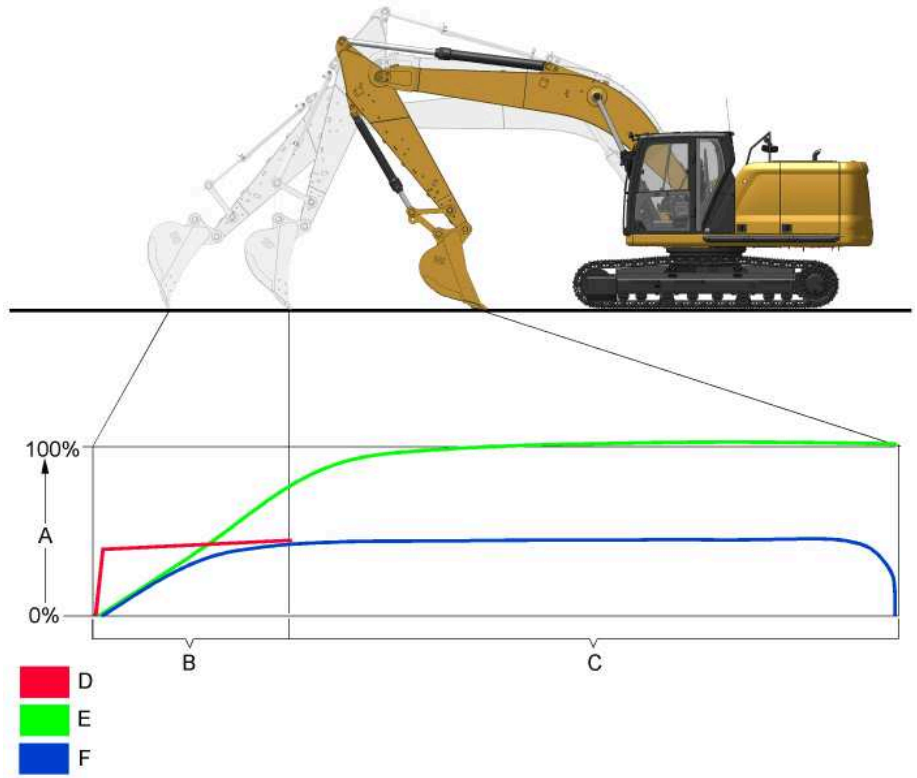

Illustration 15 g06250472
Stick speed vs. accuracy
(A) Stick joystick movement
(B) Joystick movement must be gradual
(C) In fine or normal mode, joystick input can be at 100 percent.
(D) Joystick movement too fast
(E) Good for fine or normal mode
(F) Good in any mode

For best results using Cat Grade, it is important to be cognizant of stick speed in order to obtain accurate results. When the bucket touches the ground before digging, the initial dig movement must be gradual. If operating in Fine or Normal mode, joystick speed can be increased to 100 percent after the slow initial engagement. Approximately 50 percent stick speed is necessary to maintain accuracy when in Quick mode after the slow initial engagement.

Cut/fill error can be minimized if the work tool is properly calibrated and the operator maintains a deliberate speed of operation.

Smart Boom

When using the smart boom function, it is necessary to slow down stick speed. Smart boom cannot keep up when the stick is operating at a rapid pace. This is particularly noticeable when the boom is at the raise/lower transition point and the stick is near vertical.

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2023/04/18 **Operation Information (M0113012-09)**

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Note: Operating Temperature Range for the Machine The machine must function satisfactorily in the anticipated ambient temperature limits that are encountered during operation. The standard machine configuration is intended for use within an ambient temperature range of −18 °C (0 °F) to 43 °C (109 °F). Special configurations for different ambient temperatures may be available. Consult your Cat® 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. Keep the machine under control always to prevent injury.

Sound the horn and allow adequate time for bystanders to clear the area before moving the machine into a restricted visibility area. Follow local practices for your machine application. For more information refer to Operation and Maintenance Manual, "Restricted Visibility".

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. Refer to Operation and Maintenance Manual, "Seat" for more information.
2. Fasten the seat belt. Refer to Operation and Maintenance Manual, "Seat Belt" for more information.

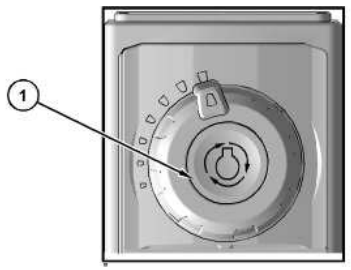

Illustration 1 g06685022
(1) Engine speed dial

3. Turn the engine speed dial (1) to the desired operating range. Refer to Operation and Maintenance Manual, "Operator Controls" for more information.
4. Move the hydraulic lockout control to the UNLOCKED position. Refer to Operation and Maintenance Manual, "Operator Controls" for more information.

Illustration 2 g06181525
Typical example

5. Raise the boom enough to provide sufficient ground clearance.

Illustration 3 g06685024
(2) Travel speed control switch

6. Select the desired travel speed by operating the travel speed control switch (2). The indicator will light to display the active mode. Refer to Operation and Maintenance Manual, "Operator Controls" for more information.
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 Cat® dealer.

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

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.

Note: The location of certain operator controls may vary slightly depending upon cab configuration.

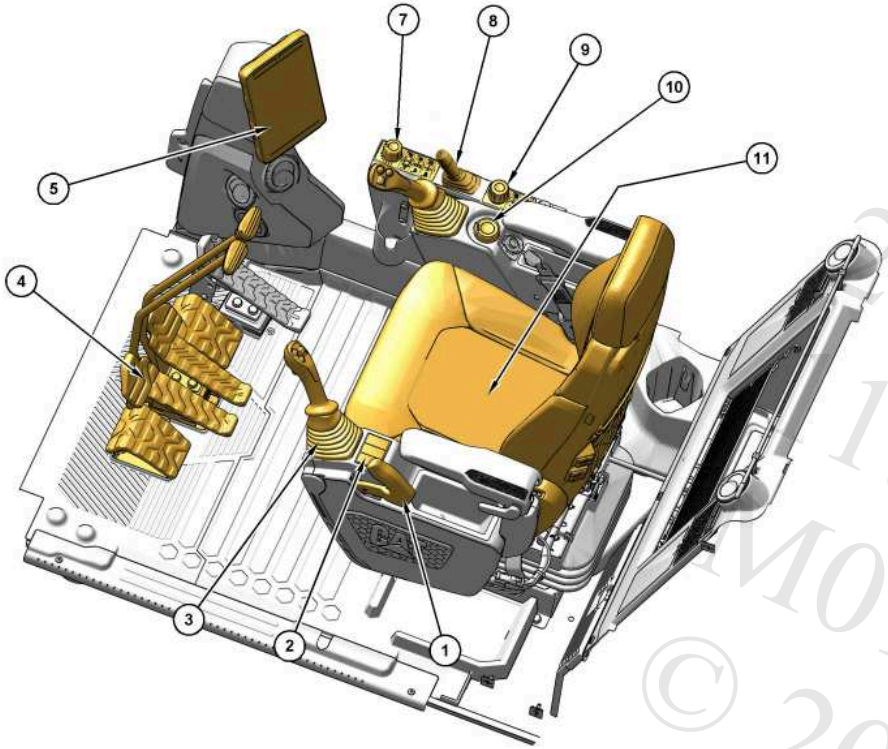

Illustration 1 g07706657

(1) Hydraulic lockout control
(2) Left side switch panel
(3) Joystick controls
(4) Travel controls
(5) Monitor
(7) Right side switch panel
(8) Blade Control
(9) Monitor navigation panel
(10) Engine start switch
(11) Operator seat

Hydraulic Lockout Control (1)

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

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

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

Unlocked - Move the lever for the hydraulic lockout control 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 rearmost position to release the console lock and tilt the console upward for easier exit and entry.

Left Side Switch Panel (2)

Illustration 2 g06219690

Beacon Light Switch (2A) (If equipped)

Beacon Light Switch - Push the top of the switch to turn on the beacon light. Push the bottom of the switch to turn off the beacon light.

Quick Coupler Control (2B) (If equipped)

Quick Coupler Switch

If equipped, the switch for the quick coupler control is on the left console. The switch is equipped with a spring loaded lock button. To operate the switch, the lock button must be pushed forward to release the switch. With the lock held forward, press the rear of the switch downward to uncouple the bucket or work tool. Press the button again to attach the bucket or work tool.

Note: An alarm will sound whenever the switch has been activated to lock or unlock a work tool.

For further details, refer to Operation and Maintenance Manual, "Quick Coupler Operation".

Joystick Controls (3)

The joystick control is used to control the functions of the machine implements. For more information on the individual functions of the joysticks, refer to Joystick Controls .

Travel Control (4)

Illustration 3 g06178249
Position for normal travel
(A) Rear of machine
(B) Final drive
(C) Idler

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

Stop - Release the travel levers/pedals to stop the machine. When you release 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.

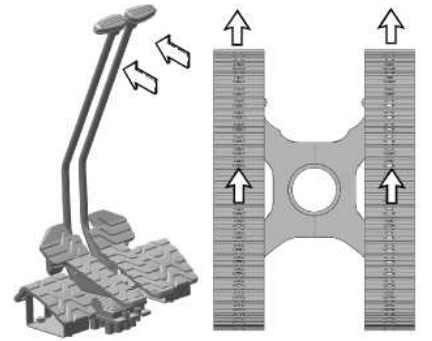

Illustration 4 g06178269
FORWARD travel

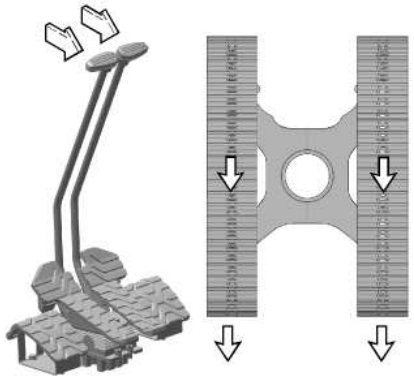

Illustration 5 g06178283
REVERSE travel

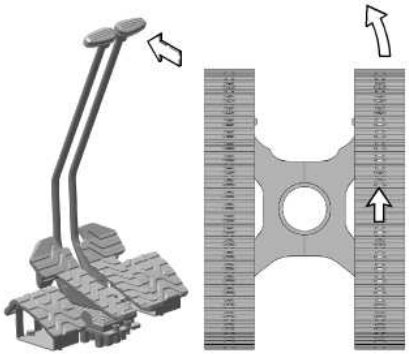

Illustration 6 g06178288
Pivot left turn (FORWARD)

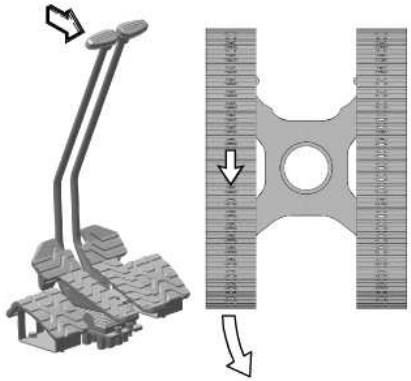

Illustration 7 g06178294
Pivot Left Turn (REVERSE)

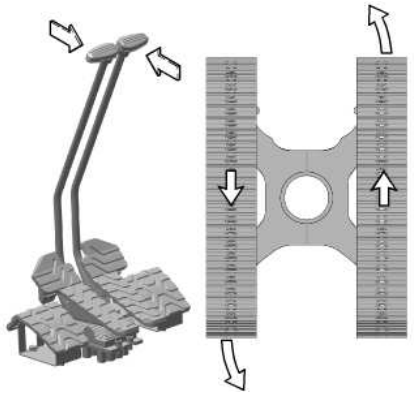

Illustration 8 g06178300
Counter-rotate turn (LEFT)

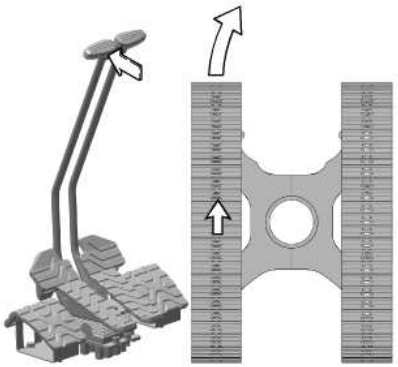

Illustration 9 g06178305
Pivot right turn (FORWARD)

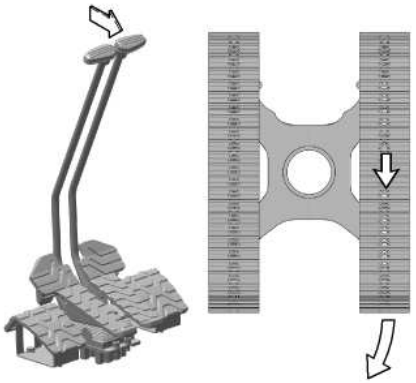

Illustration 10 g06178308
Pivot right turn (REVERSE)

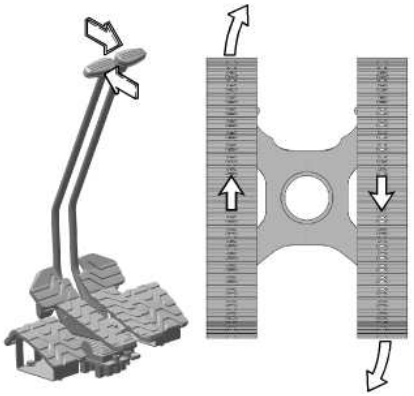

Illustration 11 g06178313
Counter-rotate turn (RIGHT)

Monitor (5)

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

Right Side Switch Panel (7)

Illustration 12 g07654231
Right side switch panel
(12) Engine speed / power mode control
(13) Light switch
(14) Window washer
(15) Operator Information
(16) Radio mute switch
(17) Window wiper
(18) Travel speed control

Engine Speed / Power Mode Control (12)

Engine Speed Control - Turn the dial to control the engine speed (engine rpm). Select the desired position from the seven available positions. Turn the dial counterclockwise to decrease the engine speed (engine rpm). Turn the dial clockwise to increase the engine speed (engine rpm).

