Timberjack 360/460 Skidder

Operator Manual
Timberjack 360/460
Skidder
S/N: 10EB1277 - 10EB1401

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

If this product contains a gasoline engine:

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The State of California requires the above two warnings.

Worldwide Construction And Forestry Division
LITHO IN U.S.A.

Section 10 - Specifications

Section 11 - Miscellaneous

Warranty Certificate - TIMBERJACK Forestry Machines

Standard Warranty:

Timberjack warrants each new TIMBERJACK forestry machine to be free of failure resulting from defective material and workmanship under proper use and service for a period of twelve (12) month or two thousand (2,000) hours, whichever first occurs, following date of delivery of the machine to the original retail customer (user).

Timberjack warrants each new TIMBERJACK attachment or crane sold separately to be free of failure resulting from defective material and workmanship under proper use and service for a period of six (6) month or fifteen hundred (1,500) hours, whichever first occurs, following date of delivery of the machine to the original retail customer (user).

This warranty is not valid for machines sold more than eighteen (18) months after delivery from the factory.

The prescribed pre-delivery and start-up inspections must have been carried out and a properly filled out Warranty Registration Form signed by the customer submitted to Timberjack to validate all aspects of this warranty. The machines may only be used for their designated purpose as defined in Timberjack Technical and Marketing documents.

Timberjack's sole obligation under this warranty is limited to the repair or replacement without charge at Timberjack's factory, warehouse, or approved repair shop, return freight prepaid by the user of any part or parts which Timberjack's inspection shall disclose to have been defective in material or workmanship.

This warranty, in its entirety, does not cover maintenance items used in servicing TIMBERJACK forestry machines, such as tires, filters, bulbs etc.

This warranty shall be void if repairs or alterations to a TIMBERJACK forestry machine have been made by persons or firms not specifically approved by Timberjack so as in Timberjack's opinion to adversely affect in any way the stability and reliability of such machine.

The installation in such machine of any product or attachment not specifically approved by Timberjack or failure to use only genuine Timberjack maintenance parts shall also void this warranty.

Liability or obligation on the part of Timberjack for damages, whether general, special, or for negligence and expressly including any incidental and consequential damages, is hereby disclaimed. Timberjack's obligation to repair or replace shall be the limit of its liability under this warranty and the sole and exclusive right and remedy of the user.

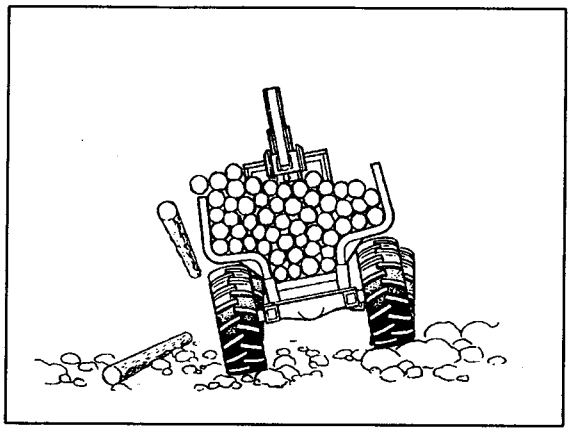
THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

This warranty may not be changed, altered, or modified in any way except in writing by Timberjack.

TIMBERJACK
Helsinki, Finland

November 1999

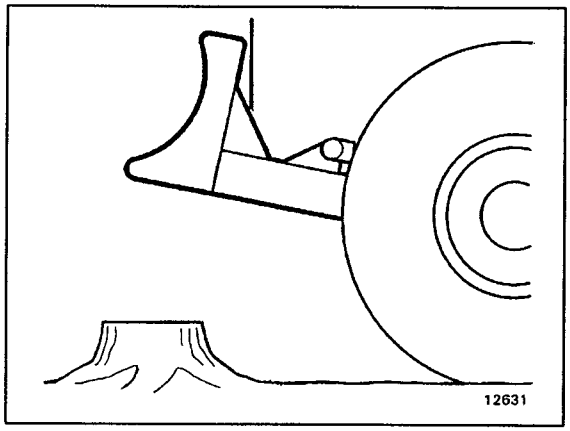
3.5 Operating Safety Precautions



Do not overload the woodbunk on a forwarder. A load that is stacked too high can cause the machine to overturn, or part of the load to roll off when traveling over rough terrain.

Check yard and landing areas as well as skidding trails for hazards: look for stumps, large rocks, holes, and drop-off areas; be aware of springs, mud holes, creeks and standing water and plan your operation in accordance with the environment you are working in.

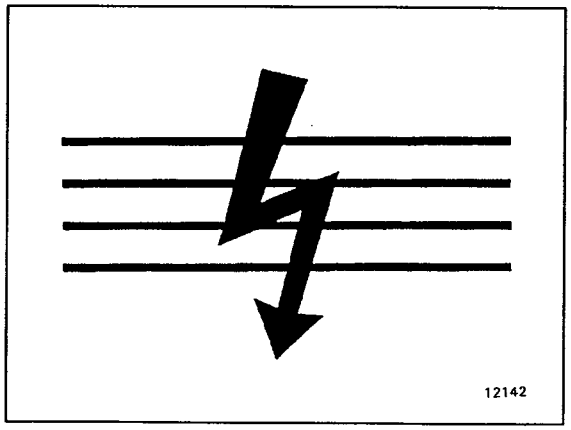
Never use the parking brake to slow down or stop the vehicle except in an emergency. Ensure that the brake is properly adjusted at all times.



When working on steep slopes, travel as straight up and down as possible to prevent roll-over.

Before moving the machine, raise the dozer blade and, when traveling, keep the blade high enough off the ground to clear stumps.

Approach with caution areas where overhanging telephone or electric power lines are present. Serious injury or death by electrocution can result if the machine or any of its attachments are not kept a safe distance from high-voltage electric power lines.



