

Operation Section

Before Operation

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Mounting and Dismounting

SMCS Code: 7000

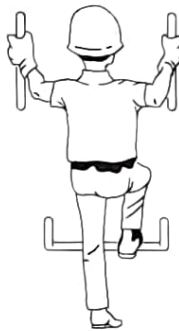


Illustration 54

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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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Daily Inspection

SMCS Code: 1000; 7000

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

Inspect the area around the machine and under the machine. Inspect the machine components and lines for defects. Look for loose bolts, trash buildup, oil, coolant, fuel, or exhaust leakage, broken parts, or worn parts.

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.

Inspect the condition of the equipment and of the hydraulic components.

Check the condition of the tires. Adjust the inflation pressure, if necessary.

Check all of the oil levels, all of the coolant levels, and all of the fuel levels.

Remove any trash buildup and debris. Make all necessary repairs before you operate the machine.

Ensure that all covers and guards are securely attached.

Ensure that the rear view camera is working properly.

Adjust the mirrors for the correct rear view of the machine.

Grease the work tool on a daily basis.

Daily, perform the procedures that are applicable to your machine. Refer to the Operation and Maintenance Manual, "Maintenance Interval Schedule" "Every 10 Service Hours or Daily" category for the list of procedures.

Machine Operation

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Alternate Exit

SMCS Code: 7310

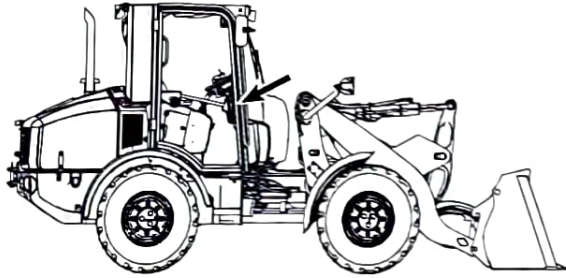


Illustration 58

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The right cab door can be used as an alternative exit. The door can be opened from the inside of the cab or from the outside of the cab.

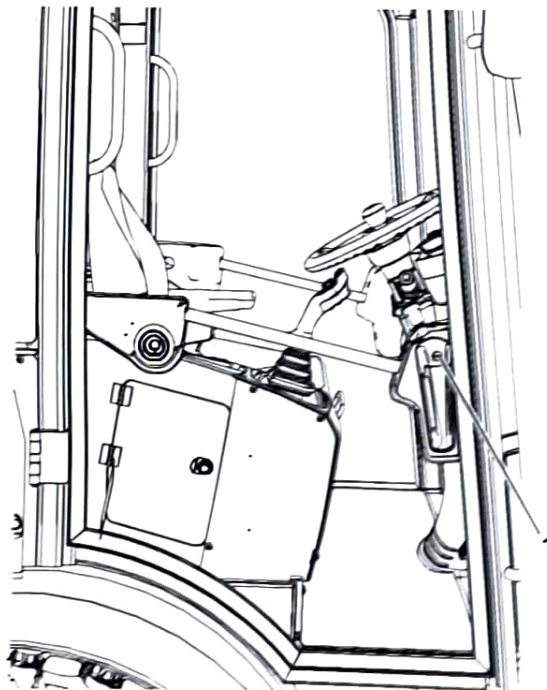


Illustration 59

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View of right-hand door

(1) Outside cab door release

Note: To open door from the outside pull on door handle.

In order to open the cab door from the inside of the cab, squeeze the lever on the grab handle on the door.

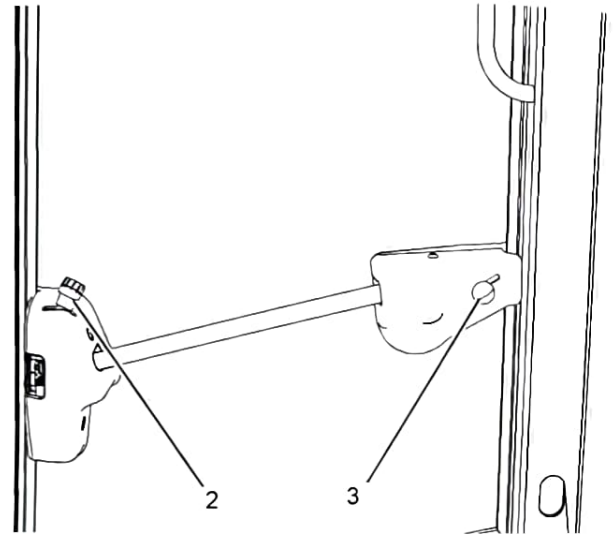


Illustration 60

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View of right-hand door in the open position

(2) Door handle
(4) Release lever

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

To open door, from the inside with door closed:

- Push the lever on the door handle (2) .
- Push door all the way open until door grabs door catch.

Note: If you are inside and the cab door is open, pull on the door release(3) on the end of the grab handle in order to close the door.

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Cab Door

SMCS Code: 7308

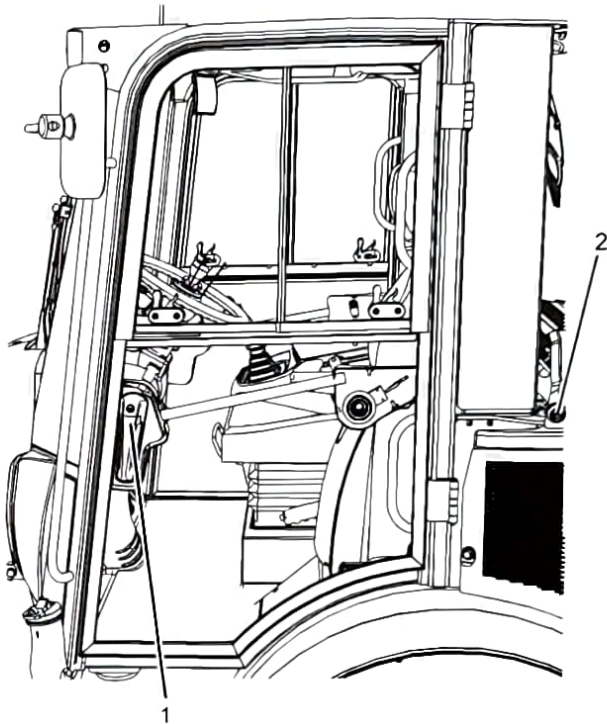


Illustration 61

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- (1) Door Handle
(2) Catch

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

In order to open the cab door from the inside of the cab, push the lever (4) forward.

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

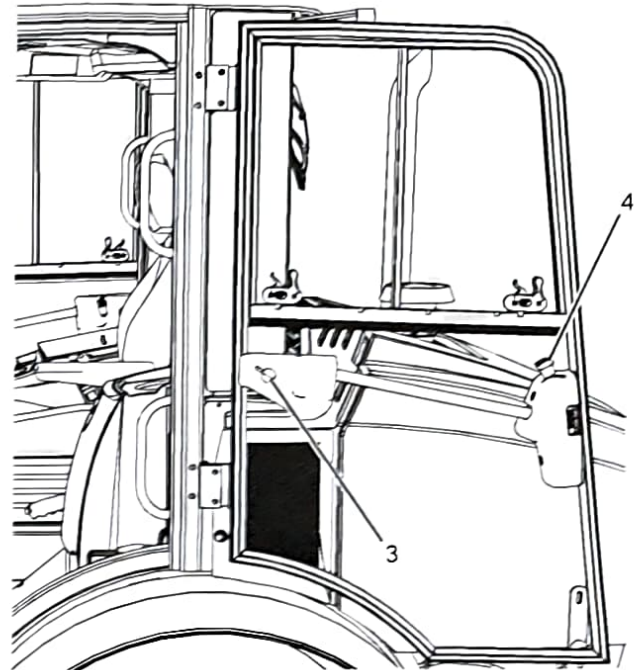


Illustration 62

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- (3) Release Button
(4) Release Lever

In order to release the cab door from the catch, do one of the following:

- In order to release the cab door from the catch, pull the lever (3) forwards.

If you are inside and the cab door is open, pull on the Release lever (3) on the end of the grab handle in order to close the door.

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Seat

SMCS Code: 7312

Adjust the seat in order to allow full travel of the pedals. Make the seat adjustments when the operator is sitting against the back of the seat.

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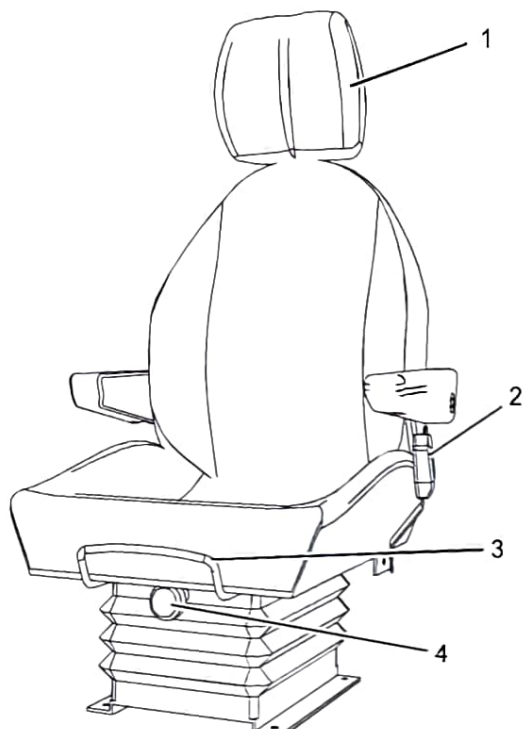


Illustration 63

g03802585

Mechanical Suspension

Rotate knob (3) in order to adjust the angle of the armrest in the operating position.



Fore and Aft Position (3) – Pull the lever upward. Hold the lever upward and slide the seat forward or backward to the desired position. Release the lever in order to lock the seat into position.



Seat Backrest Angle Adjustment (2) – Pull the lever upward. Hold the lever upward and adjust the backrest to the desired angle. Release the lever in order to lock the backrest into position.



Seat Height/Weight (4) – Unfold Lever from Knob and crank clockwise to increase the height and counter clockwise to decrease the height. The suspension must be adjusted so that green is showing on the indicator while sitting in the seat.

Air Suspension (If Equipped)



Headrest (1) – Pull up on the headrest in order to remove extension.



Lumbar Support (if equipped) – Repeatedly squeeze the bulb located on the side of the seat to increase support. Push the button next to the bulb to decrease the support.



Seat Height (Air suspension) – Push in on the air valve knob (7) in order to raise the height of the seat. Pull out on the air valve knob (7) in order to lower the height of the seat.

Heated Seat (If Equipped)

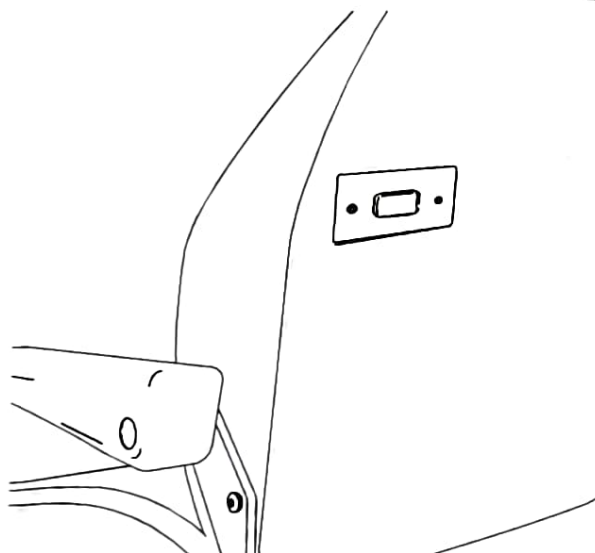


Illustration 64

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A switch for the power is located on the back of the seat on the left side.

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Seat Belt

SMCS Code: 7327

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

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

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 65

g02150795

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

Fasten seat belt catch into buckle. 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

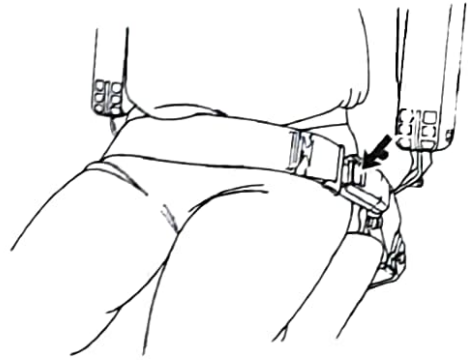


Illustration 66

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

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Mirror (If Equipped)

SMCS Code: 7319

⚠ WARNING

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

⚠ WARNING

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

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

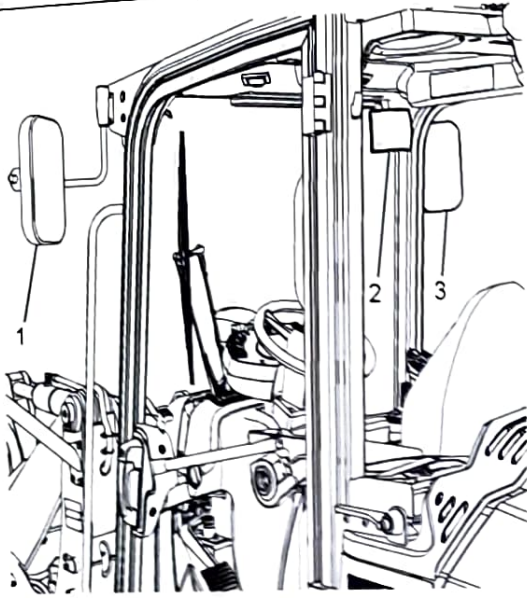


Illustration 67

g03732691

- (1) Left side mirror
- (2) Interior mirror
- (3) Right side mirror

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

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

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

Mirror Adjustment

- Park the machine on a level surface.
- Lower the work tool to the ground.
- Stop the engine.