Power Mode Control - Push in the dial to change the power mode settings. The Power Mode Control allows the operator to choose what power mode to operate the engine. The modes that can be selected are: "ECONOMY", "SMART", and "POWER".

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

Note: "ECONOMY" mode is **not** available on GC models.

Light Switch (13)

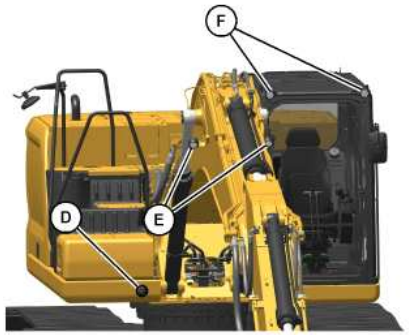

Illustration 13 g06178337

Light Switch - Push the switch to turn on the work lights.

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

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

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

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

Note: Your machine may be equipped with a premium surrounding lighting package with left side, right side, and rear lights. Refer to M0109053 , "Next Generation Hydraulic Excavator Monitoring System Supplement", , Function List Screen, Work Light Control for more information.

Note: Your machine may be equipped with a lighting system that has a time delay. When this system is installed, the exterior lights will not turn off for a predetermined amount of time after the engine start switch has been turned to the OFF position. Refer to , M0109053 , "Next Generation Hydraulic Excavator Monitoring System Supplement", , Application Menu, Lighting Shutdown Timer for more information.

Window Washer (14)

Window Washer (14) - Push the switch to activate the window washer. While the switch is depressed, the indicator light will come on and washer fluid will spray from the nozzle. The window wiper will also operate while the switch is depressed. After the switch is released for approximately 3 seconds, the window wiper will stop.

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.

Operator Information (15)

Operator Information Button (15) - Press and hold this button to view the operator information screen. The indicator light will illuminate when the button is pressed.

Radio Mute (16)

Radio Mute (16) - Press radio mute switch (16) to mute the radio. The indicator light will illuminate when mute is activated. Press the button again to unmute the radio.

Window Wiper (17)

Window Wiper (17) - Push the switch to activate the window wiper. Whenever the switch is depressed, the mode of the window wiper will change according to the indicator light that is illuminated.

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

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

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

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

Travel Speed Control (18)

WARNING

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

Personal injury can result from sudden changes in machine stability.

Travel Speed Control Switch (18) - Press the travel speed control switch to select automatic travel speed or low travel speed. When the engine start switch is on, the travel speed control switch is always set at the LOW SPEED position. Whenever the travel speed control switch is pressed, the travel speed changes. The indicator lights illuminate to show which speed selection is active.

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

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

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

Blade Control (8)

NOTICE

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

When curling the front attachment, do not allow the bucket to hit the blade.

The blade is not intended to be used for machine stabilization. Do not use the blade as an outrigger or stabilizer.

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.

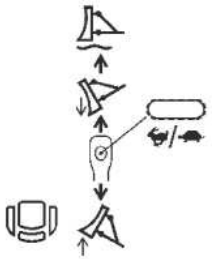

Illustration 14 g07655070

Float - Push the lever fully forward past the detent to activate the blade float function. The float function is not deactivated when the lever is released into the NEUTRAL position. When in float, the blade moves up and down with the ground contour. Display indicates that float is active. Float will be deactivated if the lever is moved through the HOLD position to the RAISE or the LOWER position at least 6° degrees from the HOLD position.

Note: 6° degree should be evaluated by operator

Lower - Push the lever forward to lower the blade. Blade lower movement speed can be controlled by how far the lever is pushed forward. Releasing the lever will return to the HOLD position.

Hold - The lever will return to the HOLD position when you release the lever from the RAISE position, or from the LOWER position. The movement of the bulldozer blade stops in the up and down direction. If the lever is released from the float position, the float function remains active.

Raise - Pull back on the lever to raise blade. Blade raise movement speed can be controlled by how far the lever is pulled back. Releasing the lever will return to the HOLD position.

High-Speed Travel Switch (8A) (If Equipped)

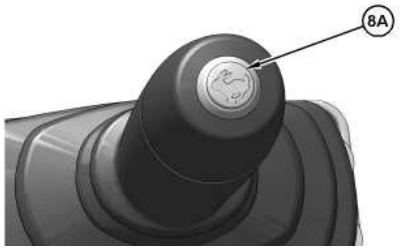

Illustration 15 g07651882
(8A) High-speed travel switch

High-speed travel switch (8A) is on dozer blade lever (8). Use high-speed travel switch (8A) to change the travel speed.

Push the switch 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.

Monitor Navigation Panel (9)

Illustration 16 g07654260
Right side switch panel
(19) Jog dial
(20) Heating and air conditioning
(21) Next menu
(22) Travel alarm mute (If Equipped)
(23) Home
(24) Radio control

Jog Dial (19)

The jog dial can be used to select items displayed on the monitor screen. The dial can be rotated 360 degrees. The dial can also be moved left, right, up, and down. The dial can be pushed in to make a selection.

Air Conditioning and Heating (20)

Air Conditioning and Heating (20) - 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 (19) 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.

Next Menu (21)

Next Menu (21) - Press the next menu button to access the next higher menu. If there is not a menu above the current screen being viewed, the button will not do anything.

Refer to Monitoring System for more information.

Travel Alarm Mute Switch (22) (If Equipped)

Travel Alarm Mute Switch (22) - Press travel alarm mute switch (22) to mute the travel alarm.

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

Home (23)

Home Key (23) - Press the home key to return to the default display at any time.

Refer to Monitoring System for more information.

Radio Control (24)

Radio Control (24) - Press this button to display the radio controls on the monitor. The indicator light on the button will illuminate when the radio is turned on. Use jog dial (19) to make selections. If equipped with a touch screen display, touch the icons on the screens to make a selection.

Refer to Radio for more information.

Engine Start Switch (10)

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

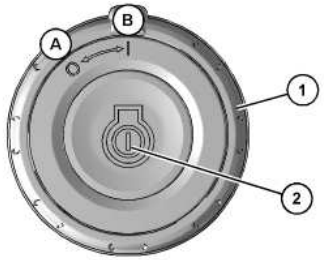

Illustration 17 g06180554
(A) Off
(B) On
(1) Engine start ring
(2) Start button

OFF - Turn the engine start ring (1) to the OFF position (A) to stop the engine.

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).

START - To start the engine, enter the code on the monitor. Press start button (2). After the engine starts, release the button.

Note: Pressing the start button with the engine on will also turn off the engine.

Operator's Seat (11)

There are different options for operators seats. Each operator seat and console have various adjustments to meet a wide range of operators. For more information, refer to Seat .

Tilt-Up Console (11A)

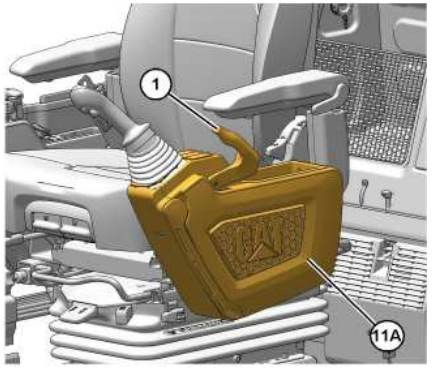

Illustration 18 g07654176
(1) Hydraulic lockout control
(11A) Tilt-up console

Some optional seats are equipped with a tilt-up console. The console can be tilted upward for easier exit and entry. The console is unlocked by pulling the hydraulic lockout control (1) to the rear-most position. The console will then tilt upward. Simply push the console downward until the console locks into place when ready for use.

USB/Aux Ports and 12V Power Receptacle (If Equipped) (25) & (26)

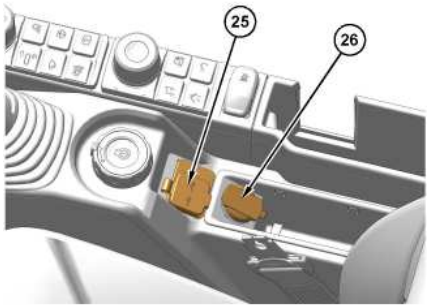

Illustration 19 g07654603
(25) USB/AUX/MIC port
(26) 12V power receptacle

USB - The USB port is used to play music from a portable device. The USB symbol on the radio screen on the monitor must be selected.

AUX - The AUX port is used to play music from a portable device. AUX must be selected on the radio screen on the monitor.

12V Power Receptacle - The power receptacles can be used to power automotive electrical equipment or accessories. The power receptacle only operates when the engine start switch is in the ON position.

12V Power Receptacle (27)

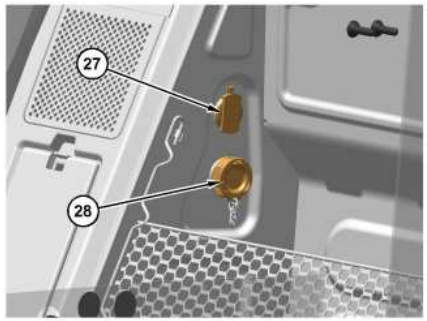

Illustration 20 g07654608
(27) 12V power receptacle
(28) Service port

12V Power Receptacle - The power receptacles can be used to power automotive electrical equipment or accessories. The power receptacle only operates when the engine start switch is in the ON position.

Service Port (28)

A service port is located inside the cab behind the seat. This service port allows service personnel to connect a laptop computer to diagnose machine and engine systems.

Consult with your Cat® dealer for additional information.

Dome Light (29)

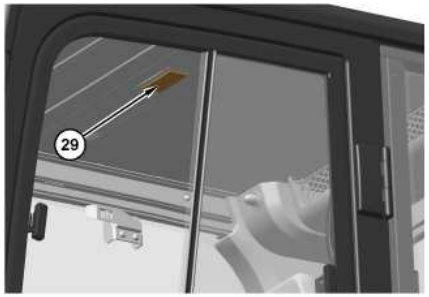

Illustration 21 g07654609

The dome light has three different positions. When the dome light is in the center position (horizontal), the light will come on when the door is open and shut off when the door is closed.

When the left side of the light is pressed, the lamp will be inoperable.

When the right side of the light is pressed, the lamp will be illuminated until the lamp is switched to another position.

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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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General Operation

Note: Machine can be configured with different Quick Coupler settings with accelerator or without accelerator function, and "Hold to Run" or "Alarm" or "Hydraulic Pin Grabber" For activation and deactivation consult your Cat dealer.

Note: If machine is equipped with Tilt Rotator, refer to Operation and Maintenance Manual, M0073418 , "TRS10, TRS14, TRS18, and TRS23 Tilt-Rotator" and consult your Cat dealer.

This procedure describes the use of the hydraulic circuit with a Cat dedicated Quick Coupler. If a different Quick Coupler is used, contact your Cat dealer for pressure adjustment and refer to the documentation for the Quick Coupler for proper operation.

- The engine start switch is ON. Refer to Operation and Maintenance Manual, "Operator Controls".
- The engine is running.
- The hydraulic lockout control must be in the UNLOCKED position to operate the quick coupler controls. Refer to Operation and Maintenance Manual, "Operator Controls".

When the above conditions are achieved, the system will perform the desired 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 for the Quick Coupler to work properly.

The work tools are held onto the quick coupler by hydraulic pressure. If pressure is lost, a locking bar keeps the work tool locked with the force of built-in springs. Ensure that the hydraulic system and the locking bar are working properly before using the Quick Coupler.

A lifting eye is included on the Quick Coupler. Release the work tool from the Quick Coupler to use the lifting eye to pick up loads. To lift a load with the lifting eye, extend the bucket cylinder until the quick coupler is in a VERTICAL position. Do not exceed the rated load for the machine. Refer to Operation and Maintenance Manual, "Lifting Capacities" for more information.

