Allied Wagner

LUMBERJACK

Operator's Manual

80-980 10/2/2014 (for lumberjacks built after 3/2011) PrintedinUSA

⚠ 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.

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer, birth defects, and other reproductive harm. Wash hands after handling.

Other chemicals in this vehicle are also 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 1

General

Figure 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 Figure 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 typical. The nameplate may also be located inside the cab.

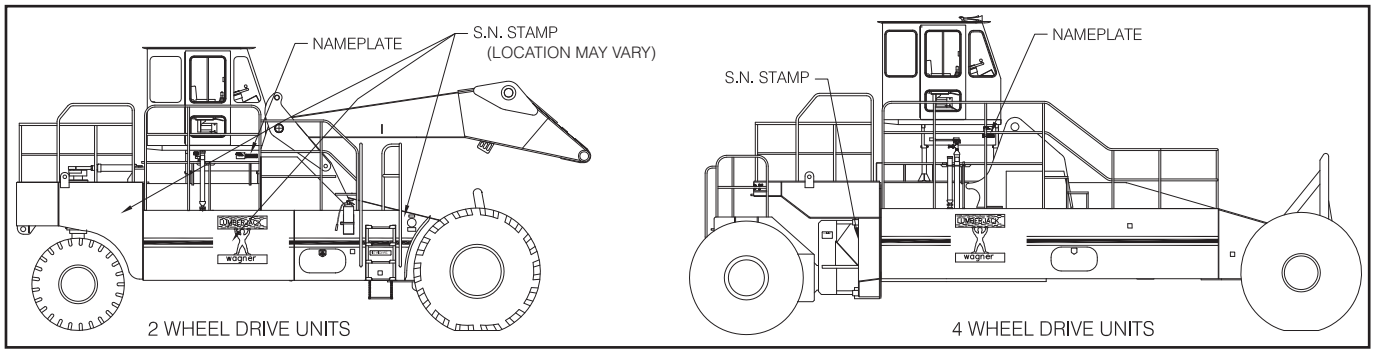


Figure 1-2 Machine Identification (Carriage Assembly Shown Removed for Clarity)

This Operator's Manual is relevant for the following Lumberjacks:

Model	Starting Serial Number	Model	Starting Serial Number
L80	105439	L480	079119
L90	039323	L490	057136
L100	093202	L4100	094051
L115	113310	L4115	109254
L120	101220	L4130	095216
L130	045109		

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.

1.4 Part Identification/Terminology

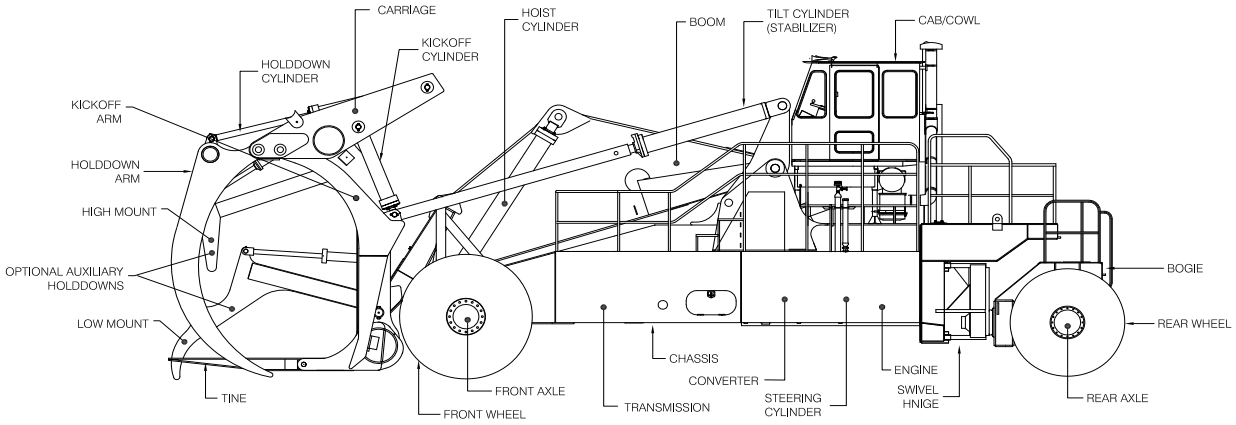


Figure 1-3 Wagner L4115 Lumberjack

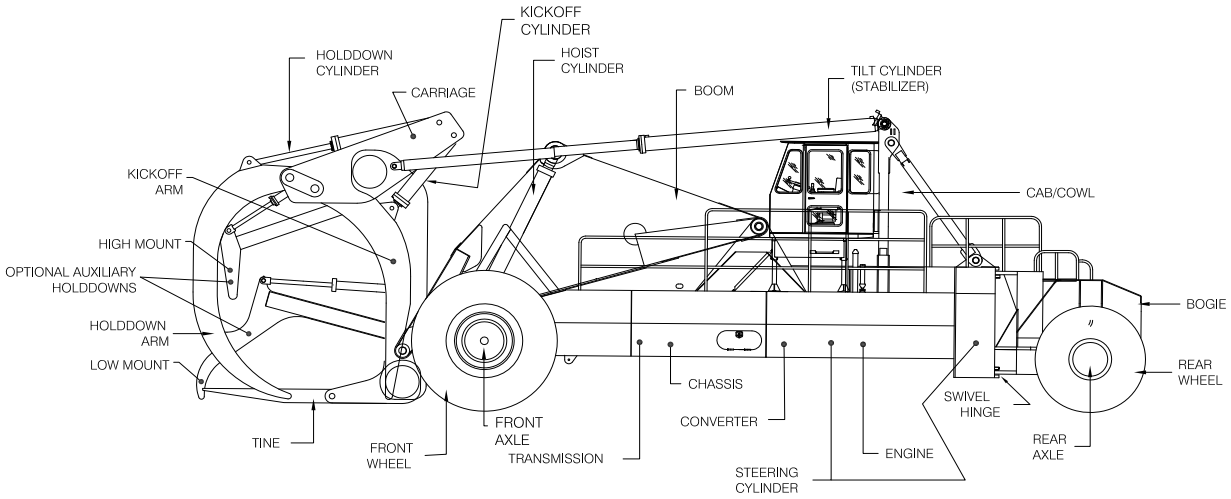


Figure 1-4 Wagner L4130 Lumberjack

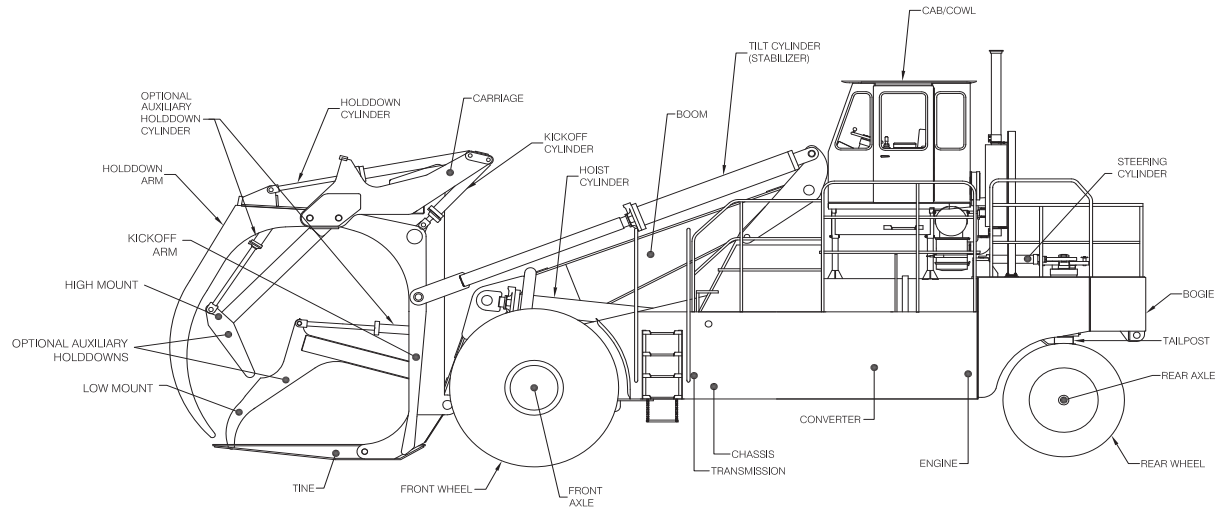


Figure 1-5 Wagner L80F Lumberjack

1.5 Ingress/Egress

2 Wheel Drive Units
Use service ladders on right/left side of chassis when boarding or leaving lumberjack.

4 Wheel Drive Units
Use service ladders on right/left side of the chassis, or the rear of the bogie, when boarding or leaving lumberjack.

⚠ CAUTION

Do not use the rear service ladder to enter or exit the lumberjack when the chassis and bogie are not aligned (see Figure 1-6).

Top View Of 4WD Lumberjack

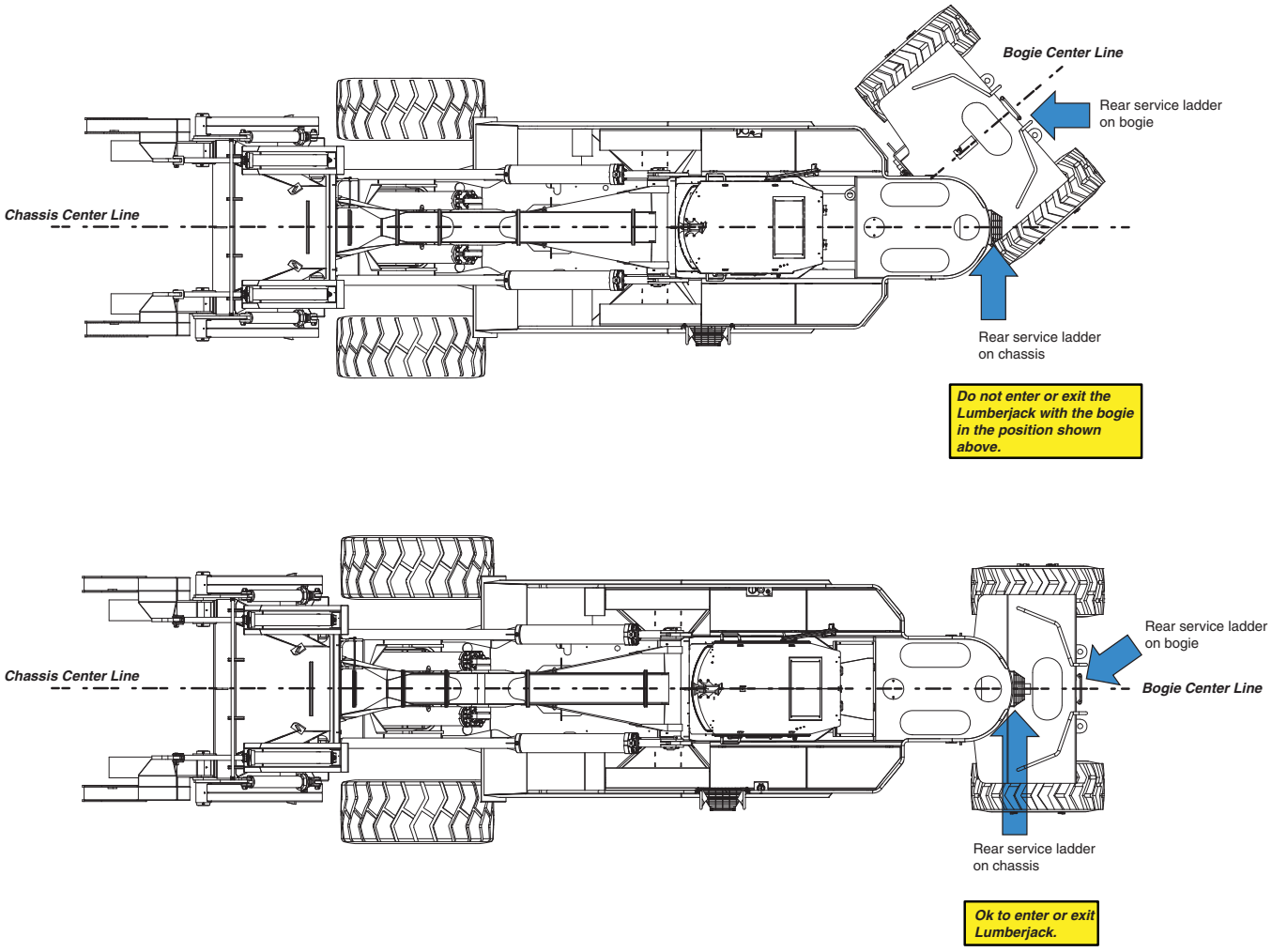


Figure 1-6 Wagner L490S Lumberjack

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. 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 Wagner. It's your responsibility to see that they are carried out.

2.2 Safety Symbols

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

⚠ DANGER

The "DANGER" symbol indicates a hazardous situation which, if not avoided, will result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.

⚠ WARNING

The "WARNING" symbol indicates a hazardous situation which, if not avoided, could result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.

⚠ CAUTION

The "CAUTION" symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, or equipment damage. Carefully read the message that follows to prevent minor or moderate injury.

NOTICE

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

NOTE: …The term "**NOTE**" highlights operating procedures or practices that may improve equipment reliability and/or personnel performance, or to emphasize a concept.

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.

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.

Obey the following cautions and warnings before using your machine to avoid equipment damage, personal injury or death.

2.3 Safety Regulations

- Each country has its own safety legislation. It is in the operator's own interest to be conversant with these regulations and to comply with them in full. This also applies to local bylaws and regulations in force on a particular work site.
- Should the recommendations in this manual deviate from those in the user's country, the national regulations should be followed.

2.4 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 safety 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 material 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" and safety belt.
- 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. Be sure to check under the unit before boarding.
- 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 will damage equipment.

2.5 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.

2.6 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, lower the carriage to the ground and stop the engine.
- Tag the key switch with a **"DO NOT START"** sign and 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.
- 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.
- Before welding anywhere on the unit, disconnect the batteries.
- 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.
- Do not enter fuel or hydraulic tanks without proper safety equipment. Check you local government safety regulations for confined space entry requirements.

2.7 Safety Equipment

- Ensure test equipment is in good condition.
- If an instrument must be held while taking measurements, ground the case of the instrument before energizing equipment.
- Do not touch live equipment or personnel working on live equipment while holding a multimeter. Some types of measuring devices should not be grounded; do not hold such devices while taking measurements.
- Prevent personal injury or equipment damage by using a lifting device with a lifting capacity greater than twice the weight of any equipment to be lifted.
- Always use personal protective equipment (PPE) appropriate to the situation. This may include the use of hearing protection, eye protection, a respirator, a hard hat, leather gloves, steel toed boots, etc.

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.
4. Lower hydraulic equipment before leaving operator's position.
5. Shut power off before lubricating or making equipment adjustment unless otherwise specified in 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 persons.

2.8 Electrical Hazards

- An electric shock could be fatal. Ensure power to the Lumberjack is "OFF" before opening electrical panels.
- All electrical cables and connectors must be in good condition (free of corrosion, damage, etc). Use caution in wet weather to avoid danger from electrical shock. Never attempt electrical testing or repair while standing in water.

- Do not wear electrically conductive jewelry, clothing, or other items while working on the electrical system.

2.9 Hot Oil Hazards

- Burns from hot oil can be severe; always allow lubricating and hydraulic oil to cool before draining.

2.10 Compressed Air Hazards

- When using compressed air to dry parts, pressure should not exceed 30 psi (200 kPa).
- Air pressure penetrating your skin can be fatal. Never direct compressed air at anyone.

2.11 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 work shift 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 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 Fighting 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. Allied Systems recommends that you, upon receiving your machine, contact your local authorized service center for your fire suppression system. Have your systems fully checked and verified before putting your machine into service.

- 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 proper 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 your machine is equipped with a fire suppression system, and that system has not automatically been activated, manually activate the system.

⚠ WARNING

WARNING: The hand held extinguisher is intended to be used to help prevent reflash only. Always exit the machine before using, and position yourself with an exit at your back for means of escape in case the extinguisher malfunctions or something unexpected happens.

- Take the extinguisher and proceed to the source of the fire calmly.
- Though the manufacturer's instructions may vary, normally aim at the base of the fire.
- Even when the fire seems to be out, stand by with the extinguisher until the fire area is dead cool. Check this by removing any panels and looking for hot spots.
- Locate the cause of the fire and correct it before restarting the machine.
- Have your local authorized service center for your fire suppression system thoroughly inspect the entire machine and service or replace the extinguishers and fire suppression system before returning to work.

Section 3

Instruments and Controls

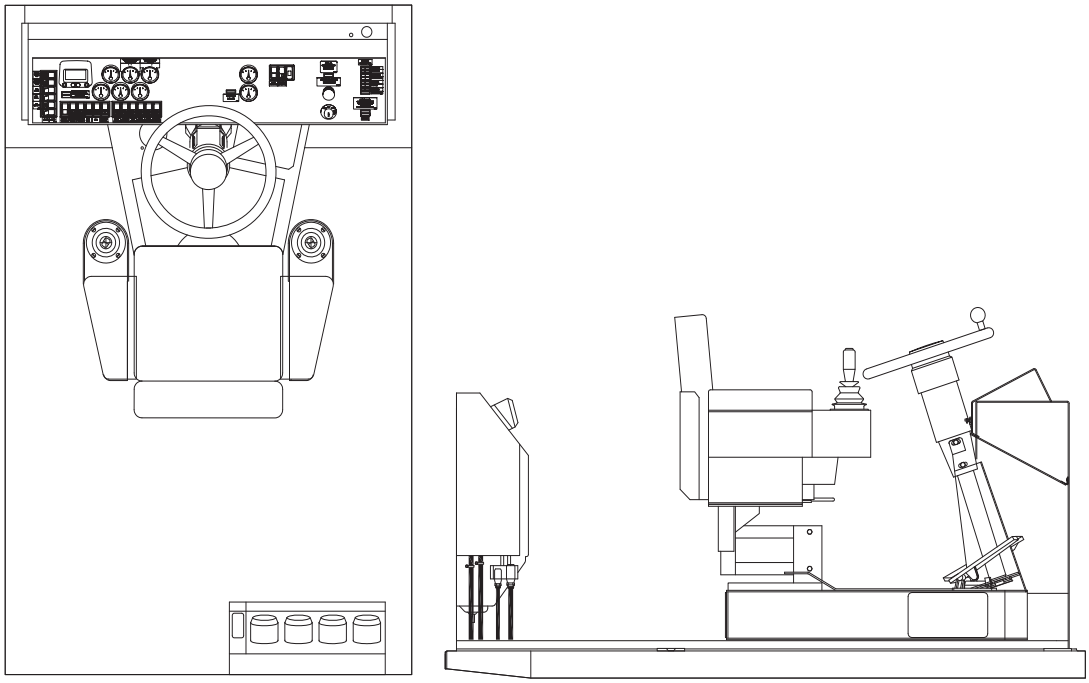


Figure 3-1 Operator's Cab With Rotate Seat Platform (older version)

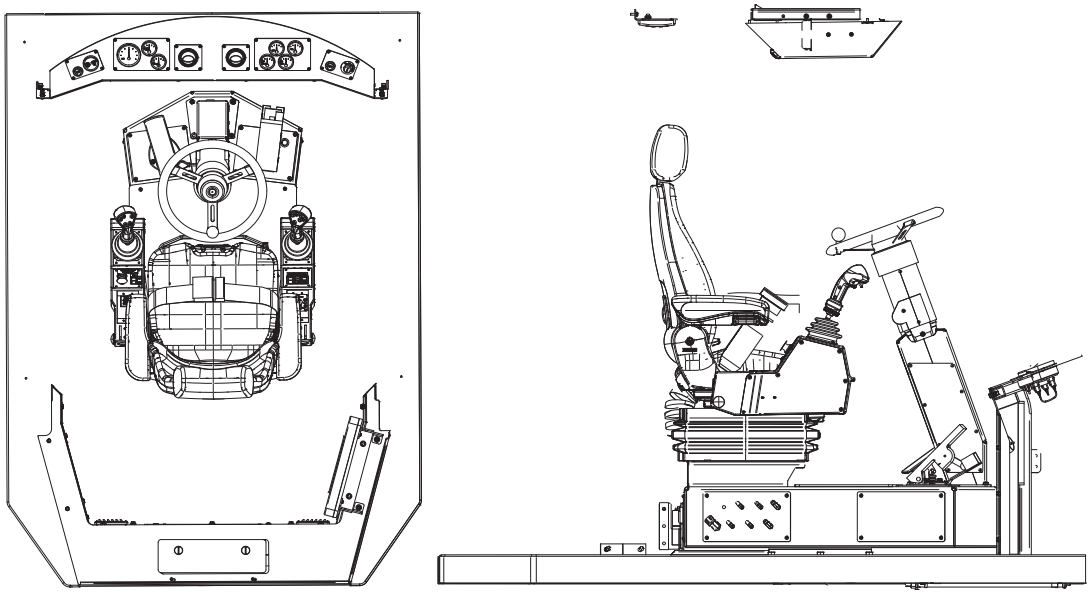


Figure 3-2 Standard Operator's Cab With Rotate Seat Platform

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.

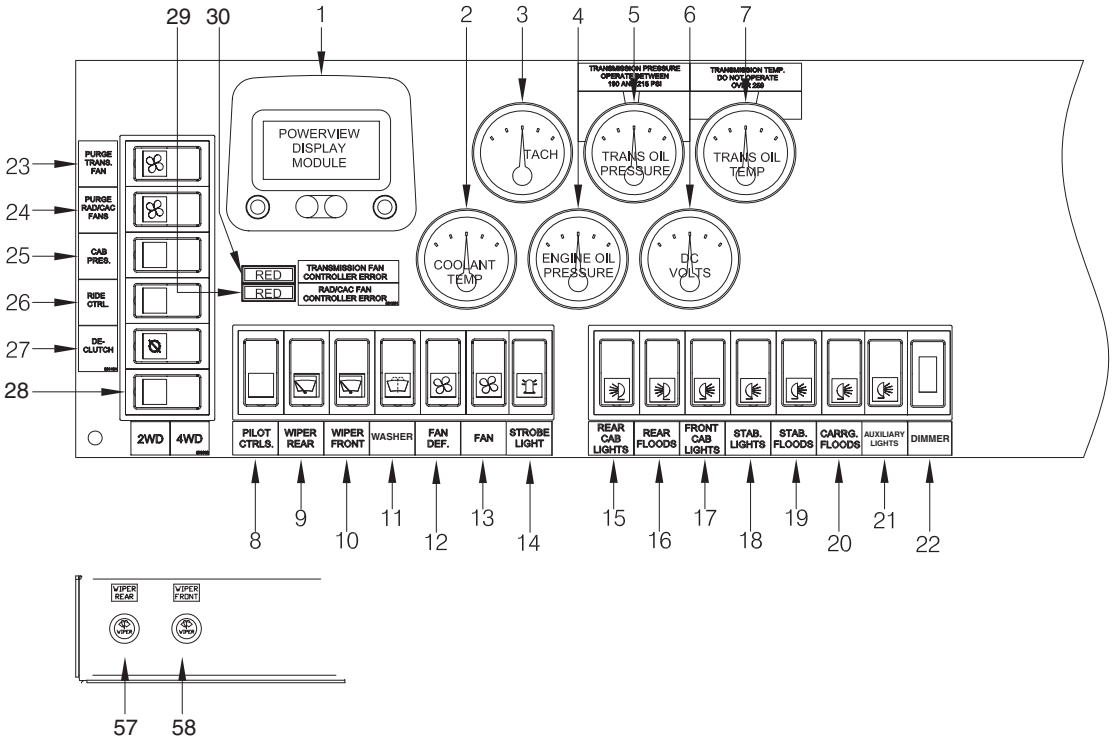


Figure 3-3 Instrument Panel, Left Side

3.2 Operator's Instrument Panel (prior to 6/1/2012)

NOTE: Your instrument panel may vary from the configuration displayed 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. Refer to appendix in back of this manual for operating instructions.

2. Engine Coolant Temperature Gauge
Displays engine coolant temperature. If the temperature holds steady at 230°F/110°C or higher, 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 operating voltage of the electrical system - whether the alternator is or isn't charging. The numbers indicate volts (acceptable range is 24-28 volts).

7. Transmission Oil Temperature Gauge
Displays converter oil temperature. This gauge should read below 250° F/121°C. If the temperature exceeds the maximum allowance, discontinue operation and report to appropriate service personnel.

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

9. Rear Windshield Wiper ON / OFF Switch
Three position: Off-Low-High

10. Front Windshield Wiper ON / OFF Switch
Three position: Off-Low-High

11. Washer
Two Position: Rear-Off-Front

12. Defroster Fan Switch (window mounted fan)
ON / OFF switch
Three position switch located on fan: Low-Off-High

13. Fan Switch (located behind operator)
ON / OFF switch
Three position switch located on fan: Low-Off-High

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

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

16. Rear Cab Light Switch
ON / OFF switch for rear flood lights.

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

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

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

20. Carriage Light Switch
ON / OFF switch for carriage lights.

21. Auxiliary Lights
ON / OFF switch for auxiliary lights.

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

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

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

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

26. 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 (Load Dampening) manifold remains closed during normal operation. Otherwise, any load that is raised will descend, causing risk to both personnel and the machine. See Page 5-8 for details.

27. 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.

28. 2WD / 4WD
Engages the rear axle when turned on to put the machine into four wheel drive.

29. Transmission Fan Controller Error Indicator Light
This light indicates an error with the transmission cooler fan.

30. Radiator Fan Controller Error Indicator Light
This light indicates an error with the radiator fan.

NOTICE

If any arc welding is to be carried out on the machine's structure, it is extremely important that the battery disconnect switch be turned OFF, ECM and Radiator Fan Controller be disconnected to prevent severe damage to the electrical system. The Battery Disconnect Switch is located in the battery box on the left side of the Lumberjack (see Section 6 for more information).

