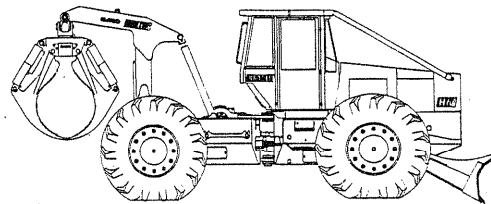


RANGER



Log Skidder Operator's Manual



R14826

Record Your Unit
Serial Number Here

Allied Systems
COMPANY



WARNING

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.**

(10-95)

FOREWORD

The purpose of this manual is to serve as a guide to the proper operation and maintenance of your machine. Study this manual carefully before starting, operating the machine or performing any preventive maintenance procedures. Many hours have been spent in designing and producing the safest and most efficient machine possible. All this may be wasted if you do not read the safety instructions and follow them. Become familiar with all controls and instructions and keep this manual in the machine for handy reference. Machines usually do not cause accidents, people do. A safety conscious person and a well maintained machine make a safe, efficient and profitable combination.

NOTE: *This manual has been written to include options not necessarily fitted to the version of the machine you have purchased. We therefore ask you to disregard information which is not applicable to your machine.*

It is our policy to constantly strive to improve our products. The right therefore is reserved to make changes in design and improvements whenever it is believed the efficiency of the product will be improved, without incurring any obligation to incorporate such improvements in any product which has been shipped or is in service.

SAFETY REGULATIONS

Each country has its own safety legislation. It is in the operator's own interest to be conversant with these regulations and to comply with them in full. This also applies to local bylaws and regulations in force on a particular worksite.

Should the recommendations in this manual deviate from those in the user's country, the national regulations should be followed.

SAFETY ALERT SYMBOL



The symbol shown above will appear at various points in this manual in conjunction with warning statements. Its appearance means: "WARNING! BE ALERT! YOUR SAFETY IS INVOLVED!"

NOTE: *Make sure that the warning Decals are readable, otherwise accidents may occur.*

KNOW THE CAPACITY AND LIMITS OF YOUR MACHINE!

CONTENTS

PRESENTATION

INSTRUMENT PANEL

OTHER CONTROLS

OPERATING INSTRUCTIONS

BASIC PREVENTIVE
MAINTENANCE

CONTENTS

UNAUTHORIZED MODIFICATION OF ROLLOVER PROTECTIVE STRUCTURE (ROPS)

Do not make unauthorized modifications or alterations to the ROPS such as: welding on fire extinguisher brackets, antenna brackets, or fire suppression systems. Unauthorized modifications will affect the structural limits of the ROPS and will void the certification.

The Rollover Protective Structures (ROPS) have been certified to meet specified test requirements. These certifications are required by the U.S. Department of Labor under OSHA Regulation 1926.1000 and other regulations.

Any planned modification or change must be reviewed in advance by the Engineering Department to determine if the modification or change can be made within the limits of the certifying tests.

It is important that each person in your organization, including management, be made fully aware of these rules involving the ROPS.

Whenever anyone sees a machine ROPS with unauthorized modifications or changes, both the customer and manufacturer should be notified in writing.

SPARK ARRESTER MAY BE REQUIRED

Many states and other governmental entities have adopted laws and regulations which require spark arresters on machines operating on or near forests, brush or grass covered lands within their jurisdiction. The Federal government also has regulations (Forest Services) which require spark arresters on machines operating on National lands.

Use of machines without spark arresters in areas where such use is prohibited by law or regulation can subject the owner or operator of the machine to penal fines or civil damages, including the costs of fire suppression.

Spark arresting equipment complying with the applicable laws and regulations must be installed on any machines which are likely to be operated in such areas. All machines which are converted for woodland use (loggers, harvesters, etc.) should be equipped with approved spark arresting equipment.

The H67 machine has a turbocharged engine which does not require additional spark arresting equipment to comply with currently known laws and regulation.

FIRE; (PREVENTION, EQUIPMENT AND SUPPRESSION)

Fire Preventive Instructions

Forest fires are both costly and dangerous. Fire prevention must be foremost in the mind of a log skidder operator. Observe the following instructions to reduce the chance of a fire.

- Fire prevention features provided by the manufacturer should be maintained in operational condition and should be used to supplement the operator's fire prevention efforts. In no case should the features be used or assumed as replacement for operator efforts at preventing fires.
- Keep the machine and all equipment free of dirt, wood, oil etc. This will decrease possible fire hazards and make it easier to find loose or defective parts. This is especially important when working with combustible materials.
- The engine compartment and frame assembly should be inspected and cleaned at least daily, To do a thorough job, remove the access panels. Use regulated compressed air, steam or water with a non-flammable degreasing agent to remove all foreign materials. Maintain the engine cooling system to avoid overheating.
- Remove any debris from the operator's compartment and winch platform after each work shift.
- Check all the electrical wiring and connections for defects. Keep battery terminals clean and tight. if you find a problem, repair or replace immediately.
- Inspect the driveshaft and brakes for debris and remove all traces.
- Inspect all fuel, oil and hydraulic lines and connections. Tighten or replace any that show any leakage.
- Clean up any fuel, oil or hydraulic fluid spills after making repairs or servicing.
- Oily clothes are a serious fire hazard.
- Never perform welding operations until the entire machine has undergone a thorough cleaning. In addition, cover rubber hoses etc. and have at least a fire extinguisher at hand.
- Hydraulic fluid is flammable. Do not weld on pipes or tubes that are filled with fluid. Be careful when welding next to filled pipes or tubes.
- There is always a risk of fire. Find out which type of fire extinguisher to use, where it is and how to use it.
- Gasoline is highly flammable and should never be used as a cleaning fluid. Use an approved solvent for cleaning.
- Some solvents can cause skin rashes and or fire dangers. Do not inhale solvent vapors.
- Store flammable starting aids in a cool, well ventilated location away from combustible materials.
- Smoking, open flames, etc. should not be permitted around any machine during fueling operations and/or when fuel system is open to the atmosphere.

CONTENTS

Fire Fighting Equipment

- Keep your fire extinguishers fully charged and in good working order. Know how to use them.
- Carry an approved fire extinguisher rated for all class of fires.
- A 5 pound rated extinguisher is the minimum size recommended in some areas. Check local laws.
- Install it within reach of the operator in a position that protects it from damage.
- Use only a "quick release" type of mount.
- Service the extinguisher according to the manufacturer's specifications. Service after every use, no matter how short a time and never operate the machine without both in full working order.

Fire Suppression

- Do not panic!
- Stop the machine and turn off engine in the clearest area available.
- Lower the blade (and log grapple if applicable).
- Shut off fuel and battery disconnect.
- Take the extinguisher and proceed to the source of the fire calmly.
- Though the manufacturer's instructions may vary, normally aim at the base of the fire.
- Even when the fire seems to be out, stand by with the extinguisher until the fire area is dead cool. Check this by removing any panels and looking for hot spots.
- Locate the cause of the fire and correct it before re-starting the machine.
- Thoroughly inspect the entire machine and recharge or replace the extinguisher(s) before returning to work.

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Section 1

Presentation



Fig. 1-1 Ranger H67 Skidder

PRESENTATION - H67 RANGER SKIDDER

This manual is your guide to correct operation of the RANGER H67. Become familiar with it, understand it, and use it. Read all instructions carefully prior to operation. They will help you understand the unit, its capabilities, and its limitations.

The Ranger H67 articulated log skidders are available in the following model styles.

A Cable Skidder with a bare drum winch line pull of 15,182kpa (33,400lbf),

Ranger Parallelogram Grapple Skidder with a 2670 mm (105 in) grapple opening and a 360° rotation,

A standard Esco 100" HI-VIS

An optional Esco HI-VIS Single Arch Grapple Skidder with a 2184 mm (86 in) grapple opening and a 270° rotation.

The Allied W3C Winch is standard on the Parallelogram and the Single Arch Ranger Skidders.

The (Lufkin Winch) is standard on the Cable Skidder.

ENGINE - CURRENT PRODUCTION

The standard engine is a six cylinder Cummins 6BTA5.9 rated at 174 Hp (132Kw) @ 2500 rpm. A 185 hp (138 kw) 6BTA5.9 Elite series engine is available as an option.

DRIVE TRAIN

The transmission is a three speed power shift, full reversing, hydraulic transmission. A separate torque converter provides up to 2.73 to one torque multiplication. Gear shifting is through a lever operated, hydraulic control valve and forward and reverse modulation is provided for use in the first and second speed ranges.

The front drive axle has a No-Spin differential as standard and Dif-Lock as an option. The rear drive axle is standard with Dif-Lock. Both front and rear axles incorporate inboard mounted planetaries.

The winch is shaft driven and hydraulically controlled. It can be operated with the machine standing or with it moving in forward or reverse.

Drive shafts incorporate universal and slip shafts.

PRESENTATION

BRAKES

A single service brake pedal actuates two sealed, inboard mounted, wet disc brake units in the rear axle as well as a multiple wet disc brake mounted to the transmission. The transmission mounted wet disc brake also serves as a mechanically applied parking brake.

BRAKE ACCUMULATORS

If oil flow to the brake operating circuit is interrupted for any reason, safe braking operation will be temporarily provided by energy stored in the brake accumulators. Two accumulators are in the system, isolated from each other; to serve the two separate brake circuits.

STEERING

The hydraulic steering valve, controlled by the steering wheel, actuates the double acting hydraulic cylinders, which move the hinged front and rear frames to turn the machine. Turning the steering wheel to the right or left moves the machine in that direction.

CAB

The enclosed cab provides roll-over and falling object protection (ROPS / FOPS) in accordance with applicable SAE and ISO certification requirements.



MAINTENANCE AND INSPECTIONS

MAINTENANCE

If the machine is to work as economically as possible, thorough maintenance is necessary. The recommended intervals for maintenance and lubrication refer to normal working conditions. The maintenance work described in this manual can be carried out by a trained operator. Further adjustments and repairs should be performed by an authorized dealer.

INSPECTIONS

Delivery Inspections

Before the machine left the factory it was tested and adjusted. In addition to this, your dealer has carried out a further check, the "Predelivery Inspection", according to our instructions before the machine was delivered to you.

Follow-Up Inspections

It is important that the machine receive further checks. Re-tightening bolts, checking adjustments and other minor measures have to be carried out. The machine should have two follow up service inspections. The first should be completed within the first 30 days or 100 hours of operation. The second should be done within 6 months, but not more than 1000 hours of operation.

The points in time at which these services should be carried out may be changed without prior notice.

Maintenance Inspections

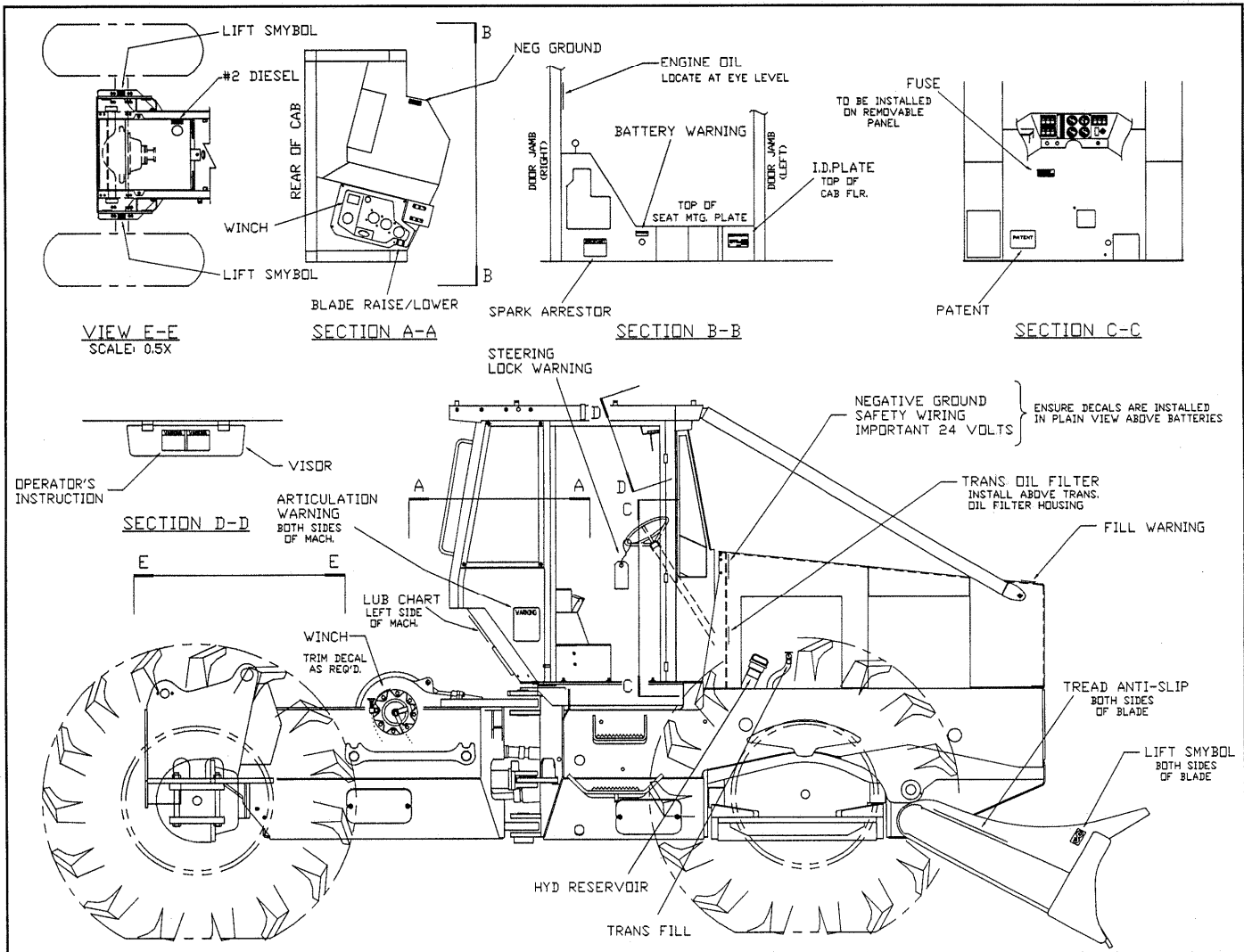
In addition to the maintenance listed in this manual, authorized dealers offer maintenance programs which give an indication of the general condition of the machine.

Further information about these programs can be obtained from the nearest authorized dealer.

PRESENTATION

NAMEPLATES, WARNINGS AND INFORMATION DECALS

DECALS AND PLATES ARE INSTALLED AT SPECIFIC PLACES ON THE SKIDDER TO AID THE OPERATOR OR SERVICEMAN BY WARNING HIM OF POTENTIAL HAZARDS AND BY OUTLINING THE PROCEDURES THAT MUST BE FOLLOWED FOR PROPER SERVICE. DECALS AND PLATES SHOULD BE INSPECTED FREQUENTLY FOR DAMAGE AND DETERIORATION. PLATES SHOULD BE CHECKED FOR LOOSE OR MISSING HARDWARE.



WARNING

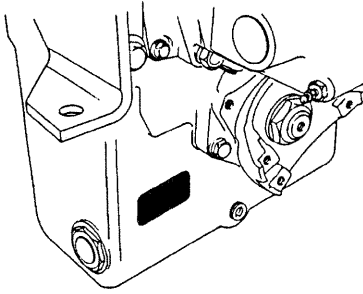
NOTE: DO NOT OPERATE THIS MACHINE UNTIL YOU HAVE STUDIED THIS MANUAL CAREFULLY. MAKE YOURSELF FAMILIAR WITH THE OPERATION OF THIS MACHINE, INCLUDING THE POSITION AND FUNCTION OF THE VARIOUS INSTRUMENTS OCCASIONALLY, NOTING ANY ABNORMAL READINGS, AND TAKE THE APPROPRIATE CORRECTIVE ACTION TO PREVENT SERIOUS DAMAGE.

SERIAL AND MODEL NUMBERS

Transmission Serial Number and Model Number

The transmission serial number and model number are located on the metal tag attached to the rear of the transmission.

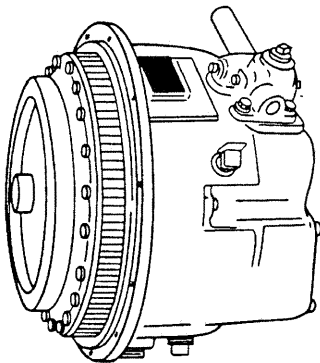
NOTE: The position of the metal tag maybe in a slightly different position than that in the illustration.



Torque Converter Serial Number and Model Plate

The torque converter serial number and model plate are located on the metal tag on the converter housing.

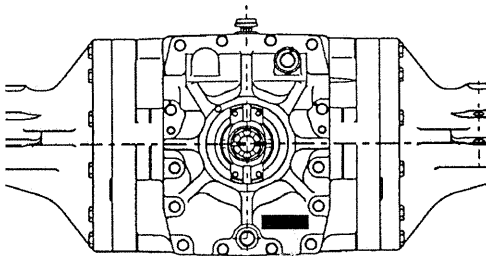
NOTE: The position of the metal tag may be in a slightly different position than that in the illustration.



Drive Axle Ratio and Serial Number Model Plate

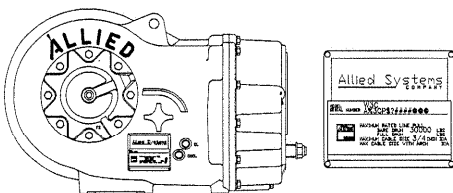
The drive axle ratio and serial number model plate are located on the metal tag on the differential housing.

NOTE: The position of the metal tag may be in a slightly different position than that in the illustration.



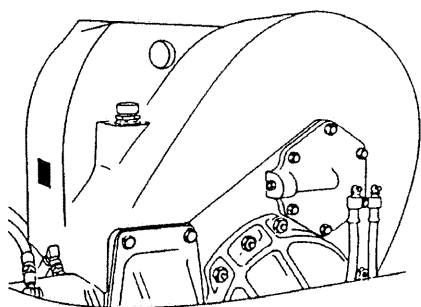
Grapple Winch Serial Number and Model Number

The winch serial number and model number are contained on the NAME PLATE which is located on the side of the WINCH. In addition to S/N and M/N, it contains other pertinent information such as; gear ratios, internal options (if any), maximum cable size, and maximum rated line pull.



(See following page for Cable Winch)

PRESENTATION



Cable Winch Serial Number and Model Number

The winch serial number and model number are contained on the NAME PLATE which is located on the front of the WINCH. In addition to S/N and M/N, it contains other pertinent information such as; gear ratios, internal options (if any), maximum cable size, and maximum rated line pull.

Section 2

Instrument Panel

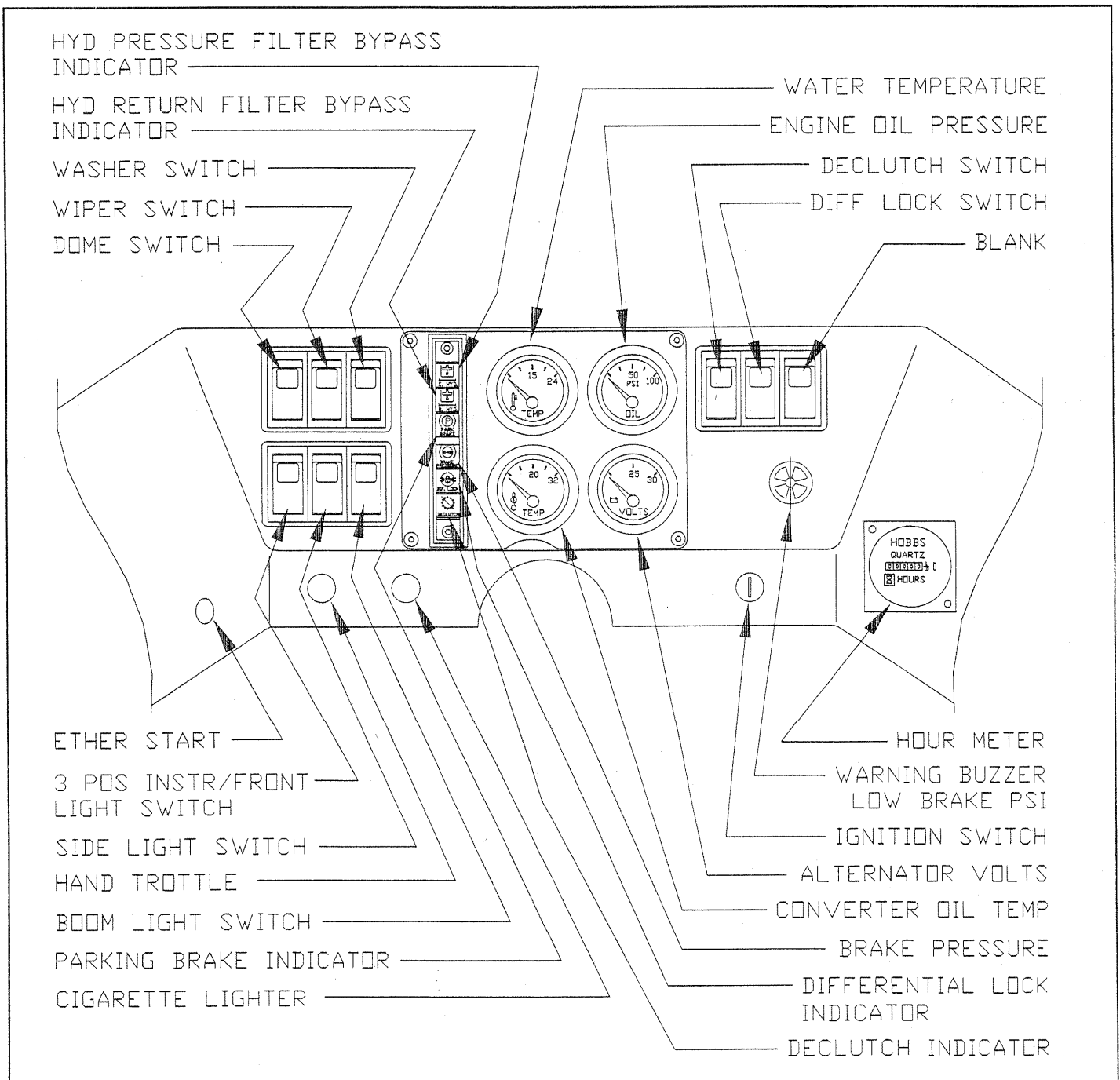


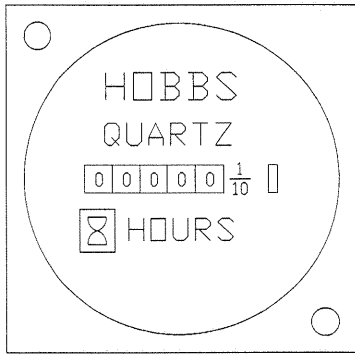
Fig. 2-1 Ranger H67 Skidder - Instrument Panel



WARNING

NOTE: DO NOT OPERATE THIS MACHINE UNTIL YOU HAVE STUDIED THIS MANUAL CAREFULLY. MAKE YOURSELF FAMILIAR WITH THE OPERATION OF THIS MACHINE, INCLUDING THE POSITION AND FUNCTION OF THE VARIOUS INSTRUMENTS OCCASIONALLY, NOTING ANY ABNORMAL READINGS, AND TAKE THE APPROPRIATE CORRECTIVE ACTION TO PREVENT SERIOUS DAMAGE.