Maintain a distance of 10 ft. (3 m) between the machine or boom and any power line carrying up to 50,000 Volts or less.

Power lines carrying more than 50,000 Volts require a safety distance of 10 ft. (3 m) plus 1/2 inch (13 mm) for each additional 1,000 Volts above the 50,000 Volt level.

If state/province, local or job site regulations require even greater safety distances than stated above, adhere strictly to these regulations for your own protection.

3.7 Driving/Transporting on Public Roads

When traveling on public roads, use accessory lights and other cautionary devices to bring your approach to the attention of other vehicle operators. Ensure that your vehicle meets all regulatory requirements.

If the machine must be transported, make sure it is adequately secured to the transporting vehicle. Even though the brakes may be fully engaged, the wheels must be blocked and the machine secured with chains, wire, or rope to prevent movement during transport.

Position and secure the implement attachment, including the loader, so that the equipment will not move and cause imbalance during transport.

When transporting the machine ensure that the overall height does not exceed local or state maximum height regulation.

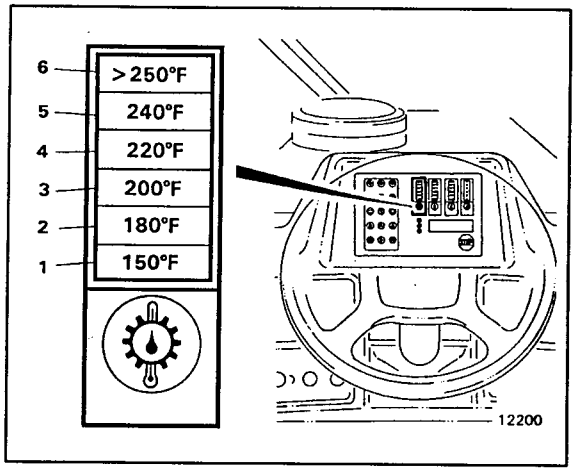
4.3 Controls and Instrumentation

4.3.1 Operator Controls and Instruments

1. Air Circulating Fan
2. Sun Visor
3. Radio/Tape Player
4. Steering Wheel
5. Instrument Panel
6. Upper Switch Panel
7. Upper Fuse Panel Cover
8. Parking Brake Switch
9. Rear View Mirror
10. Ignition Switch.
11. Air Vents.
12. Air Conditioner Switch Control Panel
13. Transmission Controller.
14. Joystick Grapple Control
15. Grapple Constant Pressure Indicator
16. Rear Axle Differential Lock Switch
17. Decking Blade Control Lever
18. Transmission Declutch Switch
19. Winch Control Lever
20. EGS Override Switch
21. Interlock Relay Circuit
22. Air Intake heater Button.
23. Master Electrical Disconnect.
24. Accelerator Pedal
25. Service Brake Pedal
26. Foot Rest
27. Operator's Seat
28. Fire Extinguisher
29. Lower Fuse Panel Compartment
30. Horn Button
31. Twelve Volt Power Outlet
32. Test and Display Selection Button
33. Instrument Panel
34. Winch Position Rear View Mirror (Not Shown)

4.3 Controls and Instrumentation

4.3.4 Monitor Instrument Panel

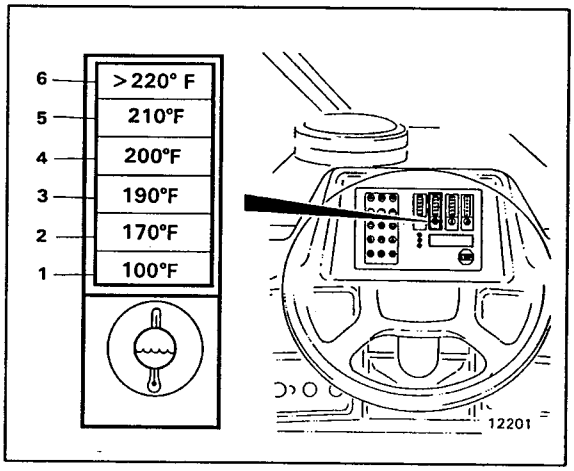


Transmission Oil Temperature Bar Graph

If the oil temperature is less than 66°C (150°F), the first segment of the bar graph (1) and the symbol below it will flash off and on until the oil warms up to that temperature. As the oil temperature increases, each additional segment of the bar graph (2,3,4) will light up.

When the amber bar is indicated (5), it will flash off and on.

When the red bar is indicated (6), both the red bar and the red 'STOP' sign will begin to flash off and on, and the warning buzzer will sound.



Engine Coolant Temperature Bar Graph

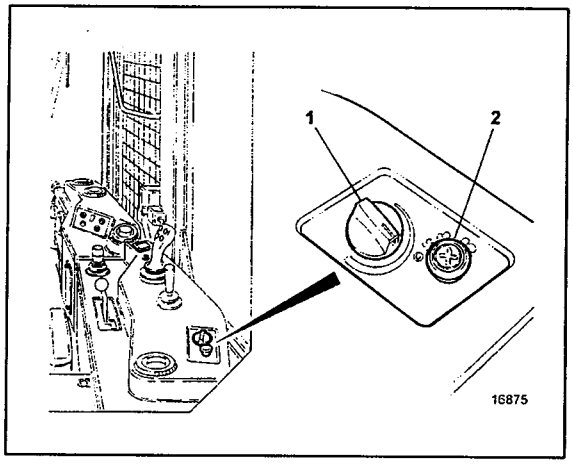
If the coolant temperature is less than 38°C (100°F), the first segment of the bar graph (1) and the symbol below it will flash off and on until the coolant warms up to that temperature. As the coolant temperature increases, each additional segment of the bar graph (2,3,4) will light up.

When the amber bar is indicated (5), it will flash off and on.