Note: Hand tools may be needed in order to adjust the mirrors. Refer to Specifications, SENR3130, "Torque Specifications" for the recommended torque.

Right Side Rear View Mirror

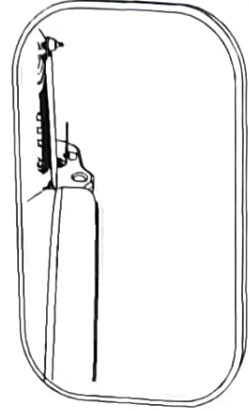


Illustration 68

g03862790

Adjust the right side rear view mirror so the side of the machine can be seen and so the rear tire can be seen. Also adjust the right side rear view mirror in order to see the following:

- 2 m (6.6 ft) of the side of the machine in front of the tire and a point on the ground 1 m (3.3 ft) from the right side of the rear tire
- See an object on the ground at a distance of 30 m (98 ft) from the rear corner of the machine.

Left Side Rear View Mirror

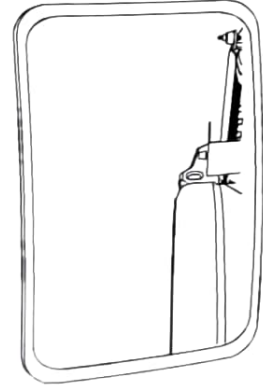


Illustration 69

g03862821

Adjust the left side rear view mirror so the side of the machine can be seen and so the rear tire can be seen. Also adjust the left side rear view mirror in order to see the following:

- 2 m (6.6 ft) of the side of the machine in front of the tire and a point on the ground 1 m (3.3 ft) from the right side of the rear tire
- See an object on the ground at a distance of 30 m (98 ft) from the rear corner of the machine.

Interior Mirror

The interior mirrors can be adjusted to a position in order to allow the operator to see preferred areas at the rear of the machine during operations such as loading and unloading.

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Operator Controls

SMCS Code: 7300; 7451

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

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes descriptions of gauges, switches, machine controls, attachment controls, transportation, and towing information.

Illustrations guide the operator through correct procedures of checking, starting, operating, and stopping the machine. Operating techniques that are outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and the capabilities of the machine.

The following information briefly identifies the components of the cab. More information on the operation of each item is covered separately in this manual.

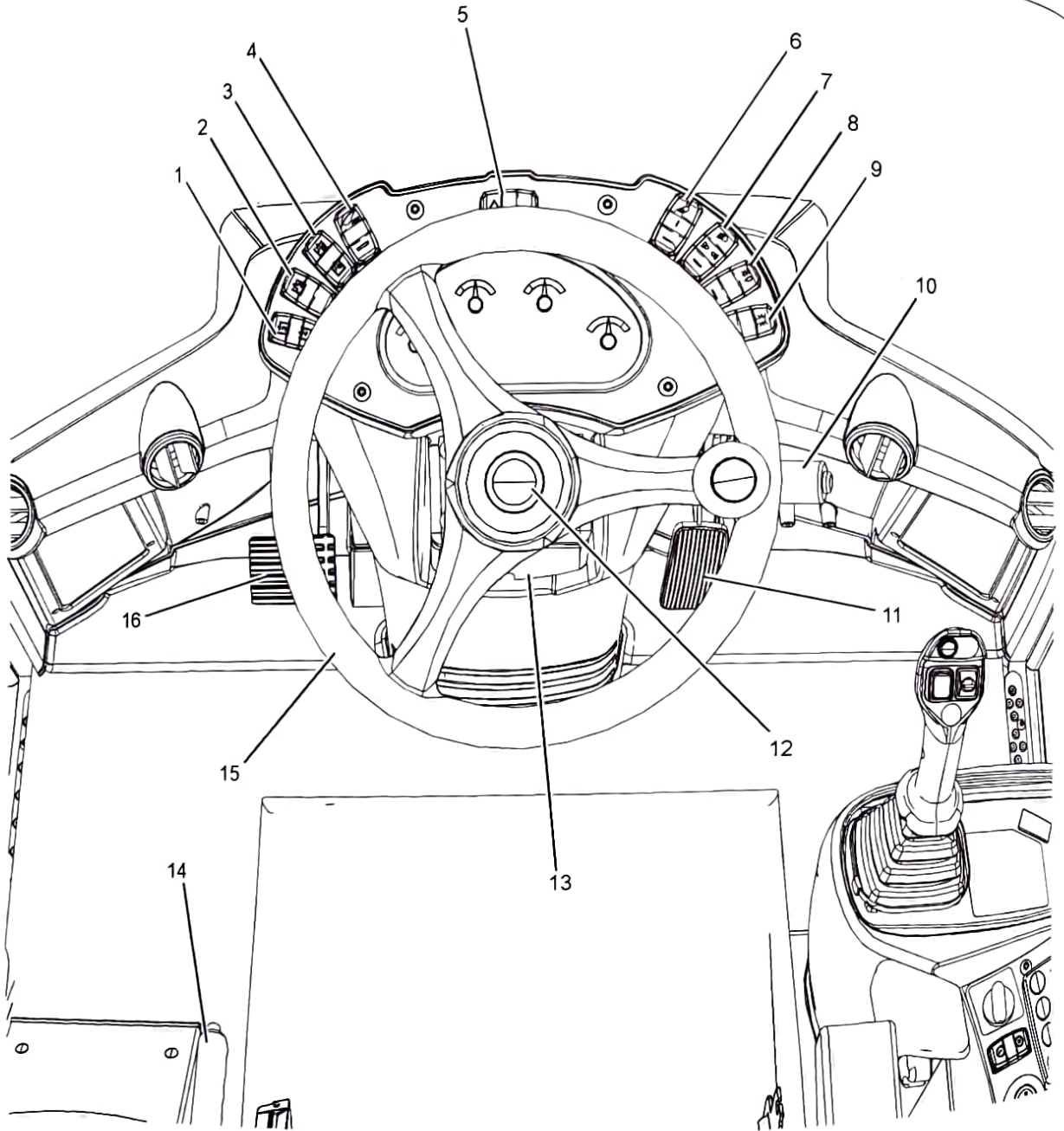


Illustration 70

- (1) Auxiliary Hydraulics 3/4 Switch (If Equipped)
- (2) Auxiliary 7 Switch (if equipped)
- (3) Auxiliary 5/6 Switch (if equipped)
- (4) ECO mode
- (5) Hazard Flashers

- (6) Front Work Lights
- (7) Roading Lights
- (8) Rear Fog Lights
- (9) Rotating Beacon
- (10) Multifunction Lever
- (11) Accelerator Pedal

- (12) Horn
- (13) Steering Column Tilt Control
- (14) Parking Brake Control
- (15) Steering Control
- (16) Decel/ Brake Pedal

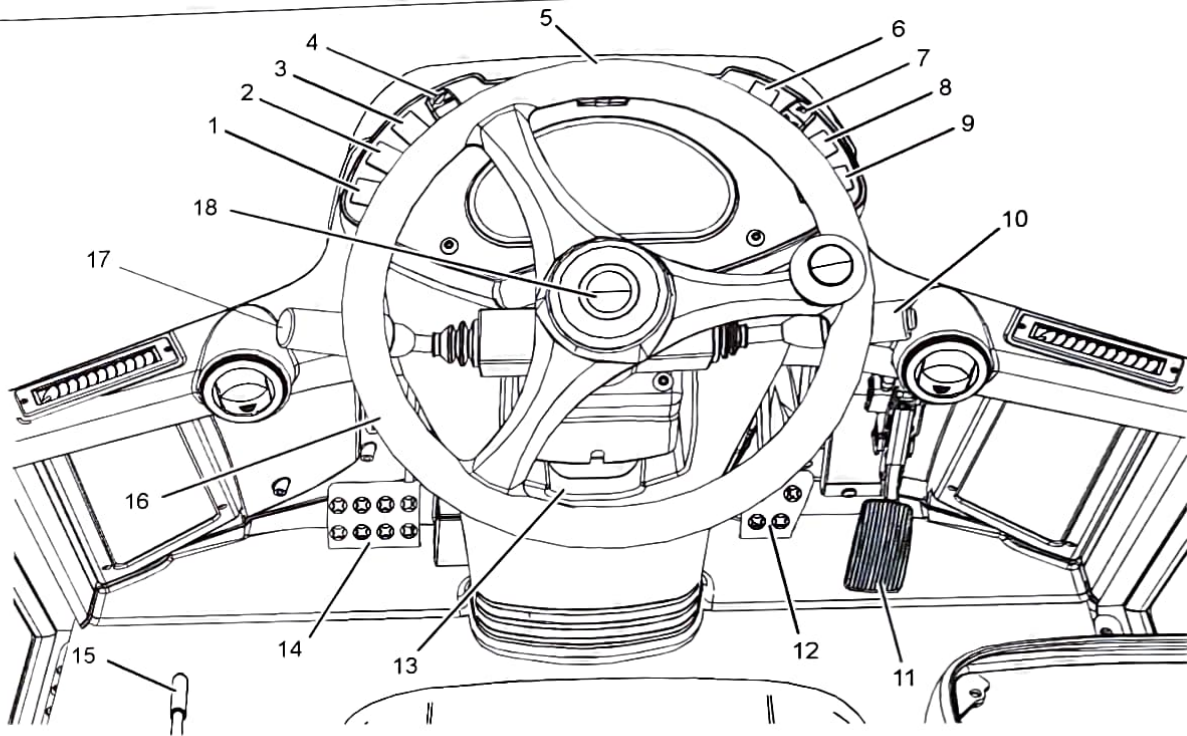


Illustration 71

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Japanese Pedal Set Up

- (1) Auxiliary Hydraulics 3/4 Switch (If Equipped)
- (2) Auxiliary 7 Switch (if equipped)
- (3) Auxiliary 5/6 Switch (if equipped)
- (4) ECO mode
- (5) Hazard Flashers
- (6) Front Work Lights

- (7) Roading Lights
- (8) Rear Fog Lights
- (9) Rotating Beacon
- (10) Multifunction Lever
- (11) Accelerator Pedal
- (12) Service Brake
- (13) Steering Column Tilt Control

- (14) Decel / Brake Control
- (15) Parking Brake Control
- (16) Steering Control
- (17) FNR Shift lever
- (18) Horn

Secondary Auxiliary Hydraulics 3/4 Switch (1) (if equipped)

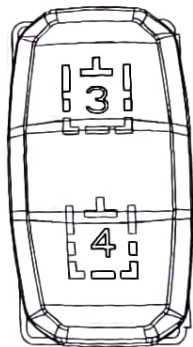


Illustration 72

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This control provides hydraulic oil flow to the auxiliary connections on the loader arm. Press the right side of the switch for normal flow to the connector. Press the left side of the switch in order to reverse the flow. The center position is "OFF".

Auxiliary 7 Switch(2) (if equipped)

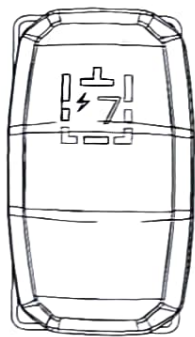


Illustration 73

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This switch supplies power to pin B on the electrical connector for the work tool. Press the left side of the switch in order to provide 12 V power. Press the right side of the switch in order to turn off the power.

Auxiliary 5/6 Switch (3) (if equipped)

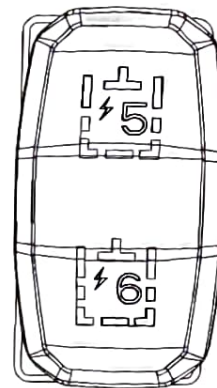


Illustration 74

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This switch supplies power to two pins in the electrical connector for the work tool. Press the left side of the switch in order to supply pin D. Press the right side in order to supply pin C. The center position is off.

ECO Mode(4)



ECO Mode – When Economy Mode is active, the indicator light on the switch will be ON and the maximum engine speed will be limited. Economy Mode may reduce the runout speed of the machine and hydraulic implement speed. The machine will still achieve maximum rimpull in Economy Mode.

Hazard Flashers (5)



Hazard Flashers – Pressing the left side of the switch will turn signal lights to on.

Front Work Lights(6)



Front Work Lights – Press the top side of the switch to the middle position in order to turn on the front work lights. Press the switch all the way to the top in order to turn on the front work lights and the rear work lights.

Rooding Lights (7)



Rooding Lights – Press the right side of the switch to the middle position in order to activate the position lights and the instrument panel lights. Press the switch all the way to the right in order to turn on the rooding lights.

Rear Fog Lights (8)



Rear Fog Lights – Press the right side of the switch in order to turn on the rear fog lights. Press the left side of the switch in order to turn off the rear fog lights. The position lights or the roading lights must be ON before the rear fog lights will operate.

Rotating Beacon (9)



Rotating Beacon – Press the right side of the switch in order to turn on the rotating beacon.

Multifunction Lever(10)

The multifunction lever controls the front window wiper and the window washer, the high beam, and low beam road lights and the directional turn signals.

Window wiper

Rotate the handle in order to turn on the front window wiper. Position 1 is off and position 2 is intermittent mode. Turn the switch to position 3 for wiping at low speed. Turn the switch to position 4 for wiping at high speed.

Window washer

Press in the end of the control in order to activate the front window washer. Wipers will complete 2-3 additional strokes to remove the remaining wiper fluid after the window washer has been released.

Turn signal

Move the lever forward in order to activate the left turn signal. Move the lever rearward in order to activate the right turn signal.

Low beam lights and high beam lights

Pull the lever upward in order to flash the high beam lights momentarily. Push the lever downward away from the operator in order to turn on the high beam lights.

Accelerator Control (11)



Accelerator Control – Push down on the pedal in order to increase the engine speed. Decrease pressure on the pedal in order to decrease the engine speed.