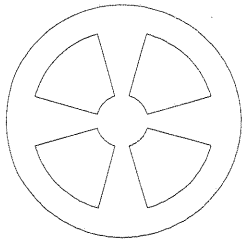
INSTRUMENT PANEL



Hour Meter

HOURL METER

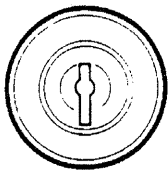
The hour meter indicates the number of hours of operation that the machine has worked. Monitor the hour meter closely to enable periodic lubrication and maintenance operations to be done at the recommended operating intervals. This will contribute to longer, trouble free operation of your Ranger Log Skidder.



Warning Buzzer

WARNING BUZZER

The Warning Buzzer will sound when the brake accumulator pressure drops below 1600 PSI.



IGNITION SWITCH

Insert the key into the ignition switch and turn it fully to the right to start the engine. The transmission must be in neutral to be able to start the engine. If the engine stops cranking while starting or will not crank, push the circuit breaker reset button on the right side of the engine and try again. If the engine will not crank, further trouble shooting will be required.

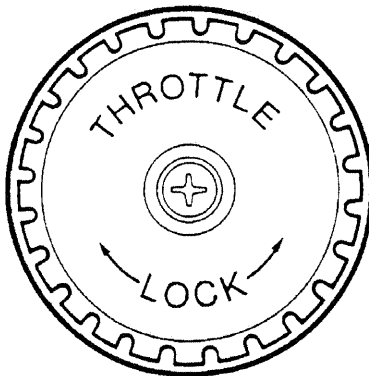


CIGARETTE LIGHTER (Optional)

This is also a power point.



Cigarette Lighter



Hand Throttle Control

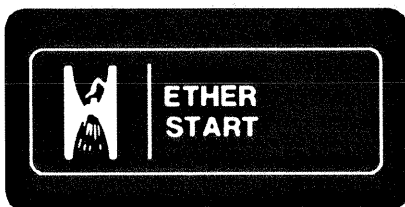
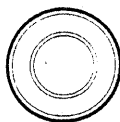
HAND THROTTLE CONTROL (Optional)

This control is for use during warm-up or while making checks or adjustments at specified engine speeds. Pull the handle out until the desired engine speed is reached and turn the handle clockwise to lock it in that position. Turn the handle counter clockwise and push it in all the way to return the engine to Low Idle RPM.



WARNING

DO NOT USE THE HAND THROTTLE WHILE TRAVELING. WHEN THE CONTROL IS LOCKED, THE ACCELERATOR LINKAGE IS LOCKED AS WELL AND IT WILL NOT BE RELEASED BY THE SERVICE BRAKE. RELEASE THE LOCK TO RESTORE THROTTLE CONTROL TO THE ACCELERATOR PEDAL FOR TRAVELING.



Ether Switch

ETHER START SWITCH (Optional)

If the machine is equipped with an ether start.

DIESEL ENGINE COLD STARTING INSTRUCTIONS

1. Use only when starting.
2. Push switch for 3 seconds.
3. Release for 4 seconds to discharge.
4. Repeat as required to keep engine running.
5. Precharge may be required for engines over 500 CID.
6. Refer to special instructions for Automatic Ignition Control.

**IMPORTANT - USE ONLY FOR STARTING
READ COMPLETELY!**

TO ACTIVATE VALVE

1. Crank engine.
2. Pull handle out for 3 seconds to fill valve while engine is cranking.
3. Push handle in to discharge shot while engine is cranking.
4. Crank engine for 20 seconds maximum.

IMPORTANT OUTSIDE TEMPERATURE NOTE

- a. Above 0° F perform steps 1,2, & 3 once only while cranking engine.
- b. Below 0° F perform steps 1,2, & 3 twice only while cranking engine.
- c. If engine fails to start, wait 5 minutes before repeating steps 1,2,3,& 4.

INSTRUMENT PANEL

NOTE: THE INDICATOR LIGHT BANK IS LOCATED ON THE DASH IN THE OPERATOR'S COMPARTMENT.

PRESSURE HYDRAULICS

The Pressure Filter Bypass Hydraulics light indicates that the filter is plugged and needs servicing.

RETURN HYDRAULICS

The Return Filter Bypass Hydraulics light indicates that the filter is plugged and needs servicing.

PARKING BRAKE INDICATOR

The Parking Brake Indicator light indicates that the parking brake is applied when the ignition switch is in the ON position.

BRAKE PRESSURE

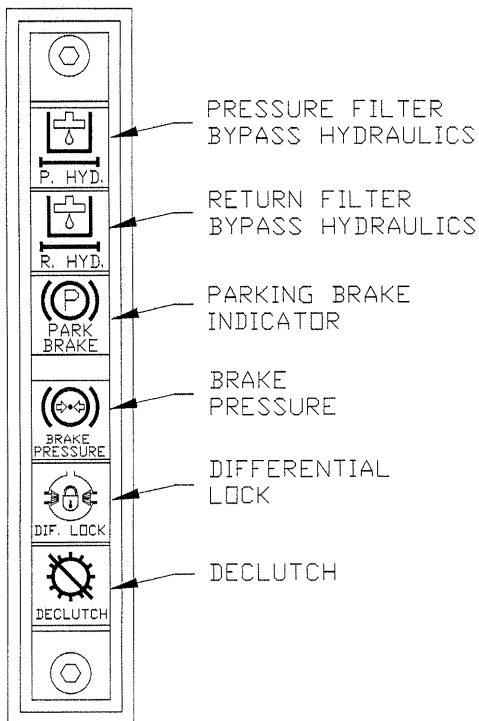
The Brake Pressure light indicates that the pressure in the circuit is low.

DIFFERENTIAL LOCK

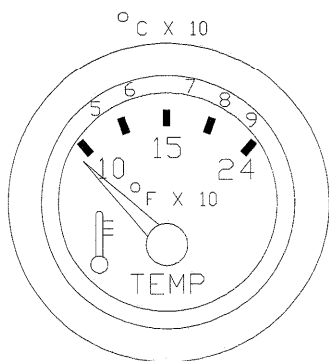
The Differential Lock light indicates that the differential lock is engaged.

DECLUTCH

The Declutch light indicates that the declutch is functioning.



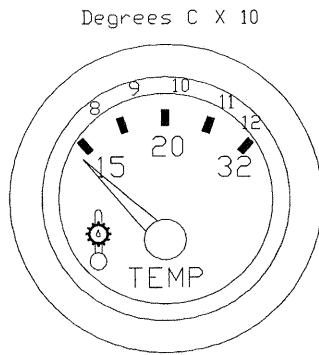
Indicator Lights



Engine Coolant Temp

ENGINE COOLANT TEMPERATURE GAUGE

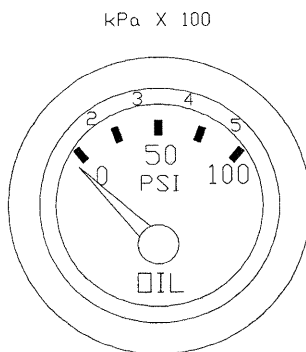
This gauge allows the operator to monitor the temperature of the engine coolant. **DO NOT** allow the needle to enter the 220° F range on the gauge or serious damage to the engine and its components can result. If overheating does occur, shut down the engine immediately and determine the cause.



Converter Oil Temperature

CONVERTER OIL TEMPERATURE GAUGE

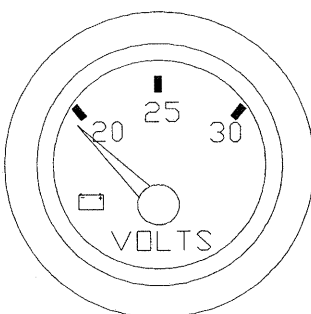
This gauge allows the operator to monitor the temperature of the transmission/converter hydraulic fluid. DO NOT allow the indicator needle to exceed 240° F range on the gauge or serious damage to the system can result. If the system begins to overheat, choose a lower transmission speed range. If the system continues to overheat, shut down the engine and determine the cause.



Engine Oil Pressure Gauge

ENGINE OIL PRESSURE

This gauge allows the operator to monitor the operating pressure of the engine lubrication system. After 15 seconds of operation, this gauge should read 70 kPa (10 PSI) minimum at Low Idle RPM. If the pressure is below this, shut down the engine immediately and determine the cause.

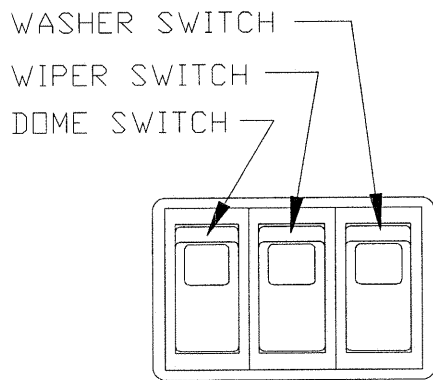


Alternator Voltmeter

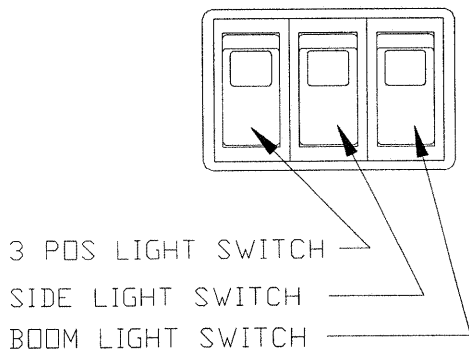
ALTERNATOR VOLTMETER

This gauge shows the electrical system voltage with the IGNITION SWITCH ON. Under normal conditions, the needle will be within the area of the gauge with in 23-25 volts. If the needle enters the zone under 23 or over 25 volts and remains there while operating, the electrical system should be serviced.

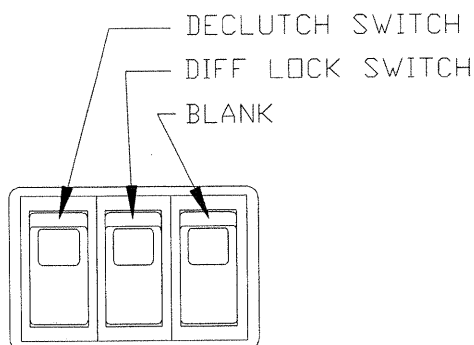
INSTRUMENT PANEL



Upper Left Switches



Lower Left Switches



Upper Right Switches

WASHER SWITCH

Press the rocker switch to apply washer fluid to the windshield.

NOTE: Use only clean windshield washer solvent in the washer reservoir. Use a quality brand of washer anti-freeze if ambient temperature falls below 0 ° C (32 ° F).

WIPER SWITCH

Press the rocker switch to start the windshield wipers. Press in the opposite direction to stop. The wiper switch has two speeds.

DOME SWITCH

The dome light rocker switch controls the dome light inside the cab.

3 POSITION LIGHT SWITCH

This is a three position rocker switch for the instruments and front lights. The Instrument Lights are at the second position and the Front/Instrument Lights are at the third position.

SIDE LIGHT SWITCH

The side light rocker switch controls the side lights outside the cab.

BOOM LIGHT SWITCH

The boom light rocker switch controls the boom lights outside the cab.

DECLUTCH SELECT SWITCH

This switch allows the transmission to be dis-engaged in reverse with the service brake applied for quicker hydraulic functions.

Note: **DECLUTCH:** The transmission although engaged in gear is temporarily dis-engaged.

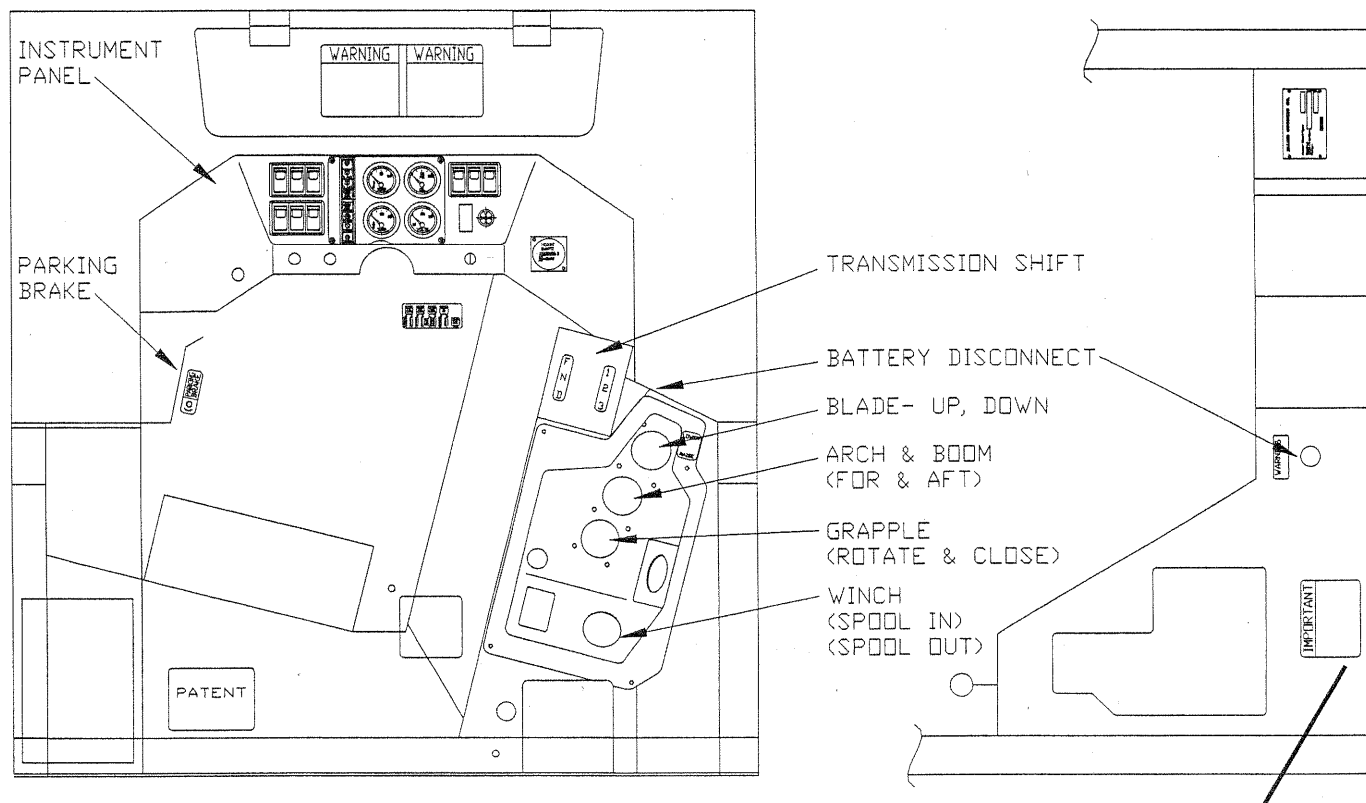
DIFFERENTIAL LOCK SWITCH

Depressing the rocker switch engages the differential lock (Hydro Lock) and the light should be on. Pushing the rocker switch in the opposite direction disengages it and the light should be off.

NOTE: The differential lock is intended, and should be used as an intermittent traction assist device. The differential lock is to be engaged only when additional traction is required. Continual engagement of the lock will result in a loss of horsepower, increased heating of the hydraulic oil, and increased tire wear.

Section 3

Other Controls

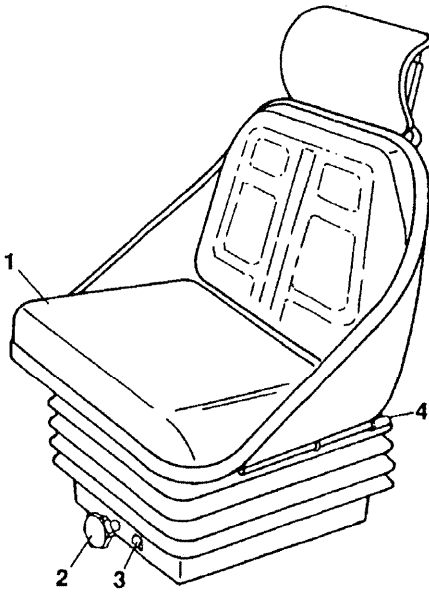


Operator's Cab

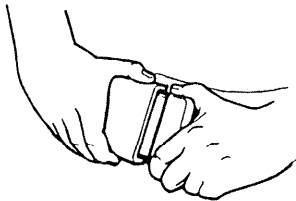
IMPORTANT

THIS MACHINE IS EQUIPPED EITHER WITH A TURBOCHARGER OR SPARK ARRESTOR ON THE EXHAUST SYSTEM IN ORDER TO COMPLY WITH U.S. FOREST SERVICE, CALIFORNIA AND OTHER STATE'S LEGAL REQUIREMENTS FOR USE OF THIS MACHINE IN FLAMMABLE FOREST, BRUSH OR GRASS COVERED AREAS. IF A SPARK ARRESTOR IS INSTALLED ON THIS MACHINE, THE FAILURE TO MAINTAIN IT IN WORKING ORDER VIOLATES THE AFOREMENTIONED LAWS AND REGULATIONS.

OTHER CONTROLS



Operator's Seat



Buckle Up for Safety



Fire Extinguisher

OPERATOR'S SEAT

Adjust the operator's seat to a comfortable position.



WARNING

NOTE: DO NOT ATTEMPT TO MAKE SEAT ADJUSTMENTS WHILE THE MACHINE IS IN MOTION.

Seat Adjustment

This lever is located below the operator's seat and allows the operator to position the seat forward and back. Lift the lever (Item 4) up and hold, then release the lever.

Forward And Back Adjustment

Lift lever (Item 4) up and hold, slide seat to desired position, then release lever.

Height Adjustment

To raise the height of the seat you must manually lift the seat (Item 1) to the first or second click stop.

To lower the seat lift it to its highest position, the seat will then lower into its lowest position. Adjustments can be made accordingly.

Weight Adjustment

By turning the weight adjustment knob (Item 2), located at the bottom of the seat, the operator's weight can be set for a more stable and comfortable ride. The weight selected can be seen through a window (Item 3) next to the adjusting knob with the seat in the unloaded position.

The suspension seat can be adjusted from 110 lbs (50 kg) to 287 lbs (130 kg) and should be set so the seat does not bottom out during normal operation for maximum suspension life.

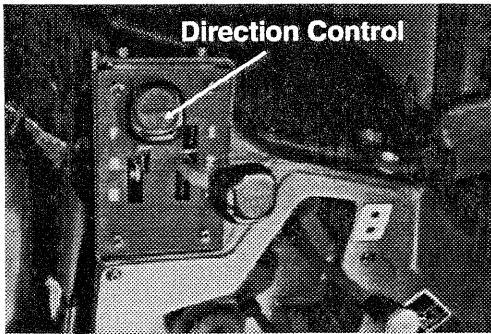
SEAT BELT

Always fasten your seat belt when you operate the machine. Adjust the belt so that it fits snugly around your hips.

Seat belt and mounting must be inspected for damage or wear. Check the buckle for correct operation.

FIRE EXTINGUISHERS (Hand Held)

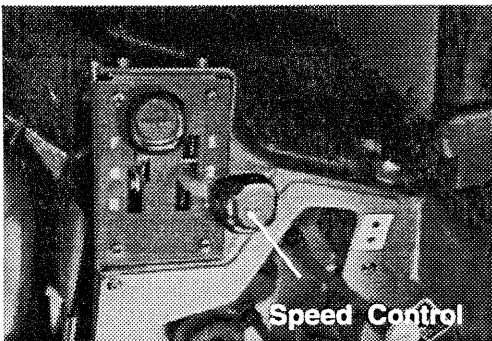
Ranger Skidders are equipped with two 2.3 kg (5 lb.) fire extinguishers. There is one mounted in each door. Read and understand the instructions printed on the canister and learn how to operate them. Learn how to remove the canisters from their mounting brackets in the shortest amount of time.



Direction Control Lever

DIRECTION CONTROL LEVER

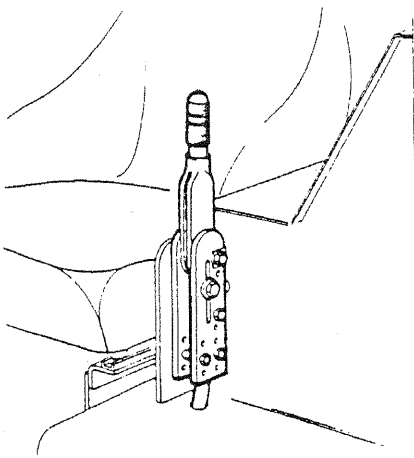
This lever is connected to the transmission control valve and controls the transmission's Forward and Reverse functions and has a center Neutral position.



