Allied Wagner

LUMBERJACK

Operator's Manual

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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.

This operator's manual should be regarded as part of the machine. Suppliers of both new and second-hand machines are advised to retain documentary evidence that this manual was provided with the machine.

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Section 6 Maintenance and Lubrication

Section 1

General

Fig. 1-1 L4100 Lumberjack

1.1 Introduction

This manual is your guide to correct operation of the Wagner Lumberjack. 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.

As an operator it is your responsibility to make certain that your Lumberjack operates at maximum efficiency, with the greatest possible safety. It is also your responsibility to keep it in top operating condition through proper operating techniques and correct operator maintenance. Remember, safe and efficient operation is up to you- the operator.

The Lumberjack, workhorse of the logging industry, has proven itself the world over. It can unload a full truck load or railcar load of logs in one pick. And...the load may be decked, sorted, stored, or transported directly to the mill, covering every distance with speed and agility. The Lumberjack also helps to save time and labor in splitting loads and sorting within log yards.

Rugged construction and ease of service contribute to the Lumberjack's long life and low maintenance. The Lumberjack's superior visibility and responsive controls result in fast, efficient and safe operation.

If you require information not found in this manual, please contact your local Wagner dealer. If you are unsure who your local dealer is, then contact

Allied Systems Company
21433 SW Oregon Street
Sherwood, OR 97140 USA
Phone: (503) 625-2560

1.2 Intended Use Statement

This machine is designed for the unloading, transportation, splitting, decking, and sorting of logs in log yards. Use in any other way is considered contrary to the intended use. Compliance with and strict adherence to the conditions of operation, service and repair as specified also constitute essential elements of the intended use.

The machine should be operated, serviced and repaired only by persons who are familiar with its particular characteristics and who understand the relevant safety procedures.

Accident prevention regulations, and all other generally recognized regulations on safety and occupational medicine, must be observed at all times.

Any arbitrary modifications carried out on this machine may relieve the Allied Systems Company and your Wagner dealer of any liability resulting from damage or injury.

⚠ WARNING

WARNING: Any removal of safety devices may result in damage to the machine, personal injury, or death.

1.3 Machine Identification

The model and serial number of your vehicle provide Allied Systems Company and your maintenance department with a way to keep a record of each machine. Each Lumberjack has the S.N. stamped into the chassis, usually on the right side of the machine next to the ladder (on 2WD units), or on the right side of the machine next to the bogie (on 4WD units). See Fig. 1-2. Additionally, the nameplate, usually mounted on the front right side of the cab, provides the model and serial number of your vehicle.

NOTE: The Serial Number stamp or nameplate location may vary on your machine. The locations shown in Figure 1-2 are normal, though not universal.

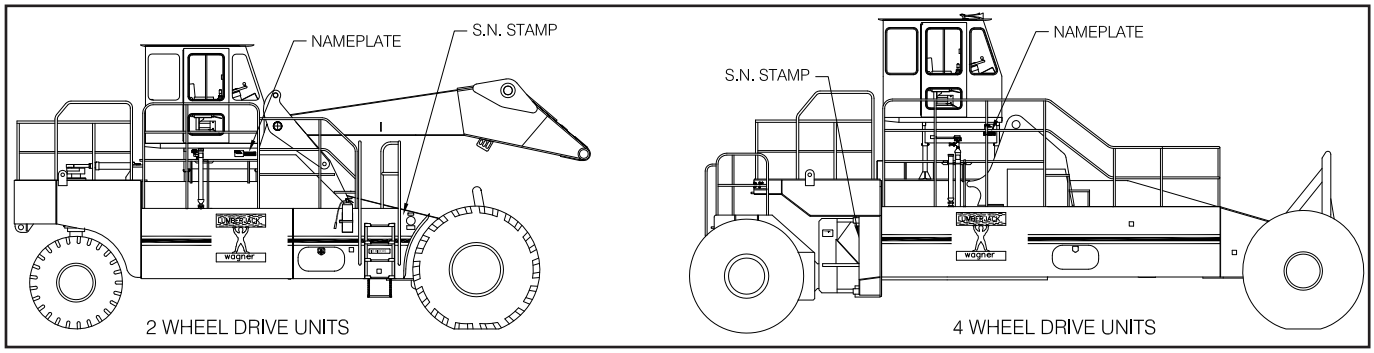
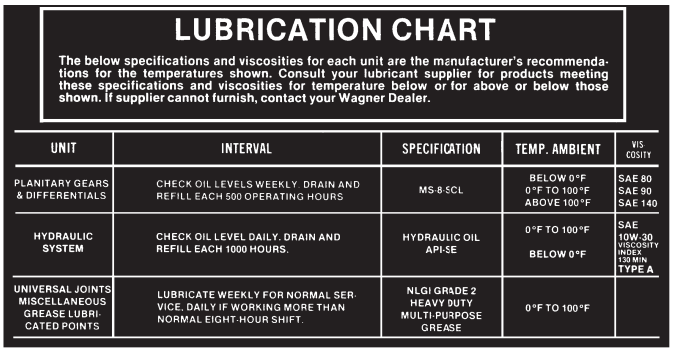


Fig. 1-2 Machine Identification (Carriage Assembly Shown Removed for Clarity)

NOTE: The importance of the machine's model and serial number cannot be overstated. Always have these numbers at your fingertips when requesting parts, service, or operation information of any kind. It is from these numbers that our service department creates a unit file in which a complete history of your machine is maintained.

A typical lubrication plate is shown in Fig. 1-3. These plates are securely fastened to the right side of the cab superstructure. The lubrication plate lists the time intervals, specifications, temperature limits, and viscosity requirements of lubrication oils and greases. For further information, see section 6 of this manual.



LUBRICATION CHART

The below specifications and viscosities for each unit are the manufacturer's recommendations for the temperatures shown. Consult your lubricant supplier for products meeting these specifications and viscosities for temperature below or for above or below those shown. If supplier cannot furnish, contact your Wagner Dealer.

UNIT	INTERVAL	SPECIFICATION	TEMP. AMBIENT	VIS. COSITY
PLANITARY GEARS & DIFFERENTIALS	CHECK OIL LEVELS WEEKLY. DRAIN AND REFILL EACH 500 OPERATING HOURS	MS-8-SCL	BELOW 0°F 0°F TO 100°F ABOVE 100°F	SAE 80 SAE 90 SAE 140
HYDRAULIC SYSTEM	CHECK OIL LEVEL DAILY. DRAIN AND REFILL EACH 1000 HOURS.	HYDRAULIC OIL API-SE	0°F TO 100°F BELOW 0°F	SAE 10W-30 VISCOSITY INDEX 130 MIN TYPE A
UNIVERSAL JOINTS MISCELLANEOUS GREASE LUBRICATED POINTS	LUBRICATE WEEKLY FOR NORMAL SERVICE. DAILY IF WORKING MORE THAN NORMAL EIGHT-HOUR SHIFT.	NLGI GRADE 2 HEAVY DUTY MULTI-PURPOSE GREASE	0°F TO 100°F	

Fig. 1-3 Lubrication Plate

1.4 Part Identification/Terminology

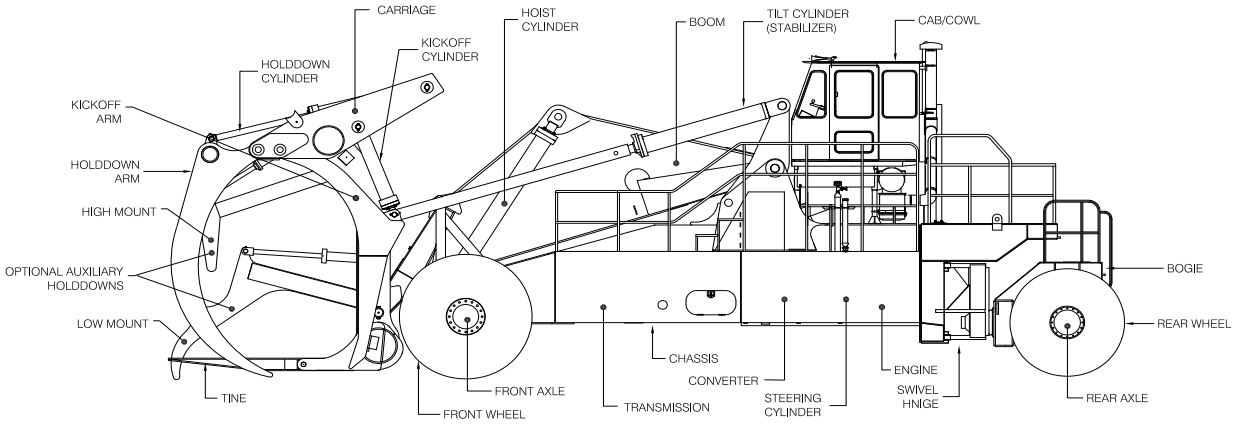


Fig. 1-4 Wagner L4115 Lumberjack

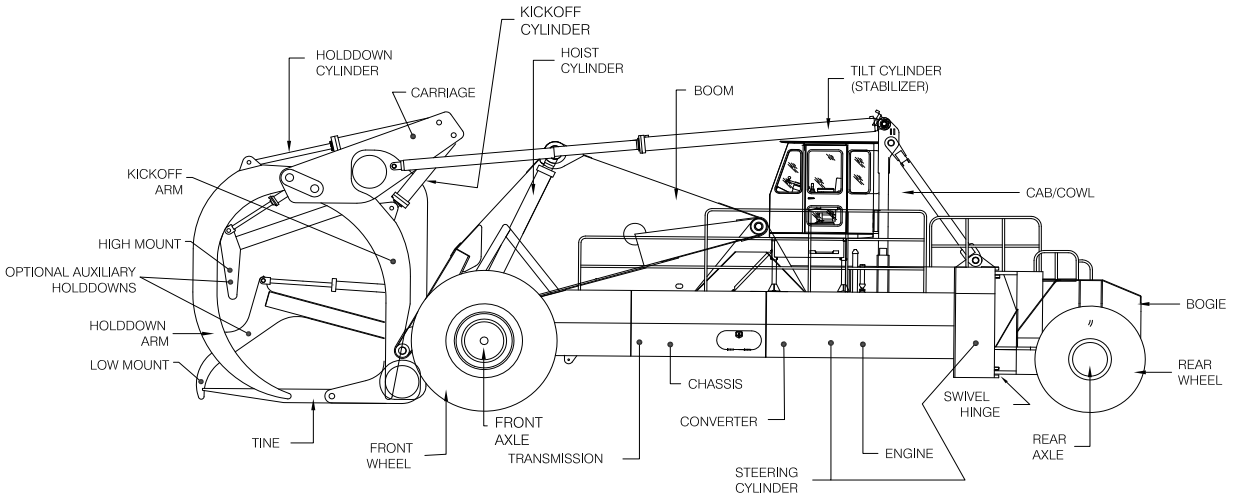


Fig. 1-5 Wagner L4130 Lumberjack

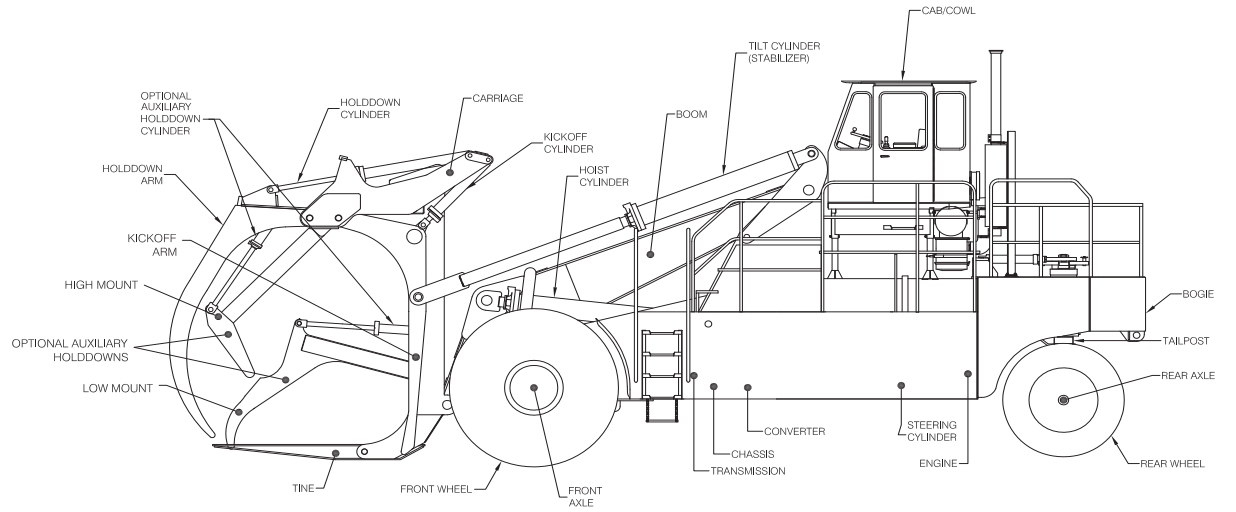


Fig. 1-6 Wagner L80F Lumberjack

Section 2

Safety

2.1 Safety Is Your Business

Why? Because **SAFETY**, based on knowledge, technical skill, and years of experience has been carefully built into your Wagner Lumberjack. Time, money and effort have been invested in making your machine a safe product. The dividend from this investment is **YOUR PERSONAL SAFETY**.

However, it must be realized that no power-driven equipment can be any safer than the person behind the controls. If you don't operate and maintain your Wagner safely, our efforts will have been in vain.

The safety instructions and warnings, as documented in this manual and shipped with the machine, provide the most reliable procedures for the safe operation and maintenance of your Lumberjack. It's your responsibility to see that they are carried out.

The following terms define the various precautions and notices in this manual:

NOTE: Whenever information exists that requires additional emphasis beyond the standard text, the term NOTE is used.

IMPORTANT: Whenever information exists that requires special attention to procedures or to ensure proper operation of the equipment or to prevent its possible failure, the term IMPORTANT is used.

⚠ CAUTION

The "CAUTION" symbol appears where a hazardous situation which, if not avoided, could result in minor to moderate injury and equipment damage.

⚠ WARNING

The "WARNING" symbol appears wherever incorrect operating procedures or practices could cause serious injury or death. Carefully read the message that follows to prevent serious injury or death.

NOTICE

The "NOTICE" symbol alerts to a situation that is not related to personal injury but may cause equipment damage.

NOTE: All possible safety hazards cannot be foreseen so as to be included in this manual. Therefore, the operator must always be alert to possible hazards that could endanger personnel or damage to the equipment.

2.2 Operation Warnings

- You must be trained in the operation of this machine prior to operation.
- Be extremely careful if you do not normally operate this machine. Reorient yourself to the machine before starting, then proceed slowly. However, you must not operate without having previously received proper training.
- Know your company's log yard rules. Some have site specific directions and procedures. The methods outlined in this manual provide a basis for safe operation of the machine. Because of special conditions, your company's log handling procedures may be somewhat different from those shown in this manual.
- Always face the ladder when going up and down ladders. Maintain three points of contact.
- Never jump on or off the machine.
- All walking surfaces (steps, ladders, etc.) must be free of ice, grease, oil or other materials that could cause or contribute to a slip or fall.
- The only person required on the machine is the operator. Never allow anyone to ride on the machine outside the cab, or its attachments. A person may ride inside the cab only if the unit is equipped with a buddy seat.
- Do not operate this machine if you know of malfunctions, missing parts, and/or mis-adjustments. These situations can cause or contribute to an accident or damage to the machine. Stop the machine immediately if problems arise after starting.
- Do not operate the machine before disconnecting the hydraulic tank or engine block heaters.
- The hydraulic tank heater and/or engine block heater use a 110 or 220 V AC external power source. An electrical shock could be fatal.
- All electrical cables and connectors must be in good condition. Use caution in wet weather to avoid danger from electrical shock. Extension cords to the hydraulic tank and/or engine block heater must be properly grounded.
- Do not start the engine if the key had been marked with a "**DO NOT START**" or "**RED**" tag.
- Never operate any of the cab controls from anywhere other than the operator's seat.
- Sound the horn to alert personnel in the area before starting the engine, and make sure everyone is clear. Be sure that all controls are in neutral before starting the engine.
- Be aware that several people can stand in the engine compartment, completely out of sight of the operator.
- For maximum visibility and overall safety, travel in reverse whenever possible. Always travel in reverse when the machine is loaded. Keep the load as low as practical. Be aware that the stability of the machine can vary with changes in slope, load and the position of the attachments. Do not exceed the rated load of this machine.
- Never allow the binder chains to be removed from the load until it is securely clamped by the holddown arms or secured by some other means provided by your company.
- Never pass a load over ground personnel or other equipment. Sound the horn and wait for the area to be cleared before moving the machine or load.

- Be accurate in load placement. It's important to know what the load will do when it's released.

- Lower or move the load to the ground before leaving the cab or shutting down the engine.

- High voltage electricity can discharge to ground without direct contact with the machine's structure. Minimum clearances from energized power lines or other power sources must be maintained. If electrical energy does discharge through the machine, **REMAIN IN THE CAB. AVOID CONTACT WITH METAL SURFACES. DO NOT PERMIT ANYONE TO COME INTO CONTACT WITH THE MACHINE'S STRUCTURE.**

⚠ WARNING

WARNING: Remain at least 25 feet from high voltage electrical wires. Failure to do so may result in injury or death and may damage equipment.

2.3 Maintenance Warnings

Maintenance, lubrication and repair of this machine can be dangerous unless performed properly. Each person must satisfy himself that he has the necessary skills and information, proper tools and equipment, and that his work method is safe, correct, and meets his own company's requirements.

- Do not attempt to make adjustments, or perform maintenance or service unless you are authorized and qualified to do so.

- Unless specified in service procedures, never attempt maintenance or lubrication procedures while the machine is moving or the engine is running.

- Keep hands, feet, long hair and clothing away from power-driven parts. Do not wear loose fitting clothing or jewelry while performing maintenance and lubrication in these areas.

- Always perform all maintenance and lubrication procedures with the machine on level ground, parked away from traffic lanes.

- Before performing maintenance or service under the machine:

  * Move the machine to a level surface, engage the parking brake, and stop the engine.

  * Lower the carriage to the ground.

  * Tag the key switch with a **"DO NOT START"** sign and/or remove the key.

  * Block the tires to keep the machine from rolling.

  NOTE: Local laws and regulations may require that additional safety measures be taken. Please consult local authorities.

- Never rely on the hydraulic system to support any part of the machine during maintenance or lubrication. Never stand under a component that is supported only by the hydraulics. Make sure it is resting on its mechanical stops. If necessary, support components with appropriate safety stands.

- Use caution when working around hot fluids. Always allow lubricating and hydraulic oils to cool before draining. Burns can be severe.

- Use extreme caution when using compressed air to blow parts dry. The pressure should not exceed 30 psi (208 kPa) at the nozzle. Never use air to blow yourself off. Air pressure penetrating your skin can be fatal.

- Engine exhaust fumes can cause death. If it is necessary to run the engine in an enclosed space, remove the exhaust fumes from the area with an exhaust pipe extension. Use ventilation fans and open shop doors to provide adequate ventilation.

- DO NOT remove the radiator cap when the engine is hot. The coolant will be under pressure and can flash to steam with explosive force, causing severe burns. To prevent burns, remove the radiator cap only when the engine is cool.
- Before disconnecting hydraulic lines, be sure to lower all loads and relieve all hydraulic pressure. The load could fall on you, or escaping hydraulic oil could cause severe personal injury (see below).
- Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing.
- Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging or servicing in an enclosed space. Always shield your eyes when working near batteries. When removing battery cables, always turn the battery disconnect switch(es) OFF first, then disconnect the negative (-) cable. When installing a battery, always connect the positive (+) cable first. This procedure will help to prevent a spark which could cause an explosion.
- Before making adjustments to the engine or chassis electrical system, disconnect the battery. An electrical spark could cause a fire, explosion or severe burns.
- It is essential to personnel safety that safe ladders, personnel lifts and/or scaffolding be used while servicing this machine. Always use safety tread walks and hand holds to reach lubrication points or to inspect or adjust the machine. These areas can be dangerously slick under conditions of rain, frost or oil smears.

CAUTION

1. Before operating: Know your machine. Read the Operator's Manual.
2. Operate at low speeds in crowded areas or soft terrain.
3. Avoid abrupt changes in boom direction. Do not drop load.
4. Lower hydraulic equipment before leaving operator's position.
5. Shut power off before lubricating or making equipment adjustment unless otherwise specified in the Operator's Manual.
6. Keep hands, feet and clothing away from power driven parts.
7. Keep off equipment while operating unless seat or operator's platform is provided. Keep all others off.
8. Make certain everyone is clear of equipment before operating.
9. This machine is not designed for lifting or moving of persons.

Hydraulic Hazards

Be aware of the hazards of pressurized hydraulics:

- Wear personal protective equipment, such as gloves and safety glasses, whenever servicing or checking a hydraulic system.
- Assume that all hydraulic hoses and components are pressurized. Relieve all hydraulic pressure before disconnecting any hydraulic line.
- Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.
- Small hydraulic hose leaks are extremely dangerous, and can inject hydraulic oil under the skin, even through gloves.
- Infection and gangrene are possible when hydraulic oil penetrates the skin. See a doctor immediately to prevent loss of limb or death.

2.4 Fire Safety

⚠ WARNING

WARNING: Diesel fuel and hydraulic oil are flammable. Never smoke while handling fuel or working on the fuel system. The fumes in an empty fuel container are explosive. Never cut or weld on fuel lines, tanks, or containers. Keep open flames and sparks away from the machine.

Avoiding Fire and Explosion Hazards

- Keep the machine free of oil, grease, chips, and trash accumulations. Regular pressure washing and/or steam cleaning is recommended for fire prevention and general safety. Use an approved solvent to clean machine parts. Never use gasoline or diesel fuel.
- Inspect for and remove all combustible materials from engine area before starting the machine and periodically throughout the workshift as required. These materials build up in tight corners and are highly combustible. To do a thorough job, remove the access panels.
- Remove any debris from the operator's compartment after each work shift.
- Inspect the driveshaft and brakes for debris and remove as necessary.
- Never overfill the fuel or hydraulic tanks. Any overflow could cause a fire. Immediately repair any hydraulic or fuel leaks and clean up any spills.
- Shut off the engine and electrical equipment while filling the fuel tank. Use extra caution when fueling a hot engine. Always ground the fuel nozzle against the filler neck to avoid sparks.
- Handle all solvents and dry chemicals according to procedures identified on manufacturer's containers. Work in a well-ventilated area. Make sure you know where fire extinguishers are kept and how to use them.
- Avoid spilling fuel. If a spill occurs, wipe it up immediately.
- Always ensure that excess grease and oil accumulation, including spillage, is cleaned up immediately.
- Inspect the machine daily for potential fire hazards and make any necessary repairs immediately.
- Maintain the engine cooling system to avoid overheating.
- Check all the electrical wiring and connections for defects, and repair or replace as necessary. Keep battery terminals clean and tight.
- Never perform welding operations until the entire machine has undergone a thorough cleaning. In addition, cover rubber hoses and have at least a fire extinguisher at hand.
- Hydraulic fluid is flammable. Do not weld on or near pipes, tubes, or hoses that are filled with fluid.
- Store flammable starting aids in a cool, well ventilated location.
- Remember, there is always a risk of fire.

Fire Suppression Equipment

All Wagner units built after November 1, 2004 are supplied with a hand held fire extinguisher. If your unit is not so equipped, Allied Systems Company recommends that an appropriately rated fire extinguisher be installed. A 20 pound ABC rated extinguisher is the minimum size recommended. Install it within easy reach of the operator in a position that protects it from damage. Use only a "quick release" type of mount.

- Keep your fire extinguisher(s) and fire suppression system, if so equipped, fully charged and in good working order. Know how to use them.
- 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.
- Service the extinguisher and the fire suppression system 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 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.

Fire Suppression

- Do not panic!
- Stop the machine and turn off the engine in the clearest area available.
- Lower the carriage if time permits.
- If your machine is equipped with a fire suppression system, and that system has not automatically been activated, manually activate the system. There are two manual controls. One is in the operator's cab, and one is by the ladder used to exit the machine. Only one manual control needs to be activated.

  NOTE: The hand held extinguisher is intended to be used to help prevent reflash only.

- Calmly and quickly exit the machine, clear the area, and contact your supervisor and/or local fire department.
- When it has been determined to be safe to return to the machine, locate the cause of the fire and correct it before returning the machine to service.
- Thoroughly inspect the entire machine and recharge or replace the extinguishers and fire suppression system before returning to work.

Section 3

Instruments and Controls

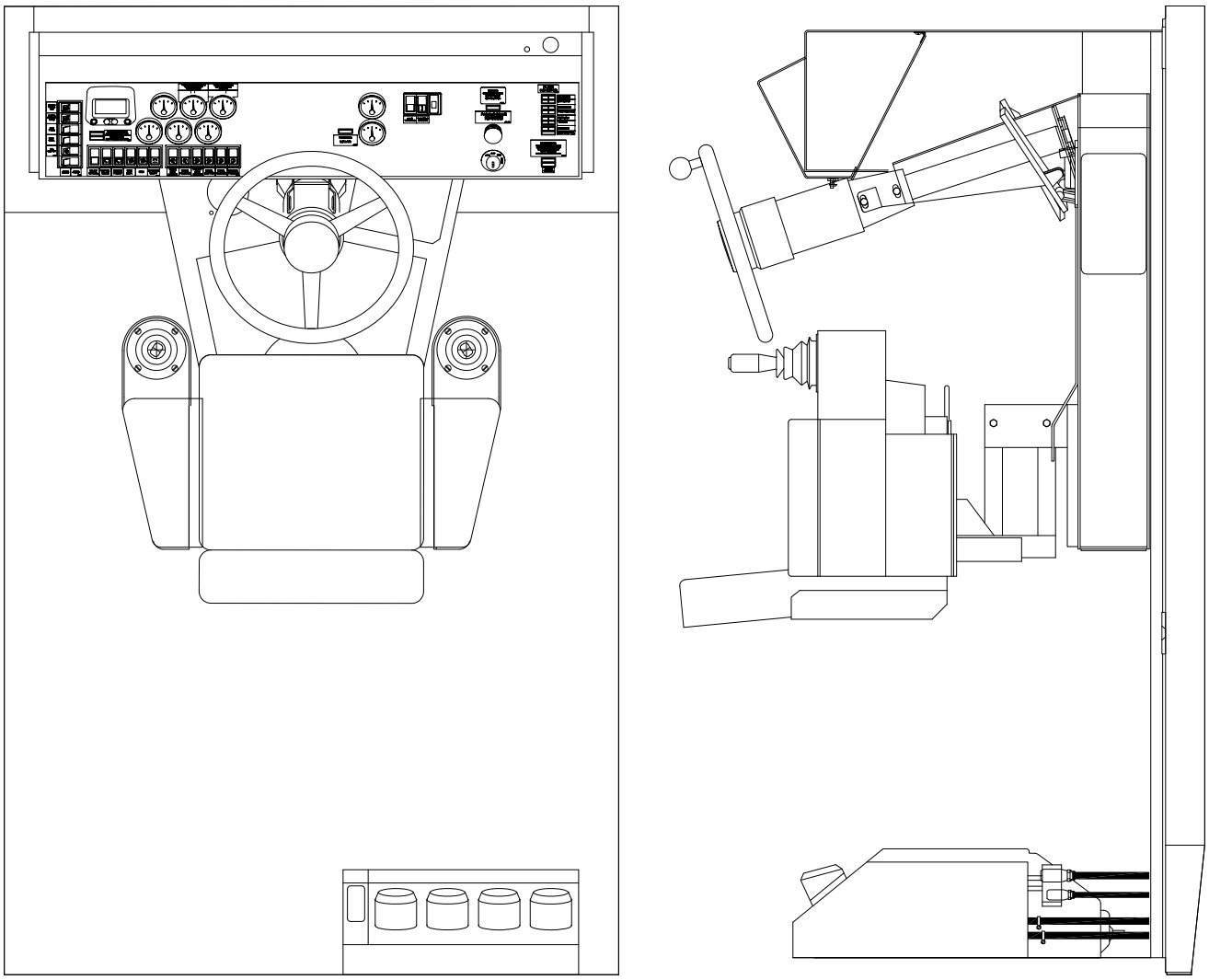


Fig. 3-1 Operator's Cab

3.1 General

Become thoroughly familiar with the location and use of all instruments and controls before operating this machine. Check all instruments immediately upon starting, again after reaching operating temperature, and at frequent intervals during operation to assure proper care through prompt detection of irregularities. If any of the instruments do not register properly, stop the engine and notify maintenance personnel to correct the problem.