When the red bar is indicated (6), both the red bar and the red 'STOP' sign will begin to flash off and on, and the warning buzzer will sound.

4.3 Controls and Instrumentation

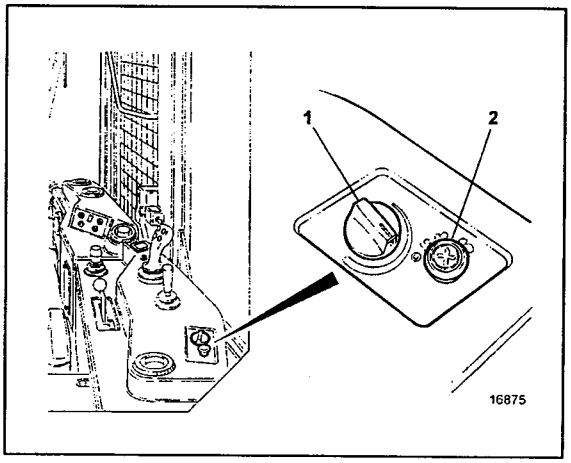
4.3.5 Switches and Indicators



Heater Control Panel (Open Cab)

Cab air temperature is controlled by the heater switch (1). Turn the switch clockwise for heat; turn it counter-clockwise for cooler air.

Air flow is controlled by the fan switch (2). The switch has four positions:
Off, Low, Medium and High.



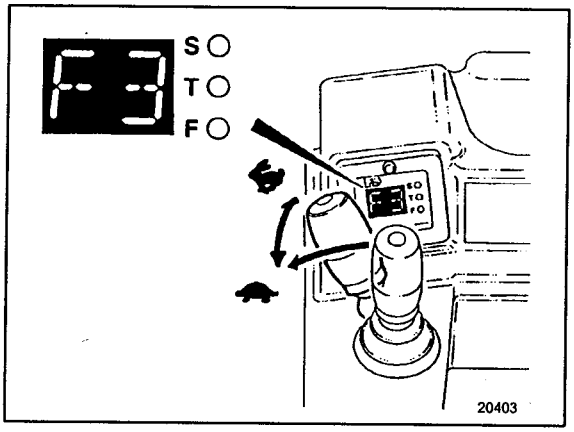
Heater/Pressurizer Control Panel

Cab air temperature is controlled by the heater switch (1). Turn the switch clockwise for heat; turn it counter-clockwise for cooler air.

Air pressure and flow are controlled by the fan switch (2). The switch has four positions:
Off, Low, Medium and High.

4.3 Controls and Instrumentation

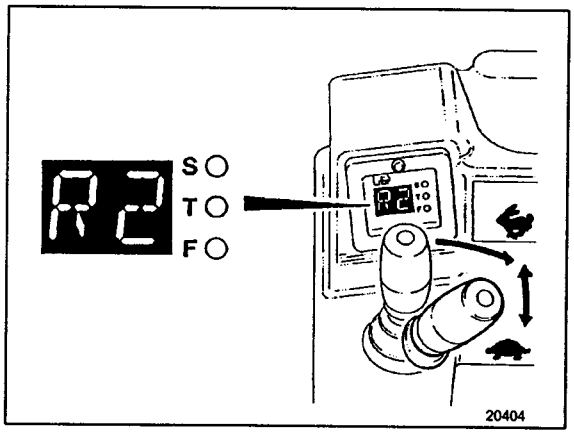
4.3.6 Driving/Operating Controls



Electronic Gear Selector (EGS)

The electronic gear selector (EGS) is designed to control the selected gear in the transmission. It is connected to a remote display which shows specific information to the operator.

Moving the EGS will determine both driving direction and gear selection.

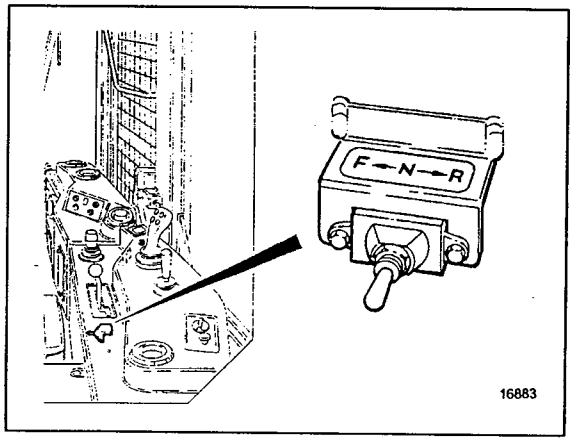


Neutral Lock

The engine can be started even when the EGS is in Forward or Reverse position; however, **the transmission will not shift into gear until the gear selector has passed through Neutral position.**

Important!
The skidder is equipped with an interlock circuit which:

1. *Requires that a specific starting procedure be followed. (See section 5.1.4)*
2. *Shifts the transmission into neutral within five seconds of sensing the operator is not seated in the seat.*



EGS Override Switch

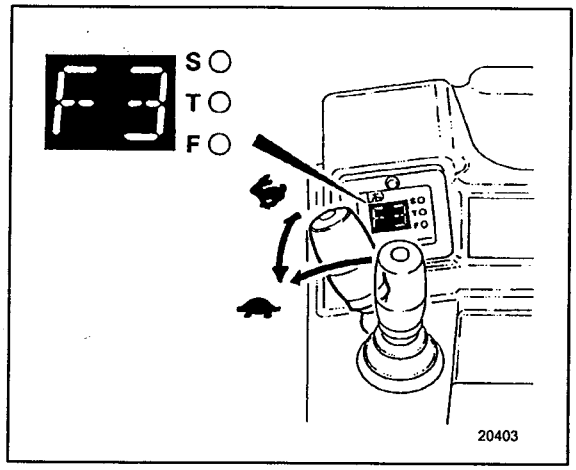
In the event of an EGS failure, the manual override switch can be used to move the skidder to a more suitable location for service.