Speed Range Control

SPEED RANGE CONTROL

This lever is used to select First, Second or Third gear range.



Parking Brake Lever

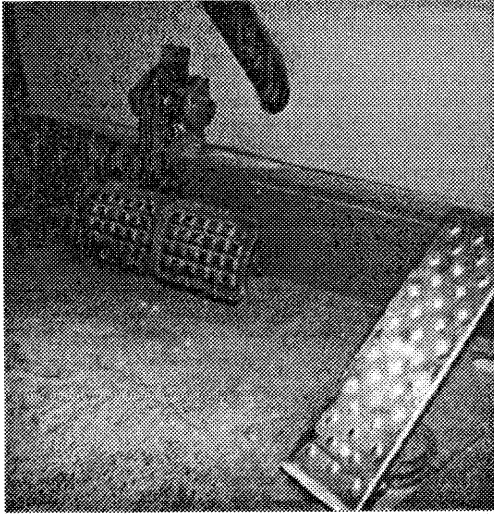
PARKING BRAKE LEVER

Pull this lever up and back to actuate the parking brake mechanism.

The parking brake mechanism is also part of the service brake system and is located on the back of the transmission.

NOTE: This lever has a switch that activates the declutch system. The transmission may still be in gear.

OTHER CONTROLS



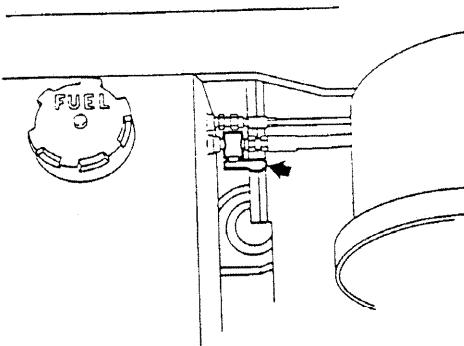
Brake & Accelerator Pedals

ACCELERATOR PEDAL

This pedal is located on the floor to the right of the steering wheel. It controls the engine throttle. Depress the pedal to increase the speed of the machine or release it to decrease the speed.

BRAKE PEDAL

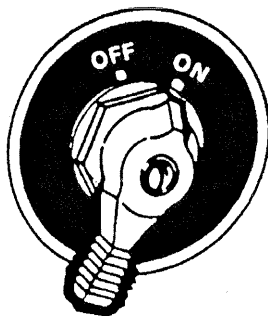
This pedal is located on the floor under the steering wheel. It controls the brakes. Depress the pedal to stop or reduce the speed of the machine.



Fuel Shut Off Valve

FUEL SHUT OFF VALVE

The fuel shut off valve located at the fuel tank should be closed at the end of the work shift. Remember to turn the valve on before starting the engine.



WARNING
DO NOT TURN BATTERY DISCONNECT
SWITCH TO OFF POSITION
WHILE ENGINE IS RUNNING

Battery Disconnect

BATTERY DISCONNECT SWITCH

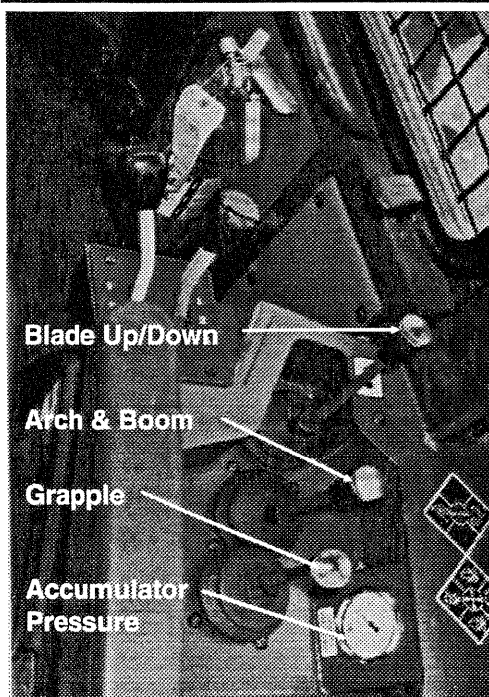
Turn this switch to the OFF position to disconnect the current supply from the battery to the electrical system.



CAUTION

NOTE: DO NOT turn this switch to OFF position while the engine is running.

NOTE: Turn the battery disconnect to the OFF position at the end of each workshift or when the machine is not to be operated.



Console

BLADE UP/DOWN

This lever control is used to raise or lower the blade. Forward to lower, back to raise.

ARCH & BOOM

Arch Control Lever on Grapple Skidders, this lever moves the grapple arch forward or back to position the grapple tongs over the load.

Boom Control Lever on Parallelogram Grapple Skidders; this lever controls the boom pivot to better access the grapple over the load.

GRAPPLE

On Grapple Skidders this lever opens and closes the grapple tongs and rotates the grapple assembly.

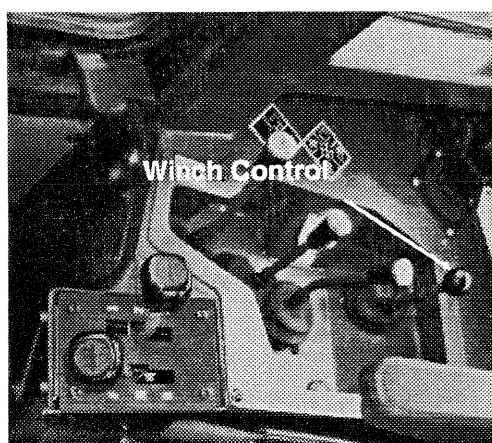
ACCUMULATOR PRESSURE GAUGE

This gauge allows the operator to monitor the pressure in the power grip system.

If there is a pressure drop shown on the gauge, hold the grapple control lever in the CLOSE position long enough to allow the system to reach maximum pressure, about 3000PSI. Experience with your specific operating conditions will tell what pressure reading on the gauge will require that the accumulator be re-energized.

WINCH

This lever actuates the winch control valve to operate the winch with the engine running. When the lever is moved to the FREE-SPOOL position, the winch mainline can be pulled out from the winch cable drum. When the lever is moved to the WINCH-IN position, the winch cable drum will rotate and pull the load. When the lever is in the center LOCK position, the cable drum is held in the SKIDDING mode and the load can be transported to its destination.



Console - Winch Control



WARNING

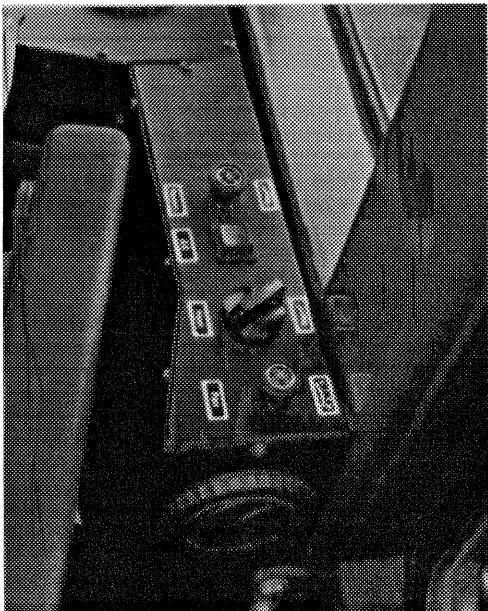
THE WINCH MUST ONLY BE OPERATED FROM THE OPERATOR'S SEAT. NEVER STAND IN THE ARTICULATION AREA (OUTSIDE THE OPERATOR'S GUARD) WHEN YOU OPERATE THE WINCH. THE OPERATOR'S GUARD WILL PROTECT YOU IN THE EVENT THAT THE CABLE SHOULD SNAP UNDER TENSION.



CAUTION

NOTE: WHEN THE LOAD HAS BEEN WINCHED-IN TO THE BUTT PLATE, RELEASE THE WINCH CONTROL LEVER IMMEDIATELY. SERIOUS DAMAGE TO THE WINCH AND TRANSMISSION CAN RESULT IF THE WINCH IS MADE TO PULL AGAINST THE BUTT PLATE LONGER THAN MOMENTARILY.

OTHER CONTROLS



HEATER/ AIR CONDITIONER

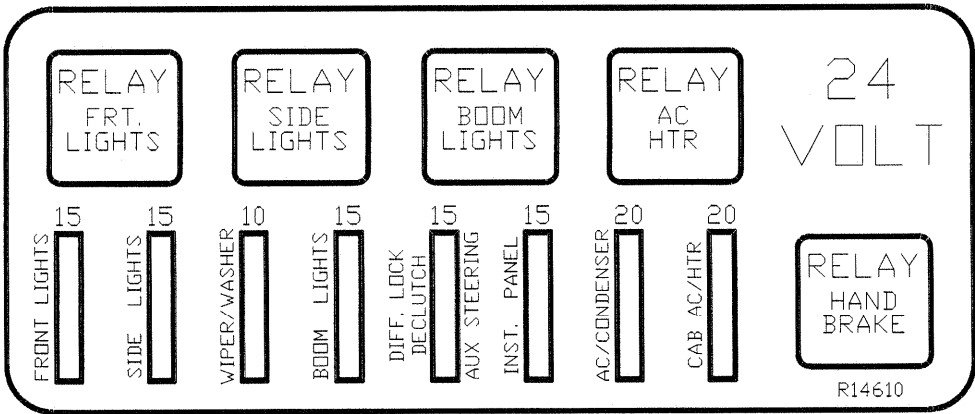
Recirculate Air - 2 Position Rotary Switch

Air Conditioner - Push Button Switch

Heat - Rotary Switch

Fan - 4 Position Rotary Switch

Heater/Air Conditioner



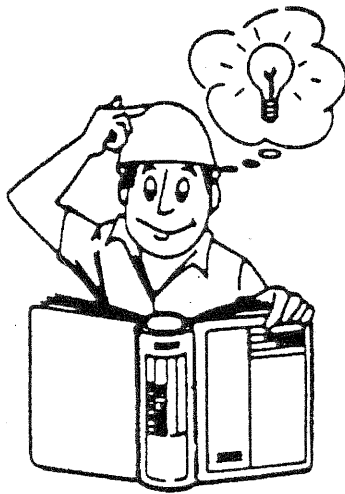
Fuse Panel

FUSE PANEL

The fuse panel is located under the instrument panel on the fire wall. It can be accessed through the cover cutout. See the electrical section of the service manual for the correct type and size of fuse required to restore power.

Section 4

Operating Instructions



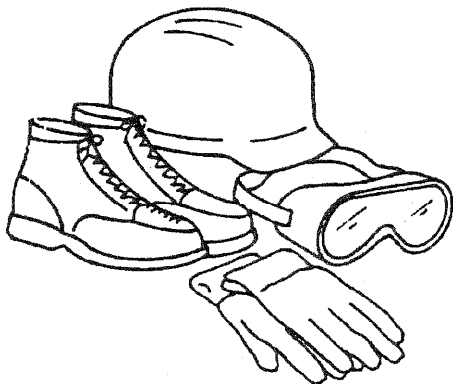
PREPARE TO OPERATE

Before you operate the machine, read and understand this manual.

Never operate the machine while under the influence of alcohol, medicine or other drugs.

The optional enclosed cab has two exits; the left hand door and the right hand door.

The canopy and optional cab are for the protection of the operator. They meet the requirements for R.O.P.S./F.O.P.S. protection according to the S.A.E. and I.S.O. Standards.



Wear suitable clothing.

Know the area and company rules and regulations.

PROCEDURE BEFORE STARTING

- 1. A walk around inspection should be carefully performed looking for leaks, loose, missing or damaged parts. Defects should be corrected prior to starting the engine.
- 2. Daily maintenance checks should be completed.

NOTE: PERFORM MAINTENANCE CHECKS IN SEQUENCE TO AVOID REPEATING MOUNTING AND DISMOUNTING THE MACHINE.



WARNING

NOTE: WHEN MOUNTING AND DISMOUNTING THE MACHINE, USE THREE POINT MOUNT (i.e. TWO HANDS AND ONE FOOT/ONE HAND AND TWO FEET). DON'T JUMP!

In addition to walk around inspection and daily maintenance check, the following checks should be made:

- Frame locking link is in the stored position.
- Wheel blocks are removed.
- Battery disconnect switch is in the "ON" position.
- Fuel shut off valve is turned on.
- Windows are clean, if applicable.
- Park brake is applied.

OPERATING INSTRUCTIONS

RUN IN INSTRUCTIONS

During the first 50 hours of a new machine's operation, the machine must be operated with extra care until all components are run in.

Engine

See the Cummins Operation and Maintenance Manual for break-in instructions for the engine. The engine lubricating oil and filters should be changed after the first 50 hours of operation and every 250 hours of operation thereafter under normal operating conditions.

Transmission

The fluid in the transmission/converter hydraulic system should be checked daily and changed every 1000 hours of operation. The transmission filter element should be changed after the first 50 and 100 hours and every 500 hours thereafter. The sump screen should be cleaned every 1000 hours of operation.

Hydraulic System

The hydraulic system should be checked daily and changed every 1000 hours of operation. Change the filter after the first 50 hours and every 500 hours thereafter. Clean the magnet in the bottom of the tank after the first 50 hours and when the fluid is changed.

NOTE: CLEANLINESS IS VERY IMPORTANT WHEN YOU WORK ON THE ENGINE, TRANSMISSION/CONVERTER OR THE HYDRAULIC SYSTEM.

GENERAL INFORMATION

Transmission

The power shift transmission in your machine allows the operator to shift directly to a higher speed range, even at full throttle. When shifting to a lower speed range, it is recommended that the engine speed be increased to reduce drag from the wheels. The transmission is equipped with Forward-Reverse modulation that allows the direction to be changed under power while the machine is still moving in the FIRST and SECOND SPEED RANGES - ONLY.



WARNING

NOTES: THIS FEATURE SHOULD NOT TO BE USED IN THIRD SPEED RANGE BECAUSE DAMAGE TO THE TRANSMISSION CAN RESULT.

DO NOT USE THE TRANSMISSION AS A DOWN HILL BRAKE, SHIFTING THE TRANSMISSION INTO REVERSE WHILE GOING DOWN A GRADE. THE ENGINE CAN STALL AND THERE WILL BE NO STEERING.

Use the FIRST speed range for maximum traction effort while pulling a load.

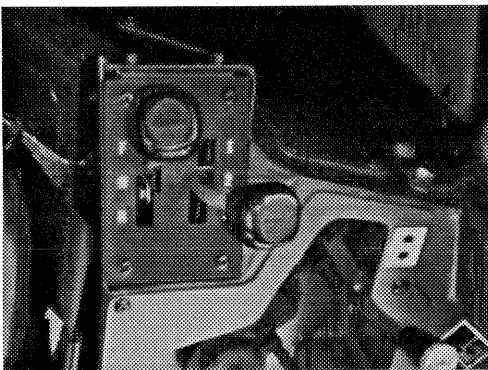
Use the SECOND speed range for normal skidding or decking operations.

Use the THIRD speed range for operating the machine without a load, to travel at maximum speed.



CAUTION

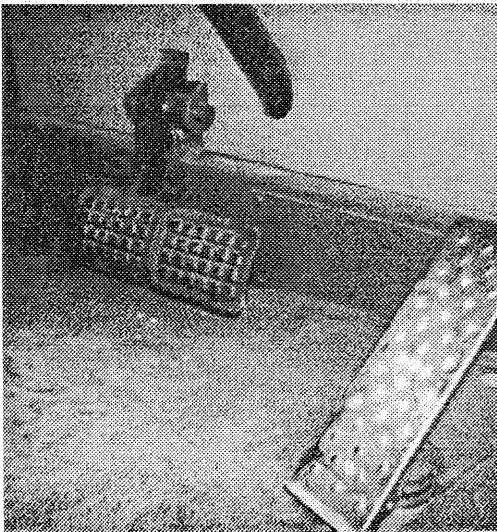
NOTE: IF THE READING ON THE CONVERTER OIL TEMPERATURE GAUGE REACHES 240° F, SHIFT THE MACHINE TO A LOWER SPEED RANGE TO REDUCE THE STRAIN ON THE TORQUE CONVERTER.



Transmission & Speed Range Controls

STEERING

The steering wheel is connected to a steering control valve separate from the main valve. Turning the wheel to the right or left will steer the machine in that direction. The main hydraulic pump, supplying flow to the steering hydraulics is driven by the engine and torque converter. If the engine stalls, steering will be lost and the machine must be brought to an immediate and safe stop.

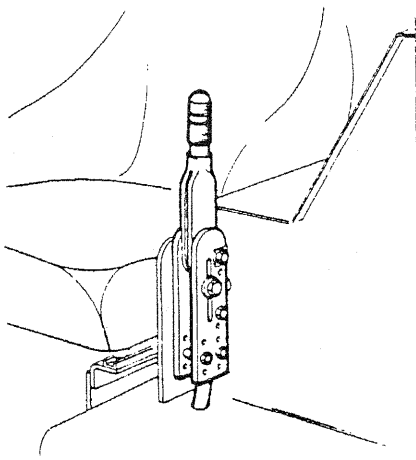


Service Brakes

SERVICE BRAKES

The service brakes are used to slow and/or stop the machine.

NOTE: THE BRAKE SYSTEM IS SEPARATE FROM THE MAIN HYDRAULIC SYSTEM



Parking Brake Lever

PARKING BRAKE

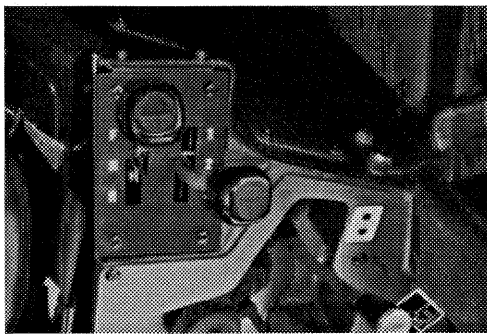


WARNING

DO NOT OPERATE THE RANGERS WITH ONLY ONE OF THE BRAKE SYSTEMS OPERATIONAL. BOTH BRAKE SYSTEMS MUST BE KEPT IN GOOD WORKING CONDITION AT ALL TIMES.

The brake mechanism of the transmission mounted hydraulic brake is mechanically applied for use as a parking brake. Always apply the parking brake and lower the blade when you leave the operator's seat. It should be released before you put the machine in motion. If you park the machine on a grade, the tires should be securely blocked in addition to applying the parking brake and lowering the blade.

OPERATING INSTRUCTIONS



Transmission & Speed Range Controls

STARTING THE ENGINE

1. Check that the transmission is in neutral and the parking brake is applied. If the machine is equipped with a hand throttle, it should be pushed all the way in (to its low idle position).

2. Put the battery disconnect switch in the ON position.



WARNING
DO NOT TURN BATTERY DISCONNECT
SWITCH TO OFF POSITION
WHILE ENGINE IS RUNNING

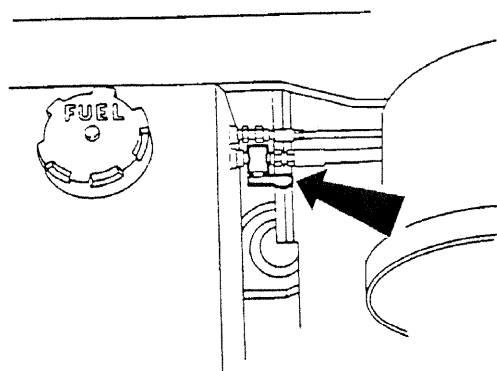
Battery Disconnect Switch



CAUTION

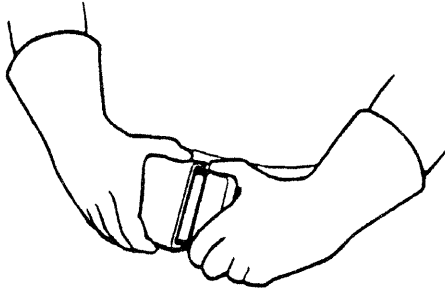
NOTE: DO NOT TURN BATTERY DISCONNECT SWITCH TO OFF POSITION WHILE THE ENGINE IS RUNNING.

3. Turn ON the fuel shut off valve.



Fuel Shut Off Valve

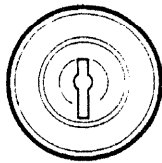
4. Fasten the seat belt.



5. Apply and hold the brake pedal.



Service Brakes



Ignition Switch

6. Insert the key into the ignition switch and turn it fully clockwise to the start position until the engine starts and then release the key. If the reading on the engine oil pressure gauge is less than 70 kPa (10 PSI), after 15 seconds of operation, shut off the engine immediately and determine the cause before you operate the machine.



CAUTION

NOTE: DO NOT CRANK THE ENGINE FOR LONGER THAN 30 SECONDS IF THE ENGINE FAILS TO START. WAIT UNTIL THE STARTER STOPS TURNING BEFORE YOU TURN THE KEY AGAIN. SERIOUS DAMAGE TO THE STARTER MOTOR AND TO THE FLYWHEEL DRIVE GEAR CAN RESULT.

OPERATING INSTRUCTIONS

SHUTDOWN PROCEDURE

- Move the Unit to a safe designated parking area preferably as level as possible.
- Shift the transmission to neutral.
- Set the parking brake.
- Idle the engine for at least five (5) minutes to normalize internal temperatures and prevent damage to the turbocharger.
- Lower the blade to the ground.
- Close the grapple completely and lower it to the ground.
- Be sure the winch cable is retracted and properly secured, not lying on the ground.
- Turn off the ignition switch.



WARNING

WARNING: Turn off the battery disconnect switch.



WARNING

WARNING: Be sure that any accessories not wired through the disconnect switch are turned off. The practice of wiring around the disconnect switch is strongly discouraged by the manufacturer as it creates the possibility for fire and safety hazards.