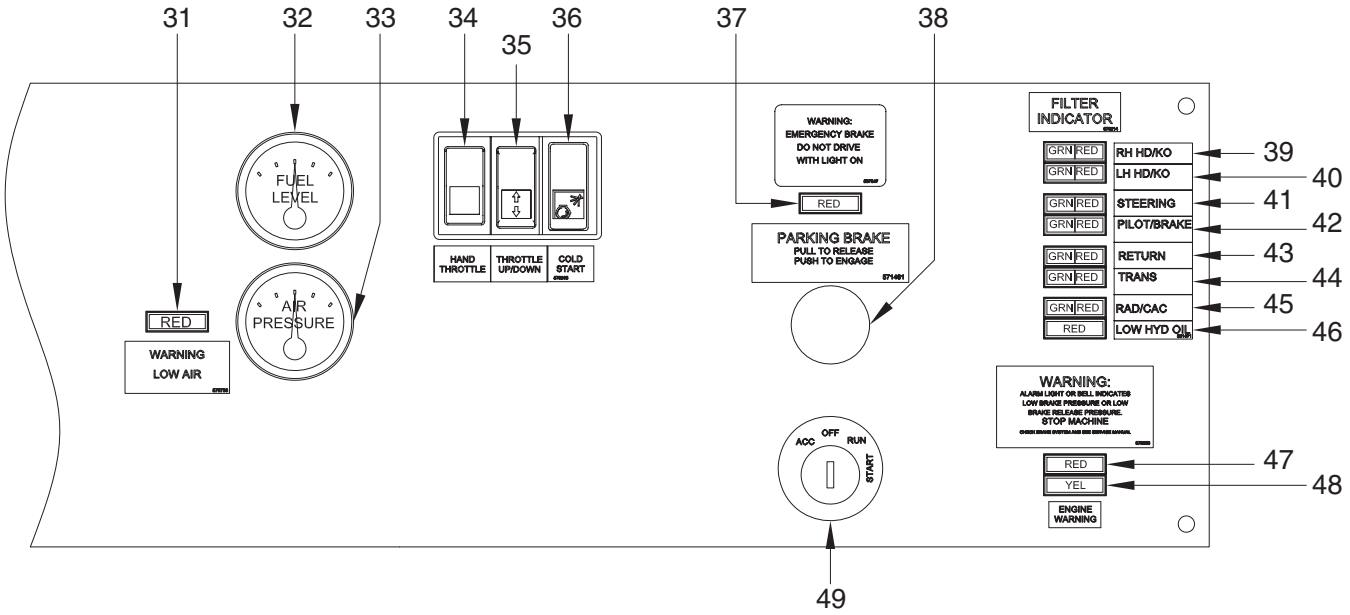


Figure 3-4 Instrument Panel, Right Side (prior to 6/1/2012)

3.2 Operator's Instrument Panel (Standard Cab With All Options Prior to 6/1/2012 continued)

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

31. 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.

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

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

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

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

36. Cold Start Control Switch
This controls a measured amount of ether to the intake manifold to aid cold engine starting.

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

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

NOTICE

DO NOT apply parking brakes when the machine is moving. Damage to components can occur.

39. RH HD/KO (Holddown/Kickoff)Filter Indicator Lights*

40. LH HD/KO (Holddown/Kickoff) Filter Indicator Lights*

41. Steering System Filter Indicator Lights*

42. Pilot/Brake System Filter Indicator Lights*

43. Return Filter Indicator Lights*

44. Transmission Cooler Indicator Lights (Option)*

* These lights indicate the condition of the high pressure supply filters. With the machine running and at operation temperature, the green lights should be on. If the red light(s) come on and stay on, filter service is required.

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

46. 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.

47. 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.

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

49. 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.

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

51. Circuit Breakers (Standard Cab Only)
Electrical Circuit protection. Push to reset. Located under dash on left side.

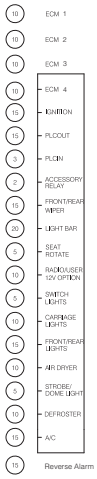


Figure 3-5 Circuit Breakers

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

53. A/C Temperature Control
To turn the air conditioner on, turn the knob clockwise. When A/C is operating, turn knob clockwise to decrease air temperature. Adjust temperature with knob.

54. Air Control (Option)
Pull knob to recirculate air. Push know for fresh air.

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

56. Heater/Air Conditioner
Three position switch: HEAT, OFF and A/C

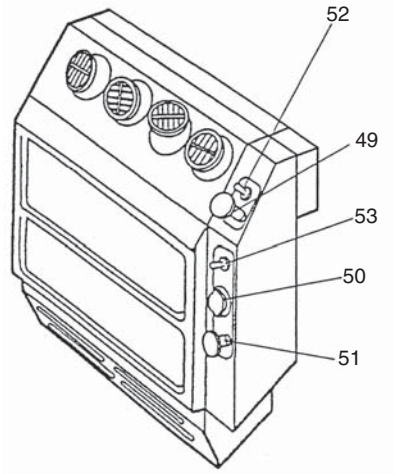


Figure 3-6 Air Conditioner Controls

57. Rear Wiper, Delay (Option)
Four position: Off-Intermittent-Low-High

58. Front Wiper, Delay (Option)
Four position: Off-Intermittent-Low-High

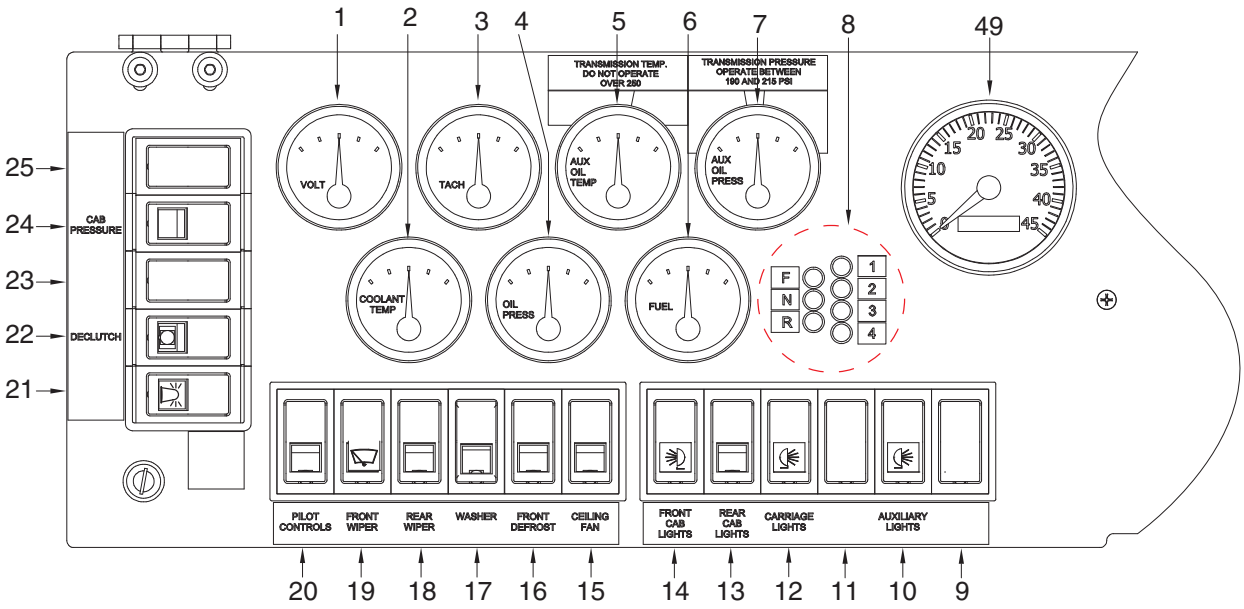


Figure 3-7 Instrument Panel, Left Side (effective 6/1/2012)

3.3 Operator's Instrument Panel (effective 6/1/2012)

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

1. Voltmeter
The voltmeter indicates the operating voltage of the electrical system - whether the alternator is or isn't charging. The numbers indicate volts (acceptable range is 24-28 volts).

2. Engine Coolant Temperature Gauge
Displays engine coolant temperature. If the temperature holds steady at 230°F/110°C or higher, 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 Oil Temperature Gauge
Displays converter oil temperature. This gauge should read below 250° F/121°C If the temperature exceeds the maximum allowance, discontinue operation and report to appropriate service personnel.

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

7. 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.

8. Transmission Controller Indicator Lights

"R" Reverse
Light is on when Transmission Controller is in the reverse position.

"N" Neutral Indicator Light
Light is on when Transmission Controller is in the neutral position. The Light will flash when Declutch is activated.

"F" Forward Indicator Light
Light is on when Transmission Controller is in the forward position.

"1" First Gear Indicator Light
Light is on when Transmission is in first gear.

"2" Second Gear Indicator Light
Light is on when Transmission is in second gear.

"3" Third Gear Indicator Light
Light is on when Transmission is in third gear.

"4" Fourth Gear Indicator Light
Light is on when Transmission is in fourth gear.

9. **Blank**

10. **Auxiliary Lights**
ON / OFF switch for auxiliary lights.

11. **Blank**

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

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

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

15. **Ceiling Fan (located behind operator)**
ON / OFF switch
Three position switch located on fan: Low-Off-High

16. **Defroster Fan Switch (window mounted fan)**
ON / OFF switch
Three position switch located on fan: Low-Off-High

17. **Washer**
Two Position: Rear-Off-Front

18. **Rear Windshield Wiper ON / OFF Switch**
Three position: Off-Low-High

19. **Front Windshield Wiper ON / OFF Switch**
Three position: Off-Low-High

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

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

22. **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.

23. **Blank**

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

25. **Blank**

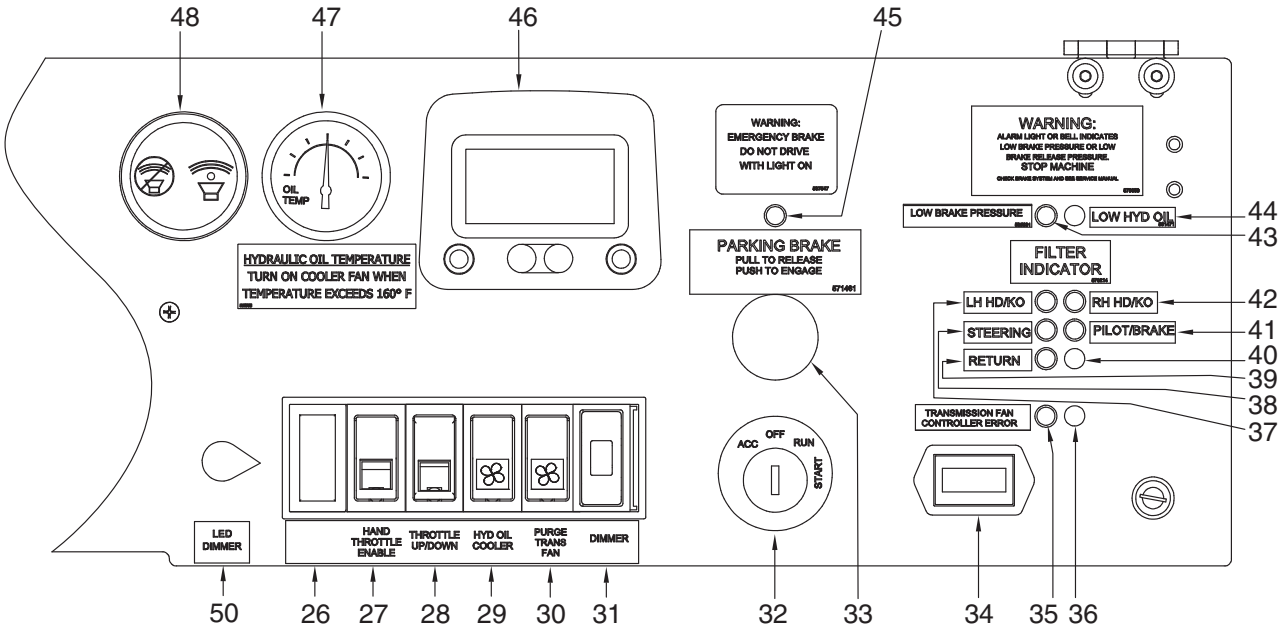


Figure 3-8 Instrument Panel, Right Side (Standard Cab effective 6/1/2012)

3.3 Operator's Instrument Panel (effective 6/1/2012 continued)

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

26. Blank

27. Hand Throttle Enable
Over rides foot throttle. To engage flip switch into the on position. Used with item 28.

28. Throttle UP/DOWN
Adjusts RPM's up or down when adjacent switch (item 27) is engaged.

29. Hydraulic Oil Cooler Purge
Three position: Off-On-Purge
When purge is pressed, the switch signals the fan controller to reverse the fan direction to blow debris off the front of the oil cooler. This is a momentary switch and should be pressed and held for approximately 10 seconds.

30. Purge Trans Fan
Depressing this momentary switch reverses the fan direction to blow debris off the front of the radiator. This is an automatic 12 second cycle after which the fan will return to its normal direction and operation.

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

32. 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.

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

34. Hour Meter
Displays time the machine has been powered on.

35. Blank

36. Blank

37. LH HD/KO (Holddown/Kickoff) Filter Indicator Light*

38. Steering Filter Indicator Light*

39. Return Filter Indicator Light*

40. Blank

41. Pilot/Brake Filter Indicator Light*

42. RH HD/KO (Holddown/Kickoff) Filter Indicator Light*

* These lights indicate the condition of the high pressure supply filters. With the machine running and at operation temperature, the lights should be OFF. If the light(s) illuminate and stay on, filter service is required.

43. Low Brake Pressure Indicator Light
Light is on when brake pressure is too low.

44. Blank

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

46. 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. Refer to appendix in back of this manual for operating instructions.

47. Hydraulic Oil Temperature Gauge
Displays hydraulic oil temperature. Do Not operate machine in production use until hydraulic oil temperature has reached operating temperature (70°F /21°C or higher). See Normal Engine Start-Up in Section 5).

48. Audible Alarm
Audible alarm sounds when signaled by the PowerView.

49. Speedometer
Displays speed of vehicle in miles per hour (mph) and kilometers per hour (kp/h).

50. Dimmer
Twist to adjust LED light level.

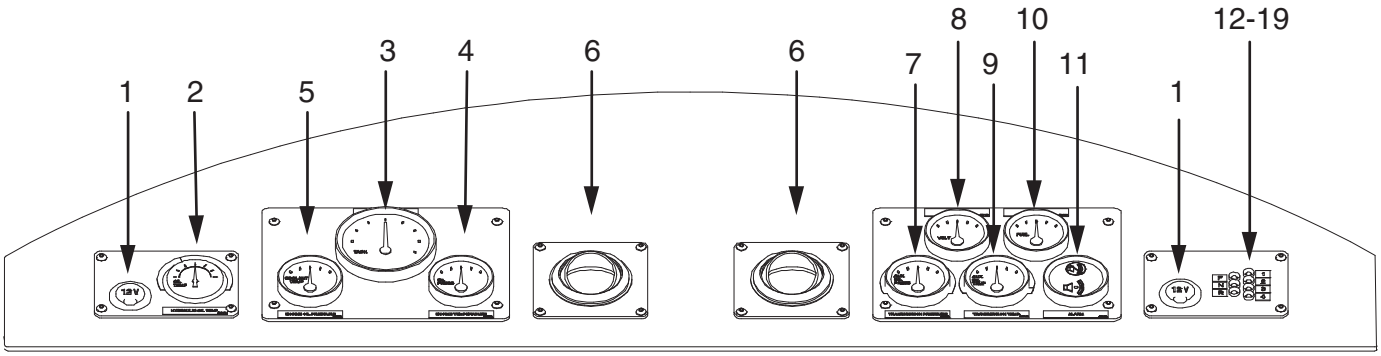


Figure 3-9 Dashboard Instrument Panel

3.4 Operator's Instrument Panel

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

1. **12 V Power Outlet**
   Power for accessories.

2. **Hydraulic Oil Temperature Gauge**
   Displays hydraulic oil temperature. Do not operate machine until hydraulic oil temperature has reached operating temperature (70°F /21°C to 160°F/71°C). See Normal Engine Start-Up in Section 5.

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 Coolant Temperature**
   Displays engine coolant temperature. If the temperature holds steady at 230°F/110°C or higher, 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.

5. **Oil Pressure**
   Displays engine lubricating oil pressure. Determines pressure only - not amount.

6. **Louver (Heater/Air Conditioner**
   Adjustable air louvers for heater/air conditioner.

7. **Auxiliary (Transmission) Oil Pressure**
   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.

8. **Volt Meter**
   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 24-28 volts).

9. **Auxiliary Oil Temperature**
   Displays converter oil temperature. This gauge should read below 250° F/121°C. If the temperature exceeds the maximum allowance, discontinue operation and report to appropriate service personnel.

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

11. **Audible Alarm**
    Audible alarm sounds when signaled by the PowerView.

12. **Key Switch Start (Not Illustrated)**
    The key switch (located on dash or steering column) 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.

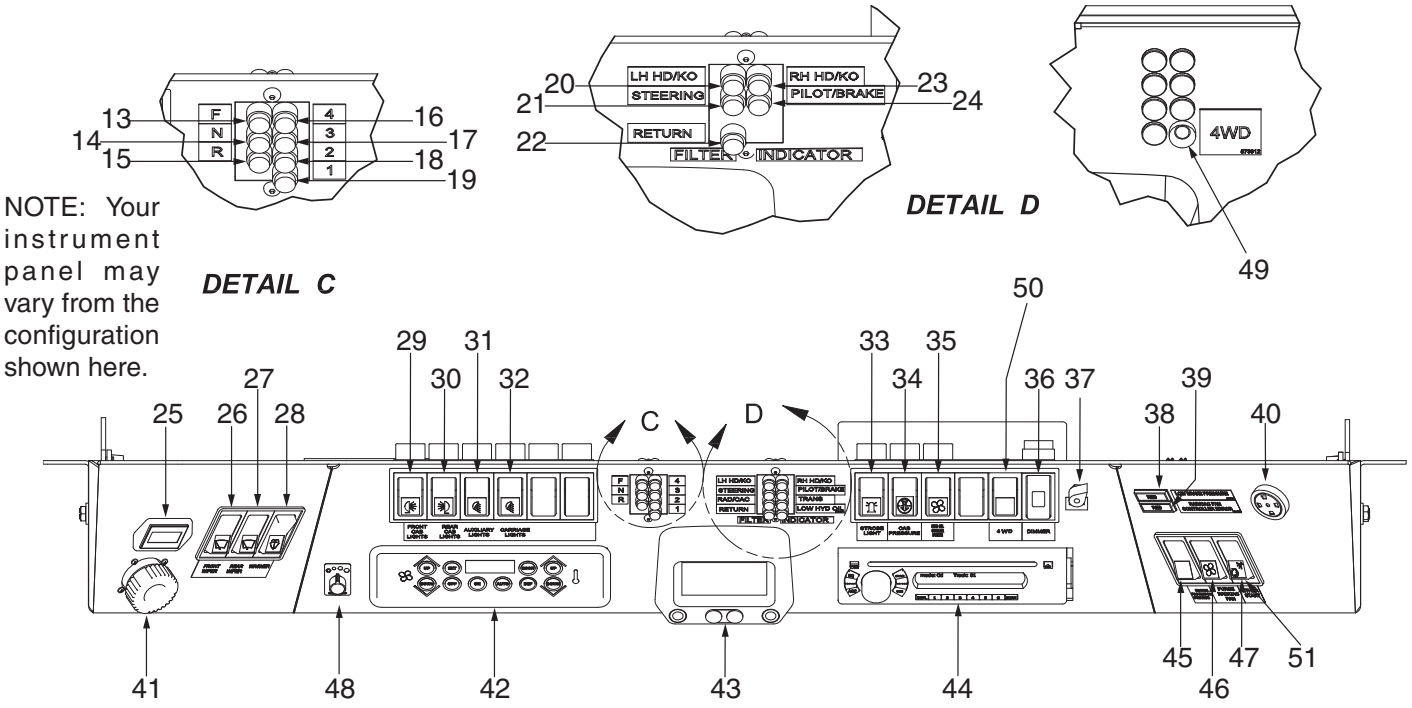


Figure 3-10 Overhead Instrument Panel

13. "F" Forward Indicator Light
Light is on when Transmission Controller is in the forward position.

14. "N" Neutral Indicator Light
Light is on when Transmission Controller is in the neutral position. The Light will flash when Declutch is activated.

15. "R" Reverse
Light is on when Transmission Controller is in the reverse position.

16. "4"Fourth Gear Indicator Light
Light is on when Transmission is in fourth gear.

17. "3" Third Gear Indicator Light
Light is on when Transmission is in third gear.

18. "2" Second Gear Indicator Light
Light is on when Transmission is in second gear.

19. "1" First Gear Indicator Light
Light is on when Transmission is in first gear.

20. LH HD/KO (Holddown/Kickoff) Filter Indicator Light*

21. Steering Filter Indicator Light*

22. Return Filter Indicator Light*

23. RH HD/KO (Holddown/Kickoff) Filter Indicator Light*

24. Pilot/Brake Filter Indicator Light*

*These optional lights indicate the condition of the high pressure supply filters. With the machine running and at operation temperature, the lights should be OFF. If the light(s) illuminate and stay on, filter service is required.

25. Hour Meter
Displays time the machine has been powered on.

26. Front Wiper Switch
Three position: OFF-Low-High

26B. Front Wiper Knob
Four position: OFF-Intermittent-Low-High

27. Rear Wiper Switch
Three position: OFF-Low-High

27B. Rear Wiper Knob
Four position: OFF-Intermittent-Low-High

28. Washer
Two position: Front - Rear

29. Front Cab Lights
OFF/ON switch for front cab lights.

30. Rear Cab Lights
OFF/ON switch for rear cab lights.

31. Auxiliary Lights
OFF/ON

32. Carriage Lights
ON / OFF switch for carriage lights.

33. Strobe Light
ON / OFF switch for cab mounted strobe.

34. Cab Pressure
When ON, the back wall cab pressurizer provides pressurized filtered air from outside to the cab, which keeps contaminates out.

35. Hydraulic Oil Cooler Purge
Three position: Off-On-Purge
When purge is pressed, the switch signals the fan controller to reverse the fan direction to blow debris off the front of the oil cooler. This is a momentary switch and should be pressed and held for approximately 10 seconds.

36. Dimmer
Twist to adjust LED light level.

37. Dimmer
Scroll for adjusting instrument light level.

38. Low Brake Pressure Indicator Light
Light is on when brake pressure is too low.

39. RAD/CAC Fan Controller Error Indicator Light
Light is on when the fan controller has discovered an error.

40. Audible Alarm
An audible alarm will sound when brake pressure is too low.

41. ECM Communications Port

42. Cab Environmental Controls
Controls Heat / Air Conditioning

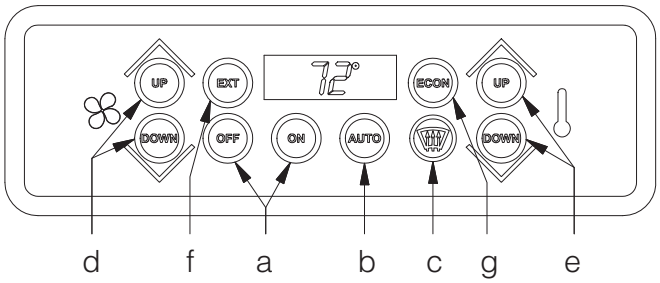


Figure 3-11 Cab Environmental Controls

a. ON/OFF
Powers vehicle Heater-AC control system on or off. The LED numeric display is illuminated when the unit is turned on. The display will show the current set point temperature.

b. AUTO
Places the system in a fully automatic temperature control mode including automatic fan speed control. A panel light indicates when this mode is active. The system will adjust the blower fan speed to the lowest setting necessary to maintain the cab temperature at the displayed set point temperature,.

c. DEF (Defrost Icon)
Energizes the AC system to allow for rapid dehumidification of the cab. The AC will be enabled even if the set point temperature requires heat. A panel light indicates when this mode is active.

d. FAN UP/DOWN
Overrides the automatic fan speed control feature. Increments fan speed up or down in 11 steps. The digital display indicates the fan speed setting as a percentage or “HI” when maximum fan speed is reached or “LO” when minimum fan speed is reached then returns to normal display 5 seconds after either key is depressed. The set point fan speed is maintained until it is changed or if the AUTO key is depressed.

e. TEMPERATURE UP/DOWN
Increments the set point temperature up or down. The system will control the electronic water valve and/or the AC compressor clutch to hold the cab temperature as closely as possible to the set point temperature.

f. EXT (External Temperature)
When depressed displays the outside temperature as measured by the outside air sensor. The outside temperature will be displayed for a duration of 5 seconds then return to displaying the set point temperature.

g. ECON (Economy Mode)
When depressed, locks out the AC function. The control uses only fresh air, fan speed, and water valve control to maintain the set point temperature. Depressing the ECON key again will return the system back to normal operation. A panel light indicates when this mode is active.

43. 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. Refer to appendix in back of this manual for operating instructions.

NOTICE

If any arc welding is to be carried out on the machine's structure, it is extremely important that the battery disconnect switch be turned OFF, ECM and Radiator Fan Controller be disconnected to prevent severe damage to the electrical system. The Battery Disconnect Switch is located in the battery box on the left side of the Lumberjack (see Section 6 for more information)

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

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

44. CD Player (Option)

45. Engine Protection Override Switch (optional)
The engine protection override switch allows the driver to delay engine shutdowns when a condition more critical than engine destruction exists during the engine shutdown warning period initiated by the engine protection feature.

Pressing and releasing the engine protection override switch resets the shutdown timer to 30 seconds.

46. Purge RAD/CAC Fan
When ON, this switch signals the fan controller to reverse the fan direction to blow debris off the front of the radiator. The fan will return to its normal direction after approximately 10 seconds. This is a momentary switch and only needs to be depressed briefly.

47. Ether Start
This control supplies a measured amount of ether to the intake manifold to aid cold engine starting.

48. Overhead A/C Fan Control
Off/On - Low -Medium - High

49. 4WD Indicator Light (Option)
Four Wheel Drive indicator light will illuminate when 4WD switch is in ON position.

50. 4WD OFF/ON Switch (Option)
Engine power is transmitted to all four wheels, in all gears, when 4WD switch is in the ON position.

NOTE: Standard 4WD machines operate in 4WD in 1st and 2nd gears, and 2WD in 3rd and 4th gears.

51. Turbo Delayed Shutdown Switch (Option)
With the turbo delayed shutdown switch "ON" while turning the ignition switch to off, the engine will not shut down until the exhaust temperature at the turbo cools and reaches a preset temperature.

If it is required to shut down the engine prior to the turbo cooling to the preset temperature, shutdown can be accomplished immediately by switching the turbo delay shutdown switch and ignition switch to the "OFF " position.

Note: The switch backlight will illuminate when the exhaust temperature at the turbo is above the preset temperature.

3.5 Fuses and Circuit Breakers

52. Electrical Protection

Push to reset. Circuit breakers are located on the back panel behind operators seat. Fuse amperage is noted on decal.

10	Engine ECM 1	10	Engine ECM 3
15	Engine ECM 2	20	Wiper
5	Fan Control	15	Filter Indicators
15	Ignition	15	Ether Relay
10	Radio / 12 V Options	15	Panel Lights
5	Strobe Dome	20	Lights
10	Trans/Impliments	20	Auxiliary Lights
10	HYD Oil Cooler	30	HVAC
2	Accessory Relay	10	Engine ECM 4
10	Reverse Alarm	10	Seat Rotate

Figure 3-12 Circuit Breaker Panel

53. Dome Light Switch (Not Illustrated)

ON/OFF switch, mounted on the light.