NOTICE

Once the work tool has been properly attached to the coupler, no loosening of the work tool should occur. Refer to the Operation and Maintenance Manual, "Quick Coupler Installation and Removal" section of the quick coupler for additional information. If at any point after the proper attachment and back drag testing of the work tool, should the work tool then become loose or if the rear pin of the work tool detaches from the movable hook, stop work immediately and safely ground and detach the work tool. Consult your Cat dealer to inspect the coupler prior to putting the coupler back into service. This situation could indicate potential coupler damage that may not be readily visible to the customer or operator of the machine and coupler.

Electric Switch Operation

Illustration 1 g07500529
(1) Quick coupler switch
(2) Safety lock

Quick coupler switch (1) is located inside the cab on the switch panel to the left of the operator's seat. Refer to Operation and Maintenance Manual, "Operator Controls". The electric switch has only one position for coupling the work tool and uncoupling the work tool. Quick coupler switch (1) is equipped with a safety lock (2). The locking tab must be pushed backward before quick coupler switch can be pressed.

Coupling the Work Tool

WARNING

Inspect the coupler wedge engagement before you operate the excavator.

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

Inspect coupler wedge engagement from the cab by rotating the bucket or the work tool inward. Extend the bucket cylinder to bring the coupler actuator into view and bring the stick in until the wedges are visible.

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

The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm the coupler pins are engaged. A physical test is required by dragging the attachment on the ground to confirm the coupler pins are engaged.

Note: 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.

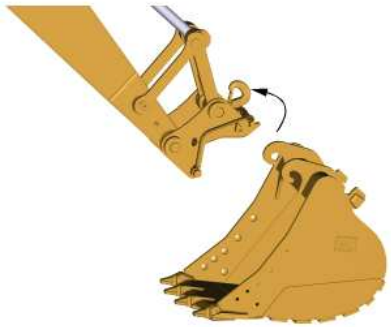

Illustration 2 g06220881
Engaging the work tool

1. Position the work tool on a level surface.
2. Retract the bucket cylinder. Position the Quick Coupler in alignment between the hinges of the work tool.

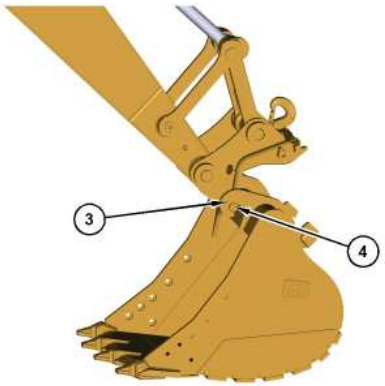

Illustration 3 g07499629
(3) Hinges
(4) Lower bosses

3. Move the stick forward and raise the stick until lower bosses (4) engage hinges (3) of the work tool.

Illustration 4 g06642184
Quick coupler locking icon

4. Push the locking tab on the quick coupler switch (1) backward and then push the switch and release. The monitor will display "Quick Coupler Unlocking Requested". Refer to Operation and Maintenance Manual, "Monitoring System" for more information.

Illustration 5 g06642183
Quick coupler unlocking icon

5. If machine is set with accelerator, the system will automatically pressurize until the wedge is fully extended. The buzzer will continue to sound and the monitor will display "Quick Coupler Unlocked".

   If machine is set without accelerator, operate a hydraulic system function (for example, hold the control lever of the bucket cylinder in the retract direction) until the wedge is fully extended. The buzzer will continue to sound and the monitor will display "Quick Coupler Unlocked".

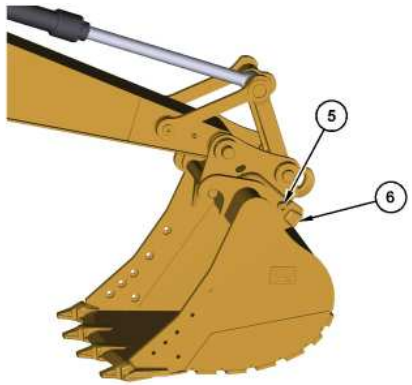

Illustration 6 g07499633
(5) Center bosses
(6) Locking area

6. Extend the bucket cylinder to rotate the Quick Coupler toward the work tool.

Center bosses (5) must engage with the cutout of the hinge.

Illustration 7 g06642184
Quick coupler locking icon

Illustration 8 g07500529
(1) Quick coupler switch
(2) Safety lock

7. Release quick coupler switch (1). The monitor will display "Quick Coupler Locking".

Illustration 9 g06642185
Locking icon

8. If machine is set with accelerator, the system will automatically pressurize until the wedge is fully retracted. The buzzer will stop and the monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

   If machine is set without accelerator, operate a hydraulic system function (for example, hold the control lever of the bucket cylinder in the retract direction) until the wedge is fully retracted. The buzzer will stop and the monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

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

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.

9. Verify that the Quick Coupler and the work tool are locked together.

   a. Retract the bucket cylinder and place the work tool on the ground.

   b. Apply pressure to the work tool against the ground.

   c. Drag the work tool backward.

NOTICE

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

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

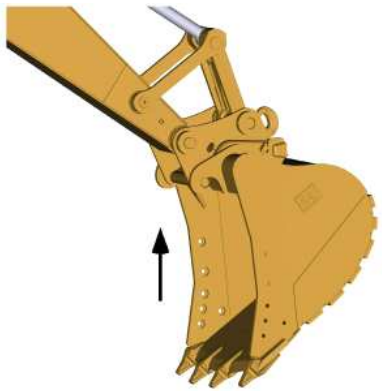

Illustration 10 g06220888
Retracting bucket cylinder

10. Raise the boom or raise the stick. Retract the bucket cylinder to confirm that the wedge is fully engaged. If the wedge is fully engaged, the work tool is locked in place. The work tool is ready to use.

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.

Illustration 11 g06220889
Placing the bucket on the ground

1. Level the bucket or level the work tool on the ground.

Illustration 12 g06642184
Quick coupler locking icon

2. Push the locking tab on the switch backward and then push the switch and release. The monitor will display "Quick Coupler Unlocking Requested".

Illustration 13 g06642183
Quick coupler unlocking icon

3. If machine is set with accelerator, the system will automatically pressurize until the wedge is fully extended. The buzzer will continue to sound and the monitor will display "Quick Coupler Unlocked".

   If machine is set without accelerator, operate a hydraulic system function (for example, hold the control lever of the bucket cylinder in the retract direction) until the wedge is fully extended. The buzzer will continue to sound and the monitor will display "Quick Coupler Unlocked".

Illustration 14 g06220891
Work tool engaged

4. Retract the bucket cylinder to move the Quick Coupler toward the machine while the coupler switch is being pushed and held.

Illustration 15 g06642184
Quick coupler locking icon

5. Release coupler switch (1). The monitor will display "Quick Coupler Locking".

Illustration 16 g06642185
Locking icon

6. If machine is set with accelerator, the system will automatically pressurize until the wedge is fully retracted. The buzzer will stop and the monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

   If machine is set without accelerator. Operate a hydraulic system function (for example, hold the control lever of the bucket cylinder in the retract direction) until the wedge is fully retracted. The buzzer will stop and the monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

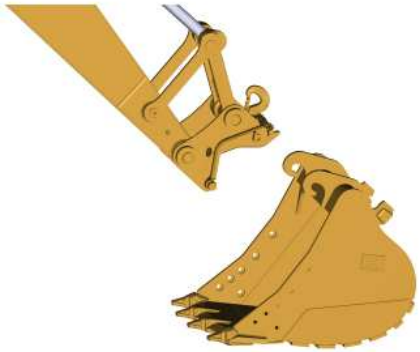

Illustration 17 g06220892
Work tool disengaged

7. Lower the stick and move the stick toward the machine to disengage the quick coupler.

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General Operation

NOTICE

The Cat Quick Coupler (Hydraulic Pin Grabber) is not designed to be used in applications where there is long exposure to excessive vibration. 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 carefully inspect the coupler daily for cracks, bent components, wear, distressed welds, etc. when operating with any of the above work tools.

Note: Machine can be configured with different quick coupler settings with Accelerator or without Accelerator function. And "Hold to Run" or "Alarm" or "Hydraulic Pin Grabber" For activation and deactivation consult your CAT dealer.

Note: If machine is equipped with Tilt Rotator, refer to Operation and Maintenance Manual, Tilt Rotator and consult your CAT Dealer.

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 hydraulic pressure. If pressure is lost, a check valve in the hydraulic cylinder traps oil in the cylinder. Ensure that the hydraulic system is working properly before using the quick coupler.

A lifting eye is included on the quick coupler. Release the work tool from the quick coupler to use the lifting eye to pick up loads. To lift a load with the lifting eye, extend the bucket cylinder until the quick coupler is in a VERTICAL position. Do not exceed the rated load for the machine.

NOTICE

Once the work tool has been properly attached to the coupler, no loosening of the work tool should occur. Refer to the Operation and Maintenance Manual, "Quick Coupler Installation and Removal" section of the quick coupler for additional information. If at any point after the proper attachment and back drag testing of the work tool, should the work tool then become loose or if the rear pin of the work tool detaches from the movable hook, stop work immediately and safely ground and detach the work tool. Consult your Cat dealer to inspect the coupler prior to putting the coupler back into service. This situation could indicate potential coupler damage that may not be readily visible to the customer or operator of the machine and coupler.

Quick Coupler Operation

Electric Switch Operation

Illustration 1 g06382398

Quick coupler switch (1) is located inside the cab on the switch panel to the left of the operator's seat. The electric switch has only one position for coupling the work tool and uncoupling the work tool. The switch is equipped with a safety lock (2). The locking tab must be pushed backward before the switch can be pressed.

NOTICE

Once the work tool has been properly attached to the coupler, no loosening of the work tool should occur. Refer to the quick coupler Operation and Maintenance Manual, "Quick Coupler Installation and Removal" for additional information. If at any point after the proper attachment and back drag testing of the work tool, should the work tool then become loose or if the rear pin of the work tool detaches from the movable hook, stop work immediately and safely ground and detach the work tool. Consult your Cat dealer to inspect the coupler prior to putting the coupler back into service. This situation could indicate potential coupler damage that may not be readily visible to the customer or operator of the machine and coupler.

NOTICE

Inspection of the Center-Lock coupler is required after a failure of the primary engaging system or a miscoupling of the tool, causing the work tool to swing by the secondary lock. Contact your Cat dealer.

Refer to Special Instruction, REHS5676 , "The Inspection Procedure for the Center-Lock Coupler" for the proper procedure.

Note: For machines operating hydromechanical work tools equipped with a Center-Lock Pin Grabber Coupler, the addition of a Hydromechanical Conversion Kit may also be required. Refer to the Operation and Maintenance Manual for the quick coupler for more information or consult your Cat dealer.

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

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

The alarm will go off when the coupler is locked and the monitor will display a message. These assurances do not confirm that the coupler pins are engaged. A physical test is required by dragging the attachment on the ground to confirm the coupler pins are engaged.

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. Position the bucket or the work tool on a level surface.
2. Make sure that the pins are in the bucket or the work tool. Make sure that the pin keepers are installed correctly.

Illustration 2 g06187057

3. Extend the stick cylinder and fully extend the bucket cylinder until the quick coupler is curled past a vertical position. This action must be performed before pressing the switch.

Illustration 3 g06642184

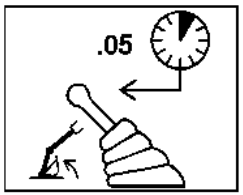

Illustration 4 g01231447

4. Push the locking tab on the switch backward and then push the switch and release. The buzzer will sound and the monitor will display "quick coupler unlocking requested".

Illustration 5 g06642183

5. Hold the control lever for the bucket cylinder in the EXTEND position until the hook is fully unlocked. The buzzer will continue to sound and the monitor will display "quick coupler unlocked".

Illustration 6 g06187063

6. Align the quick coupler with the work tool.

Illustration 7 g06187068

7. Rotate the quick coupler to grab the top pin.

Illustration 8 g06187086

8. Rotate the quick coupler downward to grab the bottom pin.

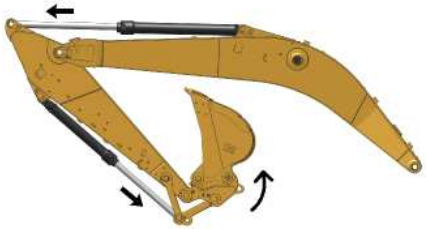

Illustration 9 g06187108

9. Extend the stick cylinder and extend the bucket cylinder until the work tool is curled past a vertical position.

   This action must be performed before you push the coupler switch to lock the coupler.

Illustration 10 g06642184

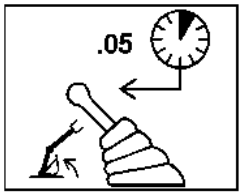

Illustration 11 g01231447

10. Push the locking tab on the switch backward and then push the switch and release. The buzzer will continue to sound and the monitor will display "quick coupler locking".