Horn (12)



Horn – Depress the horn button in order to sound the horn.

Steering Column Tilt Control (13) If Equipped



Steering Column Tilt Control – Pull up on the lever in order to move the steering column to the desired position. Push the lever downward in order to lock the column in the desired position.

Parking Brake Control (14)



Parking Brake Control – Pull up on the parking brake lever in order to engage the parking brake. The hydrostatic drive will shift to NEUTRAL. Push the button on top of the parking brake lever. Lower the lever in order to release the brake.

Park Brake Drive Through

Note: If the parking brake lever switch is faulted or stuck in the Engaged position, the transmission will be locked to NEUTRAL. It is possible to override this interlock by quickly commanding the transmission direction from NEUTRAL to either FORWARD, NEUTRAL, FORWARD, or REVERSE, NEUTRAL, REVERSE. The command must be performed in under 1.5 seconds.

Steering Control (15)



Steering Control – The steering wheel controls the directional steering of the machine. The machine will turn in the same direction as the steering wheel.

Service Brake (16)



Service Brake – Use the service brake to slow down the machine ground speed for normal braking.

Note: The first 25 mm to 51 mm (1 to 2 inch) of the service brake travel provides the inching function. The inching function provides low ground speed. The inching function provides more power for the hydraulic system.

Note: Some machines may have an optional right-hand brake pedal.

Right Hand Console

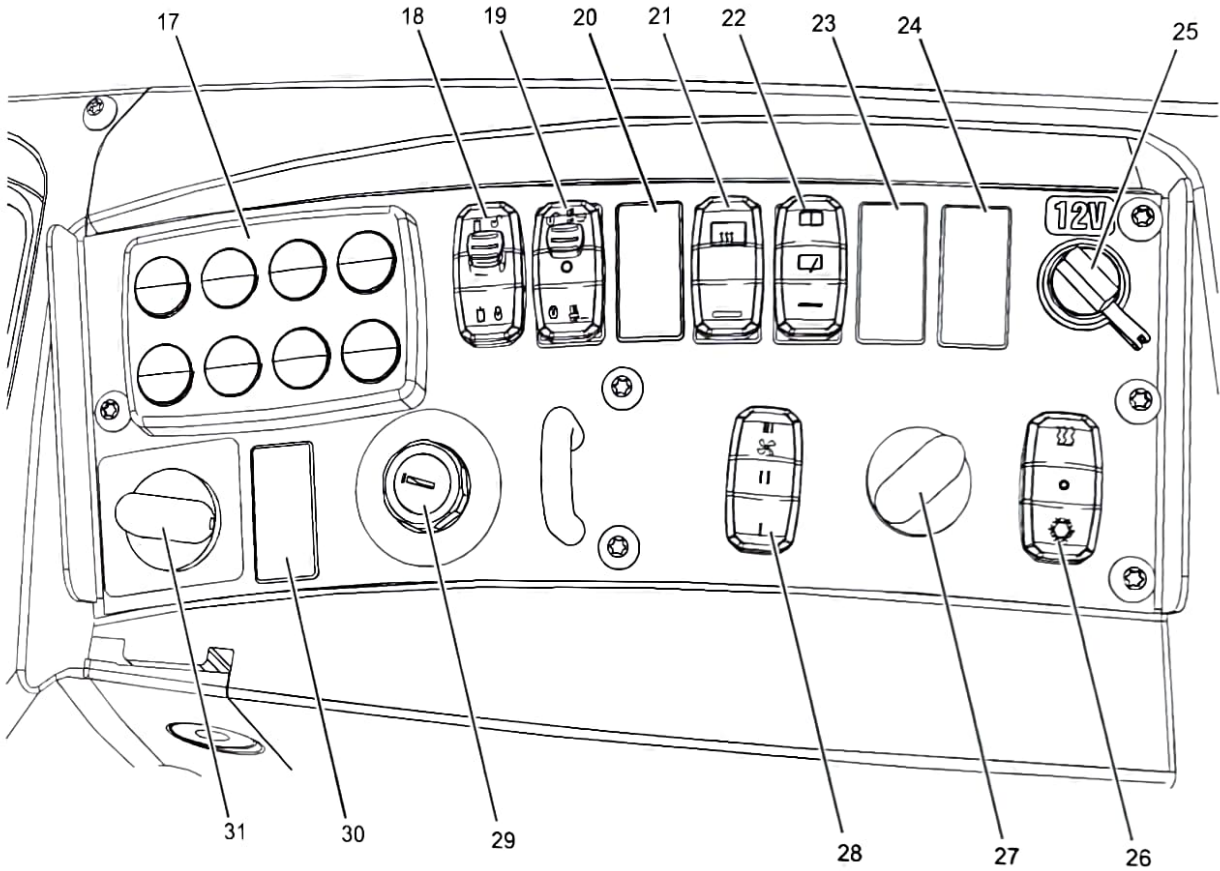


Illustration 75

- (17) Optional Keypad
- (18) Implement Lock out
- (19) Quick Coupler
- (20) (Blank)
- (21) Rear Defrost
- (22) Rear Wiper

- (23) (Blank)
- (24) (Blank)
- (25) Electrical Power Receptacle (12V)
- (26) Heater and Air Conditioner On/Off Switch
- (27) HVAC Temperature Control

- (28) Fan Control
- (29) Key Switch
- (30) Transmission High/Low
- (31) Creeper Control

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Optional Keypad (17)

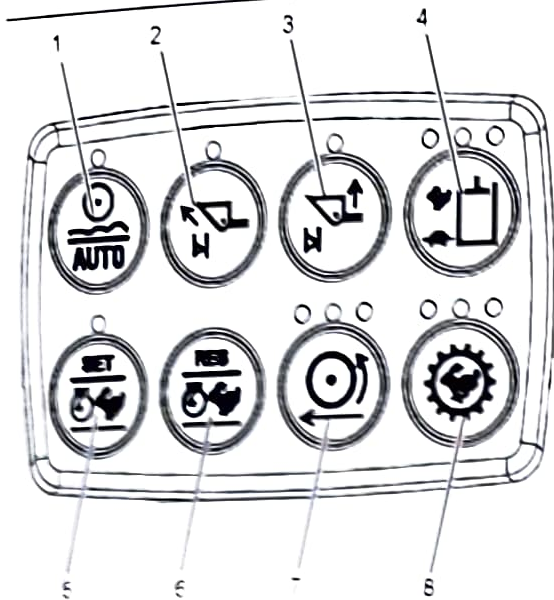


Illustration 7:

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- (1) Ride Control
- (2) Rackback Kickout
- (3) Lift Kickout
- (4) Implement Modulation
- (5) Throttle Lock Set/Decelerate
- (6) Throttle Lock Resume/Accelerate
- (7) Reduced Rimpull Hystat
- (8) Hystat Aggressiveness Adjustment

(1) Ride Control Enable (if equipped) – Press to Enable or Disable the Ride Control System. When Ride Control is enabled, the LED above the button will be lit.

(2) Rackback Kickout Enable (if equipped) – Press to Enable or Disable the Rackback Kickout. When the Rackback Kickout is enabled, the LED above the button will be lit.

(3) Lift Kickout Enable (if equipped) – This option is not available.

(4) Implement Modulation Adjustment – Press and release the button to toggle through the implement modulation settings. The settings correspond to Fine Normal and Course modulation. Fine is indicated by 1 LED on. Normal is indicated by 2 LEDs on. Course is indicated by 3 LEDs on. When in Fine mode, the maximum cycle times of the implements may be reduced.

(5) Throttle Lock Set/Decelerate – Press the Throttle Pedal until the desired speed is achieved and then press the Throttle Lock Set/Decelerate button to lock that speed. When the Throttle Lock is active, the LED above the button will be lit. Press and

hold of the switch will slowly decelerate the locked throttle speed to allow for small adjustments.

Note: To cancel throttle lock, press and release the Set button again or press the brake pedal past 65% travel. Alternatively, turning off Economy Mode will also cancel Throttle Lock.

(6) Throttle Lock Resume/Accelerate – Press the button to resume previous throttle lock that was set before being Canceled. Press and hold of the switch will slowly accelerate the locked throttle speed to allow for small adjustments.

(7) Reduced Rimpull – Press and release the button to toggle through the reduced rimpull settings. The settings correspond to Maximum rimpull, Medium-High rimpull, Medium rimpull, and Low rimpull. The percentage of rimpull that is allowed in each mode is 100%, 90%, 80%, and 60% for Max, Medium High, Medium Low, and Low. Maximum rimpull is indicated by all 3 LEDs on. Medium-High rimpull is indicated by 2 LEDs on. Medium Rimpull is indicated by 1 LED on. Low rimpull is indicated by all LEDs being off.

(8) Hystat Aggressiveness Adjustment – Press and release the button to toggle through hystat aggressiveness settings. The settings correspond to Soft, Normal, and Hard aggressiveness. Soft is indicated by 1 LED on. Normal is indicated by 2 LEDs on. Hard is indicated by 3 LEDs on.

Note: Options not available will have the backlight turned off.

Implement Lock out (18)

Implement Lockout – Press the bottom of the switch in order to disable the implement controls.

Push the red locking tab upward and press the top of the switch in order to enable the implement controls.

Quick Coupler (19)

WARNING

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

Do not operate this machine until you have positive indication that the coupler pins are fully engaged.



Engage – Press the bottom of the switch in order to engage the coupler pins. The coupler engage function will continue for 5 seconds. After 5 seconds, it will stop when the switch is released.



Disengage – Press the red tab at the top of the switch in order to release the switch. The top of the switch can then be pressed in order to disengage the coupler pins. The coupler disengage function will only be energized while the switch is held in the disengage position. It will stop when the switch is released.

Spare(20)

N/A

Rear Window Defroster (21)



Rear Window Defroster – Press the top of the switch in order to activate the defroster. The defroster will remain on for a maximum of 10 minutes. Press the top of the switch in order to turn off the defroster.

Rear Window Wiper/Washer (22)



Rear Window Wiper – Press the top of the switch once in order to activate the wiper. Press the top of the switch and hold the top of the switch in order to activate the rear window washer.

Spare (23)

N/A

Spare (24)

N/A

Electrical Power Receptacle (25)



Power Receptacle (12 volt) – The 12V receptacle can be used for supply electrical equipment and accessories. The receptacle supplies power for diagnostic equipment.

Heater and Air Conditioning On/Off Switch (26)

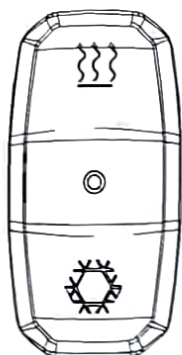


Illustration 77

g03802942

Press the top of the switch in order to activate the heater. Press the bottom of the switch in order to activate the air conditioner. The fan speed is selected by the fan control switch.

HVAC Temperature Control (27)



Temperature Control – Turn the knob to the left to **COOL**. Turn the knob to the right to **WARM**.

Fan Control (28)



Fan Control



LOW – Press the bottom of the switch in order to set the fan speed in the **LOW** position.



MEDIUM – Press the switch into the middle position in order to set the fan speed to the **MEDIUM** position.



HIGH – Press the top of the switch in order to set the fan speed to the **HIGH** position.

Engine Start Switch (29)

Engine Start Switch – Refer to Operation and Maintenance Manual, "Engine Starting" for details on starting the engine.



OFF – Machine in operation, turning key to the off position will shut off the engine and most of the machine's electrical system. If the parking, hazard, or low-beam lights are on when the machine is keyed off the lights will remain on. The parking, hazard, or low-beam lights will remain functional after the machine has been keyed off. Turn on the parking, hazard, or low-beam light, after the machine has been keyed off. The back lighting will illuminate the parking and low-beam light buttons. Press the button to turn on the parking lights or the low beam head lights. Push the top of the switch on the right panel to turn on the hazard lights. These lights will stay on with the key switch in **OFF** position.



ON – Operator turning the ignition switch to on will turn on the machines electrical system. The instrument cluster will perform a "self test". Wait until completion before you start the engine.



START

1. Engage the parking brake.
2. Lower any raised work tools to the ground. Refer to Operation and Maintenance Manual, "Equipment Lowering with Engine Stopped". Move the hydraulic controls to the **HOLD** position.

Note: This procedure only applies to the 910K AY41-UP.

3. Move the direction control to **NEUTRAL**.

Note: The engine will not start unless the direction control is in **NEUTRAL**.

4. Hold the throttle control at the **LOW IDLE** position before starting the engine.
5. Before the engine is started, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the forward horn before you start the engine.
6. Turn the engine start switch key to the **START** position.

Note: In applications for cold weather, pause until the indicator lamp for the starting aid turns off. The engine start switch in the **ON** position activates the glow plugs. Once the indicator light for the starting aid goes off, start the engine.

Note: If the machine is equipped with the Machine Security System, turn the engine start switch key to the ON position. Hold for 3 seconds before starting the machine.

NOTICE

Do not crank the engine for more than 10 seconds. Allow the starter motor to cool for 30 seconds before cranking again.

Do not engage the starter when the flywheel is turning.

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

Transmission High/Low (30) (if equipped)

Speed Control – This switch controls the speed range of the machine. The machine must be stationary in order to change the speed range. Stop the machine. Apply the service brake and hold the service brake.

High Speed Range – Press the top of the switch. The display will indicate speed range "H" when the High gear is engaged.

Low Speed Range – Press the bottom of the switch. The display will indicate speed range "1" or "2" when the Low gear is engaged.

Note: Ensure the service brake is pressed and held while changing speed range from Low to High or High to Low. Changing speed range may take up to 5 seconds. The display will show a gear symbol while the shift is in process.