3.6 Armrest Control & Joystick Options List By Serial Number

Model	Serial Number	Joystick Option	Description	Page #
L90C	039324	L105	Left Armrest Control Unit, 6 Lever	3-24
		R105	Right Armrest Control Unit	3-24
L90C	039325	L105	Left Armrest Control Unit, 6 Lever	3-24
		R105	Right Armrest Control Unit	3-24
L90C	039326	L106	Left Armrest Control Unit, 2 Button	3-25
		R103	Right Armrest Control Unit, 3 Button	3-21
L90C	039327	L103	Left Armrest Control Unit, 2 Button	3-20
		R103	Right Armrest Control Unit, 3 Button	3-21
L90C	039328	L103	Left Armrest Control Unit, 2 Button	3-20
		R103	Right Armrest Control Unit, 3 Button	3-21
L90C	039329	L103	Left Armrest Control Unit, 2 Button	3-20
		R103	Right Armrest Control Unit, 3 Button	3-21
L90C	039330	L103	Left Armrest Control Unit, 2 Button	3-20
		R103	Right Armrest Control Unit, 3 Button	3-21
L90F	047622	L104	Left Armrest Control Unit, 4 Button	3-22
		R104	Right Armrest Control Unit, 5 Button	3-22
L90F	047623	L106	Left Armrest Control Unit, 2 Button	3-25
		R103	Right Armrest Control Unit, 3 Button	3-21
L90S	039323	L102	Left Armrest Control Unit, 8 Button	3-18
		R102	Right Armrest Control Unit, 4 Button	3-19
L100	093202	L101	Left Armrest Control Unit, 6 Button	3-16
		R101	Right Armrest Control Unit, 2 Button	3-17
L100F	106336	L105	Left Armrest Control Unit, 6 Lever	3-24
		R105	Right Armrest Control Unit	3-24
L100F	106337	L106	Left Armrest Control Unit	3-25
		R105	Right Armrest Control Unit	3-24
L115F	113310	L104	Left Armrest Control Unit, 4 Button	3-22
		R104	Right Armrest Control Unit, 5 Button	3-22
L130F	045109	L103	Left Armrest Control Unit, 2 Button	3-20
		R103	Right Armrest Control Unit, 3 Button	3-21
L490S	057136	L104	Left Armrest Control Unit, 4 Button	3-22
		R104	Right Armrest Control Unit, 5 Button	3-22
L490S	057137	L104	Left Armrest Control Unit, 4 Button	3-22
		R104	Left Armrest Control Unit, 4 Button	3-22

L101 (Left Armrest Control Unit, 6 Button)

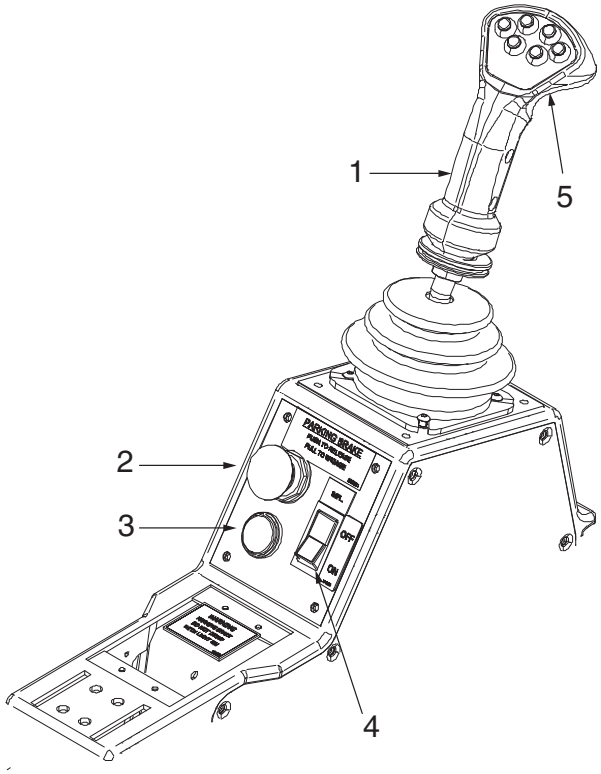


Figure 3-13 Left Armrest Control Console

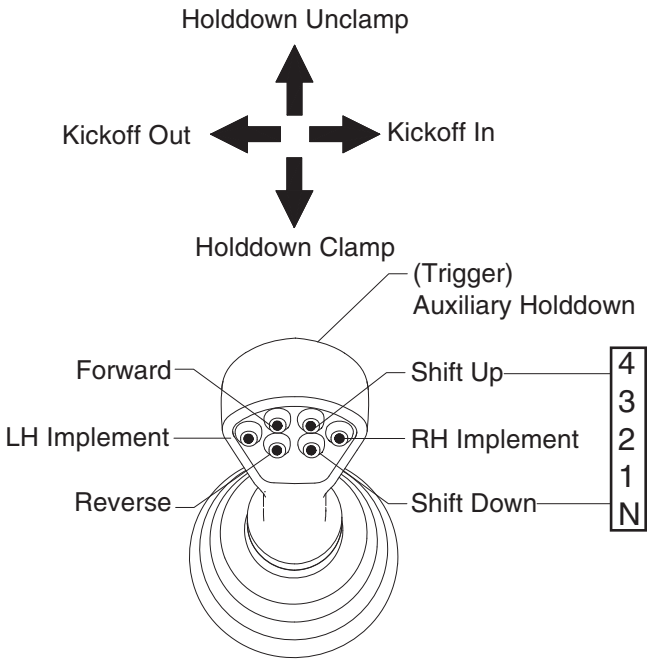


Figure 3-14 Holddown and Kickoff Joystick

1. **Shift Joystick**
   Joystick control for holddown and kickoff. Use buttons for the following (See Figure 3-14):
   - Push joystick forward to unclamp Holddowns.
   - Pull joystick back to clamp Holddowns.
   - Push joystick right to move Kickoff forward.
   - Push joystick left to move Kickoff back.
   - Push left button to control LH Implement.
   - Push left top center button to shift Forward.
   - Push left center bottom button to shift Reverse.
   - Push right button to control RH Implement.
   - Push right top center button to shift Up.
   - Push right center bottom button to shift Down.
   - Push right center bottom button and hold (.5 seconds or until (N) indicator light is illuminated) to shift from any gear directly to neutral.
   - Press and hold the LH Implement button while operating the joystick to control the left Kickoff/ Holdown arm only.
     Press and hold the RH Implement button while operating the joystick to control the right Kickoff/Holdown arm only.

2. **Parking Brake**
   To apply the parking brakes, pull the button out. To release the brakes, push the button in.

NOTICE

DO NOT apply parking brakes when the machine is moving. Damage to components can occur.

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

4. **Implement Control - ON / OFF Switch**
   Place this switch in the OFF position when there is any danger of inadvertently moving the implement control levers during service or repair while the engine is running. Place the switch in the OFF position before leaving the cab. With the switch in the OFF position, the implement controls are shut off, including optional bucket float feature.

⚠ CAUTION

Always place the Implement Control Switch in the OFF position while the engine is running before leaving the cab and performing any service work.

NOTE: Your Lumberjack will either be equipped with a multiple button controller mounted on the left armrest, as shown Figure 3-14 (Option A), or a two button controller on the left armrest, as shown as shown in Figure 3-17.

5. Auxiliary Holddown (Option)
Hold trigger in while pushing or pulling joystick to extend or retract Auxiliary Holddown.

R101 (Right Armrest Control Unit, 2 Button)

6. Boom and Carriage Tilt Joystick
Joystick control for Carriage and Boom. Use buttons for rotating seats (See Figure 3-16).

- Push the joystick forward to lower hoist.
- Pull the joystick back to raise hoist.
- Move the joystick right to tilt carriage out.
- Move the joystick left to tilt carriage back.
- Push the left button to rotate seat left.
- Push the right button to rotate seat right.

7. Declutch
If the control is activated, 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.

8. Throttle UP/DOWN
Adjusts RPM's up or down when adjacent switch (item 8) is engaged.

9. Hand Throttle Switch On/Off
Over rides foot throttle. To engage flip switch into the on position. Used with item 7.

NOTE: For engine warm up only.

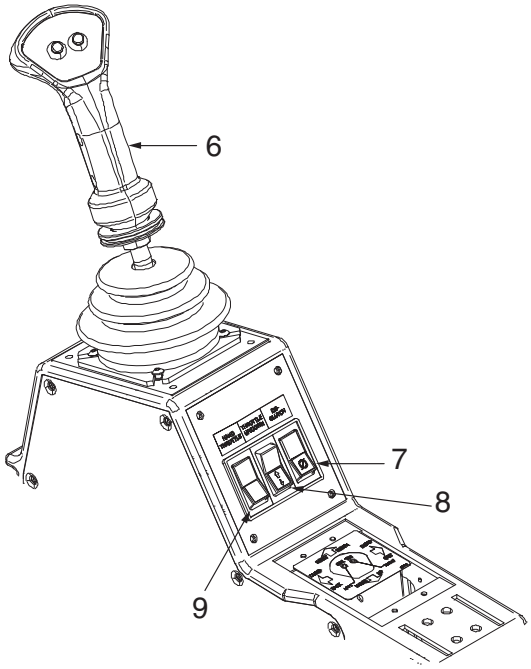


Figure 3-15 Right Armrest Control Unit

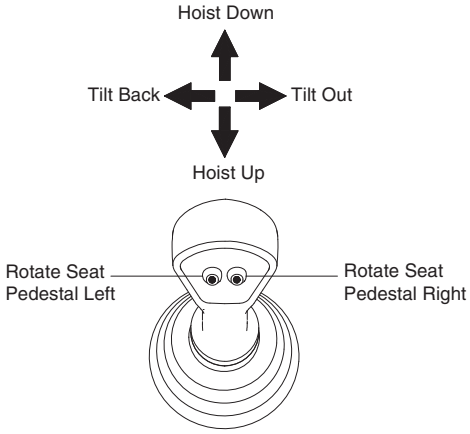


Figure 3-16 Boom and Carriage Joystick Detail

L102 (Left Armrest Control Unit, 8 Button)

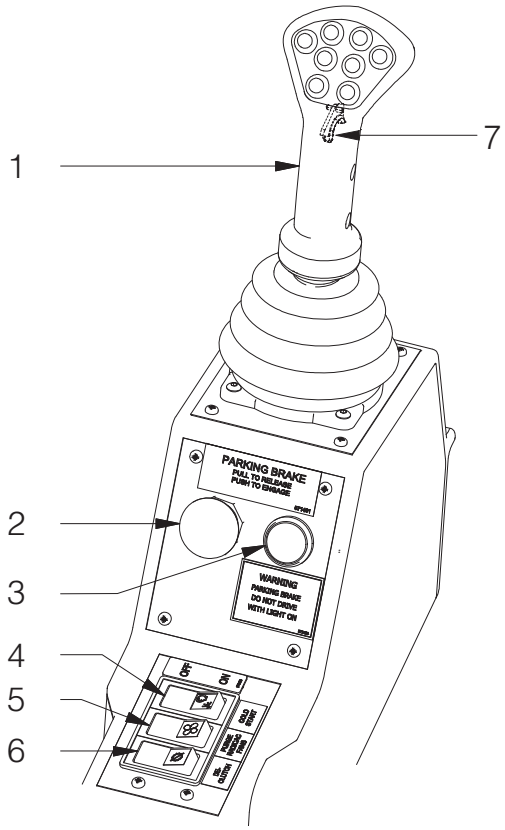


Figure 3-17 Left Armrest Control Unit

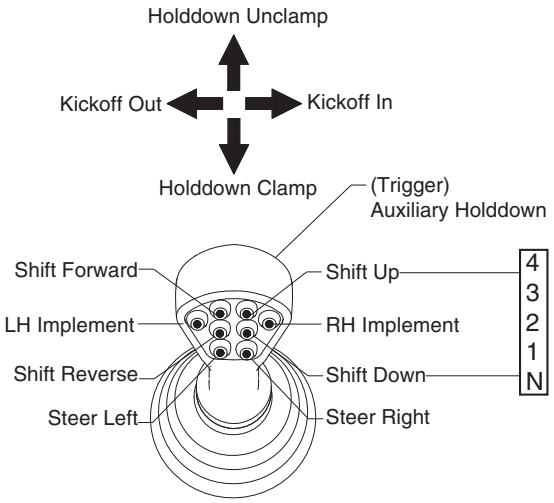


Figure 3-18 Shift/Steer Joystick Detail

1. Shift/Steer Joystick
(See Figure 3-18).

- Push joystick forward to unclamp Holddowns.
- Pull joystick back to clamp Holddowns.
- Push joystick right to move Kickoff IN.
- Push joystick left to move Kickoff OUT.
- Push left button to control LH Implement.
- Push left top center button to shift Forward.
- Push left center middle button to shift Reverse.
- Push left bottom proportional button to steer left.
- Push right button to control RH Implement.
- Push right top center button to shift Up.
- Push right center middle button to shift Down.
- Push right center bottom button and hold to shift from any gear directly to neutral.
- Push right bottom proportional button to steer right.
- Press and hold the LH Implement button while operating the joystick to control the left Kickoff/ Holddown arm only.
  Press and hold the RH Implement button while operating the joystick to control the right Kick-off/Holddown arm only.

IMPORTANT! Always let up on the throttle slightly when shifting speed ranges. This will significantly reduce shock loads to drivetrain components during shift. Also, you should always reduce engine rpm when downshifting, as you can over-speed the engine.

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

NOTICE

DO NOT apply parking brakes when the machine is moving. Damage to components can occur.

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

4. Cold Start Control Switch
This control supplies a measured amount of ether to the intake manifold to aid cold engine starting.

5. Purge RAD/CAC Fan Switch
When ON, this switch reverses the fan direction to blow debris off the front of the radiator.

6. Declutch Control Switch
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.

7. Auxiliary Holddown (Option)
Hold trigger in while pushing or pulling joystick to extend or retract Auxiliary Holddown.

R102 (Right Armrest Control Unit, 4 Button)

NOTE: the right armrest control unit will raise to allow clearance for ingress and egress of the operator from the cab. Raise the cushioned armrest, and lift up on the right armrest controls unit. The implement controls will not function when the armrest control unit is raised.

8. Hand Throttle Switch On/Off
Over rides foot throttle. To engage flip switch into the on position. Used with item 9 (See Figure 3-19).

NOTE: For engine warm up only.

9. Hand Throttle Up/Down Switch
Adjusts RPM's up or down when adjacent switch (item 8, see Figure 3-19) is engaged.

10. Implement Control - Shut Off Switch
Place this switch in the OFF position when there is any danger of inadvertently moving the implement control levers during service or repair while the engine is running. Place the switch in the OFF position before leaving the cab. With the switch in the OFF position, the implement controls are shut off, including optional bucket float feature.

⚠ CAUTION

Always place the Implement Control Switch in the OFF position while the engine is running before leaving the cab and performing any service work.

11. Hoist and Carriage Tilt Joystick
(See Figure 3-20).
- Push joystick forward to lower hoist.
- Pull joystick back to raise hoist.
- Push joystick right to tilt carriage out.
- Push joystick left to tilt carriage back.
- Push the top left button to rotate Seat left.
- Push the top right button to rotate Seat right.
- Push left bottom button to steer left.
- Push right bottom button to steer right.

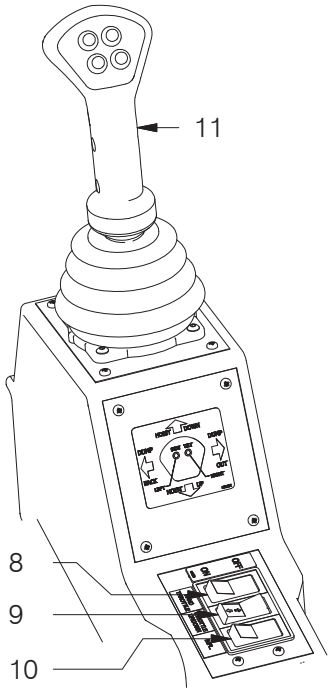


Figure 3-19 Right Armrest Control Unit

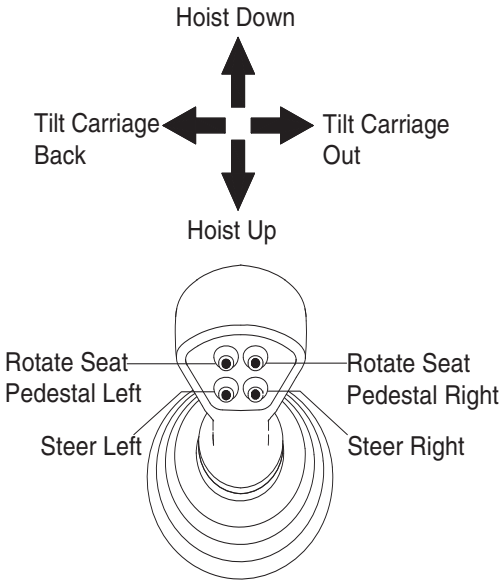


Figure 3-20 Hoist and Tilt Joystick Detail

L103 (Left Armrest Control Unit, 2 Button)

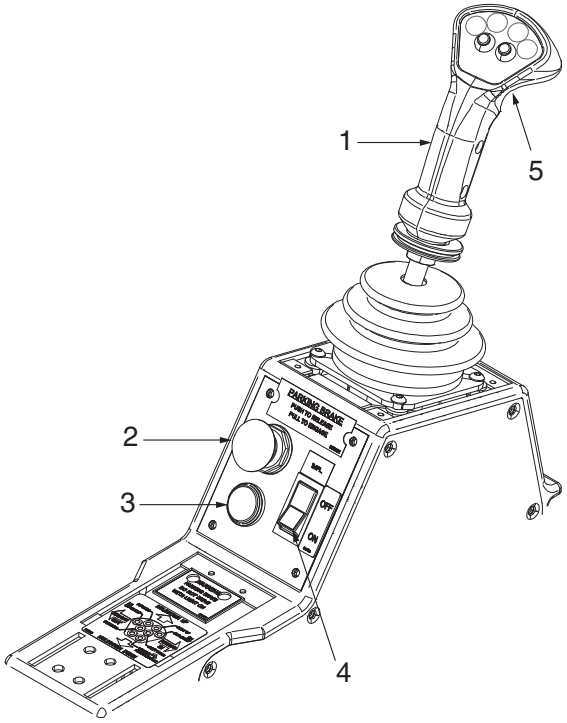


Figure 3-21 Left Armrest Control Unit

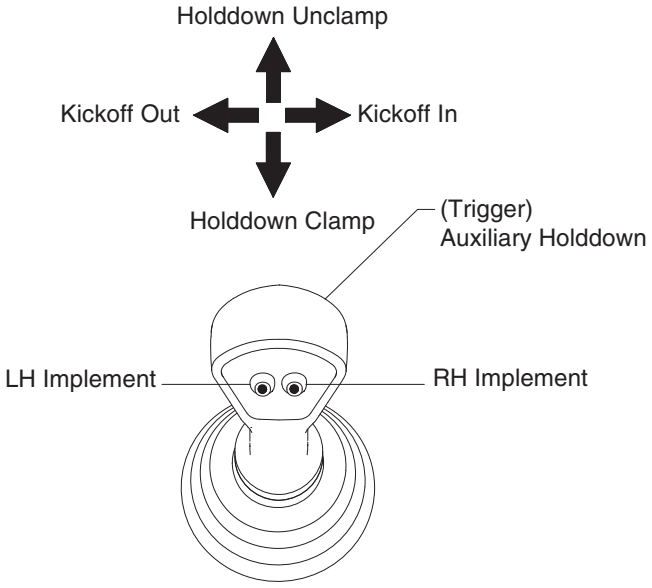


Figure 3-22 Holddown and Kickoff Joystick Detail

NOTE: the left armrest control unit will raise to allow clearance for ingress and egress of the operator from the cab. Raise the cushioned armrest, and lift up on the left armrest control unit. The implement controls will not function when the armrest control unit is raised.

1. Holddown and Kickoff Joystick
(See Figure 3-22)

- Push joystick forward to unclamp Holddowns.
- Pull joystick back to clamp Holddowns.
- Push joystick right to move Kickoff IN.
- Push joystick left to move Kickoff OUT.
- Press and hold the LH Implement button while operating the joystick to control the left Kickoff/ Holdown arm only.
  Press and hold the RH Implement button while operating the joystick to control the right Kick-off/Holdown arm only.

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

NOTICE

DO NOT apply parking brakes when the machine is moving. Damage to components can occur.

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

4. Cold Start Control Switch
This control supplies a measured amount of ether to the intake manifold to aid cold engine starting.

5. Trigger - Auxiliary Holddown (Option)
Hold trigger in while pushing or pulling joystick to extend or retract Auxiliary Holddown.

R103 (Right Armrest Control Unit, 3 Button)

NOTE: the right armrest control unit will raise to allow clearance for ingress and egress of the operator from the cab. Raise the cushioned armrest, and lift up on the right armrest controls unit. The implement controls will not function when the armrest control unit is raised.

6. Boom and Carriage Tilt Joystick
(See Figure 3-24).

- Push joystick forward to lower Boom.
- Pull joystick back to raise Boom.
- Push joystick right to tilt Carriage forward.
- Push joystick left to tilt Carriage back.
- Push top right button to put transmission in neutral.
- Push bottom left button to rotate seat pedestal left.
- Push bottom right button to rotate seat pedestal right.

7. Declutch Control Switch
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.

8. Hand Throttle Switch On/Off
Over rides foot throttle. To engage flip switch into the on position. Used with item 9 (see Figure 3-23). NOTE: For engine warm up only.

9. Hand Throttle Up/Down Switch
Adjusts RPM's up or down when adjacent switch (item 8, see Figure 3-23) is engaged.

10. Trigger - Shift Gear/Change Direction of Travel

IMPORTANT! Always let up on the throttle slightly when shifting speed ranges. This will significantly reduce shock loads to drivetrain components during shift. Also, you should always reduce engine rpm when downshifting, as you can over-speed the engine.

To start shift sequence, release parking brake, apply service brake for one second while shifting into 1st forward or 1st reverse.

Gear and directional shifts (see Figure 3-23) are controlled by rolling the trigger down (forward) and rolling the trigger up (reverse).

Direction shift only allowed with service brake applied for one second from neutral.

For immediate shifting from forward to reverse, or reverse to forward while in 2nd, 3rd or 4th gear: Roll the trigger down and hold while in reverse or up and hold while in forward for approximately one second (with both the brake activated for one second and throttle at idle for one second) to downshift and change direction. The transmission will downshift one gear immediately, then change direction after 0.6 seconds.

Shift to neutral by activating parking brake or pressing the neutral button on the joystick.

Note: Shift sequence program changed starting with model L490S-137 (sn 057137) - Date 12/2013. Changes: *Once in the gear sequence, shifting from first gear forward to first gear reverse is possible regardless of brake or throttle inputs.*

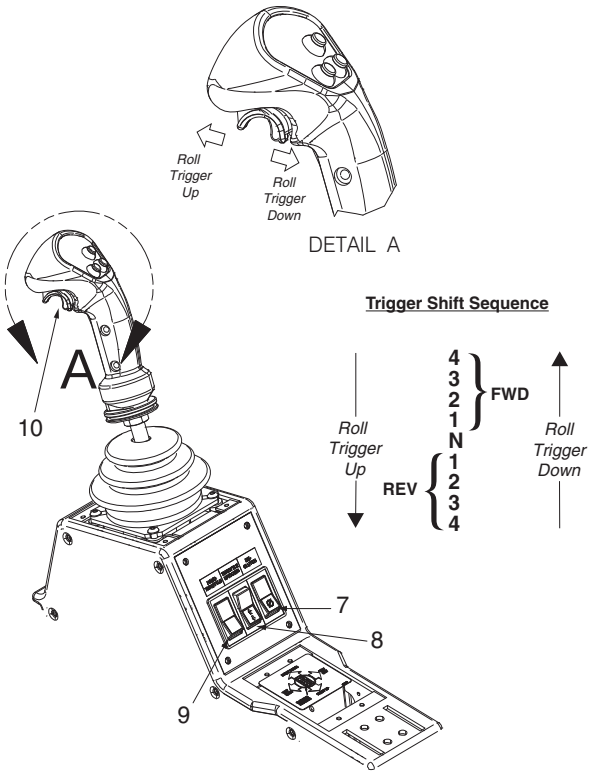


Figure 3-23 Right Armrest Control Unit

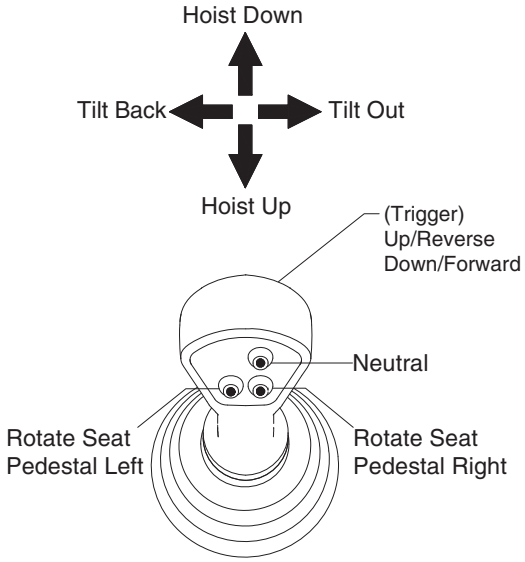


Figure 3-24 Boom and Carriage Joystick Detail

L104 (Left Armrest Control Unit, 4 Button)

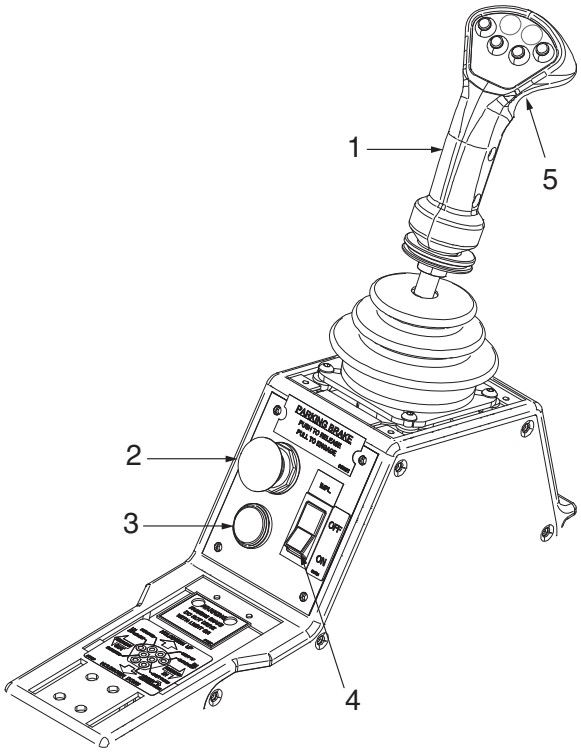


Figure 3-25 Left Armrest Control Unit

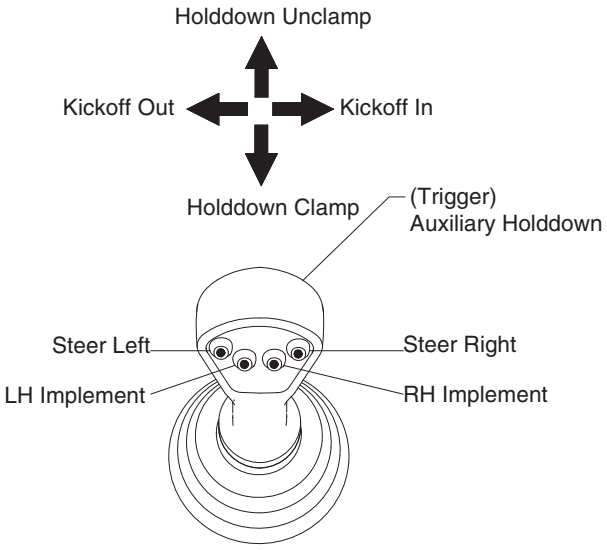


Figure 3-26 Holddown and Kickoff Joystick Detail

NOTE: the left armrest control unit will raise to allow clearance for ingress and egress of the operator from the cab. Raise the cushioned armrest, and lift up on the left armrest control unit. The implement controls will not function when the armrest control unit is raised.