A failure will be a condition where only the EGS has failed (the red 'F' LED will be on and the gear selector will not engage any gears).

Refer to Section 5 for detailed operating instructions.

5.1 Driving the Skidder

5.1.6 Operating the Transmission



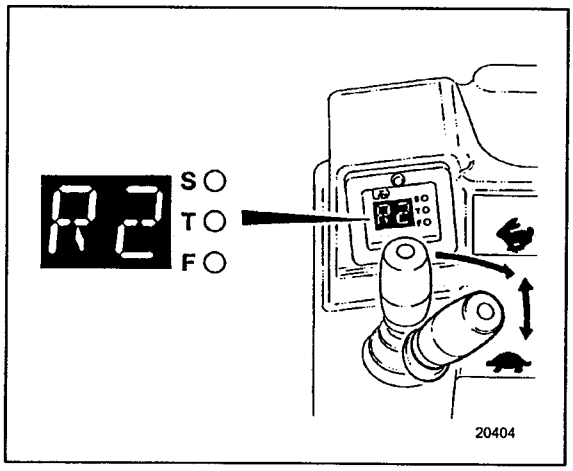
Driving Forward

Move the controller forward to engage forward gear.

To select a higher speed range (1 through 6), push the controller to the right (away from you). Release the controller when you have reached the desired speed range. The controller is spring-returned to the centre when released.

If the controller is held in the upshift position, the EGS will automatically shift through subsequent speed ranges at 1.5 second intervals.

To select a lower speed range, pull the controller to the left (toward you). Release the controller when you have reached the desired speed range.



Driving Rearward

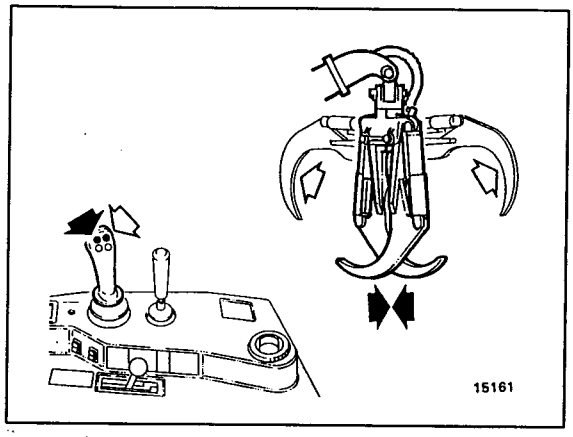
Move the controller rearward to engage reverse gear.

Push the controller to the right (away from you) to select a higher gear range (1 through 3). Release the controller when you have reached the desired gear range.

To select a lower gear range, pull the controller to the left (toward you). Release the controller when you have reached the desired gear range.

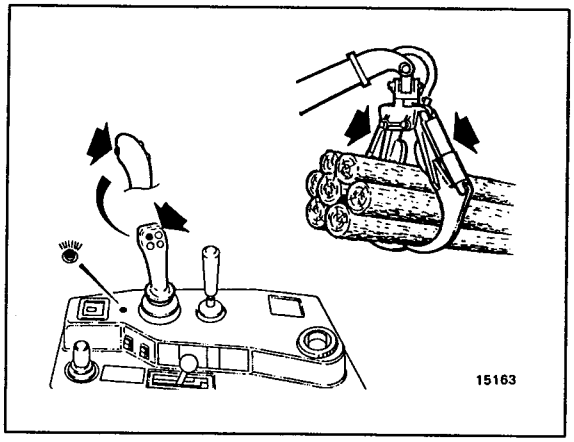
Note:
When shifting between forward and reverse directions, the controller will automatically select the gear range that was last used in that direction. However, if the EGS remains in neutral for longer than fifteen minutes, these values are automatically reset to 3rd. gear in Forward and 2nd. gear in Reverse.

5.2 Using the Implements



Grapple Control - Open and Close

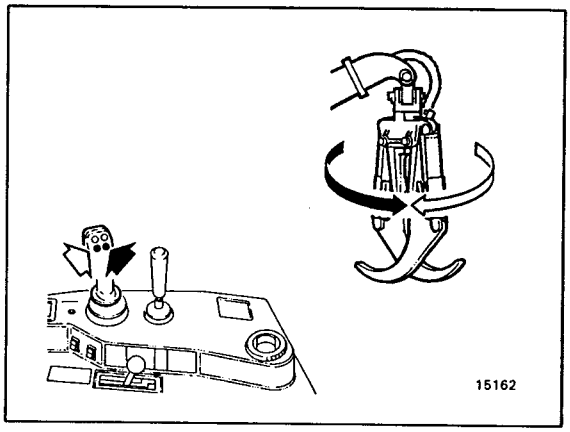
Pushing the upper left button will close the tongs.
Pushing the upper right button will open the tongs.



Grapple Control - Constant Pressure

To ensure that the load remains firmly held, momentarily press the upper left button and the 'trigger' button at the same time. Constant pressure will be maintained on the tongs and the 'Constant Pressure' indicator will light up.

To release the constant pressure function, momentarily press the upper right button.