Creep Control (31)

Creep Control – The creep control allows speed control from a full stop to full runout speed for the speed range. Turn the control clockwise in order to obtain maximum speed for a given engine rpm. Turn the control counterclockwise in order to reduce travel speed without reducing engine rpm. The creep control will only work in speed range 1 and in speed range 2.

Options for Joystick Control

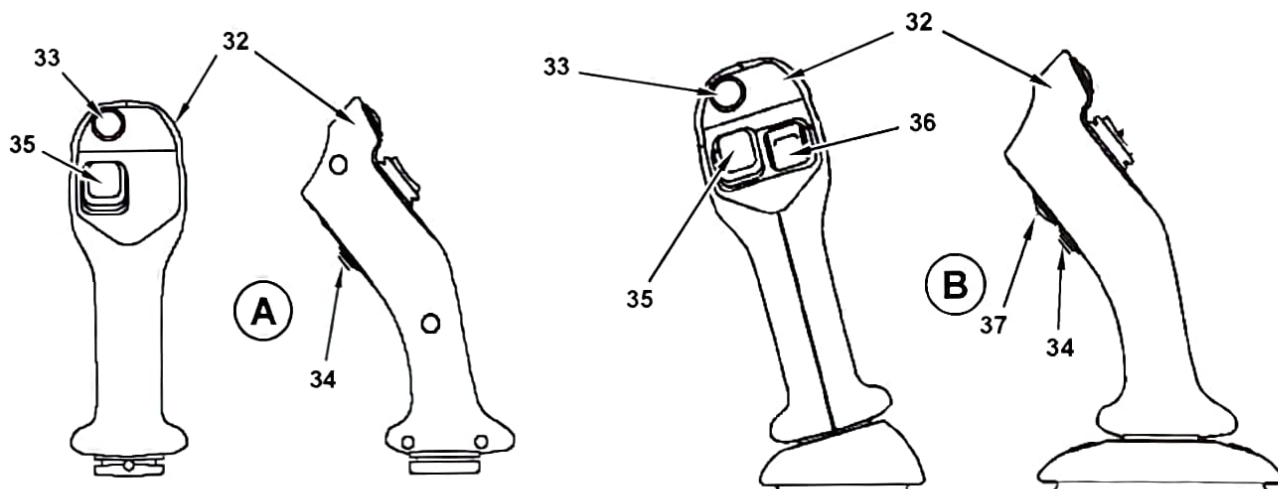


Illustration 78

g03730253

(A) 2 Valve, 1 Handle

(B) 3 Valve, 1 Handle

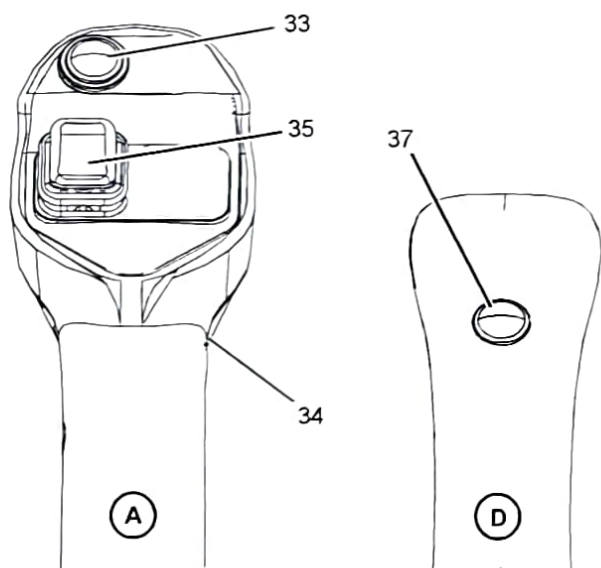


Illustration 79

g03730339

Japan 3 Valve, 2 handle

(32) Joystick Control

(33) Speed 1 and Speed 2

(34) Differential Lock

(35) Forward/Neutral/Reverse Control

(36) Proportional 3 - Auxiliary Hydraulics

(37) Continuous Flow

FLOAT – Push the lever forward into the detent in order to activate float. When the lever is moved into the detent, the operator will feel an increased resistance from the lever. If held in the detent position, float will remain active for up to 1 min. To maintain float without holding the lever, the lever should be released to the HOLD position. When float is activated, the attachment will follow along the contour of the ground. The attachment will remain in the FLOAT position until the lever is moved at least 6 degrees from the HOLD position.

LOWER – Push the joystick forward.

HOLD – The joystick will return to this position when the joystick is released.

RAISE DETENT (If Equipped) – This option is not available.

RACKBACK DETENT – Pull the lever left into the detent in order to activate the Rackback Kickout. When the lever is moved into the rackback detent, the operator will feel an increased resistance from the lever. Once in the detent, release the lever to the HOLD position in order to activate the Rackback Kickout. The attachment will continue until the attachment reaches the Rackback kickout position. In order to override the kickout manually, the lever must be moved at least 6 degrees from the HOLD position. The kickout will not be activated if the lever is held in the detent position for more than 1 second. The

kickout will not be activated if the lever is not returned to the HOLD position.

DUMP – Move the joystick to the right.

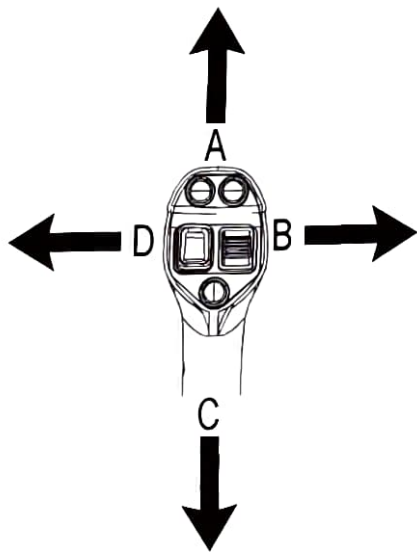


Illustration 80

g03430668

- (A) Lower
- (B) Dump
- (C) Raise
- (D) Rack

Bucket Shake-out – This feature detects when the operator quickly moves the joystick back and forth between dump and rackback. It bypasses the normal implement commands and issues direct commands to the valves in order to provide abrupt bucket movement to shake out stuck material. Bucket shake-out mode shall be activated by actuating the joystick rapidly across the tilt axis center.

Speed Range Selection (33)

Press and release button 33 in order to change from speed range "1" to speed range "2" or from speed range "2" to speed range "1". This operation can be performed while the machine is in motion.

Differential Lock (If Equipped)

Push button (34) and hold the button in order to lock the differentials. Release the button in order to unlock the differentials. The differential lock will activate if the machine speed is less than 8 km/h (5 mph). It will deactivate when the speed is greater than 8 km/h (5 mph), or when the button is released and the speed is less than 10 km/h (6 mph).

Note: Both the front differential and the rear differential will lock.

Forward/Reverse Control (35)

Note: A control rocker switch on the implement joystick comes standard on all machines. Some machines are equipped with an optional, secondary directional control on the column.

- F** **FORWARD** – Press the top of the directional control switch in order to enable forward travel.
- N** **NEUTRAL** – Press the directional control switch to the middle position in order to neutralize the transmission and to provide hystat braking.
- R** **REVERSE** – Press the bottom of the directional control switch in order to enable reverse travel.

Note: If the parking brake is engaged and the directional control switch is in the FORWARD position or the REVERSE position, the machine will not move. Move the direction control switch to the NEUTRAL position and release the parking brake in order for the hydrostatic drive to be engaged.

Auxiliary Hydraulics

Auxiliary Flow Control

Move the auxiliary control roller (36) or secondary joystick (if equipped) in order to supply auxiliary hydraulic flow. The work tool function will depend on the work tool attached and the connection to the auxiliary hoses.

In order to supply continuous flow, move the auxiliary control roller (36) or secondary joystick (if equipped) to the desired flow. Hold that command and press and release the Continuous Flow button (37). Then release the auxiliary command to the neutral position. When Continuous Flow is active, the Continuous Flow icon will illuminate on the display.

To cancel Continuous Flow either move the auxiliary control roller (36) or secondary joystick (if equipped) out of neutral or alternatively, press and release the Continuous Flow button again while the auxiliary control is in the neutral position.

i06078706

Changing Direction and Speed

SMCS Code: 1000; 3030; 3100; 4269; 5462; 5705; 7000; 7300; 7451

NOTICE

For operator comfort and maximum service life of power train components, deceleration and/or braking is recommended before any directional shifts are made.

Directional changes at full engine speed are possible. However, if you are changing direction, reducing the machine speed and/or braking the machine is recommended. Keep a loaded bucket low to the ground.

Reference: For more information, refer to Operation and Maintenance Manual, "Operator Controls".

i06237213

Diesel Particulate Filter Regeneration

SMCS Code: 108F

S/N: H661-Up

S/N: H771-Up

S/N: H881-Up

General Information

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

Modes of Regeneration

Passive – Passive Regeneration occurs when the exhaust temperature is high enough for regeneration to occur. Passive regeneration may occur unnoticed by the operator. No operator action is required. Operating the machine above mid throttle and under load allows for passive regeneration during normal operation. Low idle and low load applications will

have lower exhaust temperatures, where passive regeneration is not possible.

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

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

When an active regeneration is required with the parking brake engaged and the implements and auxiliary hydraulics not being operated, automatic adjustments of the engine speed by the ECM may occur to keep the engine RPM above the active regeneration threshold.

When an active regeneration is required, and the machine is being operated below the mid Throttle. The DPF alert indicator may illuminate. The operator can increase the engine speed above mid throttle with the throttle pedal or throttle lock (if equipped). An active regeneration will occur and the DPF light will turn off.

If increasing the RPM is not acceptable, alternatively the operator can allow a parked regeneration. There are three states that are checked for with three different time durations for activating a parked regen.

Idle State 1 – Machine not moving, Transmission in NEUTRAL, Implements Not Operated - If these conditions are met for approximately 3 minutes, the ECM will slowly increase engine speed, and an active regen will begin.

Idle State 2 – Same as Idle State 1 plus the Park Brake is engaged - If these conditions are met for approximately 2 minutes, the ECM will slowly increase engine speed, and an active regen will begin.

Idle State 3 – Same as Idle State 2 plus the Implements are locked out - If these conditions are met for approximately 1 minute, the ECM will slowly increase engine speed, and an active regen will begin.

After completing the active regeneration the engine speed will slowly decrease down to low idle.

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

Warning Symbols



1 - Engine Emission System (DPF) –
This emissions icon comes on the LCD screen on the monitor.



2 - Action Lamp – This indicator appears on the lower right side of the monitor.



3 - Engine Condition Indicator – This indicator appears on the lower right side of the monitor.



4 - Action Alarm – Horn

Engine Emission Alert

Table 24

Warning Symbol	Machine Action	Operator Action
None	If the parking brake is engaged and the implements and the auxiliary hydraulics are not active, the ECM may increase the engine speed.	No action required.
1 Red	If the parking brake is not engaged and the engine rpm is below mid throttle, an active regeneration will begin.	Increase the engine rpm above mid throttle until the DPF light turns off. The regeneration may take up to 30 minutes. or Bring the machine to a stop. Engage the parking brake. Set the engine speed to low idle. The ECM will automatically increase the engine rpm above mid throttle. The regeneration may take up to 30 minutes.
1 Red 2 Red 3 Red	The engine will derate until an active regeneration is completed	Bring the machine to a stop. Engage the parking brake. Set the engine speed to low idle The ECM will automatically increase the engine rpm above mid throttle. The regeneration may take up to 30 minutes.
1 Red 2 Flash Red 3 Red 4 Action Alarm	Engine will remain derated.	A regeneration can only be done through Cat Electronic Technician (ET), by an authorized Cat dealer Consult your local Cat dealer. If the engine is run through these warning indicators, the DPF will require servicing and may require replacement. Engine damage can occur

.06702160

Product Link

SMCS Code: 7490; 7606

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

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

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

Data Broadcasts

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

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

- Providing services to the customer and/or the machine
- Checking or maintaining Product Link equipment
- Monitoring the health of the machine or performance
- Helping maintain the machine and/or improve the efficiency of the machine
- Evaluating or improving Caterpillar 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 of 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.

Note: If using the previous version of Product Link radios (PL121SR, 522, 523, 420, or 421) refer to blast site requirements as stated in Operation and Maintenance Manual, SEBU8142, "Product Link - 121SR/321SR/420/421/522/523".