1. **Holddown and Kickoff Joystick**
   (See Figure 3-26)

   - Push joystick forward to unclamp Holddowns.
   - Pull joystick back to clamp Holddowns.
   - Push joystick right to move Kickoff IN.
   - Push joystick left to move Kickoff OUT.
   - Press and hold the LH Implement button while operating the joystick to control the left Kickoff/ Holdown arm only.
     Press and hold the RH Implement button while operating the joystick to control the right Kick-off/Holdown arm only.
   - Push left top proportional button to steer left.
   - Push right top proportional button to steer right.

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

NOTICE

DO NOT apply parking brakes when the machine is moving. Damage to components can occur.

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

4. **Cold Start Control Switch**
   This control supplies a measured amount of ether to the intake manifold to aid cold engine starting.

5. **Trigger - Auxiliary Holddown (Option)**
   Hold trigger in while pushing or pulling joystick to extend or retract Auxiliary Holddown.

R104 (Right Armrest Control Unit, 5 Button)

NOTE: the right armrest control unit will raise to allow clearance for ingress and egress of the operator from the cab. Raise the cushioned armrest, and lift up on the right armrest controls unit. The implement controls will not function when the armrest control unit is raised.

6. **Boom and Carriage Tilt Joystick**
   (See Figure 3-28).
   - Push joystick forward to lower hoist.
   - Pull joystick back to raise hoist.
   - Push joystick right to tilt Carriage out.
   - Push joystick left to tilt Carriage back.
   - Push middle right button to put transmission in neutral.

- Push left top proportional button to steer left.
- Push right top proportional button to steer right.
- Push bottom left button to rotate seat pedestal left.
- Push bottom right button to rotate seat pedestal right.

7. Declutch Control Switch
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.

8. Hand Throttle Switch On/Off
Over rides foot throttle. To engage flip switch into the on position. Used with item 9 (see Figure 3-27).

NOTE: For engine warm up only.

9. Hand Throttle Up/Down Switch
Adjusts RPM's up or down when adjacent switch (item 8, see Figure 3-27) is engaged.

10. Trigger - Shift Gear/Change Direction of Travel

IMPORTANT! Always let up on the throttle slightly when shifting speed ranges. This will significantly reduce shock loads to drivetrain components during shift. Also, you should always reduce engine rpm when downshifting, as you can over-speed the engine.

To start shift sequence, release parking brake, apply service brake for one second while shifting into 1st forward or 1s reverse.

Gear and directional shifts (see Figure 3-23) are controlled by rolling the trigger down (forward) and rolling the trigger up (reverse).

Direction shift only allowed with service brake applied for one second from neutral.

For immediate shifting from forward to reverse, or reverse to forward while in 2nd, 3rd or 4th gear: Roll the trigger down and hold while in reverse or up and hold while in forward for approximately one second (with both the brake activated for one second and throttle at idle for one second) to downshift and change direction. The transmission will downshift one gear immediately, then change direction after 0.6 seconds.

Shift to neutral by activating parking brake or pressing the neutral button on the joystick.

Note: Shift sequence program changed starting with model L490S-137 (sn 057137) - Date 12/2013. Changes: *Once in the gear sequence, shifting from first gear forward to first gear reverse is possible regardless of brake or throttle inputs.*

11. Brake Buttons (Option)
This feature is useful when more traction is needed. Press and hold the corresponding right or left brake button to apply pressure to the brake of the spinning wheel and transfer power to the opposite side to regain traction.

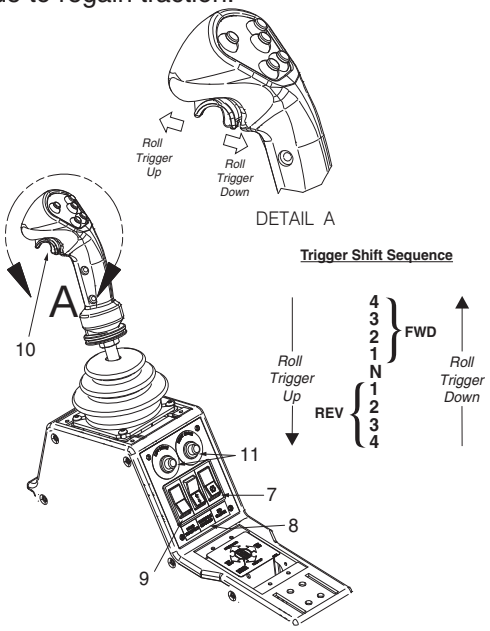


Figure 3-27 Right Armrest Control Unit

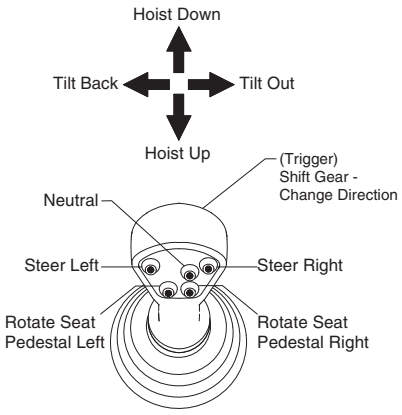


Figure 3-28 Hoist and Carriage Joystick Detail

L105 (Left Armrest Control Unit, 6 Lever)

1. **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.

2. **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.

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

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

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

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

7. **Auxiliary Holddown Arm On/Off Switch (Optional)**
   Toggle switch right to activate auxiliary holddown arms. Push holddown lever forward to open the auxiliary holddown arm, pull the lever back to close the auxiliary holddown arm. Toggle switch left to de-activate auxiliary holddown arms.

   NOTE: Your Controls may vary from the configuration shown here.

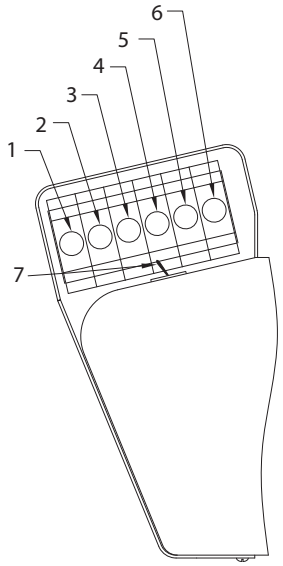


Figure 3-29 Holddown and Kickoff Controls

R105 (Right Armrest Control Unit)

1. **Hoist and Carriage Tilt Joystick**
   RH Joystick control for hoist and carriage tilt (see Figure 3-30).

   - Push joystick forward to lower Hoist.
   - Pull joystick back to raise Hoist.
   - Push joystick right to tilt Carriage forward.
   - Push joystick left to tilt Carriage back.

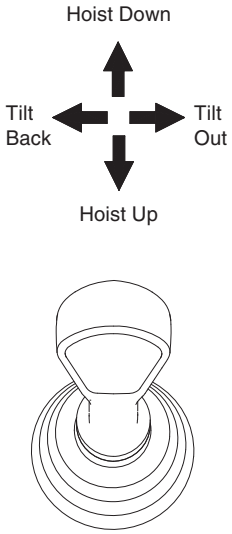


Figure 3-30 Hoist and Carriage Joystick Detail

L106 (Left Armrest Control Unit)

1. Holddown and Kickoff Joystick

LH Joystick control for Holddown and Kickoff (see Figure 3-31).

- Push joystick forward to unclamp Holddown.
- Pull joystick back to clamp Holddown.
- Push joystick right to move Kickoff in.
- Push joystick left to move Kickoff out.
- Press and hold the Left Only button while operating the joystick to control the left Kickoff/ Holdown arm only.
  Press and hold the Right Only button while operating the joystick to control the right Kickoff/ Holdown arm only.

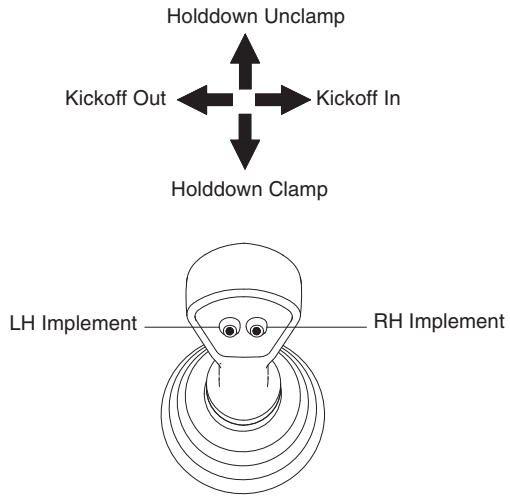


Figure 3-31 Holddown and Kickoff Joystick Detail

3.7 Steering Column and Pedals

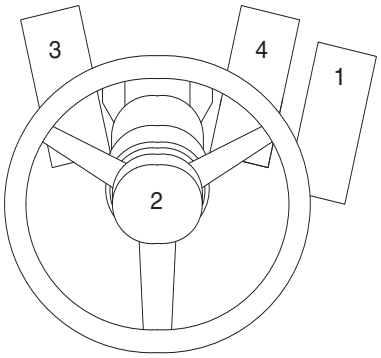


Figure 3-32 Steering and Pedals (Option)

1. **Accelerator Pedal**
   Foot-controlled engine accelerator pedal.

2. **Steering Wheel and Column**

3. **Brake Pedal**
   Will also declutch the transmission if the declutch control is engaged.

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

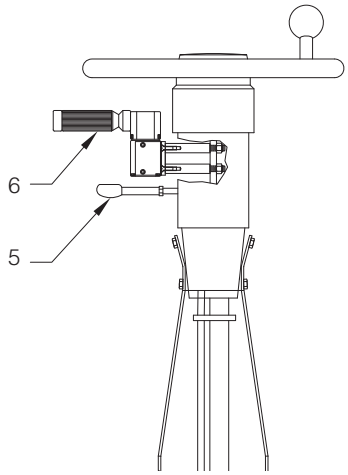


Figure 3-33 Transmission and Column Controls

5. **Tilt/Telescope 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.

   NOTE: For better egress, tilt steering column forward and telescope up.

Transmission Controller (Option)

6. **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.

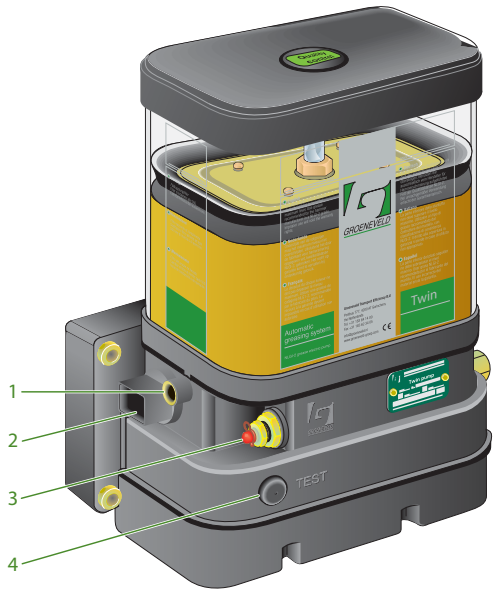
7. **Key Switch Start**
   The key switch (located on dash or steering column) is used to start and stop the engine and to turn the accessories on and off. This is a four position switch: ACC, OFF, RUN and START. When turning the key clockwise from the center, or OFF position, the first position to the 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.

3.8 Automated Greasing System (Option)

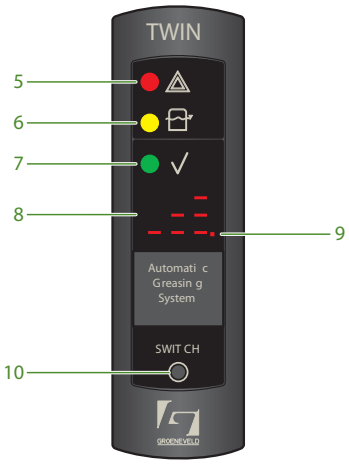
With an optional automated grease system, all connected grease points are lubricated automatically. For detailed operation and service information see 80-1052 (Groeneveld system) or 80-1088 (Lincoln system).

NOTICE

The automatic greasing system greatly reduces the time and effort for greasing the machine. However there are grease points that are not served by the automatic system and must be greased by hand. See section 6 Lubrication Points for more information.



Automatic Greasing System



1. Bleeding and grease overflow outlet
2. Electrical connector
3. Filler coupling with grease filter
4. Test Push-Button
5. Alarm indicator LED
6. Low grease level indecator LED
7. System activated indicator LED
8. 3-digit display
9. Decimal dot
10. Switch-button

Automatic Greasing System - Monitor

Figure 3-34 Automatic Greasing System

3.9 Operator Controls (Safety)

Figure 3-35 Fire Suppression System Shown with Automatic Detection and Activation System

Fire Suppression System
Two fire suppression system actuators are provided. Either one will set off the system. One is located to the right of the steering column, mounted to the right hand wall of the cab. The other is mounted on the chassis, at ground level, just to the left of the right side boarding ladder. Memorize the location of each. Many machines are equipped with an optional automatic fire detection and activation system, as shown in Figure 3-356.

In case of fire, pull the safety pin on the actuator, strike the button, and LEAVE THE VEHICLE. Fire retardant will be released, the engine will shut down and the batteries will be disconnected from the electrical system. After the system has discharged watch carefully for flare ups and spot fires. Notify the Fire Department and / or service personnel as soon as possible.

⚠ CAUTION

All maintenance and servicing should be performed by a qualified service technician from your local authorized service center for your fire suppression system.

Front Panel Indicators

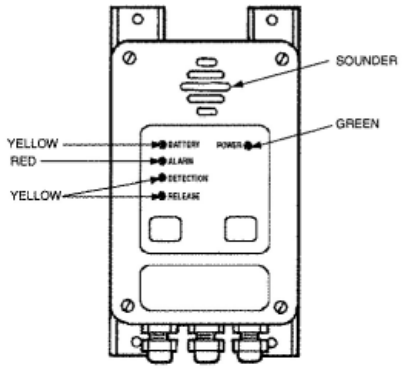


Figure 3-36 Control Module, Indicator Lights

Battery Trouble (Yellow)
LED pulses once every 10 seconds when indicating battery trouble.

The yellow battery trouble LED will pulse when a low power condition is detected in either of the connected supplies (internal or external). If only one power source is used, the control module will automatically ignore the unconnected circuit upon resetting the control module. If a power source is once connected and recognized, a subsequent loss of that power source will be recognized as a Battery Trouble condition. If a power source is once connected, recognized, and then disconnected, the disconnected supply can be ignored by operating the RESET button.

Power Normal (Green)
LED pulses once every 3 seconds when indicating normal power.

The green Power Normal LED pulses “on” once every 3 seconds indicating power is normal from both sources of input power. If the power drops below an acceptable level from either the internal or external source of input power, the green Power LED will be extinguished. If only one source of power is used, the green Power LED will extinguish when the voltage level drops below an acceptable level.

Alarm (Red)
The alarm LED will flash if an alarm condition exists. An alarm condition is caused by operation of the detection circuit or operation of the manual pull/pressure switch input circuit. The alarm condition will continue until the source of the alarm is removed and the control module is reset.

DETECTION CIRCUIT ACTIVATION MODE - Upon receipt of an input to the detection circuit, the Alarm LED and the sounder will pulse at a rate of 2 times per second and will continue at this rate until the first time delay period has expired.

After the first time delay, a second time delay mode is initiated. This causes the LED and sounder to pulse at a rate of 4 times per second.

After discharge, the LED and sounder will continue to pulse at a rate of 4 times per second for 30 seconds. After that, it will switch to the trouble mode and pulse once every 10 seconds.

ELECTRIC MANUAL RELEASE MODE - The first time delay mode will be by-passed and the LED will pulse at a rate of 4 pulses per second. After the time delay setting is reached, it will pulse another 30 seconds at the same rate. After that, the control module will go into the post-discharge mode, at which time the Alarm LED and Release LED will pulse at a rate of one pulse per 10 seconds.

PRESSURE SWITCH CIRCUIT (FEED BACK) ACTIVATED MODE - When this mode is actuated, the Alarm LED will pulse a minimum of 30 seconds at 4 pulses per second. The control module will then go into the post-discharge mode and the Alarm and Release LED will pulse at a rate of one pulse per 10 seconds.

Release Trouble (Yellow)
The Yellow Release LED and the audio will pulse at a rate of once every 10 seconds when a trouble condition is detected in the release circuit. The control module will return to normal when the trouble condition is cleared.

The Release Trouble will also pulse after the system has completed a discharge cycle or a pressure switch feed back signal has been received. The trouble signal in this condition is used to indicate a recharge of the fire suppression system is necessary. A Release Trouble under either of these conditions can only be cleared by resetting the control module.

Detection Trouble (yellow)
The Yellow Detection Trouble LED and the audio pulse once every 10 seconds when the control module detects a trouble in the detection circuit. The control module will automatically return to normal when the trouble is cleared.

Sounder (Audio)
The sounder gives the audio indication for all alarm and trouble outputs. The sounder will pulse at the same rate as the visual corresponding LED.

The sounder gives the audio indications of the various outputs. The sounder is rated at 85 dB at 2 ft (0.6 m).

The pulse rates are as follows:

Alarm - Time Delay 1 = 2 pulses per second
Time Delay 2 = 4 pulses per second

Trouble - 1 pulse per 10 seconds

Loss of Power - 1 pulse per 10 seconds

Release Circuit Fired - 4 pulses per second for 30 seconds, then 1 pulse per 10 seconds

Low Battery - 1 pulse per 10 seconds

Front Panel Buttons

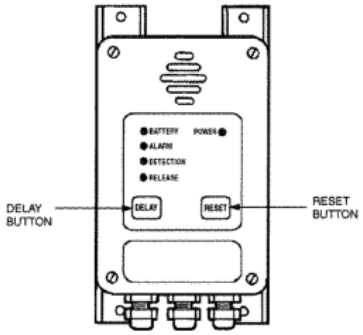


Figure 3-37 Control Module, Front Panel Buttons

Delay
Pushing the “DELAY” button during the first time delay cycle will restart the time delay cycle. If the second time delay cycle has already started, the “DELAY” button will have no effect.

The “DELAY” button can also be used to check the diagnostics function. By depressing the delay button when the system is in the trouble condition, the LEDs will flash a pattern code. Each pattern code indicates a certain type of trouble. The code pattern is prioritized. The first trouble must be fixed before addressing the next one. Once the first trouble is taken care of, depressing the “DELAY” button will cause the LEDs to indicate the code for the next trouble, if there is one. When the “DELAY” button is pressed, three short audio and visual indications will acknowledge the switch has been depressed properly.

In a post discharge condition, pressing the DELAY button will silence the alarm relay if the alarm relay has been programmed to silence.

Reset
The “RESET” button is used to re-initialize the control panel. When depressed, it provides an indication that all LEDs and the sounder are functional.

It is used to upload the manual programming into the control module.

If trouble(s) has not been cleared, the trouble indication will reappear after the RESET button is pressed.

When the “RESET” button is pressed, three short audio and visual indications will acknowledge the switch has been depressed properly.

Fire Extinguisher (hand held)

Mounted to the chassis to the rear of the boarding ladder.

Battery Disconnect Switch

The battery disconnect switch is located on the left side of the Lumberjack (See Figure 3-3838). This switch isolates 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 or electrical shorts. Turn the switch(s) counterclockwise to disconnect the battery.

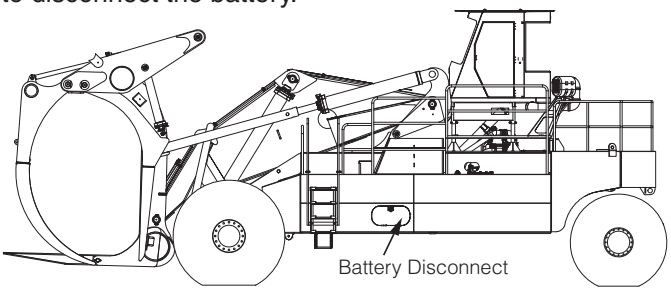
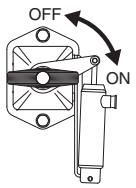
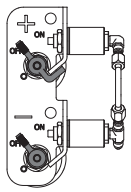


Figure 3-38 Battery Disconnect Switch Location

Note: Style A was superceded by Style B on 4/29/2014	
	Turn the switch counterclockwise to disconnect the battery.
Switch style A	
	Turn both switches counterclockwise to disconnect the battery.
Switch style B	

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

⚠ CAUTION

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

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

3.10 Seat Controls (Standard Configuration)

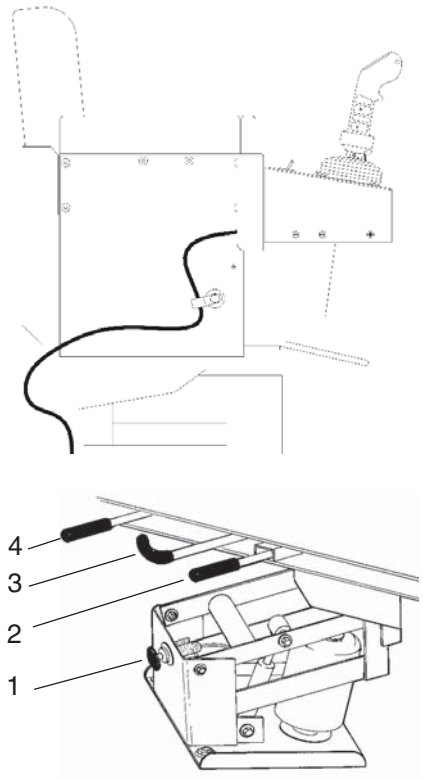


Figure 3-39 Seat Controls

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

2. **Seat Swivel Release Lever**
   Pull lever up to rotate seat.

⚠ WARNING

To prevent accidental movement of implements while rotating seat, turn off pilot controls (see page 3-6).

3. **Seat Forward and Backward Adjustment Lever**
   Pull lever left to slide seat forward and backward.

4. **Seat and Pedestal Forward and Backward Adjustment Lever (option)**
   Pull lever right to slide seat and pedestal forward and backward.

3.11 Seat Controls - Deluxe Model (Joystick Steering Option Displayed)

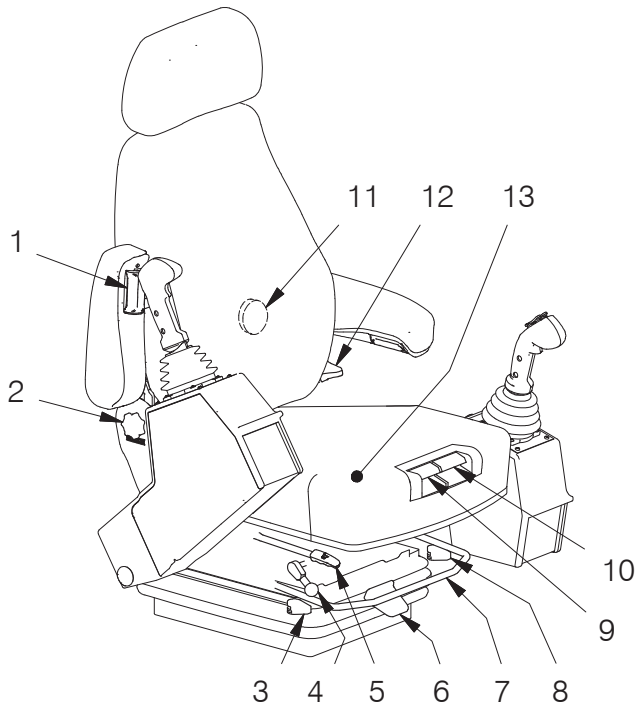


Figure 3-40 Seat Controls

1. **Armrest Inclination Knob**
   Turn the knob to adjust the inclination of the cushioned armrest.

   NOTE: The right and left armrest control unit (see Figure 3-40) will raise to allow clearance for ingress and egress of the operator from the cab. Raise the cushioned armrest, and lift up on the right armrest controls unit.

2. **Armrest Elevation Knob**
   Turn the knob counter-clockwise to release the cushioned armrest. This will allow adjustment of the elevation of the cushioned armrest relative to the seat. Once the elevation is set, turn the knob clockwise to lock the armrest in place.

3. **Seat Suspension Resistance Adjustment Lever**
   Use this lever to adjust the resistance in the seat's suspension. Each operator should adjust this to accommodate their weight.

4. Swivel Release Lever
Raise the knob to release the seat assembly's swivel.

NOTE: Swiveling the seat assembly to the right will allow clearance for ingress and egress of the operator from the cab.

5. Seat Slide Release Lever
Lift this lever to allow the seat back, seat cushion, and cushioned armrests to slide independent of the armrest control units. Use this to set a comfortable working distance to the joystick controls.

6. Seat Suspension Elevation Adjustment Lever
Use this lever to adjust the elevation of the seat.

NOTE: this adjustment uses a small compressor to set the seat's suspension and requires the cab's electrical system to be energized. Make sure the key switch is set to either "ACC" or "Run".

A. For each new operator or shift change depress and hold the Seat Suspension Adjustment Lever until all air is exhausted from the seat. The seat must be occupied for all adjustments.

B. Lift lever all the way up and a click should be heard, release the adjustment lever, the compressor will operate and pressurize the suspension and will automatically stop when the suspension reaches the correct mid-stroke position for the operator's weight.

C. Once the compressor has stopped the lever can be lifted and held and the seat will rise up to an additional 3". At any point during this adjustment the desired height can be maintained by releasing the lever.

NOTICE

To prevent compressor damage do not operate the compressor for more than 45 seconds.

D. To reduce the seat height, depress the lever to exhaust the air in the system until the desired height is reached. Do not go below the mid-stroke position. To check if this has occurred, after the compressor has stopped, lift lever and immediately release it, if compressor turns on the suspension will automatically reset to the proper height.

7. Seat Assembly Slide Release Lever
Lift this lever to allow the seat back, seat cushion, cushioned armrests, and armrest control units to slide forward or backward as a whole. Use this to set a comfortable working distance to the pedals and steering wheel.

8. Seat Suspension Travel Lever
Use this lever to either allow the seat's suspension to travel both up/down and forward/back, or limit the suspension to travel only up/down.

9. Seat Cushion Slide Release Handle
Squeeze this handle to allow the seat cushion to slide forward or back relative to the seat back. Use this to establish a comfortable working position for the seat cushion.

10. Seat Cushion Pitch Adjustment Handle
Squeeze this handle to set the pitch of the seat cushion.

11. Lumbar Support Adjustment Knob
Use this knob (back side of seat) to adjust the lumbar support in the seat back.

12. Seat Back Recline Lever
Raise this lever to change the angle of the seat back relative to the seat cushion.

13. Optional Operator Present Switch
A switch under the seat cushion senses when the operator is occupying the seat.

3.12 Vehicle Monitoring System (Option)

A Vehicle Monitoring System is installed on all Lumberjack units starting with serial number 039326 (L90C-326). The system is factory installed, but requires optional activation by the end user to be functional. Once activated, data is sent wirelessly and can be viewed through a web browser (no operator interaction is required). Older Lumberjack units can also be retrofitted with the vehicle monitoring system.