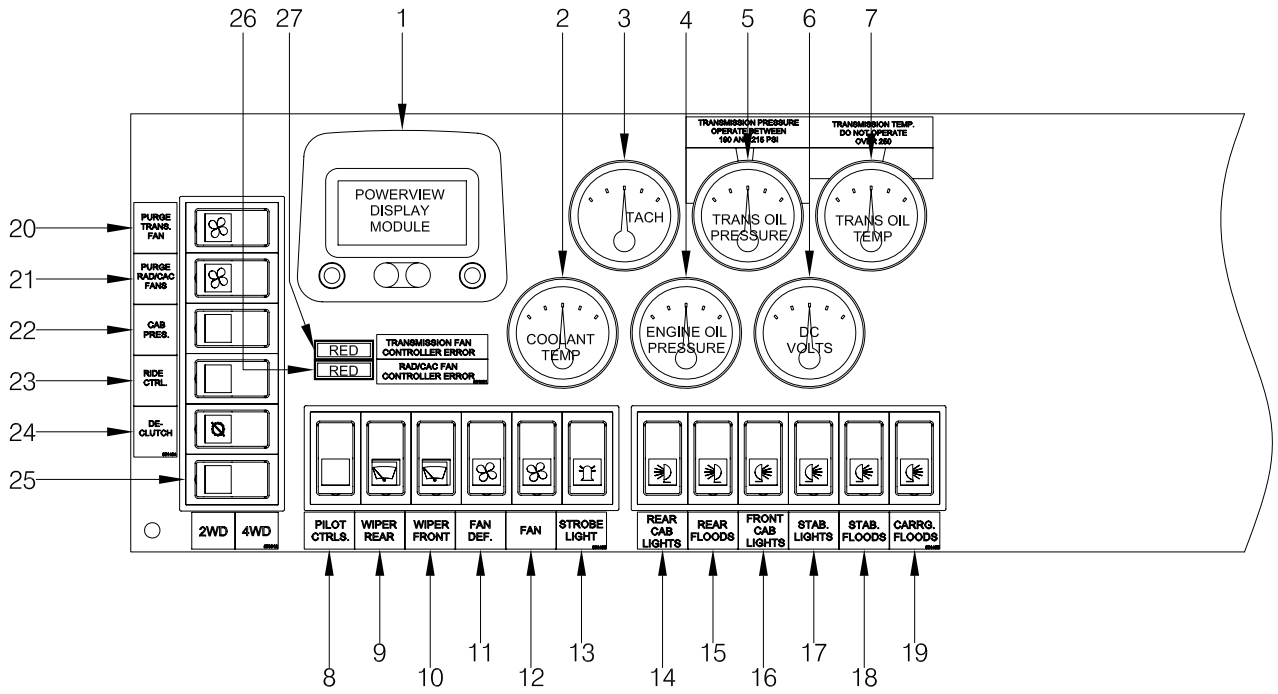


Fig. 3-2 Typical Instrument Panel, Left Side

3.2 Operator's Instrument Panel

NOTE: Your instrument panel may vary from the configuration shown here.

1. **Powerview Display Module**
   The Powerview Display Module is a multi-function tool that enables the operator or service personnel to view many different engine parameters as well as engine service codes. See Section 3.4 for more information regarding the operation of the Powerview Display Module.

2. **Engine Coolant Temperature Gauge**
   Displays engine coolant temperature. If the temperature holds steady at 200° F or higher (older machines), or 230°F or higher (newer machines with electronic engines), discontinue operation, allow the engine to idle for 3 to 5 minutes and shut it down. Determine the cause before continuing operation. If a coolant hose failure occurs, shut the engine down immediately.

3. **Tachometer**
   An electrical tachometer indicating engine revolutions per minute (rpm). To read, multiply the indicated number by 100. Example: 20 x 100 = 2000 rpm.

4. **Engine Oil Pressure Gauge**
   Displays engine lubricating oil pressure. Determines pressure only - not amount.

5. **Transmission Pressure Gauge**
   Displays the oil pressure that the transmission clutches use. Clutch pressure should be between 180 and 220 psi at engine idle speed. The pressure should not vary more than 5 psi between the four speed ranges.

6. **Voltmeter**
   The voltmeter indicates the voltage condition of the electrical system - whether the alternator is or isn't charging. The numbers indicate volts (acceptable range is 20-28 volts).

7. **Transmission Circuit Temperature Gauge**
   Displays converter oil temperature. This gauge should read below 250° F. If the temperature exceeds the maximum allowance, discontinue operation and report to appropriate service personnel.

8. **Pilot Controls**
   Turn to OFF when servicing the machine so there is no possibility of the implements accidently being activated.

9. **Rear Windshield Wiper ON / OFF Switch**
   Three position: Off-L-H

10. **Front Windshield Wiper ON / OFF Switch**
    Three position: Off-L-H

11. **Defroster Fan Switch (window mounted fan)**
    Three position: L-Off-H
    A second switch is located on the fan.

12. **Fan Switch**
    Optional defroster fan behind operator.

13. **Strobe Light Switch**
    ON / OFF switch for cab mounted strobe.

14. **Rear Cab Light Switch**
    ON / OFF switch for rear cab lights.

15. **Rear Flood Light Switch**
    ON / OFF switch for rear flood lights.

16. **Front Cab Light Switch**
    ON / OFF switch for front cab lights.

17. **Stabilizer Light Switch**
    ON / OFF switch for stabilizer lights.

18. **Stabilizer Flood Light Switch**
    ON / OFF switch for stabilizer flood lights.

19. **Carriage Light Switch**
    ON / OFF switch for carriage lights.

20. **Purge Transmission Cooler Fan Switch**
    When ON, this switch reverses the fan direction to blow debris off the front of the transmission cooler.

21. **Purge Radiator Fan Switch**
    When ON, this switch reverses the fan direction to blow debris off the front of the radiator.

22. **Cab Pressurizer**
    When ON, the roof mounted cab pressurizer provides pressurized filtered air from outside to the cab, which keeps contaminates out.

23. **Ride Control**
    When the control is on and the machine is moving fast enough, the system will dampen the effect of carrying loads over uneven ground.

⚠ WARNING

WARNING: Make sure the needle valve in the ride control manifold remains closed during normal operation. Otherwise, any load that is raised will descend, causing risk to both personnel and the machine. See Page 5-6 for details.

24. **Declutch**
    If the control is ON, the declutch system automatically shifts the transmission into neutral when you apply the service brakes. This allows you to perform all hydraulic functions at any rpm smoothly, without causing converter stall or other unnecessary strains on the brake or drivetrain components. If downgrades are encountered, the control may be turned to the OFF position, and the transmission will remain in gear when the brakes are applied. This control should be left in the ON position for normal operations.

25. **2WD / 4WD**
    Engages the rear axle when turned on to put the machine into four wheel drive.

26. **Transmission Fan Controller Error**
    This light indicates an error with the transmission cooler fan.

27. **Radiator Fan Controller Error**
    This light indicates an error with the radiator fan.

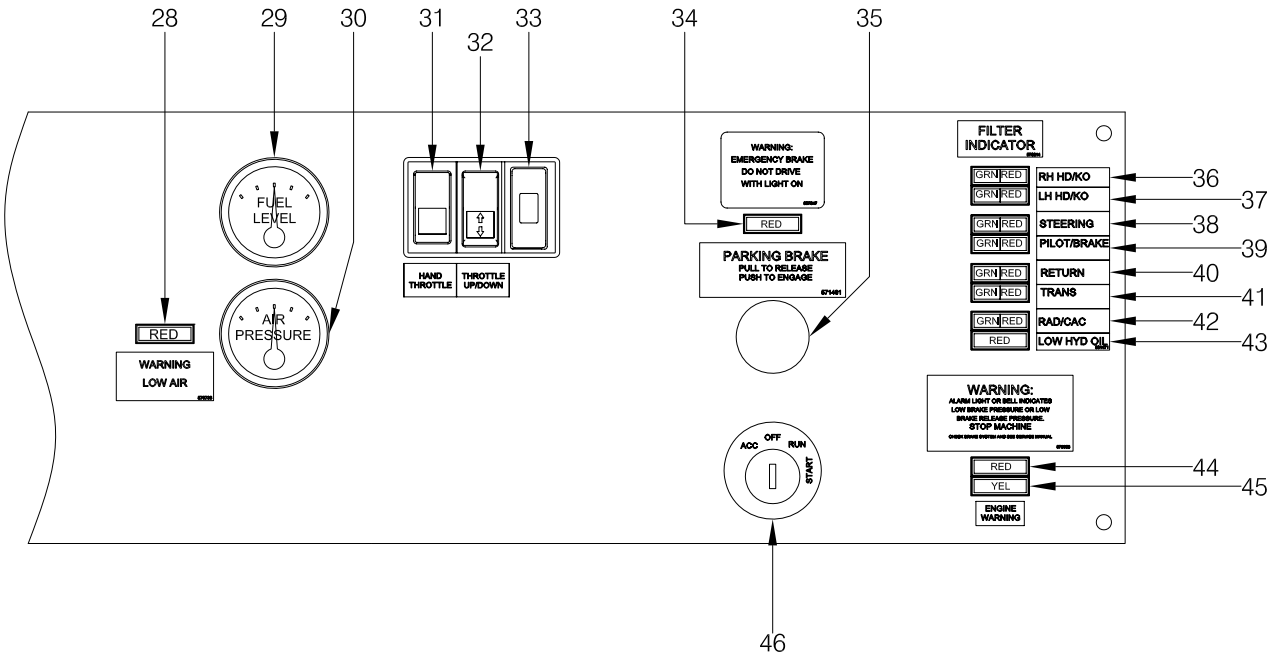


Fig. 3-3 Typical Instrument Panel, Right Side

3.2 Operator's Instrument Panel (cont)

NOTE: Your instrument panel may vary from the configuration shown here.

28. Low Air Pressure Warning Light (red)
This light indicates low air pressure. If the light comes on, the air pressure has dropped below safe operation level. Discontinue operation and report to your service department.

29. Fuel Level Gauge
The fuel level gauge indicates how much fuel is remaining in the tank.

30. Air Pressure Gauge
Displays the air system pressure. Operating pressure is from 60 to 120 psi.

31. Hand Throttle
When this switch is ON, the adjacent switch over rides the foot throttle.

32. Throttle Up/Down
When the previous switch is ON, this switch adjusts engine RPM up or down.

33. Panel Dimmer Switch
Dims and brightens the lights in the instrument panel.

34. Parking Brake Indicator Light (red)
If the key switch is ON, and the parking brake is ON, this light will be ON.

35. Parking Brake Control
To apply the parking brakes, push the button in. To release the brakes, pull the button out.

36. RH Holddown and Kickoff System Filter Indicator Lights*

37. LH Holddown and Kickoff System Filter Indicator Lights*

38. Steering System Filter Indicator Lights*

39. Pilot/Brake System Filter Indicator Lights*

40. Return Filter Indicator Lights*

*These Lights display the condition of the filters. When the lights show green the filters are working properly. When the lights show red the filter needs servicing.

41. Transmission Indicator Lights
If this light shows red, the transmission needs servicing.

42. Radiator Indicator Lights
If the light shows red, the radiator needs servicing

43. Low Hydraulic Oil Level Indicator Lights
If this light shows red, the hydraulic oil level is low. Discontinue operation and report this to your service department.

44. Engine Stop Light (red)
This light comes on whenever engine oil pressure drops below a safe operating level or when engine temperature is excessive. On some models, the engine will shut down automatically if the problem continues.

45. Engine Warning Light (yellow)
This light indicates a non-fatal engine control monitor (ECM) error. Engine will derate, and shutdown may be approaching.

46. Key Switch Start
The key switch is used to start and stop the engine and to turn the accessories on and off. This is a four position switch: ACC, OFF, RUN and START. When turning the key clockwise from the center, or OFF position, the first position to the right is RUN. The second is START. The START position is spring loaded, and will return the key to the RUN position when released. ACC is to the left of OFF: this position is used for accessories operation only.

3.3 Operation Controls

47. Battery Disconnect Switch
Located in the battery compartment on the LH side of the machine, mounted to the left and to the right of the batteries. These switches isolate the batteries from the electrical circuits and should be set to "OFF" when the machine is not in use, or during maintenance and repair, to prevent unauthorized starting of the vehicle, or electrical shorts. Turn the switches counterclockwise to disconnect the battery.

NOTE: Allow 30 seconds between ignition key off and battery disconnect off events to avoid erroneous ECM fault code on electronic engines.

NOTICE

If any arc welding is to be carried out on the machine's structure, it is extremely important that both disconnect switches be OFF. If the switches are left on, severe damage to the electrical system can result.

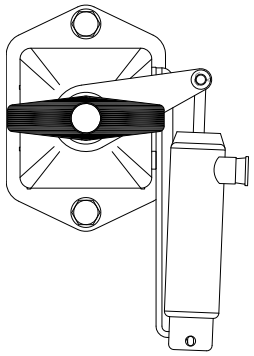


Fig. 3-4 Battery Disconnect Switch

NOTE: On machines equipped with a fire suppression system, the batteries are automatically disconnected whenever the system is actuated.

48. Accelerator Pedal
Foot-controlled engine accelerator pedal.

49. Steering Wheel and Column

50. Brake Pedal
Will also declutch the engine if the declutch control is engaged.

51. Second Brake Pedal (Optional)
Brake pedal only-- will not declutch the transmission. When this second brake pedal is installed, the "normal" brake pedal will always declutch.

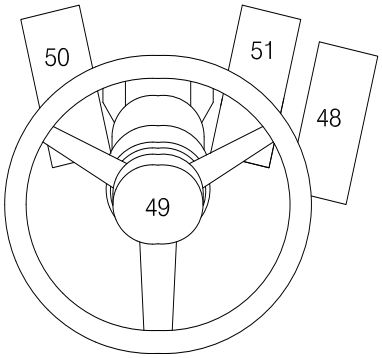


Fig. 3-5 Steering and Pedals

3.3 Operation Controls (cont)

52. Tilt Column

To tilt wheel, pull up on the lever to release the lock. To move the telescopic wheel in or out, push down on the lever to release the lock.

53. Transmission Controller

- Push Controls to the “F” position to engage in forward.
- Center in the “N” position to engage into neutral.
- Pull back to the “R” position to engage in reverse.
- Twist the control forward to shift up.
- Twist the control backwards to shift down.

IMPORTANT: Always release the throttle slightly when shifting speed ranges. This will significantly reduce shock loads to drivetrain components. Also, you should always reduce engine rpm when downshifting, as you can over-speed the engine.

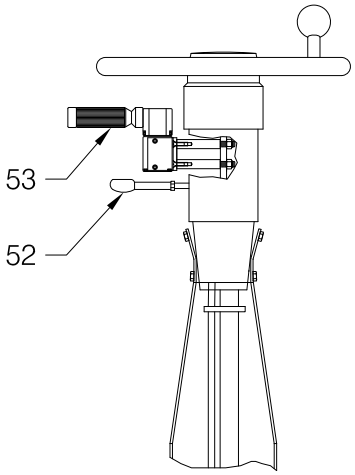


Fig. 3-6 Transmission and Column Controls

NOTE: Some units are equipped with the transmission controller mounted on the right seat armrest.

NOTE: Your Lumberjack will either be equipped with a single lever control mounted on the left armrest for holddown and kickoff control, as shown on item 55 and Fig 3-7 (Option A), or a multiple lever control on the left armrest, as shown on items 56a through 56f and Fig 3-8 (Option B).

54. Holddown and Kickoff Control (Option A)

Single lever for all functions. Push lever forward to open the holddown arms. Pull it back to close the holddown arms. If your machine is equipped with auxiliary holddown arms, the lever will also be supplied with a trigger. Squeeze the trigger and push lever forward to open the auxiliary holddown arms. Squeeze the trigger and pull it back to close the auxiliary holddown arms. Push the lever left to move the kickoff arms out. Push it right to bring the kickoff arms back. Push the left (top) button to activate the left side of the carriage only. Push the right (top) button to activate the right side of the carriage only.

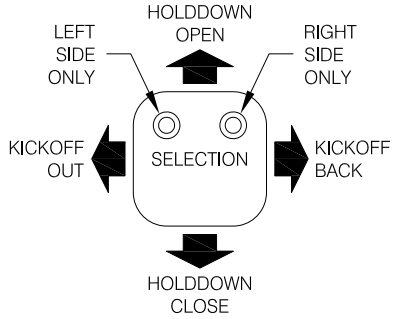


Fig. 3-7 Holddown and Kickoff Controls
(Left Hand Control, Option A)

55. Holddown and Kickoff Control (Option B)

55a. Left Auxiliary Holddown (Optional)
Push the lever forward to open the left auxiliary holddown arm, pull the lever back to close the left auxiliary holddown arm.

55b. Right Auxiliary Holddown (Optional)
Push the lever forward to open the right auxiliary holddown arm, pull the lever back to close the right auxiliary holddown arm.

55c. Left Kickoff Arm Control
Push the lever forward to extend the left kickoff arm, pull the lever back to retract the left kickoff arm.

55d. Right Kickoff Arm Control
Push the lever forward to extend the right kickoff arm, pull the lever back to retract the right kickoff arm.

55e. Left Holddown Control
Push the lever forward to open the left holddown arm, pull the lever back to close the left holddown arm.

55f. Right Holddown Control
Push the lever forward to open the right holddown arm, pull the lever back to close the right holddown arm.

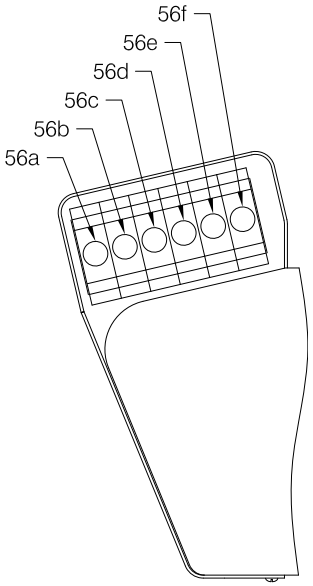


Fig. 3-8 Holddown and Kickoff Controls
(Left Hand Control, Option B)

56. Hoist and Tilt Control, and Platform Rotate
Single lever for both functions. Push the lever forward to lower the boom and carriage. Pull the lever back to raise. Push the lever right to tilt the carriage forward. Push the lever left to tilt it back. Push the left (top) button to rotate the seat platform left. Push the right (top) button to rotate the seat platform right. The control is spring loaded to neutral for all functions and will hold the load in its position at time of release.

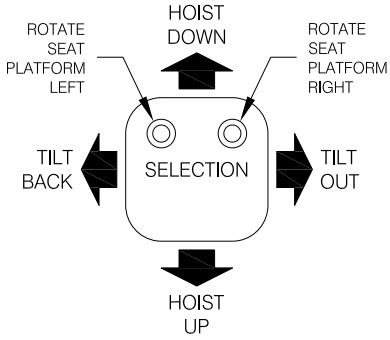


Fig. 3-9 Hoist and Tilt Control
(Right Hand Control)

3.3 Operation Controls (cont)

57. Dome Light Switch (Not Illustrated)
ON/OFF switch, mounted on the light.

58. Stereo/CD Player (Optional, Not Illustrated)
AM /FM Radio and cassette player or CD player, mounting on front of instrument panel, left side.

59. Circuit Breakers
Electrical Circuit protection. Push to reset. Located under dash on left side.

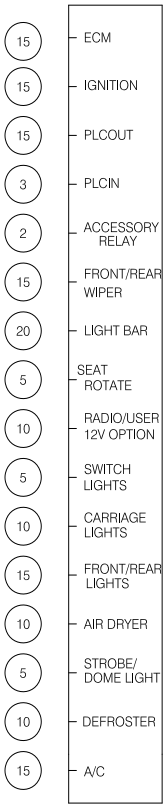


Fig. 3-10 Circuit Breakers

60. Seat Height and Ride Control
Push button to raise seat. Pull button to lower seat.

61. Seat Forward and Aft Adjustment Lever

62. Seat Swivel Release Lever
Locks seat in forward position.

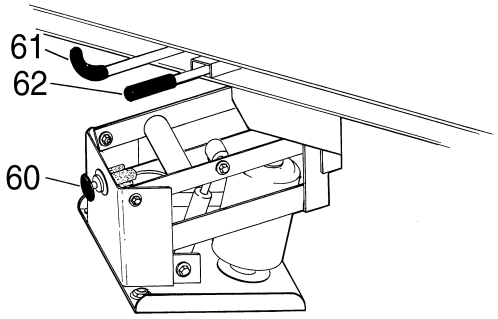


Fig. 3-11 Seat Controls

63. Fire Extinguisher (hand held)
Mounted to the chassis to the rear of the boarding ladder.

64. Optional Fire Suppression System
In case of fire, pull the safety pin on the actuator and strike the button. Fire retardant will be released, the engine will shutdown automatically and the batteries will be disconnected from the electrical system.

If possible, take the hand-held fire extinguisher and LEAVE THE VEHICLE. After the system has discharged, watch carefully for flare-ups and spot fires.

Notify the Fire Department and/or maintenance personnel as soon as possible.

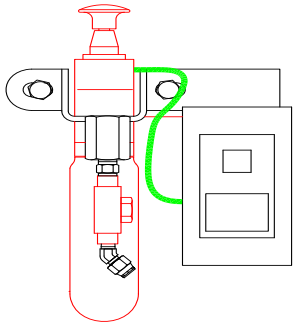


Fig. 3-12 Fire Suppression Actuator

NOTE: Two fire suppression system actuators are provided. Either one can set off the system. One is located behind the cab door to the right of the operator's seat. The other is mounted on the chassis at the rear of the machine just to the right of the rear ladder. Memorize the location of both. Some machines are equipped with an optional automatic fire detection and activation system, which can still be actuated manually if required.

65. Heater Control
Pull the handle for more heat. Push for less heat.

66. A/C Control
To turn the air conditioner on, turn the knob clockwise and turn the fan switch on. Adjust temperature with knob.

67. Heater / Air Conditioning Selector Knob
To turn the air conditioner on, turn the knob clockwise and turn the fan switch on. Adjust temperature with thermostat knob.

68. Fan Switch
Three position switch: HIGH, MED and LOW

69. Heater/Air Conditioner
Three position switch: HEAT, OFF and AC

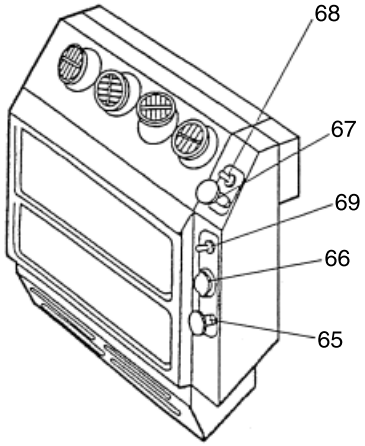


Fig. 3-13 Air Conditioner Controls

70. Air Filter Indicator
Standard location is mounted on the air cleaner housing. It indicates air filter restriction by showing "red" zone, the element must be serviced as soon as possible. To reset the indicator, press the button on top.

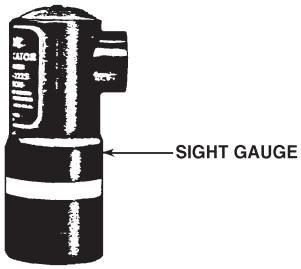


Fig. 3-14 Air Filter Indicator

3.4 Powerview Display Module

General

Your Lumberjack is equipped with a PowerView display module, a multifunctional tool that enables you to view many different engine or transmission parameters and service codes. The system allows you to accurately monitor the modern electronic engine and transmission installed on your Lumberjack. The PowerView includes a graphical backlit LCD screen. It has excellent contrast and viewing from all angles. Back lighting can be controlled via menu or external dimmer potentiometer. The display can show either a single parameter or a quadrant display showing four parameters simultaneously. Diagnostic capabilities include fault codes with text translation for the most common fault conditions. The PowerView has four buttons using self-calibrating charge transfer activation technology, which eliminates the concern for pushbutton wear and failure. In addition, operators can navigate the display with ease.

Display Parameters

The following are some of the engine and transmission parameters displayed by the PowerView in English or Metric units, as well as in Spanish, French, or German (when applicable, consult engine or transmission manufacturer for SAE J1939 supported parameters):

- Engine RPM
- Engine Hours
- Machine Hours
- System Voltage
- % Engine Load at the current RPM
- Coolant Temperature
- Oil Pressure
- Fuel Economy
- Throttle Position
- Engine Manifold Air Temperature
- Current Fuel Consumption
- Transmission Oil Pressure
- Transmission Oil Temperature
- Transmission Gear Position
- Active Service Codes
- Stored Service Codes (when supported)
- Set Units for display (English or Metric)
- Engine Configuration Parameters

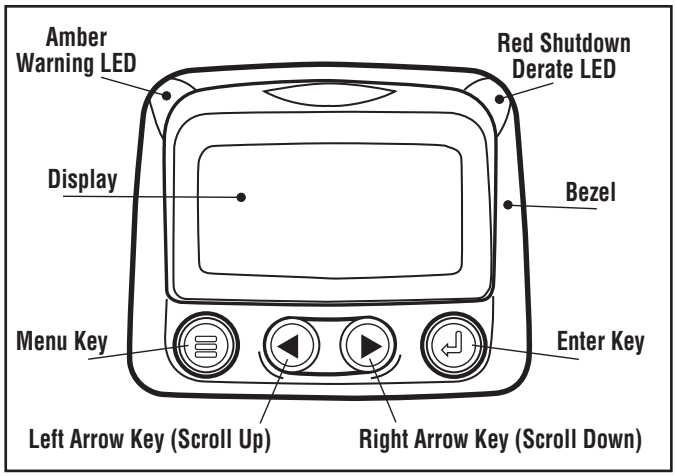


Fig. 3-15 Powerview Faceplate Features

NOTICE

The Menu. Left Arrow, Right Arrow and Enter key buttons are touch sensitive and can be damaged if pressed to hard.

Keypad Functions

The keypad on the PowerView is a capacitive touch sensing system. There are no mechanical switches to wear or stick, and the technology has been time proven in many applications. It operates in extreme temperatures, with gloves, through ice, snow, mud, grease, etc., and it allows complete sealing of the front of the PowerView. The 'key is touched' feedback is provided by flashing the screen. The keys on the keypad perform the following functions:

» **Menu Key** - The Menu Key is touched to either enter or exit the menu screens.

» **Left Arrow** - The Left Arrow Key is touched to scroll through the screen either moving the parameter selection toward the left or upward.

Right Arrow - The Right Arrow Key is touched to scroll through the screen either moving the parameter selection toward the right or downward.

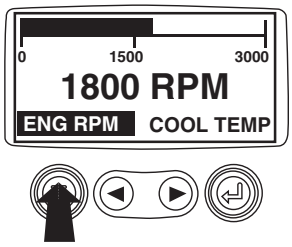
» **Enter Key** - The Enter Key (also known as Enter Button) is touched to select the parameter that is highlighted on the screen.

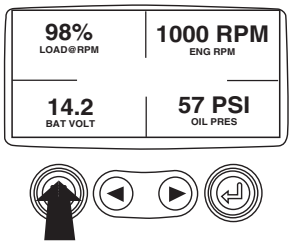
⚠ CAUTION

CAUTION: Always stop Lumber Jack and engage parking brake before making any adjustments to the Powerview display module. Failure to do so may cause equipment damage or injury to personnel.