- 12 m (40 ft) for Product Link 121SR and 321SR
- 3 m (10 ft) for Product Link 522/523

If required, the following are suggested methods to disable the Caterpillar Product Link communication device:

- Turn the Product Link radio disable switch to the OFF position
- Disconnect the Caterpillar Product Link communication device from the main power source. This action is performed by disconnecting the wiring harness at the Product Link radio

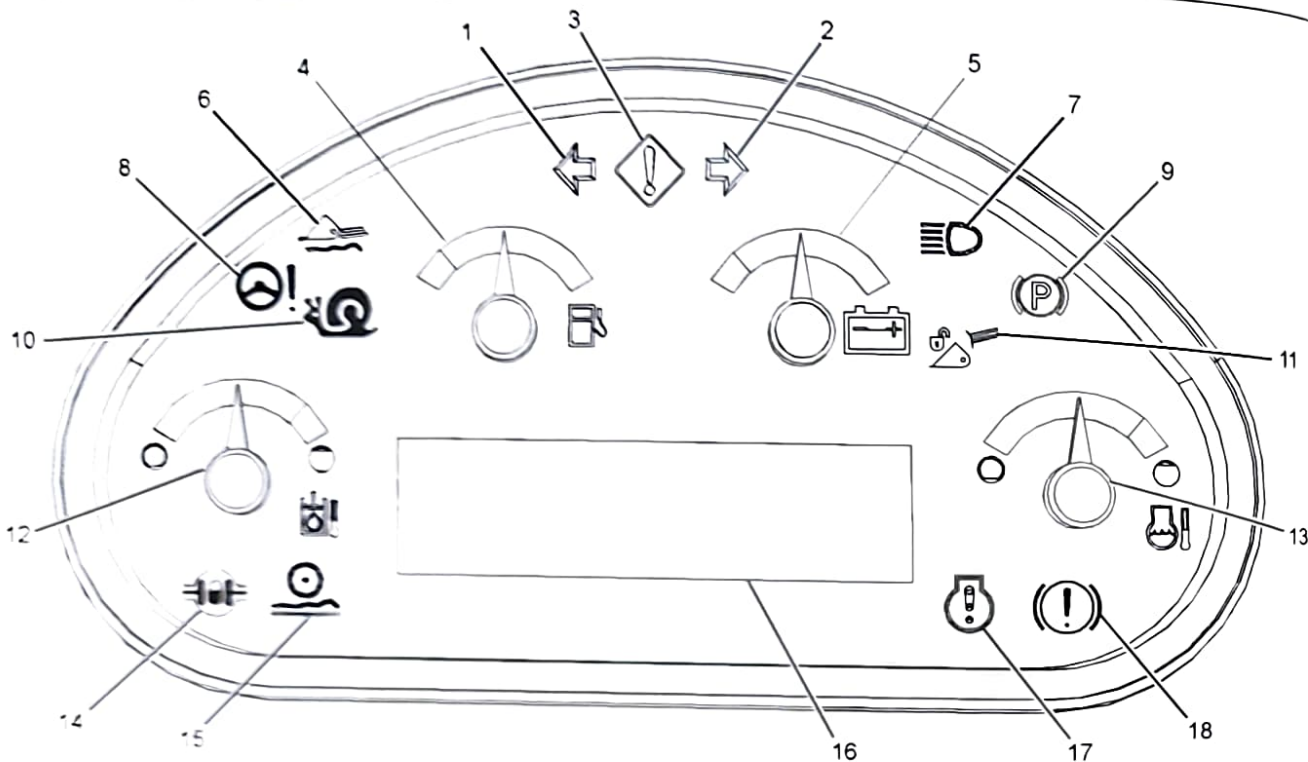
Note: If no radio disable switch is installed and the equipment will be operating near a blast zone, a Product Link radio disable switch may be installed on the equipment. The switch will allow the Caterpillar Product Link communication device to be shut off by the operator from the equipment control panel. Refer to Special Instruction REHS7339, Special Instruction REHS2365, Special Instruction REHS2368, Special Instruction REHS5595, Special Instruction REHS5596, Special Instruction REHS5850 and Special Instruction REHS9111 for more details and installation instructions.

i06078735

Alert Indicators

SMCS Code: 7450; 7451

Alert Indicator Panel



Illustrator 9E

g03731440

- (1) Left Turn Signal
- (2) Right Turn signal
- (3) Action Lamp
- (4) Fuel Level
- (5) Battery Voltage
- (6) Implement Float Active
- (7) High Beam
- (8) N/A
- (9) Parking Brake
- (10) Creep
- (11) Quick Coupler Unlock
- (12) Hydraulic Oil Temperature
- (13) Engine Coolant Temperature
- (14) Differential Lock (if equipped)
- (15) Ride Control Active (if equipped)
- (16) LCD Display
- (17) Engine Condition Indicator
- (18) Low Brake Charge Pressure



Left Turn Signal – Alert indicator (1) will flash when the left turn signal is activated.



Right Turn signal – Alert indicator (2) will flash when the right turn signal is activated.



Action Lamp – Alert indicator (3) will light in order to inform the operator of a malfunction in the operating system.

Table 31

WARNING OPERATION		
Warning Level	Alarm	Action Lamp
Level 1	OFF	OFF
Level 2	OFF	Flashing
Level 2-Special	ON	Flashing
Level 3	Pulsating	Flashing

The monitoring system has the following four warning levels for events:

Level 1 – This warning level is identified by the illumination of a respective warning lamp. This warning level is used in order to indicate that the

machine needs attention soon. No harm to the machine has occurred.

Level 2 – This warning level is used to indicate that the operation of the machine should be changed. Possible severe damage to components on the machine may occur.

Special Level 2 – This warning level is used to indicate that the operation of the machine should be changed as soon as possible. Possible severe damage to components on the machine may occur. The warning light may flash either red or yellow.

Level 3 – This warning level is used in order to indicate that the machine needs to have a safe emergency engine shutdown. Possible injury to the operator or severe damage to components may occur.



Implement Float Active – Alert indicator (6) will light when float is active.



High Beam – The alert indicator (7) will light when the high beams are on.



Parking Brake – Alert indicator (9) will light when the parking brake is engaged.



Creeper – Alert indicator (10) will light when the machine is in creeper mode.



Quick Coupler Unlock – Alert indicator (11) will light when the quick couple disengage function is active. Lock the quick coupler before operating the machine.



Differential Lock (If Equipped) – Alert indicator (14) will light when the differentials are locked.



Ride Control Active (If Equipped) – Alert indicator (15) will light when the ride control is active. Ride Control must be enabled on the keypad. The machine must be above the set speed for the feature to activate and the light to illuminate. The light will be off when ride control is deactivated.



Engine Warning – Alert indicator (17) will light when an engine warning is activated.



Low Brake Charge Pressure – Alert indicator (18) will light when the brake charge pressure is low or there is a fault on the brake charge sensor.

Gauge Panel



Fuel Level – Gauge (4) displays the fuel level.

Note: Alert will illuminate when fuel level drops below 15%.



Battery Voltage – Gauge (5) display Battery Voltage level.



Hydraulic Oil Temperature – Gauge (12) indicates the temperature of the hydraulic oil.



Engine Coolant Temperature – Gauge (13) indicates the temperature of the engine coolant.



LCD Display – The LCD display (16) provides a display area for functions of the machine. Look below under LCD Display for more specific information.

LCD Display



Illustration 99

When the machine is off (Key Off and Engine Off) the LCD will display the last known Service Meter Hours.

g00848264



Illustration 100

g03646396

Once the machine is not started, if the Park Brake is ON, then the LCD will display the service meter hours, and direction.



Illustration 101

g03646289

Once the machine is started, if the Park Brake is ON, then the LCD will display Service Meter Hours, Machine Direction, and engine speed.



Illustration 102

g03646422

Once the machine is started, if the Park Brake is OFF, then the LCD will display , machine ground speed, machine gear and direction, and engine speed.

LCD Indicators



Illustration 103

g03646476

Alert indicators that are displayed in the bottom of the LCD display are listed below.



Glow Plug – Indicator will be used to inform the operator that the engine is too cold to start, and the operator should wait until the indicator turns off before starting.



Machine Security System – Indicator will illuminate when the machine security system is activated.



Hydraulic Oil Filter Bypass – Indicator will illuminate to show the operator that the hydraulic oil filter bypass switch was enabled due to a certain PSI threshold.



ECO Mode – Indicator will illuminate when machine is in Machine Fuel Economy Mode.



Continuous Flow – The alert indicator will illuminate indicating the auxiliary hydraulic system is in the Continuous Flow mode.



Constant Speed Drive – The alert indicator will illuminate when machine is in Constant Speed Drive.



Diesel Particulate Filter (DPF) – This indicator illuminates when a regeneration cycle of the diesel particulate filter (DPF) is needed.

i02608407

Parking Brake

SMCS Code: 7000

Please refer to the illustration in Operation and Maintenance Manual, "Alert Indicators" for the location.

The parking brake indicator on the operator panel and the NEUTRAL indicator on the operator panel will light when the parking brake lever is pulled up.

NOTICE

Moving the machine with the parking brake engaged can cause excessive wear or damage to the brake. If necessary, have the brake repaired before operating the machine.

Please refer to the illustration in Operation and Maintenance Manual, "Operator Controls" for the location.

If the direction control switch is in the FORWARD position or in the REVERSE position, the machine will not move when the parking brake is released. Move the direction control switch to NEUTRAL. Then, move the direction control switch to the desired direction in order for the hydrostatic drive to be engaged.

i06227084

Work Tool Operation

SMCS Code: 6700; 7000

Refer to Operation and Maintenance Manual, "Caterpillar Approved Work Tools" for a list of approved work tools for this machine.

Refer to Operation and Maintenance Manual, "Operator Controls" for the location and operation of the controls that are referenced below.

Note: All of the work tool functions that are described below are viewed from the operator station.

Operate the machine and the work tool slowly in an open area. Check for proper operation of all controls and all protective devices on the machine and the work tool.

Note: During initial operation, unexpected motion may occur due to air in the hydraulic system. Cycle the hydraulic system approximately five times in order to purge air out of the circuit. You may need to add hydraulic oil to the machine after the machine fills the hydraulic circuits of the work tool. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Level - Check" for the proper procedure for checking the hydraulic oil level.

Simple Hydromechanical Work Tools

Read the manual and understand the instructions and warnings in the Operation and Maintenance Manual for these work tools. Consult your Cat dealer for replacement manuals. Proper care is your responsibility.

Standard Auxiliary Hydraulics

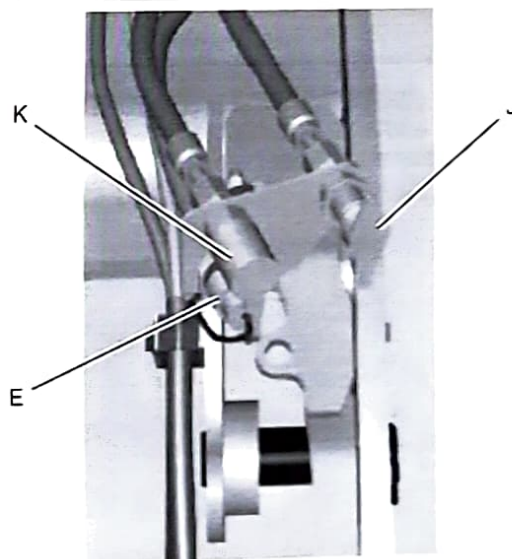


Illustration 104

g03803239

Auxiliary Hydraulic Connections for Simple Work Tools

- (1) Female Connection
- (2) Male Connection
- (3) Electrical Connection

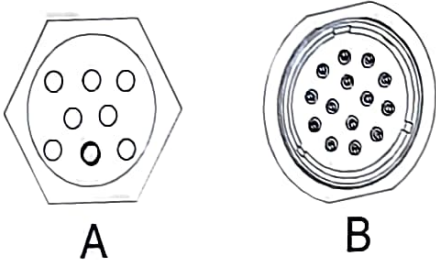


Illustration 105

g03803260

- (A) 8way electrical connector
(B) 14way electrical connector

The auxiliary hydraulic oil flow is controlled with button (36) and with button (37) on the joystick for pilot controlled machines.

Multipurpose Bucket

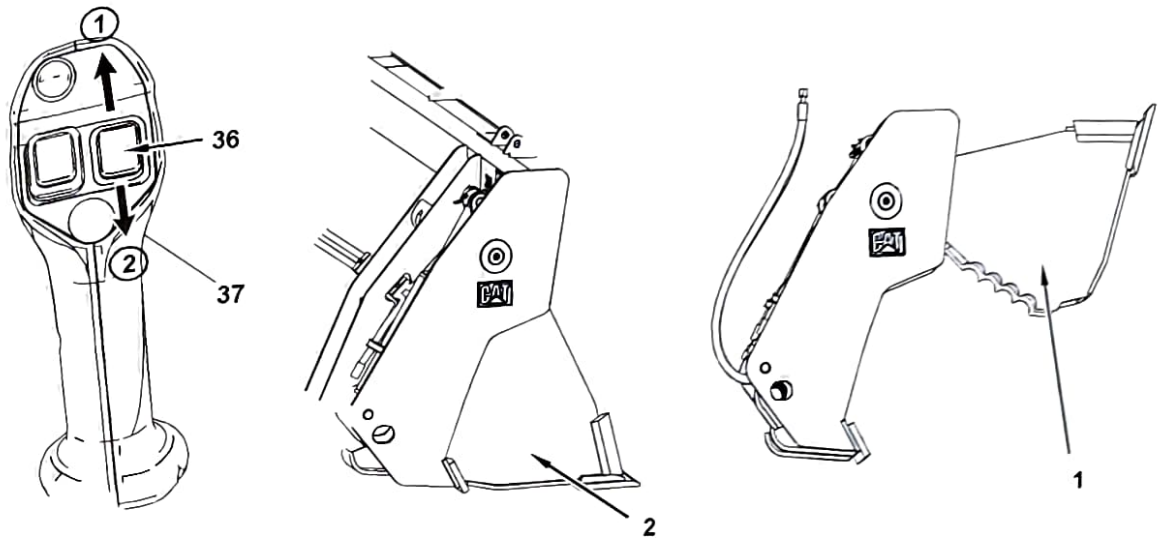


Illustration 106

g03862877

Pilot Controls

Move the thumb wheel (36) to the top (1) in order to open the clam on the bucket.

Move the thumb wheel (36) to the bottom (2) in order to close the clam on the bucket.