WARNING

WARNING: Secure the cab as required to prevent vandalism and entry by children or other unauthorized personnel.



WARNING

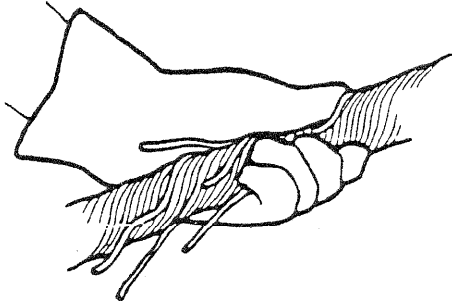
WARNING: Walk around the unit and inspect for mechanical discrepancies or any other problems that may create a safety or potential fire hazard and resolve or report them in the appropriate manner.

Operating Instructions for Cable Skidder

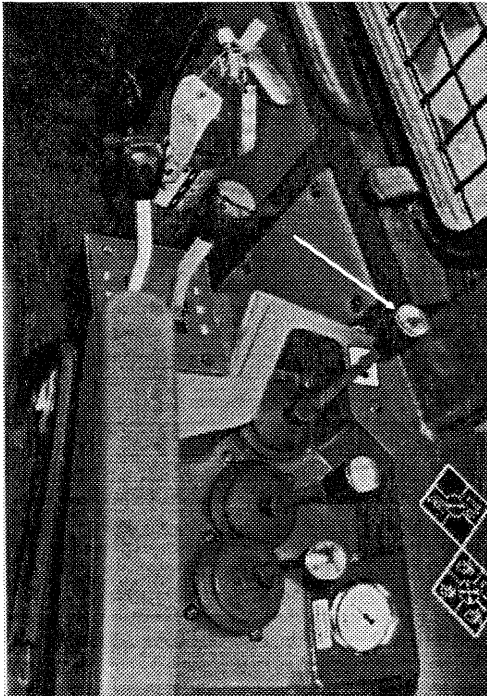
OPERATING A CABLE SKIDDER

NOTE: DO NOT WORK TOO FAST. KNOW YOUR CAPACITY AND THAT OF THE MACHINE.

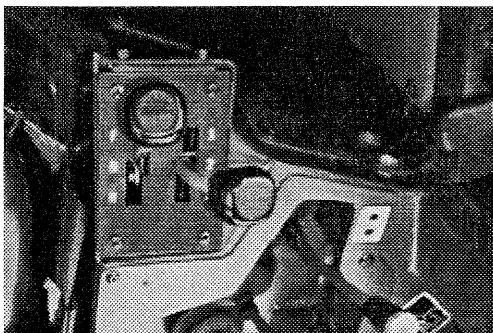
NOTE: MAKE SURE THE PATH OF OPERATION IS CLEAR OF LARGE ROCKS OR OTHER LARGE DEBRIS. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE MACHINE.



SP-10411



Blade Up Down



Direction & Speed Control Levers



WARNING

WARNING: NEVER ENTER OR LEAVE THE OPERATOR'S COMPARTMENT WHILE THE MACHINE IS STILL MOVING.

OPERATE THE MACHINE WHEN SEATED. DO NOT ALLOW RIDERS! WATCH WHERE YOU ARE GOING. STAY AWAY FROM; PEOPLE, THE EDGE OF CLIFFS, OTHER MACHINES AND VEHICLES, ETC.

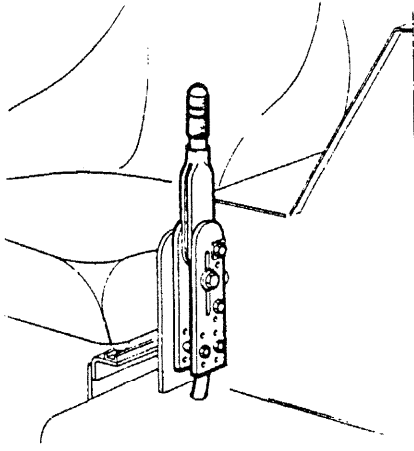
CHECK THE CONDITION OF THE WINCH MAINLINE AND CHOKERS REGULARLY. IF THEY BECOME WORN OR DAMAGED, THEY COULD BREAK UNDER STRESS AND CAUSE SERIOUS BODILY INJURY TO YOURSELF OR CO-WORKERS. REPLACE BADLY WORN OR DAMAGED CABLES PROMPTLY.

ALWAYS WEAR PROTECTIVE WORK GLOVES WHEN YOU HANDLE WINCH CABLES.

Operation

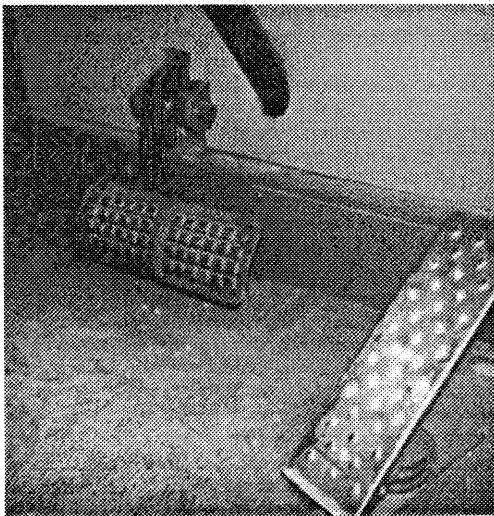
1. Raise the blade to the maximum height.
2. Put the transmission control levers in the desired direction and speed range position.

OPERATING INSTRUCTIONS



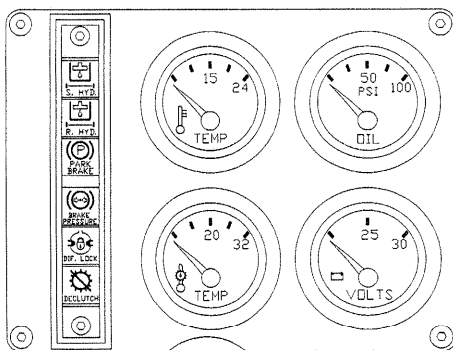
Parking Brake Lever

3. Release the parking brake lever.



Brake & Accelerator Pedals

4. Depress the accelerator pedal to put the machine in motion.

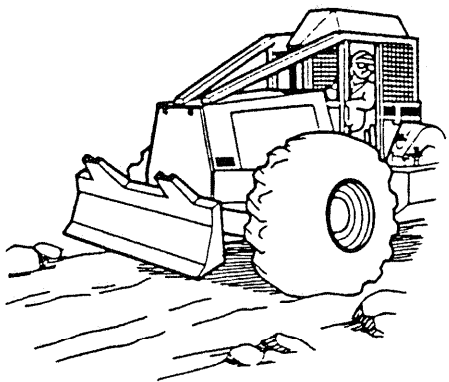


Gauges & Indicator Lights

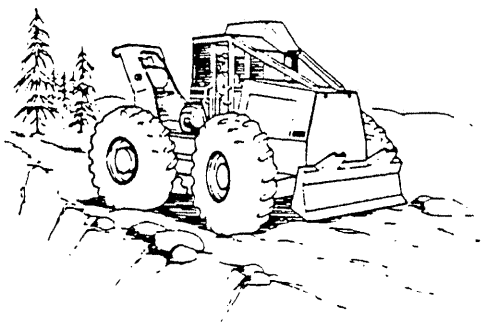
5. Check all gauges to see that all systems are operating correctly.

OPERATING INSTRUCTIONS

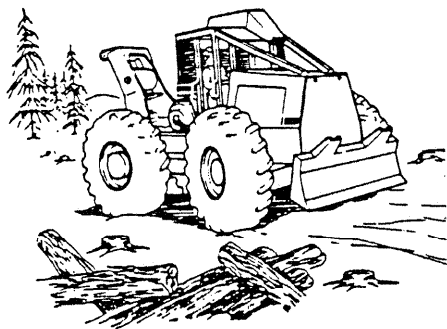
6. Watch out for any obstructions such as rocks and stumps that could overturn or damage the machine.



7. Pay attention along the route you travel to see if there is an easier way to return. The machine will behave much differently when it is pulling a load. This change in mobility can make it necessary to change your return route.



8. When you enter the stump area make a slow turn to see the best position to approach the logs with the least amount of effort and time. Avoid obstructions that can snag or tangle the load.

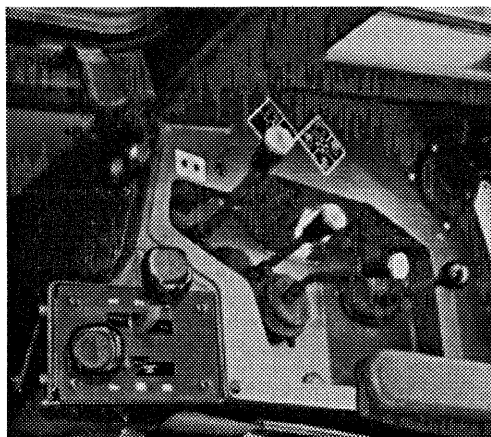


OPERATING INSTRUCTIONS



Direction & Speed Control Levers

9. Before you leave the operator's seat, put the transmission in neutral, lower the blade and apply the parking brake.



Console - Winch Control

10. Put the winch control lever in free-spool position. Unbuckle your seat belt and exit the operator's compartment.



WARNING

WARNING: NEVER ENTER OR LEAVE THE OPERATOR'S COMPARTMENT WHILE THE MACHINE IS STILL MOVING.



11. Go to the rear of the machine and pull the winch mainline and chokers from the winch cable drum far enough to reach the ends of the logs to be attached.

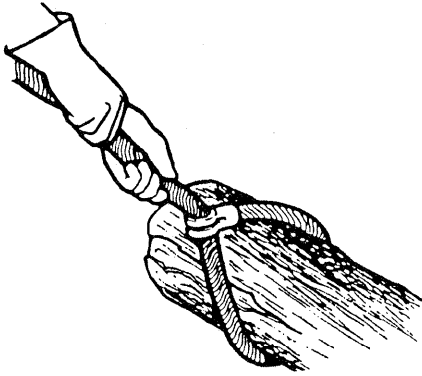


WARNING

NOTE: REMEMBER TO ALWAYS WEAR PROTECTIVE WORK GLOVES WHEN YOU HANDLE WINCH CABLES.

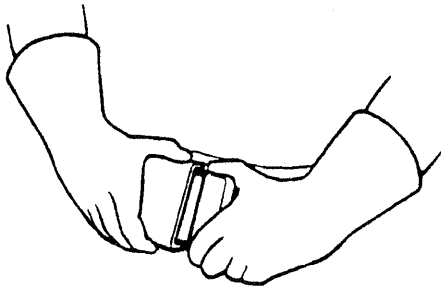
OPERATING INSTRUCTIONS

12. Attach the chokers around the butt ends of the logs approximately 60 cm (24 in.) from the ends, pulling the cables snug.

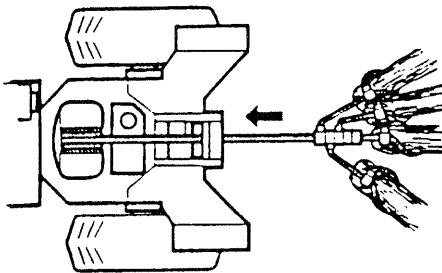


NOTE: THE SIZE AND NUMBERS OF LOGS YOU CAN SKID AT ONE TIME WILL DEPEND ON THE TERRAIN AND THE CONDITIONS IN WHICH YOU ARE WORKING AS WELL AS THE NATURE OF THE WOOD ITSELF. EXPERIENCE AND COMMON SENSE WILL TELL YOU THE LOAD YOU SHOULD SKID.

13. With all the chokers set, remount the skidder and fasten your seat belt.

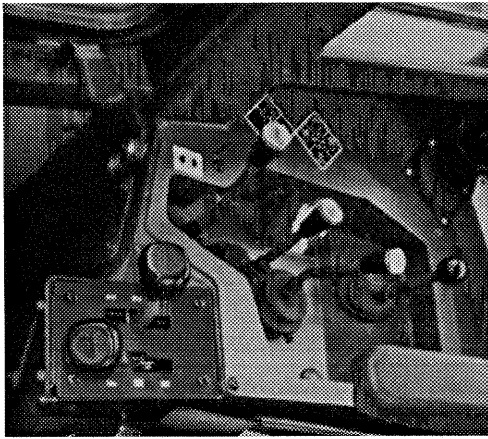


14. Before you winch the logs in, be sure that the machine is pointing in the same direction as the logs are to be pulled. It is best to pull the logs straight into the rear of the machine, especially on a grade.



NOTE: WATCH FOR CO-WORKERS THAT MAY BE IN YOUR PATH AND ADVISE THEM TO STAND CLEAR.

OPERATING INSTRUCTIONS



Console - Winch Control

15. Raise the blade and release the parking brake and put the winch control lever in WINCH-IN position to pull the load. The winch cable drum speed is determined by the speed of the engine and load on the torque converter, so increase the engine speed as required. As the logs are pulled in, they will be bunched together. Make sure that the load is neatly bunched and pull snug against the butt pan. Put the winch control lever in LOCK position and return to the landing.

WINCHING TECHNIQUES

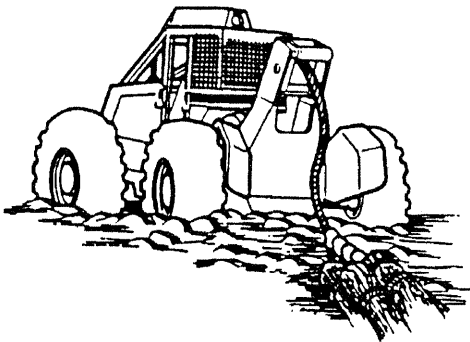
Bunching

As stated earlier, when logs are winched up to the butt pan, they will bunch together. Increasing the speed of the winch can help to pull the load easier over obstructions but you must use common sense to avoid breaking the cables on large rocks or stumps or even overturning the machine. Bunching can even be done with the machine in motion if necessary. This can help to bunch the logs under certain conditions.



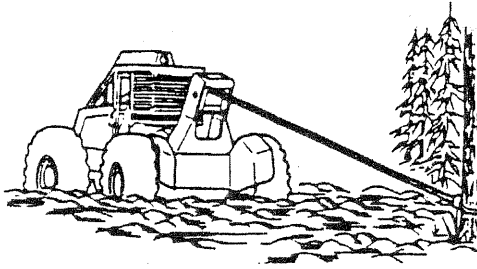
Drop - Winching

If the machine loses traction in soft or muddy ground or because of obstructions, quickly put the winch control in FREE-SPOOL position and drop the load until the machine reaches firmer or clearer ground. Remember not to out run the length of your mainline. When better conditions are reached winch in the load. Put the winch control lever in the LOCK position and return to the landing.



Reverse - Winching

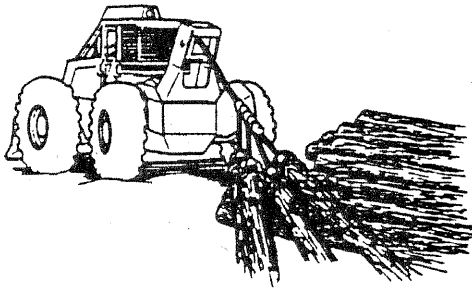
If the machine becomes stuck and can not be freed in either direction, the winch cable can be fastened to a stationary object such as a large tree and with the transmission in REVERSE, winch in the cable under power to free the machine.



NOTE: The differential lock is intended, and should be used as an intermittent traction assist device. The differential lock is to be engaged only when additional traction is required. Continual engagement of the lock will result in a loss of horsepower, increased heating of the hydraulic oil, and increased tire wear.

DECKING

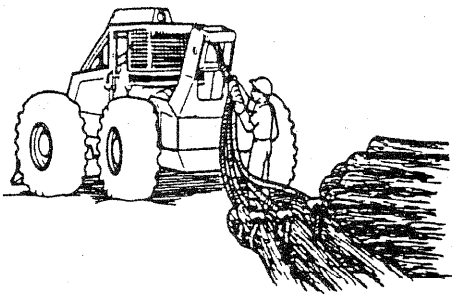
1. When you reach the landing, pull the logs onto the pile and put the winch control lever in the FREE-SPOOL position while the machine is still moving to drop the logs in the desired position on the pile.



2. Before you leave the operator's seat put the transmission in NEUTRAL, lower the blade and apply the parking brake.

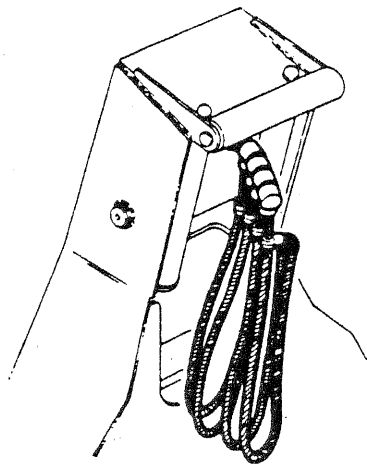
3. Unfasten your seat belt and exit the operator's compartment.

4. Pull the cable from the cable drum so that the chokers are loose enough to remove easily and remove all of the chokers from the logs.

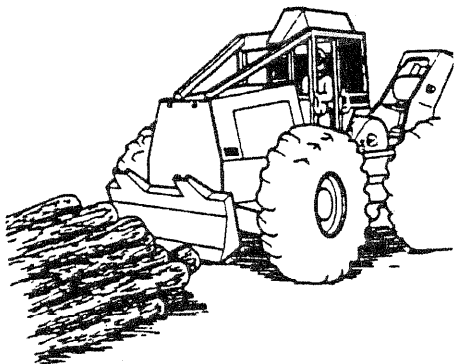


OPERATING INSTRUCTIONS

5. Remount the machine, fasten your seatbelt and winch the mainline onto the cable drum until the chokers are pulled up to the fairlead main roller.



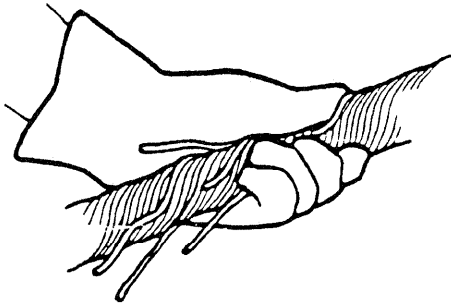
6. To make a pile and even up the logs, first release the parking brake, Then put the transmission in **First** or **Second** speed range so that more power will be available to the hydraulic system. Position the machine so that the logs can be evened and piled up with the blade.



Operating Instructions for Grapple Skidder

OPERATING A GRAPPLE SKIDDER

Parallelogram or HI-VIS Grapple Skidder



NOTE: DO NOT WORK TO FAST. KNOW YOUR CAPACITY AND THAT OF THE MACHINE.

NOTE: MAKE SURE THE PATH OF OPERATION IS CLEAR OF LARGE ROCKS OR OTHER LARGE DEBRIS. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE MACHINE.



WARNING

WARNING: NEVER ENTER OR LEAVE THE OPERATOR'S COMPARTMENT WHILE THE MACHINE IS STILL MOVING.

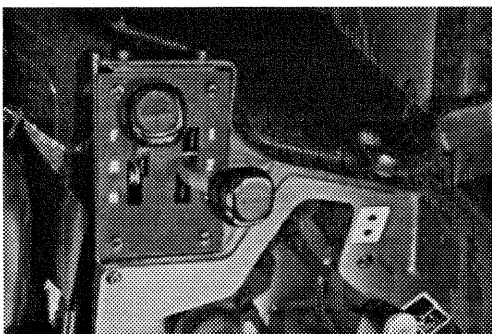
OPERATE THE MACHINE WHEN SEATED. DO NOT ALLOW RIDERS! WATCH WHERE YOU ARE GOING. STAY AWAY FROM; PEOPLE, THE EDGE OF CLIFFS, OTHER MACHINES AND VEHICLES, ETC.

CHECK THE CONDITION OF THE WINCH MAINLINE AND CHOKERS REGULARLY. IF THEY BECOME WORN OR DAMAGED, THEY COULD BREAK UNDER STRESS AND CAUSE SERIOUS BODILY INJURY TO YOURSELF OR CO-WORKERS. REPLACE BADLY WORN OR DAMAGED CABLES PROMPTLY.

ALWAYS WEAR PROTECTIVE WORK GLOVES WHEN YOU HANDLE WINCH CABLES.