Figure 3-41 Vehicle Monitoring System

Activation:
To activate service, please contact your dealer with the following information:

- Wagner serial number
- Vehicle Monitoring System serial number. The serial number is located on the monitoring system module which is installed in the cab below dash (see Figure 3-44).

Note: Service not available in all countries. Contact your dealer for availability.

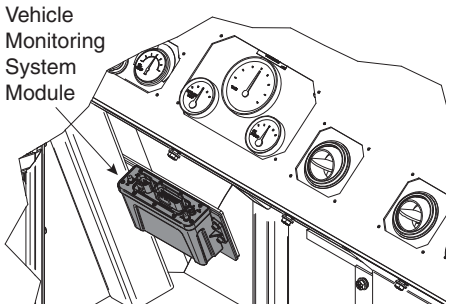


Figure 3-42 Vehicle Monitoring System Module

The Vehicle Monitoring System has many benefits and features:

Benefits:
- A 24/7 watchdog in your efforts for continuous improvement
- Ensure a timely and reliable maintenance schedule for your Wagner
- Increase your Wagner's productivity and performance
- Schedule service and maintenance intervals based on run hours, saving you time and money
- Track utilization of your engines
- Verify engine health while your Wagner is at work

Features:
- Broadcasts J1939 protocol to remote locations
- Updates every 15 minutes, as status changes/events occur, and on demand
- On-line Web Monitoring
- Smart Phone APP
- Create customizable reports
- For use on any vehicle with J1939 connectivity
- Remotely monitors the following parameters:
  - » Engine Status
  - » Battery Voltage
  - » Run Hours
  - » Oil PSI
  - » Coolant Temp
  - » RPM
  - » Intake Temperature
  - » Barometric PSI
  - » Boost PSI
  - » Torque %
  - » Load %
  - » Fuel Rate
  - » Total Fuel Consumption
  - » Engine Faults
  - » Transmission temperature
  - » Transmission pressure
  - » Auxiliary temperature
  - » Auxiliary pressure
  - » Hydraulic Temperature

Note: For best results, use Google Chrome or Mozilla Firefox browser for displaying tracking data correctly.

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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.

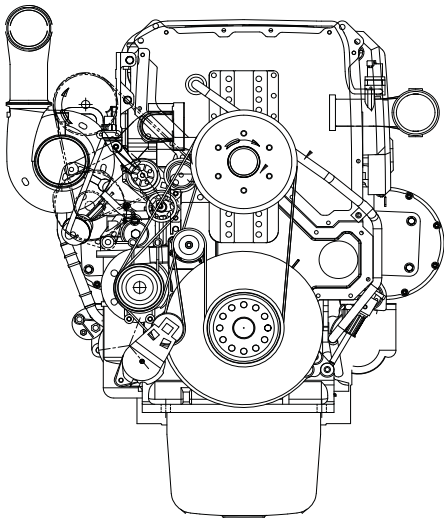

Figure 4-1 Engine

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.

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.

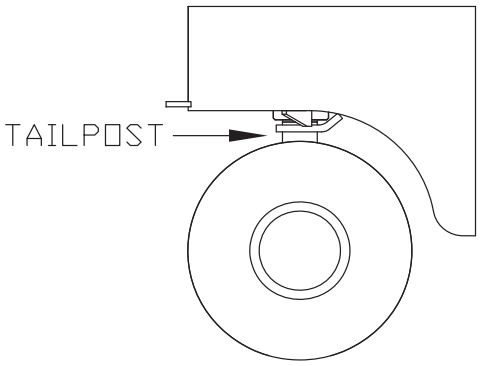

Figure 4-2 Tailpost

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 or rough yards.

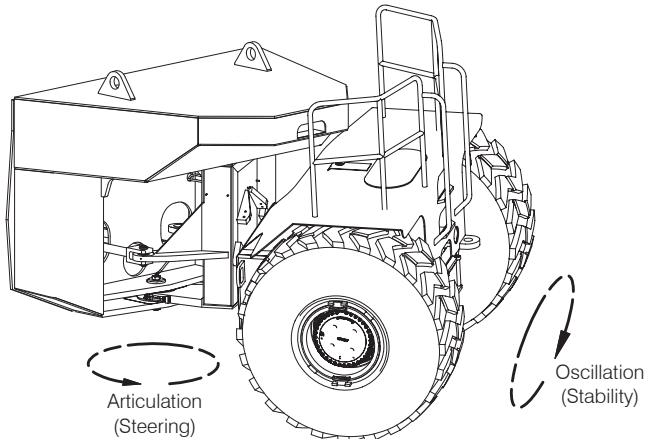

Figure 4-3 Swivel Box / Bogie Assembly

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.

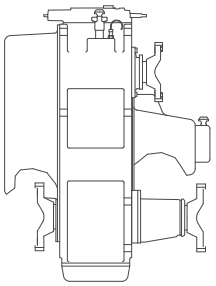

Figure 4-4 Transmission

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.

Shifting from forward to reverse or reverse to forward is inhibited in second, third and fourth gear.

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: It is recommended to brake to a full stop when changing directions (e.g. Forward to Reverse). 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.

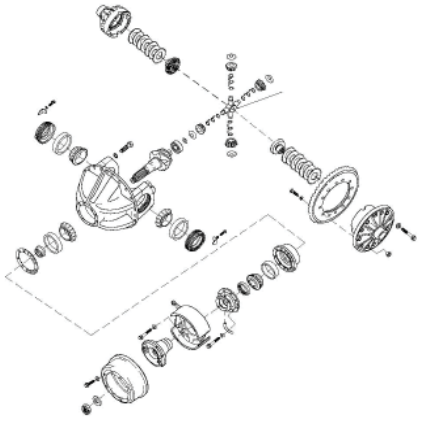

Fig 4-5 Differential (Posi-torque shown)

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).

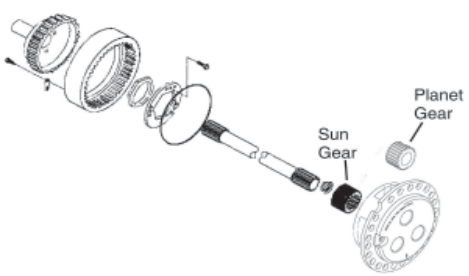

Figure 4-6 Planet Assembly

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.

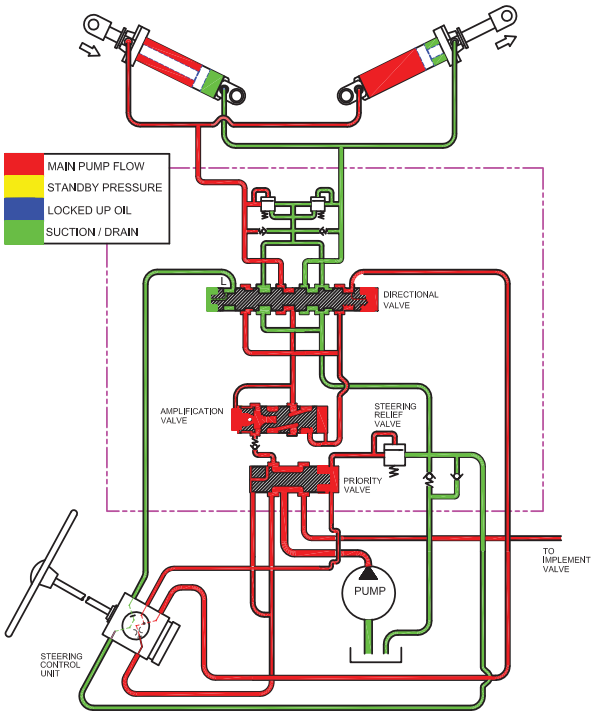

Figure 4-7 Steering System (Right Turn)

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 and L100 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
Implements on a Wagner Lumberjack are defined as:

Hoist - Raises and lowers Carriage
Tilt - Tilts Carriage
Holddown - Secures load
Auxiliary Holddown - Secures load
Kickoff - Clears load from tines

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

1. Ride Control switch (located on overhead instrument panel) 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 from shock loading to the hoist cylinders when 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, and will return to normal operation when the brake pedal is released.

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 illuminating when the filters need to be serviced to protect the components.

Automatic Fire Suppression System (Optional)
The Fire Suppression System main purpose is to suppress a fire on the machine long enough for safe egress of the operator (see Fire Suppression System in Section 3).

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 Figure 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.

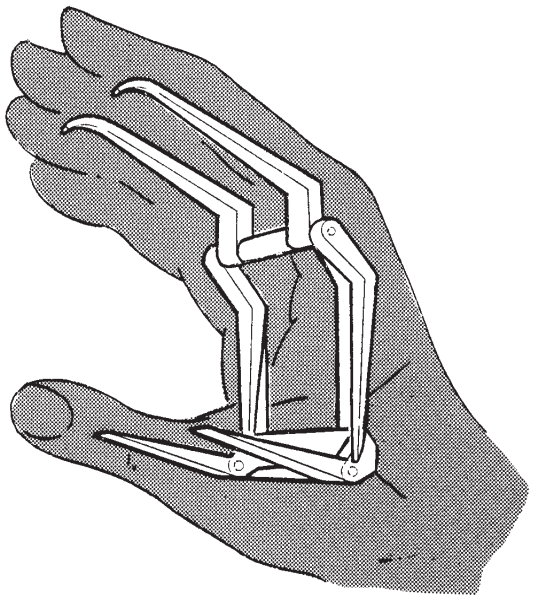
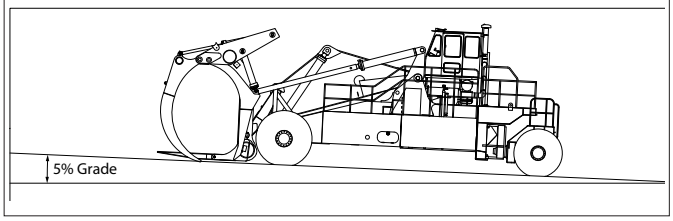


Figure 5-1 Carriage-Hand Comparison

5.3 Break-in Period

NOTICE

A scavenge pump kit is recommended in the transmission circuit if the Lumberjack is used in a yard that has a 5% grade or greater.



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 230° F.

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.

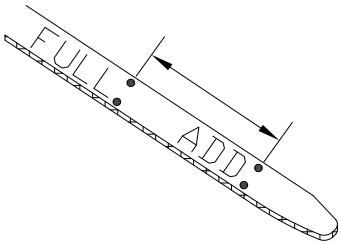


Figure 5-2 Typical Dipstick

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 Figure 5-3.

Important! See warning on this page for tank venting procedure.

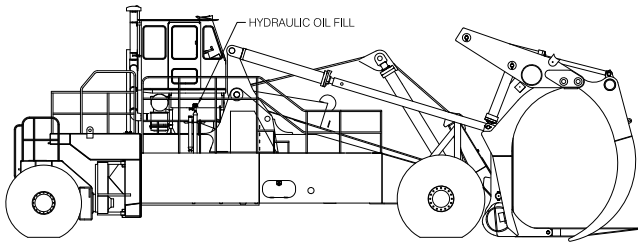


Figure 5-3 Hydraulic Oil Fill Location

⚠ 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.

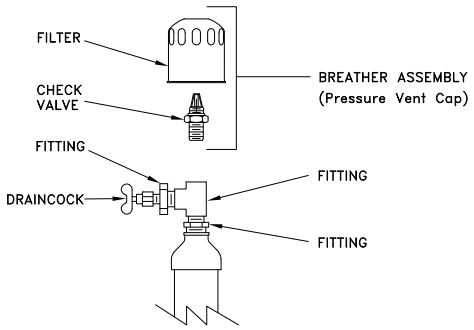


Figure 5-4 Tank Breather Assembly

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 parking brake engagement: Pull the knob to ensure the brake is set.

4. Place the transmission range selector in the "neutral" position, "N" on the gear quadrant, with the bucket float switch in the "off" position if so equipped.

   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

IMPORTANT! Read this entire manual and engine manufactures operation and maintenance manual before starting the engine.

The Red Shutdown / Derate LED located on the Power View Screen (see Power View Display Module in section 3) when illuminated indicates the need to stop the engine as soon as can be safely done. The engine must remain shut down until the fault can be repaired.

The Amber Warning LED located on the Power View Screen (see Power View Display Module in section 3) when illuminated indicates the need of repair at the first available opportunity.

Normal Engine Start-up (Caterpillar Engine Only)

NOTE: Do not adjust the engine speed during start-up. The electronic control module (ECM) will control the engine speed during start-up.

1. Check that transmission is in neutral and that the parking brake is applied.

2. Turn the key switch to the START position in order to engage the starting motor and crank the engine.

   NOTE: For cold (coolant temperature below 18° C / 64° F) engine start-up, turn the key switch to the RUN position. Leave the key switch in the RUN position for 15 seconds. Turn the keys witch to the START position. Release the switch to RUN position as soon as the engine starts. If engine fails to start, see Cold Start Control Switch in this section.

NOTICE

Do not engage the starting motor when flywheel is turning. Do not start the engine under load.

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

3 Allow the key switch to return to the RUN position after the engine starts.

4. 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 Red Shutdown / Derate light comes on.

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

6. Using the hand throttle, continue to warm the engine at 1000 rpm until the engine temperature reaches at least 150^0 F.

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

8. Follow steps below to achieve hydraulic oil operating temperature (70°F/21°C).

   a) Bring the engine rpm to 1500 rpm either with the hand throttle or with the use of the foot pedal throttle.

   b) Function all implements through the full range of motion 5 times each. This should warm the oil sufficiently enough for operation.

   c) If the weather is below 32°F, it may be necessary to bottom out one of the hydraulic function cylinders (preferably the hoist or stabilizer cylinders). This will pass the oil through the relief thus generating more heat.

Cold Weather Starting Procedure (Caterpillar Engine Only)

In cold weather it may be necessary to use cold weather starting procedures.

⚠ WARNING

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

Starting ability will be improved at temperatures below -18°C (0° F) from the use of a jacket water heater or extra battery capacity.

When No.2 diesel fuel is used, the following items provide a means of minimizing starting problems and fuel problems in cold weather: engine oil pan heaters, jacket water heaters, fuel heaters, and fuel line insulation.

NOTE: Do not adjust the engine speed control during start-up. The electronic control module (ECM) will control the engine speed during start-up.

1. Check that transmission is in neutral and that the parking brake is applied.

2. Turn the key switch to the RUN position. Leave the key switch in the RUN position for 20 seconds.

NOTICE

Do not engage the starting motor when flywheel is turning. Do not start the engine under load.

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

3. Turn the key switch to the START position in order to engage the starting motor and crank the engine.

4. Allow the key switch to return to the RUN position after the engine starts.

5. Repeat step 2 through step 4 if the engine fails to start.

6. Allow the engine to idle for three to five minutes, or allow the engine to idle until the water temperature indicator begins to rise. The engine should run at low idle smoothly until speed is gradually increased to high idle. Allow the white smoke to disperse before proceeding with normal operation.

7. Operate the engine at low load until all systems reach operating temperature (coolant temperature above 18° C / 64° F). Check the gauges during the warm-up period.

8. Follow steps below to achieve hydraulic oil operating temperature (70°F/21°C).

   a) Bring the engine rpm to 1500 rpm either with the hand throttle or with the use of the foot pedal throttle.

   b) Function all implements through the full range of motion 5 times each. This should warm the oil sufficiently enough for operation.

c) If the weather is below 32 degrees F, it may be necessary to bottom out one of the hydraulic function cylinders (preferably the hoist or stabilizer cylinders). This will pass the oil through the relief thus generating more heat.

Cold Start Control Switch
If Cold Weather Starting Procedure fails, do the following:

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.

⚠ 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.

Normal Engine Start-Up (Cummins Engine)

⚠ WARNING

WARNING: Do not depress the accelerator pedal or move the accelerator lever from the idle position wile cranking the engine. This can result in engine overspeed and severe damage to the engine.

⚠ CAUTION

CAUTION: To prevent damage to the starting motor, do not engage the starting motor for more than 30 seconds. Wait 2 minutes between each attempt to start (electrical starting motors only).

NOTE: Engines equipped with air starting motors require a minimum of 480 kPa

1. Check that transmission is in neutral and that the parking brake is applied.

2. With the accelerator pedal or lever in the idle position, turn the key switch to the RUN position for 15 seconds, then turn the key to the START position.

NOTE: If the engine does not start after three attempts, check the fuel supply system. Absence of blue or white exhaust smoke during cranking indicates no fuel is being delivered.

⚠ CAUTION

CAUTION: The engine must have adequate oil pressure within 15 seconds after starting. If the warning lamp indicating low oil pressure has not gone out or there is no oil pressure indicated on a gauge within 15 seconds, shut off the engine immediately to reduce the possibility of engine damage. The low oil pressure troubleshooting is located in your engine manufactures operation and maintenance manual.

3. Idle the engine 3 to 5 minutes before operating with load.

4. After starting a cold engine (coolant temperature below 71° C / 160° F), increase the engine speed (rpm) slowly to provide adequate lubrication to the bearings to allow the oil pressure to stabilize.

⚠ CAUTION

CAUTION: Do not operate engine at low idle for long periods with engine coolant temperature below the minimum specification (71° C / 160° F). This can result in the following:

- Fuel Dilution of the lubricating oil
- Carbon build up in the cylinder
- Cylinder head valve sticking
- Reduced performance

5. Follow steps below to achieve hydraulic oil operating temperature.

   a) Bring the engine rpm to 1500 rpm either with the hand throttle or with the use of the foot pedal throttle.

   b) Function all implements through the full range of motion 5 times each. This should warm the oil sufficiently enough for operation.

   c) If the weather is below 32 degrees F, it may be necessary to bottom out one of the hydraulic function cylinders (preferably the hoist or stabilizer cylinders). This will pass the oil through the relief thus generating more heat.

Cold Weather Starting Procedure (Cummins Engine Only)

Follow the Normal Engine Start-Up Procedure above. In cold weather, the engine can run longer at idle but only until the minimum specified oil pressure is detected by the electronic control module (ECM).

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.

Cold Weather Starting Procedure (Caterpillar and Cummins)

Temperatures below 0° C (32° F):

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 (see step 5 above).

⚠ 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 -18° C (0° F)

If the machine will be shut down for several hours or longer with ambient temperatures below -18° C (0° F), the hydraulic tank heater (Option) 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 (option) 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 (Caterpillar and Cummins)

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 parking 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 Figure 5-5. Refer to your Wagner parts manual for manifold location.

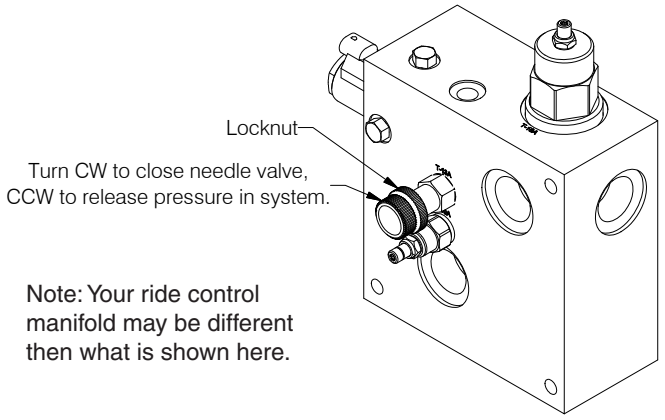


Figure 5-5 Ride Control Manifold

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 (with steering wheel option)

1. 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.

2. 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 de-clutch 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.

Steering (with Joystick steering option)

1. With the operator facing the front, pressing the bottom right button on the LH Joystick will turn the machine right, while pressing the bottom left button on the LH Joystick will turn the machine Left.

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 Figure 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 Figure 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 Figure 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 Figure 5-9).

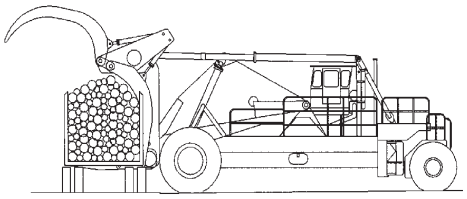


Figure 5-6

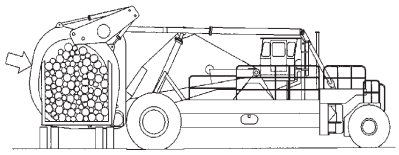


Figure 5-7

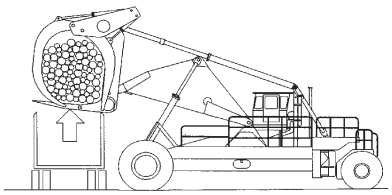


Figure 5-8

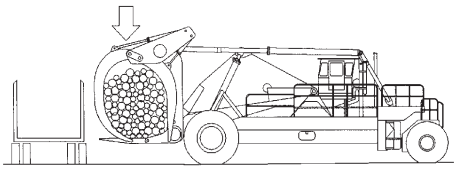


Figure 5-9

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.

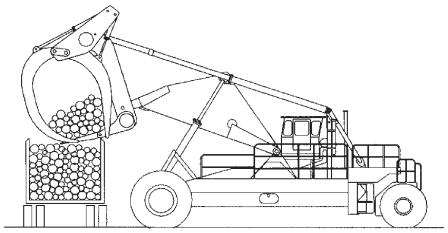


Figure 5-10

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 Figure 5-11).

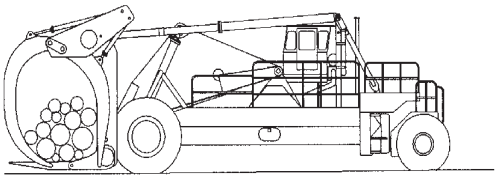


Figure 5-11

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 Figure 5-12).

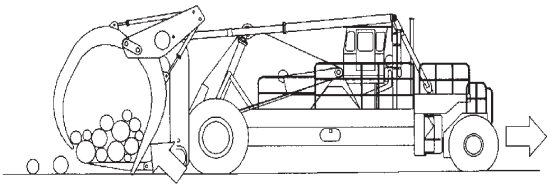


Figure 5-12

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 Figure 5-13).

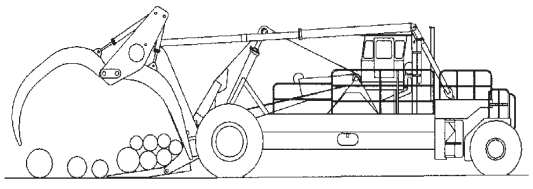


Figure 5-13

5. Figure 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.

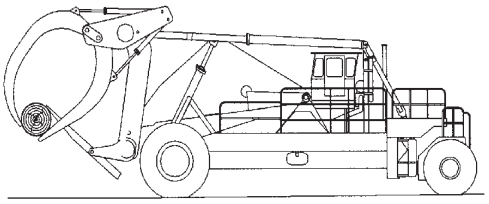


Figure 5-14

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 Figure 5-15).

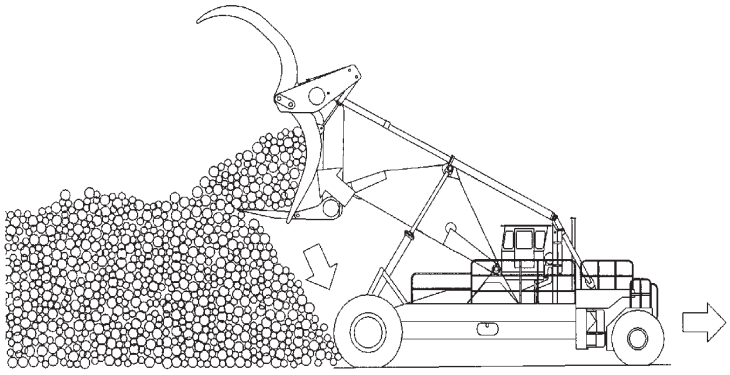


Figure 5-15

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 Figure 5-16).

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

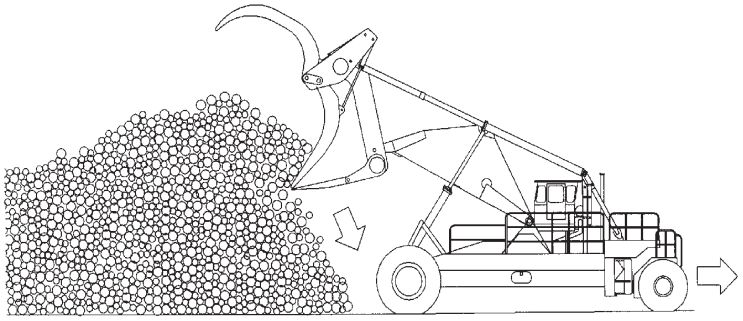


Figure 5-16

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

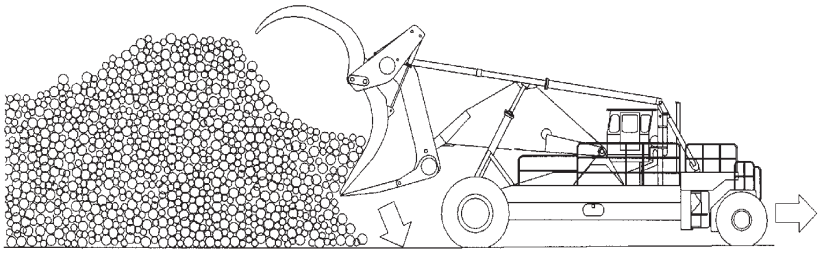


Figure 5-17

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 Figure 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 Figure 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

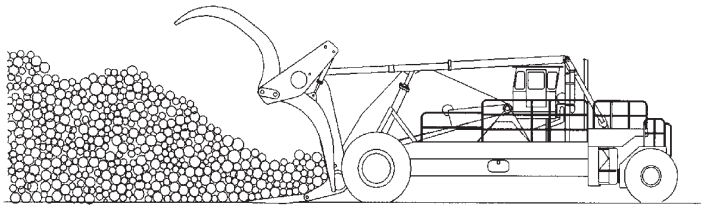


Figure 5-18

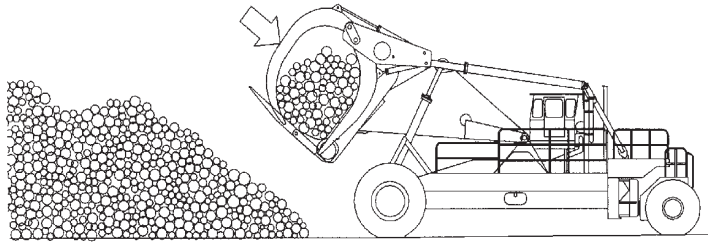


Figure 5-19

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 Figure 5-20).