High Flow Hydraulics

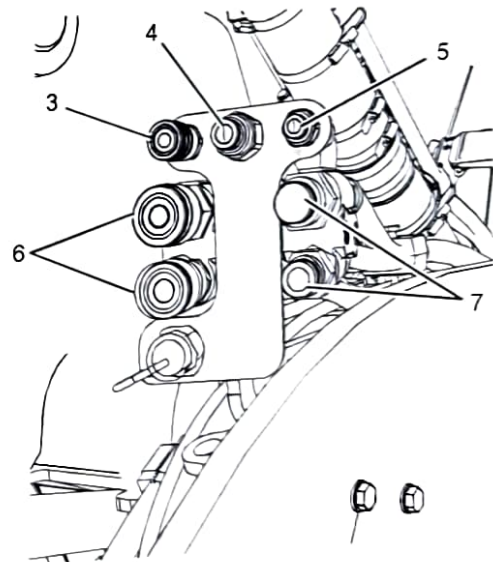


Illustration 107

g03803378

Horizontal option

- (3) Activating button 4 in cab causes flow from this QD
- (4) Case Drain
- (5) Activating button 3 in cab causes flow from this QD
- (6) Thumb Roller - Down Flow from this QD
- (7) Thumb Roller - Up Flow from this QD

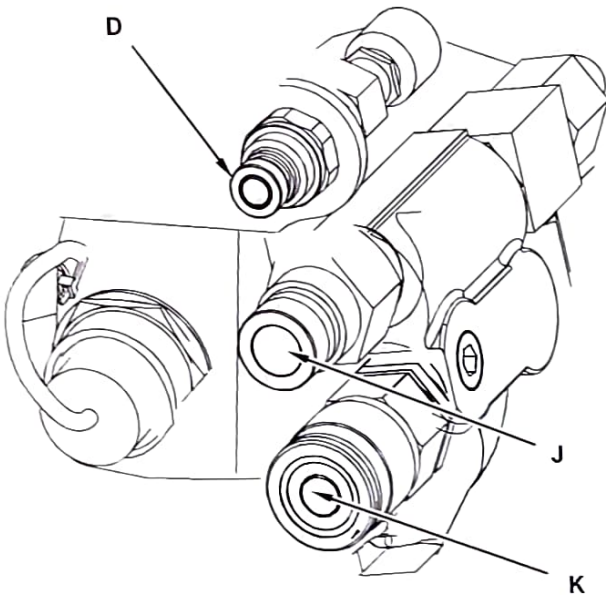


Illustration 108

g02879776

Connections for High Flow Hydraulics

The auxiliary hydraulic oil flow is controlled with button (36) on the joystick. Move the thumb wheel in an upward direction on the pilot joystick in order to provide hydraulic flow to connector (J). Move the thumb wheel in a downward direction on the pilot joystick in order to provide hydraulic flow to connector (K).

Excess oil flows to connector (D). Connector (D) returns oil to the hydraulic tank.



Illustration 109

g01501910

Electrical Jumper

Note: The high flow option is activated by connecting the electrical harness for the work tool. If the high flow work tool has an electrical harness, the electrical harness must be attached in order to activate the high flow. If the high flow work tool does not require an electrical harness, the work tool will have an electrical jumper. The jumper must be attached in order to activate the high flow.

Complex Hydromechanical Work Tools

Note: For the functionality of Cat Complex Work Tools, read the Operation and Maintenance Manual for the work tool.

Consult your Cat dealer for replacement manuals. Read all the safety messages and understand all the safety messages for each work tool.

i06089249

Work Tool Coupler Operation

SMCS Code: 6129; 7000

WARNING

Improper Attachment of the Work Tool could result in injury or death.

Do not operate the machine without confirmation that the coupler pins are fully engaged. Follow the operating procedures in the Operation and Maintenance Manual.

Note: The auxiliary hydraulic lines for the work tool must be disconnected before you operate the work tool coupler. Inadvertent motion of the work tool could occur.

Note: Identify the style of work tool coupler that is installed on your machine.

Identify the Work Tool Coupler

The machine may have a Vertical Pin Work Tool Coupler or a Horizontal Pin Work Tool Coupler. The operation of the coupler pins is different for each style. The following illustrations will help you identify the type of coupler on your machine.

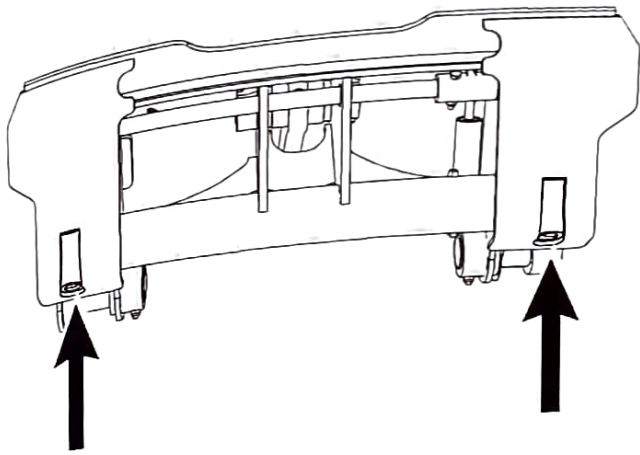


Illustration 110
Vertical Pin Work Tool Coupler

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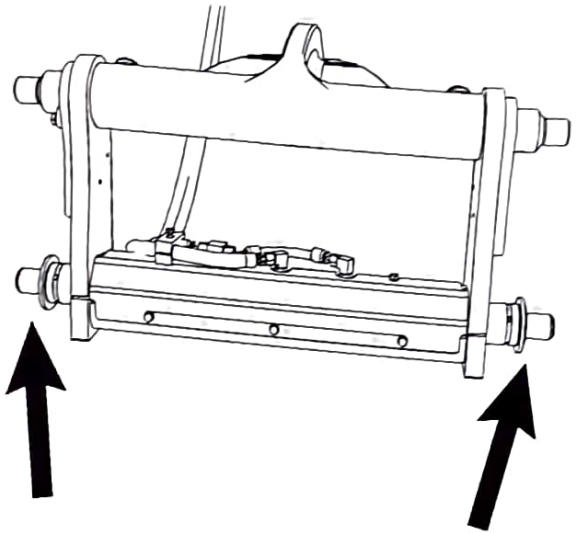


Illustration 111
Horizontal Pin Work Tool Coupler

g03803489

Attaching the Vertical Pin Work Tool Coupler

Note: Before you install the work tool, inspect the coupler and the work tool mounting bracket for any wear or for any damage. Ensure that the work tool mounting bracket and the face of the coupler are clean. Ensure that the coupler has no accumulation of material. Refer to Operation and Maintenance Manual, "Quick Coupler - Clean/Inspect" and Operation and Maintenance Manual, "Work Tool Mounting Bracket - Inspect" for inspection procedures.

1. Position the work tool on a level surface. Move the hydraulic lines (if equipped) for the work tool away from the work tool mounting bracket.
2. Ensure that the coupler pins are fully retracted before you align the work tool coupler with the hooks on the work tool.
3. Refer to Operation and Maintenance Manual, "Operator Controls" for details on the location and the operation of the hydraulic work tool coupler control.
4. Enter the machine.
5. Fasten the seat belt.
6. Start the engine.
7. Disengage the parking brake.
8. Tilt the work tool coupler forward.

9. Align the work tool coupler between the outer plates of the mounting bracket. Move the work tool coupler under the angled plate of the mounting bracket and rack back the work tool.
10. Press the bottom of the work tool control (23) on the right-hand console in order to engage the coupler pins. Refer to Operation and Maintenance Manual, "Operator Controls" for details on engaging the coupler pins.
11. Fully lower the loader arms.
12. If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.

Note: Ensure that the hydraulic oil in the work tool is compatible with the host machine. If the oil is not compatible, the work tool system will need to be flushed.

- a. Stop the engine.
- b. Turn the engine start switch key to the ON position.
- c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
- d. Turn the engine start switch key to the OFF position.
- e. Apply the hand brake and exit the machine.
- f. Ensure that the quick connect couplers are clean.
- g. Connect the auxiliary hydraulic hoses for the work tool to the machine. Twist the collar of the quick connect coupler for one quarter of a turn in order to secure the hydraulic connections. Refer to Operation and Maintenance Manual, "Operator Controls - Auxiliary Hydraulic Controls" for operating details. If the work tool is equipped with electrical lines, then route the electrical lines with the hydraulic hoses. Connect the wire harness to the electrical connector on the host machine. Check the connections in order to ensure that the connections are properly secured. Check the connections on the work tool in order to ensure that the connections are in the correct receptacle.

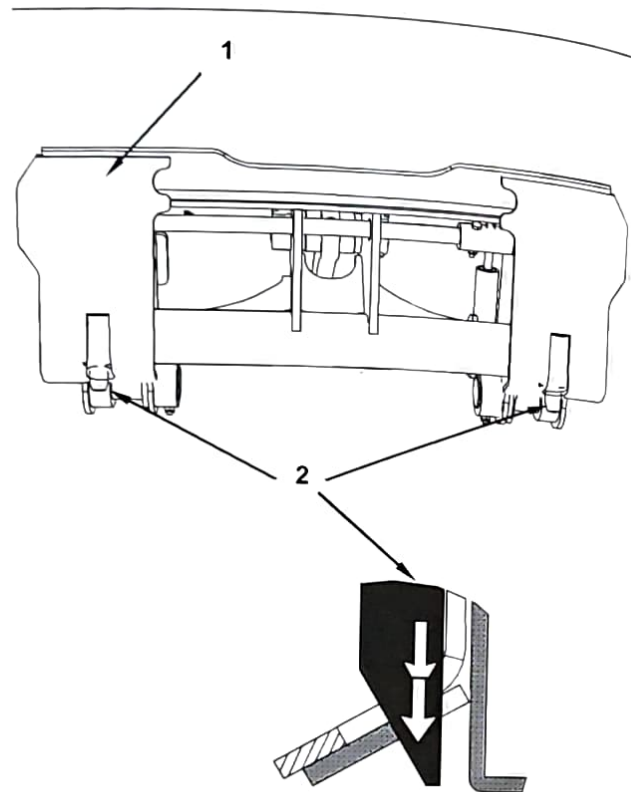


Illustration 112

g01354513

- (1) Hydraulic Work Tool Coupler
- (2) Coupler Pins

13. Engagement of the work tool mounting bracket must be verified.
 - a. Visually ensure that both coupler pins (2) are extending out of the holes in the work tool mounting bracket.

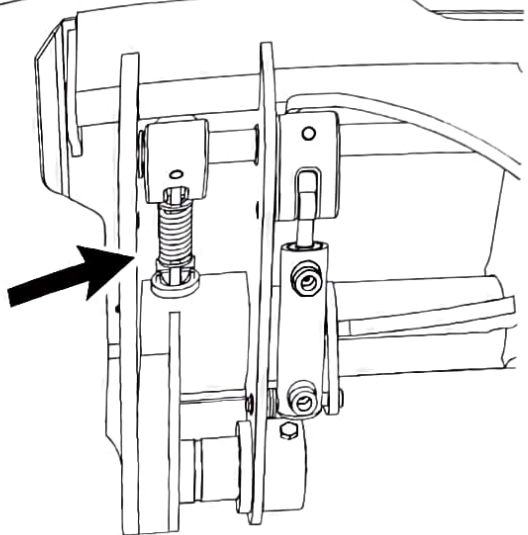


Illustration 113

g03803509

Coupler link arm in the DISENGAGED position

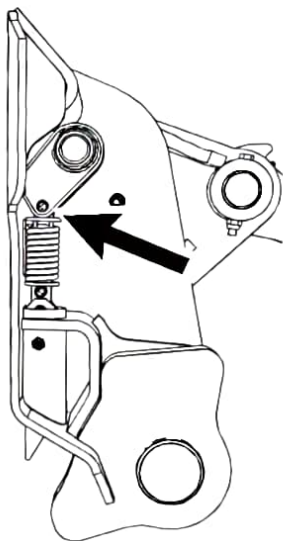


Illustration 114

g03803521

The coupler link arm must move over center. Note the side panel is removed for clarity.

- b. The coupler link arm must move over center. Ensure that the coupler link arm has gone over center and ensure that the coupler link arm is touching the front plate of the coupler. If the coupler link arm did not move over center, then the work tool is not secure on the coupler. When the coupler link arm is over the center, the coupler pins are locked.

- 14. Also use the following procedure to verify engagement of the coupler pins.

- a. Enter the machine.
- b. Fasten the seat belt and lower the armrests.
- c. Start the engine.
- d. Disengage the parking brake.
- e. Raise the work tool off the ground.
- f. Visually inspect the coupler pins (2) in order to ensure that the pins are fully extended through the work tool.
- g. Activate the tilt control in order to tilt the work tool downward.
- h. Apply down pressure on the work tool.

Note: The work tool Operation and Maintenance Manual will inform you if forward pressure should not be applied on a work tool.

- i. Move the machine backward. Ensure that the coupler pins do not disengage from the work tool.

- 15. Test the work tool for leaks and for proper operation.

Removing the Vertical Pin Work Tool Coupler

⚠ WARNING

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

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

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

⚠ WARNING

Inadvertent movement of the work tool may occur if the coupler pins are disengaged before the auxiliary hose lines are disconnected.

Serious injury or death may result from disengaging the coupler pins before the auxiliary hose lines are disconnected.

Place the work tool in a safe position and disconnect the auxiliary hose lines before disengaging the coupler pins.

NOTICE

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

1. Position the machine on level ground.
 2. Lower the work tool to the ground.
 3. If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.
 - a. Stop the engine.
 - b. Turn the engine start switch key to the ON position.
 - c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
 - d. Turn the engine start switch key to the OFF position.
 - e. Apply the hand brake and exit the machine.
 - f. Disconnect the auxiliary hydraulic lines for the work tool.
- Note:** If protective caps are available, install protective caps over the quick connect couplers.
- Note:** Connect the hoses for the work tool together. Connecting the hoses together will reduce the probability of contaminating the hydraulic system. Connecting the hoses together will reduce the buildup of pressure in the hoses. Connecting the hoses together will ease the connection of the hoses to the machine.
4. If the work tool is equipped with an electrical line, then disconnect the wire harness from the connector on the machine. If protective caps are available, install protective caps over the electrical connectors.
 5. Enter the machine.
 6. Fasten the seat belt.
 7. Start the engine.
 8. Disengage the parking brake.
 9. Move the lock on the work tool control (23) on the right-hand console. Press the top of the switch. The coupler pins will disengage.
 10. Tilt the work tool coupler forward. Lower the work tool coupler away from the work tool.