Blade Up Down



Direction & Speed Control Levers

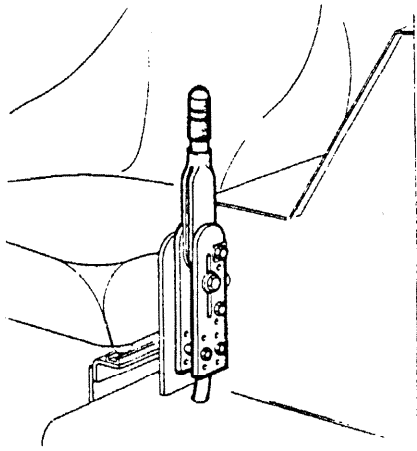
Operation

1. Raise the blade to its maximum operating height.

2. Put the transmission control levers in the desired direction and speed range position.

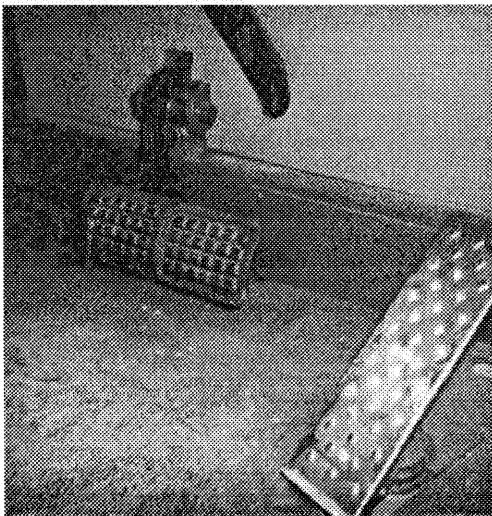
OPERATING INSTRUCTIONS

3. Release the parking brake lever.



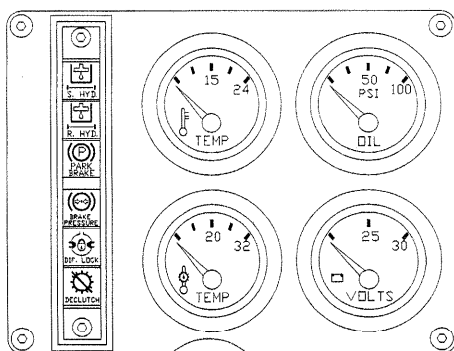
Parking Brake Lever

4. Depress the accelerator pedal to put the machine in motion.



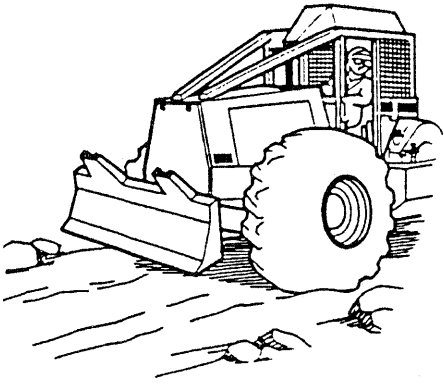
Brake & Accelerator Pedals

5. Check all gauges to see that all systems are operating correctly.

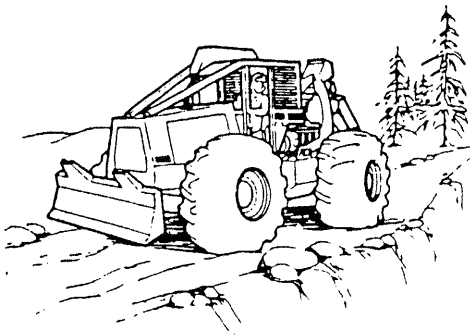


Gauges & Indicator Lights

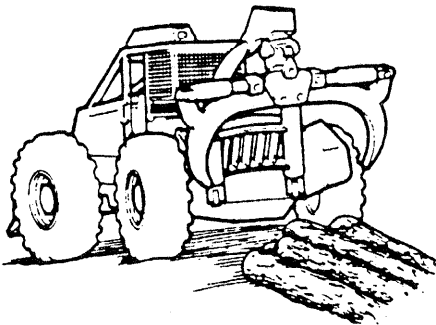
OPERATING INSTRUCTIONS



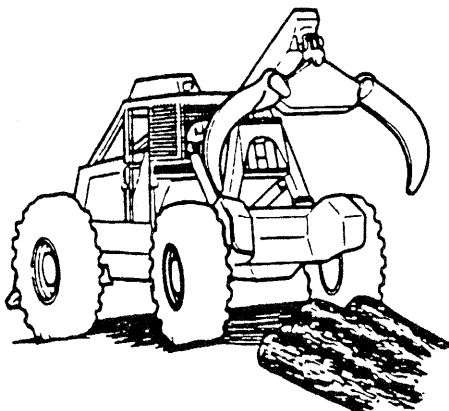
6. Watch out for any obstructions such as rocks and stumps that could overturn or damage the machine.



7. Pay attention along the route you travel to see if there is a easier way to return. The machine will behave much differently when it is pulling a load. This change in mobility can make it necessary to change your return route.



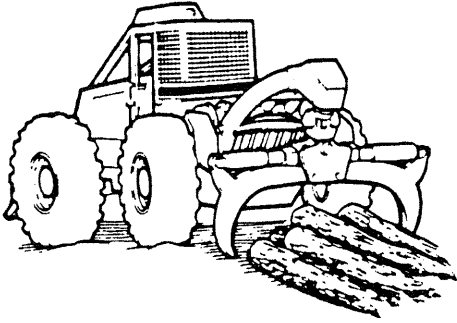
8. **HI-VIS.** Approach the log pile with the transmission in REVERSE, the grapple tongs OPEN, and the arch pulled forward so that the grapple can fit around the load.



Parallelogram. Approach the log pile with the transmission in REVERSE, the grapple tongs OPEN, and the arch pulled forward and the boom in the raised position so that the grapple can fit around the load.

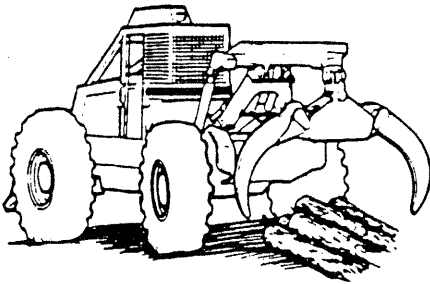
NOTE: NEWER GRAPPLE MACHINES HAVE THE OPTION OF SELECTING DE-CLUTCH IN REVERSE TO SPEED UP HYDRAULIC ACTION WHEN BACKING UP TO A LOAD.

OPERATING INSTRUCTIONS

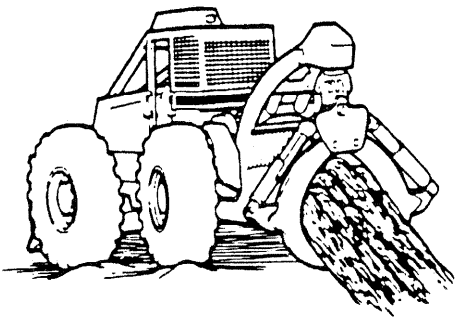


9. **HI-VIS.** Move the arch back to lower the grapple on the log pile so that the grapple tongs will pick up the logs approximately one meter (three feet) from the butt ends to prevent any unevenly bunched logs from being lost.

Parallelogram. Move the arch back to lower the grapple on the log pile so that the grapple tongs will pick up the logs approximately one meter (three feet) from the butt ends to prevent any unevenly bunched logs from being lost.

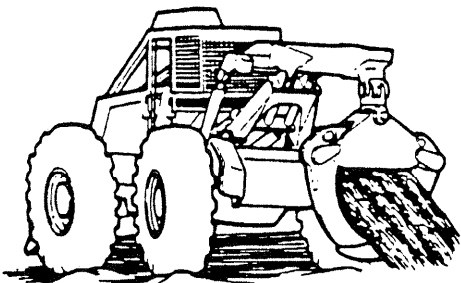


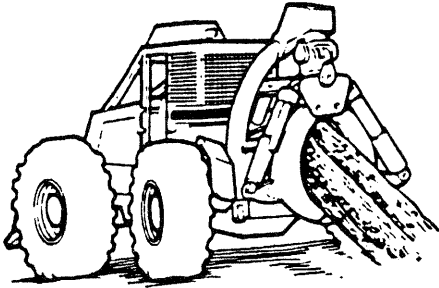
10. **All Machines.** Put the transmission in NEUTRAL, and put the grapple control lever in the CLOSE position. Increase the speed of the engine to increase power and speed to the hydraulic system. Close the grapple firmly around the logs.



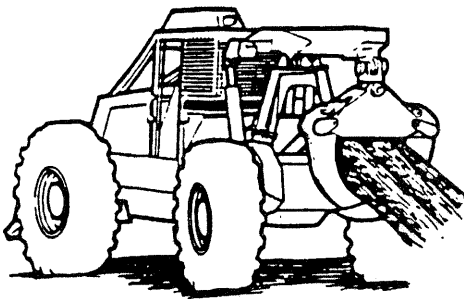
These machines are equipped with a reverse de-clutch mechanism. If selected and by applying the service brake with the transmission in reverse, will put the transmission in neutral. To increase power and speed to the hydraulic system, close the grapple firmly around the logs.

NOTE: IF THE SERVICE BRAKE IS APPLIED WITH THE TRANSMISSION IN NEUTRAL OR REVERSE AND THE DECLUTCH SWITCH IS ON, THE TRANSMISSION PUT IN FORWARD; FORWARD CLUTCH WILL NOT ENGAGE UNTIL THE SERVICE BRAKE IS RELEASED.

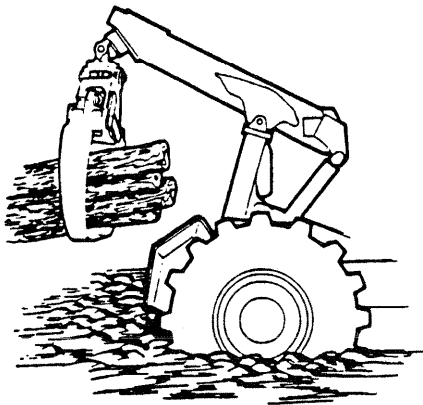




10. When the grapple tongs have closed hold the grapple lever in the CLOSE position until approximately 3,000 psi reading shows on the grapple accumulator system gauge. Put the grapple control lever in the center position, pull the arch forward if applicable, and position the arch forward until the load makes contact with the arch butt grille and return to the landing.



NOTE: ALL GRAPPLES - AS THE LOAD IS PULLED ACROSS THE GROUND, IT WILL SHIFT POSITION IN THE TONGS. PUT THE GRAPPLE CONTROL LEVER IN THE CLOSE POSITION MOMENTARILY ONCE OR TWICE ALONG THE ROUTE TO TIGHTEN UP THE GRAPPLE TONGS TO PREVENT ANY LOGS FROM FALLING OUT OF THE BUNDLE. THE GRAPPLE ACCUMULATOR SYSTEM SHOULD BE RE-ENERGIZED WHEN THE PRESSURE DROPS DOWN TO 2500 PSI ON THE PRESSURE GAUGE.

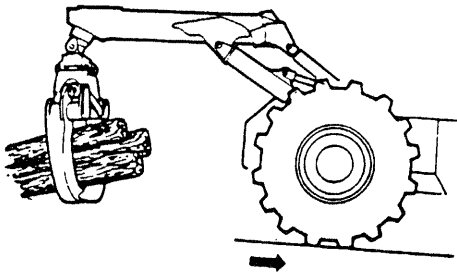
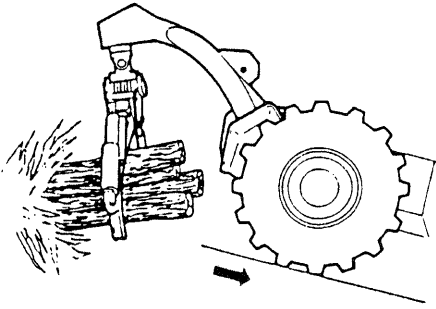


11. The load should be carried high enough to clear obstructions on the ground. Carry the load properly; low for stability, high for clearance.

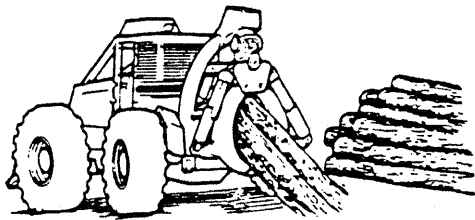
NOTE: The differential lock is intended, and should be used as an intermittent traction assist devise. The differential lock is to be engaged only when additional traction is required. Continual engagement of the lock will result in a loss of horsepower, increased heating of the hydraulic oil, and increased tire wear.

OPERATING INSTRUCTIONS

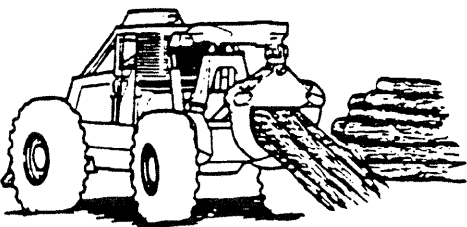
12. The load should be carried as low as possible when traveling down a steep grade especially when turning.



13. If you are to add to a pile, move along the side of a pile with the log grapple at its highest position to pull the load onto the pile.



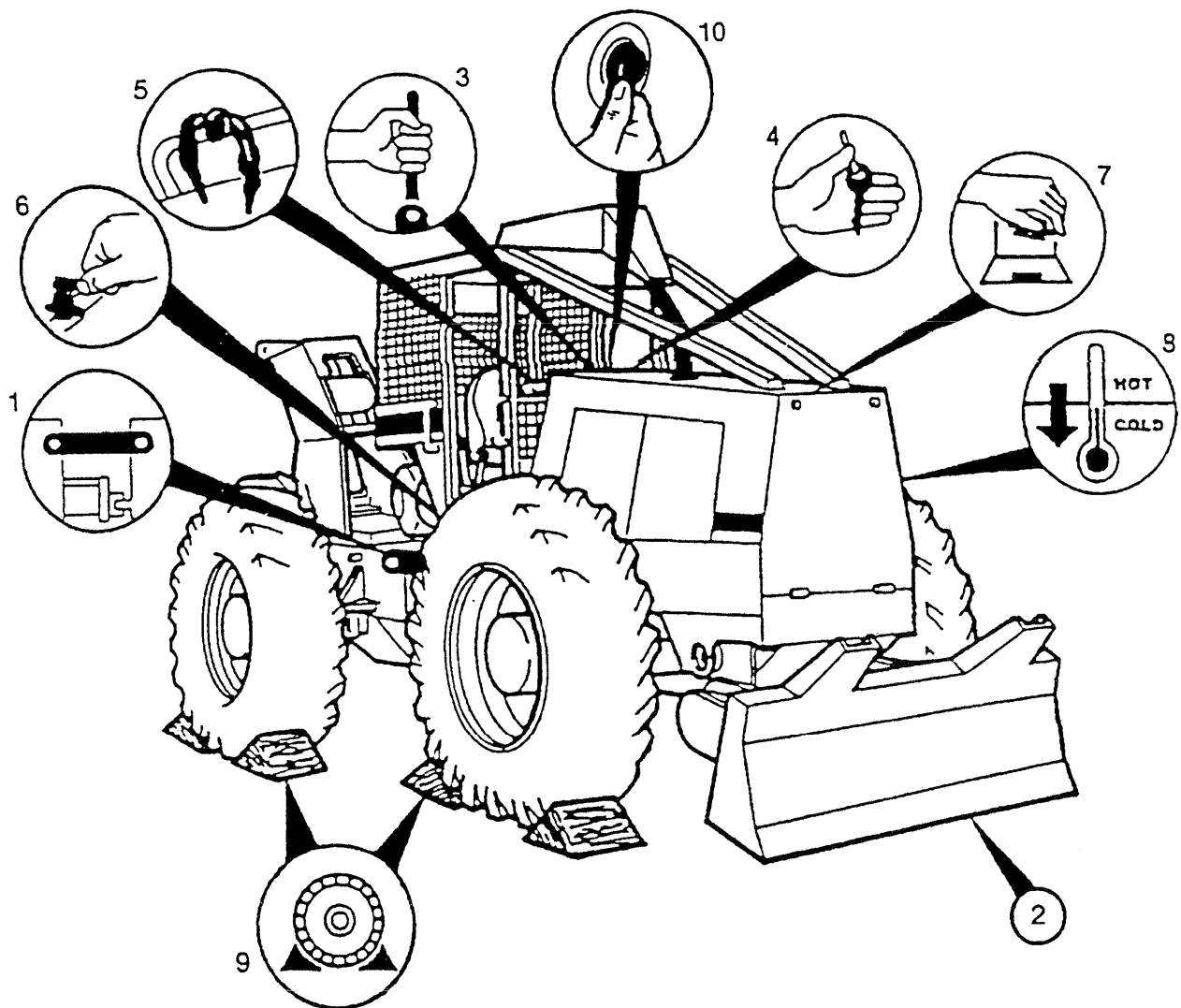
14. Open the grapple arms and release the load on the pile. Drive forward away from the pile and close the tongs. Position the arch approximately halfway forward and return to the area for another load.



NOTE: RANGER GRAPPLE SKIDDERS ARE EQUIPPED WITH A WINCH AND CAN BE FITTED WITH A WINCH CABLE TO PERFORM ANY OF THE WINCHING TECHNIQUES DESCRIBED EARLIER IN THIS MANUAL.

Section 5

Basic Preventive Maintenance



Ranger Skidder in Service Position



WARNING

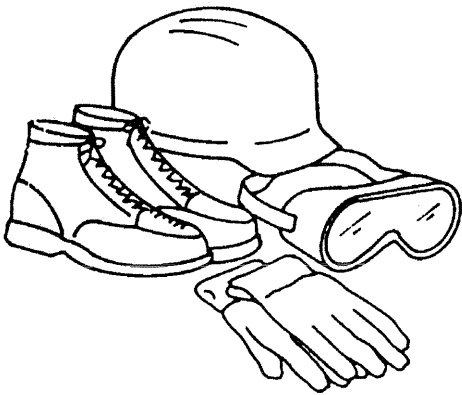
USE CAUTION IF YOU WORK ON WARM MACHINE. HOT FLUIDS AND COMPONENTS CAN CAUSE PERSONAL INJURY.

BASIC PREVENTIVE MAINTENANCE



A FEW SIMPLE RULES WHEN SERVICING

- Do not perform any work on the machine unless you are authorized to do so.
- Maintenance can be dangerous unless performed properly. Be certain that you have the necessary skill and information, correct tools and equipment to do the job.
- Standard maintenance procedures should always be observed. Read the manufacturers manual or find assistance if you do not understand what you are doing.
- Keep the work place clean. Oil or water on the floor makes it slippery and also dangerous in connection with electrical equipment or electrically powered tools. Oily clothes are a serious fire hazard.
- When running a machine inside be certain that the building is properly vented.

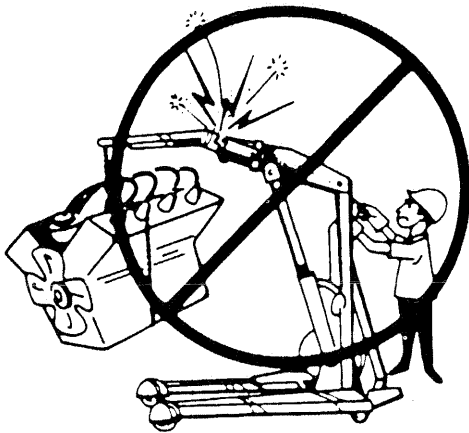


- Do not wear loose fitting clothing or jewelry when working on a machine.
- Always wear a hard hat, safety glasses, gloves, boots, or other protective articles as the job requires.
- Keep the machine and all the equipment free of dirt and oil. This will decrease the possible fire hazards and make it easier to find loose and defective parts. This is especially important when working with combustible materials.
- Machines should be clean of debris particularly around the engine, exhaust, and drive line components.



A FEW SIMPLE RULES WHEN SERVICING (Continued)

- Fire prevention features provided by the manufacturers should be maintained in operational condition and should be used to supplement the operator's fire prevention efforts. In no case should the features be used or assumed as replacement for diligent operator efforts at preventing fires.
- Prior to welding or brazing on any part of the machine, the part and the surrounding area should be cleaned and a fire extinguisher should be made available.
- There is always a risk of fire. Find out which type of fire extinguisher to use, where it is located and how to use it.
- In case of fire be prepared to run for safety, but if time permits first: Stop the engine.
Turn the battery disconnect switch and close the fuel shut off valve.
Start combating the fire and/or call for help.
- Gasoline is highly flammable and should never be used as a cleaning fluid. Use an appropriate fluid for cleaning.
- Some solvents can cause skin rashes and or fire dangers. Do not inhale solvent vapors.
- Store flammable starting aids in a cool, well ventilated location.
- Smoking, open flames, etc., should not be permitted around any machine during fueling operations and/or when the fuel system is open to the atmosphere.



- Always be sure that the frame locking link is connected when working on the machine except when it is necessary to articulate it.
- When lifting or supporting component, use equipment with a weight capacity as great as or greater than the weight of the component.
- Use the correct tools for the job. Repair or replace any broken or defective equipment or tools.
- Make sure that no tools or other objects are left inside where they may cause damage.
- Check that there is no damage to electrical wires or hoses.



A FEW SIMPLE RULES WHEN SERVICING (Continued)

- Release all system pressure slowly before working on any part of the hydraulic system. Be alert - there could be high pressure stored in the grapple circuit on units with a grapple accumulator system.



WARNING

NOTE: DO NOT DISCHARGE THE ACCUMULATOR PRESSURE UNTIL YOU HAVE COMPLETELY READ THE PROCEDURE TO BE FOUND IN THIS MANUAL.

- Remove all pressure caps slowly.
- Be careful of hot fluid when changing oil in engine, hydraulic system, transmission, etc.
- Before you work on the machine always lower the blade and grapple (if so equipped). If you must work on the machine with the blade or grapple raised, always securely support them.
- Be sure the machine is in the SERVICE POSITION before lifting the machine. Always support an elevated machine using proper blocks and/or cribbing before beginning work on it.
- To find leakage use cardboard or wood, not your hand.
- Never adjust a pressure relief valve above the manufacturer's recommendations.
- Hydraulic fluid is flammable. Do not weld on pipes or tubes that are filled with fluid. Be careful when welding near filled pipes or tubes.
- Always inspect the cooling system with the engine stopped. This is a pressurized system. Coolant should be checked at the coolant recovery bottle on the side of the engine. If it is necessary to check through radiator cap (for anti-freeze level) be sure to relieve the pressure by slowly turning the cap off.
- Read all nameplates and decals before you operate the machine. Each nameplate and decal has important information about operation or service.
- Always stop the engine before removing inspection covers. Do not let tools or parts fall into the opening.



GENERAL INFORMATION

If the machine is to work as economically as possible, thorough maintenance is necessary. The most important care a machine receives is the preventive maintenance that you perform. It consists of lubrication, various checks and adjustments. The recommended intervals for maintenance and lubrication refer to normal working and environmental conditions.

Most of the maintenance procedures are simple to perform. The necessary detailed instructions are provided in this manual.

All maintenance and service work should be performed by qualified personnel.



WARNING

WHEN WORKING IN THE CENTER HINGE AREA THE FRAME LOCKING LINK MUST BE USED.