Illustration 12 g06642185

NOTICE

Hold the bucket cylinder control lever in the EXTEND position while the quick coupler is locking. Failure to do so may result in unwanted movement of the work tool.

11. Hold the control lever for the bucket cylinder in theEXTEND position until the hook is fully locked. The buzzer will stop to sound and the monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

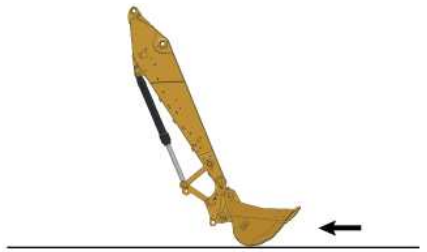

Illustration 13 g06187115

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

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.

12. Verify that the quick coupler and the work tool are locked together.

    a. Retract the bucket cylinder and place the work tool on the ground.

    b. Apply pressure to the work tool against the ground.

c. Drag the work tool backward.

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.

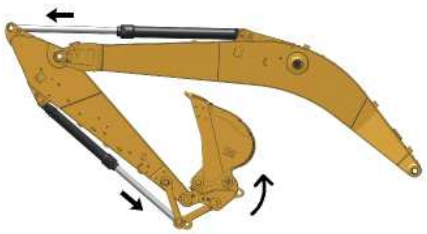

Illustration 14 g06187108

1. Extend the stick cylinder and fully extend the bucket cylinder until the work tool is curled past a vertical position. This action must be performed before pressing the switch.

Illustration 15 g06642184

2. Push the locking tab on the switch backward and then push the switch and release. The buzzer will sound and the monitor will display "quick coupler unlocking requested".

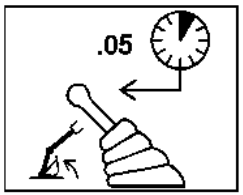

Illustration 16 g01231447

Illustration 17 g06642183

3. Hold the control lever for the bucket cylinder in the EXTEND position until the hook is fully unlocked. The buzzer will continue to sound and the monitor will display "quick coupler unlocked".

Illustration 18 g06187142

4. Move the boom and the stick until the tool or the bucket is in the storage position. Keep the tool close to the ground.

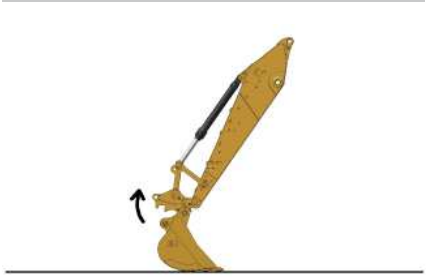

Illustration 19 g06187151

5. Rotate the quick coupler upward to release the bottom pin.

Illustration 20 g06187156

6. Continue to rotate the quick coupler upward to release the top pin and completely release the work tool from the quick coupler.
7. Move the stick to a position that is clear of the work tool.

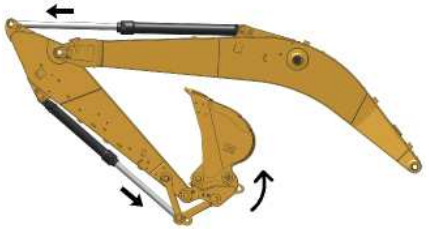

Illustration 21 g06187108

8. Extend the stick cylinder and extend the bucket cylinder until the work tool is curled past a vertical position. This action must be performed before you push the coupler switch to lock the coupler.

Illustration 22 g06642184

9. Push the locking tab on the switch backward and then push the switch and release. The buzzer will continue to sound and the monitor will display "quick coupler locking".

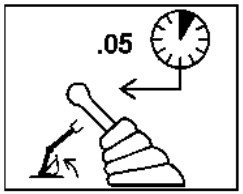

Illustration 23 g01231447

Illustration 24 g06642185

10. Hold the control lever for the bucket cylinder in the EXTEND position until the hook is fully locked. The buzzer will stop to sound and the monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

11. To lift objects with the lifting eye of the quick coupler, refer to Coupler Lifting Eye Operation without Bucket later in this chapter.

Coupling a Bucket that is Reversed

Illustration 25 g06187159

1. When you use a hydraulic pin grabber quick coupler, you can connect to a bucket that is in a reversed position. Refer to Illustration 25 for an example of connecting to a bucket that is in a reversed position.
2. Follow the same steps for coupling the work tool to couple the host machine to a bucket that is reversed. Refer to Coupling the Work Tool for the proper procedure.

NOTICE

When some Caterpillar 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.

If the bucket is not fully engaged in the jaw of the coupler, the quick coupler can become snagged on the bucket bosses. The full weight of the bucket is then carried by the quick coupler sideplates, which can cause damage to the quick coupler.

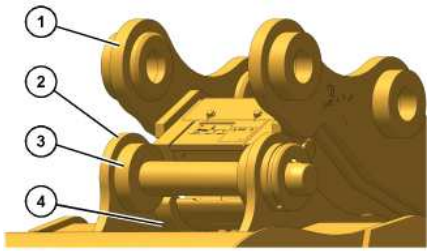

Illustration 26 g06187418
(1) Quick coupler
(2) Bucket
(3) Boss
(4) Hook

Coupler Lifting Eye Operation without Bucket

A lifting eye is included on the quick coupler. Release the work tool from the quick coupler to use the lifting eye to pick up loads. To lift a load with the lifting eye, extend the bucket cylinder until the quick coupler is in a VERTICAL position. Do not exceed the rated load for the machine. Refer to Operation and Maintenance Manual, Lifting capacities for more information.

Note: The maximum load capacity of the coupler lifting eye is 12000 kg (26455 lb). Exceeding the maximum capacity could result in serious injury or death.

1. Remove the work tool. Refer to Uncoupling the Work Tool for the proper procedure.

Illustration 27 g06384615

2. Use the lifting eye of the quick coupler, as needed.

3. To reinstall the bucket or the work tool, refer to Coupling the Work Tool for the proper procedure.

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General Operation

Note: If the machine is configured to sound a buzzer while operating the CW coupler, refer to Operation and Maintenance Manual, Quick Coupler Operation (Circuit for CW Coupler with Alarm).

Note: Machine can be configured with different quick coupler settings with Accelerator or without Accelerator function. And "Hold to Run" or "Alarm" or "Hydraulic Pin Grabber" For activation and deactivation consult your CAT dealer.

Note: If machine is equipped with Tilt Rotator, refer to Operation and Maintenance Manual, Tilt Rotator and consult your CAT Dealer.

This procedure describes the use of the hydraulic circuit with a Cat dedicated quick coupler. If a different quick coupler is used, contact your Cat dealer for pressure adjustment and consult the documentation for the quick coupler for proper operation.

- The engine start switch is on.
- The engine is running.
- The hydraulic lockout control must be in the UNLOCKED position to operate the quick coupler controls.

When the above conditions are achieved, the system will perform the desired 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 hydraulic pressure. If pressure is lost, a locking bar keeps the work tool locked with the force of built-in springs. Ensure that the hydraulic system and the blocking bar are working properly before using the quick coupler.

A lifting eye is included on the quick coupler. Release the work tool from the quick coupler to use the lifting eye to pick up loads. To lift a load with the lifting eye, extend the bucket cylinder until the quick coupler is in a VERTICAL position. Do not exceed the rated load for the machine.

NOTICE

Once the work tool has been properly attached to the coupler, no loosening of the work tool should occur. Refer to the Operation and Maintenance Manual, "Quick Coupler Installation and Removal" section for additional information. If at any point after the proper attachment and back drag testing of the work tool, should the work tool then become loose or if the rear pin of the work tool detaches from the movable hook, stop work immediately and safely ground and detach the work tool. Consult your Cat dealer to inspect the coupler prior to putting the coupler back into service. This situation could indicate potential coupler damage that may not be readily visible to the customer or operator of the machine and coupler.

Electric Switch Operation

Illustration 1 g06382398

Quick coupler switch (1) is located inside the cab on the switch panel to the left of the operator's seat. The electric switch has only one position for coupling the work tool and uncoupling the work tool. The switch is equipped with a safety lock (2). The locking tab must be pushed backward before the switch can be pressed.

Coupling the Work Tool

WARNING

Inspect the coupler wedge engagement before you operate the excavator.

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

Inspect coupler wedge engagement from the cab by rotating the bucket or the work tool inward. Extend the bucket cylinder to bring the coupler actuator into view and bring the stick in until the wedges are visible.

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

The buzzer will not sound when the switch is in the lock position. The position of the switch does not confirm the coupler pins are engaged. A physical test is required by

dragging the attachment on the ground to confirm the coupler pins are engaged.

Note: 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.

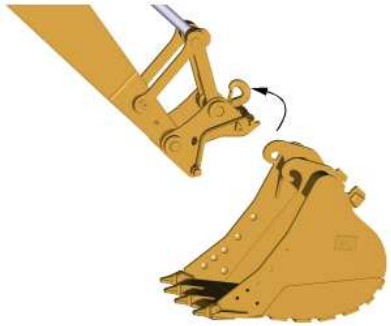

Illustration 2 g06220881

1. Position the work tool on a level surface.
2. Retract the bucket cylinder. Position the quick coupler in alignment between the hinges of the work tool.

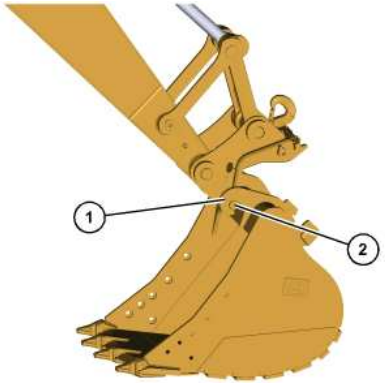

Illustration 3 g06220883
(1) Hinges
(2) Lower bosses

3. Move the stick forward and raise the stick until the lower bosses (2) engage the hinges (1) of the work tool.

Illustration 4 g06642184

4. Push the locking tab on the switch backward and then push the switch and hold. The monitor will display "quick coupler unlocking requested".

Illustration 5 g06642183

5. If machine is set with accelerator, the system will automatically pressurize, while the coupler switch remains pushed and held, until the wedge is fully extended. The monitor will display "quick coupler unlocked".

   If machine is set without accelerator. Operate a hydraulic function (for example, hold the control lever of the bucket cylinder in the retract direction), while the coupler switch remains pushed and held, until the wedge is fully extended. The monitor will display "quick coupler unlocked" .

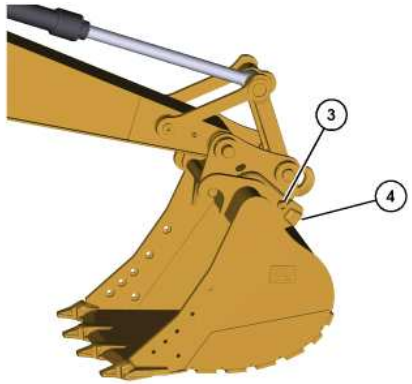

Illustration 6 g06220887
(3) Center bosses
(4) Locking area

6. Extend the bucket cylinder to rotate the quick coupler toward the work tool.

   Center bosses (3) must engage with the cutout of the hinge.

Illustration 7 g06642184

7. Release coupler switch (1). The monitor will display "Quick Coupler Locking".

Illustration 8 g06642185

8. If machine is set with accelerator, the system will automatically pressurize until the wedge is fully retracted. The monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

   If machine is set without accelerator. Operate a hydraulic system function (for example, hold the control lever of the bucket cylinder in the retract direction) until the wedge is fully retracted and the monitor will display "Quick Coupler Locked - Verify Tool Locked", when the coupler is locked.

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

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.

9. Verify that the quick coupler and the work tool are locked together.

   a. Retract the bucket cylinder and place the work tool on the ground.

b. Apply pressure to the work tool against the ground.

c. Drag the work tool backward.

NOTICE

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

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

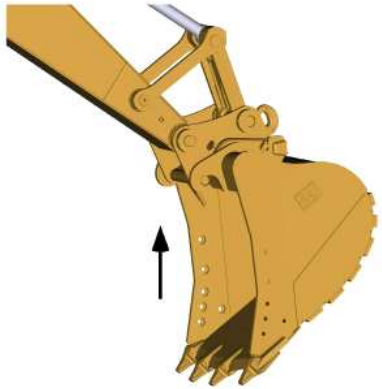

Illustration 9 g06220888

10. Raise the boom or raise the stick. Retract the bucket cylinder to confirm that the wedge is fully engaged. If the wedge is fully engaged, the work tool is locked in place. The work tool is ready to use.

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.

Illustration 10 g06220889

1. Level the bucket or level the work tool on the ground.

Illustration 11 g06642184

2. Push the locking tab on the switch backward and then push the switch and hold. The monitor will display "quick coupler unlocking requested".

Illustration 12 g06642183

3. If machine is set with accelerator, the system will automatically pressurize, while the coupler switch remains pushed and held, until the wedge is fully extended and the monitor will display "quick coupler unlocked".