11. Back away from the work tool.

Attaching the Horizontal Pin Work Tool Coupler

Note: Before you install the work tool, inspect the coupler and the work tool mounting bracket for any wear or for any damage.

1. Position the work tool on a level surface. Move the hydraulic lines (if equipped) for the work tool away from the work tool mounting bracket.
2. Ensure that the coupler pins (2) are fully retracted before you align the work tool coupler with the hooks on the work tool.
3. Refer to Operation and Maintenance Manual, "Operator Controls" for details on the location and operation of the hydraulic work tool coupler control.
4. Enter the machine.
5. Fasten the seat belt.
6. Start the engine.
7. Disengage the parking brake.
8. Tilt the work tool coupler forward.

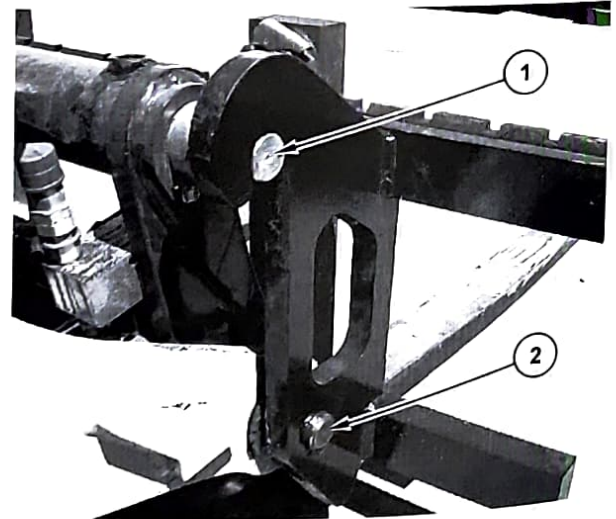


Illustration 115

g01333632

9. Align the coupler pins on the top of the coupler (1) with the hooks of the work tool. Move the work tool coupler under the hooks and rack back the work tool.

10. Press the bottom of the work tool control (23) on the right-hand console in order to engage the coupler pins. Refer to Operation and Maintenance Manual, "Operator Controls" for details on engaging the coupler pins.

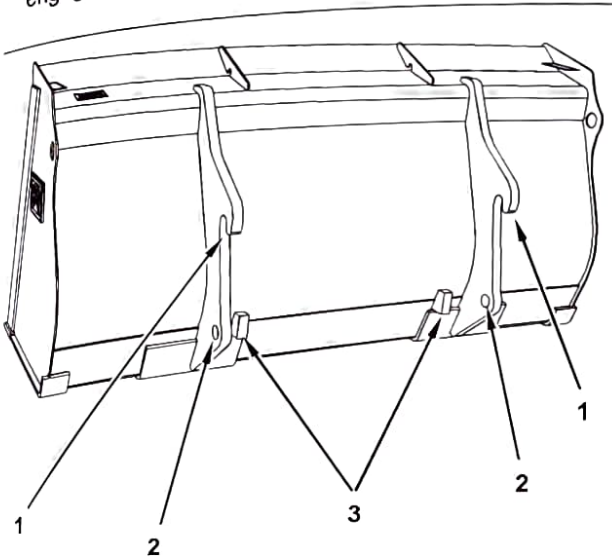


Illustration 116

g01525694

- (1) Hooks
- (2) Pin Bore
- (3) Stops

11. The tool will move up and the tool will move out. This motion will cause clearance in two areas. The hooks will raise off the bosses in the first area. The second area should show a clearance between the quick coupler and the stop. See Illustrations.

12. The coupler pins (2) should protrude through the bores of the work tool.

Note: There is a gap between the coupler and the stop. The stop is installed in order to provide a contact point for the work tool while the tool is being installed. The stop will position the work tool in order to align the pin bores while the pins are installed. The pins have tapered ends in order to move the work tool into alignment.

NOTICE

The stops on the work tool are used for aligning the hooks onto the pins. The stops are not intended to carry working loads. The work tool may move slightly as the pins are engaged on the Horizontal Pin Work Tool Coupler. Do not weld on the work tool or on the work tool coupler. Changes in the ability to carry the load of the work tool may result. Tool stop bars that are modified may stop the tools from being interchangeable with other similar machines. Modifying tool stop bars can accelerate wear to the work tool and the machine coupler.

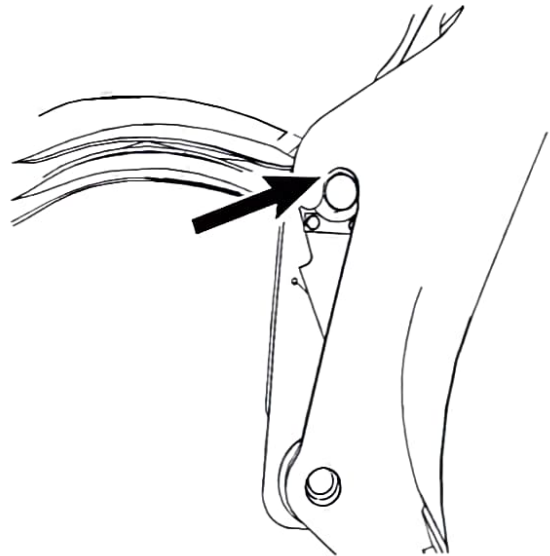


Illustration 117

g01524818

The hook in the first area

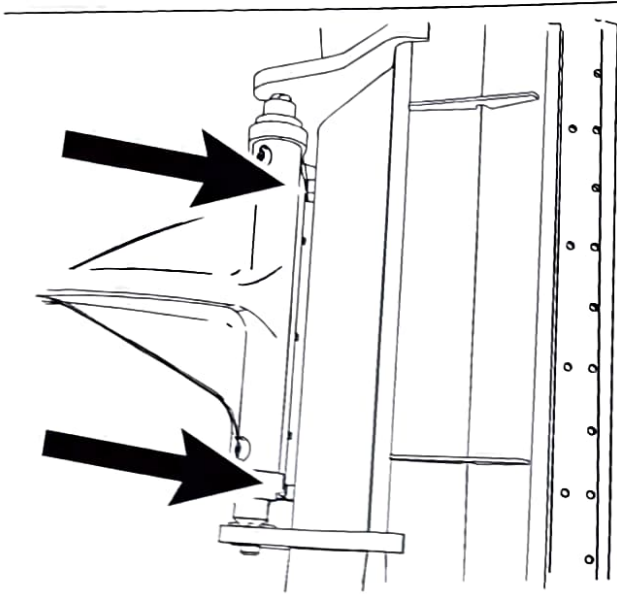


Illustration 118

g01525670

Top view of the stop in the second area

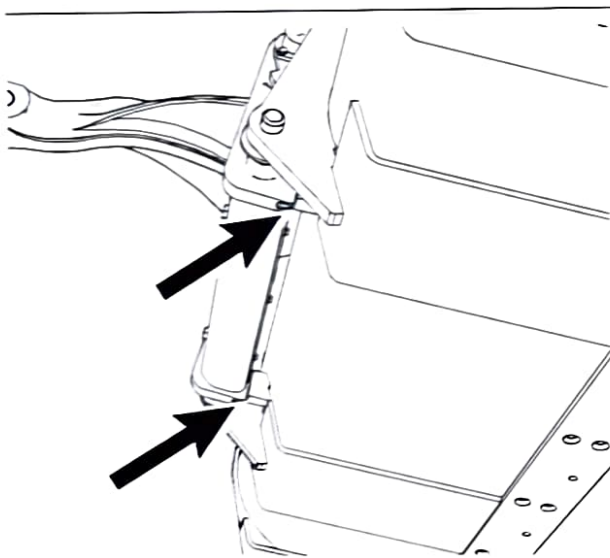


Illustration 119

g01525671

Bottom view of the stop in the second area

NOTICE

The coupler valve lever must be in the vertical position when the machine is in operation. This will prevent inadvertent movement of the coupler pins and the possible loss of the work tool.

13. Fully lower the loader arms.

14. If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.

Note: Ensure that the hydraulic oil in the work tool is compatible with the host machine. If the oil is not compatible, the work tool system will need to be flushed.

- a. Stop the engine.
 - b. Turn the engine start switch key to the ON position.
 - c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
 - d. Turn the engine start switch key to the OFF position.
 - e. Apply the hand brake and exit the machine.
 - f. Ensure that the quick connect couplers are clean.
 - g. Connect the auxiliary hydraulic hoses for the work tool to the machine. Twist the collar of the quick connect coupler for one quarter of a turn in order to secure the hydraulic connections. Refer to Operation and Maintenance Manual, "Operator Controls - Auxiliary Hydraulic Controls" for operating details. If the work tool is equipped with electrical lines, then route the electrical lines with the hydraulic hoses. Connect the wire harness to the electrical connector on the host machine. Check the connections in order to ensure that the connections are properly secured. Check the connections on the work tool in order to ensure that the connections are in the correct receptacle.
15. Test the work tool for leaks and for proper operation.

Removing the Horizontal Pin Work Tool Coupler

WARNING

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

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

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

WARNING

Inadvertent movement of the work tool may occur if the coupler pins are disengaged before the auxiliary hose lines are disconnected.

Serious injury or death may result from disengaging the coupler pins before the auxiliary hose lines are disconnected.

Place the work tool in a safe position and disconnect the auxiliary hose lines before disengaging the coupler pins.

NOTICE

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

1. Position the machine on level ground.
2. Lower the work tool to the ground.
3. If the work tool is equipped with auxiliary hydraulic lines, perform the following procedure.
 - a. Stop the engine.
 - b. Turn the engine start switch key to the ON position.
 - c. Move the auxiliary control back and forth in order to relieve hydraulic pressure within the auxiliary lines.
 - d. Turn the engine start switch key to the OFF position.
 - e. Apply the hand brake and exit the machine.
 - f. Disconnect the auxiliary hydraulic lines for the work tool.

Note: If protective caps are available, install protective caps over the quick connect couplers.

Note: Connect the hoses for the work tool together. Connecting the hoses together will reduce the probability of contaminating the hydraulic system. Connecting the hoses together will reduce the buildup of pressure in the hoses. Connecting the hoses together will ease the connection of the hoses to the machine.

4. If the work tool is equipped with an electrical line, then disconnect the wire harness from the connector on the machine. If protective caps are available, install protective caps over the electrical connectors.

Mechanical Coupler Valve

1. Enter the machine.
2. Fasten the seat belt.
3. Start the engine.
Move the lock on switch (23) on the right-hand console. Press the top of the switch in order to disengage the coupler pins. Refer to Operation and Maintenance Manual, "Operator Controls", for details on disengaging the coupler pins.
 1. Disengage the parking brake.
 2. Tilt the work tool coupler forward. Lower the work tool coupler away from the work tool.
 3. Back away from the work tool.

Engine Starting

i06238942

Engine Starting

SMCS Code: 1000; 7000

1. Engage the parking brake.
2. Lower any raised work tools to the ground. Refer to Operation and Maintenance Manual, "Equipment Lowering with Engine Stopped". Move the hydraulic controls to the HOLD position.
3. Move the direction control to NEUTRAL.

Note: The engine will not start unless the direction control is in NEUTRAL.

4. Hold the throttle control at the LOW IDLE position before starting the engine.
5. Before the engine is started, check for the presence of bystanders or maintenance personnel. Ensure that all personnel are clear of the machine. Briefly sound the forward horn before you start the engine.

Note: When the ignition switch is turned ON, the instrument cluster will perform a "self test". Wait until completion before you start the engine.

Note: If the machine is equipped with the anti-theft keypad, the security code must be entered before starting the engine.

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

Note: In applications for cold weather, pause until the indicator lamp for the starting aid turns off. The engine start switch in the ON position activates the glow plugs. Once the indicator light for the starting aid goes off, start the engine.

NOTICE

Do not crank the engine for more than 10 seconds. Allow the starter motor to cool for 30 seconds before cranking again.

Do not engage the starter when the flywheel is turning.

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

Note: Un-commanded loader arm drift may occur after engine start up. It may be necessary to cycle the loader arm up and down three to four cycles in order to fill the ride control accumulator with oil. This will eliminate the drift after machine has not been running for extended periods.

Note: For information on engine warm-up refer to Operation and Maintenance Manual, "Engine and Machine warmup".

WARNING

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

Starting Engine in Cold Weather

Prepare the machine for operation in temperatures that are below 0° C (32° F). Follow the appropriate warm-up procedures when the machine is operated in temperatures that are below 0° C (32° F).

Machine preparation requires using the correct engine oil. Refer to the "Lubricant Viscosities and Refill Capacities" for proper oil viscosity of engine oil and hydraulic oil for cold-weather operation. Refer to OMM, SEBU5898, "Cold Weather Recommendation for Caterpillar Machines". Refer to OMM, SEBU6250, "Caterpillar Machine Fluid Recommendations".

NOTICE

If the engine fails to start after 10 seconds, disengage the starter. Wait 30 seconds and repeat the procedure. Do not allow the starter motor to run continuously for more than 20 seconds.

Starting Engine below -18 °C (0 °F)

Coolant heater may be required.

Starting Engine below -23 °C (-10 °F)

Consult your Caterpillar dealer. Also refer to Operation and Maintenance Manual, SEBU5898, "Cold Weather Recommendation". This publication is available from your Caterpillar dealer.

Cool Engine Elevated Idle

The Cool Engine Elevated idle feature will temporarily increase the low idle engine speed when the engine coolant is below normal operating temperature. Increasing the low idle speed will accelerate the warm-up of the engine and fluids. When the engine coolant reaches normal operating temperature, the engine speed returns to the low idle speed.

i06085549

Engine and Machine Warm-Up

SMCS Code: 1000; 7000

Note: The hydraulic lockout must be in the UNLOCKED position before the hydraulic controls will function.