WARNING

- NO ROOM FOR MAN IN THIS AREA WHEN MACHINE IS TURNING OR MOVING
- MAN IN THIS AREA NOT VISIBLE TO OPERATOR
- DO NOT STAND OR WORK IN THIS AREA WHEN ENGINE IS RUNNING
- USE STEERING FRAME LOCK WHEN SERVICING, LIFTING OR TRANSPORTING.



WARNING

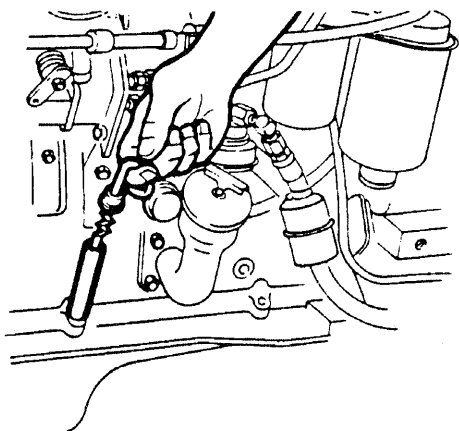
THERE IS A RISK OF THE MACHINE MOVING EVEN WITH THE PARKING BRAKE APPLIED.

- When checking fluid levels, the machine should be on level ground.
- Fluid levels should be checked in the morning when the fluids are cold and have drained to the bottom of each component. This does not apply to the hydraulic transmission.
- Schedule servicing to avoid damage to the machine. Keep good records and read the machine manuals.
- Make a complete visual inspection.
- Check for loose bolts and capscrews, leaks and worn parts. Report everything that needs attention.

BASIC PREVENTIVE MAINTENANCE

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Dipstick

ENGINE

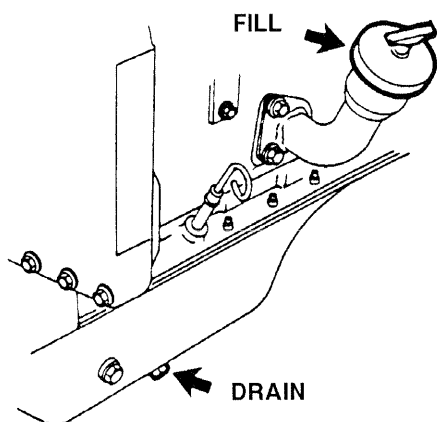


WARNING

BE CAREFUL IF ENGINE IS HOT, HOT OIL CAN CAUSE BURNS.

Checking Oil Level

The oil level should be checked daily and should be between the high - H and - L marks on the dipstick.



Drain and Fill Cap

Changing Engine Oil

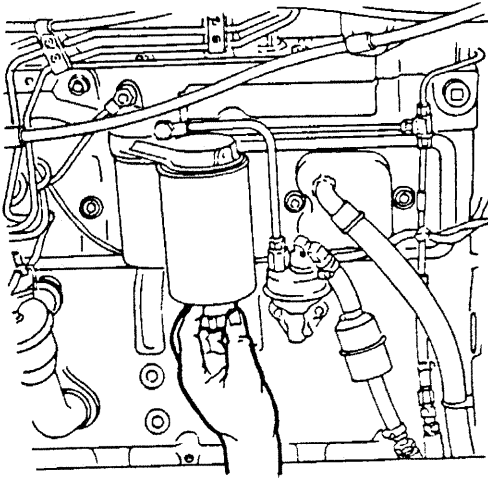
Drain the engine oil into a suitable container when the engine is hot. Hot oil flows more freely and carries more contaminants with it.

Replace the engine lube oil filter with the filter specified in the Parts Manual for your Skidder.

Choose an oil viscosity that is correct for the ambient operating temperature as recommended in the Cummins Engine Operation and Maintenance Manual.

Engine lube oil capacity is approximately 16 liters (4.4 US gallons.)

BASIC PREVENTIVE MAINTENANCE



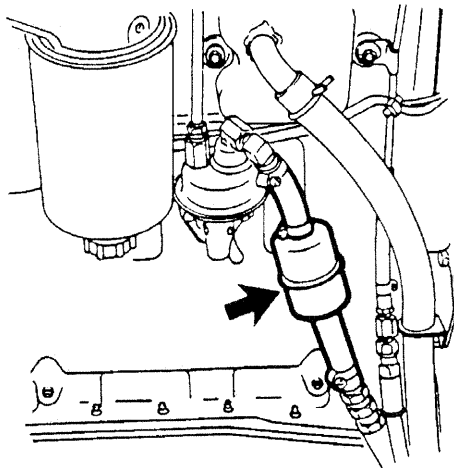
Fuel Filters

FUEL SYSTEM

Fuel Filters

Drain any water and sediment from the engine fuel/water separator at the beginning of each work shift.

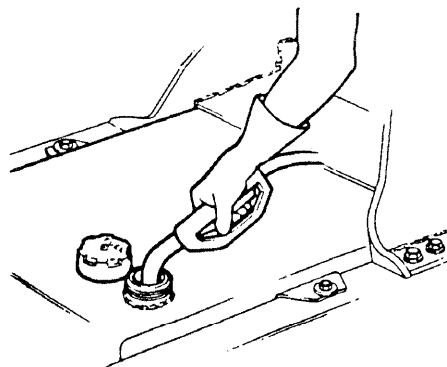
Change the engine fuel filters according to the instructions in the Cummins Operation and Maintenance Manual.



Fuel Strainer

Check the Fuel Strainer

Check the in line fuel strainer for a build up of foreign material by blowing through it orally. The strainer should be replaced if it is contaminated.



Fuel Tank

Fuel Tank

Clean fuel is essential for trouble-free operation of the engine. Clean the area around the fuel filler cap before you remove it. Avoid spilling the fuel to reduce the chance of a fire and to reduce the build-up of dirt. Fill tank at the end of each work shift to inhibit condensation.



WARNING

DO NOT SMOKE WHILE REFUELING.

If the strainer screen in the fuel filter hole becomes clogged or dirty, it should be cleaned in solvent and blown dry with compressed air.

Before each shift, open the drain cock on the bottom of the fuel tank and drain sufficient fuel to remove any sediment and water from the tank.

Check and clean the vent hole in the fuel cap.

AIR INTAKE SYSTEM

Air Cleaner

The air cleaner prevents dust and other impurities from entering the engine. The air first passes through the outer filter element and then through the inner element. Engine wear is largely affected by the cleanliness of the intake air therefore it is important to check the air cleaner regularly and to service it correctly.

Check Air Cleaner Service Indicator

Check the air cleaner service indicator located on the air intake tube between the air cleaner and the turbo charger. When the indicator shows red, the air cleaner elements should be serviced.

Check Air Intake Tubes and Clamps

Check the intake tubes and clamps between the air cleaner and the turbocharger and replace any tubes that are cracked or damaged. Tighten any loose clamps.

Service Air Cleaner

Remove the outer element from the air cleaner body and use compressed air (from the inside of the element) to blow any dirt particles from the element. Wash the element in a non-sudsing detergent for about 15 minutes. Rinse with warm tap water from inside until the water that passes through the element is clean. Air dry the element.

Shine a bright light from inside of the element and check it for pin holes, ruptures or thin spots. Replace if any of these conditions exist.

NOTE: DO NOT REMOVE THE INNER ELEMENT EXCEPT TO CHANGE IT. REPLACE BOTH ELEMENTS AFTER THE SECOND CLEANING OF THE OUTER ELEMENT OR EVERY 2000 HOURS OF OPERATION. THE FREQUENCY OF AIR CLEANER SERVICING DEPENDS ON THE WORKING CONDITIONS OF THE MACHINE.

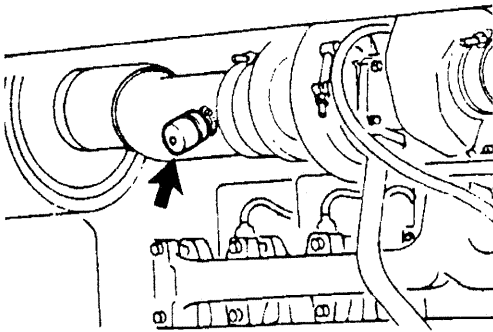
Clean the Air Cleaner Vacuator Valve

Tap the rubber vacuator valve to remove dust and dirt on a daily basis.

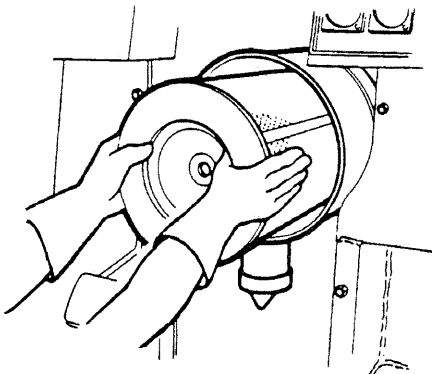
NOTE: IT MAY BE NECESSARY TO REMOVE THE VACUATOR VALVE TO REMOVE CAKED PARTICLES OF DIRT FROM THE VALVE.

Air Pre Cleaner (Optional)

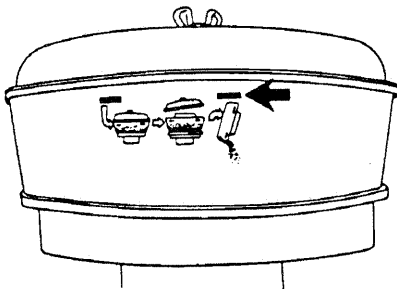
When the level of debris in the air pre cleaner reaches the full line on the bowl, remove the pre cleaner and empty it.



Air Cleaner Indicator

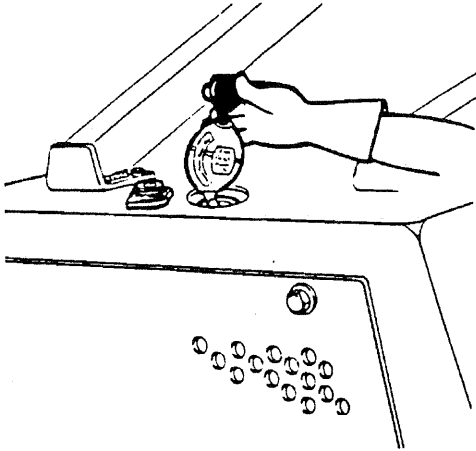


Air Cleaner

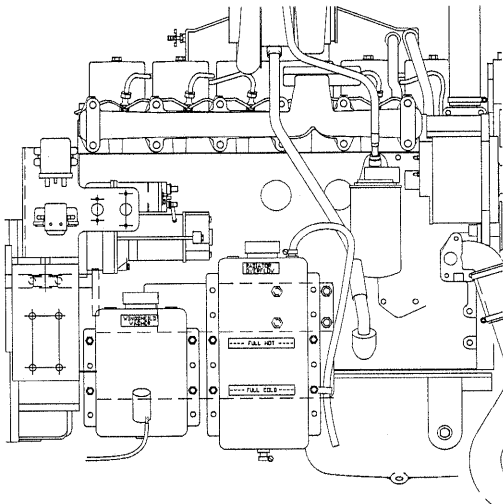


Air Cleaner Vacuator

BASIC PREVENTIVE MAINTENANCE



Checking Antifreeze



Coolant Recovery

COOLING SYSTEM

The following measures must be carried out regularly to ensure that the cooling system operates correctly.

Antifreeze

The cooling system of the machine was shipped with a solution of equal parts of ethylene glycol and water. This concentration is recommended for subsequent fills. The coolant should be changed every 1000 hours of operation.

Checking Coolant through Recovery Bottle

Check the coolant level daily. The level should be checked at the coolant recovery bottle. Add coolant as required.



WARNING

THE COOLING SYSTEM IS PRESSURIZED AND THERE IS A RISK OF SCALDING WHENEVER REMOVING THE RADIATOR CAP. REMOVE SLOWLY WITH GLOVED HAND. WEAR SAFETY GLASSES.

Check Hoses and Clamps

Check hoses and clamps and replace any hoses that are cracked or damaged. Tighten any loose clamps, do not over tighten the clamps.

Cleaning the Radiator

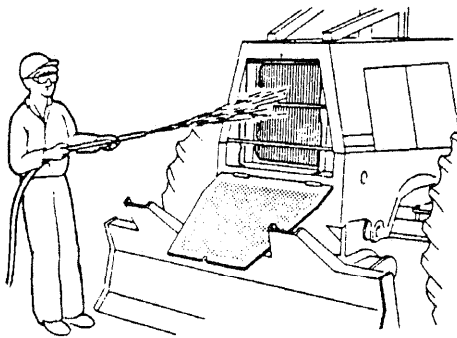
The radiator should be cleaned daily to reduce the chance of possible engine damage caused by improper engine cooling.

Remove the bolts from the top of the grill and lower the grill so that it rests on the blade. Use a fire hose or a pressure washer to clean the radiator in the opposite direction of the air flow.

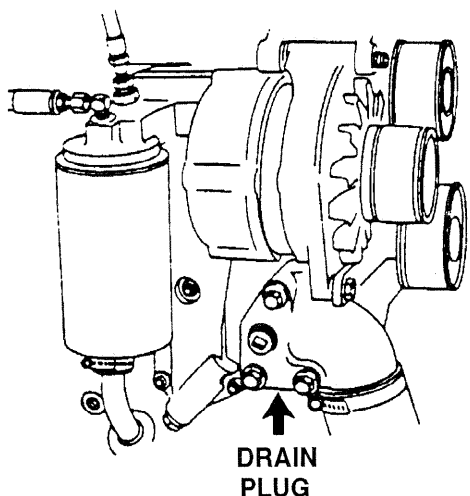


CAUTION

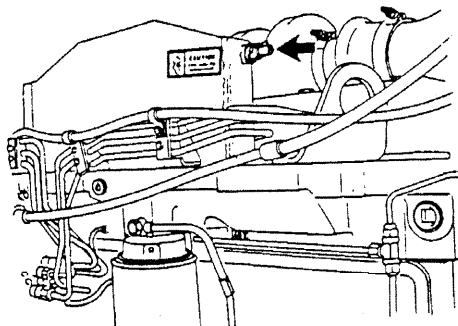
NOTE: BE CAREFUL NOT TO DAMAGE THE RADIATOR CORE WHILE CLEANING.



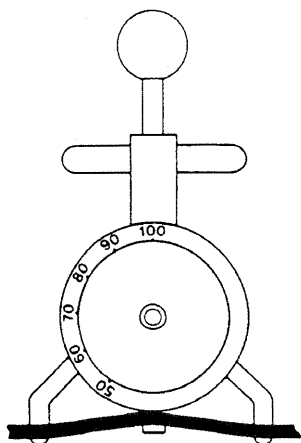
Cleaning Radiator



Drain Plug



Pressure Tester



FAN BELT TENSIONER

Change Coolant and Flush System

- 1. Slowly remove the radiator cap.
- 2. Open the drain cock on the bottom of the radiator.
- 3. Remove the drain plug from the bottom of the coolant inlet elbow on the engine.
- 4. Open the bleeder cock on the engine aftercooler to drain the system.
- 5. Install the drain plug.



CAUTION

NOTE: SEE ENGINE MANUFACTURE'S MANUAL FOR CORRECT COOLING SYSTEM CLEANING PROCEDURES.

- 6. Flush the cooling system by running clean water through it.
- 7. Close the drain cocks and install the drain plug (leaving the after cooler bleeder cock open).
- 8. Add coolant to the radiator filler hole to the correct level, (closing the aftercooler bleeder cock when a continuous flow of coolant flows through it).
- 9. Pressure test system and cap for leaks using a cooling system pressure tester.
- 10. Start the engine and add coolant until the radiator is full and free of air.
- 11. Check the coolant level when the engine reaches its operating temperature and again when it has cooled.



WARNING

NEVER POUR COLD COOLANT INTO A HOT ENGINE. THIS COULD CAUSE THE CYLINDER HEAD OR ENGINE BLOCK TO CRACK. THE FAILURE TO CHANGE THE COOLANT CAN RESULT IN THE COOLING SYSTEM BECOMING CLOGGED AND THE ENGINE CAN BE SERIOUSLY DAMAGED BY OVERHEATING.

FAN BELT TENSION

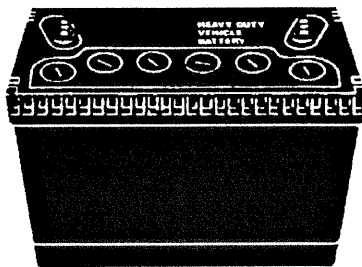
Visually check belts for looseness, or worn belts. Replace worn belts.

The engine is equipped with a fan belt tensioner that eliminates the need to adjust the belt. Use a belt tensioner gauge to check the belt tension every 1000 hours of operation to make sure that the tensioner is working properly. See the Cummins Engine Operation and Maintenance Manual.

ELECTRICAL SYSTEM

Batteries

The batteries are located in front of the operator's compartment.



Check Battery Condition



WARNING

ALL LEAD-ACID BATTERIES GENERATE HYDROGEN GAS WHICH IS HIGHLY FLAMMABLE. IF IGNITED BY SPARK OR FLAME, THE GAS MAY EXPLODE VIOLENTLY, CAUSING SPRAYING OF ACID, FRAGMENTATION OF THE BATTERY, POSSIBLE SEVERE PERSONAL INJURIES. WEAR SAFETY GLASSES WHEN WORKING NEAR BATTERIES.

ANTIDOTES:

EXTERNAL - FLUSH WITH WATER.

INTERNAL - DRINK LARGE QUANTITIES OF WATER OR MILK. FOLLOW WITH MILK OF MAGNESIA, BEATEN EGG OR VEGETABLE OIL. CALL PHYSICIAN IMMEDIATELY.

EYES - FLUSH WITH WATER FOR 15 MINUTES AND GET PROMPT MEDICAL ATTENTION.

The batteries are connected in series in a 24 volt system. Check the electrolyte level weekly. (more often in warm weather). The level should be approximately 10mm (3/8 in) above the plates. If necessary add distilled water. Check that the battery terminals and the battery posts are clean, tight and are coated with anti-corrosive substance. During cold weather, it is very important that the batteries do not become discharged. The electrolyte can freeze and damage the battery



WARNING

DO NOT ATTEMPT TO CHARGE OR LOAD TEST A FROZEN BATTERY. IF FROZEN, IT MAY EXPLODE. ALLOW THE BATTERY TO WARM TO 15.5 ° C (60 ° F) BEFORE PLACING ON CHARGE.

NOTE: Maintenance free batteries allow you to use a hydrometer to test for specific gravity of the electrolyte. Individual plugs can be unscrewed allowing access to each cell. Specific gravity of each cell can then be tested. When re-installing plugs be sure they are properly seated. If the specific gravity, when corrected to 80° F is less than 1.225, the battery is to be charged.

NOTE: When checking battery temperature other than 80° F, for every 10° above 80° ADD .004 to the reading. For every 10° below 80° SUBTRACT .004 from the reading.

Check Battery Cables and Connections

Check the battery cables, connections and hold downs for damage, looseness and corrosion. Replace damaged parts as needed. Clean and tighten connections as needed. Disconnect the ground cables first at the end furthest from battery before removing a battery. This will avoid causing sparks which could cause an explosion. Connect the ground cable last during installation.

Starting with Auxiliary Batteries

DO NOT connect jumper cables to the battery terminals. Use system voltage to jump start. Connect the positive cable first to the positive starter cable. Connect the negative cable to the machine frame.



WARNING

FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN PERSONAL INJURY OR DAMAGE TO THE ELECTRICAL SYSTEM.



Battery Disconnect Switch

Battery Disconnect Switch

NOTE: When performing any welding operation on a machine turn off the battery disconnect switch and disconnect the positive and negative cable connections at the battery.

NOTE: Never connect the arc welder (or cutter) ground cable to the opposite to the one being welded on. Connect the ground cable as close as possible to the area to be welded. Thoroughly clean the weld area to be welded to reduce the chance of fire and have a fully charged fire extinguisher on hand.

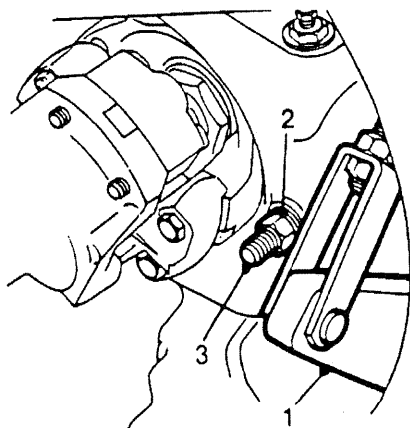
Check Neutral Start Switch

Put the transmission control lever in the FORWARD position. Try to start the engine. If the starter starts the engine, replace the neutral start switch.

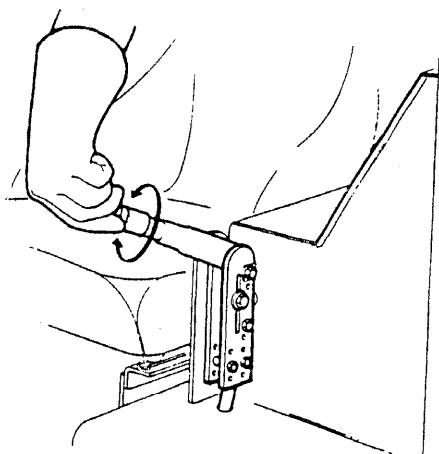
Put the transmission control lever in the REVERSE position. Try to start the engine. If the starter starts the engine, replace the neutral start switch.

NOTE: If the starter will turn the engine with the transmission control lever in the NEUTRAL only position, the neutral start switch is good.

NOTE: If the starter will not start the engine, the Neutral Start Switch could also be out of adjustment.



Adjusting Linkage



Adjusting Parking Brake Lever

BRAKE SYSTEM

Adjusting the Parking Brake Linkage

Before adjusting the clevis at the brake lever arm:

- Adjust the transmission service brake clearance.
- Rotate the adjustment knob on the hand lever to full release position.
- Adjust the clevis until the pin slides freely through the brake lever arm.
- Adjust the knob on the hand lever until the lever force is firm.