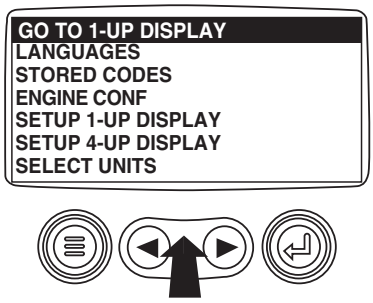
Main Menu Navigation

1. Starting at the single or four engine parameter display, touch “Menu”.

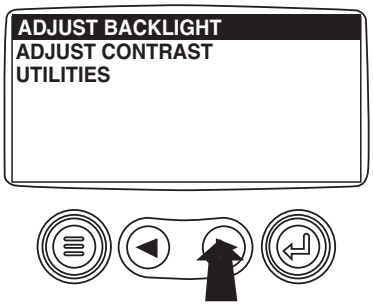




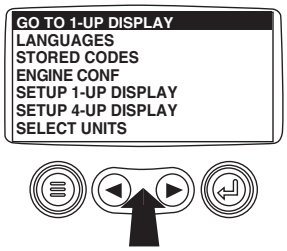
2. The first seven items of the “Main Menu” will be displayed. Touching the “Arrow Buttons” will scroll through the menu selection.

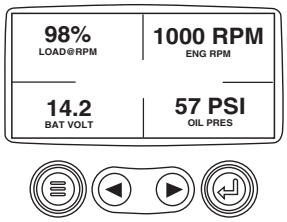


3. Touching the right arrow button will scroll down to reveal the last items of “Main Menu” screen highlighting the next item down.



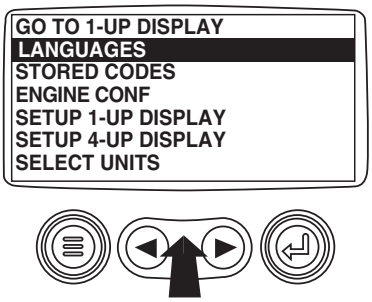
4. Touch the “Arrows” to scroll to the desired menu item or touch “Menu” to exit the Main menu and return to the engine parameter display.



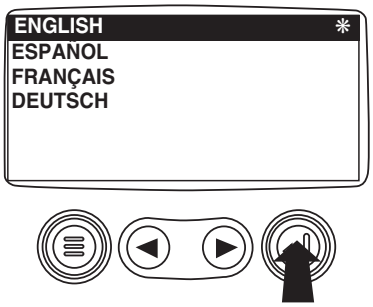


Selecting a Language

1. Starting at the main menu display use the “Arrows” to scroll to the ”Language” menu and once highlighted touch the “Enter” button.



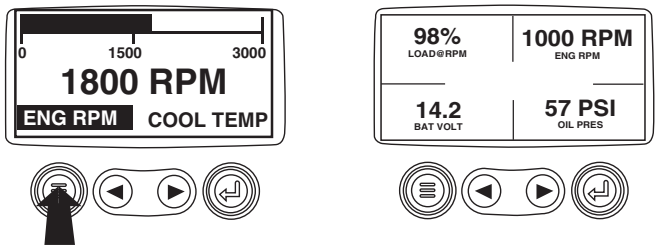
2. The language choices will be displayed. Use the “Arrow” buttons to scroll through the selections and touch “Enter” to make a selection.



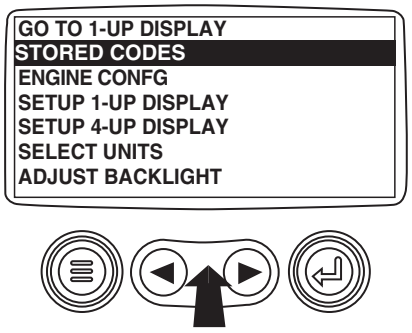
3. Now that you have selected the language, touch the “Menu” button to return to the main menu display.

Stored Fault Codes

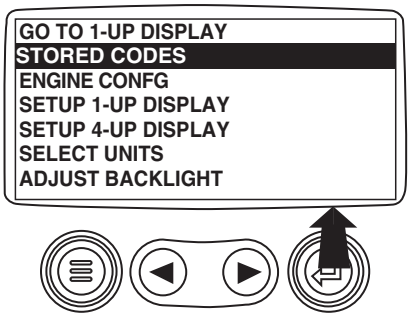
1. Starting at the single or the four engine parameter display touch the “Menu button”.



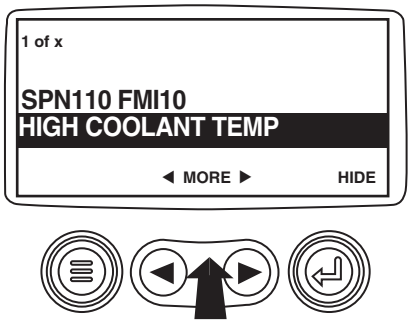
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the Stored Fault Codes is highlighted.



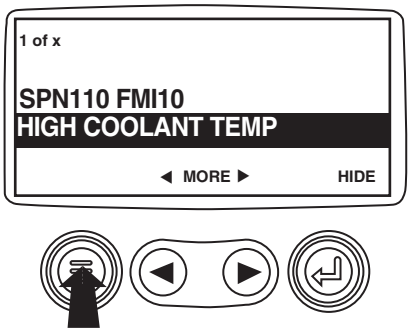
3. Once the “Stored Fault Codes” menu item has been highlighted, touch the “Enter Button” to view the “Stored Fault Codes” (when applicable, consult engine or transmission manufacturer for SAE J1939 supported parameters).



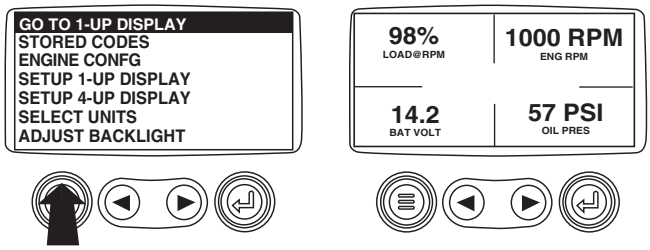
4. If the word “MORE” appears above the “Arrow Buttons” there are more stored fault codes that may be viewed. Use the “Arrow Buttons” to scroll to the next Stored Diagnostic Code.



5. Touch the “Menu Button” to return to the main menu.

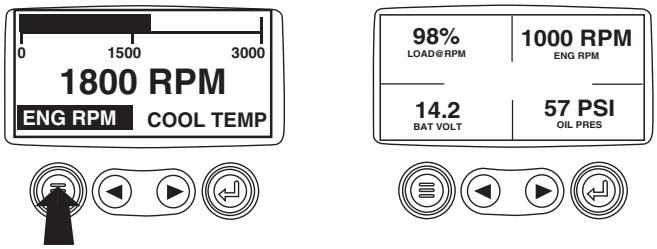


6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

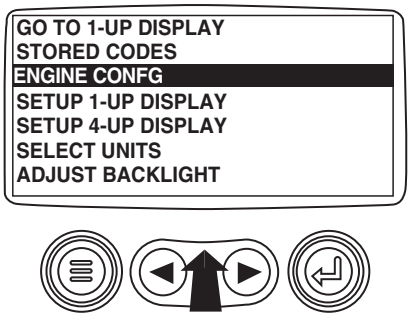


Engine Configuration Data

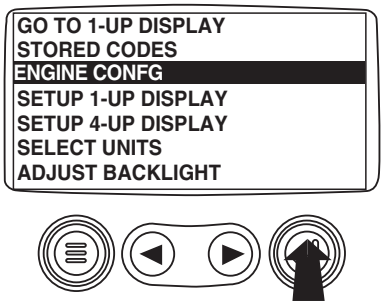
1. Starting at the single or four engine parameter display touch the ”Menu Button”.



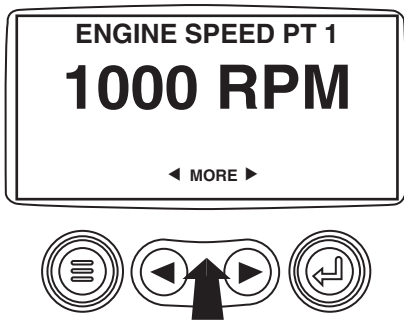
2. The main menu will pop up on the display. Use the “Arrow Buttons ”to scroll through the menu until the “Engine Configuration” is highlighted.



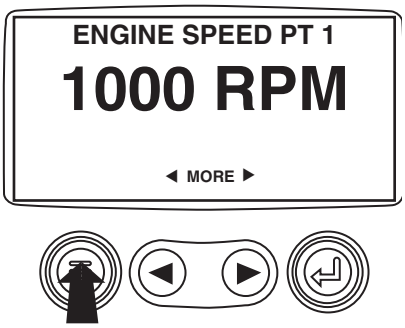
3. Once the “Engine Configuration” menu item has been highlighted, touch the “Enter Button” to view the engine configuration data.



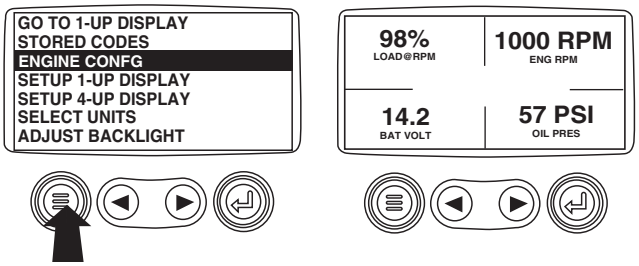
4. Use the “Arrow Buttons” to scroll through the engine configuration data.



5. Touch the “Menu Button” to return to the main menu.

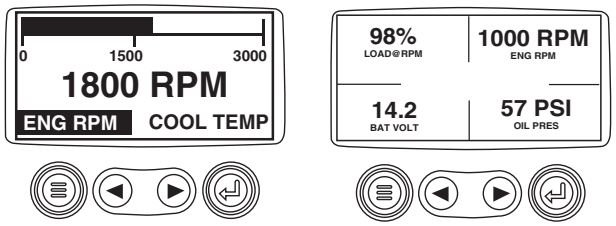


6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.



Faults and Warnings - Auxiliary Gage Fault

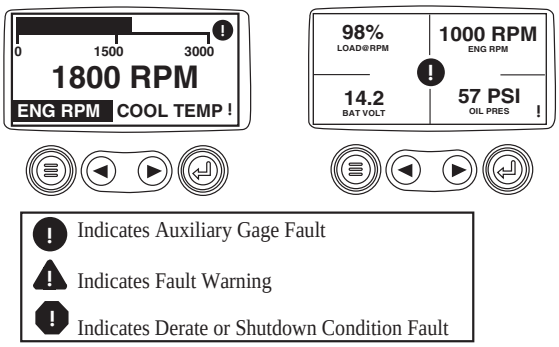
1. During normal operation the single or four parameter screen will be displayed.



2. The PVA Series of auxiliary gages can be attached to the PowerView. These auxiliary gages communicate with the Modbus master PowerView via a daisy-chained RS-485 port. If at any time during system initialization or normal operation an auxiliary gage should fail, the single or four parameter screen will be replaced with the “MLink Gage Fault” message.

3. To acknowledge and “Hide” the fault and return to the single or four parameter display, touch the “Enter Button”.

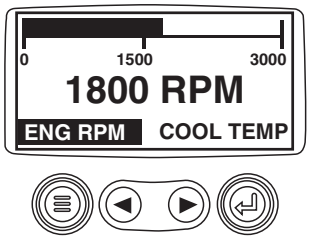
4. The display will return to the single or four parameter screen.

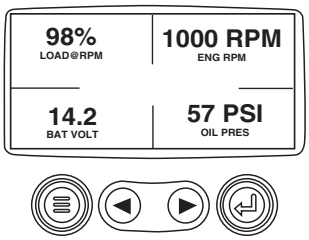


5. Touching the “Enter Button” will redisplay the hidden fault. Touching the “Enter Button” once again will hide the fault and return the screen to the single or four parameter display. NOTE: The fault can only be cleared by correcting the cause of the fault condition.

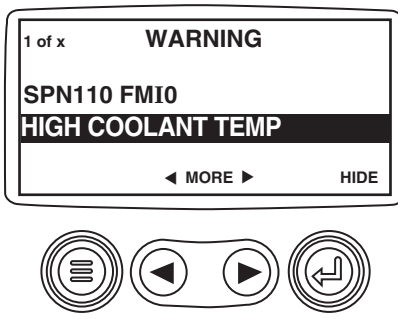
Active Fault Codes

1. During normal operation the single or four parameter screen will be displayed.

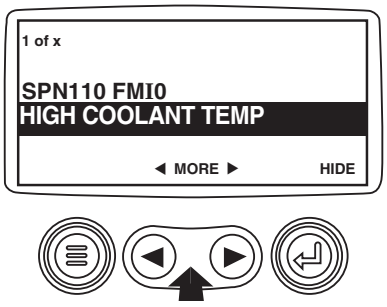




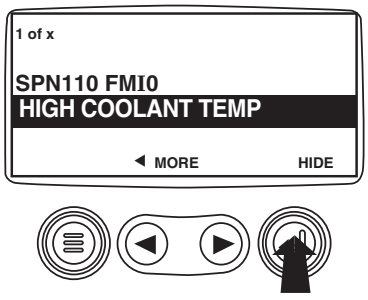
2. When the PowerView receives a fault code from an engine control unit the single or four parameter screen will be replaced with the “ActiveFault Codes” message.



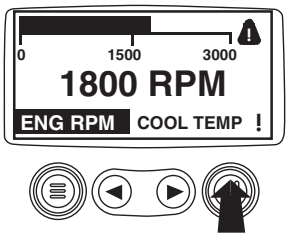
3. If the word “MORE” appears above the “Arrow Buttons” there are more active fault codes that may be viewed. Use the “Arrow Buttons” to scroll to the next “Active Fault Code”.

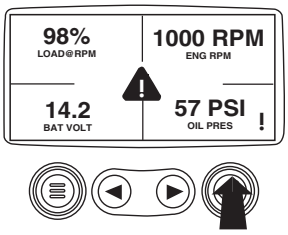


4. To acknowledge and “Hide” the fault and return to the single or four parameter display touch the “Enter Button”.

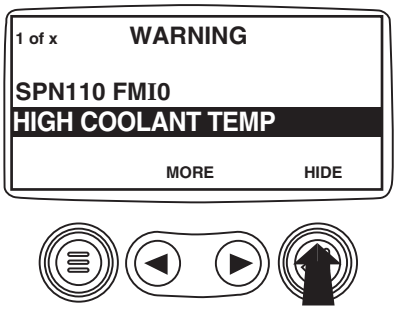


5. The display will return to the single or four parameter display, but the display will contain the “Active Fault” warning icon. Touching the “Enter Button” will redisplay the hidden fault.

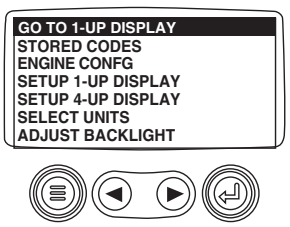


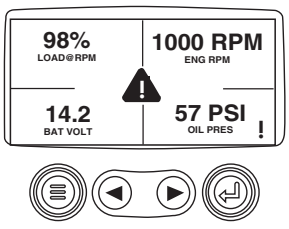


6. Touching the “Enter Button” once again will hide the fault and return the screen to the single or four parameter display.



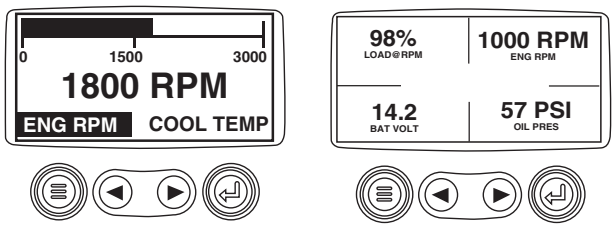
7. The Single or Four parameter screen will display the fault icon until the fault condition is corrected. NOTE: Ignoring active fault codes could result in severe engine damage.



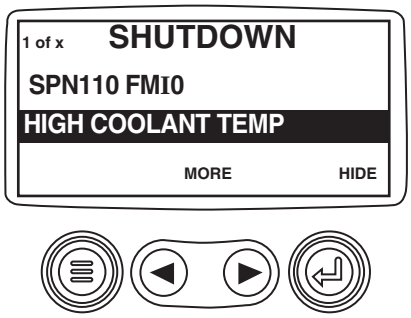


Shutdown Codes

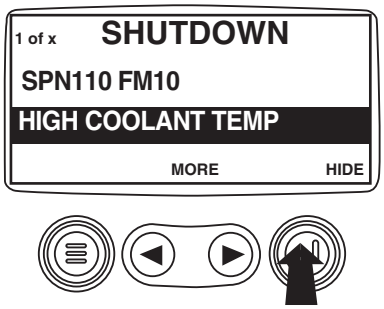
1. During normal operation the single or four parameter screen will be displayed.



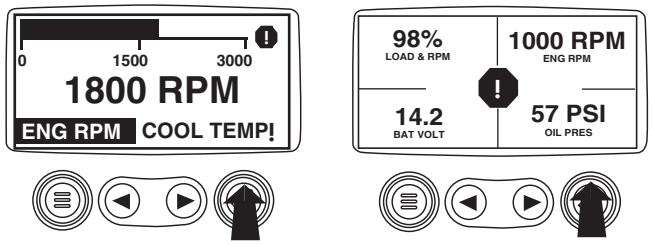
2. When the PowerView receives a severe fault code from an engine control unit the single or four parameter screen will be replaced with the “Shutdown!” message.



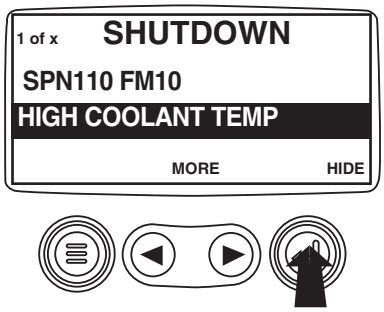
3. To acknowledge and “Hide” the fault and return to the single or four parameter display touch the “Enter Button”.



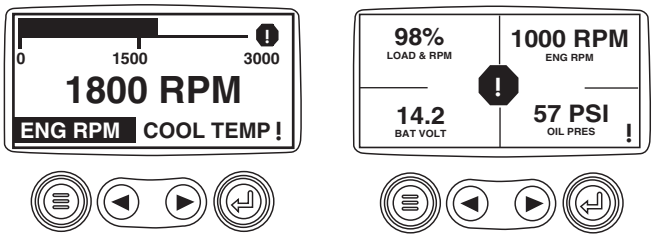
4. The display will return to the single or four parameter display, but the display will contain the “Shut Down” icon. Touching the “Enter Button” will redisplay the hidden fault.



5. Touching the “Enter Button” once again will hide the fault and return the screen to the single or four parameter display.

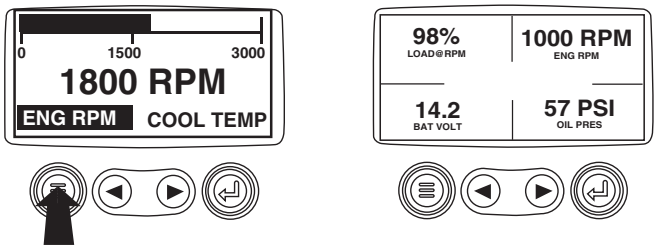


6. The Single or Four parameter screen will display the fault icon until the fault condition is corrected. NOTE: Ignoring active fault codes could result in severe engine damage.

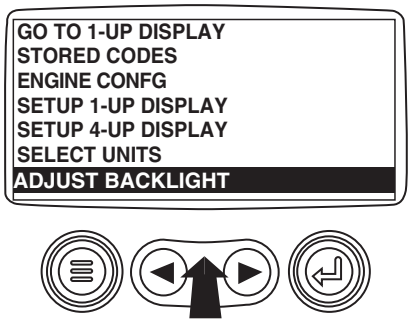


Back Light Adjustment

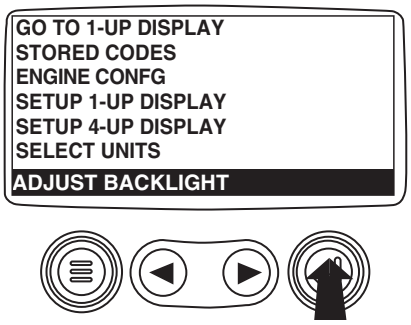
1. Starting at the single or four engine parameter display touch the ”Menu Button”.



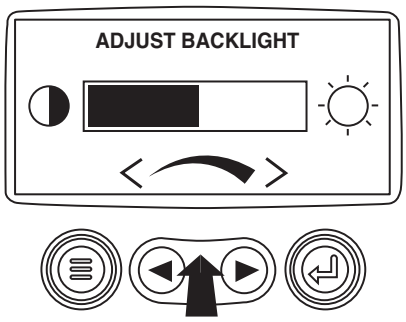
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the “Adjust Backlight” is highlighted.



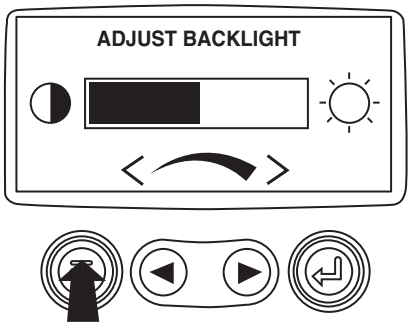
3. Once the “Adjust Backlight” menu item has been highlighted touch the “Enter Button” to activate the “Adjust Backlight” function.



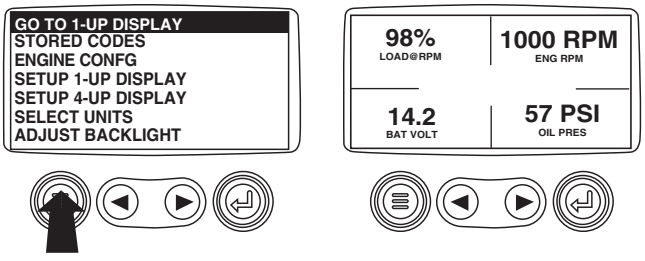
4. Use the “Arrow Buttons” to select the desired backlight intensity.



5. Touch the “Menu Button” to return to the main menu.

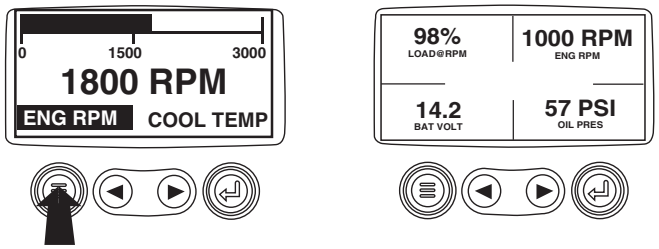


6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

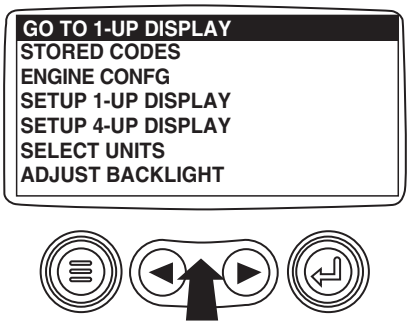


Contrast Adjustment

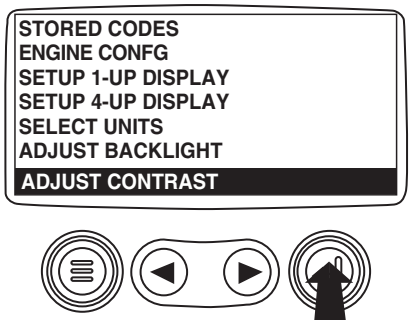
1. Starting at the single or four engine parameter display, touch the “Menu Button”.



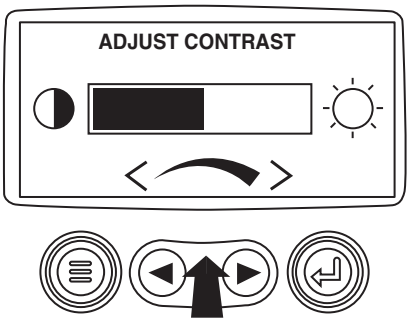
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until “Adjust Contrast” is highlighted.



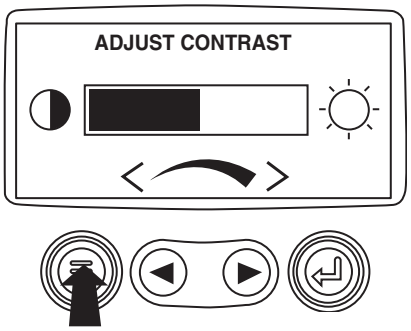
3. Once the “Adjust Contrast” menu item has been highlighted touch the “Enter Button” to activate the “Adjust Contrast” function.



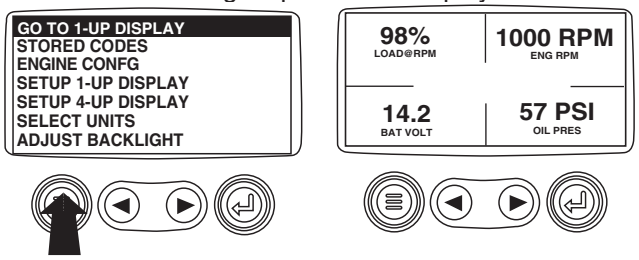
4. Use the “Arrow Buttons” to select the desired contrast intensity.



5. Touch the “Menu Button” to return to the main menu.

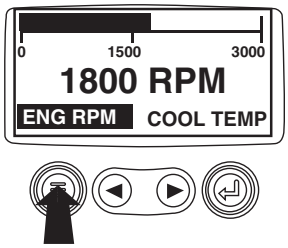


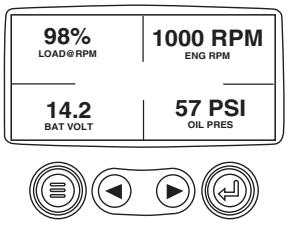
6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.



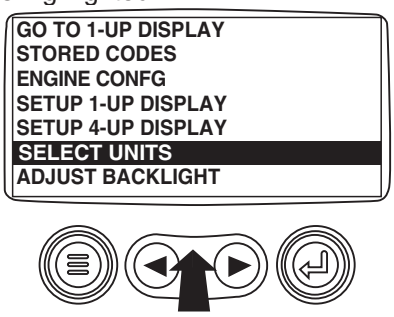
Select Units

1. Starting at the single or four engine parameter display touch the ”Menu Button”.

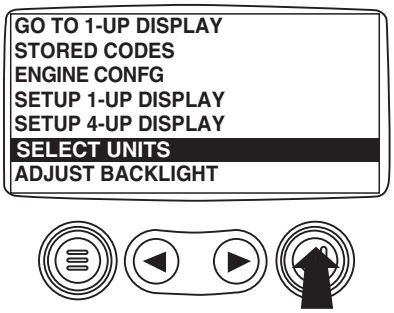




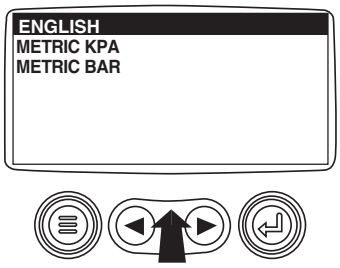
2. The main menu will pop up on the display. Use the arrow buttons to scroll through the menu until the “Select Units” is highlighted.



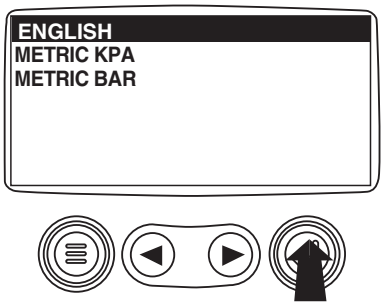
3. Once the “Select Units” menu item has been highlighted touch the ”Enter Button” to access the “Select Units” function.