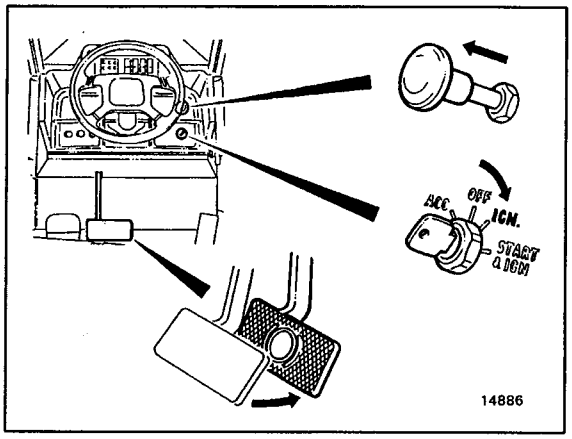


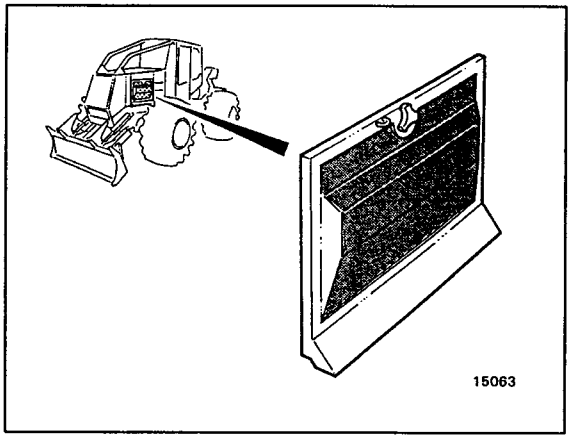
Grapple Head Rotation

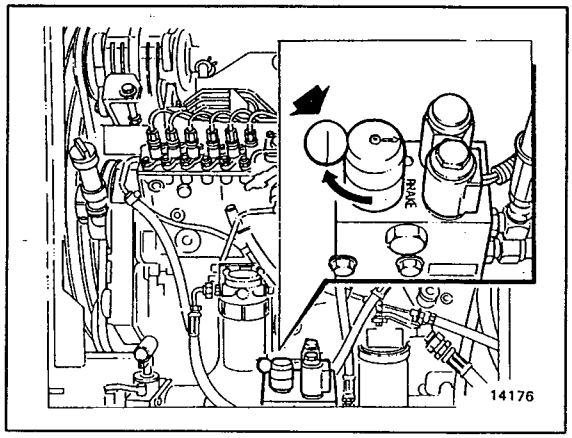
Clockwise	Press the lower left button.
Counter-clockwise	Press the lower right button.

5.6 Towing the Skidder

5.6.2 Manual Parking Brake Release







WARNING

Lower the decking blade to the ground and block the wheels before releasing the brakes.
Failure to follow this safety procedure can lead to risk of personal injury and equipment damage.

Important!
The operator must be in a seated position in the cab before attempting to release the brake.

1. With the engine stopped, turn the ignition key to the ON position (IGN).
2. Pull the parking brake button out to the OFF position.
3. Momentarily depress the service brake pedal. The parking brake should now be released and the red indicator light on the dash will be OFF.

If the machine has been standing for an extended period of time without the engine running, it may be necessary to charge the accumulator before the manual brake release system can be used. Items 4 through 9 show the steps taken to charge the accumulator.

4. Turn the ignition key to the OFF position.
5. Remove the engine left hand side screen.
6. Rotate the knob on the tilt/brake release valve to the 'BRAKE' position.

6.1 Maintenance Schedule

Service all of the items listed in the maintenance schedule without exception.
The time intervals that are shown are not fixed, but are to be used as a guide.

Maintenance 8 Hours:

1. Check engine oil level.
2. Check air filter pre-cleaner.
3. Check and clean engine air filter. * **
4. Check fuel/water separator.
5. Check engine coolant level.
6. Check hydraulic fluid level.
7. Check transmission oil level.
8. Check fuel level.
9. Lubricate front and rear pillow blocks. ***
10. Lubricate central grease block.
11. Lubricate rear steering cylinder pins.
12. Lubricate frame hinge pins.
13. Lubricate decking blade pivots.
14. Lubricate grapple hinge points.
15. Check grapple head snubber adjustment.
16. Clean external surfaces and engine compartment.
17. Fill windshield washer reservoir.
18. Clean air conditioner primary filter. **
19. Check water tank pressure.
20. Check cab tilt locking pin bolts.

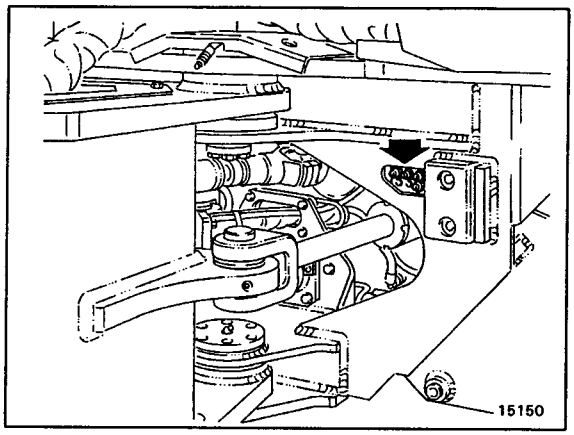
Maintenance 50 Hours:

21. Clean radiator and oil cooler fins.
22. Check planetary hub oil level.
23. Check axle differential oil level.
24. Lubricate axle pinion seals. ***
25. Check and clean axle breathers.
26. Check fire extinguisher pressure.
27. Lubricate driveshafts. ***
28. Inspect for loose bolts, oil leaks, unusual wear or damage.
29. Check tire condition and pressure.
30. Check wheel nut torque.
31. Check air conditioner secondary filter. *
32. Check heater air filter.
33. Check hand pump oil level.
34. Clean air conditioner condenser fins.

* Under extremely dusty conditions, more frequent cleaning may be required.
** Cleaning frequency may be extended to 50 hours depending on environmental dust conditions.
*** Under very wet and muddy conditions, more frequent lubrication may be required.