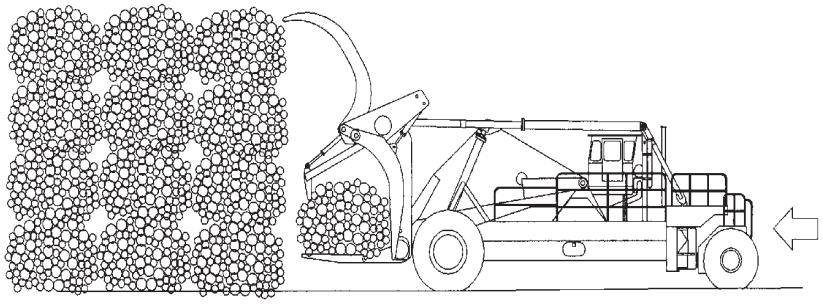


Figure 5-20

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 Figure 5-21).

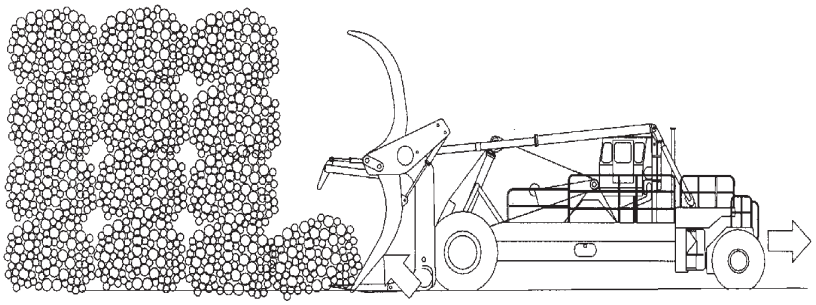


Figure 5-21

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 Figure 5-22).

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

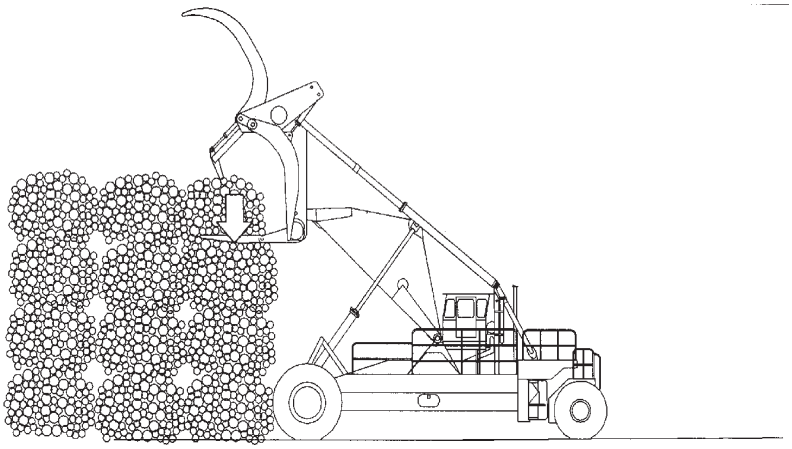


Figure 5-22

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 Figure 5-23.

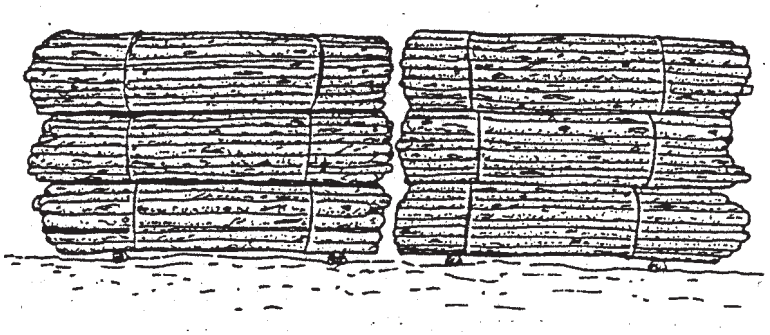


Figure 5-23

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 Figure 5-24. Be sure that the bundles are stacked vertically, not interlocking (See Figure 5-25).

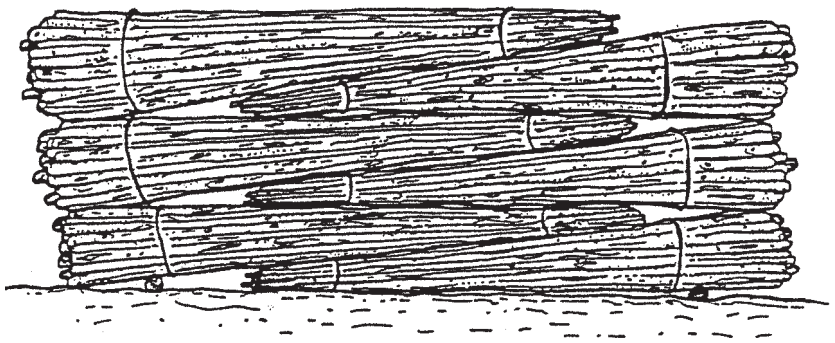
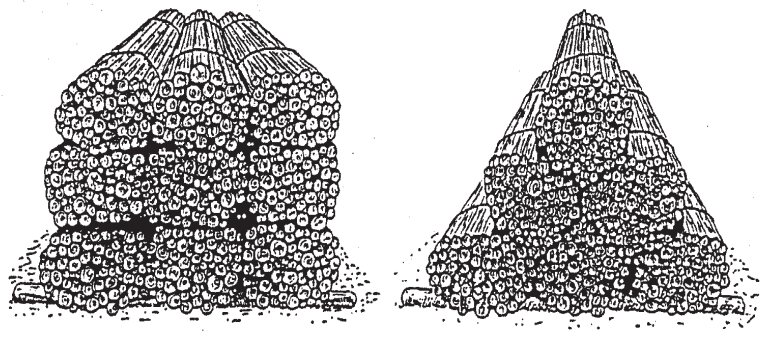


Figure 5-24

3. Figure 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

Figure 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.

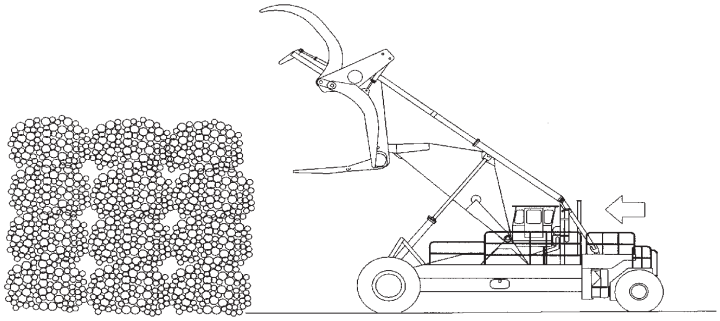


Figure 5-26

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.

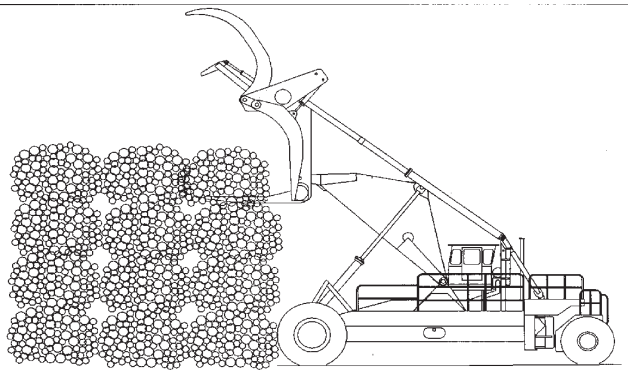


Figure 5-27

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.

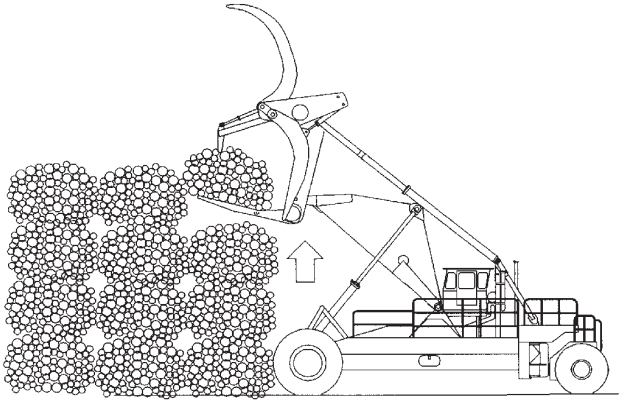


Figure 5-28

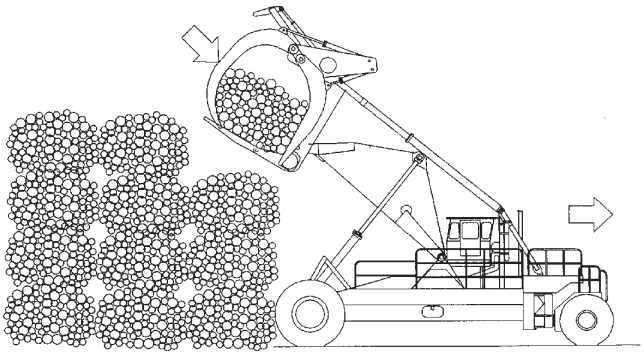


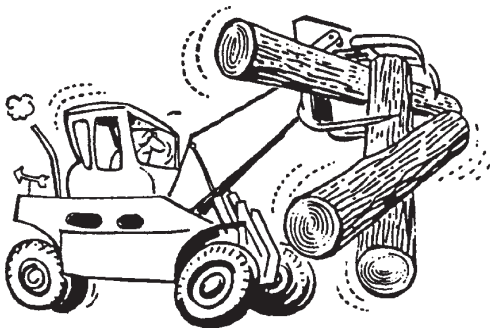
Figure 5-29

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.

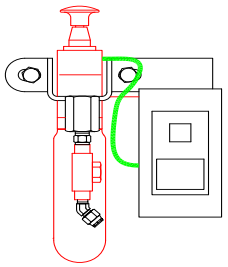


Figure 5-30 Fire Suppression System Actuator

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, tag the key switch "**DO NOT START**" and follow your companies Lockout Procedure to ensure that the engine is not inadvertently started.

5. **Battery Disconnect Switch**
   Always set the Battery Disconnect switch to "OFF" before performing any welding. The Battery Disconnect Switch is located in the battery compartment on the LH side of the Lumberjack. Turn the switch counterclockwise to disconnect the batteries.

6. **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.

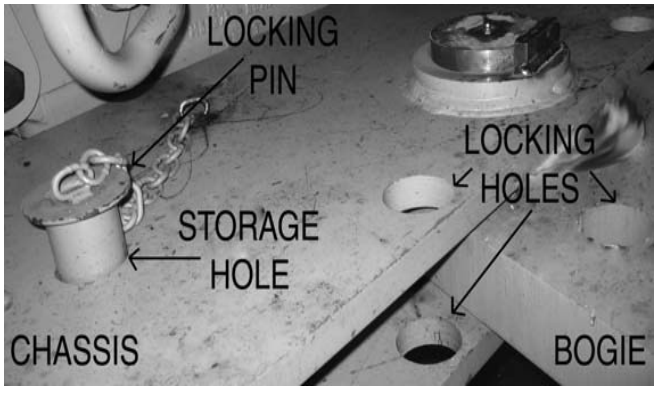


Figure 6-1 Bogie Locking Pin In Storage Hole

7. Ingress/Egress

2 Wheel Drive Units
Use service ladders on right/left side of chassis when boarding or leaving lumberjack.

4 Wheel Drive Units
Use service ladders on right/left side of the chassis, or the rear of the bogie, when boarding or leaving lumberjack.

⚠ CAUTION

Do not use the rear service ladder to enter or exit the lumberjack when the chassis and bogie are not aligned (see Figure 1-6).

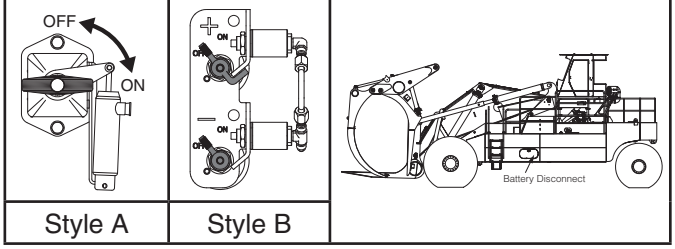
8. Use Safe Ladders / Scaffolding
Due to the height of the upper lube points, it is essential to personnel safety that safe ladders, personnel lifts and / or scaffolding be used while servicing. These areas can be dangerously slick under conditions of rain, frost or oil smears.

6.3 Welding

Before performing any welding, always do the following to prevent severe damage to the Lumberjacks electrical system:

1. **Set Battery Disconnect Switch to OFF** located in the battery Box on the left side of the Lumberjack.

Note: Style A was superceded by Style B on 4/29/2014



Style A | Style B

Figure 6-2 Battery Disconnect Switch

2. **Disconnect ECM (Electronic Control Module)** the ECM connector is located on the engine, right side of Lumberjack (See Figure 6-3).

Figure 6-3 ECM (Electronic Control Module)

3. **Disconnect PLC (Programmable Logic Controller)** or electronic control modules if so equipped.

For questions or concerns, please contact your local dealer or Allied Systems Company Service Department at (503) 625-2560.

6.4 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

1. **Promotes Safety-** properly maintained equipment is better able to operate within its design specifications and react positively to the operator's control.

2. **Improves Equipment Availability-** by minimizing the chances of breakdown.

3. **Reduces Unexpected Downtime-** unexpected downtime is expensive and detracts from normal scheduled maintenance.

4. **Allows Planning of Daily Production-** by knowing the condition of available equipment.

5. **Allows Planning of Maintenance Man Hours-** by distribution of duties and necessary lead time for parts ordering.

6. **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:

1. **10 Hours (each shift or daily)**
2. **50 Hours (weekly)**
3. **250 Hours (monthly)**
4. **500 Hours (quarterly)**
5. **1000 Hours (semiannually)**
6. **2000 Hours (annually)**
7. **5000 Hours**

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.

6.5 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.

6.6 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.

6.7 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.

6.8 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 fluids used for initial factory fill:

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

ENGINE COOLANT Anti-Freeze, Premix 50/50

TRANSMISSION/CONVERTER
Mobilfluid 424

DRIVE AXLES
Mobilube HD 85W-140 (Hot Weather/Heavy Load)
80W-90 General Fill

Clark Posi-Torque (Differentials)
Lubrizol #6178 Additive

HYDRAULIC SYSTEM (Wet Disk Brake Units)
Mobilfluid 424

HYDRAULIC SYSTEM(Dry Disk Brake Units)
Mobile DTE 10 Excel 32

GENERAL CHASSIS LUBRICATION
Mobilgrease Special No. 2

DRIVELINES - Slip Yoke Splines/Cross Assembly
Mobilith SHC 220 Grease

SEAT PLATFORM SWIVEL - Mobilith SHC 220 Grease

The above fluids 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.

6.9 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 6-4 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.

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.

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

Figure 6-4 ISO 4406-1999 Fluid Cleanliness Codes

⚠ 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.

6.10 Lubrication Points (See Fig 6-5)

10 HOURS

Before engine startup, check the following:

(1) Steering Cylinder Pins
(2) Boom To Chassis Pins
(3) Boom To Carriage Pins *a
(4) & (5) Hoist Cylinder Pins *a
(6) Hinge Bearings (4WD Units Only) *a
(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

⚠ 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 Driveline Support Bearings (4WD Units Only)
(20) Driveline Cross Assemblies *b*c (refer to service form 80-627)
(25) Rear Differential Bearing (4WD Units Only)*c
(24) Optional Automatic Grease System. Check grease level. See 80-1052 for service and maintenance information.

250 HOURS

(21) Fan Drive Bearing (not all engines)
(27) Seat Platform Swivel Bearing *c (grease fitting located under cab)

500 HOURS

(22) Tailwheel Bearing (2WD Units Only)
(23) Tailpost (2WD Units Only)
(24) Optional Automatic Grease System. Clean or replace grease filter. See 80-1052 for service and maintenance

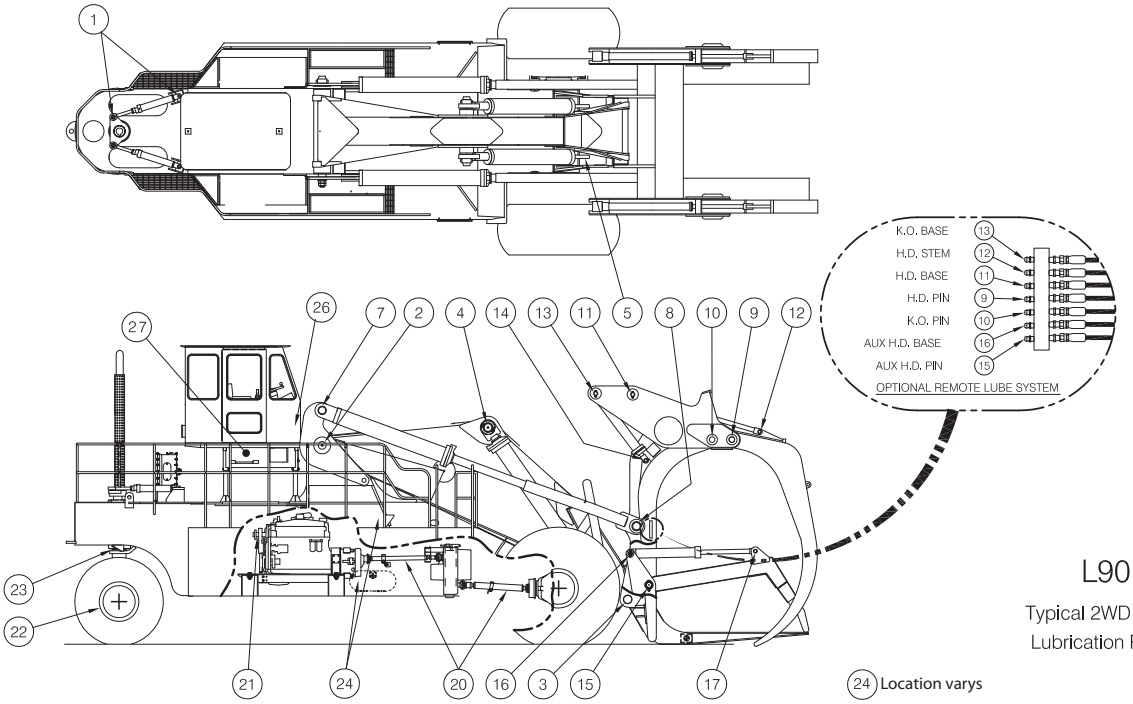
1000 HOURS

(20) Driveline Slip Yokes *b*c (refer to service form 80-627)

2000 HOURS

(26) Steering Column U-Joints *c

*a When operating in water, lubricate submerged points more frequently.
*b Use handgun or lower pressure adaptor; lubricate sparingly.
*c Not lubricated by optional automatic grease system.



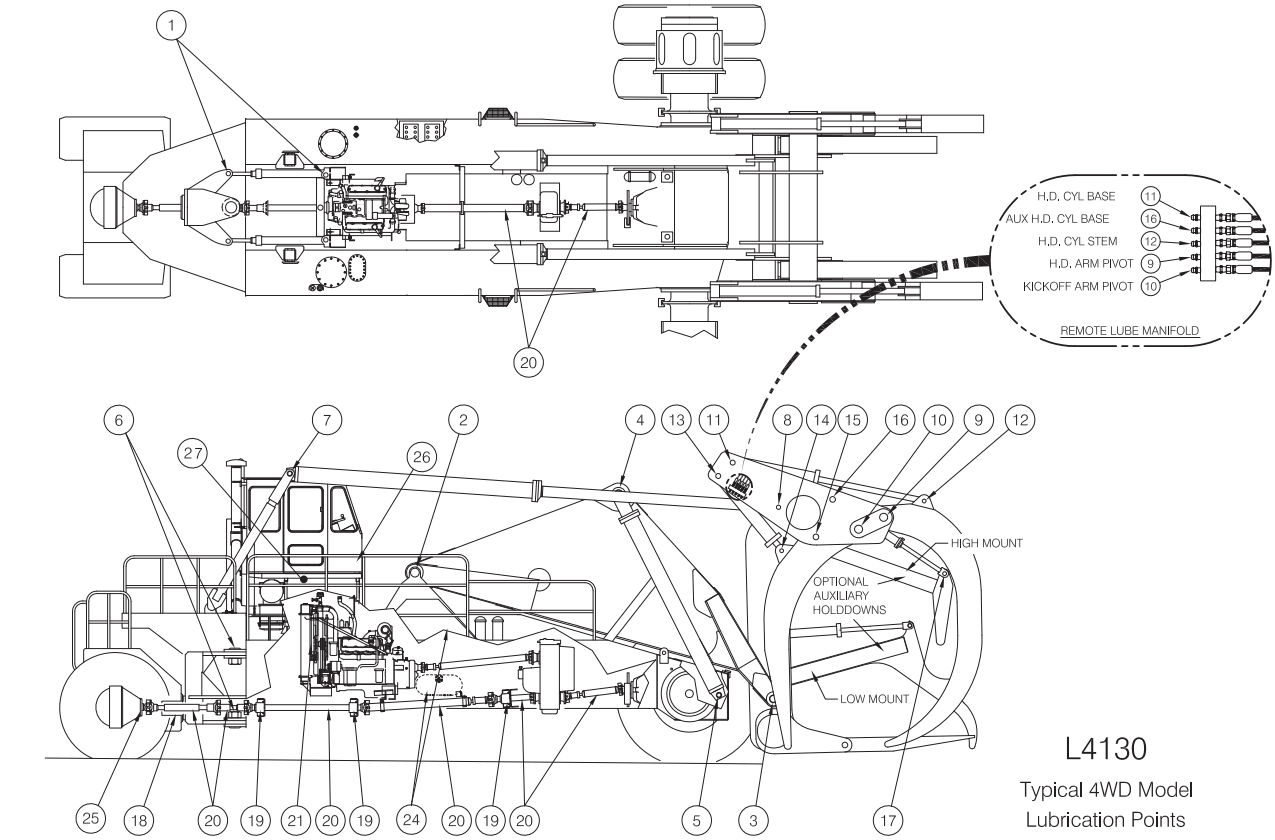


Figure 6-5 Lubrication Chart

NOTE: Due to variations in engine types and machine models, the indicated locations may not be exact.

6.11 Shift Maintenance Checklist (See Fig 6-6)

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.

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

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 tension - check for damage - change as required (Check indicator - clean or change element as required, empty dust cup, check for leaks and damage)	☐	☐	
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)	☐	☐	
–	FIRE SUPPRESSION SYSTEMS (Verify certifications are current)	☐	☐	

After Starting Engine - Check The Following:

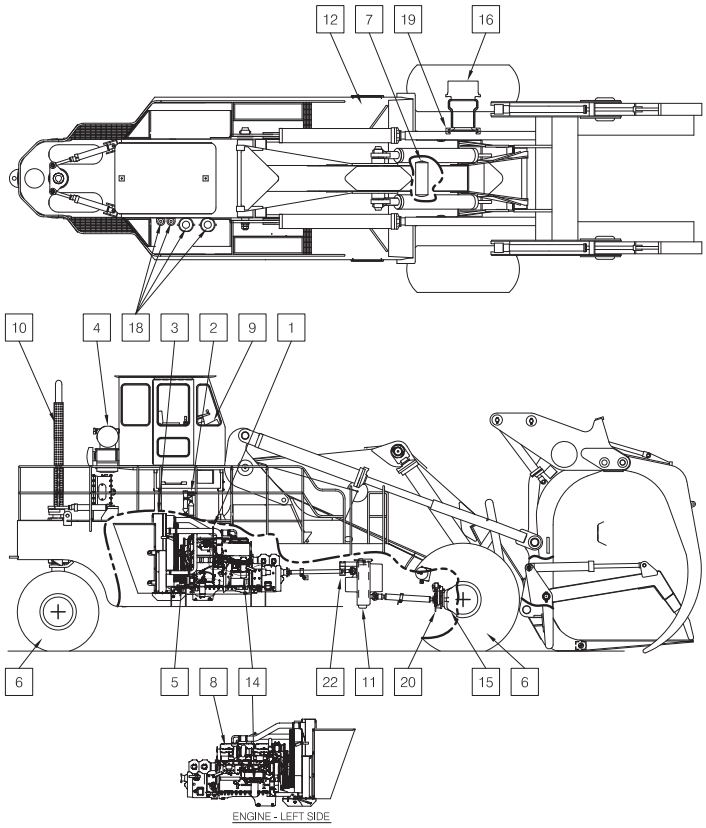
8	ENGINE (Does it sound normal?)	☐	☐	
9	INSTRUMENTS (Check for normal readings)	☐	☐	
9	CONTROLS (Check for normal operation)	☐	☐	
10	EXHAUST SYSTEM (Check for leaks and excessive smoke)	☐	☐	
11	TRANSMISSION - After warming to operation temp.- (Check oil level - check for leaks)	☐	☐	____
–	HYDRAULIC FILTERS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

Note Anything Abnormal or in Need of Repair

LIGHTS_____ DEFROSTER_____ REVERSE WARNING HORN_____
HORN_____ WINDSHIELD WIPERS_____
HEATER_____ AIR CONDITIONER_____

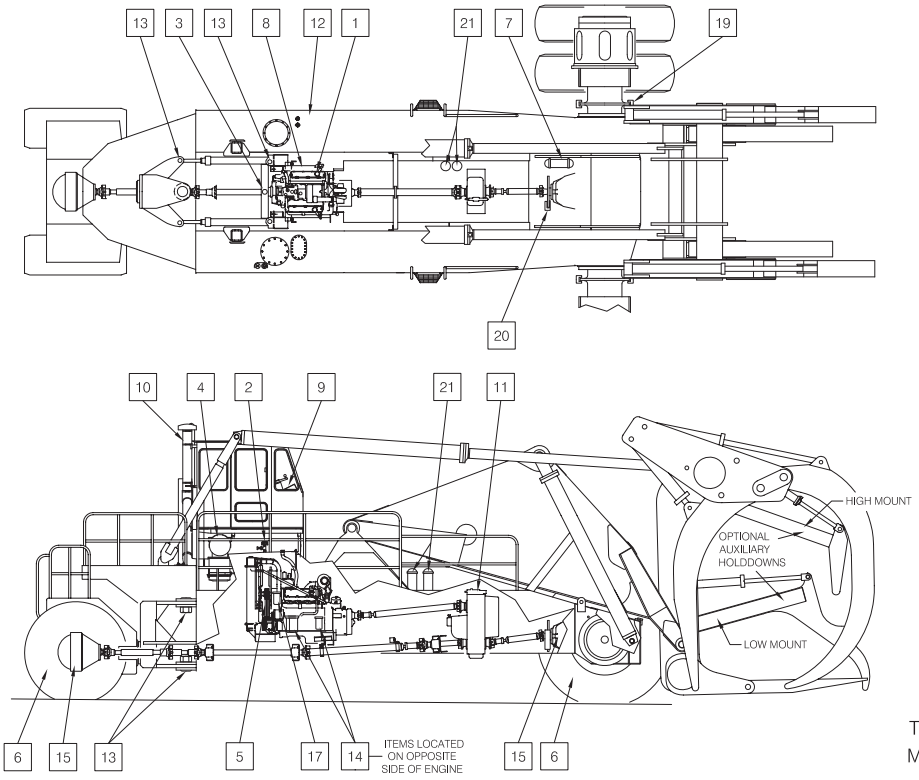
OPERATOR_____ SUPERVISOR_____ DATE_____
MODEL_____ SERIAL NUMBER_____ HOUR METER_____

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

Figure 6-6 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.