   If machine is set without accelerator. Ooperate a hydraulic function (for example, hold the control lever of the bucket cylinder in the retract direction), while the coupler switch remains pushed and held, until the wedge is fully extended. The monitor will display "quick coupler unlocked".

Illustration 13 g06220891

4. Retract the bucket cylinder to move the quick coupler toward the machine while the coupler switch is being pushed and held.

Illustration 14 g06642184

5. Release coupler switch (1). The monitor will display "Quick Coupler Locking".

Illustration 15 g06642185

6. If machine is set with accelerator, the system will automatically pressurize until the wedge is fully retracted. The monitor will display "Quick Coupler Locked - Verify Tool Locked" when the coupler is locked.

   If machine is set without accelerator. Operate a hydraulic system function (for example, hold the control lever of the bucket cylinder in the retract direction) until the wedge is fully retracted and the monitor will display "Quick Coupler Locked - Verify Tool Locked", when the coupler is locked.

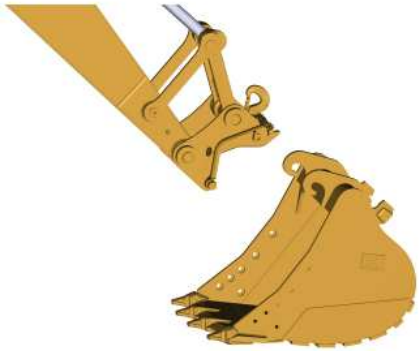

Illustration 16 g06220892

7. Lower the stick and move the stick toward the machine to disengage the quick coupler.

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The radio is integrated into the monitoring system. All the radio controls are adjusted using the monitor. The actual radio is mounted in the right rear console behind the operator seat.

Illustration 1 g06213193
(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 touch screen. Home button (2) can be used to return to the main screen.

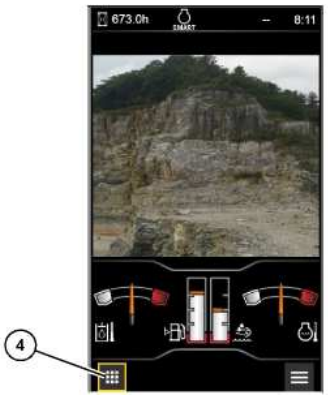

Illustration 2 g06213076
(4) Application menu

Press radio button (3) to go directly to the radio screen. To navigate to the radio screen from the main screen, press application menu button (4).

Illustration 3 g07544994

Use jog dial (1) to highlight "Audio" and then press the jog dial downward to select the entry. You may also access the screen by simply touching the "Audio" box on the touch screen.

Illustration 4 g07657619

Radio screen
(5) Volume control
(6) Tuner
(7) Preset stations
(8) Auxiliary button
(9) DAB button (If Equipped)
(10) USB button
(11) Home button
(12) Power button
(13) Audio settings button
(14) FM button
(15) AM button
(16) Bluetooth button

Volume control (5)

- The volume control is used to raise or lower the audio volume.

Tuner (6)

- The tuner is used to tune the radio to the desired station.

Preset stations (7)

- The preset stations 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 indicator light for the active preset station will illuminate.

Auxiliary button (8)

- When a device is plugged into the auxiliary port, press the auxiliary button to connect the device to the radio. The indicator light will illuminate when this mode is active.

DAB button (9)

- If equipped, press this button to access DAB radio. The indicator light will illuminate when this mode is active.

USB button (10)

- When a device is plugged into the USB port, press the USB button to connect the device to the radio. The indicator light will illuminate when this mode is active.

Home button (11)

- Press the "Home" button to return to the main monitor screen.

Power button (12)

- Pressing this button turns the radio on and off. The indicator light on the monitor and on button (3) will illuminate when the power is on.

Audio Setting button (13)

- Pressing this button will open the radio function list menu.

FM button (14)

- Press this button to access FM radio. The indicator light will illuminate when this mode is active.

AM button (15)

- Press this button to access AM radio. The indicator light will illuminate when this mode is active.

Bluetooth button (16)

- When a Bluetooth device is connected, press the Bluetooth button to connect the device to the radio. The indicator light will illuminate when this mode is active.

Audio Setting (13)

To access the radio function list, press the "Audio Setting" button (13).

The function list 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.

Auto Loudness

- When on, this feature automatically adjusts treble and bass levels when reducing the volume setting. This effect allows the user to hear more clearly at a lower volume.

Repeat

- Allows the user to set the repeat preference.

Bluetooth

- Allows the user to pair a phone, view paired devices, and edit device names.

Refer to Operation and Maintenance Manual, "Next Generation Hydraulic Excavator Monitoring System Supplement", Phone for information on the Bluetooth screen.

Selection Method

All settings can be made using the touch screen or by using the jog dial. The method depends on the preference of the operator. When using the touch screen, simply touch 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.

Illustration 5 g06213233

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

Radio Operation

1. To operate the system, press power button (12).
2. Select between the AM button (15) for AM stations, the FM button (14) for FM stations, or the DAB button (9) for DAB radio (if equipped).
3. Use tuner (6) to adjust to the desired station. If presets stations (7) are set, press the desired preset station.
4. Use volume control (5) to adjust the volume.
5. When the machine is in operation, turn down the volume of the radio.

USB / AUX / Bluetooth Operation (If Equipped)

Illustration 6 g06213245

1. To play audio from a device such as an MP3 player or a phone connect the device using an auxiliary cable or a USB cable. Depending on the cable being used, plug the cable into the appropriate port on the console.

   To play audio from a "Bluetooth" device, you must first pair the "Bluetooth" device with the machine. Refer to Operation and Maintenance Manual, "Next Generation Hydraulic Excavator Monitoring System Supplement", Phone for information on the Bluetooth pairing.

2. Select either "USB" (10), "AUX" (8), or "Bluetooth" (9) depending on which type of connection was used. Play the music from the device. The music should be playing over the radio speakers if properly connected. Adjust the volume as necessary.

Illustration 7 g07657646

Note: If "USB" (10) or "Bluetooth" (16) are selected, extra controls appear on the screen for playing music. They include the following:

17

- Skip to the beginning of the track

18

- Rewind the track

19

- Pause/Play the track

20

- Fast forward the track

21

- Skip to the end of the track

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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).

NOTICE

Do not change the position of the roof hatch without performing the following actions:

- **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.**

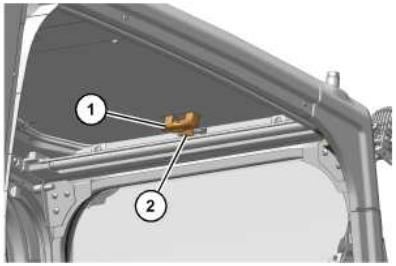

Illustration 1 g06179871
(1) Grip
(2) Lock

To open the roof hatch, release lock (2). Hold grip (1) and push the roof hatch upward.

To close the roof hatch, hold grip (1) and pull the roof hatch downward. Engage lock (2) securely.

NOTICE

Do not stand or walk on the hatch or the roof of the cab. Serious damage may occur.

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2024/10/02 **Rubber Segment Track Operation - If Equipped (M0113012-09)**

SMCS - 4172 i10311723

Certain machines may be equipped with rubber track surfaces. The following guidelines apply to machines equipped with rubber track surfaces.

Loading or Unloading the Machine on a Trailer

Take the following precautions when loading or unloading a machine with rubber track surfaces on a trailer:

- Take sufficient care not to allow the machine to slip since the surface of the rubber track is flat.
- Load the machine only after removing soil or clay that has adhered to rubber track surfaces to avoid unexpected slippage.

Ground Conditions

Take the following precautions regarding ground conditions for a machine with rubber track surfaces:

- Do not travel on road surfaces where oil has collected, or on slope in rain or snow conditions.
- Certain harsh types of terrain can damage rubber track surfaces. Limit the use of your machine on sharp rocky surfaces, gravel, fields with crop stubble, and iron scrap. Exercise extreme caution if such terrains are unavoidable by driving slowly, avoiding fast turns, and avoiding hill traversing turns.
- Do not drive with track edges pressing against walls, curbs, and other objects. Doing so can damage the edge of the track, which could lead to more severe damage.

Driving Techniques

Practice the following driving techniques when operating a machine with rubber track surfaces:

- Driving slowly and turning with a large radius, compared to fast small radius turns, will extend track life.
- High friction caused by fast turns on concrete surfaces can lead to rubber abrasion.

Environmental Conditions

Obey the following practices when operating a machine with rubber track surfaces:

- Salty environments should be avoided if possible due to the erosive nature of salt and airborne water vapor containing salt. Erosion of the adhesive bonding area between core metals and rubber can lead to core metal pull-out. Remove salt deposits by washing tracks after use in such conditions.
- If fuel, hydraulic oil, or similar products come in contact with rubber tracks, clean off the contaminant immediately.
- When storing your machine or tracks keep sheltered from rain and direct sunlight.
- Due to the material properties of rubber, rubber tracks can operate problem-free within a temperature range of −25 °C (−13 °F) and 55 °C (131 °F).
- Remove mud or snow to avoid rubber deformation / separation from core metal that can occur when material is trapped between the steel shoe and rubber pad.

Installation

When installing rubber track pads, always install to all links / shoes on both tracks. If rubber track pads are not installed to all links / shoes, the durability will be greatly reduced.

Rubber track pads should be replaced when core metal is exposed through the track pad surface.

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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

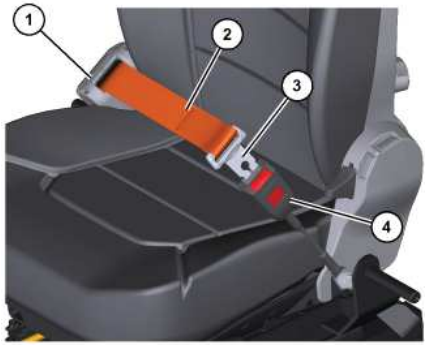

Illustration 1 g06223891

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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Comfort Seat

Illustration 1 g06225151
(1) Headrest
(2) Backrest adjuster
(3) Seat and console fore and aft adjuster
(4) Indicator
(5) Seat height adjustment lever
(6) Seat fore and aft lever

The operator can adjust the height of headrest (1). To adjust the headrest, hold the headrest with both hands. Move the headrest up and down. Release the headrest when the desired position is attained. The headrest will remain in the desired position.

Pull up on backrest adjuster (2) to release the lock. Move the backrest to the desired position and then release the adjuster.

Lift up on fore and aft adjuster (3) to release the seat from the locked position. Adjust the seat and console forward or rearward to the desired position and then release the lever to lock the seat.

Use seat height adjustment lever (5) to adjust the seat for the operator's height and weight. Move the adjuster switch to the "+" symbol to raise the height. Ratchet the seat upward without sitting in the seat. Then sit in the seat to check the color of indicator (4). When the indicator is showing green, the seat is in the right range for the operator. Further adjustment can be made as long as the indicator stays green.

To lower the seat, move the adjust switch to the "-" symbol. Ratchet the adjuster downward without sitting in the seat. Then sit in the seat to check the color of indicator (4). When the indicator is showing green, the seat is in the right range for the operator. Further adjustment can be made as long as the indicator stays green.

Pull upward on seat fore and aft lever (6) to release the cushion lock. Adjust the seat cushion forward or backward to the desired position and then release the lock to lock the cushion in place.

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2018/10/15 **Securing the Machine (M0113012-09)**

SMCS - 7000

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WARNING

Do not transport the machine if there is a malfunction of the swing parking brake system.

The machine may swing during transportation if the swing parking brake system is not functioning properly which could result in injury or death.

Contact your Cat dealer for service.

Comply with any laws that govern the characteristics of a load (length, width, height, and weight).

1. Move the hydraulic lockout control to the LOCKED position.
2. Turn the engine start ring to the OFF position or press button to stop engine.
3. Turn the battery disconnect switch to OFF and remove the disconnect switch key.
4. Remove the ether starting aid cylinder. See Operation and Maintenance Manual, "Ether Starting Aid Cylinder - Replace" for the removal procedure.
5. Lock the door and the access covers. Attach any vandalism protection.

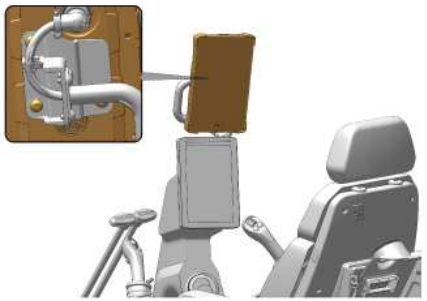

Illustration 1 g06181075

Note: Caterpillar strongly recommends removing the Cat Grade Control monitor (if equipped) before transporting the machine to protect the monitor from damage or theft.

6. Disconnect the wiring harness from the Cat Grade Control monitor. Remove the three screws that secure the monitor to the mounting bracket and remove the monitor. Remove the monitor from the cab and store in the monitor carrying case.