1. Allow the engine to warm up at low idle for at least 5 minutes. Engage the work tool controls and disengage the work tool controls. This will speed up the warm-up of the hydraulic components.

2. Look at the indicators and the gauges frequently during operation.

To help the hydraulic oil to warm up faster, hold the bucket control in the CLOSE position for short periods of 10 seconds or less. This will allow the hydraulic oil to reach relief pressure, which causes the hydraulic oil to warm up more rapidly.

NOTICE

The hydraulic control valve may become overheated if the bucket is operated continuously under relief conditions.

Cycle all controls in order to allow warm hydraulic oil to circulate through all hydraulic cylinders and through all hydraulic lines.

When you idle the machine for warm-up, heed 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.

Adjustments

i02641019

Work Tool Positioner

SMCS Code: 5112

WARNING

Use caution to avoid possible personal injury when adjusting the bucket positioner.

Stop the engine and lower all equipment to relieve the hydraulic pressure.

Engage the parking brake and block the tires to prevent sudden movement of the machine.

Keep unauthorized personnel off the machine.

Please refer to the illustration in Operation and Maintenance Manual, "Operator Controls" for the location of the switches.

1. Start the engine. Lower the work tool to the ground.
2. Position the work tool at the desired angle to the ground.
3. Stop the engine. Turn the engine start switch key to the OFF position and remove the key.
4. Engage the parking brake. Chock the wheels.

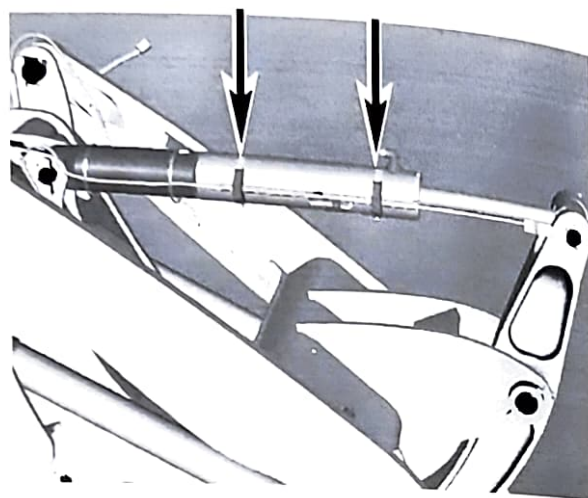


Illustration 120

g01331492

5. In order to change the digging angle, loosen the clamps that hold the tube assembly. Move the tube assembly downward on the cylinder in order to increase the digging angle. Move the tube assembly upward on the cylinder in order to reduce the digging angle.
6. Tighten the clamps.
7. Test the adjustment of the work tool positioner.
 - a. Start the engine.
 - b. Ensure that the switch for the work tool positioner is in the ON position. The switch is located on the right hand control panel in the cab.
 - c. Raise the work tool.
 - d. Dump the load.
 - e. Move the joystick to the tilt back detent position.
 - f. The work tool should return to the preset angle. The joystick should return to the HOLD position.
 - g. If the work tool does not return the preset angle, return to step 5.

Parking

i01795132

Stopping the Machine

SMCS Code: 7000

NOTICE

Park on a level surface. If it is necessary to park on a grade, block the wheels securely.

Engage the parking brake. Do not engage the secondary brake while the machine is moving unless the primary service brakes fail.

1. Apply the service brakes in order to stop the machine.
2. Move the direction control switch to the NEUTRAL position.

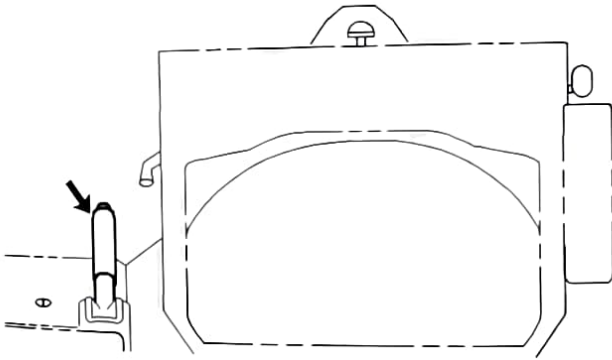


Illustration 121

g00910348

3. Engage the parking brake.
4. Lower the work tool to the ground and apply slight downward pressure.

i01405497

Stopping the Engine

SMCS Code: 1000; 7000

NOTICE

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

1. Operate the engine for five minutes at low idle with no load.

This allows hot areas in the engine to cool gradually. This will extend the engine life.

2. Turn the engine start switch key to the OFF position in order to stop the engine.
3. Turn the engine start switch key to the ON position. Move all hydraulic control levers back and forth in order to relieve hydraulic pressure. Turn the engine start switch key to the OFF position.
4. Move all hydraulic control levers into the HOLD position.

i04505975

Stopping the Engine if an Electrical Malfunction Occurs

SMCS Code: 1000; 7000

S/N: L661-Up

S/N: Z661-Up

S/N: L771-Up

S/N: Z771-Up

S/N: L881-Up

S/N: Z881-Up

Fuel Shutoff

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

1. Open the engine hood. Refer to Operation and Maintenance Manual, "Access Doors and Covers".

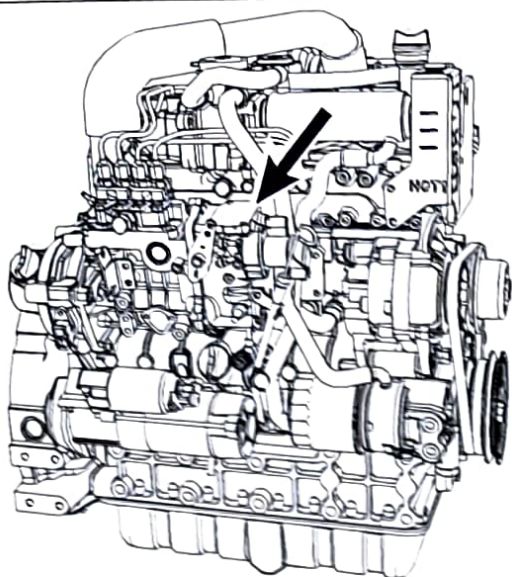


Illustration 122

g02768702

2. Disconnect the electrical connector on the top of the fuel injector pump in order to stop the engine.

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

i06093941

Stopping the Engine if an Electrical Malfunction Occurs

SMCS Code: 1000; 7000

S/N: H661–Up

S/N: H771–Up

S/N: H881–Up

Inside Cab

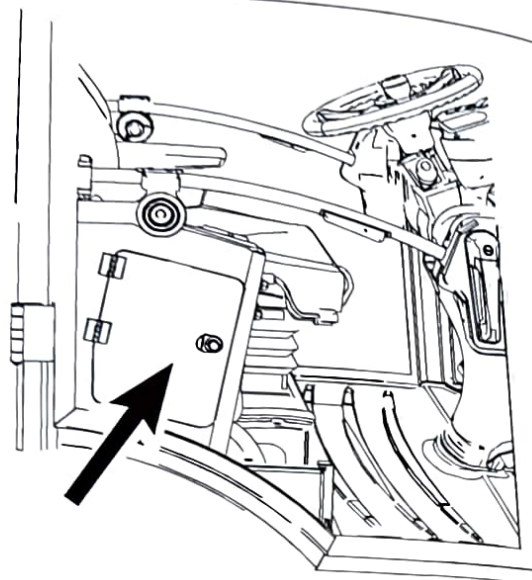


Illustration 123

g01356828

The fuse panel is located behind the seat on the right side.

Remove the cover in order to access the fuse panel.

20A	10A	20A	20A
10A	15A	15A	10A
10A			10A
10A	20A	15A	15A

15A	10A	10A	10A
10A	5A	10A	10A
15A	25A	10A	10A
10A	5A	10A	10A

Illustration 124

g03806270

Remove the Key Switch to Engine ECM fuse in order to shut down the ECM. Removing the fuse will disable the fuel supply to the engine.

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

i06092878

Equipment Lowering with Engine Stopped

SMCS Code: 7000

WARNING

Personal injury or death can result from a bucket falling.

Keep personnel away from the front of the machine when lowering the bucket.

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

If the engine has been off for a short period, the equipment can be lowered to the ground. Turn the engine start switch key to the ON position. Move the joystick to the LOWER position.

Note: In order to prevent the need for replacement of the lock valve, the arms should be lowered as soon as possible after the engine stops. Before you lower the arms, ensure that it is safe.

Lowering the Equipment with the Accumulator Charged

If electrical power is available and the accumulator is charged, the loader arms can be lowered from the operator station with the work tool control.

1. Fasten the seat belt.
2. Move the engine start switch to the ON position.
3. Slowly move the work tool control to the LOWER position in order to slowly lower the loader arms.

If the loader arms do not lower, the accumulator is not charged. It is possible to recharge the accumulator by cranking the engine for 15 seconds. Repeat step 2 and 3.

If there is no electrical power, the loader arms must be lowered by using the procedure that is explained next.

Alternate Lowering the Equipment

WARNING

Personal injury can result from oil under high pressure.

DO NOT allow high pressure oil to contact skin.

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

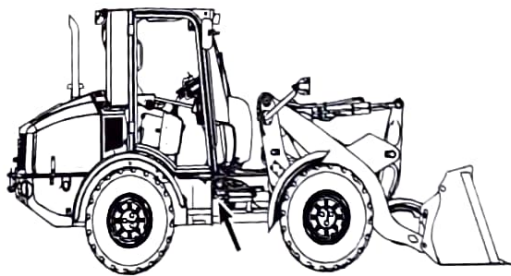


Illustration 125

g03732709

The lowering control valve is located on the right side of the machine under the cab.

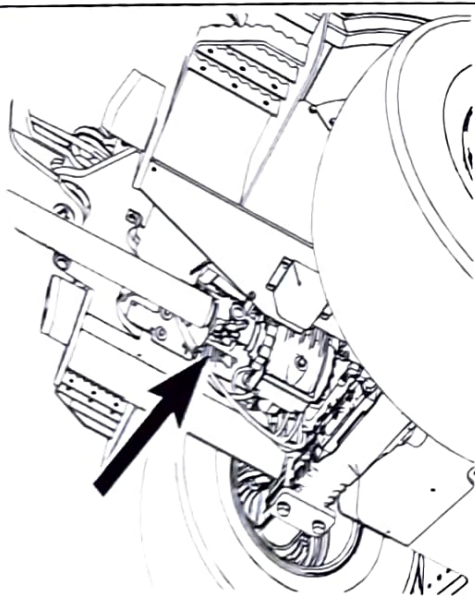


Illustration 126

g01371597

The loader arms must be lowered manually if the accumulator is not charged or if there is no electrical power.

1. If the engine has been off for a long period, or the engine is not operable, the following procedure is performed by one person.

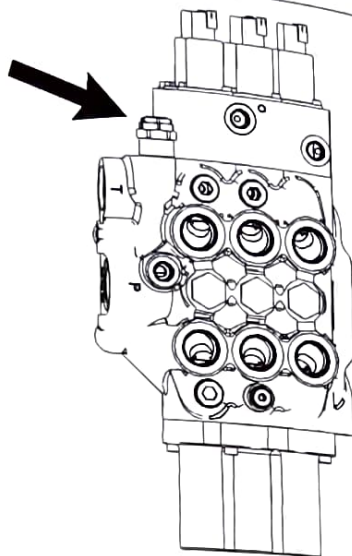


Illustration 127

g03731158

2. Turn the screw of the valve clockwise until the boom starts to move. Count the number of turns. This operation will allow the equipment to lower to the ground.

Note: Return the screw to the original position. The screw must be in the original position for proper operation of the bank valve.

3. Make the necessary repairs before you operate the machine.

Machines with Load Check Valves

The load check valve must be disabled before the lift arms can be lowered. Use the following procedure before the "Alternate Lowering the Equipment" that is described above:

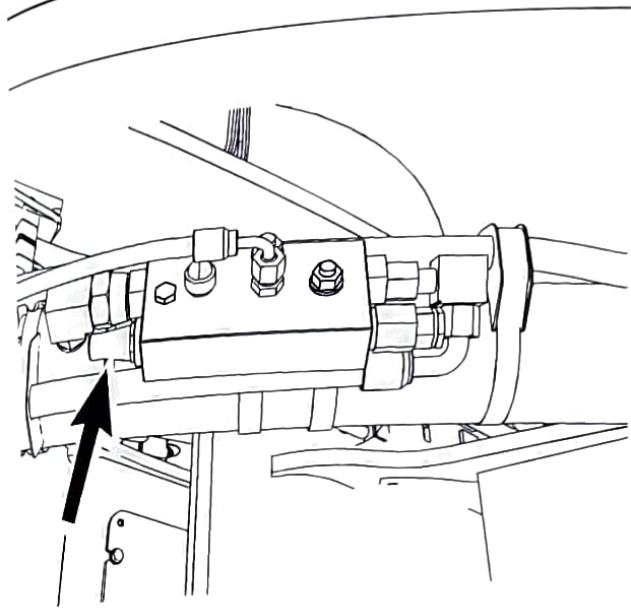


Illustration 128

g03805504

1. Remove the tamper proof cap.
2. Screw the valve fully into the housing.
3. Follow the procedure "Alternate Lowering the Equipment".

Note: The load check valves must be replaced if this procedure is used. Consult your Caterpillar dealer for the part numbers for your machine.

i02650270

Leaving the Machine

SMCS Code: 7000

1. Use the steps and the handholds when you get off the machine. Face the machine and use both hands. Make sure that the steps are clear of debris before you dismount.
2. Inspect the engine compartment for debris. Clean out any debris and any paper in order to avoid a fire.