6.12 Maintenance Checklist

FIRST 50 HOURS

1.	Check fluid levels - differentials, planetaries		OK_____	Add_____
2.	Check hydraulic system - hoses, fittings		OK_____	REPAIR_____
3.	Check battery - cables & connections		OK_____	REPAIR_____
4.	Check all driveline capscrews - torque to spec. See service forms 80-1057 Torque Specification Chart & 80-627 Driveline Service.		ADD_____	OK_____
5.	Check electrical system - lights, options, connections		OK_____	NO_____
6.	Check expander pins - torque to spec. (center hinge & steering cylinder pins)		OK_____	NO_____
7	Check all pins, bushings and load bearing hardware		OK_____	NO_____
8	Check accumulator pre-charge (if applicable)		OK_____	NO_____

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 - torque to spec		OK_____	REPAIR_____
4.	Check battery electrolyte level		OK_____	ADD_____
5.	Lubricate chassis & driveline cross assemblies - 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*[a]	14	OK_____	ADD_____
3.	Take engine oil sample for analysis*[a]		OK_____	NO_____
4.	Change fuel filters*[a]		OK_____	REPLACE____
5.	Check axle differential oil level*[b]	15	OK_____	ADD_____
6.	Check axle planetary oil level*[b]	16	OK_____	ADD_____
7.	Change cooling system filter	17	OK_____	REPLACE____
8.	Check all hydraulic pressure and record		OK_____	NO_____
9.	Check fire suppression actuator	18	OK_____	NO_____
10.	Inspect brake system & components	19	OK_____	REPAIR_____
11.	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 Hydraulic filters*[a]	21	OK_____	REPLACE____
3.	Service Transmission filters*[a]	22	OK_____	REPLACE____
4.	Take oil samples from transmission, axle,		OK_____	NO_____
	and hydraulic system for analysis*[a]		OK_____	NO_____
5.	Check accumulator pressures		OK_____	NO_____
6.	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_____	REPLACE____
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_____
6.	Drivelines - See service form 80-627, Driveline Service & Maintenance.		OK_____	NO_____
7.	Have ANSUL representative inspect and recertify fire suppression system		OK_____	NO_____

EVERY 2000 HOURS OR ANNUALLY

1.	Repeat the 1000 hour check		OK_____	NO_____
2.	Drain, flush and fill differential*a	15	OK_____	ADD_____
3.	Drain, flush and fill planetaries*a	16	OK_____	ADD_____
4.	Check wheel bearing preload. Re-torque if necessary		OK_____	ADD_____
5.	Change hydraulic oil and filters*a	21	OK_____	ADD_____
6.	Have Allied representative inspect machine (annually)		OK_____	ADD_____

EVERY 3000 HOURS

1.	Drivelines - Inspect slip splines for wear (backlash). See service form 80-627, Driveline Service & Maintenance.	OK_____	NO_____

EVERY 5000 HOURS
(Caterpillar Tier 4 engines only)

1.	Change ARD Spark Plugs	OK_____	NO_____
2.	Clean/Replace Diesel Particulate Filter (DPF) Consult with Caterpillar Service Department	OK_____	ADD_____
3.	Change Fuel Priming Pump	OK_____	ADD_____

*a 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.

*b

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.

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

Repairs:

Problem:_____
_____

Parts: _____
_____

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

6.13 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 Figure 6-6 (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

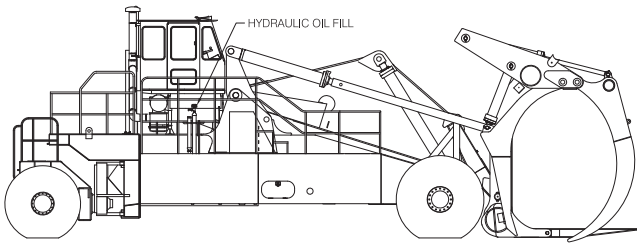


Figure 6-7 Hydraulic Oil Fill Location

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 below. 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)

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 structural 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 6.15.

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.

6.14 Expander Pin Maintenance Procedures

12. Expander Pin Pivot System (Optional)
Some Lumberjack units are equipped 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.

6.15 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.

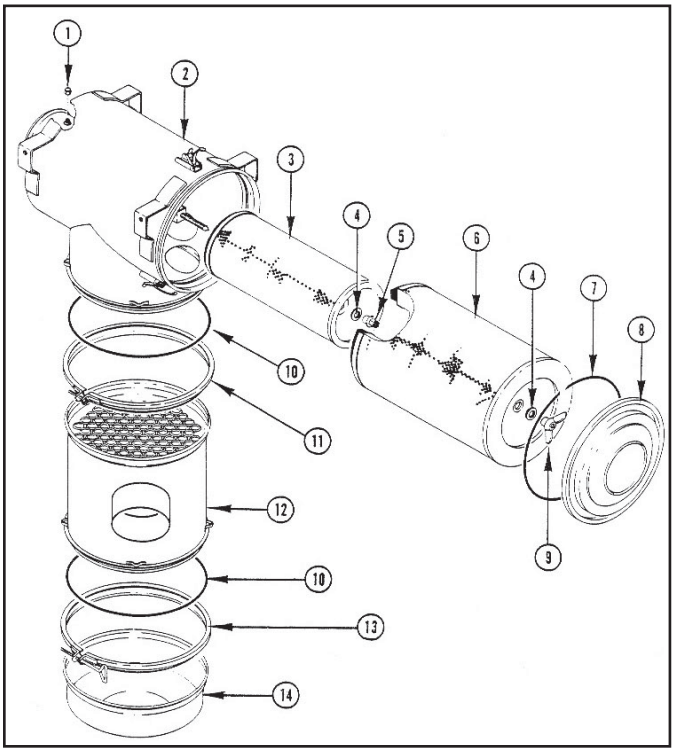


Figure 6-8 Air Intake System (Typical)

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 requirements 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)

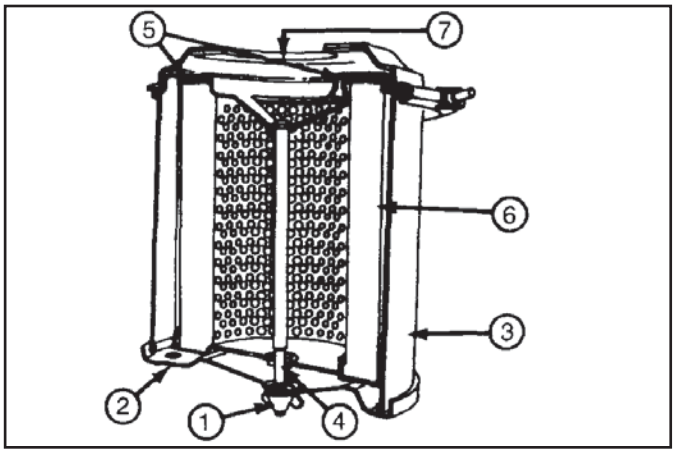


Figure 6-9 Element Replacement

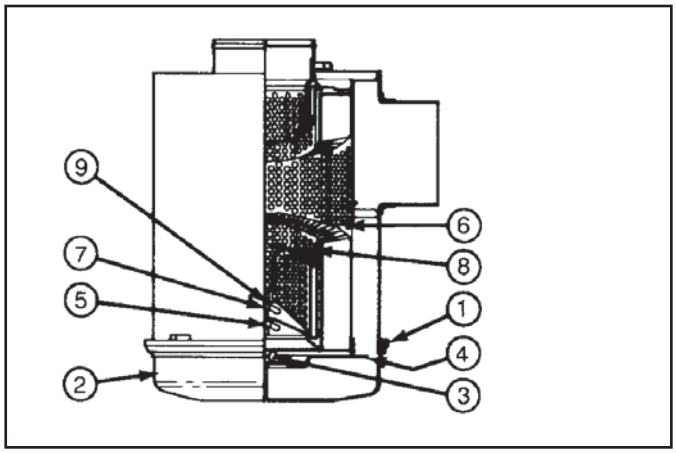


Figure 6-10 Dual - Heavy Duty Dry - Type Element

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

PowerCore Air Cleaners

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 loose clamps.

1. Shut off engine. Unlatch and remove the housing service cover.

Figure 6-11 Remove Housing Service Cover

2. Remove primary filter. Pull the filter out of housing. Loosen the filter gasket seal. Using the handle, push down on the filter to loosen the seal, which will tilt the filter to approximately a 5° angle.

NOTE: Remove any excess dirt and wipe out the housing before removing the safety (or secondary) filter.

Figure 6-12 Remove Primary Filter

3. Remove safety/secondary filter. Using the plastic handle on the face of the safety filter, pull the filter toward the center of the housing and remove.

NOTE: A safety/secondary filter only needs to be replaced at every third primary air filter change.

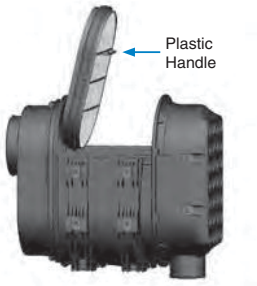


Figure 6-13 Remove Safety/Secondary Filter

4. Inspect the new filter before installing. Visually check for cuts, tears, or indentations on the sealing surfaces before installation. If any damage is visible, do not install.

Figure 6-14 Inspect New Filter

5. If replacing safety/secondary filter, use the plastic handle on the safety filter, slide the filter at an angle into the outlet side and push in place until the filter seats firmly and evenly within the housing.

NOTE: insert the safety filter tab into the positioning slot before pushing the filter in place.

Figure 6-15 Use plastic Handle on Safety Filter

6. Slide the filter down at approximately a 5° angle until it hits the end of the housing. Rotate the filter toward the outlet section to complete the seal.

Figure 6-16 Insert Primary Filter

7. Place the service cover in position and fasten the latches.

Figure 6-17 Replace Service Cover

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.

Figure 6-21 Air Filter Service Indicator

Cab Air Recirculation Elements

Some cabs are equipped with air recirculation elements. Inspect elements annually. Replace elements when cab pressurizer element is replaced. Consult your parts book for part number.

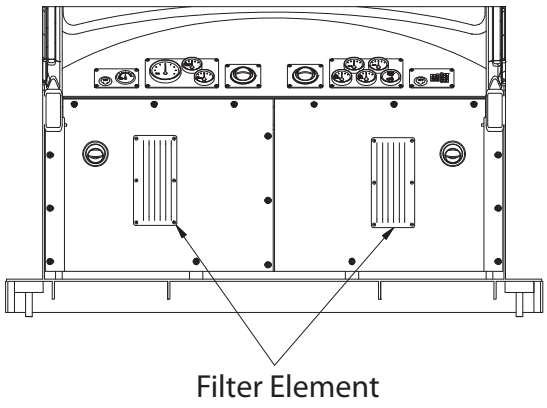


Figure 6-18 Elements Behind Panel

Cab Pressurizer

Your Lumberjack will have one of the following cab pressurizers installed. Replace filter element when there is a noticeable drop in cab air pressure. Consult your parts book for part number.

A.

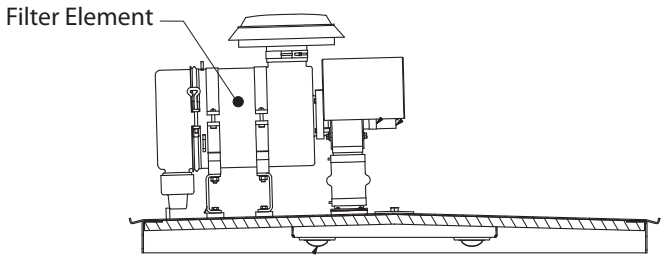


Figure 6-19 Remote Filter

B.

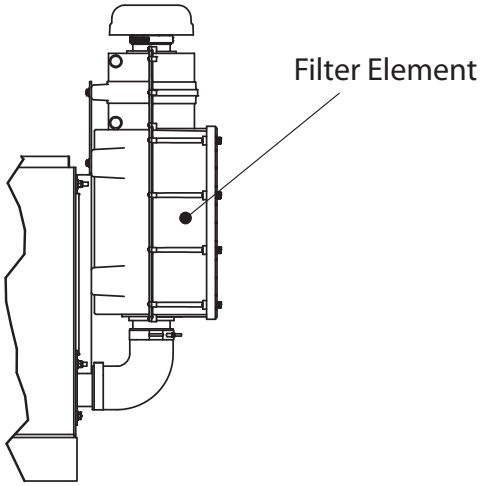


Figure 6-20 Pressurizer

6.16 Hydraulic Filter Maintenance

General

A hydraulic filter is a critical component of the hydraulic system. It helps prevent contamination from entering the hydraulic system which may cause damage to hydraulic components.

High Pressure Filters

High pressure filter elements must be serviced when the indicator (see item 8 below) on the filter is red or when an indicator light in the cab has illuminated.

Refer to your service manual if a different style filter is installed on your lumberjack.

Parts Description

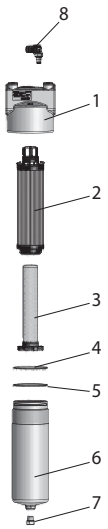


Figure 6-21 High Pressure Filter

1. Filter Head
2. Element
3. Core
4. O-Ring, Bowl
5. O-Ring, Anti-Extrusion Ring
6. Bowl
7. Plug, Drain
8. Filter Indicator
   The indictor will be red when the filter is in bypass (plugged) and green when in operating condition.

Note: The electrical indicators may be different on how they are reset. Some models are reset by pressing down the indicator site glass. Other models are reset automatically and may not be reset manually.

Service Instructions

1. Stop system power and vent captive pressure.
2. Drain filter assembly.
3. Remove bowl and element assembly.
4. Push down to squeeze tangs and lift element (see Figure 6-22).
5. Twist to remove core (see Figure 6-23).
6. Retain reusable core (see Figure 6-24).
7. Discard used element.
8. Insert reusable core into new element (see Figure 6-25).
9. Push element assembly into bowl until tangs snap (see Figure 6-26).
10. Inspect o-ring and anti-extrusion ring.
11. Install bowl with new element (see Figure 6-27).
12. Torque bowl (25-30 ft-lb/35-40 N-m) and drain plug (25-30 ft-lb/35-40 N-m).
13. Power up and inspect.

Figure 6-22

Figure 6-23

Figure 6-24

Figure 6-25

Figure 6-26

Figure 6-27

Hydraulic In-Tank Return Filters

In-tank return filter elements (see Figure 6-29) must be serviced when the differential pressure indicator indicates service is required. The differential pressure indicator is located near the valve module on the right side of the lumberjack.

The differential pressure indicator below (Figure 6-28) indicates the elements are in working condition. As the elements collect contamination, the indicator plunger will move from left to right into the red area indicating that the elements should be replaced.

Figure 6-28 Differential Pressure Indicator

Note: If the return filter is not equipped with a differential pressure indicator, the element should be serviced according to the maintenance schedule.

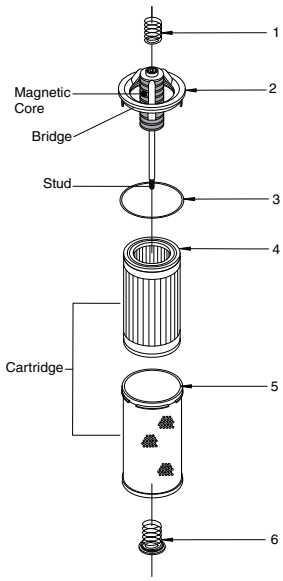


Figure 6-29 In-Tank Return Filter

Parts Description

1. Spring, Top
2. Insert Assembly
3. O-Ring(Insert to Tank)
4. Element
5. Sleeve
6. Bypass Spring Assembly

Servicing Dirty Elements

1. Stop system power and vent captive pressure.
2. Clean cover plate and surrounding area (see Figure 6-30).
3. Remove cover plate and gasket (see Figure 6-30).

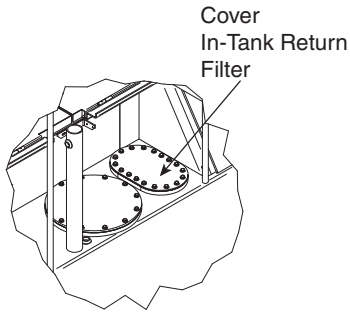


Figure 6-30 Cover Plate

4. Remove in-tank filter assembly (see Figure 6-29).
5. Remove the bypass spring assembly (see Figure 6-29).
6. Remove contaminated cartridge with a twisting motion (see Figure 6-29).
7. a. Discard disposable element (see Figure 6-29).
   b. Wash sleeve in non-caustic solvent. Compressed air can be used to prevent damage to the element during cleaning.

Before Installing Cartridge

1. Clean magnetic core (insert assembly) with a lint free cloth (see Figure 6-29).
2. Check all seals and tank cover gasket and replace if necessary.

To Assemble and Install New or Cleaned Cartridge

1. Lubricate all seals
2. Insert new element into clean sleeve (see Figure 6-29).
3. Assemble insert assembly and cartridge (see Figure 6-29).

   Note: For ease of mounting, hold the cartridge away from the magnetic core until the stud is through the hole in the bottom of the cartridge. Then slide the cartridge up to securely seat with the top of the bridge of the insert assembly (see Figure 6-29).

4. Install bypass spring assembly or non-bypass plate (tighten until snug).
5. Reinstall in-tank return filter into housing (make sure the top spring is secure).
6. Reinstall cover. Torque cover nuts (see 80-1057 Torque Specification Chart).
7. Follow procedure for Start-up (see section 5).

6.17 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 converter 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

6.18 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 Selection & Specifications, Form 80-257 in Section 10

**Some engines require additional coolant treatment. See engine manufacturers 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.

6.18 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.

Recommended 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
Planetary, 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
Tilt Cylinders		6,750	4,500

6.19 Jack Locations

Jack location instructions are located in section 10 of your service manual and manual pack. These instructions should be read before attempting to raise a lumberjack using a jack or any lifting device. Please contact Allied Systems (503-625-2560) if you do not have these instructions.

Appendix-A

PowerView Display Module

What software version do I have?
Once the PowerView has been powered on, do the following:

1) Press menu button.
2) Press right or left arrow buttons and select UTILITIES; press enter.
3) Press right or left arrow buttons and select SOFTWARE VERSION; press enter button.
4) See CONFIGURATION number and match with number below:

78332831 = PV-101-A, see appendix A-1
78333121 = PV-101-C, see appendix A-2

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Appendix A-1
PowerView PV-101-A Display Module

PowerView 101 Display Module

Effective date: 12/16/2011

General

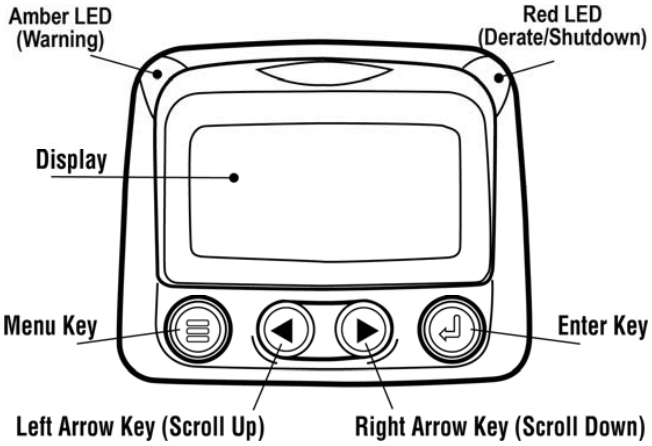
Your Lumberjack is equipped with a PowerView PV-101-A display module, a multifunctional tool that enables you to view many different engine or transmission parameters and service codes. The system allows you to accurately monitor the electronic engine and transmission installed on your Lumberjack. Back 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.

Display Parameters

The following are some of the engine and transmission parameters which may be displayed in standard or metric units as well as in English, Spanish, French, Italian, or German languages (when applicable, consult engine or transmission manufacturer for SAE J1939 supported parameters):

- Engine RPM
- Engine hours
- System voltage
- Percent 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 gear position
- Engine configuration parameters
- Active fault codes
- Stored fault codes

Faceplate Features



PowerView Faceplate Features

Keypad Functions

The keypad on the PowerView display is a capacitive touch sensing system. There are no mechanical switches to wear or stick. The keys on the keypad perform the following functions:

Menu Key - Enter or exit menu screens.

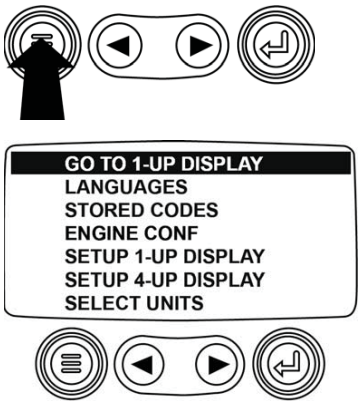
Left Arrow - Scroll the screen or move the parameter selection to the left or upward.

Right Arrow - Scroll the screen and move the parameter selection to the right or downward.

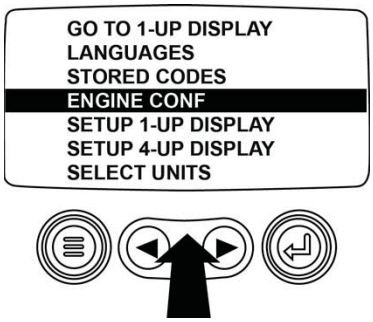
Enter Key - Select a menu or parameter or hide/view an active fault code.

Basic Navigation

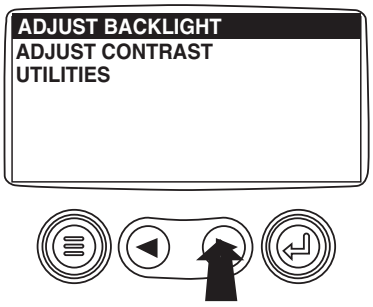
1. When Menu is pressed, the main menu items are displayed.



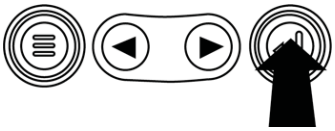
2. Touching the Arrow Keys will move the selection bar to other menu items.



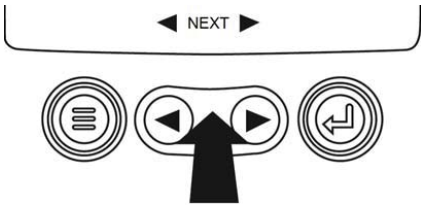
3. Certain menus have multiple pages of items. Scrolling past the top item or bottom item on the current page will reveal other menu items on additional pages.



4. When the desired item is highlighted by the cursor, pressing Enter will select that item and display the corresponding screen.



5. Anytime the word NEXT appears above the Arrow Keys there are more screens that may be viewed. Use the Arrow Keys to scroll to the next screen of information.



Operation

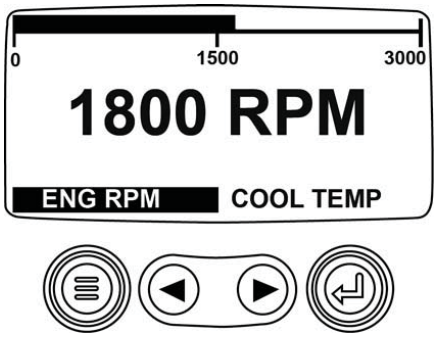
PowerView Menus (First Time Start Up)

1. When power is first applied to the display, the Murphy logo appears.

1. If the Engine ECU is broadcasting a 'Wait to Start' message, this screen will be shown. Engine manufacturers typically recommend against starting the engine while this message is broadcast from the ECU. Once the ECU stops broadcasting this message, this screen will no longer be displayed.

2. Once the engine has started, the single engine parameter appears with the engine RPM displayed.

   Pressing the Right Arrow Key will display the coolant temperature. The screen can be changed to other parameters by pressing Menu.



Setting Up The Display

The screen may be configured to display a single engine parameter (1-up display), or four parameters at once (4-up display). Default options are provided or you may customizethe display by selecting the parameters you want.

1-Up Display

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

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, and Oil Pressure.

Custom Setup – This option allows for the modification of which parameter, the number of parameters, and the order in which the parameters are being displayed.

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.

Up Display Settings

1. Touch Menu and use the Arrow Keys to highlight SETUP 1-UP DISPLAY, then press Enter.

2. To select USE DEFAULTS, highlight the option and press Enter. A message indicating "RESTORED TO DEFAULTS" is displayed.

3. To select CUSTOM SETUP, highlight the option and press Enter. A list of engine parameters is displayed.

4. To select a parameter, use the Arrow Keys to scroll and highlight the parameter, then touch Enter.

   Selected parameters are indicated by a # symbol to the right, and represent the order in which the parameter will be displayed.

5. To deselect a selected parameter and remove it from the list of displayed parameters, highlight the parameter and touch Enter.

6. Continue to scroll and select additional parameters for the CUSTOM 1-UP DISPLAY. Touch Menu at any time to return to the CUSTOM SETUP menu.

7. Selecting the AUTOMATIC SCAN ON function will cause the 1-up display to scroll through the selected set of parameters one at a time.

8. Once the USE DEFAULTS, CUSTOM SETUP and AUTOMATIC SCAN functions have been set, touch Menu once to return to the main menu, or twice to display the 1-up display screen.

4-Up Display

The 4-up display places the parameter data into four areas of the screen known as quadrants. Factory defaults for the 4-up display include coolant temperature, engine speed, oil pressure, and battery voltage. You may customize the 4-up display with parameters you define for each quadrant.

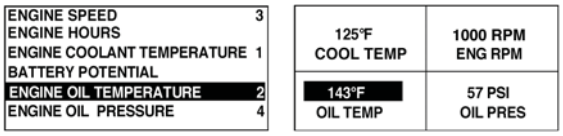
1. Touch Menu and use the Arrow Keys to highlight SETUP 4-UP DISPLAY, then press Enter.

2. To select USE DEFAULTS, highlight the option and press Enter. A message indicating “RESTORED TO DEFAULTS” is displayed.

3. To select CUSTOM SETUP, highlight the option and press Enter. The 4-up display appears.

4. The quadrant with the backlit parameter value is the currently selected parameter. Use the Arrow Keys to select which quadrant you wish to edit.

5. Touch Enter and a list of parameters will appear. The parameter that is highlighted is the selected parameter for the screen. The number to the right of the parameter indicates the quadrant in which it is displayed.



1 = upper left quadrant
2 = lower left quadrant
3 = upper right quadrant
4 = lower right quadrant

6. Use the Arrow Keys to highlight the new parameter to be placed in the quadrant that was selected in step 4 and touch Enter.

7. Touch Menu to return to the 4-UP CUSTOM SETUP screen.

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

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

Main Menu Options

This section describes the features listed on the main menu of the PowerView. These menu options are displayed whenever you touch Menu. The Arrow Keys allow you to scroll the items, and Enter selects the highlighted option.

Selecting a Language

From LANGUAGES, you may select ENGLISH, ESPANOL, FRANCAIS, ITALIANO, or DEUTSCH. The currently selected language is indicated by an asterisk.