7. Cover the exhaust opening.

NOTICE
Do not allow the turbocharger to rotate while the engine is not operating. Damage to the turbocharger can result.

Note: Before you unload the excavator from the transport machine, remove the protective covering from the exhaust opening.

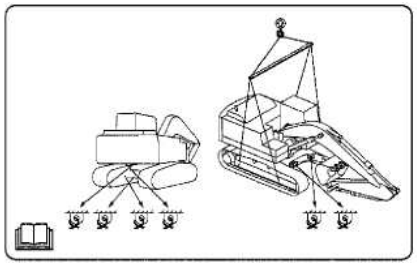

Illustration 2 g06289667

8. Chock the tracks and secure the machine with tie-downs. Make sure that you use the proper rated wire cable.

   Use the front towing eyes on the lower frame, the rear towing eyes on the lower frame, and the rear towing eye that is on the upper frame.

   Securely fasten all loose parts and all removed parts to the trailer or to the rail car.

   When the engine is stopped, the swing parking brake is automatically applied. The swing brake prevents the upper structure from rotating.

NOTICE
In freezing weather, protect the cooling system with antifreeze, to the lowest outside expected temperature on the travel route. Or, drain the cooling system completely.

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WARNING

Automatic Engine Speed Control (AEC) will increase engine speed automatically when you operate the control levers and/or travel pedals with AEC switch on.

When loading and unloading the machine from the truck or working in close quarters always turn AEC switch off to prevent any possibility of sudden movement of machine, which could result in serious injury or death.

Set the travel speed control switch to LOW before loading the machine. Never operate this switch when loading the machine on a trailer.

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

Remove ice, snow, or other slippery material from the loading dock and from the truck bed before you load the machine onto the transport machine. Removing ice, snow, or other slippery material will help to prevent the machine from slipping in transit.

Note: Obey all laws that govern the characteristics of a load (height, weight, width, and length). Observe all regulations that govern wide loads. Certain regions may require the removal of door hooks and cab bumpers, if equipped. Consult all local and regional regulations

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

1. Before you load the machine, chock the trailer wheels or the rail car wheels.
2. When you use loading ramps, make sure that the loading ramps have adequate length, adequate width, adequate strength, and an adequate slope.
3. Maintain the slope of the loading ramps within 15 degrees of the ground.
4. Position the machine so that the machine can drive straight up the loading ramps. The final drives should be toward the rear of the machine. Do not operate the control levers while the machine is on the loading ramps.
5. When you drive over the loading ramp joint areas, maintain the balance point of the machine.
6. Lower the work tool to the bed or to the floor of the transport machine.

   Note: Put appropriate shock-absorbing material between Cylinder/Cylinder guard and floor if there is potential risk to damage during transportation.
7. To prevent rolling of the machine or sudden movement of the machine, perform the following items:
   - Chock both tracks.
   - Install sufficient tie-downs at several locations.
   - Fasten wire cables.

8. If equipped, remove door hooks, cab bumpers, and fuel tank step as necessary. Refer to local regulations.

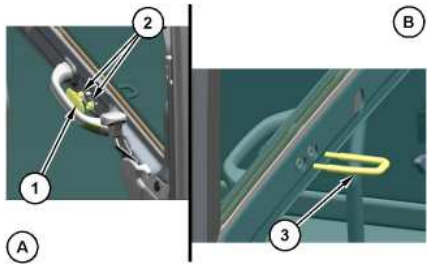

Illustration 1 g06516462
Typical example of door hook
(A) Inside
(B) Outside
(1) Cover
(2) Nuts
(3) Door Hook

a. Remove cover (1) and nuts (2) to remove door hook (3).

Illustration 2 g06516469
Typical example of cab bumper

b. Remove any bumpers on your cab.

NOTICE
Do not allow the chrome surface of the bucket cylinder rod to touch any part of the trailer. Damage to the rod can occur from impact with the trailer during transport.

Note: Refer to Operation and Maintenance Manual, "Specifications".

Shipping a Machine that is not Completely Assembled

If the machine must be shipped when the boom, stick, or counterweight is not assembled on the machine, follow the instructions in Operation and Maintenance Manual, "Operation". If the boom and stick are not installed, do not install the counterweight or use the swing function for safe shipping.

WARNING

The ROPS structural certification depends on the support of the boom, stick, and counterweight in the event of a machine tip over or a machine rollover incident.

When the machine needs to be moved without the boom, stick, or counterweight being installed, avoid any machine operations which could affect machine stability as a machine tip over or a machine rollover incident could result in serious injury or death.

The machine should be operated slowly on flat, stable ground or pavement by qualified operators.

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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.

In some regions, regulations require a shovel crane configuration to lift certain objects. Always obey the local regulations in your region.

Refer to this 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" for more information.

Activating the Shovel Crane

Illustration 1 g06741261
(1) Pitch indicator
(2) Roll indicator

1. Use pitch indicator (1) and roll indicator (2) on the monitor to position the machine on a level surface. Refer to Operation and Maintenance Manual , "Monitoring System" for more information.
2. Once the machine is in position on firm level ground, retract the bucket and lower the bucket to the ground.
3. Move the hydraulic lockout control to the LOCKED position. Refer to Operation and Maintenance Manual, Operator Controls for more information.
4. Stop the engine. Refer to Operation and Maintenance Manual, Stopping the Engine for more information.

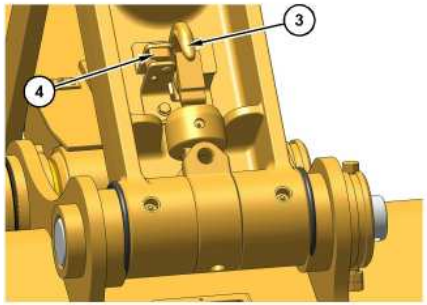

Illustration 2 g06741262
(3) Shovel crane hook
(4) Shovel crane latch

Release shovel crane latch (4). Lower shovel crane hook (3) into operating position.

Inspect the shovel crane hook for damage. Refer to Shovel Crane - Inspect .

Illustration 3 g06224672
Home Screen in Monitor

Press the function list button on the home screen.

Illustration 4 g06210063
Shovel Crane Option

Tap the "Crane" option or if using the jog dial highlight the crane option and press down on the jog dial. The "Crane" option should now say "ON"

Note: Tool Control should be turned OFF before the shovel crane can be activated. Select "Bucket" instead of any other tools. If any other work tool is selected, the shovel crane mode cannot be activated.

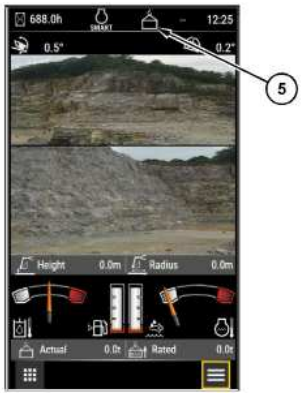

Illustration 5 g06741263
(5) Shovel crane indicator

Once the crane option is enabled, press the home button.

The monitor will display the following on the home page:

- Height
- Radius
- Actual Load
- Rated Load (not traveling)
- Rated Load (traveling)

Note: The rated load icon will turn yellow and a track will appear when the machine is traveling.

Shovel crane indicator (5) will display at the top of the monitor to indicate that the shovel crane feature is active.

Fully retract the bucket to activate the shovel crane mode. The bucket will lock into place and will not move, and the engine speed will then be reduced.

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 6 g06191883
Hook in Shovel Crane

Return to the function list screen. Tap the crane option or if using the jog dial highlight the crane option and press down on the jog dial. The crane option should now say "OFF".

Position the stick so that it 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.

Type 1

Travel With Lift Out of Work Area - If the radius is over 70% of maximum radius when traveling, the monitor will display this warning. If this warning occurs, stop traveling until the machine center of gravity becomes stable or reduce the suspended load

Crane 90% Load - If the suspended load is 90% of the rated load, the monitor will display this warning and an alarm will sound intermittently. If this warning occurs, stop operation until the machine center of gravity becomes stable or reduce the suspended load.

Crane 100% 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.

Crane Hook Interference - When the lifting height is too high, the monitor will display this warning. If this warning is present, stop lifting and lower the boom or retract the stick.

Boom Out of Work Area - 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.

Stick Out of Work Area - When the stick is retracted from the vertical position, the monitor will display this warning. If this warning occurs, return the stick to vertical.

Crane Malfunction - When an abnormality occurs with a shovel crane-related component, the monitor will display this warning. If this warning occurs, stop lifting and contact your Cat® dealer.

Crane Mode Off - When the crane system has been stopped or disabled, the monitor will display this indicator.

Type 2

Travel With Lift Out of Work Area - If the radius is over 70% of maximum radius when traveling, the monitor will display this warning. If this warning occurs, stop traveling until the machine center of gravity becomes stable or reduce the suspended load

Crane 80% Load - If the suspended load is 80% of the rated load, the monitor will display this warning and an alarm will sound intermittently. Lamp on front of travel pedal in cab will turn yellow. If this warning occurs, stop operation until the machine center of gravity becomes stable or reduce the suspended load.

Crane 90% Load - If the suspended load is 90% of the rated load, the monitor will display this warning and an alarm will sound intermittently. Lamp on front of travel pedal in cab will turn red. If this warning occurs, stop operation until the machine center of gravity becomes stable or reduce the suspended load.

Crane Hook Interference - When the lifting height is too high, the monitor will display this warning. If this warning is present, stop lifting and lower the boom or retract the stick.

Boom Out of Work Area - 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.

Stick Out of Work Area - When the stick is retracted from the vertical position, the monitor will display this warning. If this warning occurs, return the stick to vertical.

Crane Malfunction - When an abnormality occurs with a shovel crane-related component, the monitor will display this warning. If this warning occurs, stop lifting and contact your Cat® dealer.

Crane Mode Off - When the crane system has been stopped or disabled, the monitor will display this indicator.

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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, "Specifications (Shovel Crane Specifications)" 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.

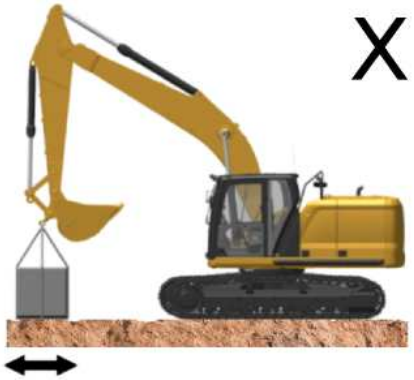

Illustration 2 g06222544

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.

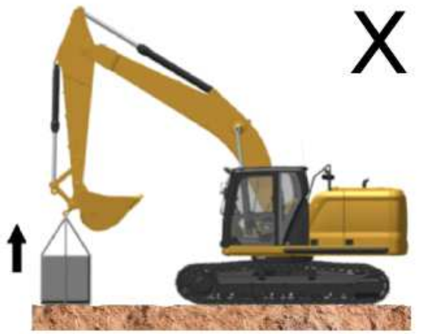

Illustration 5 g06222555

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

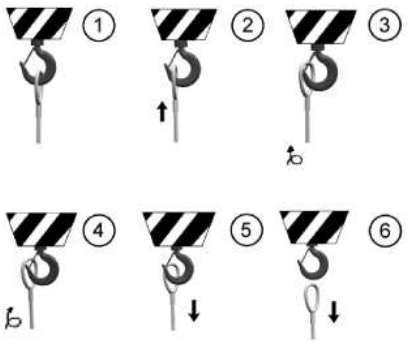

Illustration 7 g06222768

(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.

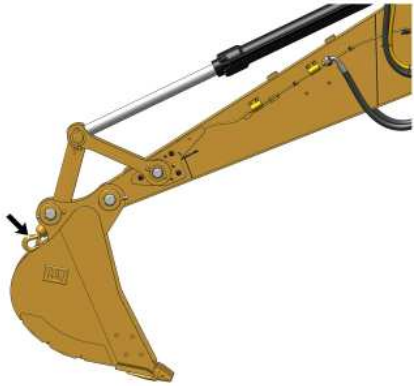

Illustration 10 g06191918

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.

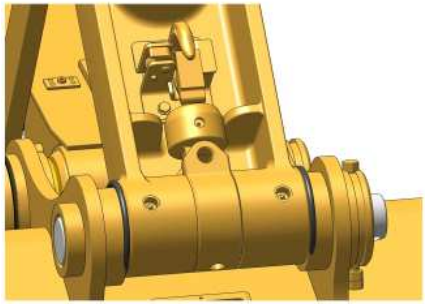

Illustration 12 g06191925
Hook in latched position

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

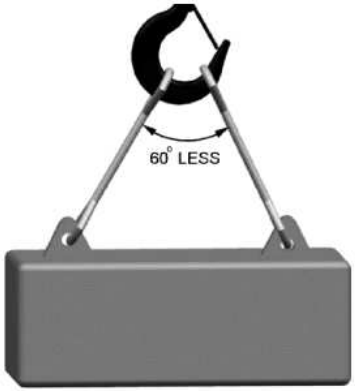

Illustration 13 g06222775

As a rule, try to set the wire rope suspension angle at 60° or below.