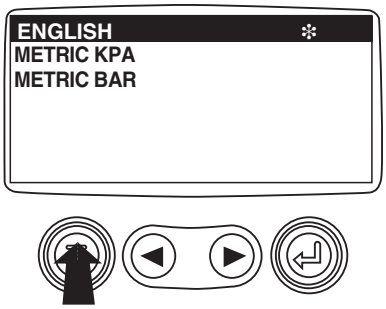
4. Use the arrows to highlight the desired units. “English” for Imperial units i.e. PSI, ºF or Metric kPa, Metric Bar for IS units i.e. kPa, Bar, ºC.



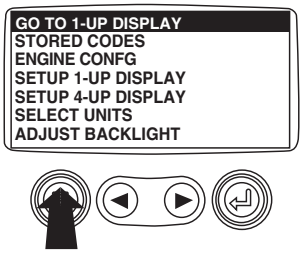
5. Touch the “Enter Button” to select the highlighted units.

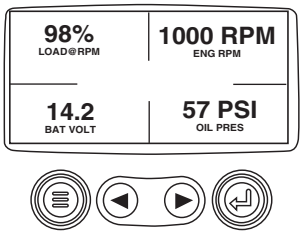


6. Touch the “Menu Button” to return to the “Main Menu”.



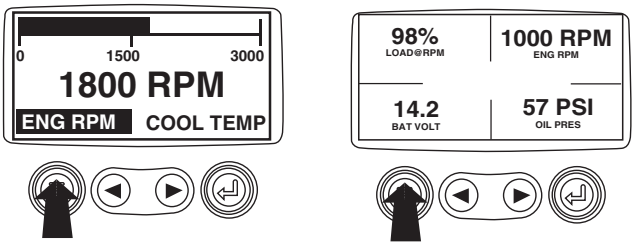
7. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.



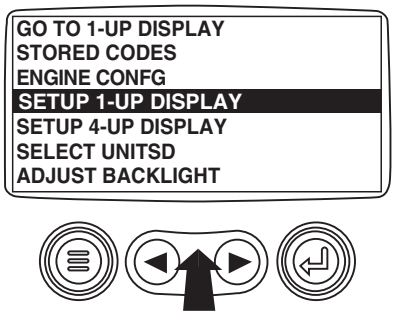


Setup 1-Up Display

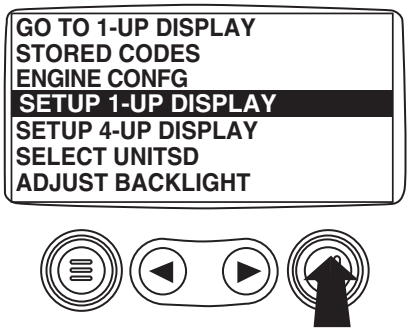
1. Starting at the single engine parameter display, touch the “Menu Button”.



2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the “Setup 1-up Display” is highlighted.



3. Once the “Setup 1-up Display” menu item has been highlighted touch the “Enter Button” to access the “Setup 1-up Display” function.

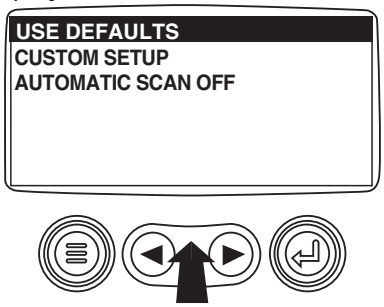


4. Three options are available for modification of the 1-Up display.

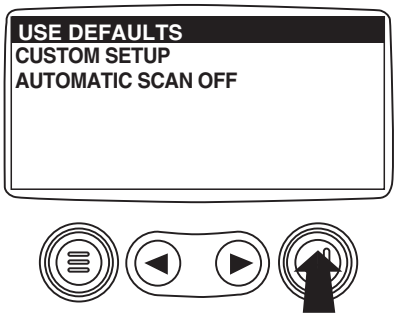
5.

   a) **Use Defaults** – This option contains a set of engine parameters: Engine Hours, Engine RPM, System Voltage, Battery Voltage, % Engine Load at Current RPM, Coolant Temperature, Oil Pressure.
   b) **Custom Setup** – This option allows for the modification of what parameter, the number of parameters, and the order in which the parameters are being displayed.
   c) **Automatic Scan** – Selecting the scan function will cause the 1-Up Display to scroll through the selected set of parameters one at a time, momentarily pausing at each.

5. **Use Defaults** - To select “Use Defaults” use the arrow buttons to scroll to and highlight “Use Defaults” in the menu display..

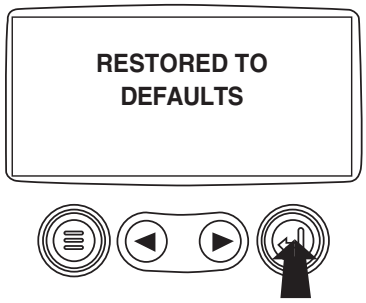


6. Touch the “Enter Button” to activate the “Use Defaults” function.

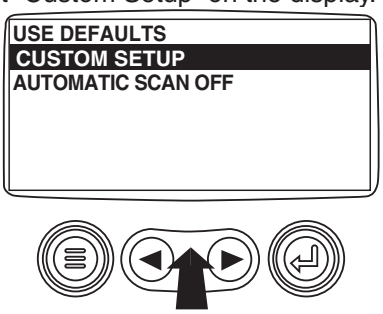


Setup 1-Up Display (Cont)

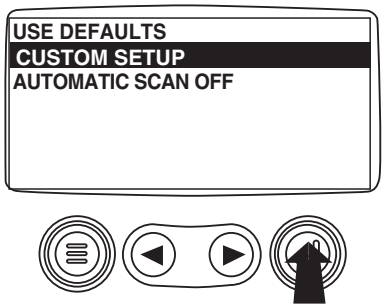
7. A message indicating the “Single Engine” parameter display parameters are reset to the factory defaults will be displayed, then the display will return to the “Custom Setup” menu.



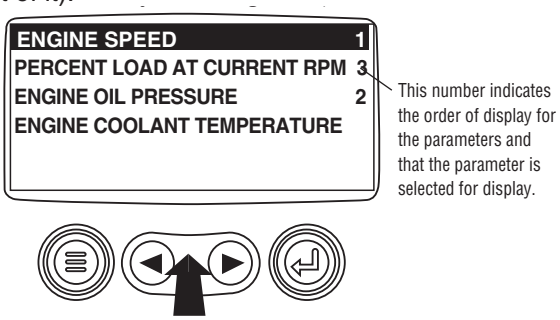
8. **Custom Setup** - To perform a custom setup of the 1-Up Display, use the arrow buttons to scroll to and highlight “Custom Setup” on the display.



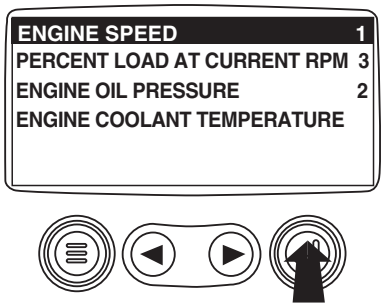
9. Touching the “Enter Button” will display a list of engine parameters.



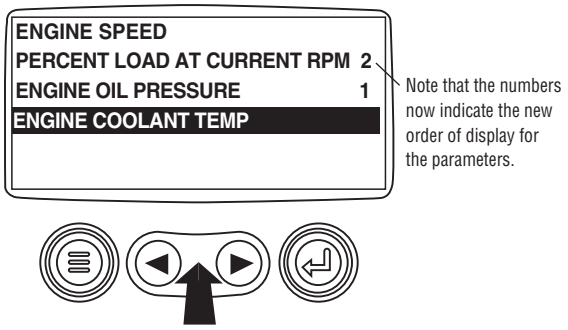
10. Use the “Arrow Buttons” to scroll to and highlight a selected parameter (parameter with a # symbol to right of it).



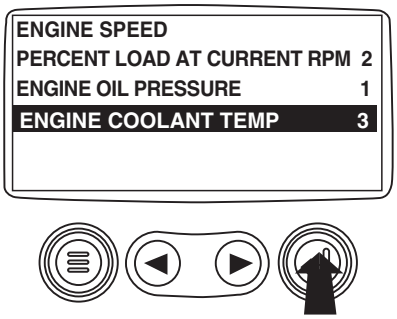
11. Touch the “Enter Button” to deselect the selected parameter removing it from the list of parameters being displayed on the 1-up display.



12. Use the “Arrow Buttons” to scroll and highlight the desired parameter that has not been selected for display.



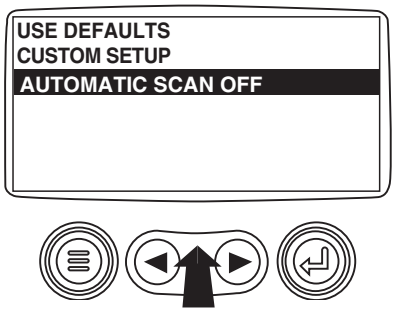
13. Touch the “Enter button” to select the highlighted parameter for inclusion in the Single Engine Parameter Display.



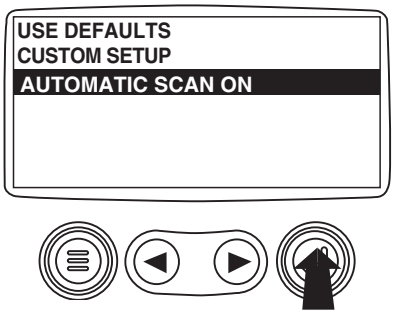
Setup 1-Up Display (Cont)

14. Continue to scroll and select additional parameters for the custom 1-Up Display. Touch the “Menu button” at any time to return to the “Custom Setup” menu.

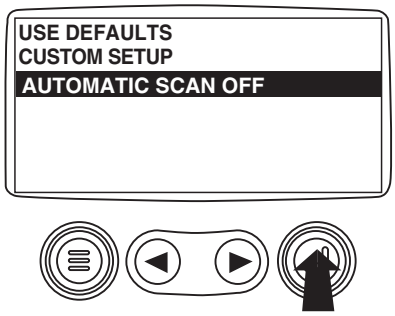
15. **Automatic Scan** - Selecting the scan function will cause the 1-Up Display to scroll through the selected set of parameters one at a time. Use the “Arrow Buttons” to scroll to the “Automatic Scan” function.



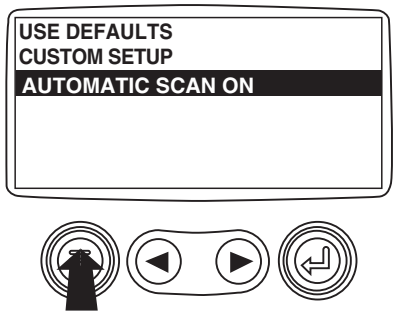
16. Touching the “Enter Button” toggles the “Automatic Scan” function on.



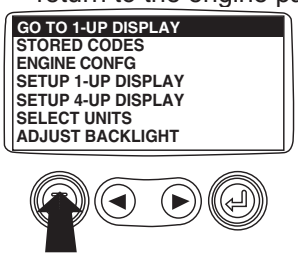
17. Touching the “Enter Button” again toggles the “Automatic Scan” function off.

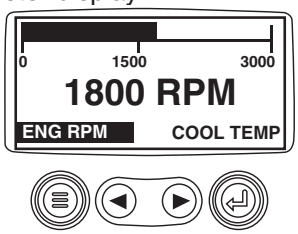


18. Once the “Use Defaults”, “Custom Setup” and “Automatic Scan” functions have been set, touch the “Menu Button” to return to the main menu.



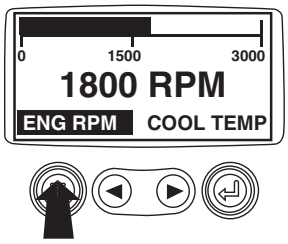
19. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

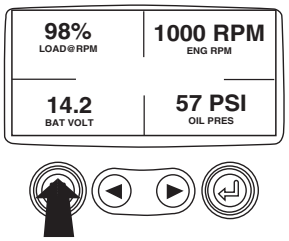




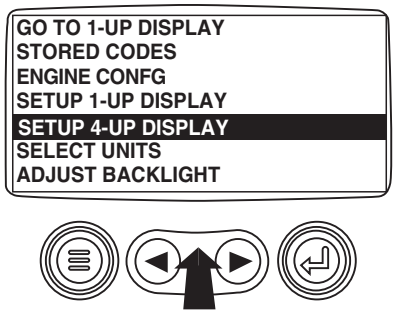
Setup 4-Up Display

1. From the single or four engine parameter display touch the “Menu Button”.

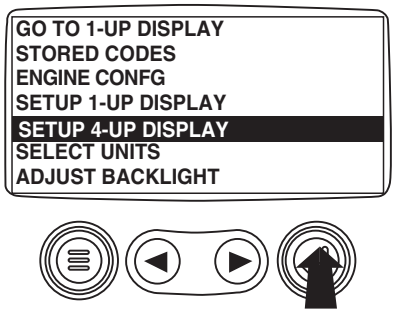




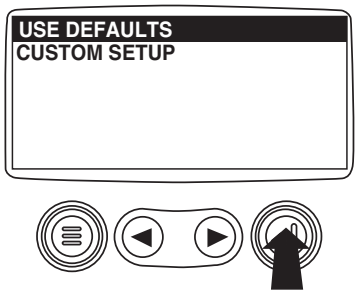
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the “Setup 4-Up Display” is highlighted.



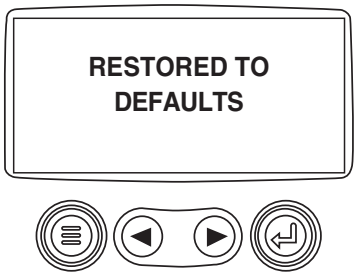
3. Once the “Setup 4-Up Display” menu item has been highlighted touch the “Enter Button” to activate the “Setup 4-Up Display” menu.



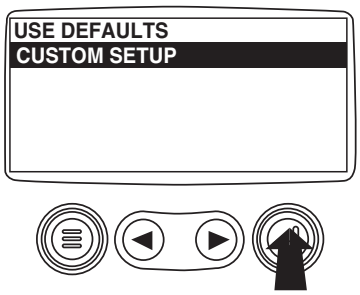
4. Touch the “Enter Button” to activate the “Use Defaults” function. This action will reset the unit to the factory default.



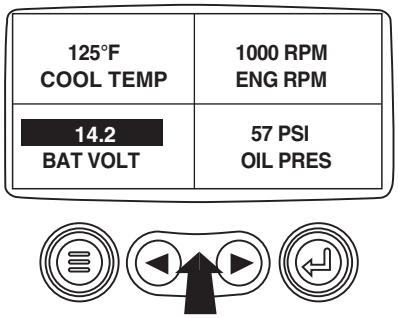
5. The “Use Defaults” screen will be displayed during the reseting period then will automatically return to the “Setup 4-Up Display” menu.



6. Select the “4-Up Custom Setup” from the “4-Up Setup” menu.

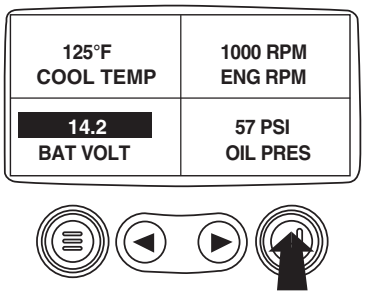


7. The quadrant with the backlit parameter value is the current selected parameter. Use the “Arrow Buttons” to highlight the parameter value in the quadrant you wish to place a new parameter.

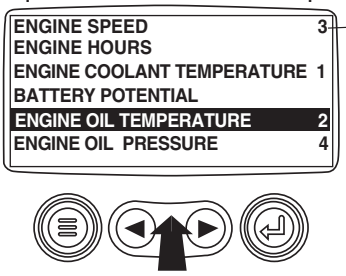


Setup 4-Up Display (Cont)

8. Touch the “Enter Button” and a list of parameters will appear.

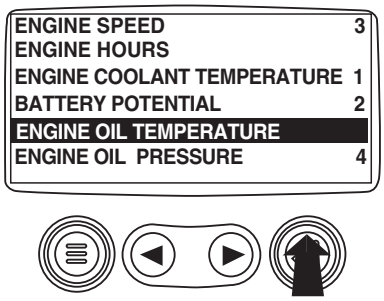


9. The parameter that is highlighted is the selected parameter for the screen. Use the “Arrow Buttons” to highlight the new parameter to be placed in the quadrant selected in the previous screen.

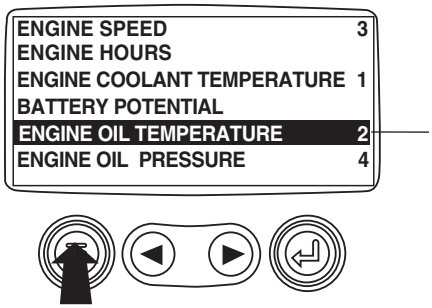


The number to the right of the parameter indicates the quadrant in which it is displayed.
1. = Upper Left Quadrent
2. = Lower Left Quadrent
3. = Upper Right Quadrent
4.= Lower Right Quadrent

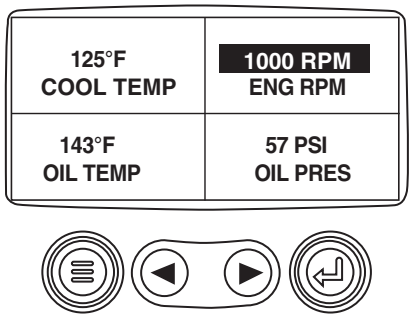
10. Touch the “Enter Button” to change the selected parameter in the quadrant to the new parameter.



11. Use the “Menu Button” to return to the “4-UP Custom Setup” screen.

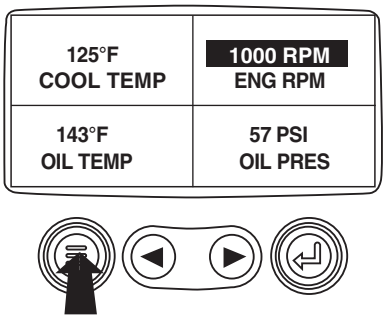


12. The parameter in the selected quadrant has changed to the parameter selected in the previous screen.

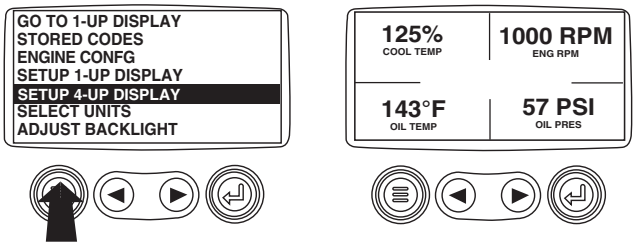


13. Repeat the parameter selection process until all spaces are filled.

14. Touch the “Menu Button” to return to the main menu.

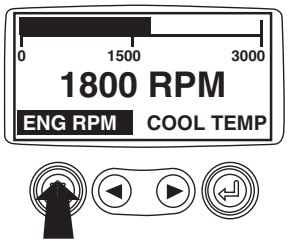


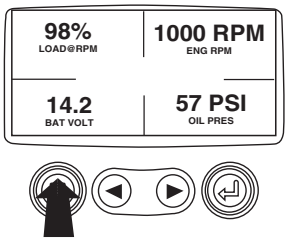
15. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.



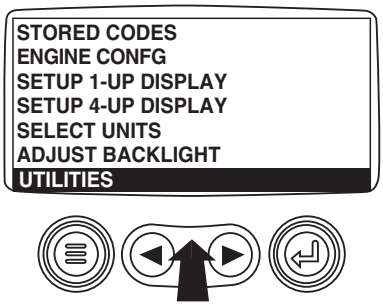
Utilities (Information and troubleshooting)

1. Starting at the single or four engine parameter display, touch the “Menu button”.

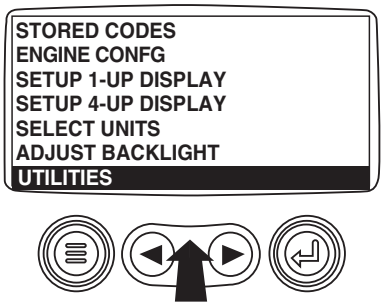




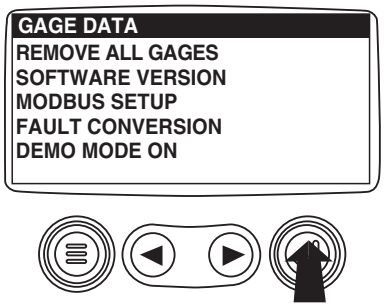
2. The main menu will be displayed. Use the “Arrow buttons” to scroll through the menu until the “Utilities” is highlighted.



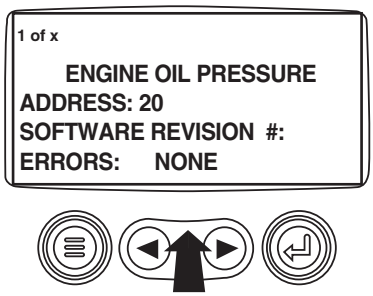
3. Once the “Utilities” menu item has been highlighted, touch the “Enter Button” to activate the “Utilities” functions.



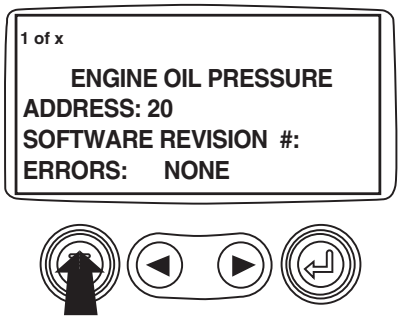
4. Touch “Select” to enter the “Gage Data” display. When “Gage Data” is selected the PowerView will communicate with the analog gages at a fixed rate of 38.4k Baud, 8 data bits, no parity check, 1 stop bits, half duplex.



5. Use the “Arrow buttons” to scroll through the items or touch “Menu” to return to the “Utilities” menu.



6. Touch “Menu Button” to return to the “Utilities” menu.

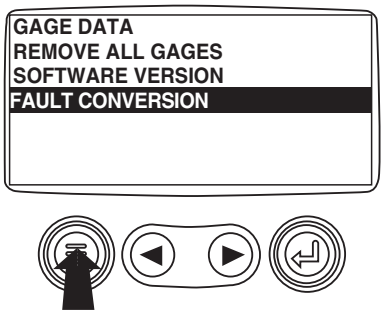


Utilities (Information and troubleshooting, cont)

7. Use the “Arrows” to highlight “Remove All Gages”. Touch “Select” to clear gage data from memory. It takes a moment to clear all gages.

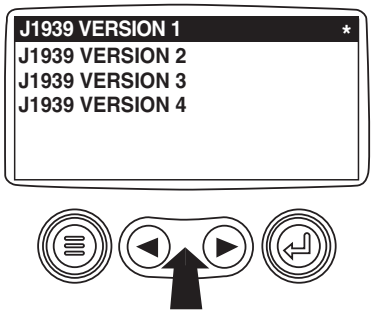
8. When the gage data has cleared, the display automatically returns to the “Utilities” menu. Scroll to “Software Version”. Touch “Select” to view the software version currently in the PowerView.

9. Touch “Menu” to return to “Utilities”. Highlight “Fault Conversion” using the “Arrows”. Touch “Select” to enter the Fault conversion menu.

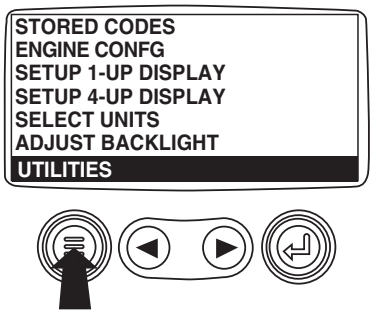


10. Use the “Arrows” to scroll and highlight the version then touch “Select” and an asterisks appears to the right of the selection.

    NOTE: There are four (4) different methods for converting fault codes. The PowerView always looks for J1939 Version 4 and can be set to use one of the 3 other J1939 versions. Most engine ECU’s use Version 4, therefore in most cases adjustment of this menu option will not be required.
    Upon receiving an unrecognizable fault, change to a different J1939 Version. If the fault SPN does not change when the version is changed, the ECU generating the fault is using Fault Conversion method 4. If the SPN number does change but is still unrecognizable, try changing to another J1939 Version not yet used and continue to check the SPN number.

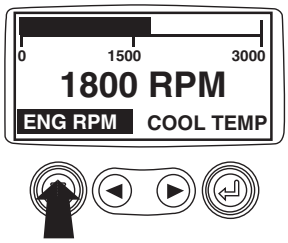


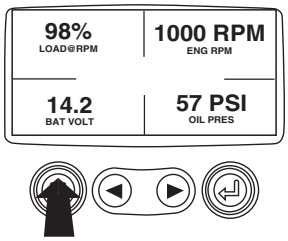
11. Touch the “Menu” button to return to “Utilities” menu. Touch the “Menu” button again to to return to the “Main” menu.



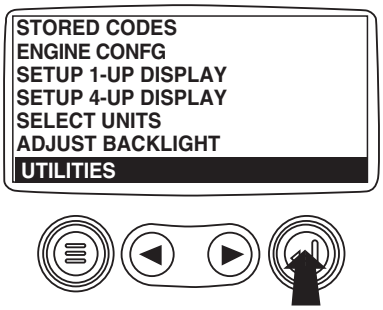
MODBUS Setup

1. Starting at the single or four engine parameter display, touch the “Menu button”.

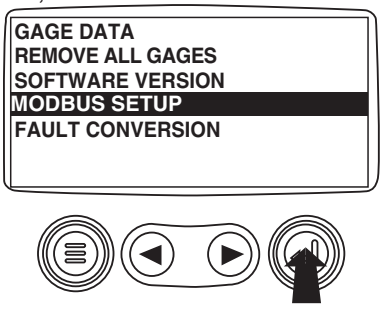




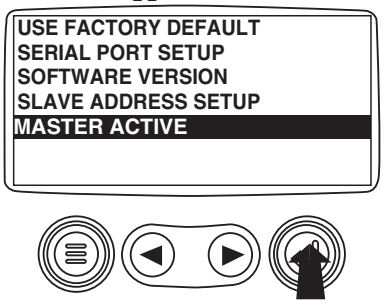
2. The main menu will be displayed. Use the “Arrow buttons” to scroll through the menu until the “Utilities” is highlighted, then touch “Enter”.



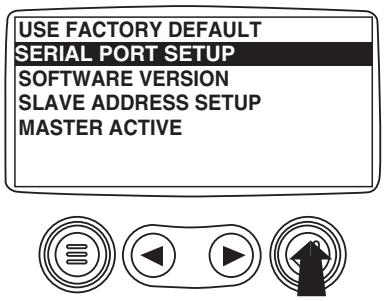
3. Once in the “Utilities” menu use the “Arrows” to scroll through the menu until the “Modbus Setup” menu is highlighted, then touch “Enter”.



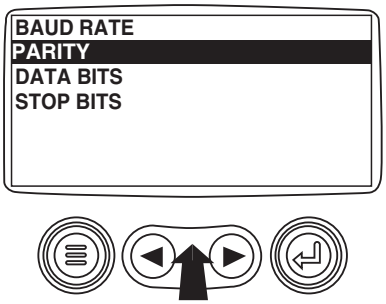
4. Use the “Arrows” to scroll down to and highlight either the “Slave Active or Master Active” modes. Touch the “Enter” button to toggle between master and slave.



5. Use the “Arrows” to scroll to the “Serial Port” menu to highlight it, then touch “Enter”.



6. Use the “Arrow” button to scroll to each selection to configure the MODBUS values for your application.



7. When finished, touch “Menu” to return to the previous screen.

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Section 4

Functional Description

4.1 Introduction

Wagner stackers provide the capability to move, deck, and sort logs quickly and efficiently. When operated properly this machine can cut transportation time within a log yard significantly.

The functions and capabilities of the stacker are the result of several systems working together: Power Unit, Drive-train, Hydraulic system and Electrical system.