Adjusting the Parking Brake Lever

If slack develops when the parking brake lever is applied, release the parking brake lever and turn the acorn nut on the end of the lever to clockwise to tighten the cable.

Bleeding the Brakes

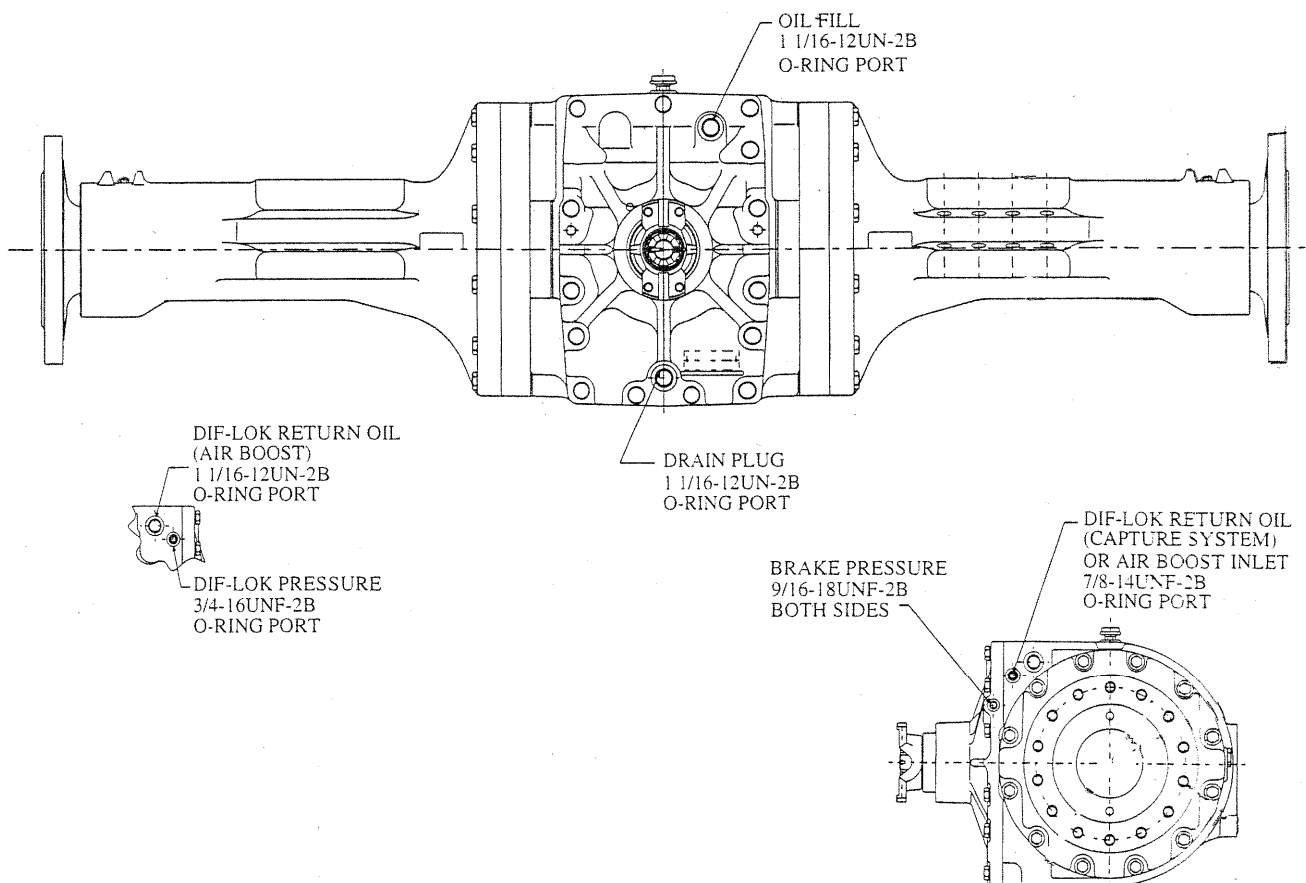
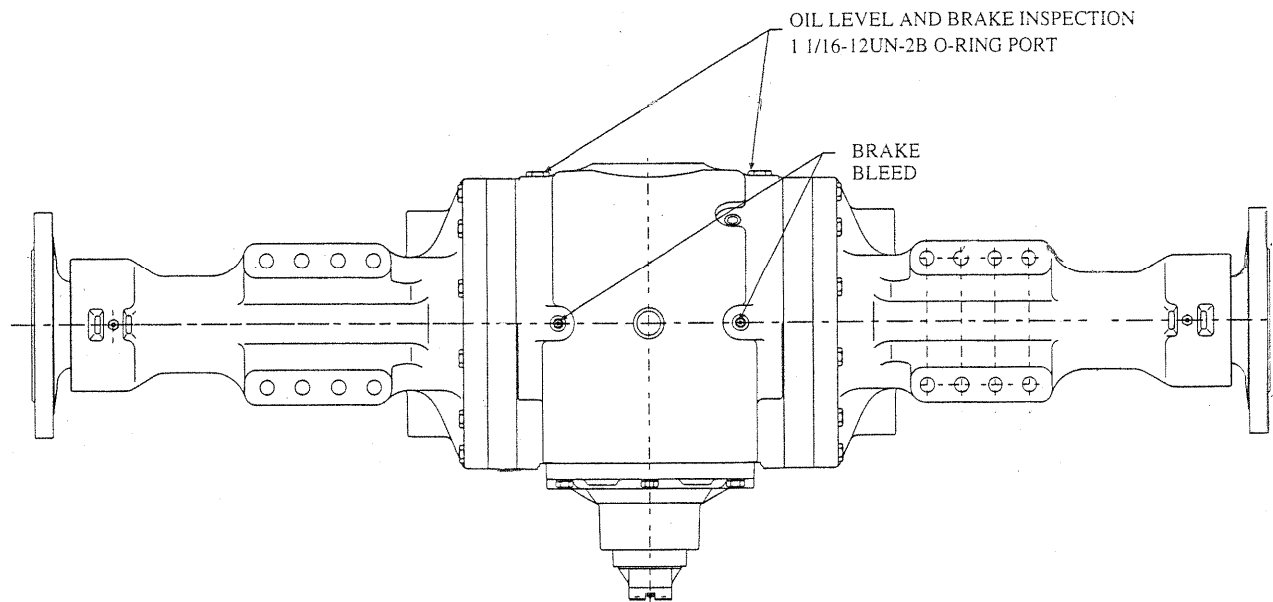


WARNING

NEVER REUSE FLUID THAT HAS BEEN COLLECTED DURING BLEEDING, IT COULD BE CONTAMINATED AND COULD INTERFERE WITH THE SAFE OPERATION OF THE BRAKES.

NOTE: The Brake Bleed Ports are plumbed to a bulkhead on the left side of the machine close to the fuel tank fill under a protective plate in front of the rear fender.

FRONT and REAR DRIVE AXLES



BASIC PREVENTIVE MAINTENANCE

AXLE MAINTENANCE SCHEDULE

Service intervals are highly dependent upon operating conditions.

NORMAL CONDITIONS

After the first 10 and 50 hours:

- Tighten wheel retainer cap screws or stud nuts to OEM recommended torque values.
- Check for fluid leaks.
- Check differential oil level.
(See Differential Oil Check Procedure below.)

After the first 100 hours:

- Change differential oil.
(See Differential Oil Change Procedure below.)

Every 250 Hours: (or whenever leakage is observed)

Check differential oil level. (See Differential Oil Check Procedure below.)

Every 2000 Hours:

Change differential oil. (See Differential Oil Change Procedure.)

DIFFERENTIAL OIL CHECK PROCEDURE

- Remove the differential fill plugs. The oil level should be slightly above the check hole.
- If oil is needed, add oil.

NOTE: The differential housing has three sumps connected by only a small hole. Fill the case slowly to allow oil to drain into all sumps. Confirm the oil level after allowing time for oil to flow into all compartments.

DIFFERENTIAL OIL CHANGE PROCEDURE

- Remove oil drain plug(s) and drain oil. Re-insert drain plug(s).
- Add oil. The oil volumes are as follows*:
1400 Series 33 quarts (31.5 L)

NOTE: The differential housing has three sumps connected by only a small hole. Fill the case slowly to allow oil to drain into all sumps. Confirm the oil level after allowing time for oil to flow into all compartments.

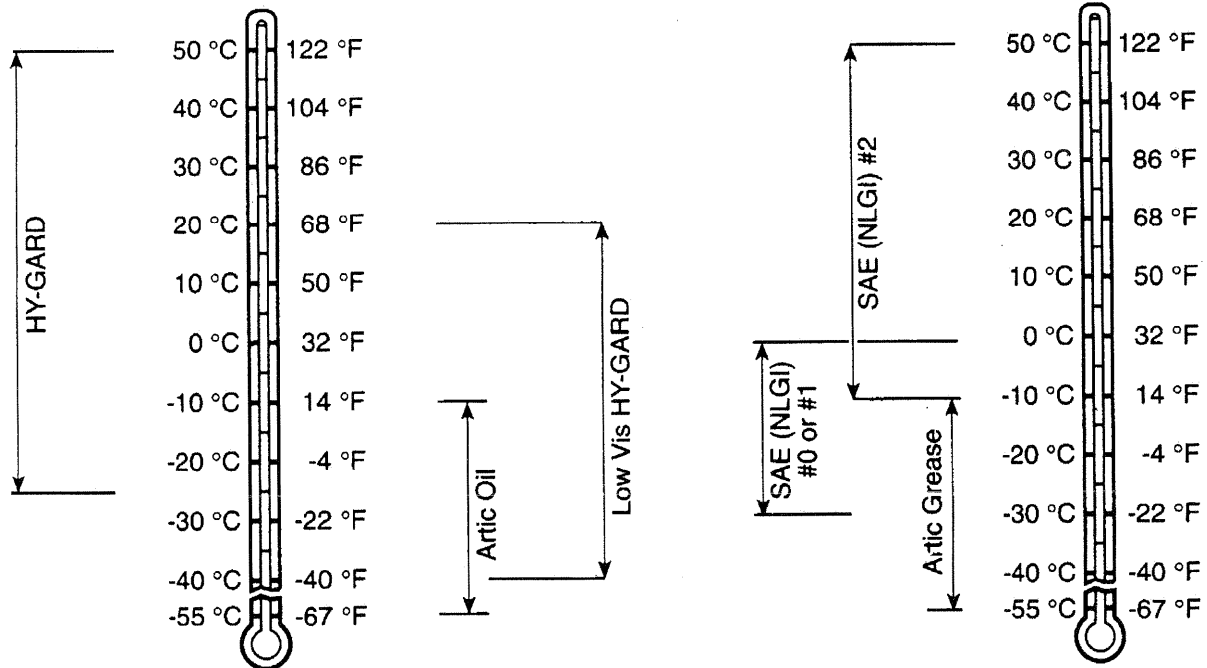
- Check differential oil level.
(See Differential Oil Check Procedure above.)

DIFFERENTIAL OIL

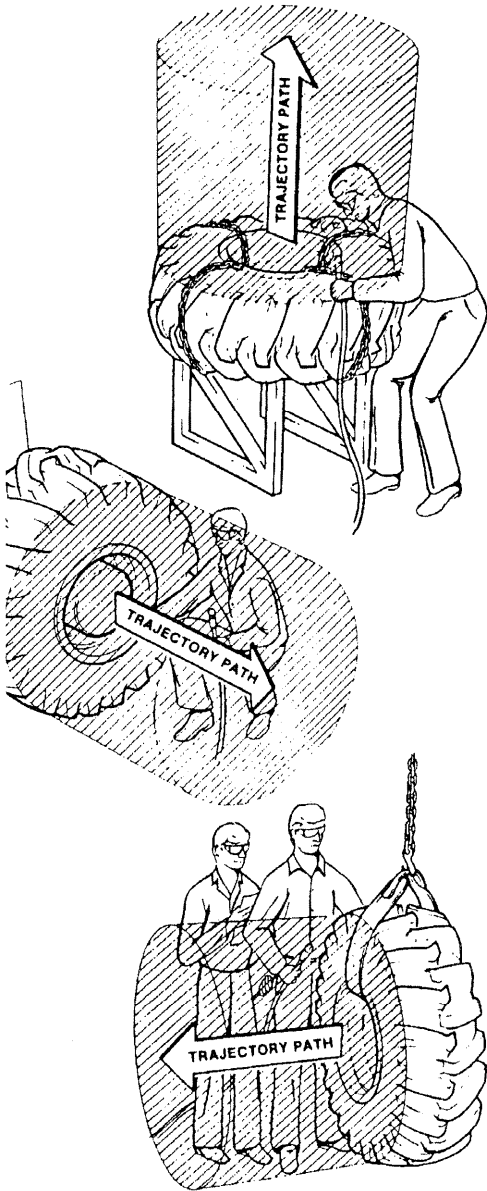
The choice of oil used in the axle assembly is of utmost importance to reduce the tendency for wet disk brakes to chatter under severe applications. Use Mobilfluid 424 Multipurpose Tractor Hydraulic Fluid or John Deere Hy-Gard Hydraulic Oil. These oils are classified as mineral-based oil with special additives for wet disk brakes. This oil is formulated to reduce gear and bearing wear, reduce brake noise, reduce foaming, and maintain brake capacity and torque. Use of other oils may compromise one or more of those properties with less than desirable results. Alternative lubricants are available. Consult your applications engineer or account manager if you have a special situation.

Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart below.

NOTE: Mobilfluid 424 is used as factory fill in Funk Axles.



BASIC PREVENTIVE MAINTENANCE



WHEELS AND TIRES



WARNING

When doing any tire service, especially tire inflation, **NEVER** stand in the **TRAJECTORY PATH**. Serious injury or death can result if an explosion should occur.

Use a self attaching air chuck with a hose long enough to avoid standing in the trajectory path when inflating a tire.

Use an inflation cage, safety cables or chains when inflating tires.

Never use air from a compressed air system to inflate a tire if alcohol has been used as an anti-freeze.

Tire Inflation Pressure

When checking the air pressure of the tires, examine valves and make sure all valve caps are in place. For the recommended Tire Inflation pressures see Specification Section of this manual.

NOTE: Never check tire pressure with load of logs in place.

Check Tire Condition

Check the condition of the tires with the machine empty. Make a report of any damaged tires.



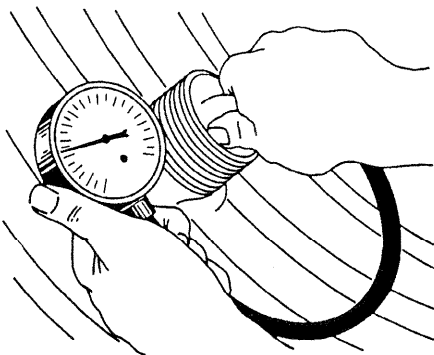
WARNING

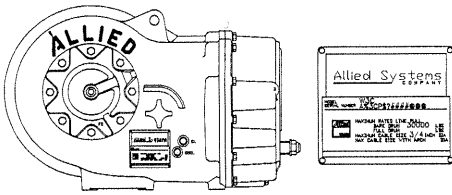
Completely deflate a tire before removing foreign material from the tread. Keep your fingers away from bead breakers and rims, and stay out of the trajectory path when removing foreign material. If a bead disengages, it will release with enough force to cause injury or death.



WARNING

For complete information pertaining to dismounting and mounting the tires on rims, refer to the Tire Manufacturer's Off-highway Tire Maintenance Manual.



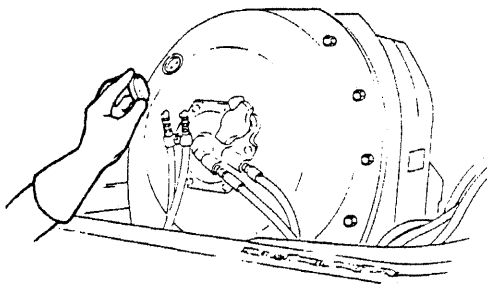


WINCH W3C

WINCH - W3C Basic Preventive Maintenance

Maintenance of the W3C Skidder Winch is limited to the hydraulic system maintenance of the skidder itself. The hydraulic oil and filters should be maintained as indicated in Maintenance Lubrication Chart as shown in this chapter.

Periodically check the winch, control valve, and connecting hoses for damage or hydraulic oil leakage. If any problems are found, they should be corrected before operating the winch.



Lufkin Winch

WINCH - LUFKIN Basic Preventive Maintenance

Maintenance of the Cable Machine equipped with a Lufkin Winch is limited to the hydraulic system maintenance of the skidder itself. The hydraulic oil and filters should be maintained as indicated in Maintenance Lubrication Chart as shown in this chapter.

Periodically check the winch, control valve, and connecting hoses for damage or hydraulic oil leakage. If any problems are found, they should be corrected before operating the winch.

Adjust the Winch Free-Spool Tension

If the winch cable requires too little effort to pull it from the cable drum, the tension can be adjusted as follows:

- Loosen the lockcrew.
- Tighten the adjusting nut to increase the tension and/or loosen it to decrease it.
- Tighten the locknut.

Installing the Winch Mainline

NOTE: Installing the winch cable this way provides a safety break away if the load should fall down a grade as well as a method of holding the cable under normal conditions.



WARNING

This break-away feature will help to prevent the machine from being pulled by the load should the load slip down a hillside. It is imperative that the operator put the winch control lever in the FREE-SPOOL position immediately to allow the cable to unwind from the winch.

Install the winch mainline to the winch cable drum as follows:

- Remove the access plug from the winch housing.
- Start the machine and put the winch in FREE-SPOOL mode.
- Rotate the cable drum by hand until the two cable anchor wire holes are in the center of the hole.
- Put the winch in the HOLD Mode and return the machine to the SERVICE POSITION.
- Choose a gauge of wire that will insert through the holes.

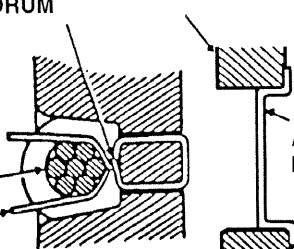
TWIST THE WIRE
AGAINST THE
CABLE DRUM

WINCH HOUSING

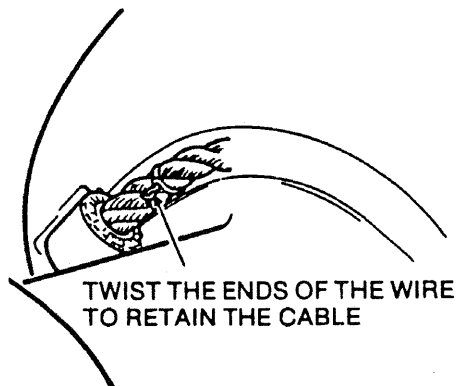
WINCH
CABLE
DRUM

CABLE
WIRE

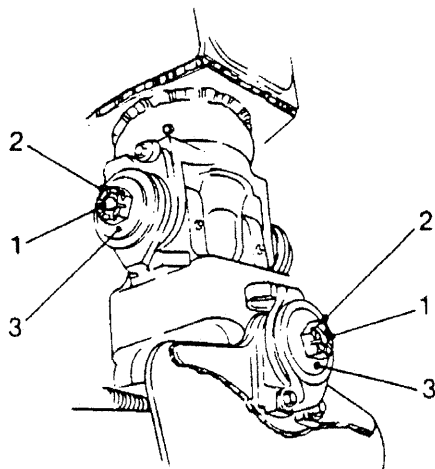
ACCESS
PLUG



BASIC PREVENTIVE MAINTENANCE



- Twist the wire ends together against the cable drum.
- Install the cable into the groove between the ends of the wire so that the cable ferrule is in the ferrule groove.
- Twist the ends of the wire together to hold the cable.
- Start the engine and WINCH - IN the cable onto the drum.
- Install the access plug.



LOG GRAPPLE

Checking and Adjusting the Grapple Snubbers

The operation of the grapple snubbers should be checked at the beginning of each work shift as follows:

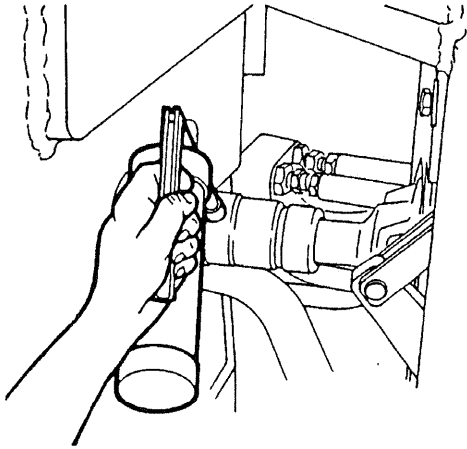
Pull back the grapple 30 cm (12 in) and release it. It should stop completely just before it reaches the bottom of the swing. If the grapple swing is greater than this, the snubber should be adjusted as follows:

Each set of upper and lower adjusting nuts should be adjusted equally. Tightening only one nut of the set can over load the snubber causing premature wear.

- Remove the cotter pins (1) from the top snubber adjusting nuts (2).
- Loosen each adjusting nut and then tighten them until each Bellville washer (3) collapses about half way.
- Recheck the grapple swing.
- Install new cotter pins to maintain the adjustment. It may be necessary to tighten or loosen an adjusting nut to install the cotter pin.

Check the adjustment of the lower snubbers by pulling the grapple 30 cm (12 in) to each side and releasing it. The bottom snubbers are adjusted the same way as the top.

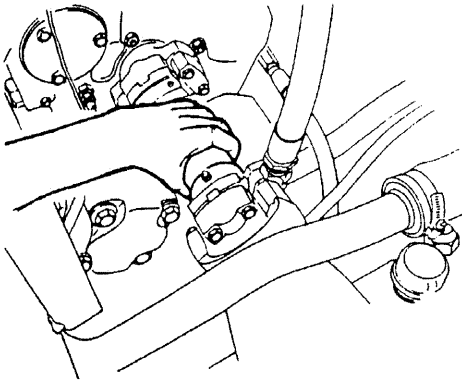
NOTE: Keep oil and grease away from the snubbers so they will operate at maximum efficiency.