Keep out of the area under a suspended load.

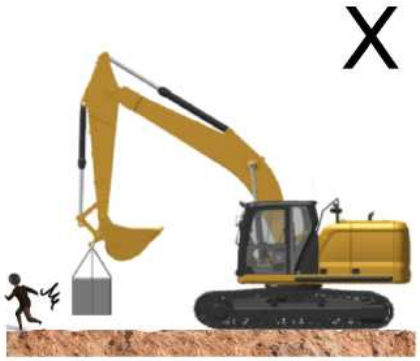

Illustration 14 g06222777

Never allow anyone to enter an area under a suspended load.

Lifting operation with a quick coupler device is prohibited.

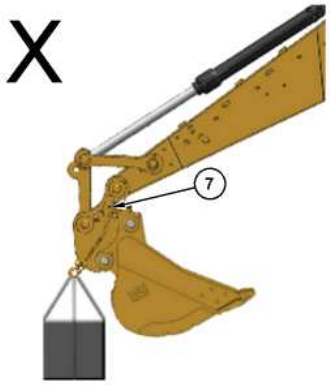

Illustration 15 g06222779
(7) Quick Coupler

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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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.

1. Park the machine on level ground. Refer to Operation and Maintenance Manual, "Stopping the Machine" for the recommended procedure.
2. 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.
3. Turn the engine start switch to the OFF position.
   Note: If the "Regen Active" indicator is illuminated, do not shut off the engine. Refer to Operation and Maintenance Manual, "Monitoring System" for more information on indicators.

Engine Shutdown Switch

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.

Turn the engine start switch to the OFF position. If the engine does not stop, perform the following procedure.

Note: Always use the engine start switch to stop the engine. Use the engine shutdown switch as an alternate method to stop the engine if the start switch fails.

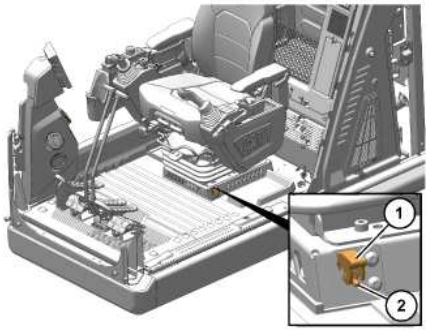

Illustration 1 g06181487

1. The engine shutdown switch is located below the left side of the operator seat.
2. Lift cover (1).
3. Push switch (2) upward. Pushing the switch upward should stop the engine and prevent the engine from being started again.
4. Return the switch to the original position. The engine will be enabled to start.
   Note: Do not operate the machine again until the malfunction has been corrected.
5. Use the method that follows if the previous steps do not stop the engine.

Stop the Engine if an Electrical Malfunction Occurs

Turn the engine start switch to the OFF position. If the engine does not stop, perform the following procedure.

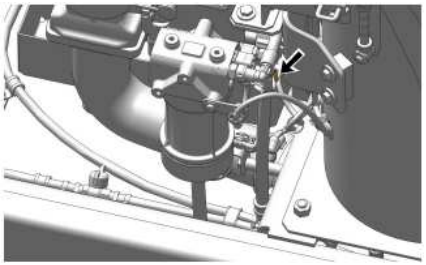

Illustration 2 g06497195
The fuel shutoff valve is located behind the right access door.

Shut off the fuel supply by pulling out the fuel shutoff valve, red tab, and rotating clockwise. The engine will stop after consuming the fuel in the fuel line. The engine may continue to run for a few minutes.

Repair the engine before you restart the engine. The fuel system may need to be primed. See Operation and Maintenance Manual, "Fuel System - Prime" for instructions.

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2019/09/04 **Stopping the Machine (M0113012-09)**

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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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2022/11/15 **Sun Screen (M0113012-09)**

SMCS - 7165

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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. Refer to Prepare the Machine for Maintenance for more information.
- Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position. Refer to Operator Controls for more information.
- Stop the engine. Refer to Stopping the Engine for more information.

Note: Do not use the sun screen when opening the front window.

Illustration 1 g07538612
(1) Sun screen
(2) Bracket

Pull sun screen (1) down from the ceiling. Hook sun screen (1) to brackets (2) at both sides of the front window. Sun screen (1) may be positioned at two different heights.

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2022/07/14 Towing the Machine (M0113012-09)

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 Final Drive Sun 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

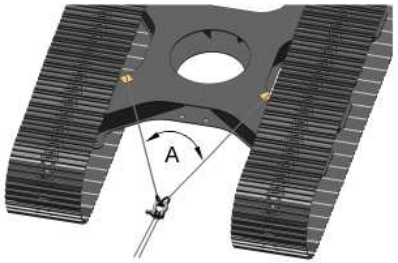

Illustration 1 g06289671
(A) Angle

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. Angle (A) between each wire rope should be 60 degree maximum. Operate the machine at a low speed.

Lightweight Towing

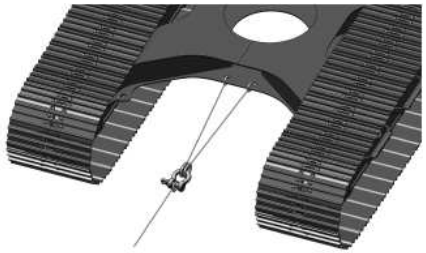

Illustration 2 g06186106

Refer to Operation and Maintenance, "Specifications" for the maximum load for lightweight towing.

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. Operate the machine at a low speed.

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2017/06/23 **Travel Control - Straight Travel Pedal (If Equipped) (M0113012-09)**

SMCS - 5462

i06946782

WARNING

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

Illustration 1 g06178249
Position for normal travel
(A) Rear of machine
(B) Final drive
(C) Idler

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

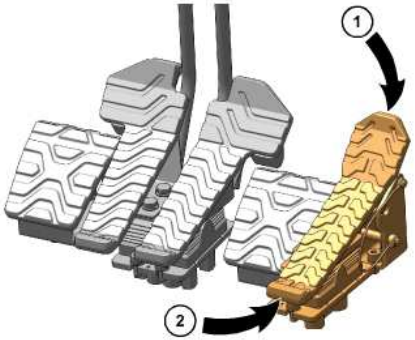

Illustration 2 g06178758

(1) Forward Travel
(2) Reverse Travel

The third pedal is to the right of the right travel pedal. The third pedal controls the forward and backward movement of the machine.

Note: If the third pedal is depressed and a travel pedal or a travel lever is operated, the machine will turn accordingly.

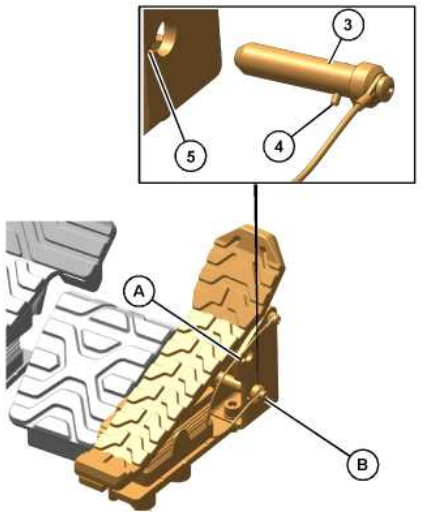

Illustration 3 g06178798
(3) Lock pin
(4) Pin
(5) Notch
(A) LOCKED position
(B) UNLOCKED position

When the machine is not operated with the third pedal, install lock pin (3) at the LOCKED position to prevent accidental operation.

Note: To prevent lock pin (3) from being pulled out, insert pin (4) through notch (5) and turn lock pin (3) counterclockwise by 1/4 turn.

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2017/07/24 **Travel in Water and Mud (M0113012-09)**

SMCS - 7000

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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

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. Refer to Prepare the Machine for Maintenance for more information.
- Lower the work tool to the ground.
- Move the hydraulic lockout control to the LOCKED position. Refer to Operator Controls for more information.
- Stop the engine. Refer to Stopping the Engine for more information.

Perform Step 1 through Step 3 to open the upper window.

Note: If equipped, the Cat® grade control monitor may interfere with the window when opening. Ensure that the monitor is adjusted out of the way before opening the window.

Note: Do not open the front window when using the sun screen to prevent the failure of the sun screen.

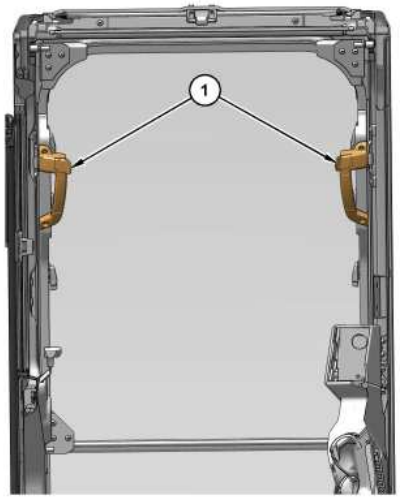

Illustration 1 g07538585
(1) Release lever

1. Release the auto-lock latches by pressing release levers (1) on the window handles.
2. Holding both handles on the window frame, pull the window upward.
3. Hold both grips that are provided on the window frame and move the window into the storage position until the auto-lock latches near the ceiling are engaged.

   Perform Steps 4 through 5 to close the upper window.

   Note: If equipped, the Cat® grade control monitor may interfere with the window when closing. Ensure that the monitor is adjusted out of the way before closing the window.
4. Release the auto-lock latches by pressing release levers (1) on the window handles.
5. Reverse Steps 1 through 3 to close the upper window.

   Perform Steps 6 through 8 to open the lower window and close the lower window.
6. Raise the lower window out of the window frame.

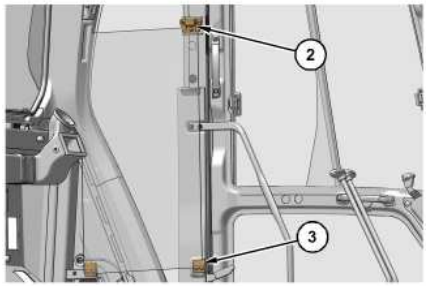

Illustration 2 g07538588
(2) Catch
(3) Brackets

7. Store the lower window in the holder that is located in the rear of the left side cab frame. To store the lower window, locate one end of the lower window into brackets (3). Secure the opposite end of the lower window with catch (2).
8. To close the lower window, reverse the procedure that is used for opening the lower window.

   Note: The lower window is curved. The lower window can only be positioned one way in the holders.

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WARNING

The joystick and controls on the joystick can be configured with different functions. Always make sure to check the joystick configuration on the monitor before using the machine to avoid unexpected machine movement. These unexpected machine movements could cause a hazard resulting in serious injury or death.

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

Note: For information that pertains to hydraulic hammers, refer to Operation and Maintenance Manual, "Work Tool Control (One-Way)".

Joystick

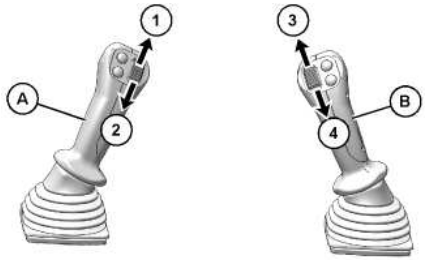

Illustration 1 g06180488
(A) Left joystick
(B) Right joystick

(1) ROTATE CLOCKWISE

- Move the thumb wheel upward to rotate the work tool clockwise.

(2) ROTATE COUNTERCLOCKWISE

- Move the thumb wheel downward to rotate the work tool counterclockwise.

(3) CLOSE

- Move the thumb wheel upward to close the work tool.

(4) OPEN

- Move the thumb wheel downward to open the work tool.

Work Tool Pedal

WARNING

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

The work tool pedal can be installed on either side of the travel pedals. The work tool pedal allows the operator to vary the speed of the work tool.

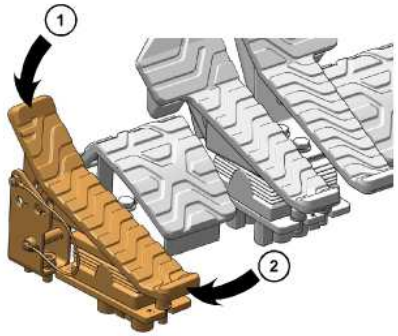

Illustration 2 g06180510

(1) CLOSE

- Push down on the front of the pedal to close the work tool.

(2) OPEN

- Push down on the rear of the pedal to open the work tool.