4.2 Power Unit

Engine
The engine is the heart of the machine. These units are equipped with diesel engines carefully selected for the intended use of the vehicle. They will provide the power needed for operation. Almost every system on the vehicle depends on the engine. It provides the power for the drive train, hydraulic system, and electrical system.

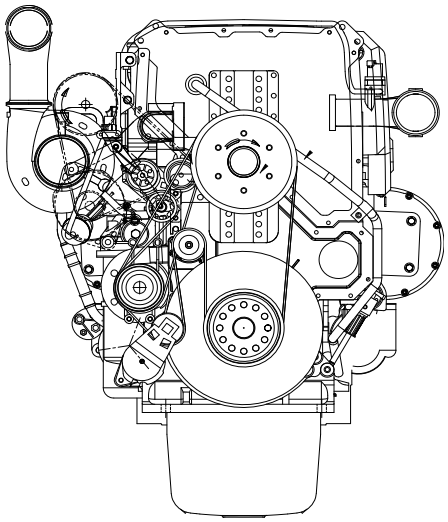

Fig. 4-1 Engine

Torque Converter
Located between the engine and transmission the torque converter allows the engine and transmission to spin independently by using a chamber filled with oil. That oil is spun by a centrifugal pump, attached to the engine, putting the oil into motion. That motion is then captured by a turbine attached to the transmission causing it to spin. This allows the vehicle to be stopped without shutting off the engine or depressing a clutch pedal.

Radiator
As cooling fluid passes through your engine, the liquid becomes hot. The radiator is designed to cool this liquid. When the hot fluid passes through the radiator, it transfers the heat from the fluid to the air being blown on the unit by a fan. The radiator on your unit is quite unique. Instead of one core like most units have, the radiator is equipped with a series of replaceable cooling tubes. This allows each tube to be replaced individually, if necessary. This design also absorbs much of the vibration that can cause failure in a conventional radiator.

Air Intake
The air intake system is critical to the life of the engine, it prevents dust and debris from entering the engine air system causing premature engine wear and possible failure. When a two stage, dry type cleaner is used, both the outer and inner elements are required to fully protect the engine from contamination.

> **IMPORTANT:** DO NOT remove the inner, safety element UNLESS you are replacing it. It should be replaced each time the primary element is changed for the third time or if the primary element becomes ruptured. The safety element should not be cleaned or disturbed in any way.

4.3 Drivetrain

Tailpost
The tailpost is what allows the two wheel drive machines to make turns. With the rear wheels mounted to it at ground level, the tailpost is also attached to the chassis of the machine and to the steering cylinders. This post rotates when the hydraulic steering cylinders are activated, causing the machine to turn.

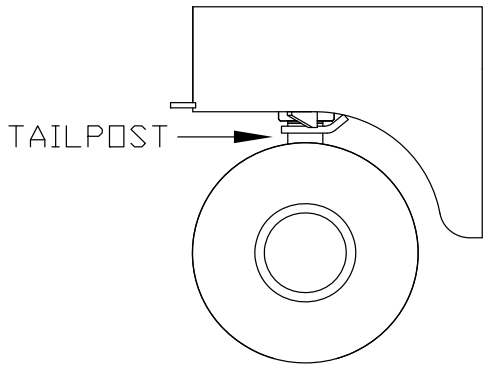

Fig. 4-2 Tailpost

Swivel Box / Bogie Assembly
The swivel box and bogie assembly allows four wheel drive machines to turn. The swivel box rotates (articulates) on the frame when the hydraulic steering cylinders are activated, causing the machine to turn. The bogie assembly tilts (oscillates) on the swivel box up to 15˚, improving traction and providing stability on soft, rough yards.

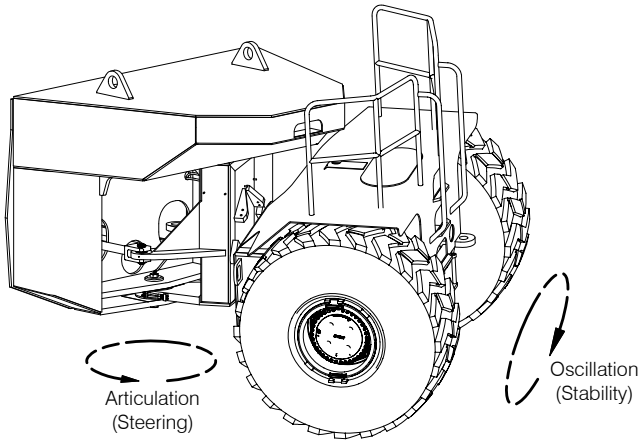

Fig. 4-3 Swivel Box / Bogie Assembly

Transmission
The transmission changes the gearing from the engine to the wheels. It allows the machine to move forward, run in neutral, or to move in reverse. It also allows the vehicle to move at a faster speed because it shifts into different gears allowing the engine to run at a lower rpm, yet spin the wheels faster. An engine can only spin a certain rpm before damage is done. Without being able to change gears the speed at which the machine is traveling just before that point would be the maximum speed of the vehicle.

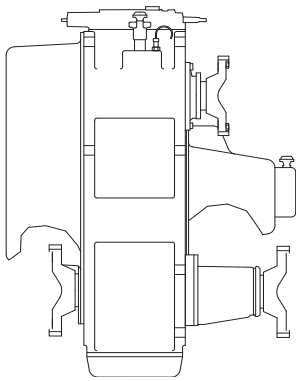

Figure 4-4 Transmission

The transmission is a “full power shift” full reversing unit. “Full power shift” means that the transmission can be shifted from one range to the next, either up or down. When shifting down, the engine rpm must be reduced sufficiently to prevent over-speeding the engine when the lower range engages.

> **Important:** Never shift the range selector up or down without momentarily relaxing the throttle pedal. Severe damage to the drivetrain could result.

“Full reversing” means that you have approximately the same speeds forward and reverse in all speed ranges.

⚠ CAUTION

> **CAUTION: Always brake to a full stop when changing directions. Drivelines are not strong enough to withstand the forces created when tons of vehicle and load are reversed suddenly.**

The transmission uses constant mesh gearing in all ranges, forward and reverse. All gears are engaged by means of hydraulically controlled multiple disc clutches, through the control valve actuated by the shift lever in the cab.

Drivelines
Drivelines transmit the engine torque (after being multiplied by the converter and transmission) to the drive axles.

Differential
The differential is what converts the rotational energy from the engine into rotational energy that drives the wheels. In order to do this a series of gears is used to transfer the motion from being perpendicular to that of the wheels into motion that powers the wheels. These gears reduce the number of rotations from the engine to the wheels, and allows the wheels on each side of the vehicle to spin at different rates necessary to make turns.

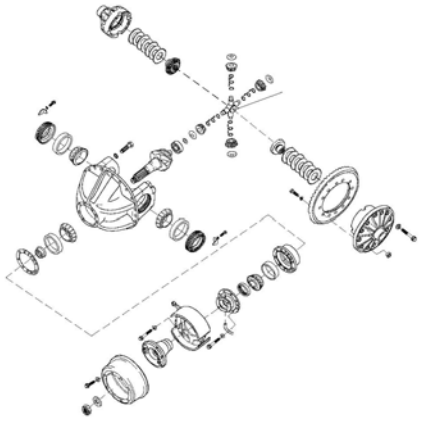

Fig 4-5 Differential (Posi-torque shown)

Planet Assembly
The planet assembly is the final gearing reduction between the engine and the wheels. It is located at the end of the axles, mounting flush with the hub. The planet has three planet gears which are driven by a sun gear attached to the axle shaft. The planet assembly is bolted to the hub causing it to spin much slower than the original input speed from the differential. L130/L4130 and larger units have a two-stage planetary reduction (not shown).

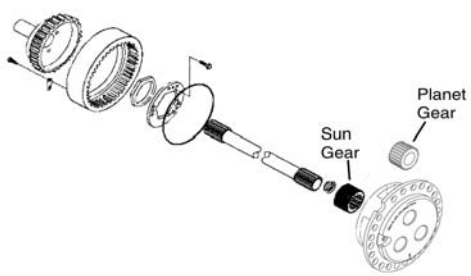

Fig. 4-6 Planet Assembly

4.4 Hydraulic System

Steering
The steering system consists of the steering control unit and a flow amplifier valve.

When the steering unit is activated, a controlled oil flow is directed to the flow amplifier valve. This oil flow is amplified and the total flow is directed to the steering cylinders.

The steering unit provides a fixed displacement of oil per revolution of the steering wheel and the amplification factor of the flow divider valve is 8. Therefore, total oil output is eight times the output of the steering control unit.

With this system it is possible to combine the steering and working hydraulics. The priority valve ensures that the steering has first priority on oil flow from the hydraulic pump. The oil flow not used for steering is then sent via the “EF” line (excess flow) to the working hydraulics. If the steering wheel is not turned, the entire oil flow is directed to the working hydraulics with minimal pressure loss.

The principle applied to the controlled operation of this system is called “load sensing.” As the name suggests, it is a system in which the load is sensed or registered. The sensed signal is used, in this example, to control the priority valve in the flow amplifier valve so that oil flow and oil pressure precisely match momentary demands.

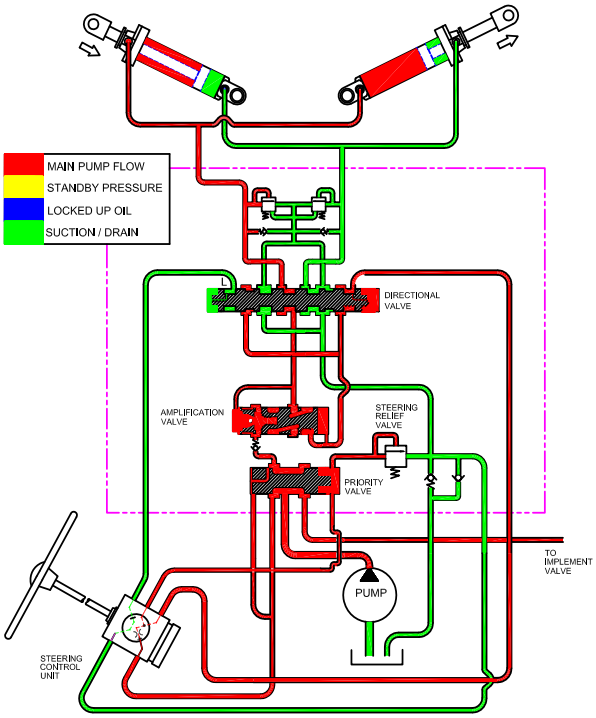

Fig. 4-7 Steering System (Right Turn)

Brakes
Wagner machines smaller than L120 use a hydraulically applied service disc brake. It uses a fixed caliper with a floating disc, with pistons on one side of the disc. A mineral oil based fluid is used as brake fluid.

The brake system is equipped with accumulators that store a volume of pressurized hydraulic oil. The operator may perform a minimum of 6 brake actuations upon a engine shut down or brake pump failure.

All models are equipped with spring applied / hydraulically released parking brakes.

L80F & L90F models have an optional wet disk brake. This brake is applied with hydraulic pressure and released when that pressure tapers off. This system is known as a “wet” system because the discs are cooled by being submerged in a sump filled with hydraulic fluid.

L130/L4130 and larger use a fixed disc brake system, with a floating piston caliper.

Implements
The hydraulic system is what provides the capability for your stacker to perform many operations. When the hydraulic pumps are activated, they move hydraulic oil from one area to another. This fluid is non-compressible; therefore, it will occupy the same volume as before the system is actuated. As the oil is moved, the force is multiplied by changing the diameter of the line it is moved through. This allows work to be done with much less effort. These pumps have a primary function, and if that function is being used, the pump output is directed directly to that action. If the primary function is not in use the flow is then directed to aid other functions which are being used. Accumulators are used to aid the hydraulic pumps. They store a certain amount of fluid under a preset pressure which is released when needed. These accumulators are charged with nitrogen to apply the necessary pressure the fluid will need to be forced through the lines.

Ride Control (Optional)
Two things have to happen in order for Ride Control to work:

1. Ride Control switch must be turned on.

2. The machine must be moving at a minimum predetermined speed programmed into the PLC. When these two things occur, the system is designed to ‘dampen’ the effect of carrying loads over uneven or bumpy ground. The ride will be smoother when the operator is transferring loads from point to point. It is accomplished through the use of two accumulators, and a series of valves that are mounted forward of the transmission compartment.

Declutch
The Declutch system, when engaged, automatically shifts the transmission into neutral when the brakes are applied. This allows more power to be provided to the implements (hoist, tilt, etc). Because the power is not being unnecessarily shared, it allows the machine to be more productive. It is controlled by a pressure switch in the brake line which sends an electronic signal to the transmission. The transmission then shifts into neutral.

4.5 Electrical System

Alternator
The alternator is what keeps the electrical system from loosing power. It is belt driven from the engine and as it spins creates power. That energy is then sent to the batteries to continuously charge them when the machine is on. This allows the electrical components to be run with minimal drop in voltage and battery downtime.

Batteries
Your Wagner's electrical system is powered by two 12 volt lead acid batteries connected in series. At 0^0 F these batteries supply 1300 cranking amps. They are 20.75" x 11" x 9.63" and weigh approximately 130 lbs. These batteries are continuously charged by the alternator when the engine is running.

Ignition
The ignition system uses an electric starting motor, activated with a key switch, much like the one on your personal vehicle.

Gauges
The gauges in your vehicle are powered through the electrical system. They must receive an electrical signal to provide a reading.

The Powerview Display Module is a little more complex. This instrument displays a variety of information to the operator. This gauge will also display vital information, from the engine, for service personnel to use at a later time.

Controls
Many of the operator's controls are electronic in nature. The transmission control stick must send electronic information to the transmission; the implement stick does the same for the hydraulic system. The throttle controls, both hand and foot, are also part of the electrical system.

Lights
Standard and optional external lighting groups enhance safety by providing illumination of surroundings during night time and adverse weather conditions. Similarly, interior lighting provides the operator with a visual reference of machine controls and instrumentation. Exterior lighting has the added benefit of equipment visibility to ground based personnel.

Filter Indicator Lights
These lights keep you informed on the condition of your on machine filters. They help to protect the machine by displaying a red light when the filters need to be serviced to protect the components.

Automatic Fire Suppression System (Optional)
The automatic detection on your fire suppression system uses an independent electrical system to detect a fire and to deploy the system. If the automated electrical system fails, there is a manual override the operator can use to deploy the system if needed.

The system consists of an automatic detection wire, an automatic control module, a squib, nitrogen cartridges, and two manual actuators. The automatic detection wire has two spring steel conductors separated by a heat sensitive insulator. When the insulator melts, the two conductors make contact, tripping the system. The squib is an electrically actuated component. When heated the squib detonates a tiny explosive charge creating enough pressure to puncture the seal in the nitrogen cartridge. Nitrogen cartridges provide the pressure required to actuate the system. The actuators can also be operated manually by pulling the safety pin and striking the button which punctures the nitrogen cartridge seal.

Options & Accessories
The electrical system is not only necessary to operate and protect the machine, but it is also used to make it a comfortable piece of equipment to operate. The A/C and heater unit requires the power from the electrical system to control the temperature inside the cab. The optional stereo system also uses it to play your favorite music while you work.

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Section 5

Operation

5.1 Introduction

You, the operator, have a key position in your company's log handling operation. Skill and attentiveness on your part are essential for maximum productivity as well as the safety of yourself and those around you.

The operating instructions in this manual are intended to help you get the maximum use of your Lumberjack, with the greatest possible safety. Become completely familiar with all of the instruments and controls. Learn the machine, its capabilities and limitations. Study the operating techniques given so that through experience, you can develop additional techniques of your own and contribute to the success of your team.

Safety First
Your coworkers depend on you to operate safely. Before operating the machine, read and observe the safety precautions given in this manual. BE A SAFE OPERATOR. A good safety record can be rewarding.

5.2 General

Log Handling
An easy way to understand the overall idea of the Lumberjack operation is to visualize the carriage as a giant hand that can pick up, sort, spread, and deck logs. See Fig. 5-1

The carriage can be raised and lowered as well as tilted forward or backward.

The holddown arms are used to clamp the load against the carriage. They're also used to "rake" logs off a pile.

The kickoff arms push the logs off the tines. They can also be used to help secure a partial load.

The holddown and kickoff arms can be actuated individually or in unison.

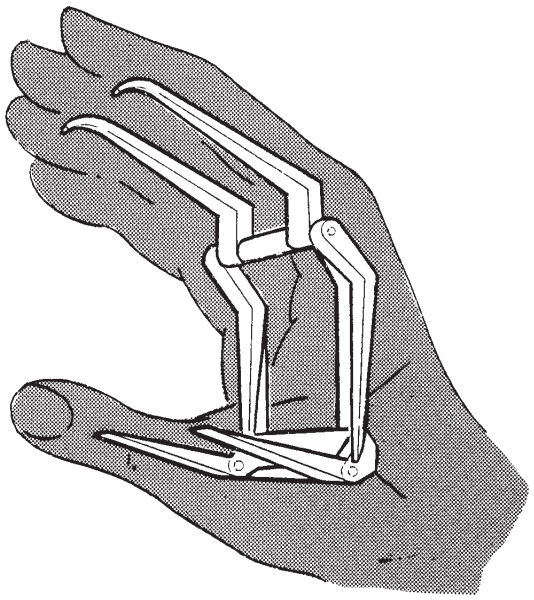


Fig. 5-1 Carriage-Hand Comparison

5.3 Break-in Period

The initial break in period for your unit is limited to the engine. The hydraulic system and other components are ready for full operation.

The way you operate your new engine during the first 50 - 100 hours of operation will have an important effect on its service life. Its moving parts are closely fitted, and even though most diesel engines are dynamometer run before leaving the factory, an additional period may be required before uniform oil films are established between mating surfaces.

Generally speaking, proceed with a new engine as follows:

1. Operate most of the time at one half to three quarters full throttle. Do not operate at maximum horsepower for more than five or ten minutes at a time.

2. Don't idle the engine for long periods. This may cause cylinder wall glazing, resulting in excessive oil consumption and loss of power.

3. Keep a close watch on the instruments. Reduce rpm if water temperature reaches 200° F (older units), or 230° F (newer units with electronic engines).

4. Operate in a gear low enough so that you can accelerate under any condition.

5. Study and follow the engine's operation manual for specific information.

The operator must assume the responsibility for the engine during operation. This is an important job and one that will determine to a large extent the success of the operation. Premature engine failures are very expensive because of lost productivity and the high cost of engine repairs or replacement. Protect your company's investment!

5.4 Start and Stop Procedures

Before operating this machine, the operator must have received operator training, a familiarity with this manual, and a complete understanding of all the procedures and functions that may be performed with this machine.

Planned maintenance and inspections are to be performed after the machine has been delivered, and prior to each shift. The operator should be aware of these procedures and be able to perform spot checks during operation.

NOTE: These inspections may be performed by maintenance personnel or by the operator. In either case, it is the operator's responsibility to see that the machine is ready for operation prior to starting.

Refer to the planned maintenance chart in section 6 for a complete list of the daily checks that are to be performed.

Engine Oil Level

The oil level should be checked prior to starting the engine.

NOTE: A 15 minute drainback time is recommended (if the engine has been running) to obtain an accurate reading.

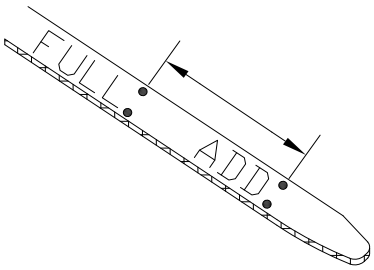


Fig. 5-2 Typical Dipstick

The oil level must be maintained between the "L" (low) or "ADD" mark, and the "H" (high) or "full" mark. Maintain the oil level as close to the "H" or "full" mark as possible.

⚠ CAUTION

CAUTION: Never operate the engine with the oil level below the "L" (low) mark, or above the "H" (high) mark. Refer to the engine's Operation and Maintenance manual for detailed engine service information.

CAUTION: Use only approved engine oil (see Lubricant Specifications Chart, Section 6). Do not overfill.

Engine Coolant Level
Daily inspection of the coolant level is recommended. Cooling systems using anti aeration baffles restrict visual observation of the true coolant level. Even if the coolant can be seen, the system may not be full. To gain a true fill, add water slowly up to the bottom of the fill neck and allow a 30 second settling period. Remember to compensate for the loss of antifreeze when adding water.

NOTE: If the engine is hot, the coolant level will be higher than when it is cold. Inspect the radiator daily for restriction caused by leaves, paper or other foreign material.

Inspect the radiator, cap, hoses, and connectors for any signs of leakage or damage.

⚠ WARNING

WARNING: Never remove the radiator cap if the engine is hot. The coolant will be under pressure and could flash to steam with explosive force, causing severe burns. Remove the radiator cap only when engine is cool.

Hydraulic Oil Level
Always check the hydraulic oil level prior to operation. The dipstick is located on the right-hand chassis deck, to the right of the operator's cab. See Fig. 5-3. **Important: See warning on this page for tank venting procedure.**

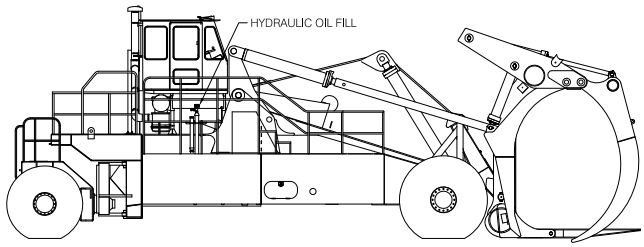


Fig. 5-3 Hydraulic Oil Fill Location

⚠ WARNING

WARNING: Always open the tank breather petcock (located on the breather pipe) before removing the dipstick, filler cap or in-tank filter cover plate. Failure to vent tank can result in personal injury and / or a substantial oil spill. Be sure to close the petcock before operating the machine.

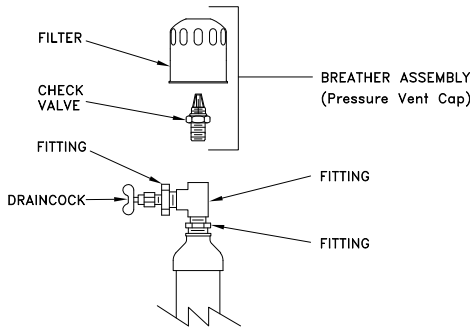


Fig. 5-4 Tank Breather Assembly

The oil level should be checked with the hoist cylinder extended. The oil level should be at or near the "H" (high) mark on the dipstick or sight glass. Fill with approved hydraulic fluid as required (See Lubricant Specifications Chart, Section 6). Do not overfill.

Transmission Oil Level
Always check the transmission oil level prior to starting the engine to be sure there is oil in the sump. The safe operation level should be checked after engine warm-up, with the transmission at normal operating temperature. The fill tube is located at the front of the transmission by the output shaft. Always check the level with the engine running, at operating temperature, with the transmission in neutral. The oil level should be between the "H" (high) and "L" (low) marks. Fill with approved fluid only (See Lubricant Specification Chart, Section 6).

"Walk Around" Inspection
Perform a "walk around" inspection, looking for leaks, loose or missing fasteners, damaged hoses, structural cracks or damage, etc.

DO NOT operate the machine until all problems have been corrected!

Tires
Visually inspect the tires for low air pressure and damage to the tread and side walls. If a tire appears suspect, appropriate maintenance personnel should thoroughly check it prior to operation.

Engine Pre-Start
1. Make sure that oil and coolant levels have been checked before attempting to start the engine.

2. Sit in your normal operating position and adjust the seat for your personal comfort. Wear your seat belt.

3. Check for emergency/parking brake engagement: Push the knob to ensure the brake is set.

4. Place the transmission range selector in the "neutral" position, "N" on the gear quadrant.

   NOTE: All current Wagner units are equipped with a neutral start switch which prevents the engine from starting unless the transmission is in neutral.

5. Give warning that you are going to start the engine. Make sure that all personnel are clear of the machine, as you may not be able to see them from the cab. Be sure that the area around the machine is clear of all obstructions.

⚠ WARNING

WARNING: Do not start the engine if the key switch has been tagged with a "Do Not Start" or "red" tag.

6. Turn the key switch to the ON position. The parking brake light and panel lights should come on.

Engine Start-up
1. Turn the key switch to the START position. Release the switch to the RUN position as soon as the engine starts.

⚠ CAUTION

CAUTION: If the engine does not start within 30 seconds, allow the starter to cool for at least 2 minutes before re-engagement.

   In cold weather it may be necessary to use the cold weather starting procedure.

2. After the engine starts, let it idle. Do not accelerate. Remember, high rpm and full load conditions on cold oil can severely damage the engine, transmission and hydraulic system.

If engine oil pressure fails to rise sufficiently after approximately 40 seconds of running, the engine may automatically shut down.

   IMPORTANT: Your Lumberjack is equipped with an audiovisual engine protection system. If oil pressure drops below a safe level, coolant temperature becomes excessive, or coolant level drops too low, the engine warning light will come on. With some models, if the condition continues, the engine will shut down automatically. If your unit is not equipped to shut down automatically, it is vitally important that you immediately shut down the engine if the light comes on.

3. If a rise in oil pressure of the engine or transmission is not observed within 5 seconds shut down the engine and have maintenance determine the cause of the problem. Do not operate the machine until the problem has been corrected.

4. Check that transmission is in neutral and that the parking brake is applied. Using the hand throttle, continue to warm the engine at 1000 rpm until the engine temperature reaches at least 130^0 F.

5. Release the hand throttle. Meanwhile, observe the gauges for proper readings and operation. Also, check the operation of all safety equipment and accessories.

Cold Weather Starting Procedure
In cold weather it may be necessary to use cold weather starting procedures. **(Note: Cummins Engine Only)**

1. Depress cold start switch and hold. This fills the chamber with a metered amount of ether.

2. Crank the engine then release cold start switch. This injects the metered amount of ether into the engine intake manifold.

3. As the engine starts repeat only if necessary to keep the engine running.

Note: For maximum engine protection and easier starting:

- Keep the batteries fully charged.
- Keep the fuel clean and free of water.
- Change the engine oil to the recommended viscosity for the air temperature.

⚠ CAUTION

CAUTION: Excessive amounts of starting fluid when cranking engine will cause engine damage.

⚠ WARNING

WARNING: Starting fluid is extremely flammable and toxic. Never smoke while using starting fluid. Never make a hole in the starting fluid container. Do not use near an open flame or put the container into a fire. Use only small amounts of starting fluid. Never store starting fluid in a hot area or in the operator's cab.

Temperatures below 32° F (0° C):

1. Let the engine idle for approximately 15 to 20 minutes before putting any load on the engine. Check all gauges for normal readings.

2. After the engine is warm, move the machine to full work capacity slowly until the hydraulic oil is at operating temperature.

⚠ CAUTION

CAUTION: If the temperature of the hydraulic oil is below its pour point, do not start the engine. The high oil viscosity could cause immediate pump cavitation, resulting in severe damage. The oil in the hydraulic tank must be heated prior to engine start-up.

Temperatures below 0° F (-18° C)

If the machine will be shut down for several hours or longer with ambient temperatures below 32° F (0° C), the hydraulic tank heater should be plugged in as soon as the machine is shut down. This will help to maintain hydraulic oil temperature.

⚠ WARNING

WARNING: The hydraulic tank heater uses a 220 or 110 VAC external power source. Be sure to connect the heater to the proper source with correct voltage. An electrical shock could be fatal. Don't forget to disconnect the heater cable before beginning operation. All electrical cables and connectors must be in good condition. Use caution in wet weather to avoid danger from electric shock. All connections to the heater must be properly grounded.

Let the engine idle for approximately 10 minutes before putting any load on the engine. Check all gauges for normal readings. In extremely cold temperatures, allow sufficient warm up time.

Engine Shut down

1. Move the throttle to idle speed, and let the engine idle for 5 minutes in order to normalize internal engine temperatures.

⚠ CAUTION

CAUTION: Except in emergencies, never shut the engine down immediately after operation. Allow the engine to idle for at least five minutes. Failure to do this could cause engine damage.