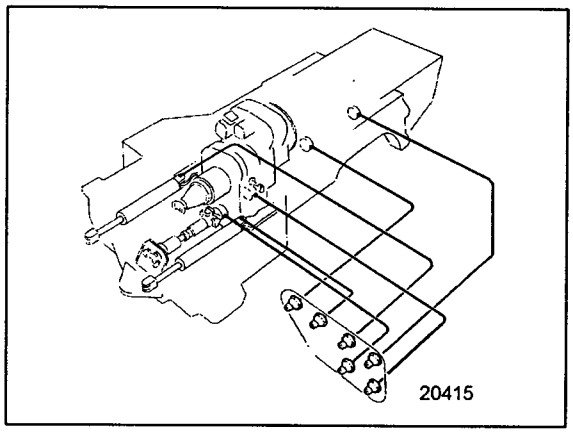
6.2 Maintenance Procedures

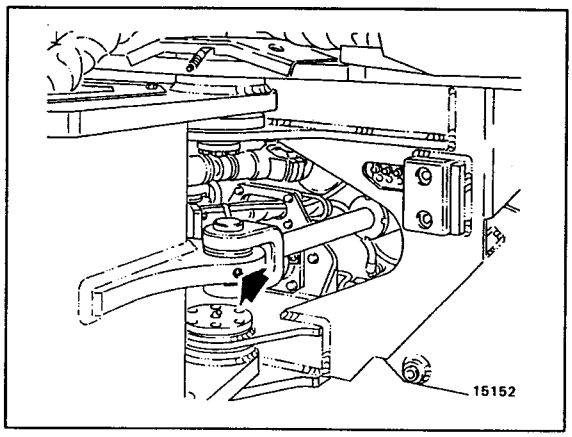
6.2.1 Maintenance 8 Hours



10. Lubricate Central Grease Block.

Turn the machine to a full left turn to access the lubrication point.
Pump two or three shots of grease through each of the fittings in the central grease block.
See Section 6.3 for recommended grease.



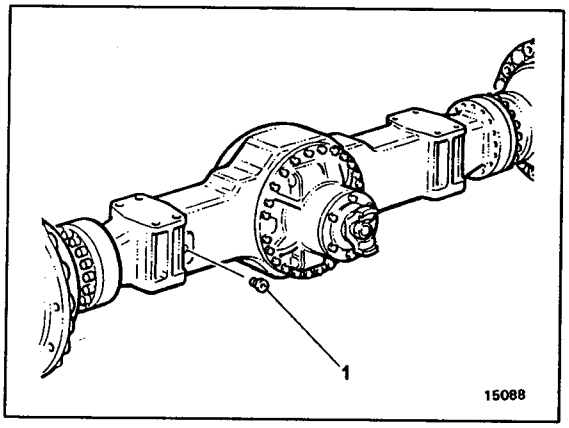


11. Lubricate Rear Steering Cylinder Pins

Lubricate both rear steering cylinder pins.
See Section 6.3 for recommended grease.

6.2 Maintenance Procedures

6.2.1 Maintenance 50 Hours



23. Check Axle Differential Oil Level.

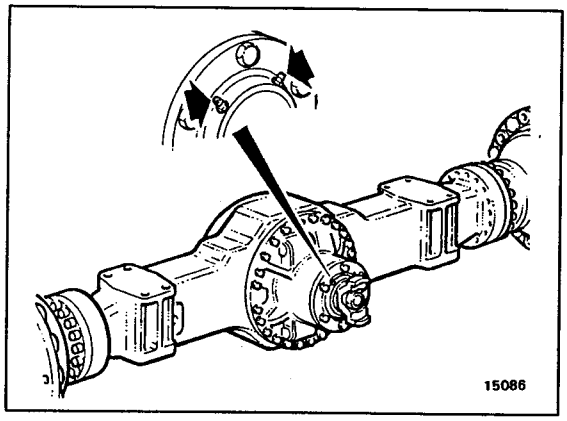
WARNING

Shut the engine off, lower the decking blade to the ground, and engage the parking brake before working under the machine.

Failure to observe these safety precautions can lead to risk of personal injury.

Oil should be level with the bottom of the filler plug hole (1). Add oil if required.

See Section 6.3 for recommended oil.

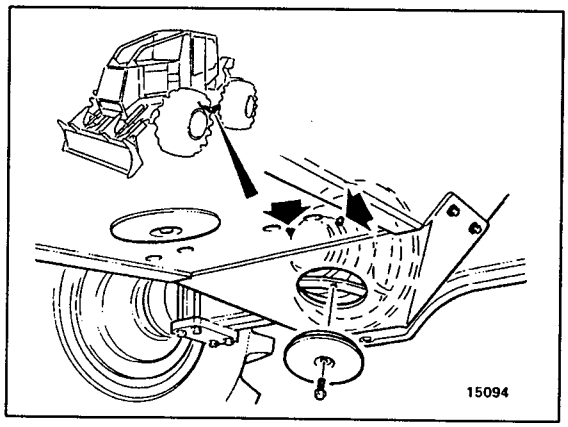


24. Lubricate Axle Pinion Seals

Front Axle

The grease fittings are accessible from the underside of the front frame where the axle extends beyond the walking beam.

Pump two or three shots of grease into either grease fitting. See Section 6.3 for recommended grease.