Stored Fault Codes

Select this and PowerView requests and displays stored fault codes from the engine ECU. If the engine does not support this function, a “Timeout ECU Not Responding” message displays.

Engine Configuration Data

This allows you to scroll through and view the engine’s configuration data. If the engine does not support this function, a “**No Engine Configuration Data**” message displays

Service Reminders

SERVICE REMINDERS permit you to RESET REMINDERS or MODIFY REMINDERS for changing engine oil, air filters, and hydraulic oil or for servicing the engine and/or machine.

NOTE: Service Reminders are internal reminders within PowerView. Once a Service Reminder is active, warnings will show SPN 916 and FMI 17. Check PowerView Service Reminders prior to calling Technical Support.

1. Use the Arrow Keys to highlight Service Reminders and touch Enter.

2. The Service Reminders options display. Use the Arrow Keys to select either Reset Reminders or Modify Reminders, and then touch Enter.

3. If you select Reset Reminders, use the Arrow Keys to highlight the Reminder you wish to edit. Touch Enter

1. The Reminder name appears at the top of the screen. The action (ON or OFF) displays mid-screen, and two choices display at screen bottom. Touch Menu to Cancel the action. Touch Enter to choose Reset.

2. If you select Modify Reminders, use the Arrow Keys to highlight the Reminder to modify and touch Enter.

3. The Reminder name appears at top screen. The hour value displays mid-screen and allows you to set the number of hours to elapse before a Reminder prompts. Bottom screen shows Cancel and Save. Touch Cancel to discard changes and return to Reminders list.

4. Use the right Arrow Key to increment the highlighted number. Use the left Arrow Key to move to the next number space.

5. Touch Save. The Modify Service Reminder screen displays. Touch YES to save or NO to return to the Reminders list.

6. A modified Reminder displays a (+) at right of Reminder name when successfully completed. Follow the above steps to modify other Reminders.

When finished, touch Menu to return to the Main Menu.

Select Units

From SELECT UNITS, you may select how information is displayed:

- ENGLISH for Imperial units (PSI, F)
- METRIC KPA
- METRIC BAR for IS units (kPa, Bar, C).

Backlight Adjustment

ADJUST BACKLIGHT allows you to select the desired backlight intensity.

Contrast Adjustment

From ADJUST CONTRAST, you may select the desired contrast intensity.

Utilities Menu

UTILITIES provide troubleshooting features and displays information about the PowerView configuration.

Gage Data

View information for optional connected PVA (PowerView Analog)gauges.

Remove All Gauges

Reset the gage memory on the PowerView.

Software Version

This screen lists Configuration, Firmware, Languages, and Bootloader versions for this PowerView unit. You may need this information if requesting assistance from Technical Support.

Analog Input

With Analog Input highlighted, press Enter. You select from two settings:

- BACKLIGHT DIMMER: Note - The unit accepts an optional backlighting dimmer (0-1k Ωpotentiometer).

- FUEL LEVEL: touch Enter to reach the Set Low Fuel Level screen. Then, touch Enter to reach Low Fuel % screen. Use the right Arrow Key to increase, or left Arrow Key to decrease the percentage of remaining fuel at which to send a warning. The default is 20%.

  NOTE: The PowerView accepts an optional Murphy fuel sender (recommend Model ES2F) for fuel level information. Custom setup for a non-Murphy fuel sender is available. See the Fuel Sender Calibration document on the PV101-A Literature tab at www.fwmurphy.com.

OEM

The OEM menu is the last item on the Utilities menu. You must have a password to access the OEM menu. The OEM menu information can be found in section 6-2 of your service manual.

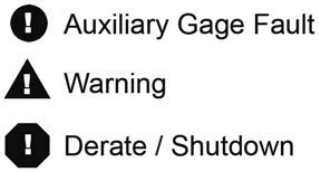
Faults and Warnings

The PowerView provides two means for detecting faults and warnings: visual LEDs on the casing (See “Faceplate Features”) and fault indicators on the display.

Visual Indication

- Amber LED (Warning)
- Red LED (Derate / Shutdown)

Fault Indicators



Auxiliary Gage Fault

Murphy’s PVA Gauges can be attached to the PowerView. If an auxiliary gage should fail, the 1-up or 4-up display will be replaced with the fault message “GAGE NOT RESPONDING”.

NOTE: The fault can only be cleared by correcting thecause of the fault condition.

Active Fault Codes

When the PowerView receives a fault code from an engine, the 1-up or 4-up display will be replaced with the active fault codes message.

Derate / Shutdown Codes

When the PowerView receives a severe fault code from an engine control unit the 1-up or 4-up display will be replaced with the SHUTDOWN message.

Acknowledging Fault Codes

1. To acknowledge and hide the fault and return to the 1-up or 4-up display, touch Enter. The display will return to the 1-up or 4-up display, but the display will contain the shutdown icon.

2. Touch Enter to redisplay the hidden fault. Touch Enter once again will hide the fault and return the screen to the 1-up or 4-up display.

Troubleshooting

You may see the following messages displayed. Each gives you specific information about the engine, ECU, or PowerView.

WAIT TO START PREHEATING - The ECU is broadcasting a ‘Wait to Start’ message. Engine manufacturers typically recommend against starting the engine while the ECU is broadcasting this message. Once the ECU stops broadcasting this message, this screen will no longer be displayed on the PowerView.

CANBUS FAILURE - The PowerView has not received any valid J1939 CAN messages for at least 30 seconds.

TIMEOUT ECU NOT RESPONDING - The PowerView sent a request to the ECU for Stored Fault Code (DM2) information, and the ECU did not respond to the request. This message on the PowerView indicates the ECU may not support Stored Fault Code (DM2) functionality over J1939.

NO STORED CODES - The PowerView sent a request to the ECU for Stored Fault Code (DM2) information, and the ECU responded. There are zero stored codes.

NO GAGE DATA - The PowerView has no record of gauges connected to the RS485 bus.

The following messages are displayed in place of a parameter value

NO DATA - The PowerView has not received data for the selected parameter for at least 5 seconds.

NOT SUPPORTED - The ECU is sending a message that it does not support this parameter.

DATA ERROR - The ECU is sending a message that there is a data error with this parameter. If not, then specifically on the PV101, FUEL LEVEL has been selected for display, and the ANALOG INPUT has been set to FUEL LEVEL, but no Murphy Fuel Sender has been connected to the analog input.

The following messages concern information about the PV101.

One of the 4-UP quadrants is empty - No parameter has been selected for display in this quadrant.

Display is not readable, either very dim or very dark - The LCD contrast may have been over or under adjusted. Press and hold the MENU key for approximately 5 seconds. This will reset the LCD contrast setting to factory default.

Appendix A-2
PowerView PV-101-C Display Module

General

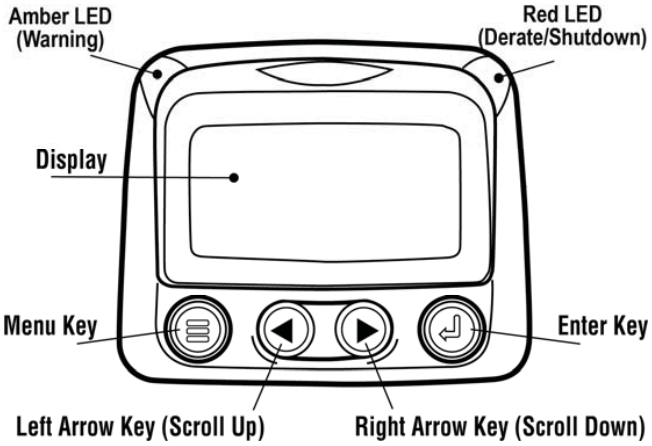
Your Lumberjack is equipped with a PowerView PV-101-C display module, a multifunctional tool that enables you to view many different engine or transmission parameters and service codes. The system allows you to accurately monitor the electronic engine and transmission installed on your Lumberjack. Back 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.

Display Parameters

The following are some of the engine and transmission parameters which may be displayed in standard or metric units as well as in English, Spanish, French, Italian, or German languages (when applicable, consult engine or transmission manufacturer for SAE J1939 supported parameters):

Engine RPM	Engine manifold air temperature
Engine hours	Current fuel consumption
System voltage	Transmission oil pressure
Percent engine load at the current RPM	Transmission oil temperature
Coolant temperature	Transmission gear position
Oil pressure	Engine configuration parameters
Fuel economy	Active fault codes
Throttle position	Stored fault codes

Faceplate Features



PowerView Faceplate Features

Keypad Functions

The keypad on the PowerView display is a capacitive touch sensing system. There are no mechanical switches to wear or stick. The keys on the keypad perform the following functions:

Menu Key - Enter or exit menu screens.

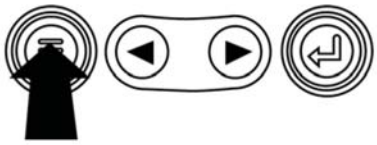
Left Arrow - Scroll the screen or move the parameter selection to the left or upward.

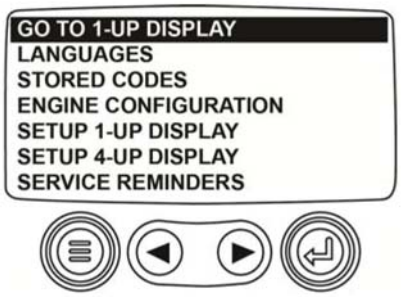
Right Arrow - Scroll the screen and move the parameter selection to the right or downward.

Enter Key - Select a menu or parameter or hide/view an active fault code.

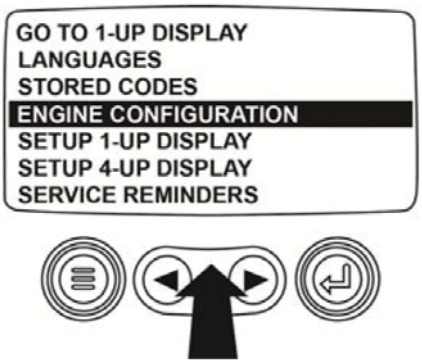
Basic Navigation

1. When Menu is touched, the main menu items are displayed.

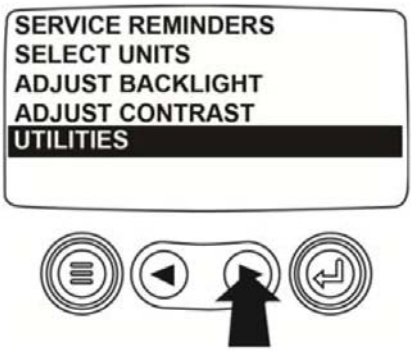




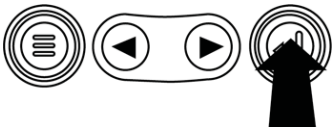
2. Touch the Arrow Keys to move the selection bar to other menu items.



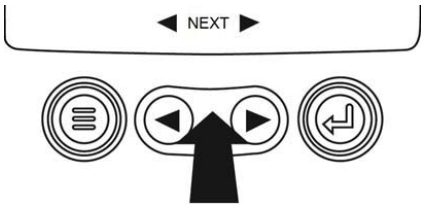
3. Some menus have multiple pages. Scroll to the top or bottom item on the current page to see other menu items on additional pages.



4. When the desired item is highlighted by the cursor, touching Enter selects that item and displays the corresponding screen.



5. Anytime the word NEXT appears above the Arrow Keys there are more screens that may be viewed. Use the Arrow Keys to scroll to the next screen of information.



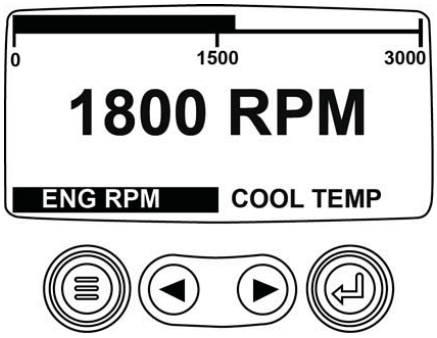
First Time Start Up

1. When power is first applied to the display, the Murphy logo appears.

NOTE: Expect a 20-minute warm up for the display with temperatures at or below -29°C/-20°F.

1. If the Engine ECU is broadcasting a 'Wait to Start' message, this screen will be shown. Engine manufacturers typically recommend against starting the engine while this message is broadcast from the ECU. Once the ECU stops broadcasting this message, this screen will no longer be displayed.

2. Once the engine has started, the single engine parameter is displayed with the engine RPM. Touchingthe Right Arrow Key displays the coolant temperature.The screen can be changed to other parameters by touching Menu.



Main Menu Options

This section describes the features listed on the Main menu of the PowerView. These menu options display whenever you touch Menu. The Arrow Keys allow you to scroll through items. Enter selects the highlighted option.

Go to 1-Up Display/Go to 4-Up Display
If you want to go to a different display, touch Enter. The alternate view is displayed.

DPF Regen*
*Murphy products are compliant with requirements for U.S. EPA Emission Standard Tier 4 Interim and EU Emissions Standard Stage IIIB for diesel engines. These engines when fitted with a DPF (Diesel Particulate Filter) can self-clean the filter of particulates. This self-cleaning is known as Regeneration. PowerView offers 3-CAN options when DPF REGEN is enabled and available in the engine ECU. For more information, find document # 1110836 on the Murphy Web site (www.fwmurphy.com).
Unless selected in the OEM Menu, DPF REGEN does not display in the Main menu. When available, the following options are presented:

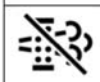
1. **AUTO DPF REGEN** – This is the factory default. Select and PowerView sends a CAN message to the ECU to perform DPF Regeneration (regen) automatically whenever needed.

2. **REQUEST DPF REGEN** – Select this and a second screen, REQUEST DIESEL PARTICULATE FILTER REGEN, displays. Use this to force a regen when autoregen is not due or is inhibited by PowerView. Touch YES (Enter) and PowerView sends a request for a regen every second for 10 seconds. If the engine does not respond, PowerView defaults back to Auto DPF Regen. You may send the request again or exit without sending a request by touching CANCEL (Menu). You return to the Main menu.

3. **INHIBIT DPF REGEN** – In cases where regen cannot be performed due to restrictions, select this to eliminate the possibility of a regen occurring. The inhibit lamp displays when the engine ECU responds to this inhibit request from PowerView. Once this option is selected, it remains in place through power cycles. When inhibit is no longer needed, you can select a different option.

The following ISO symbols indicate regen status. In each case, the symbol displays when the parameter's lamp status is broadcast from the ECU back to the PowerView.

DPF Regen ISO Symbols

Icon	PGN	SPN	Description
	64892	3697	High Exhaust Temperature (HEST) lamp indicates regeneration in process.
	64892	3703	DPF Particulate Filter Restricted lamp indicates a Regen is needed.
	64892	3698	DPF Inhibit lamp indicates an inhibited Regen status.

Selecting a Language
From LANGUAGES, you may select ENGLISH, ESPANOL, FRANCAIS, ITALIANO, or DEUTSCH. An asterisk to the right of the language indicates it is selected.

Stored Codes
Select this and PowerView requests and displays stored fault codes from the engine ECU. If the engine does not support this function, a "Timeout ECU Not Responding" message displays.

Engine Configuration
This allows you to scroll through and view the engine's configuration data. If the engine does not support this function, a "No Engine Configuration Data" message displays.

The screen may be configured to display a single engine parameter (1-up display), or four parameters at once (4-up display). Default options are provided or you may customizethe display by selecting the parameters you want.

Setup 1-Up Display

Touch Menu and use the Arrow Keys to highlight SETUP 1-UP DISPLAY, and then touch Enter. Three options are available for modification of the 1-Up display:

1. 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, and Oil Pressure.
To select USE DEFAULTS, highlight the option and touch Enter. A message indicating "RESTORED TO DEFAULTS" is displayed.

2. Custom Setup – In this option, select the parameters and order in which they will be displayed. The list is long; continue to scroll until you have seen all available parameters. To select Custom Setup, highlight and touch Enter. A list of engine parameters displays.

NOTE: The PV101 must see the parameter being broadcast over J1939 in order to select the parameter from the list.

To select a parameter, use the Arrow Keys to scroll and highlight the parameter, then touch Enter.

Selected parameters are indicated by a number to the right of it. The numbers represent the order in which the parameters will be displayed.

To deselect a parameter and remove it from the list of displayed parameters, highlight the parameter and touch Enter.

Continue to scroll and select additional parameters for the CUSTOM 1-UP DISPLAY. Touch Menu at any time to return to the CUSTOM SETUP menu.

3. Automatic Scan – (Default is OFF) Selecting the AUTOMATIC SCAN ON function will cause the 1-up display to scroll through the selected set of parameters one at a time.

Once the Use Defaults, Custom Setup and Automatic Scan functions are set, touch Menu once to return to the Main menu, or twice to display the 1-up display screen.

4-Up Display

There are two 4-up display screens available. Each option can place parameter data into one of four areas on the screen known as quadrants. Factory defaults for the first 4-up display includes coolant temperature, engine speed, oil pressure, and battery voltage. Factory defaults for the second 4-up display includes DEF (diesel exhaust fluid) Level, DPF (diesel particulate filter) active regen status, exhaust filter inlet temperature, and exhaust filter outlet temperature. You can customize each 4-up display with the parameter you define for each quadrant.

1. Touch Menu and use the Arrow Keys to highlight SETUP 4-UP DISPLAY, and touch Enter.

2. To select USE DEFAULTS, highlight the option and touch Enter. A message indicating "RESTORED TO DEFAULTS" is displayed, the default parameters listed above will be displayed.

3. To select CUSTOM SETUP, highlight the option and touch Enter. The 4-up display appears.

4. Use the Arrow Keys to switch between the two 4-up displays.

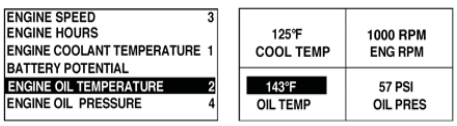
5. To edit a 4-up display, touch Enter while that 4-up displays on screen.

6. Use the Arrow Keys to select which quadrant to edit.

7. Once you select a quadrant, touch Enter and you move to a list of parameters.

NOTE: The PowerView must see the parameter being broadcast over J1939 in order to select the parameter from the list.

8. The parameter highlighted is the selected parameter for the screen. The number to the right of the parameter indicates in which quadrant it displays.



1 = upper left quadrant
2 = lower left quadrant
3 = upper right quadrant
4 = lower right quadrant

9. Use the Arrow Keys to highlight the new parameter to be placed in the selected quadrant. Touch Enter.

10. Touch Menu to return to the SETUP 4-UP CUSTOM SETUP screen.

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

12. Repeat the parameter selection process until you fill all quadrants.

Service Reminders

SERVICE REMINDERS permit you to RESET REMINDERS or MODIFY REMINDERS for changing engine oil, air filters, and hydraulic oil or for servicing the engine and/or machine. NOTE: Service Reminders are internal reminders within PowerView. Once a Service Reminder is active, warnings will show SPN 916 and FMI 17. Check PowerView Service Reminders prior to calling Technical Support.

1. Use the Arrow Keys to highlight Service Reminders and touch Enter.

2. The Service Reminders options display. Use the Arrow Keys to select either Reset Reminders or Modify Reminders, and then touch Enter.

3. If you select Reset Reminders, use the Arrow Keys to highlight the Reminder you wish to edit. Touch Enter.

4. The Reminder name appears at the top of the screen. The action (ON or OFF) displays mid-screen, and two choices display at screen bottom. Touch Menu to Cancel the action. Touch Enter to choose Reset.

5. If you select Modify Reminders, use the Arrow Keys to highlight the Reminder to modify and touch Enter.

6. The Reminder name appears at top screen. The hour value displays mid-screen and allows you to set the number of hours to elapse before a Reminder prompts. Bottom screen shows Cancel and Save. Touch Cancel to discard changes and return to Reminders list.

7. Use the right Arrow Key to increment the highlighted number. Use the left Arrow Key to move to the next number space.

8. Touch Save. The Modify Service Reminder screen displays. Touch YES to save or NO to return to the Reminders list.

9. A modified Reminder displays a (+) at right of Reminder name when successfully completed. Follow the above steps to modify other Reminders.

When finished, touch Menu to return to the Main Menu.

Select Units

From SELECT UNITS, you may select how information is displayed:

- **ENGLISH** for Imperial units (PSI, °F)
- **METRIC KPA**
- **METRIC BAR** for **IS** units (kPa, Bar, °C).

Backlight Adjustment

ADJUST BACKLIGHT – Use the Arrow Keys to brighten or darken the backlight intensity.

Contrast Adjustment

ADJUST CONTRAST – Use the Arrow Keys to lighten or darken the text and graphics.

Utilities Menu

UTILITIES is the last item on the Main Menu. The Utilities menu provides troubleshooting features and other information about the PowerView configuration.

Gage Data

View data for optional connected PVA gages. When Slave Active is enabled, gage data is not available.

Remove All Gages

Reset the gage memory on the PowerView. When Slave Active is enabled, this function is not available.

Software Version

This screen lists Configuration, Firmware, Languages, and Bootloader versions for this PowerView unit. You may need this information if requesting assistance from Technical Support.

Fault Conversion

View/Edit the J1939 fault code version. Use the Arrow Keys to move between Versions, and then touch Enter to select a version.

> NOTE: There are four methods for converting fault codes. The PowerView always looks for J1939-Version 4.
>
> However, PowerView can be set to read one of three other J1939 versions, if Version 4 is not used/unavailable. Most ECU's use Version 4, so adjustment of this menu option is rarely required.

Upon receiving an unrecognizable fault, change to a different J1939 Version in the list. 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 unused J1939 Version and continue to check the SPN number.

Analog Input

With Analog Input highlighted, press Enter. You can select between two settings:

1) BACKLIGHT DIMMER, this is in factory default upon first use. The unit accepts an optional backlighting dimmer (0-1k Ω potentiometer).

2) FUEL LEVEL, touch Enter to reach SET LOW FUEL LEVEL screen. Then, touch Enter to reach LOW FUEL % screen. Use the right Arrow Key to increase, and left Arrow Key to decrease the percentage of remaining fuel at which to send a warning. The default is 20%.

> NOTE: The PowerView accepts optional Murphy fuel sender (recommend Model ES2F) for fuel level information. A custom setup for a non-Murphy fuel sender is available. For more information, see FUEL SETPOINTS, page 31 (OEM Menu).

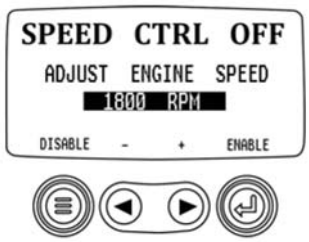
Engine Speed Control

This option must be ON in the OEM Menu for functionality to be available from the Utilities Menu.

1) From the Engine Speed Control screen, touch Enter to reach the Speed Control screen.

2) To change the setting of the engine speed via TSC1; use the right Arrow Key to increase or left Arrow key to decrease the throttle setting.

3) Once the target speed is reached, select ENABLE (Enter) to turn ON the TSC1 throttling control. (Use Disable to turn throttling control OFF and discard changes).



> NOTE: Once enabled Engine Speed Control will stay enabled even through power cycles. To turn OFF, you must disable the feature from the SPEED CTRL screen.

OEM

The OEM menu is the last item on the Utilities menu. You must have a password to access the OEM menu. The OEM menu information can be found in section 6-2 of your service manual.

Faults and Warnings

The PowerView provides two means for detecting faults and warnings: visual LEDs on the casing (*Amber* in the upper left corner, and *Red* in the upper right corner) and fault indicators on the display.

Visual Indication

- Amber LED (Warning)
- Red LED (Derate / Shutdown)

Fault Indicators

Auxiliary Gage Fault

Warning

Derate / Shutdown

Auxiliary Gage Fault

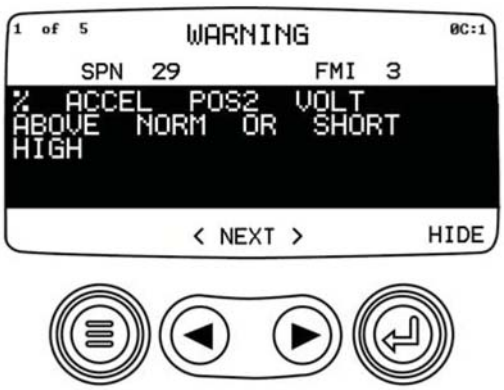
Murphy's PVA Gauges can be attached to the PowerView. If an auxiliary gage should fail, the 1-up or 4-up display will be replaced with the fault message "GAGE NOT RESPONDING".

NOTE: The fault can only be cleared by correcting the cause of the fault condition (See Troubleshooting in this document).

Active Fault Codes

When the PowerView receives a fault code from an engine, the 1-up or 4-up display will be replaced with the active fault codes message. See following fault example:

Example: Active Fault Code screen



Derate / Shutdown Codes

When the PowerView receives a severe fault code from an engine control unit the 1-up or 4-up display will be replaced with the SHUTDOWN message.

Acknowledging Fault Codes

1. To acknowledge and hide the fault and return to the 1-up or 4-up display, touch Enter. The display will return to the 1-up or 4-up display, but the display will contain the shutdown icon.

2. Touch Enter to redisplay the hidden fault. Touch Enter once again will hide the fault and return the screen to the 1-up or 4-up display.

Troubleshooting

WAIT TO START PREHEATING - The ECU is broadcasting a 'Wait to Start' message. Engine manufacturers typically recommend against starting the engine while the ECU is broadcasting this message. Once the ECU stops broadcasting this message, this screen will no longer be displayed on the PowerView.

CANBUS FAILURE - The PowerView has not received any valid J1939 CAN messages for at least 30 seconds. Check wiring, CANBUS, termination resistors, and Engine ECU address in the OEM Menu.

TIMEOUT ECU NOT RESPONDING - The PowerView sent a request to the ECU for Stored Fault Code (DM2) information, and the ECU did not respond to the request. This message on the PowerView indicates the ECU may not support Stored Fault Code (DM2) functionality over J1939.

NO STORED CODES is displayed - The PowerView sent a request to the ECU for Stored Fault Code (DM2) information. The ECU responded: There are zero stored codes.

NO GAGE DATA is displayed - The PowerView has no record of gauges connected to the RS485 bus.

NO DATA is displayed in place of a parameter value The PowerView has not received data for the selected parameter for at least 5 seconds.

NOT SUPPORTED is displayed in place of a parameter value.

This means the data received for this parameter is not valid or not supported.

DATA ERROR is displayed in place of a parameter value. The ECU is sending a message that there is a data error with this parameter. Alternatively, (PV101 only) FUEL LEVEL has been selected for display, ANALOG INPUT has been set to FUEL LEVEL, but no Murphy Fuel Sender has been connected to the analog input.

One of the 4-UP quadrants is empty.
No parameter has been selected for display in this quadrant.

Display is not readable, either very dim or very dark.
The LCD contrast may have been over or under adjusted. Press and hold the MENU key for approximately 5 seconds. This will reset the LCD contrast setting to factory default.

PVA Gages not working.
When PVA Gages are connected and do not seem to work, go to the Utilities menu and select Remove all Gages.