2. Meanwhile, place all controls in neutral and set the emergency brake.

3. To stop the engine, turn the key switch to the OFF position.

Ride Control

If your machine is equipped with the Ride Control option, make sure the needle valve in the Ride Control Manifold is closed during normal operation. See Fig. 5-5. Refer to your Wagner Parts Manual for manifold mounting location.

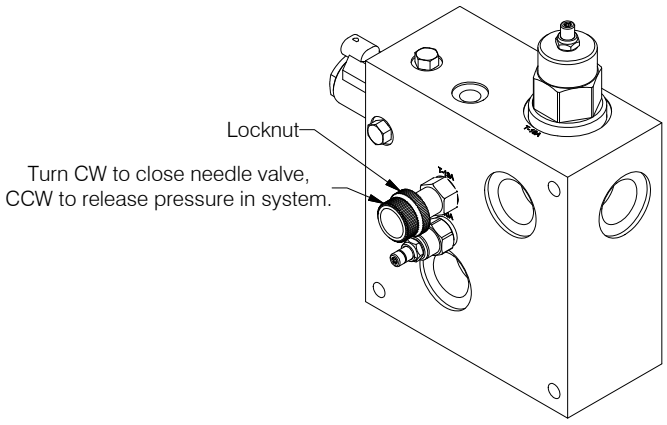


Fig. 5-5 Ride Control Manifold

⚠ WARNING

WARNING: Ride control manifold needle valve MUST remain closed during normal operation. Otherwise, any load that is raised will descend, causing risk to both personnel and the machine.

5.5 Using Booster Batteries

⚠ WARNING

WARNING: Batteries produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging or using in an enclosed space. Always shield your eyes when working with batteries.

If the batteries on the machine are weak or discharged, use booster batteries to start the engine. Never try to start the engine by towing or pushing. Use the following procedures:

1. Make sure that the parking brake is applied and that all electrical loads are shut off.
2. To prevent damage to the alternator, use care not to reverse the battery connections. Immediate damage to the alternator can be caused by making an incorrect connection during the starting procedure.

⚠ WARNING

WARNING: Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing.

3. Connect one jumper cable to the (+) positive terminal of the booster battery. Connect the other end of the same cable to the (+) positive terminal on the machine's battery.
4. Connect the jumper cable to (-) negative terminal of the booster battery. Connect the other end of this cable to a good ground connection on the machine's frame, away from the battery. This procedure will prevent a spark near the battery that could cause an explosion.
5. Start the engine in the normal manner.
6. After engine has been started, disconnect the negative cable first, then remove the positive cable.

⚠ WARNING

WARNING: When removing battery terminals, always disconnect the (-) negative cable first. When installing battery terminals, always connect the (-) negative cable last. This procedure can prevent a spark at the battery which could cause an explosion. Always make the last cable connection away from the battery, such as on the engine block. Use care to keep the cables clear of the fan or any other moving parts.

5.6 Moving, Stopping and Steering

To move the machine:

1. Make sure that the area is clear of obstructions and/or personnel. It is possible for several people to stand under or near the machine, out of sight of the operator. It is recommended that you sound the horn before moving the machine.

⚠ CAUTION

CAUTION: This machine cannot be stopped instantly. The stopping distance varies, depending on load and speed. To avoid collisions, be sure to allow ample stopping distance.

2. Release the hand throttle.

⚠ CAUTION

CAUTION: Never attempt to operate with the hand throttle instead of the foot throttle. The hand throttle is to be used for warm-up only.

3. Place the De-clutch control in the ON position.

4. Lift the carriage, if required, to clear any obstructions you might encounter.

5. Release the parking brake and put the transmission range selector into 1st gear.

⚠ CAUTION

CAUTION: It is recommended that you operate in 1st gear only, until you develop a "feel" for the machine and become familiar with all of its operating characteristics.

6. Place the shift lever into the "forward" or "reverse" position. Moving the lever not only selects the direction of travel, but also shifts the transmission from neutral to "in gear".

7. Depress the throttle pedal slowly and smoothly. Avoid sudden or jerky starts. Depress the pedal just enough to begin moving slowly.

⚠ CAUTION

CAUTION: Always brake to a full stop when changing directions. Drivelines are not strong enough to withstand the forces created when tons of vehicle and load are reversed suddenly. Keep the speed low until you feel comfortable with the machine.

Steering

8. With the operator facing the front, steering the wheel clockwise will turn the machine right, while turning the wheel counterclockwise will turn the machine left.

   Practice moving the machine around the yard. Make several practice stops to develop a "feel" for the brakes. Practice driving and steering in forward and reverse. Always use the brakes to slow and stop the machine, never gear down.

NOTE: It is recommended that you keep the declutch in the **ON** position for normal operation**.** If a downgrade is encountered, the De-clutch control may be placed in the **OFF** position, and the transmission will remain in gear while braking.

5.7 Unloading

⚠ WARNING

WARNING: Make sure ground personnel are clear of work path and in sight of operator.

1. Move the Lumberjack up to a truck or trailer with the carriage in the following position:
   - The holddown arms out - raised position
   - The kickoff arms fully retracted.
   - The tines level and just high enough to clear the bottom of the load.
2. Move in until the back of the carriage is against the load. Observe the location of carriage, kickoffs, and holddowns in relation to log truck. Partially clamp logs to prevent logs from rolling off. See Fig. 5-6.
3. Raise the boom until the tines begin to make contact with the load and tilt back slightly.
4. Securely clamp both holddown arms before the binder chains are removed. See Fig. 5-7.

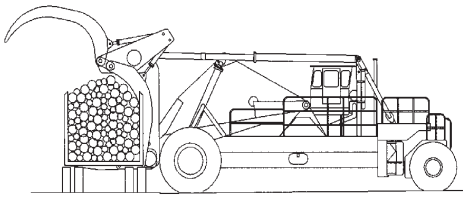


Fig. 5-6

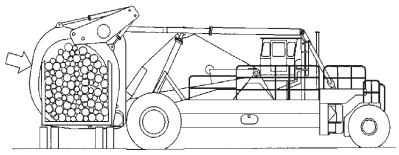


Fig. 5-7

⚠ WARNING

WARNING: Never allow the binder chains to be removed from the load until it is securely clamped by the holddown arms or by some other means provided by your company.

Never allow anyone to walk under or drive equipment under the load.

Always try to unload from the binder side of the load. It's very important that you're able to see ground personnel. Never let them out of your sight.

5. Hoist the load clear of the truck or trailer and tilt the carriage back slightly to bring the load center closer to the drive wheel axle. See Fig. 5-8.
6. With the load clear of the vehicle, back away and lower the load about 3 feet above the ground of just high enough to clear any obstructions on your way to the point of unloading. See Fig. 5-9.

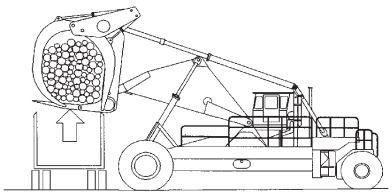


Fig. 5-8

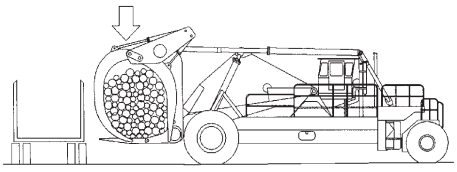


Fig. 5-9

5.8 Load Spliting

1. Approach the load with the holddown arms open.

2. Raise the carriage and tilt it forward slightly.

3. Work the tines through approximately 1/3 of the load.

4. Bring the kickoff arms forward until they make contact with the load and then pull the load in tight with the holddown arms. Tilt the carriage back.

5. Continue to tighten with the holddown arms and rise the carriage until the load is free.

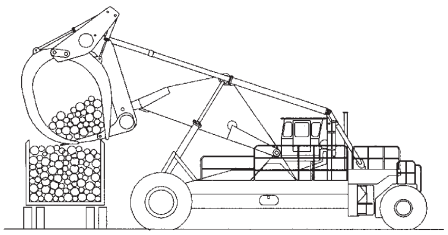


Fig. 5-10

5.9 Spreading and Sorting

1. To unload the carriage for scaling or sorting, leave the carriage level or tilted slightly back. Lower the boom until the carriage is as close to the ground as possible. See Fig. 5-11.

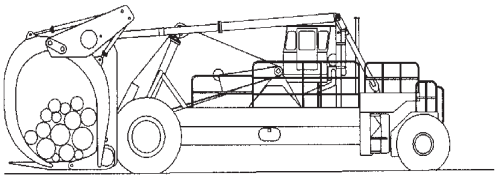


Fig. 5-11

2. While backing the machine, slowly open the holddown arms and gradually push the load forward with the kickoff arms. This way, the logs can be dropped one at a time rather than all at once. See Fig. 5-12

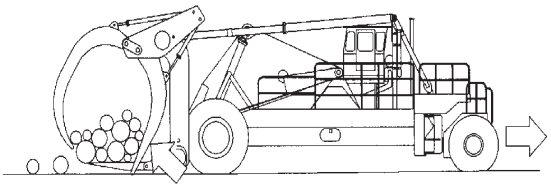


Fig. 5-12

3. If several logs fall off at once and form a pile, stop the machine, tilt the carriage forward, and using the holddown arms, rake the top logs back into the carriage.

4. When retrieving spread logs and the last one is beyond the ends of the tines, extra reach can be gained by tilting the carriage forward. This places the holddown arms in a position to rake the logs onto the tines. The distance the top of the carriage extends forward is the extra reach gained at the tip of the holddown arms. See Fig. 5-13.

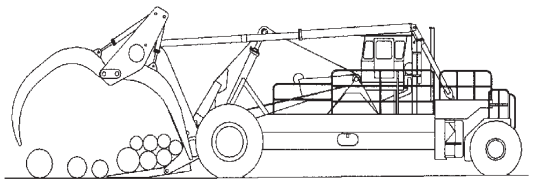


Fig. 5-13

5. Fig. 5-14 shows a good example of the Lumberjack's flexibility. The log is under the tines and is held by the holddown and kickoff arms. Partial loads should be held with the hold-down and kickoff arms.

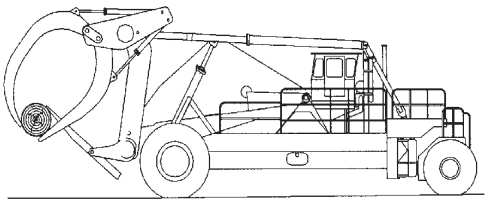


Fig. 5-14

5.10 Cold Decking Loose Logs

1. In building a cold deck, be sure that all logs are well balanced on the tines. This will help to prevent one end of a log from dropping down, resulting in "jackstraw" cold decking.

2. Move up to the deck with the load lifted to the necessary height. Place the drive wheel tires tight against the bottom logs, as this firms up the deck and helps prevent logs from shifting when you place the new load on top. See Fig. 5-15

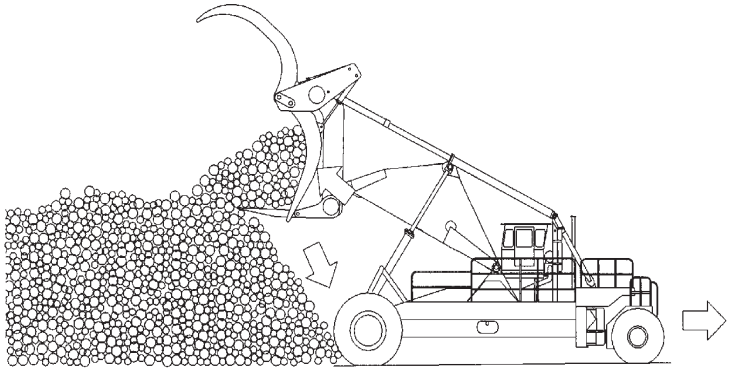


Fig. 5-15

3. When the required decking height is reached, push the load off with the kickoff arms and simultaneously lower the carriage and back away slowly. Keep the tines as close to the pile as possible to prevent logs from rolling down in front of the drive tires. See Fig. 5-16.

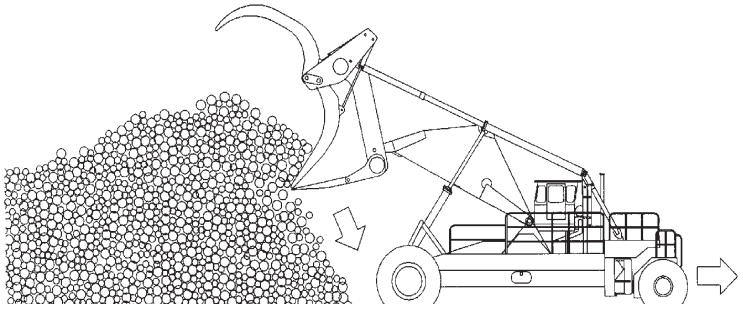


Fig. 5-16

4. Continue backing and lowering until all the logs are out of the carriage. See Fig. 5-17.

NOTE: If a log becomes "jack-strawed", straighten the pile before bringing the next load. This will make decking and retrieval much easier.

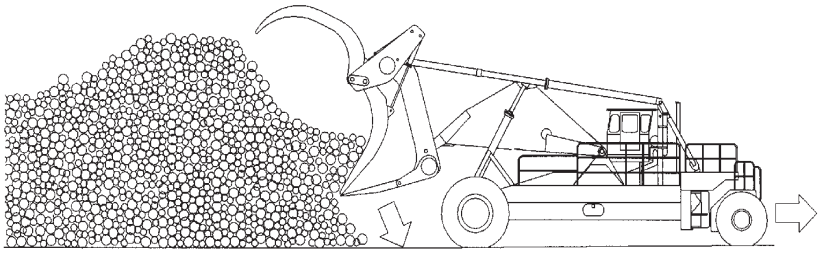


Fig. 5-17

5.11 Retrieving Loose Logs

1. To obtain maximum load retrieval of loose logs, raise the holddown arms and tilt the carriage forward slightly before moving into the deck. The tines should be hinged and at ground level.

2. Move into the deck and simultaneously tilt the carriage fully forward. The logs should roll up into the back of the carriage. Move into the deck as far as possible. See Fig. 5-18.

3. Having the carriage tilted forward at this point will allow the holddown arms to gather logs that would be otherwise out of reach. To finish filling the carriage, alternate between clamping with the holddown arms and tilting the carriage back.

4. Tilt the carriage back fully and tightly clamp the load. Back away and lower the load. See Fig. 5-19.

5. Travel with the load as close to the ground as possible. Raise the load only enough to clear obstacles.

6. Occasionally, one log in a bunch will be held by only one holddown arm and will ride on the outside of the other. It's best to drop this log and retrieve it on the next trip. Securely clamp the load with one arm (the side with the log on the outside) and open the other holddown arm. The loose log will fall to the ground

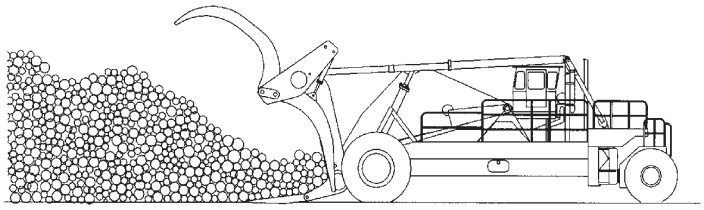


Fig. 5-18

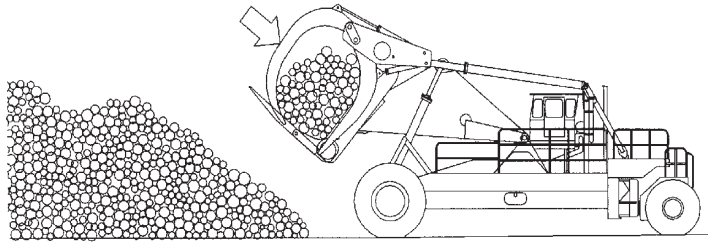


Fig. 5-19

5.12 Cold Decking Bundled Logs

1. When approaching the deck with a bundle, clamp the bundle with the auxiliary holddown arms and then raise the main holddown arms. This allows the bundle to be placed tightly against the others. See Fig. 5-20.

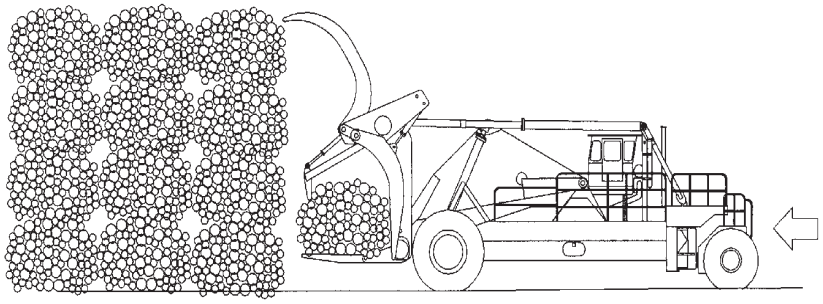


Fig. 5-20

2. To place the bundle, set the bundle in position, raise the auxiliary hold-down arms and push forward with the kickoff arms while backing up. The bundle will slide off of the tines. See Fig. 5-21.

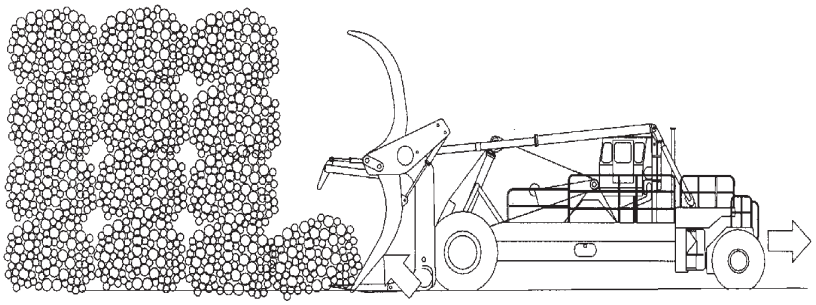


Fig. 5-21

3. Always stack bundles in vertical piles- not interlocking. This will make retrieval much easier. Also, when stacking one bundle on top of another, press down on the lower bundle with the carriage. This will flatten the lower bundle and make the deck much more stable and retrieval easier. See Fig. 5-22.

4. Depending on bundle size, it may be possible to stack the bundles four high.

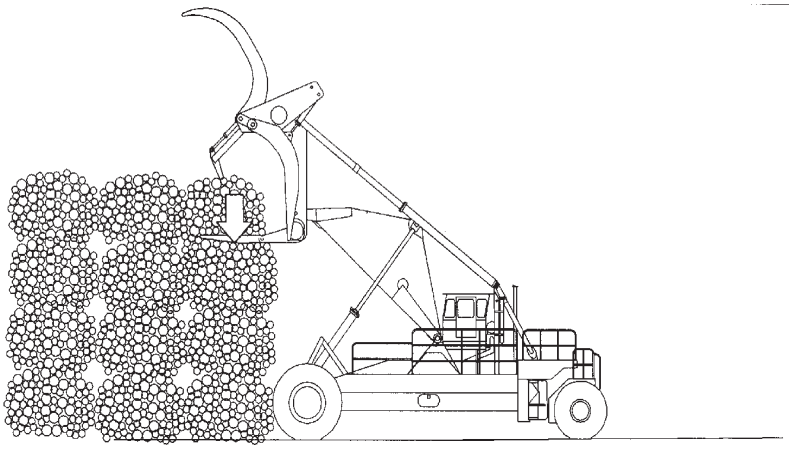


Fig. 5-22

5.13 Tips For Building Bundle Decks

1. If your log bundles are not tapered, stack the bundles directly on top of each other in vertical piles as shown in Fig. 5-23.

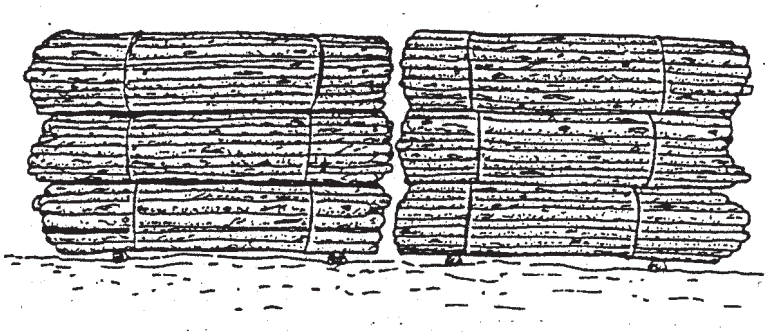


Fig. 5-23

2. Tapered log bundles require special decking techniques. Instead of decking the bundles in individual piles with the ends lined up, it is better to overlap two piles as shown in Fig. 5-24. Be sure that the bundles are stacked vertically, not interlocking. See Fig. 5-25.

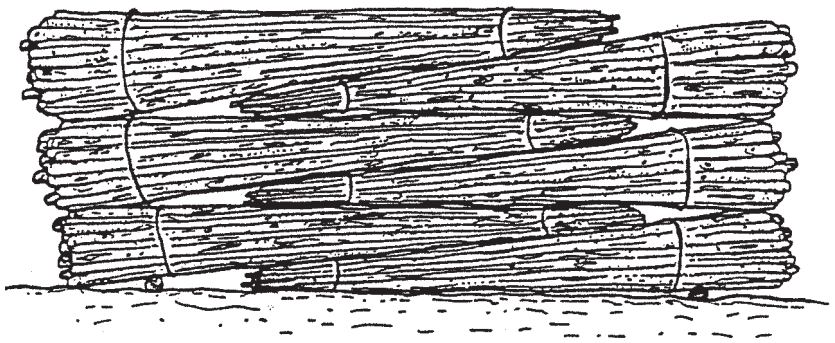
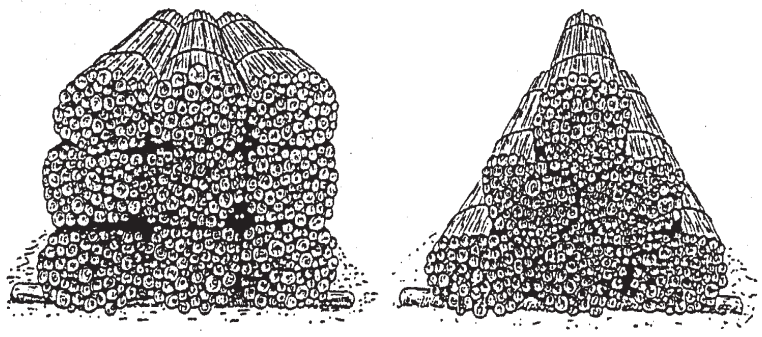


Fig. 5-24

3. Fig. 5-25 shows correct and incorrect methods of decking bundles.

   In the first example, the bundles are piled vertically, making retrieval easy.

   In the second example, the bundles are interlocking, making retrieval difficult or almost impossible without damage to the logs.



Vertical Piles
Correct

Interlocking Piles
Incorrect

Fig 5-25

5.14 Retrieving Bundled Logs

1. Approach the deck with the carriage tilted forward and all holddown arms (main and auxiliary) fully raised.

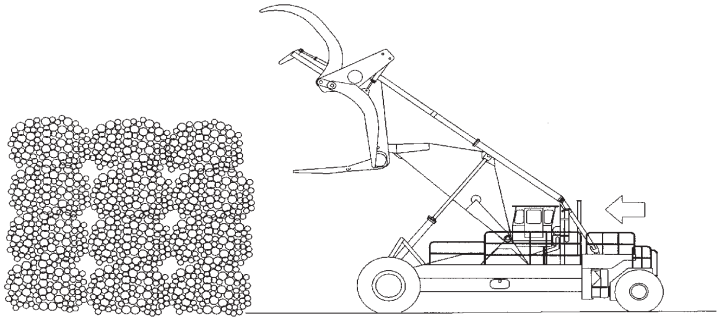


Fig. 5-26

2. Work the tines between the bundles. Take care not to hook logs from the lower bundle. Work the tines as far under the bundle as possible.

3. Clamp the bundle with the auxiliary holddown arms and tilt the carriage back.

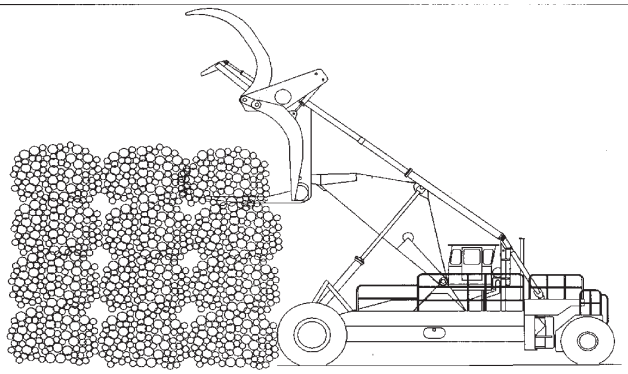


Fig. 5-27

4. Lower the main holddown arms as soon as they will clear the remaining bundles.

5. Lower the bundle to the ground and re-clamp if necessary to secure the load. Travel with the load as close to the ground as possible. Raise the load only enough to clear obstacles.

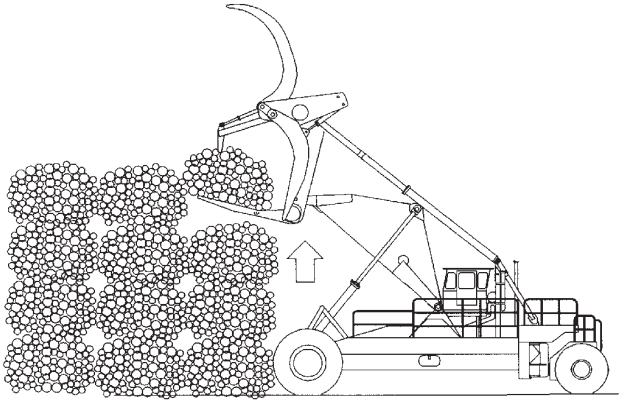


Fig. 5-28

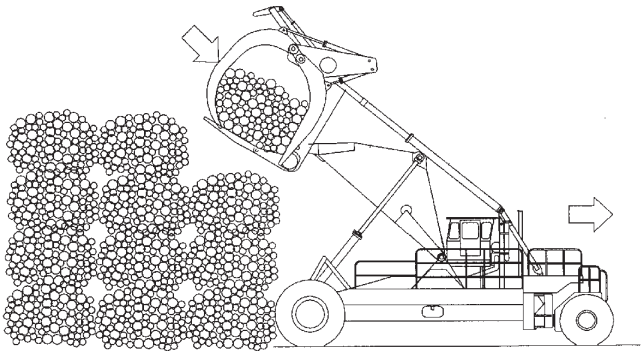


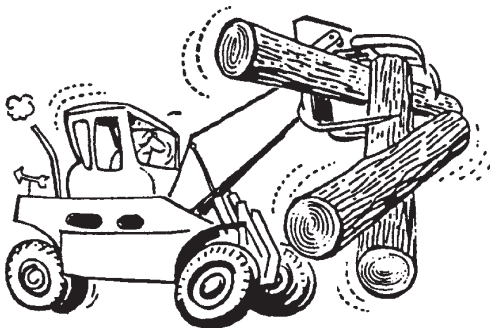
Fig. 5-29

5.15 Operating Tips

1. For maximum visibility and overall safety, travel in reverse whenever possible. Always travel in reverse when the machine is loaded. Keep the load as low as is practical.

2. Always make sure that the kickoff arms are fully retracted and against their stops when carrying a full load. Leaving them partially extended could result in damage if the load should shift or roll with any force. To obtain the greatest lift capacity, the kickoff arms must be all the way back. This way the load center is as far back as possible.

3. **WITHOUT FAIL** - always secure a load before allowing the binder chains to be removed, either by clamping the load with the holddown arms, or by some other safe means provided by your company.



4. The holddown and kickoff arms can be damaged if they are used in any way that opposes the movement of the machine under power. For example, never use the holddown arms to drag a log while moving in reverse.

5.16 Determining Load Center

The load center is figured at a specific distance from the face of the carriage towards the tips of the tines.