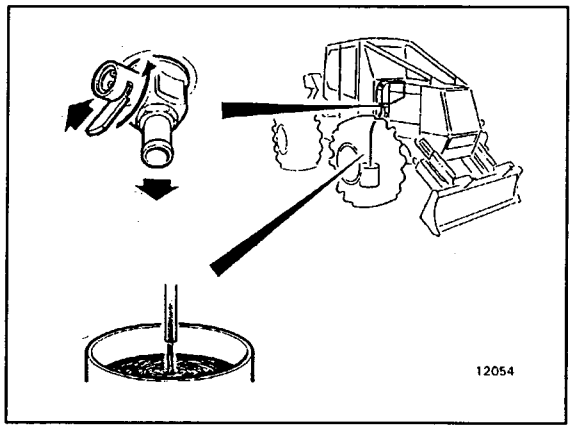
Rear Axle

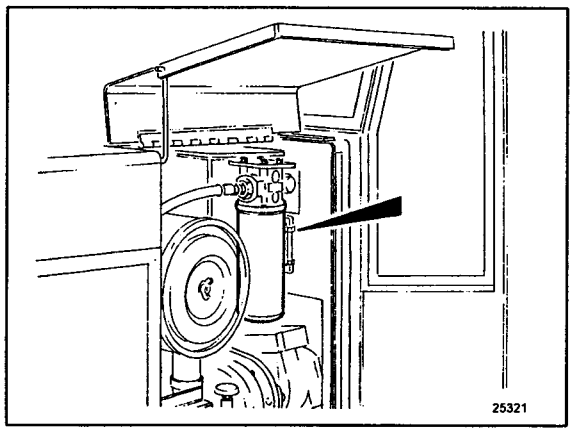
The grease fittings are reached by removing the access cover in the rear frame belly pan.

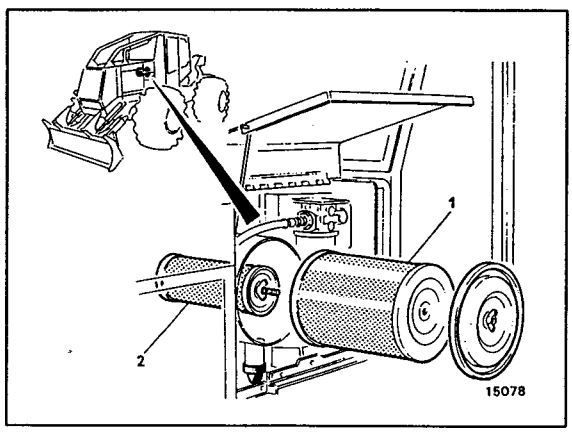
Pump two or three shots of grease into either grease fitting. See Section 6.3 for recommended grease.

6.2 Maintenance Procedures

6.2.3 Maintenance 500 Hours







43. Change Hydraulic Oil.

Note:
When ambient temperatures are close to or below freezing, it is recommended to run the machine until the oil has warmed up.

Relieve any pressure in the hydraulic tank by opening the air vent located on the front of the tank (LH side of machine)

Remove the lower access panel, and then drain the oil into a suitable container.

Use the hand pump to fill the tank with fresh oil until it is visible in the sight glass within the range shown on the decal.
See item 6. for details on the use of the hand pump.

After the oil change is completed, close the air vent, run the engine at idle speed and operate all of the hydraulic controls.

Shut off the engine and check the fluid level. Add additional oil if necessary.

See Section 6.3 for recommended oil and viscosity.

44. Change Air Filter Elements.

Change both the primary (1) and secondary (2) elements. Inspect the housing for damage.

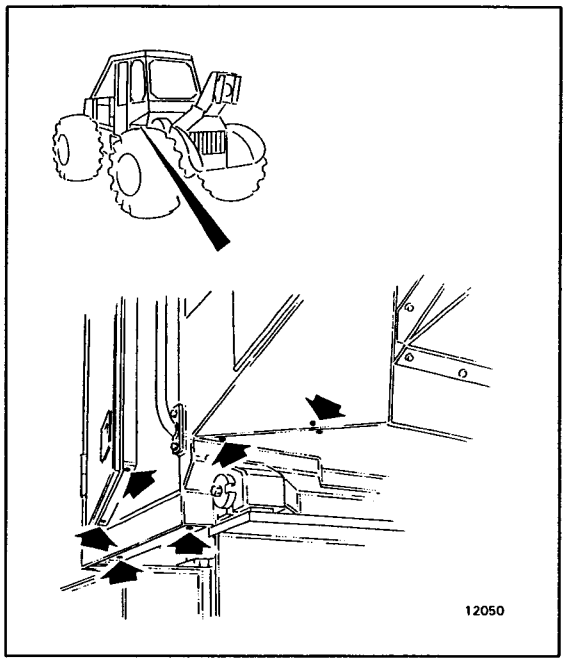
When installing the cover, make sure the seal fits tightly.

6.2 Maintenance Procedures

6.2.6 Unscheduled Maintenance

Drain Cab Drain Holes

Using a 1/4" (6.3 mm) diameter rod, clean out the drain holes in both cab doors and the fire suppression compartment.



7.1 Hydraulic Schematic - 360 Cable (F294731)

1. Hydraulic Valve - Steering
2. Crossover Relief ..... 24.48 MPa (3550 psi)
3. Steering Cylinders
4. Decking Blade Cylinders
5. Hydraulic Valve
6. Main Relief ..... 23.3 MPa (3375 psi)
7. Decking Blade Port Relief ..... 22.2 MPa (3225 psi)
8. Valve Section - Decking Blade
9. Priority Valve
10. Secondary Steering Pump (Optional)
11. Secondary Steering Pump Switch ..... 138 kPa (20 psi)
12. Main Hydraulic Pump
13. Pressure Compensator (Standby Pressure) .... 20.68 MPa (3000 psi)
14. Solenoid Valve - Pump Unloading
15. Check Valve ..... 58.6 kPa (8.5 psi)
16. Hydraulic Oil Cooler
17. Hydraulic Tank
18. Relief Valve ..... 34 kPa (5 psi) Outlet
    ..... 3.0 kPa (0.44 psi) Vacuum Inlet
19. Hydraulic Oil Filter
20. Hydraulic Oil Filter By-pass ..... 172 kPa (25 psi)
21. Hand Pump - Oil Fill ..... 700 cc/stroke (42.7 in3/stroke)
22. Test Port

6. Schematics

6.8 460 Dual Arch Grapple (F294399)