DRIVESHAFTS

Lubrication

Grease the slip joints of the driveshafts every 100 hours of operation using a hand grease gun. Some of the universal joints are sealed, non greasing type that require no lubrication maintenance. They can be identified by a hole in the center of the U-joint cross. Greaseable U-joints should be greased every 1000 hours of operation. A needle type grease gun adapter may be required to reach the grease fittings on some U-joints. This may be purchased from a local tool supplier.



Checking the Driveshafts

Check for play in the universal joints and slip joints for loose missing or damaged bolts.

HYDRAULIC SYSTEM; TRANSMISSION / WINCH

Transmission, Converter And Winch

The fluid in the transmission, converter and winch hydraulic system serves several purposes. It lubricates the transmission, converter and winch, transmits engine power through the torque converter. The fluid also cools the components. It is very important that the oil level always be at the correct level. Too low an oil level will affect the transfer of power and can damage the system. Too much oil will cause foaming and the system will overheat. Damage can also be caused by dirty oil. It is important to keep contaminants away from the dipstick and keep the system clean.

Checking Fluid Level

The fluid level should be checked daily as follows:

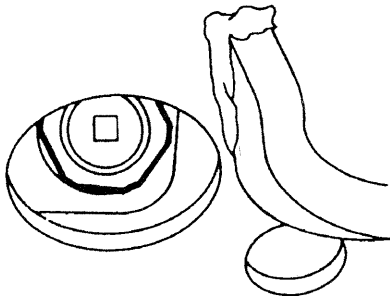
- Park the machine on level ground.
- Apply the parking brake.
- Transmission in neutral.
- Fluid at operating temperature 82° - 93° C (180° - 200° F)
- Start engine and operate it at low idle RPM.
- Check fluid level.
- Add fluid through the filler tube as required to bring the level to the full mark on the dipstick.

NOTE: If adding a large quantity of oil, it may be poured into the winch through the breather hole at the top of the housing.

Transmission and Torque Converter Fluid Warm-Up Procedure

- Block tires and hold service brake pedal applied.
- Transmission in FORWARD and THIRD.
- Run the engine at two thirds throttle until the fluid reaches its operating temperature.

NOTE: Do not apply the parking brake as this will declutch the transmission.



Changing Hydraulic Transmission Fluid

The fluid should be changed every 1000 hours of operation. Drain the fluid by removing the plug from the bottom of the transmission housing. Drain with the fluid at 65° - 93° C (150° - 200° F)



WARNING

BE CAREFUL WHEN WORKING WITH HOT FLUIDS.

Flushing the Transmission and Torque Converter

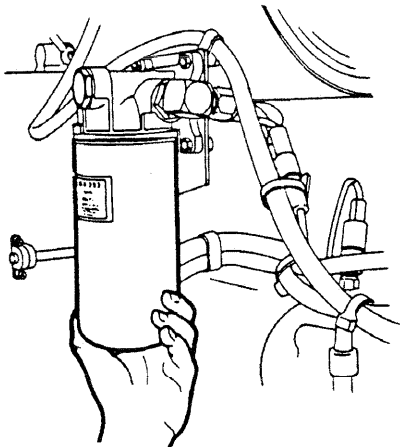
In the event of a major failure or when it becomes necessary to change most of the oil in the circuit the following procedure should be followed:

- Drain the transmission oil.
- Clean and replace the suction screen.
- Change the transmission filter.
- Remove lube line at transmission brake (from cooler) and divert into a ten gallon pail.
- Start engine and run at idle until clean oil appears at lube line or oil stops flowing.
- Shut off engine as soon as oil stops flowing.

Suction Screen

The suction screen should be cleaned every 1000 hours of operation. It is located on the bottom of the right hand side of the transmission beside the steps. Clean the screen when the fluid in the system is drained for changing. When the cleaned screen is replaced, use a new gasket. It should be tightened just enough to seat the suction screen.

Refill the transmission to low mark on the dipstick. Start the engine and run at 500 - 600 RPM to prime converter and lines. Recheck level with engine running at 500 - 600 RPM and add oil to bring level to low mark. When the oil temperature is hot 82° - 93° C (180° - 200° F) make final oil check bringing oil level to full mark. Check system for leaks.



Transmission Filter

Changing the Transmission Filter

The transmission filter should be changed after the first 50 hours of operation and every 500 hours of operation thereafter. It is accessible behind the right hand rear engine side panel. The filter can not be cleaned, it must be replaced. Apply a thin coat of transmission fluid to the gasket surface and tighten the filter. Operate the engine for five minutes at 1500 RPM and check for leaks. If leaks appear, Remove and replace the filter and repeat the installation. It usually does not help to tighten the filter further.

NOTE: Normal drain periods and filter change intervals are for average environmental and duty-cycle conditions. Severe or high operating temperatures or very dusty atmosphere conditions will cause acceleration deterioration and contamination. For extreme conditions judgment must be used to determine the required change intervals.

Torque Converter and Transmission Vent and Breather

The vent and breather should be cleaned every 250 hours of operation. Remove them from the top of the torque converter and transmission, clean them in solvent and blow dry them with low pressure compressed air as not to damage the internal parts.

HYDRAULIC SYSTEM; STEER, BLADE & GRAPPLE



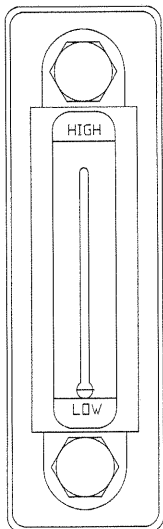
WARNING

If your Skidder is equipped with a grapple hydraulic accumulator system the hydraulic fluid in the accumulator is stored under high pressure. **BEFORE** doing any service on the grapple circuit of the hydraulic system, the accumulator must be **COMPLETELY DISCHARGED**. If the accumulator is to be disassembled, the nitrogen precharge pressure must also be **COMPLETELY DISCHARGED**.

Discharge Accumulator Hydraulic Pressure as follows:

- With the engine running, completely open the grapple tongs (open all the way from tip to tip).
- Raise the grapple tips approximately 60 cm (24") off the ground.
- Shut down the engine and put the machine in service position (with the exception of the raised grapple).
- Hold the grapple control lever in the **CLOSED** position until the pressure gauge reads zero (0) psi.
- Check the gauge to ensure that grapple system pressure is zero.

NOTE: If the grapple can not be opened (because of problems such as a pump or engine failure) then the above procedure should be done on a closed grapple on the ground. If the pressure still can not be reduced to zero, **CAREFULLY LOOSEN** the hose 1 or 2 turns (Do Not Remove) at the pilot operated check valve to the accumulator until all the hydraulic pressure has been removed. There will be approximately 3.8 liters (1 U.S. gal) of oil in the accumulator.



Sight Gauge

Checking the Hydraulic Fluid Level

NOTE: The blade should be on the ground, arch forward, grapple open, and the boom cylinders at mid stroke.

The hydraulic fluid should be checked daily and be between the LOW and HIGH marks on the sight gauge which is located on the right side of the frame. Add fluid to the reservoir as required through the filler tube.

Changing the Hydraulic Fluid

Change the hydraulic fluid every 1000 hours of operation or whenever the main hydraulic pump or the power brake pump fails and must be overhauled.

- Run the skidder until the hydraulic fluid reaches its operating temperature.
- Raise the blade, move the arch forward and the boom up (if applicable) and open the log grapple tongs.
- Shut the engine down.
- Raise the floor board to gain access to the hydraulic tank. Remove the pressure cap (4 PSI under pressure) then remove the drain plug on the bottom of the reservoir. Draining the oil into a suitable container.
- Slowly lower the blade, close the grapple arms and move the arch back (and lower the boom) to flush the fluid from the cylinders.
- Remove the hydraulic reservoir top plate and clean the inside of the tank using diesel fuel as a solvent and clean the magnet.
- Remove and clean the suction screen. Replace it if it is damaged.
- Refill the reservoir to the correct level. Start the engine and operate it at LOW Idle RPM for a few minutes.
- Raise the blade, move the arch forward, level the boom and open the grapple arms. Repeat this cycle five times.
- Recheck the level, adding fluid as required. See previous page.



CAUTION

NOTE: Never use flushing oil or compounds to clean the system, use only the recommended operating fluid.

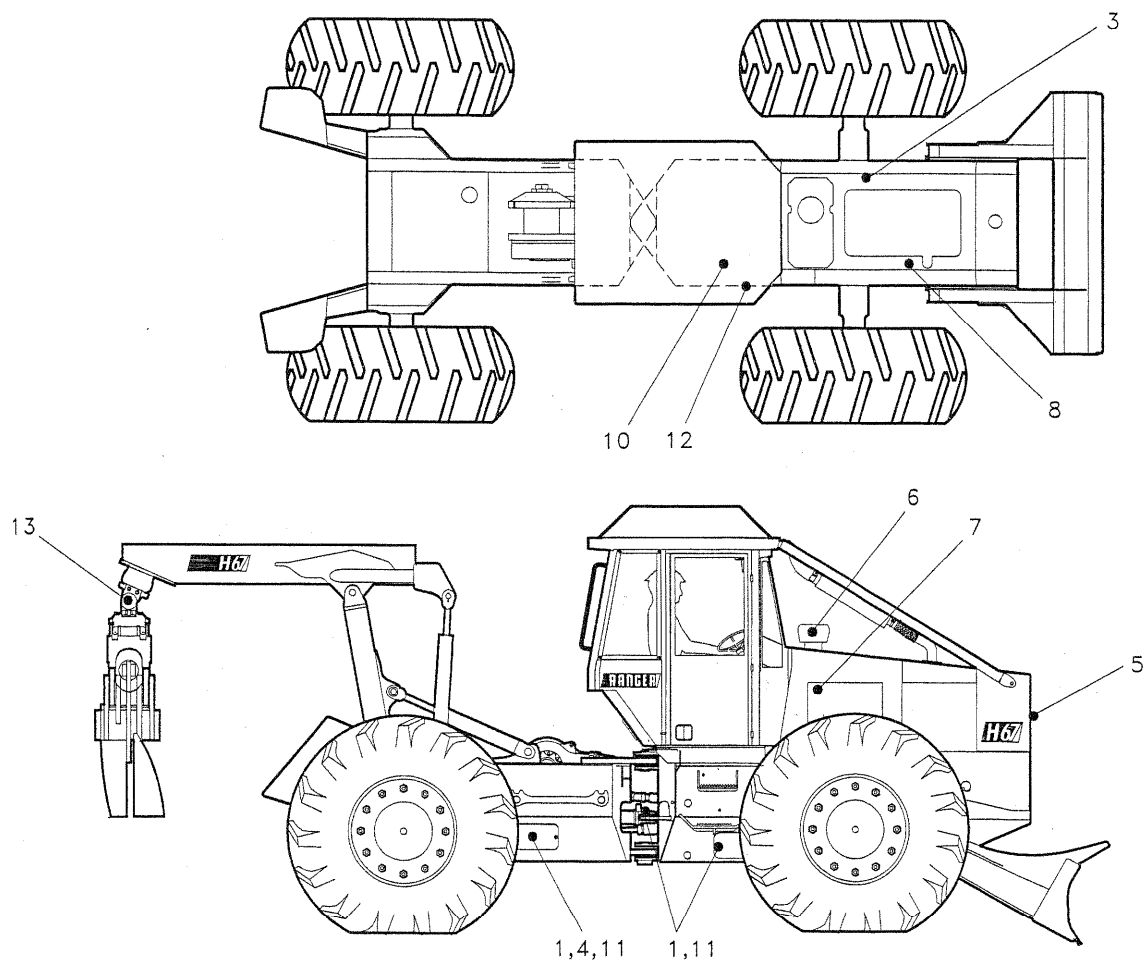
Changing the Main Hydraulic Filter

Change the filter element after the first 50 hours of operation and every 500 hours of operation thereafter.

See Hydraulic section in Service Manual (R 14828) for further information on hydraulic system.

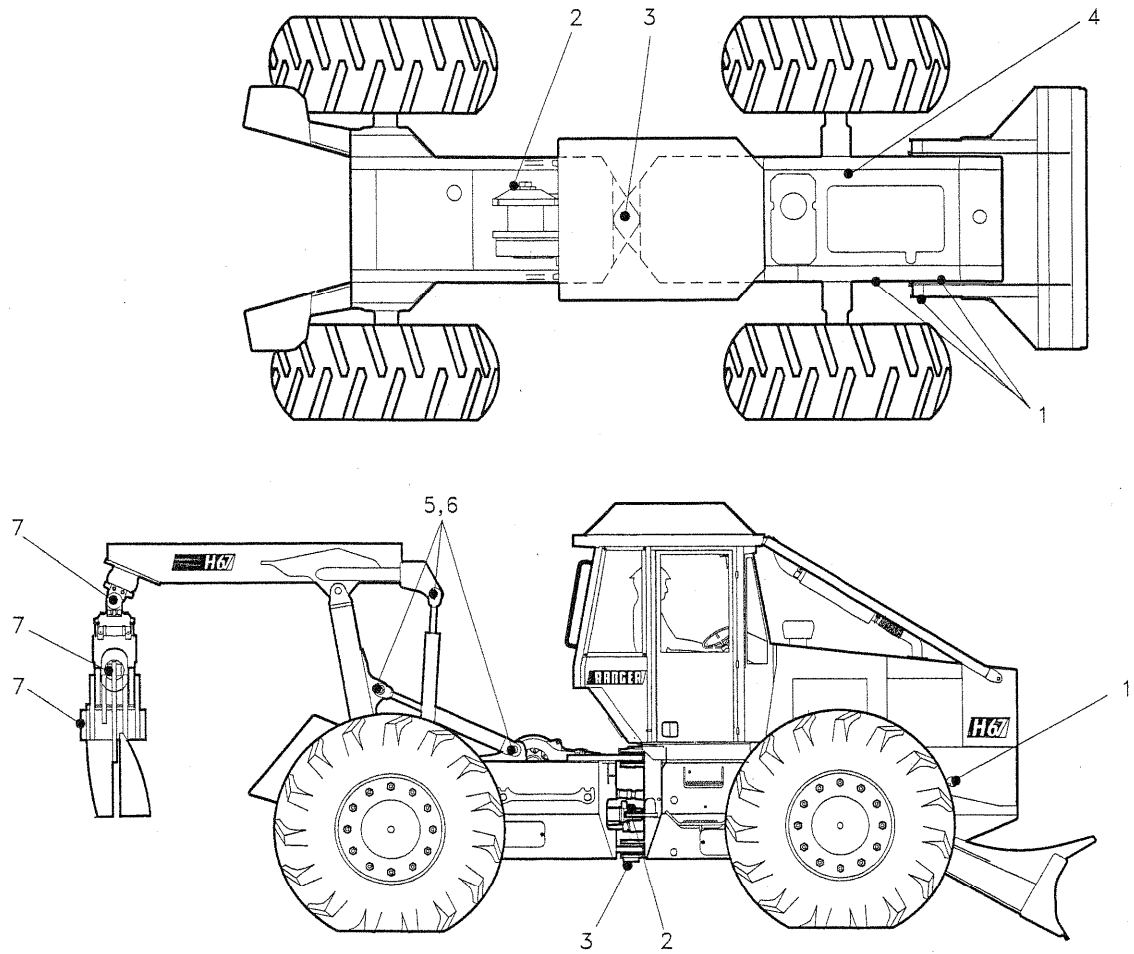
BASIC PREVENTIVE MAINTENANCE

Daily Maintenance



Item	Inspection Point	Action
1	Leaks	Inspect Entire Machine
2	Engine	Check Oil Level
3	Fuel Filter	Drain Water and Sediment
4	Fuel Tank	Drain Water and Sediment
5	Radiator	Inspect and Clean
6	Air Pre Cleaner	Empty
7	Air Cleaner	Check Service Indicator
8	Engine Coolant	Check Level
9	Battery	Inspect Condition
10	Transmission/Converter	Check Oil Level
11	Driveshafts	Check Condition
12	Hydraulic Fluid	Check Level
13	Grapple Snubbers	Check and Adjust
14	Lubrication	See Daily Lube Chart

Daily Lubrication



Item	Lubrication Instructions
1	Utility Blade and Cylinder Pins
2	Steering Cylinder Pins
3	Center Hinge Pins
4	Axle Cradle Pins
5	Arch and Cylinder Pins
6	Boom and Cylinder Pins
7	Grapple and Cylinder Pins

BASIC PREVENTIVE MAINTENANCE

Maintenance Intervals

Maintenance interval	First 50	Every 50	First 100	Every 100	Every 250	Every 500	Every 1000	Every 2000	Yearly / Every 2500	As Req'd
Power Unit										
Engine Oil Change	*				*					
Engine Oil Filter, Change	*				*					
Fuel Filter, Change										*
Fuel Strainer, Clean or Replace										*
Air Cleaner Element Outer, Change										*
Air Cleaner Element Inner, Change								*		
Coolant Protection, Check					*					
Change Coolant, Flush System							*			
Belt Tension, Check							*			
Throttle Control, Check & Adjust	*									*
Engine Performance, Check					*					
Drive Train										
Trans/Converter Oil, Change							*			
Transmission Oil Filter, Change	*		*			*				
Trans. Suction Screen, Clean							*			
Trans. & Converter Vents, Clean					*					
Axle Lubricant Levels, Check		*								
Axle Lubricant, Change							*			
Axle Breathers						*				
Slip Joint, Lube				*						
Universal Joint, Lube						*				
Brake System										
Parking Brake, Adjustment										*
Service Brake, Adjustment										*
Bleed the Brakes										*
Other Functions										
Hydraulic Fluid, Change							*			
Hydraulic Fluid Filter, Change	*						*			
Winch Vent, Clean					*					
Winch Free Spool, Adjustment										*

Lubricants and Capacities

System and Tank Capacities

Engine Crankcase	4.2 U.S. Gal. (16 liters)
Cooling System	11.8 U.S. Gal (45 liters)
Transmission/Converter	10.5 U.S Gal (40 liters)
Axle - Differential and Planetary Hubs	8.25 U.S Gal (31.2 liters)
Hydraulic Tank	14 U.S. Gal (52 liters)
Fuel Tank	67 U.S. Gal (254 liters)
Windshield Washer Reservoir	1.5 U.S. Gal (5 liters)

Recommended Lubricants

Main Hydraulic System

Prevailing Ambient Temperature	Fluid to be Used
0°F (-18°C) and above	Mobil DTE 13M
0°F (-18°C) and Below	<p>Conoco Polar Start DN-600 Fluid</p> <p>Automatic Transmission Fluid (can be used ONLY if it meets the following specifications):</p> <p>Contains the types and contents of anti-wear compounding found in API Class SD, SE, CC or CD engine oils or have passed pump tests, similar to those used in developing anti-wear type hydraulic fluids.</p> <p>Have enough chemical stability for mobile hydraulic system service</p> <p>Meets the viscosity requirements of API Class SD, SE, CC or CD engine oil - Grade SAE 10 W.</p> <p>The Following should be used as a guide in consultation with a reputable oil supplier. Any fluid may be used which meets the following requirements:</p> <p>Oil to be used must contain anti-wear properties and rust oxidation inhibitors plus anti-foam agents equal to that found in API Class SD, SE, CC or CD engine oils or have passed pump tests, similar to those used in developing anti-wear type hydraulic fluids.</p> <p>Oil must have a Saybolt Universal Viscosity of 145 to 225 seconds at 100°F(38°C) and viscosity of not less than 42 seconds at operating temperature. The oil selected should have a high shear stability to ensure that the viscosity remains within recommended limits. Viscosity Index should not be less than 90.</p> <p>Have a pour point of 20°F(11°C) below start-up temperature</p> <p>Diesel Fuel, Kerosene, Transformer Oil, Etc. MUST Not be used to dilute normal fluids.</p>
-30°F (-34°C) and Below	

BASIC PREVENTIVE MAINTENANCE

Transmission/Converter Hydraulic System

Prevailing Ambient Temperature	Fluid to be Used
30°F (-1°C) and above -10°F (-23°C) and above -30°F (-34°C) and above -65°F (-55°C) to 0°F (-18°C) -65°F (-55°C) and above	C-4 Grade 30 Transmission Fluid C-4 Grade 10 Transmission Fluid Dextron II D Transmission Fluid MIL-L-46167 or MIL-L-46167A Conoco Polar Start DN-600 Fluid

Chassis and Driveshaft Lubrication

Prevailing Ambient Temperature	Fluid to be Used
0°F (-18°C) and above	NLGI Grade 2 Lithium Base Extreme Pressure Multi-purpose Grease with 3% to 5% Molybdenum Disulfide added.
-25°F (-32°C)	NLGI Grade 0 Lithium Base Extreme Pressure Multi-purpose Grease.

Pillowblock Lubrication

Prevailing Ambient Temperature	Fluid to be Used
0°F (-18°C) and above	Unirex EP Grease (ESSO-Canada, Mobil-US) Grade 2.
below 0°F (-18°C)	Unirex EP Grease (ESSO-Canada, Mobil-US) Grade 0.

Fuel Specifications

Fuel	No. 2 Diesel
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Note:

Hydraulic Fluid must be kept clean. Any fluid added to the reservoir must be filtered through a 10 Micron screen. It is important to service filters and breathers at the correct hourly intervals.

Anytime oil is added to top off the fluid level, the same oil as is already in the system must be used. If the same fluid is not available, another approved fluid can be added if the fluid is supplied by the same manufacturer and the amount added is not greater than 50% of the system capacity. If these conditions can not be met,

the system must be drained completely and refilled.

When the fluid is changed because of ambient temperature, the system must be drained and the fluid replaced.

Because of the many types and brands of fluids that are available, it is not practical to test each one. Selecting the correct fluid should be done with the help of a reputable oil supplier who is responsible for the quality of the fluid. It is important to change fluids and filter elements at the intervals specified in this manual.

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