Model	Load Center	Max Load
L-80, L480	48”	80,000 lb
L-90, L490	54”	90,000 lb
L-100, L4100	54”	100,000 lb
L-115, L4115	54”	115,000 lb
L-120, L4120	60”	120,000 lb
L-130, L4130	72”	130,000 lb

5.17 In Case of Fire

(Units With Optional Fire Suppression System)

1. Pull the safety pin on the actuator and strike the button. Fire retardant will be released, the engine will shut down, and the batteries will be disconnected from the electrical system.

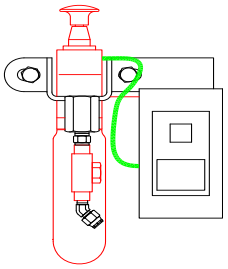


Fig. 5-30 Fire Suppression System Actuator

2. LEAVE THE VEHICLE. After the system has discharged, watch carefully for flare ups and spot fires. Call the Fire Department and/or service personnel as soon as possible.

3. Any time the system is discharged, the system must be refilled and recharged before resuming operation. Refer to the Service Manual for complete maintenance procedures.

IMPORTANT: Each unit is equipped with two actuators. One is located in the operator’s cab to the right of the operator’s seat in front of the door. The other is located on the chassis near ground level. This way, the system may be actuated by either the operator or by ground personnel.

NOTE: Some models are equipped with a fire detection system that will automatically discharge the system in the event of a fire. See the Service Manual for details and additional operator information.

⚠ WARNING

Inspect for and remove all combustible materials from engine area before starting the machine and periodically throughout the workshift as required. These materials build up in tight corners and are highly combustible. See Section 2-4 for fire safety information.

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Section 6

Maintenance and Lubrication

6.1 General

A machine that receives regular care from its operators and mechanics generally rewards them with decreased downtime and greater reliability. With the help of the information in this section, you should be able to maintain your lumberjack at top operating efficiency. The maintenance and lubrication procedures given here can be performed with a minimum amount of shop tools.

6.2 Safety Precautions

Before performing any maintenance or lubrication, review the following safety procedures. They're intended for your protection.

1. **Read This Manual**
   Be sure you understand the procedures outlined in this manual before attempting to carry them out. Pay particular attention to any safety warnings presented. If you have any questions, don't hesitate to ask your Wagner dealer.

2. **Perform Maintenance on Level Ground**
   The machine should be on level ground and clear of traffic lanes whenever possible. The parking brake should be set and the wheels blocked.

3. **Remove Loads**
   The machine should be unloaded, with the carriage resting on the ground, or with the boom on a boom rest.

⚠ WARNING

WARNING: Never rely on the hydraulic system to support any part of the machine during maintenance or lubrication. NEVER stand under a component that is supported only by the hydraulic system. Make sure it is resting on its mechanical stops or safety stands. If necessary, support components with appropriate safety stands.

4. **Stop the Engine**
   Before performing any maintenance or lubrication remove the key from the switch or tag the key switch "**DO NOT START**", to ensure that the engine is not inadvertently started.

5. **Install Swivel Locking Pin**
   All four-wheel-drive units are equipped with these pins. Always install this pin when working in the area of the swivel hinge. The machine must be on a level surface. A single swivel locking pin can be installed with the bogie turned left or right. Both pins can be used to lock the bogie in a straight line with the stacker.

⚠ CAUTION

CAUTION: Never operate the Lumberjack with the locking pins in the locked position. Damage to the machine could result.

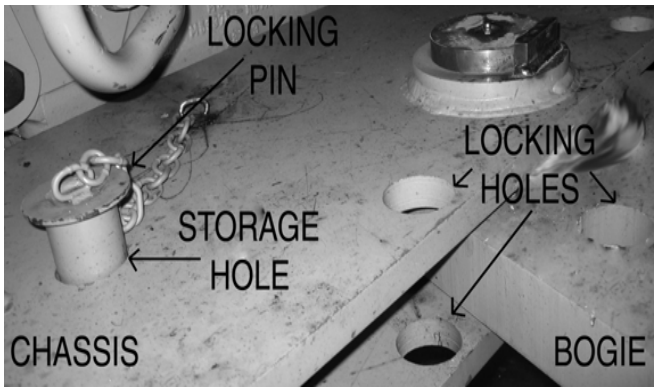


Fig. 6-1 Bogie Locking Pin In Storage Hole

Use Safe Ladders / Scaffolding
Due to the height of the upper lube points, it is essential to personnel safety that safe ladders, personnel lifts and / or scaffolding be used while servicing. These areas can be dangerously slick under conditions of rain, frost or oil smears.

6.3 Preventive Maintenance

Preventive maintenance is a system that is designed to detect problem areas and prevent equipment failure and maximize machine availability. The system is based on a series of maintenance checks and servicing points. To be effective, a preventive maintenance program demands strict adherence to a planned schedule.

Benefits of Preventive Maintenance
Time spent making required periodic checks is a real investment in working equipment and efficient use of man hours. Valuable benefits can be realized, all of which mean savings in time and resources.

Preventive Maintenance
- **Promotes Safety-** properly maintained equipment is better able to operate within its design specifications and react positively to the operator's control.
- **Improves Equipment Availability-** by minimizing the chances of breakdown.
- **Reduces Unexpected Downtime-** unexpected downtime is expensive and detracts from normal scheduled maintenance.
- **Allows Planning of Daily Production-** by knowing the condition of available equipment.
- **Allows Planning of Maintenance Man Hours-** by distribution of duties and necessary lead time for parts ordering.
- **Provides Complete History of Equipment-** based on performance, frequency and type or repairs and actual man hours expended on maintenance.

Establishing a Preventive Maintenance Program
The key to an effective prevention maintenance program is diligence in following a maintenance schedule set at regular planned intervals. Such intervals should be made compatible with the nature of operation of the equipment and with the capabilities of the maintenance facility. In any event, the intervals and inspection requirements must be planned, regular and consistent.

Specific maintenance should be completed using the following intervals:

- 10 Hours (each shift or daily)
- 50 Hours (weekly)
- 250 Hours (monthly)
- 500 Hours (quarterly)
- 1000 Hours (semiannually)
- 2000 Hours (annually)

Each successive schedule (e.g. weekly, monthly, quarterly, etc.) builds on the former and is accumulative in nature. For example, when performing weekly maintenance, the mechanic will first take note of the shift maintenance, and in addition will perform the checks specified in the weekly schedule.

Maintenance Record Keeping
The importance of good record keeping cannot be overemphasized. Each scheduled maintenance form should be checked off as the inspections and service is performed. Quantities of replenished lubricants should be recorded, as well as hydraulic pressure readings. All discrepancies should be recorded whether remedied or pending. Operators and mechanics should sign off forms and return them to the maintenance supervisor for approval and retention in an equipment unit life.

Accurately recorded maintenance forms will give the maintenance personnel an overall view of how particular equipment is holding up under normal operating conditions. Good records and the ease by which they can be reviewed also enable maintenance personnel to identify and evaluate problem areas and allow adjustment in the maintenance scheduling for their particular operation.

6.4 Shift Maintenance

Shift Maintenance is where preventive maintenance begins. The operator normally completes this inspection. It consists of the routine servicing and lubrication of the machine's major systems. On a daily basis, the operator is in a position to identify, remedy and / or record potential problem areas and is able to quickly recognize any change in the performance of the machine. The comments he or she records on the shift maintenance report, become a valuable tool to the maintenance department, and is an important ingredient to the overall success of a preventive maintenance program.

Shift Maintenance Checklist
A recommended checklist is given here as an aid in developing a practical shift maintenance program, if one has not been developed by your company. A shift maintenance report, based on the checklist, should be used to report defects found when making maintenance checks at the beginning of each shift.

Your company may have a different reporting method, however, it is usually a requirement that this form be filled out at the end of each shift. Accurate shift maintenance reports can help your company anticipate maintenance problems and take action to prevent costly failures.

Using the Checklist
The reference numbers in the left-hand column of the checklist indicate the physical location of each check point or lubrication point as it appears on the shift maintenance diagram. Circled reference numbers on the diagram indicate lubrication points. Boxed numbers indicate maintenance check points.

Shift maintenance details are provided in section 6.10, Maintenance Procedures. These procedures consist of checks that can be preformed by the operator.

6.5 Scheduled Maintenance

Periodic scheduled maintenance is intended to be performed in a complete maintenance facility by trained mechanics. The timely scheduling and completion of these periodic inspections by the maintenance department will determine the length of downtime of a particular machine.

Therefore, maintenance scheduling becomes a critical factor in the effective use of man hours and the availability of serviceable equipment.

Scheduled Maintenance Checklist
Actual operating environment governs the maintenance schedule. Some checks should be performed more often under severe conditions, such as heavy dust, extreme temperatures or extremely heavy loads.

These maintenance checklists are designed to be used as a guide until adequate experience is obtained in establishing a schedule to meet your specific needs.

A detailed list of component checks is provided with a suggested schedule basis given in hours of operation, or calendar time.

The engine manufacturer's operation and maintenance manual should be consulted for additional engine related checks.

A maintenance schedule should be established using these checklists as a guide. The result will be a maintenance program to fit your specific operation.

Using the Checklist
Although specific maintenance is identified in these checklists, location and procedure references are not provided in the columns.

Scheduled maintenance is normally carried out by trained mechanics, who are knowledgeable of the equipment systems and component locations. Scheduled maintenance procedures can be found by referring to the appropriate section of the service manual.

6.6 Scheduled Oil Sampling

Use scheduled oil sampling (SOS) to monitor machine condition and maintenance requirements. Oil samples from engine, transmission, axles, and hydraulic system should be taken when oil is hot and well mixed to ensure an accurate analysis. Contact your Wagner dealer for complete information and assistance in establishing a scheduled oil sampling analysis program for your equipment.

6.7 Lubricant Selection & Specifications

The efficiency and useful life of mechanical equipment is as dependent on proper lubrication as on proper engineering design. The importance of proper lubrication is increased because of the greater loads and pressures imposed on present day mobile heavy equipment. For this reason, we are vitally interested in promoting widespread usage of the best possible lubricants for Allied Systems Company products. Our purpose in compiling these specifications is to provide a guide to aid in the selection of a lubricant that will give the most satisfactory service.

Because many brands of fluid 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. Our lubricant recommendations are based on commercial products that have given satisfactory results in normal operation. In all cases, the lubricant supplier assumes all responsibility for the performance of his product and for product liability.

When changing fluids use the following guidelines:

- Add only filtered fluids.
- If adding lubricants other than what is currently in the reservoir, a warranty of compatibility should be obtained from the oil supplier.
- When the fluid is changed due to changes in ambient temperatures, the system should be completely drained and the fluid replaced.

Listed below are the lubricants used for initial factory fill:

ENGINE - Caterpillar & Cummins
Mobil Delvac 1300 Super 15W-40

TRANSMISSION/CONVERTER
Mobilfluid 424

DRIVE AXLES
Mobilube HD 85W-140

Clark Posi-Torque (Differentials)
Lubrizol #6178 Additive

HYDRAULIC SYSTEM
Mobilfluid 424

GENERAL CHASSIS LUBRICATION
Mobilgrease Special No. 2

HYDRAULIC BRAKE SYSTEM (Older Machines)
Mobil Multi-Purpose ATF

The above lubricants will be used on all WAGNER Lumberjack units unless the unit is to be operated in extreme climatic conditions.

Allied Systems Company requires that lubricants meet, or exceed, the specifications of the oils listed above to avoid component failure and for warranty consideration. If a cross reference to Mobil Oil Corporation specifications is required, please consult your local lubricant dealer.

6.8 Hydraulic Oil Cleanliness

Oil is a vital part of any machine's service life, but the cleanliness of that oil may be more important than you think. When using clean oil (low ISO code), component life expectancy can increase dramatically. Dirty oil can cause more damage to your machine than you may think. Dirt in the oil can cause permanent wear within the machine limiting the service life dramatically.

Scale numbers, which represent what is called the ISO 4406 code, are used to represent the cleanliness of your oil. They allow you to study current contamination levels and set goals for the future. Refer to figure 6-2 to help you better understand this rating scale. The system works by giving a 3-part code which represents the number of particles per milliliter (mL) of oil depending on particle size. The first number is representative of particles greater or equal to 4µm, the second 6µm, and the third 14µm. So an oil with the rating 12/17/9 would represent that there are between 20 to 40 4µm sized particles per ml, 640 to 1300 6µm sized particles per ml, and 2.5 to 5 particles 14µm sized particles per ml present in that particular oil.

> **NOTE:** The "/ " used in the code in no way represents a ratio in the scale. It is used only as a divider between numbers.

> **NOTE:** The ISO 4406 code was changed in 1999 to ISO 4406-1999. At times the old standard may still be used so be sure you know what version of the code you are dealing with. ISO 4406-1987 (old) had only two numbers and different sizes for particles represented by each number. In that code the first number represented particles 5µm and the second number was for particles 15µm.

There are many ways oil can become contaminated, including but not limited to poor care at the refinery, in transport, at your site, or within the machine its self. New oil is not necessarily going to be as clean as desired and may need to be filtered before adding it to the tank.

Filtration, storage and handling procedures are the most crucial elements to providing clean oil for your machinery. A few important steps in a oil cleanliness program are:

- Test your current oil cleanliness levels so you know what to compare your cleaned oil to.
- Carefully evaluate your handling and storage practices.
- Set goals for your company for cleanliness standards.
- Start improvements in filtration, storage, and handling practices.
- Observe and record your progress and return on investment.

Number of Particles Per 1 mL of Fluid		
ISO Code	Minimum	Maximum
1	0.01	0.02
2	0.02	0.04
3	0.04	0.08
4	0.08	0.16
5	0.16	0.32
6	0.32	0.64
7	0.64	1.3
8	1.3	2.5
9	2.5	5
10	5	10
11	10	20
12	20	40
13	40	80
14	80	160
15	160	320
16	320	640
17	640	1300
18	1300	2500
19	2500	5000
20	5000	10000
21	10000	20000
22	20000	40000
23	40000	80000
24	80000	160000
25	160000	320000
26	320000	640000
27	640000	1300000
28	1300000	2500000

Fig. 6-2 ISO 4406-1999 Fluid Cleanliness Codes

Recirculating filtration systems can greatly help you achieve and maintain your cleanliness goals. For smaller jobs a cart mounted system used on strategic intervals is acceptable for this propose. These units can also be used to filter new oil before it is ever put into a machine. At times with larger jobs a permanently installed system may be required to meet your needs. Cartridge type filters are common in this type of system so make sure to change them and thoroughly clean the system between lubricants to avoid cross contamination.

⚠ CAUTION

CAUTION: DO NOT use the filters on the machine to initially clean your oil. Doing so will result in unfiltered oil contaminating your system before it can be filtered.

A change in storage and handing techniques is often the most cost effective way to help with the cleanliness of your oil. To help prevent moisture from entering the storage drum during the “breathing process” contain the temperature in your storage area to a small range. Providing a storage space free of dirt and moisture will also help with this.

Another simple step is to buy cleaner oil. Your company can specify the cleanliness of the oil you purchase. It will likely be more expensive but with the increase in machinery life it is worth the cost. If this is the way your company decides to get clean oil make sure to test it upon arrival to make sure you are actually receiving what you are paying for.

Allied Systems recommends that oil with minimum cleanliness 21/19/16 be used in your Wagner when changing and topping off fluids. After an overhaul it is recommended that a cleanliness of at least 25/22/16 be used. Exceeding these levels could cause damage to your machine.

6.9 Lubrication Points (See Fig 6-3)

10 HOURS

Before engine startup, check the following:

(1) STEERING CYLINDER PINS
(2) BOOM TO CHASSIS PINS
(3) BOOM TO CARRIAGE PINS *
(4) & (5) HOIST CYLINDER PINS *
(6) HINGE BEARINGS (4WD Units Only) *
(7) & (8) TILT CYLINDER PINS
(9) HOLDDOWN ARM PINS
(10) KICKOFF ARM PINS
(11) & (12) HOLDDOWN CYLINDER PINS
(13) & (14) KICKOFF CYLINDER PINS
(15) AUXILIARY HOLDDOWN ARM PINS
(16) & (17) AUXILIARY HOLDDOWN CYLINDER PINS

* When operating in water, lubricate submerged points more frequently

⚠ WARNING

WARNING: Due to the extreme height of the upper lube points, it is essential to personnel safety that safe ladders and/or scaffolding be used while servicing. These areas can be dangerously slick under conditions of rain, frost, or oil smears.

50 HOURS

(18) SWIVEL BEARING (4WD Units Only)
(19) FRONT AND REAR SUPPORT BEARINGS (4WD Units Only)
(20) DRIVELINE **

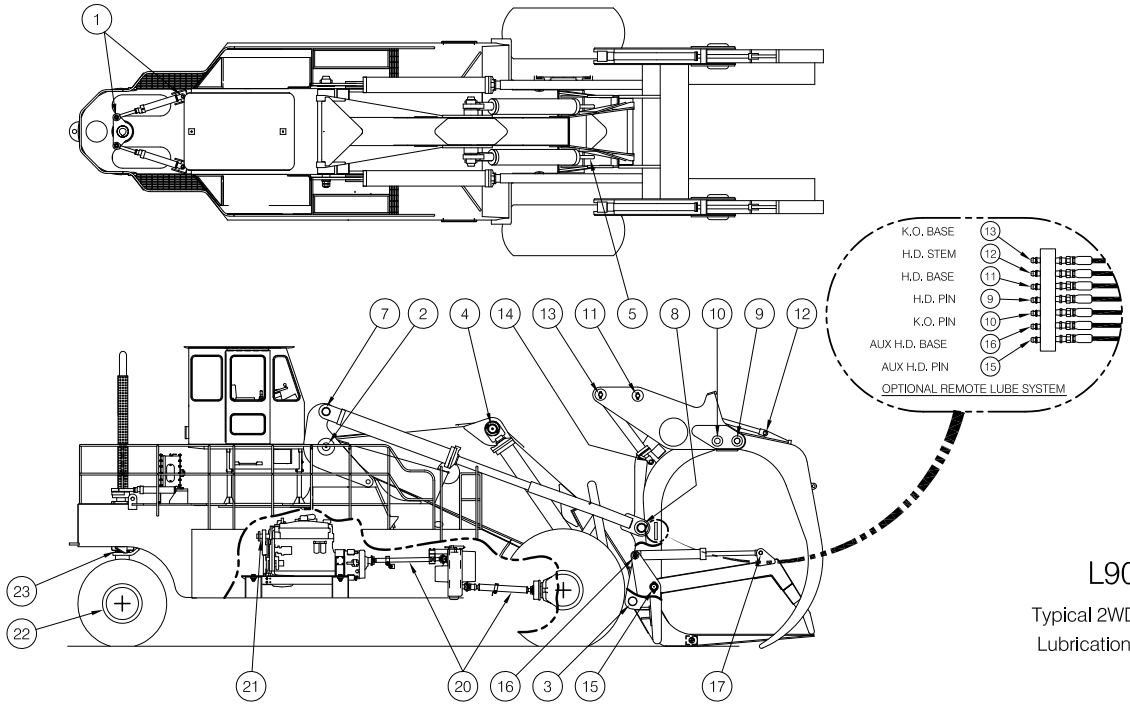
** Use handgun or lower pressure adaptor; lubricate sparingly.

250 HOURS

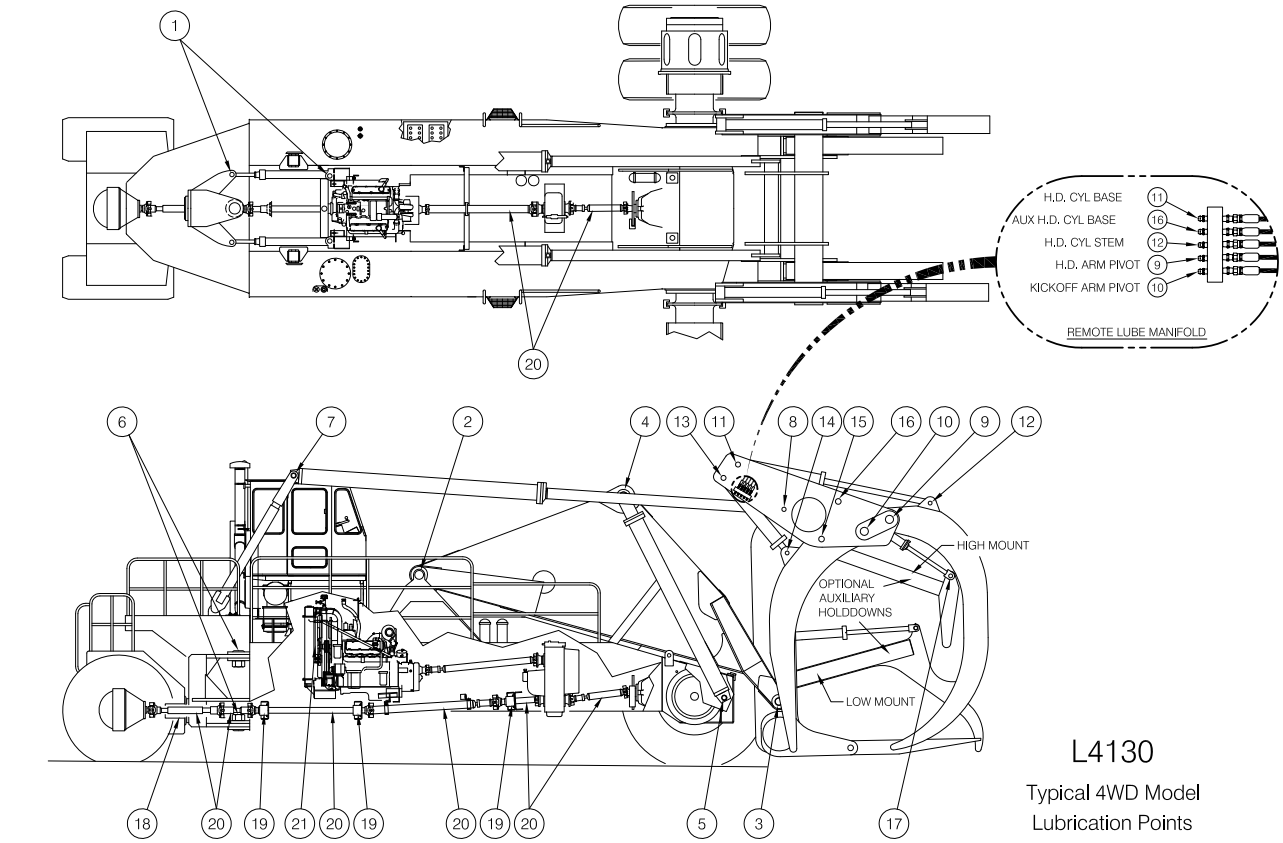
(21) FAN DRIVE BEARING (not all engines)

500 HOURS

(22) TAILWHEEL BEARING (2WD Units Only)
(23) TAILPOST (2WD Units Only)



L90
Typical 2WD Model
Lubrication Points



L4130
Typical 4WD Model
Lubrication Points

Fig. 6-3 Lubrication Chart

Note: Due to variations in engine types and machine models, the indicated location the exact location of elements may not be exact. Consult your specific service manual for exact locations.

6.10 Shift Maintenance Checklist (See Fig 6-4)

EVERY 10 HOURS OR DAILY

Note general vehicle condition. Clear away all collected debris - steam clean if necessary. Check for mechanical damage and loose or leaking components. Report all faults to maintenance department.

Before Starting Engine - Check The Following:

REF	ITEM	OK	NO	ADD
1	ENGINE (Check oil level - check for leaks)	☐	☐	____
2	HYDRAULIC TANK (Check oil level - check for leaks)	☐	☐	____
3	RADIATOR & OIL COOLER (Check coolant level - check for leaks; are fins clean and unobstructed?)	☐	☐	____
4	AIR CLEANER/INTAKE SYSTEM (Check indicator - clean or change element as required, empty dust cup, check for leaks and damage)	☐	☐	
5	ENGINE BELTS (Check for adjustment and wear)	☐	☐	
6	WHEELS & TIRES (Check condition and pressure)	☐	☐	____
7	AIR TANK (Check drain valves for correct operation)	☐	☐	
__	LUBRICATE CHASSIS (Refer to lube chart)	☐	☐	
__	WALK AROUND INSPECTION of structure: welds, leaks, damaged components, etc...	☐	☐	
__	FIRE SAFETY CHECK (Check for accumulated debris in engine compartment, etc)	☐	☐	

After Starting Engine - Check The Following:

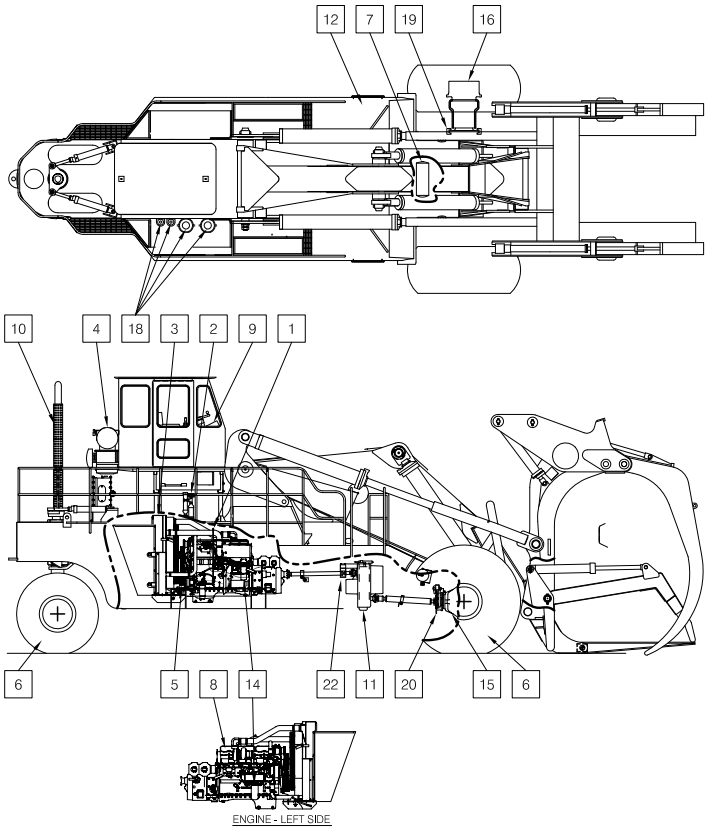
8	ENGINE (Does it sound normal?)	☐	☐	
9	INSTRUMENTS (Check for normal readings)	☐	☐	
9	CONTROLS (Check for normal operation)	☐	☐	
10	EXHAUST SYSTEM (Check for leaks and excessive smoke)	☐	☐	
11	TRANSMISSION - After warming to operation temp.- (Check oil level - check for leaks)	☐	☐	____

Note Anything Abnormal or in Need of Repair

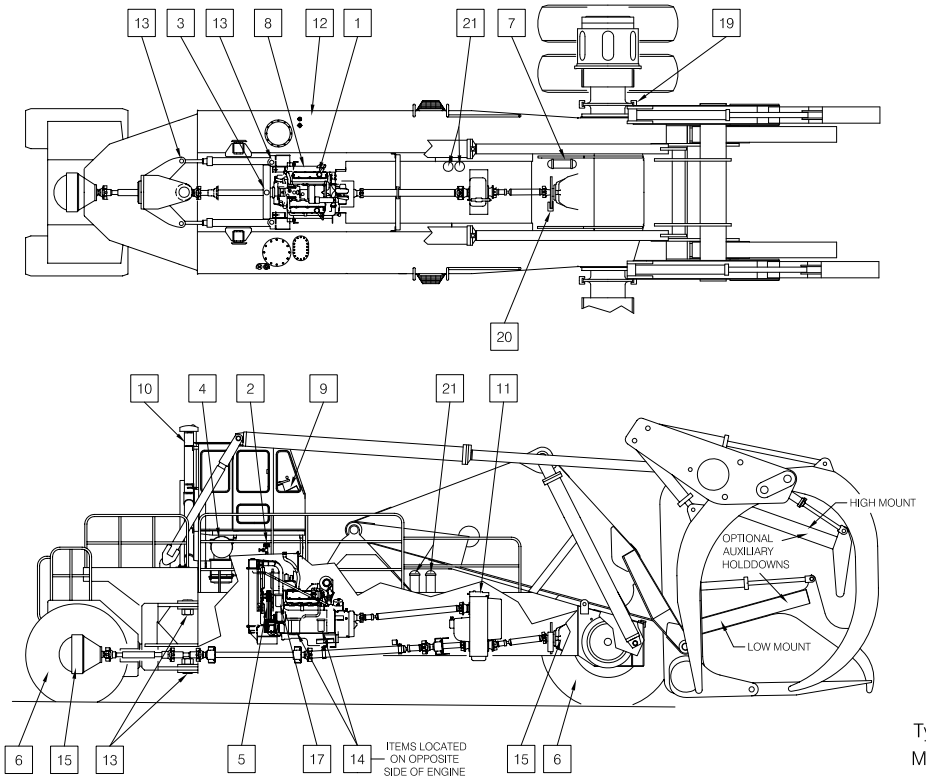
LIGHTS_____ DEFROSTER_____ REVERSE WARNING HORN_____
HORN_____ WINDSHIELD WIPERS_____
HEATER_____ AIR CONDITIONER_____

OPERATOR_____ SUPERVISOR_____ DATE_____
MODEL_____ SERIAL NUMBER_____ HOUR METER_____

Notes:
- See Section 6.11 for additional service/maintenance checklists (weekly, monthly, etc).
- See Section 6.12 for maintenance procedures for daily checklist.