1.	Hydraulic Valve - Steering		
2.	Crossover Relief		24.48 MPa (3550 psi)
3.	Steering Cylinders		
4.	Decking Blade Cylinders		
5.	Grapple Arch Cylinders		
6.	Grapple Boom Cylinders		
7.	Grapple Rotate Motor (Esco Head)		260 cc/rev (15.9 in3/rev)
	7a Grapple Rotate Motor (Timberjack Head)		491 cc/rev (30.0 in3/rev)
8.	Crossover Relief (Esco Head)		17.2 MPa (2500 psi)
	8a Crossover Relief (Timberjack Head)		20.7 MPa (3000 psi)
9.	Grapple Tong Cylinders		
10.	Valve Section - Grapple Tongs		
11.	Port Relief - Grapple Tongs	4a	22.2 MPa (3225 psi)
12.	Port Relief - Grapple Tongs	4b	24.1 MPa (3500 psi)
13.	Valve Section - Grapple Rotator		
14.	Valve Section - Grapple Boom		
15.	Port Relief - Grapple Boom	2a	24.1 MPa (3500 psi)
16.	Port Relief - Grapple Boom	2b	18.6 MPa (2700 psi)
17.	Valve Section - Grapple Arch		
18.	Port Relief - Grapple Arch	1a	22.2 MPa (3225 psi)
19.	Port Relief - Grapple Arch	1b	18.6 MPa (2700 psi)
20.	Valve Section - Decking Blade		
21.	Port relief - Decking Blade (Raise)		22.2 MPa (3225 psi)
	Port relief - Decking Blade (Lower)		22.2 MPa (3225 psi)
22.	Hydraulic Valve		
23.	Main Relief		23.3 MPa (3375 psi)
24.	Priority Valve		
25.	Secondary Steering Pump (Optional)		
26.	Secondary Steering Pump Switch		138 kPa (20 psi)
27.	Differential Lock Valve		
28.	Joystick Pilot Pressure Manifold		
29.	Pressure Reducing Valve		4.1 MPa (600 psi)
30.	Main Hydraulic Pump		67.0 cc/rev (4.09 cu in/rev)
31.	Pressure Compensator Valve		20.68 MPa (3000 psi)
	Standby pressure		20.68 MPa (3000 psi)
32.	Solenoid Valve - Pump Unloading		
33.	Check Valve		55 kPa (8psi)
34.	Hydraulic Oil Cooler		
35.	Hydraulic Tank		
36.	Air Pressure Relief Valve		34 kPa (5 psi) Outlet
			3.00 kPa (0.44 psi) Vacuum Inlet
37.	Hydraulic Oil Filter		
38.	Hydraulic Oil Filter By-pass		172 kPa (25 psi)
39.	Test Port		
40.	Pilot Joystick		2.75 MPa (400 psi) Output.
41.	Hand Pump - Oil Fill		700 cc/stroke (42.7 in3/stroke)
42.	Differential Lock - Rear Axle		

8. Electrical System

8.1 General

The instrument panel is available in two configurations (monitor package or instrument package), therefore two sets of schematics are supplied

A. Monitor Instrument Package Use Schematic F290968.

B. Gauge Instrument Package Use Schematic F294412.

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9.3 Electrical System Troubleshooting

Complete electrical system not functioning

Master disconnect switch turned off	Turn switch on
Ignition switch circuit breaker tripped	Reset circuit breaker
Battery(ies) missing or disconnected	Install or reconnect batteries
Battery(ies) discharged	Charge or replace battery(ies)
Corroded battery connector(s)	Clean battery connectors

Battery(ies) not being charged

Loose or corroded battery connector(s)	Clean and tighten battery connections.
Battery water level low	Add water
Loose or damaged alternator/fan belt	Replace belt
Alternator not charging	Contact an authorized dealer
Sulfated or worn-out battery(ies)	Replace battery(ies)

9.9 Miscellaneous Troubleshooting

9.9.1 Cab Heater Troubleshooting

No heat

Thermostatic control turned off	Increase control setting
No coolant flow to heater	Open flow control valve

Low heat

Restricted air filter	Clean or replace filter
Dirt in heater core	Clean heater core
Blower fan not running	Reset circuit breaker
Blower fan not running at fastest speed	Turn switch to fastest speed
Too much cold incoming air	Switch to recirculating air
Low engine coolant temperature	Wait for engine coolant temperature warm up

Window fogs up

Front or rear defroster fan not operating	Turn defroster fan on
Lack of outside air	Clean or replace intake air filter Switch to fresh air intake
Air humidity too high	Activate air conditioning unit

10.7 Equipment Specifications

10.7.1 Power Train Specifications

Engine: 360

Model	Cummins 6BT5.9
Displacement	5.9 litres. (359 cu. in.)
Rated HP	110 kW (148 hp) 2200 rpm
High Idle	2412 - 2502 rpm
Low Idle	850 - 1050 rpm
Stall Speed	1710 - 1860 rpm

Engine: 460

Model	Cummins 6BTA5.9
Displacement	5.9 litres. (359 cu. in.)
Rated HP	130 kW (174 hp) 2200 rpm
High Idle	2412 - 2502 rpm
Low Idle	850 - 1050 rpm
Stall Speed	1845 - 2020 rpm

Power Shift Transmission

Model	HRS32000
Torque Converter	13.7
Speeds	6 forward and 3 reverse Electronic Control

Transmission Oil Filter

Type	Spin-on
Bypass Pressure	172 kPa (25 psi)

Cooling System:

Surge Tank Capacity	9.3 litres (2.45 U.S. gal.)
System Pressure	103 kPa (15 psi)

Fan:

Type	9 blade 26 in. (660 mm) RH pusher.

Air Cleaner:

Type	Dry 2 stage with safety element

Air Precleaner (Option):

Size	216 mm (8.5") dia