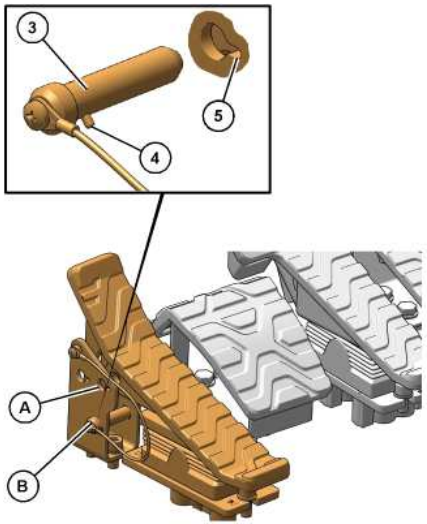

Illustration 3 g06180514
(3) Lock pin
(4) Pin
(5) Notch
(A) LOCKED position
(B) UNLOCKED position

When you are not using the work tool, put the lock pin (3) in LOCKED position (A). This will lock the work tool pedal to prevent any unexpected operation of the work tool.

Note: To prevent lock pin (3) from being accidentally pulled out, insert pin (4) through notch (5) and turn lock pin (3) by 1/4 turn.

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

Note: For information that pertains to work tools that require hydraulic oil flow in two directions, refer to Operation and Maintenance Manual, "Work Tool Control (Two-Way Flow)".

Joystick

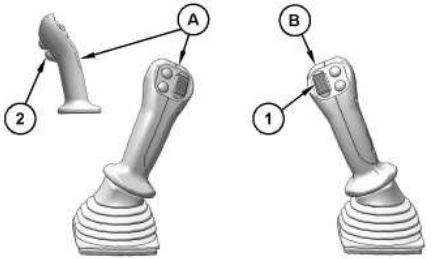

Illustration 1 g06588792

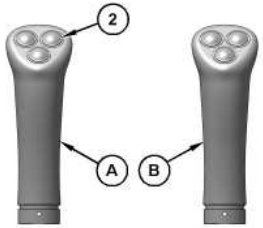

Illustration 2 g06588793

(A) Left joystick
(B) Right joystick

(1) Variable Speed

- Move the thumb wheel downward to activate the work tool. Move the thumb wheel further to increase the speed of the work tool.

(2-1) On/Off (Momentary)

- While pressing this switch, the work tool will remain activate at a constant rate. Release the switch to turn off the work tool.

(2-2) On/Off (Toggled)

- Press the switch once to activate the work tool. Press the switch again to turn off the work tool.

Work Tool Pedal

WARNING

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

The work tool pedal can be installed on either side of the travel pedals. The work tool pedal allows the operator to modulate the speed of the work tool.

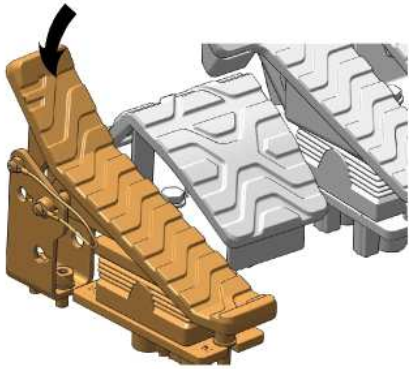

Illustration 3 g06180447

Variable Speed

- Push down on the front of the pedal to activate the work tool. Move the pedal further to increase the speed of the work tool. Release the pedal to turn off the work tool.

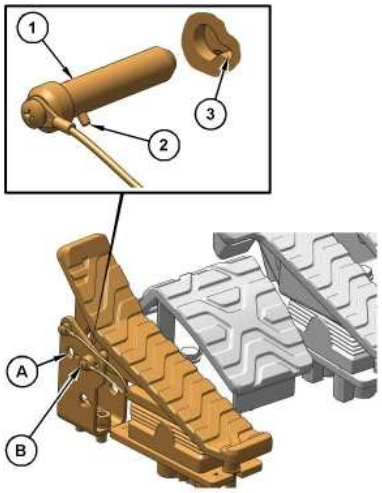

Illustration 4 g06591307
(1) Lock pin
(2) Pin
(3) Notch
(A) UNLOCKED position
(B) LOCKED position

When you are not using the work tool, put the lock pin (1) in LOCKED position (B). This will lock the work tool pedal to prevent any unexpected operation of the work tool.

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

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Hammer Operation (If Equipped)

Illustration 1 g06222793

NOTICE
Use only a hydraulic hammer that is recommended by Caterpillar.

Do not use Hammer on UHD (Ultra High Demolition) front. Hammer can be used only when retrofit boom is attached on UHD machines.

The use of a hydraulic hammer that is not recommended by Caterpillar could result in structural damage to the host machine.

Consult your Cat dealer for information on recommended hydraulic hammers.

Only use the hydraulic hammer to break rocks, concrete, and other hard objects. Before you start hydraulic hammer operation, place the machine on a level, stable surface.

Before you start hydraulic hammer operation, close the front window. Caterpillar recommends the installation of a window guard on the front window for protection from flying debris.

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

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

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

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

Stop the hydraulic hammer immediately if the jumper lines are pulsating violently. This indicates that the accumulator nitrogen charge is lost. Consult your Cat dealer for the necessary repair.

NOTICE

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

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

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

Do not use the hydraulic hammer to lift an object.

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

Operate the attachment control levers carefully to keep the hydraulic hammer tool from hitting the boom.

Do not operate the hydraulic hammer under water unless the hydraulic hammer is properly equipped. Operating the hydraulic hammer under water could damage the machine hydraulic system. Consult your Cat dealer for information on underwater operation.

Do not operate the hydraulic hammer with the upper structure sideways to the undercarriage. Before you start hydraulic hammer operation, place the upper structure in the recommended positions that are shown in illustration 2. Any other operating positions could make the machine unstable. Any other operating positions could place excessive loads on the undercarriage.

Refer to the following for any additional questions about the operation and care of your Cat hydraulic hammer:

- Operation and Maintenance Manual, SEBU7346 , "Hydraulic Hammers"
- The Operation and Maintenance Manual specific to your machine

An operation and maintenance decal, SMEU7397, is available for all hydraulic hammers. The decal provides procedures for operation and maintenance of the hydraulic hammers. The decal can be placed on the machine or the hammer. The decal can be obtained through the normal literature ordering channels.

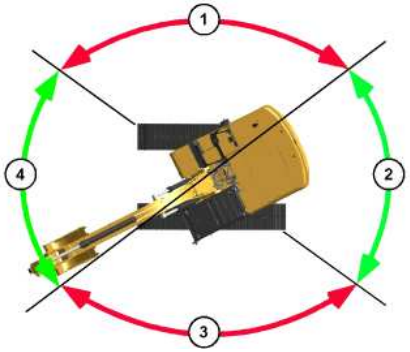

Illustration 2 g06192837
(1) Incorrect working position
(2) Correct working position
(3) Incorrect working position
(4) Correct working position

Shear Operation (If Equipped)

Illustration 3 g06222798

WARNING

Do not operate or work on this work tool unless you have read and understand the instructions and warnings in the Operation

And Maintenance Manual for both the work tool and the host machine.

Failure to follow the instructions or heed the warnings could result in injury or death.

Contact your Caterpillar dealer for replacement manuals. Proper care is your responsibility.

NOTICE

Selection of a hydraulic shear must be done with extra care.

Use of a hydraulic shear not recommended by Caterpillar could result in structural damage to the host machine.

Consult your Cat dealer for hydraulic shear information.

WARNING

Serious injury or death could occur from the demolition of pipes, vessels, tanks or other containers that may contain gas, flammable materials or hazardous chemicals.

Do not perform any demolition work on these items until all of their contents have been removed.

Follow all regulations for the removal and disposal of these materials.

NOTICE

Using the demolition tool to level the work site or push over standing structures may damage the machine or the demolition tool. Use appropriate equipment to do site preparation or maintenance operations.

NOTICE

To avoid structural damage to the machine, do not break road surfaces by placing the cutting edge of the hydraulic shear on the ground and moving the machine.

Be sure that no one is near the work tool to prevent injury. Keep the work tool under control at all times to prevent injury. When a demolition tool is used, all personnel must maintain a minimum distance of 10 m (33 ft).

Close all windows. Make sure that all required guards are in place. Wear all required protective equipment. Follow the instructions in the Operation and Maintenance Manual for the work tool.

Crusher Operation (If Equipped)

WARNING

Improper operation and maintenance of the crusher could cause personal injury or death. Observe the following procedures for safe operation of the crusher.

Consult your Cat dealer for more information on the operation and maintenance of the crusher.

Do not operate the host machine with the work tool unless you have read and understood the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions or heed the warnings could result in machine or work tool damage, and/or serious injury or death. Contact your Cat dealer for a replacement manual, if needed.

When the crusher is installed on the host machine, always make sure that the protective guarding is in place.

Using the crusher in an incorrect manner can damage the machine and/or cause personal injury or death.

Always ensure that the work area is clear of ground personnel, due to the potential crush hazards with falling debris and machine movement.

Resting or placing your foot on the work tool pedal could result in unexpected movement of the machine / work tool which could result in personal injury or death. Always lock the crusher when not in use.

NOTICE

Selection of a hydraulic crusher must be done with extra care.

Use of a hydraulic crusher not recommended by Caterpillar could result in structural damage to the host machine.

Consult your Cat dealer for hydraulic crusher information.

Close all windows. Make sure that all required guards are in place. Wear all required protective equipment. Follow the instructions in the Operation and Maintenance Manual for the work tool.

Illustration 4 g06222800

Demolition work on the roof of a building could lead to serious personal injury if the building were to collapse and the excavator turned over or fell off the roof. The demolition work must be started ONLY AFTER surveying the building for its structural integrity.

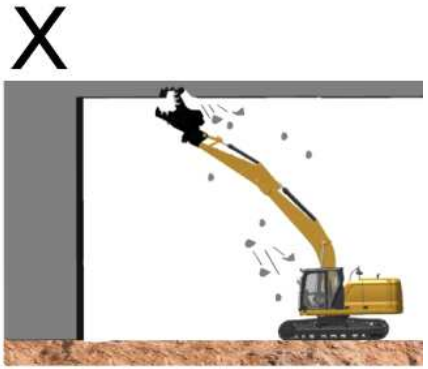

Illustration 5 g06222803

Crushing work above your head must be avoided because objects can fall and damage the machine.

Illustration 6 g06222806

Do not perform demolition work at the base of the machine, because the ground could be unstable and cause the machine to fall.

Illustration 7 g06222809

Do not suddenly lower or stop the work tool, otherwise the excavator could turn over.

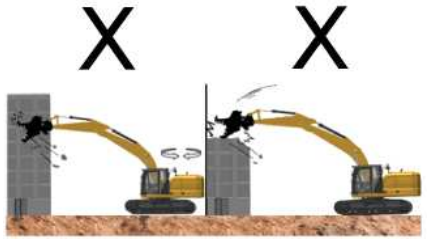

Illustration 8 g06222813

Crushing work using impact, swing, or dropping forces of the excavator could cause damages to the machine and also could lead to personal injury. As such, NEVER perform such an operation.

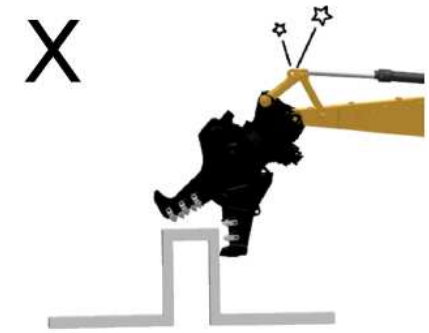

Illustration 9 g06222817

Crushing work with hydraulic cylinder at stroke end position could damage the excavator, resulting in shortening of lifespan. Also, as it could lead to unexpected personal injury due to breakage of the machine, do not perform any work at stroke end.

Illustration 10 g06222821

When performing work at elevated positions, always use care for the surroundings as well as for falling objects to avoid personal injury. Use guide personnel and signs as required.

Illustration 11 g06222829

When working sideways, the track can lift. Avoid abrupt operation and operate slowly.

Illustration 12 g06222831

Crushers could interfere with the boom and the cab depending on the type and method of usage. Know the working range of the crusher being used.

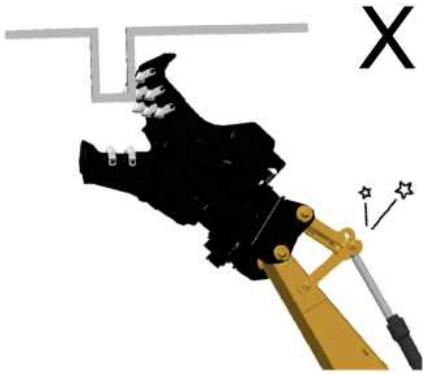

Illustration 13 g06222833

If the tooth of the crusher engages an object at a slant, excessive forces could be applied to the front regions. As such move the crusher to the front.

Illustration 14 g06222836

Never extend the boom cylinder suddenly. Sudden extension of the boom could cause tip backwards.

Illustration 15 g06222831

Sudden extension of the bucket cylinder, or sudden extension of the stick cylinder could cause damages at the stroke end position, resulting in personal injury. Operations that cause sudden extension of the cylinders is PROHIBITED!

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