L90
Typical 2WD Model
Maintenance Points



L4130
Typical 4WD Model
Maintenance Points

Fig. 6-4 Maintenance Chart

Note: Due to variations in engine types and machine models, the indicated location the exact location of elements may not be exact. Consult your specific service manual for exact locations.

6.11 Maintenance Checklist

EVERY 50 HOURS OR WEEKLY

1.	Repeat the 10 hour check		OK_____	NO_____
2.	Check for fluid leaks - oil, fuel, water		OK_____	REPAIR_____
3.	Check wheel lug nuts and studs mechanically		OK_____	REPAIR_____
4.	Check battery electrolyte level		OK_____	ADD_____
5.	Lubricate chassis - refer to Lubrication chart		OK_____	NO_____
6.	Record engine rpm		High_____	Stall_____
7.	Check for structural damage - inspect chassis & attachments for bending, cracking & broken welds		OK_____	Repair_____

EVERY 250 HOURS OR MONTHLY

1.	Repeat the 50 hour check		OK_____	NO_____
2.	Change engine oil & filters*	14	OK_____	ADD_____
3.	Take engine oil sample for analysis*		OK_____	NO_____
4.	Check axle differential oil level**	15	OK_____	ADD_____
5.	Check axle planetary oil level**	16	OK_____	ADD_____
6.	Change cooling system filter	17	OK_____	REPLACE____
7.	Check all hydraulic pressure and record		OK_____	NO_____
8.	Check fire suppression actuator	18	OK_____	NO_____
9.	Inspect brake system & components	19	OK_____	REPAIR_____
10.	Check and adjust the parking brake (if required)	20	OK_____	ADJUST_____

EVERY 500 HOURS OR QUARTERLY

1.	Repeat the 250 hour check		OK_____	NO_____
2.	Service fuel filters*		OK_____	REPLACE____
3.	Service Hydraulic filters*	21	OK_____	REPLACE____
4.	Service Transmission filters*	22	OK_____	REPLACE____
5.	Take oil samples from transmission, axle, and hydraulic system for analysis*		OK_____	NO_____
6.	Check accumulator pressures		OK_____	NO_____
7.	Check expander pivot pin torque (see page 6-13)		OK_____	NO_____

EVERY 1000 HOURS OR SEMI-ANNUALLY

1.	Repeat the 500 hour check		OK_____	NO_____
2.	Change transmission oil and filters	22	OK_____	ADD_____
3.	Clean and flush cooling system		OK_____	ADD_____
4.	Check pins and bushings for wear		OK_____	REPLACE____
5.	Steam clean machine, inspect for cracks		OK_____	NO_____

EVERY 2000 HOURS OR ANNUALLY

1.	Repeat the 1000 hour check		OK_____	NO_____
2.	Drain, flush and fill differential*	15	OK_____	ADD_____
3.	Drain, flush and fill planetaries*	16	OK_____	ADD_____
4.	Change hydraulic oil and filters*	21	OK_____	ADD_____

* Normal drain period and filter change intervals for average environmental and duty-cycle conditions. Severe or sustained high operating temperatures or very dusty atmospheric conditions will cause accelerated deterioration and contamination. Change intervals should be adjusted according to the results of oil sampling analysis. Consult your Wagner dealer for assistance in establishing an oil sampling program for your equipment.

IMPORTANT: Consult the engine manufacturer's Operation and Maintenance Manual for additional engine related checks and / or details.

WARNING

****WARNING: Pressurized Axle (Optional)
Front Axle housing is under 3 psi pressure.
Before checking axle oil level, first shut off
air supply to axle housing bulkhead.**

Repairs:

Problem:_____
_____
_____
_____

Parts: _____
_____
_____
_____

Mechanic: _____ Hours Labor: _____
Operator: _____ Supervisor: _____
Machine Model: _____ Equipment No: _____
Date: _____ Shift:_____ Hour Meter: _____

6.12 Daily Maintenance Procedures

General
The following maintenance procedures should be performed at the beginning of each work shift. The number before each maintenance procedure corresponds with the numbers given in Fig. 6-4 (Maintenance Chart). This provides an additional aid in locating each check point.

Before Starting Engine

1 **Engine Oil Level**
The oil level should be checked prior to starting the engine. Make sure that the area around the dipstick is clean and the machine is sitting on level ground.

NOTE: A 15 minute drain-back time is recommended if the engine has been running.

The oil level must be maintained between the "L" (low) mark and the "H" (high) mark, but as close to the "H" mark as possible.

⚠ CAUTION

CAUTION: Never operate the engine with the oil level below the "L" mark or above the "H" mark. Refer to the engine's Operation and Maintenance manual for detailed engine service information.
Use only approved engine oil (see Lubricant Specifications Chart, page 6-4). Do not overfill. Check engine for leaks.

2 **Hydraulic Oil Level**
Always check the hydraulic oil level prior to operation. The fill cap is located on the RH chassis deck, to the right of the operator's cab. Oil poured into the fill cap is directed through the return filters before entering the tank to keep your oil as clean as possible.

⚠ CAUTION

CAUTION: Always open the tank breather petcock (located on the breather pipe) before removing the dipstick, filler cap, or in-tank filter cover plate. Failure to vent tank can result in injury or a substantial oil spill. Be sure to close the petcock before operating the machine.

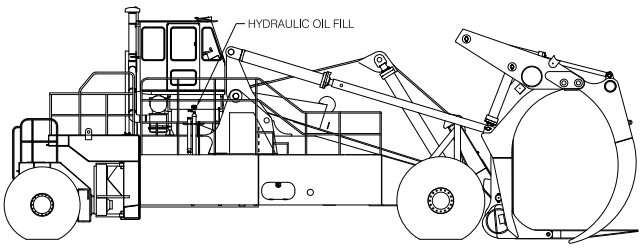


Fig. 6-5 Hydraulic Oil Fill Location

The oil level should be checked with the hoist cylinders retracted (down). The oil level should be at or near the "H" (high) mark on the dipstick. Fill with approved hydraulic fluid as required (see Lubricant Specifications Chart, page 6-4). Do not overfill.

3 **Engine Coolant Level**
Daily inspection of the coolant level is recommended. Cooling systems using anti-aeration baffles restrict visual observation of the true coolant level. Although the coolant can be seen, the system may not be full. To gain a true fill, add water slowly up to the bottom of the fill neck and allow a 30 second settling period. Remember to compensate for the loss of antifreeze when adding water.

⚠ WARNING

WARNING: Never remove the radiator cap if the engine is hot. The coolant will be under pressure and could flash to steam with explosive force, causing severe burns. Remove the radiator cap only when the engine is cool.

NOTE: If the engine is hot, the coolant will be higher than when it is cold.
Inspect the radiator daily for restriction caused by leaves, paper or bent fins. Inspect the radiator cap, houses and connectors for any signs of leakage or damage.

4 **Air Cleaner**
The air cleaner is a Donaldson two stage dry air filter. A service indicator shows the condition of the filter. The indicator will show in the green zone when the filter is clean. The indicator will show red if the filter is restricted. If red appears in the indicator window, clean or change the element and press the reset button on the indicator.

5 **Engine Belts**
Check the tension of the drive belts by pressing with the thumb halfway between pulleys. The belts should not deflect more than the values shown in the table (Fig. 6-6). If any belt is loose or worn, report to maintenance for corrective action. Consult the manual supplied with your engine for serpentine belt inspection procedures.

Engine	Belt Deflection Inches (mm)
Cummins	3/8 to 5/8 (9.5 to 15.9)
Cat	1/2 to 3/4 (13 to 19)

Fig. 6-6 Belt Deflection

6 **Wheels and Tires**
Visually inspect the tires for low air pressure and damage. Also check the wheel assemblies for cracks, loose or missing lug nut, broken studs, etc. Report any problems to maintenance.

7 **Air Tank Valves (If Applicable)**
Visually inspect the valves and connections for damage or leaks. There should be signs of water coming from the drain hoses. If not, report the condition to maintenance.

12 **Structural Inspection**
Steam clean the machine and inspect for structurally cracks. If cracks are present repair before resuming operation. Refer to WSB0369 for information on how to properly weld structural cracks.

After Starting Engine

8 **Engine**
After starting, check that the engine runs and sounds normal. It should come up to operating temperature within a few minutes after starting. If you notice unusual noises or excessive smoke, have maintenance check it out.

9 **Instruments**
Check all instruments for normal readings immediately after starting engine. Make sure that pressures and temperatures are within acceptable limits. Also, check that all controls function properly. They should be smooth and responsive.

4 **Air intake system**
Inspect all connections for damage, loose clamps, and air leaks. Look for damaged fittings and loose connections. Do not operate the machine if leaks are present. Dirt could enter the engine intake and cause severe damage. See Section 6.14.

10 **Exhaust System**
Check for leaks. Make sure that exhaust gases are not entering the operator's cab. Mounting brackets must be in place and all connections tight. Check for excessive smoke.

11 **Transmission Oil Level**
The level should be checked after engine warm up, with 180 to 200 showing on the transmission temperature gauge. The dipstick and fill tubes are located on the chassis deck, directly above the transmission. Check oil level with engine running at idle, at operating temperature, and with the transmission in neutral. The level should be between the "H" (high) and "L" (low) marks. Fill with approved fluid only. See Lubricant Specifications Chart, Page 6-4. Do not overfill. Inspect for leaks.

6.13 Expander Pin Maintenance Procedures

13 **Expander Pin Pivot System (Optional)**
Some Lumberjack units are equiped with an optional expander pin pivot system on the center hinge pins and steering cylinder pins. Initial torque and re-torque is an intricate part of the installation and crucial to the success of the pin system. Make sure to follow the torque schedule in Table below*.

Torque Schedule	
After 1 hour	* When you re-torque and the wrench "clicks out" on setting (see below) without additional torque, you have successfully "seated" the expansion sleeves and the installation process is complete.
After 3 hours	
After 10 hours or 1 day *	
After 40 hours or 4 days*	
If expansion sleeves have not "seated" within one week of operation, call Allied Systems at (503) 625-2560 for instructions.	

***Note:** The machine has to be fully articulated in order to torque the top fastening element on the lower hinge bar. The top fastening element on the upper hinge bar has to be reached through the pin access hole on top of the machine's rear deck. Tools: A 2-5/8 inch socket with appropriate extension and torque wrench.

Important: After initial torque is achieved, check the torque at 500 hour service intervals. Apply appropriate torque (664 lb ft for center hinge pin, 369 lb ft for steering cylinder pins). Tighten until the torque wrench "clicks out" on setting.

6.14 Air Intake System Maintenance Procedures

General
The air cleaner is critical to the life of the engine. It prevents dust and debris from entering the engine air system, causing premature engine wear and possible failure. When a two stage, dry type air cleaner is used, air passes through the outer, primary filter elements installed; both are required to fully protect the engine from contamination.

Air Cleaner Connections
Check the intake tubes between the air cleaner outlet and the turbocharger for cracks or wear, and that all clamps are in place and are tight.

- Replace any worn or damaged tubes and tighten any lose clamps.

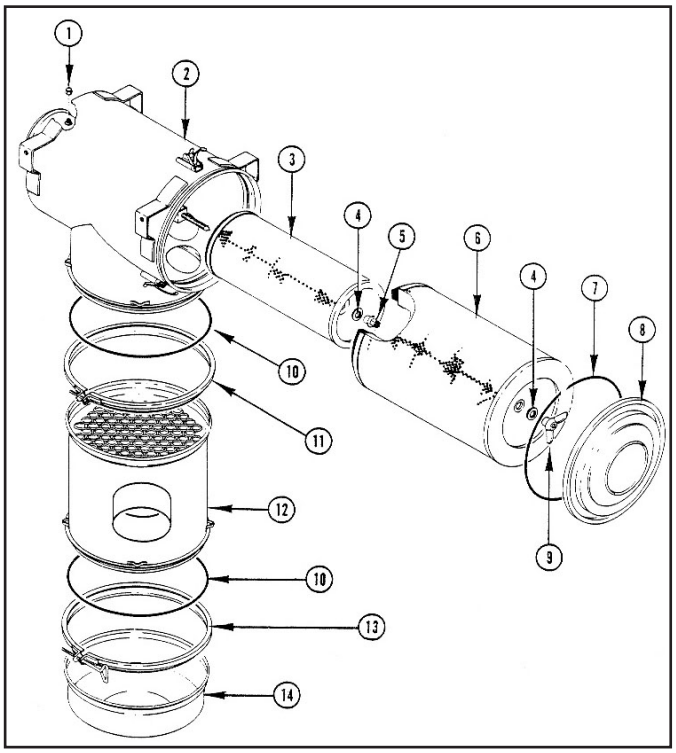


Fig. 6-7 Air Intake System (Typical)

Servicing the Air Cleaner
A rubber evacuator is installed on the bottom of the air cleaner housing to allow daily removal of debris from the air cleaner.

- Squeeze the evacuator to allow the debris to fall out.

An indicator may be located on the air tube. It is provided to alert the operator that the elements are plugged and in need of service. Air cleaner service require
ments will vary with your operating conditions. In extremely dusty conditions, this gauge should be constantly monitored, as frequent air cleaner service will be necessary.

1. Loosen the wing nut in the center of the air cleaner end cap and remove the end cap.

2. Remove the outer, primary air filter and clean the inside of the air cleaner housing thoroughly. Remove the evacuator tube and clean it and the evacuator.

   IMPORTANT: DO NOT remove the inner, safety element UNLESS you are replacing it. It should be replaced each time the primary element is changed for the third time or if the primary element is ruptured. The safety element should not be cleaned or disturbed in any way.

3. Examine the primary filter element. If dust is present on the inside surface, or if it shows signs of damage, it MUST be replaced.

4. Blow compressed air through the element, from inside outward, to remove any particles from the element.

5. Wash the primary element in non-foaming detergent for approximately fifteen minutes then rinse with warm tap water from inside outward until the water that passes through the element is clear.

6. Allow the primary element to air dry then examine the condition using a bright light shining through the element from inside outward.

Servicing the Air Pre-Cleaner
- When the level of debris in the pre-cleaner bowl reaches the full line, remove the pre-cleaner, empty it and reinstall it. (See dust cap interval)

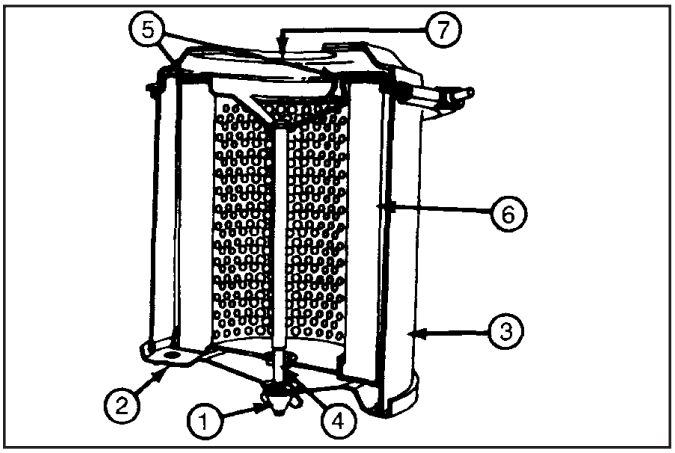


Fig. 6-8 Element Replacement

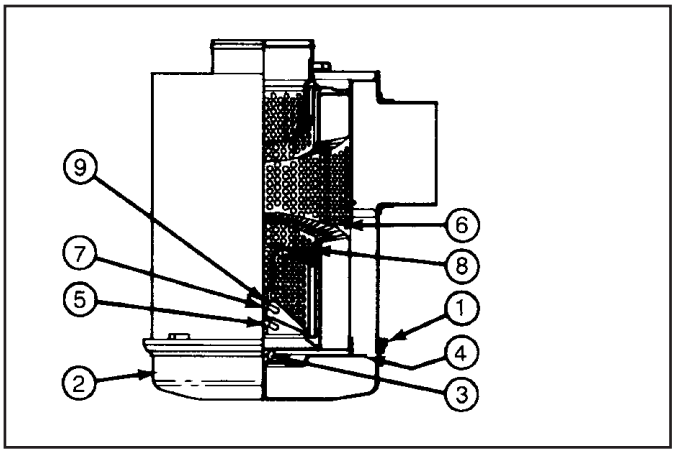


Fig. 6-9 Dual - Heavy Duty Dry - Type Element

Air Cleaner Element

NOTE: The illustrations in this section show typical parts. The particular engine parts may vary.

Cleaning
The paper element (6) in a dry-type air cleaner can be cleaned several times by using compressed air to remove the dirt, approximately 207 kPa [30 psi]. Do not hold the air jet too close to the paper element when cleaning.

Elements that have been cleaned several times will finally clog and airflow to the engine will be restricted. After cleaning, check the restriction as previously described. Replace the element if necessary.

⚠ CAUTION

Caution: Holes, loose end seals, dented sealing surfaces and other forms of damage render the cleaner inoperative and require immediate element replacement.

Replacement
1. Remove the wing-nut (1) that secures the bottom cover (2) to the cleaner housing (3). Remove the cover.

2. Pull the element (6) down from the center bolt (4).

⚠ CAUTION

Caution: Pull the cover and the element straight out when removing them from the housing to avoid damage to the element.

3. Remove the gasket (5) from the outlet end (7) of the housing.

Dual - Heavy Duty Dry-Type Element - Replacement
Heavy-duty air cleaners combine centrifugal cleaning with element filtering before air enters the engines.

Before disassembly, wipe dirt from the cover and the upper portion of the air cleaner. To clean the dual types:

1. Loosen the wing bolt (1), and remove the band securing the dust pan (2).

2. Loosen the wing nut (3). Remove the dust shield (4) from the dust pan (2). Clean the dustpan and shield.

3. Remove the wing nut (5) and secure the air cleaner primary element (6) in the air cleaner housing. Inspect the rubber-sealing washer on the wing nut (9).

4. Clean the element from the clean air side with compressed air not exceeding 207 kPa [30 psi]. Inspect the element after cleaning. Install the cleaned primary element or a new element.

5. Make sure the gasket washer is in place under the wing nut before tightening.

6. Assemble the dust shield and dustpan again. Position them to the air cleaner housing and secure with the band.

On Dual Element Type Cyclopac Cleaner
1. Check the air restriction indicator. If the air restriction is excessive, disassemble the air cleaner, remove the wing nut (7) and replace the safety element (8).

2. Assemble the air cleaner as described above

Air Filter Service Indicator
This gauge indicates filter element condition without filter disassembly. The service sight gauge indicates filter contamination by showing “red” or “green” in the sight gauge. The visible amount of red on the indicator will increase as the dust in the element increases.

For maximum engine performance the filter should be changed or cleaned immediately after the “red” signal locks in full view.

- To reset the service gauge, press the button on the top of the gauge.

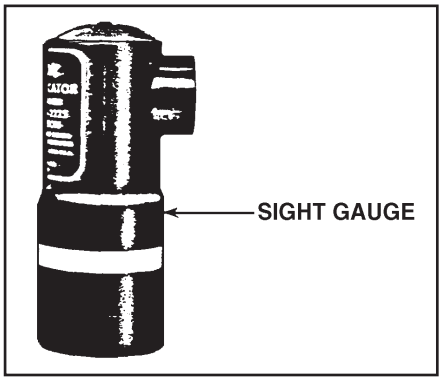


Fig. 6-10 Air Filter Service Indicator

6.15 Operator Troubleshooting

The following tables lists the most common problems that may be encountered by operators. If the problem cannot be solved using the corrective actions listed in this table,notify maintenance personnel.

Engine*

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Engine turns over but fails to start	Fuel filter blocked	Replace filter
	No power to fuel solenoid	Check electrical circuit to solenoid
	Fuel tank empty	Fill tank
	Fuel shutoff valve at tank closed	Open valve
Engine fails to turn over	Battery disconnect switches open	Close switches
	Transmission not in neutral	Place lever in neutral
	Battery Low	Have charging system checked
	Battery terminals corroded or loose	Clean and tighten terminals
Engine runs unsteady and power output low	Insufficient fuel supply	Clean fuel strainers, replace filter, fill tank, tighten fuel lines
	Contaminated fuel	Drain tank, lines, clean strainers, and replace fuel
	Wrong fuel	Drain tank and fill with proper fuel
	Air intake restricted	Remove restriction
Exhaust smokes badly	Too much oil in sump	Drain to proper level
	Air intake restricted	Remove restriction
Engine overheats	Radiator fins restricted	Clean fins
	Low coolant level	Check coolant level
Engine oil pressure low	Low oil level	Check oil level
	Oil leaks	Tighten connections
	Contaminated Oil	Change oil and filters

* Also see manufacturer’s Operation and Maintenance Manual for additional information

Transmission / Converter*

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Transmission or converter overheats	Low oil level	Fill to proper level
	Oil cooler restricted	Remove restriction
Lack of power	Low engine rpm at coverter stall	Have engine checked (governor)

* Also see manufacturer's Operation and Maintenance Manual for additional information

Hydraulic System

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No response to controls	Closed tank shutoff valve	Open valve
	Low oil level	Fill tank to proper level
	Implement controls switch "off"	Turn switch to "on"
Sluggish operation or response to controls	Hydraulic oil cold	Allow adequate warm-up time
	Low oil level	Fill tank to proper level
	Suction leak	Correct suction leak
	Plugged tank breather	Replace breather
	Restriction in circuit	Remove restriction, check filters
	Pump speed too slow	Check engine speed
Excessive noise	Cavitation	Eliminate restriction in suction line Replace tank breather
	Aeration	Fill tank to proper level Correct suction leak
	Tubing vibration	Tighten mounting clamps
Hydraulic system overheating	Low oil level	Fill tank to proper level
	Operating over pressure reliefs	Correct operating procedure

Electrical System

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Engine fails to turn over	Battery disconnect switch open	Close switch
	Neutral start switch open	Place transmission shift lever in neutral
	Battery low	Have start / charge system tested
	Battery terminals corroded or loose	Clean and tighten terminals
	Other connections loose	Tighten connections
Voltmeter indicates discharge	Alternator drive belt slipping	Tighten or replace belt
	Loose or corroded battery connections	Clean and tighten terminals

6.16 Maintenance Specifications

Hydraulic Pressure Relief Settings

NOTE: Hydraulic pressures should be set at 1500 rpm and double checked at maximum rpm. Override should not be over 50-100 psi on control valves. Check or set (see Service Bulletin WSB0370 for setting procedure) pressures in sequence shown when hydraulic oil is hot (above 120° F). Calibrate your gauge periodically. Consult the ANSI hydraulic schematic supplied with your machine for the pressure settings required on the various valves and circuits. Set main reliefs with engine at 1500 rpm. Set circuit reliefs with engine at 1000 rpm.

Component Capacities & Lubrications

Component	Lubrication Type*	L80/ L480	L90/ L490	L100/ L4100	L115/ L4115	L120/ L4120	L130/ L4130	L160/ L4160	
Engine Crackcase	Engine Oil	*~ Refer to your engine owner's manual for engine oil capacity ~*							
Fuel Tank	Diesel Fuel	*~Varies by machine. Range:*					400 - 475		*Gallons*
							1514 - 1798		*Liters*
Cooling System	Water/ Antifreeze **	*~ Varies by machine. Consult Allied Systems service department for details ~*							*Gallons*
									Liters
Hydraulic System	Hydraulic Oil	350	350	350	350	350	350	350	*Gallons*
		1324	1324	1324	1324	1324	1324	1324	*Liters*
Transmission System	Transmission Oil	22	22	22	22	22	22	22	*Gallons*
		83	83	83	83	83	83	83	*Liters*
Differential, Front	Gear Lube	14	16	16	16	16	50	50	*Gallons*
		53	61	61	61	61	189	189	*Liters*
Differential, Rear (4WD Only)	Gear Lube	10	10	10	10	10	10	10	*Gallons*
		37.85	37.85	37.85	37.85	37.85	37.85	37.85	*Liters*
Planetary Hubs (each) Front	Gear Lube	4	4	4	4	4	25	25	*Gallons*
		15.14	15.14	15.14	15.14	15.14	94.6	94.6	*Liters*
Planetary Hubs (each) Rear (4WD)	Gear Lube	4	4	4	4	4	4	4	*Gallons*
		15.14	15.14	15.14	15.14	15.14	15.14	15.14	*Liters*
Chassis Grease Fittings	Chassis Grease	*~ As required ~*							

*See Lubricant Specifications, Page 6-4

**Some engines require additional coolant treatment. See engine Operation and Maintenance Manual for specific information.

NOTE: The specifications shown in this manual are based on information available at the time of publication and are subject to change without notice or obligation.

6.17 Recommended Overhaul Schedule

To maximize efficiency and minimize downtime and costly failures, Allied Systems Company recommends the following overhaul chart to be used. When followed closely your equipment will last longer with less unexpected downtime. Contact your local Wagner dealer for “Must do Kits” including all the bearings, seals and gaskets necessary to overhaul your drivetrain components or allow your dealer to overhaul the components for you. They are authorized to overhaul and test your components.

Standard and Extreme duty definition:

Standard duty - Operating on smooth, level asphalt or concrete.

Extreme duty - Operating on any unimproved surfaces: sloped surface, mud and rock, or any time 4 wheel drive is engaged.

It is recommended that some components be overhauled at the same time, even if they might have some time before their required rebuild, to minimize downtime. Many components may have to be removed in order to gain access to others so the parts should all be rebuilt together. This will save you from having to tear the machine down again a few thousand operation hours later.

During the overhaul process make sure all parts are thoroughly cleaned before installation. Parts that do not receive this cleaning can cause the lubricant to become contaminated, which leads to much shorter service life. The schedule assumes maintenance, lubrication and genuine Wagner filters are used.

Recomended Drivetrain Overhaul Intervals (Hours)

Component		Standard Duty	Extreme Duty
Torque Converter		12,000	8,000
Pumps		6,750	4,500
Transmission		22,500	15,000
Differential, L130 and Larger	Front	22,500	15,000
	Rear	15,000	10,000
Differential, L120 and Smaller	Front	15,000	10,000
	Rear	15,000	10,000
Planetary, L130 and Larger	Front	22,500	15,000
	Rear	15,000	10,000
Differential, L120 and Smaller	Front	15,000	10,000
	Rear	15,000	10,000
Engine Tune-Up		9,000	6,000
Engine Rebuild		18,000	12,000
Steering Cylinders		9,000	6,000
Hoist Cylinders Reseal		9,000	6,000
Hoist Cylinders Rebuild		18,000	12,000

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