Operator's Manual

CHIP CARRYDOZER®
CHD100

For machines with serial numbers CHD100-103290 to 103296.

Allied Wagner

80-975 10/5/2015 Printed in USA

⚠ 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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General

Figure 1-1 Wagner Carrydozer

1.1 Introduction

This manual is your guide to correct operation of the Wagner Carrydozer® series. 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's your responsibility to make certain that your Carrydozer 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 Wagner Carrydozers are designed and developed specifically to move material faster, further, and at less cost than a traditional machine. It is unique in that it can carry a load and doze at the same time, thus greatly increasing its efficiency. The weight of the carried load adds to the traction needed to doze a volume comparable to the bucket load.

Rugged construction and ease of service contribute to the Carrydozers long life and low maintenance. And, the Carrydozers superior visibility and responsive controls result in a fast, efficient and safe operation.

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

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

1.2 Intended Use Statement

This machine is designed for the dozing of raw materials. Use in any other way is considered as 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 dealer of any liability resulting from damage or injury.

1.3 Machine Identification

The model and serial number of your vehicle provide Allied Systems with a way to keep record of each machine. Each Wagner Carrydozer has the S.N. stamped into the chassis, on the left side of the machine in the front as shown in Figure 1-2. Additionally, a nameplate is mounted on the inside or outside of the cab. The name plate provides the model and serial number of your vehicle (See Figure 1-3).

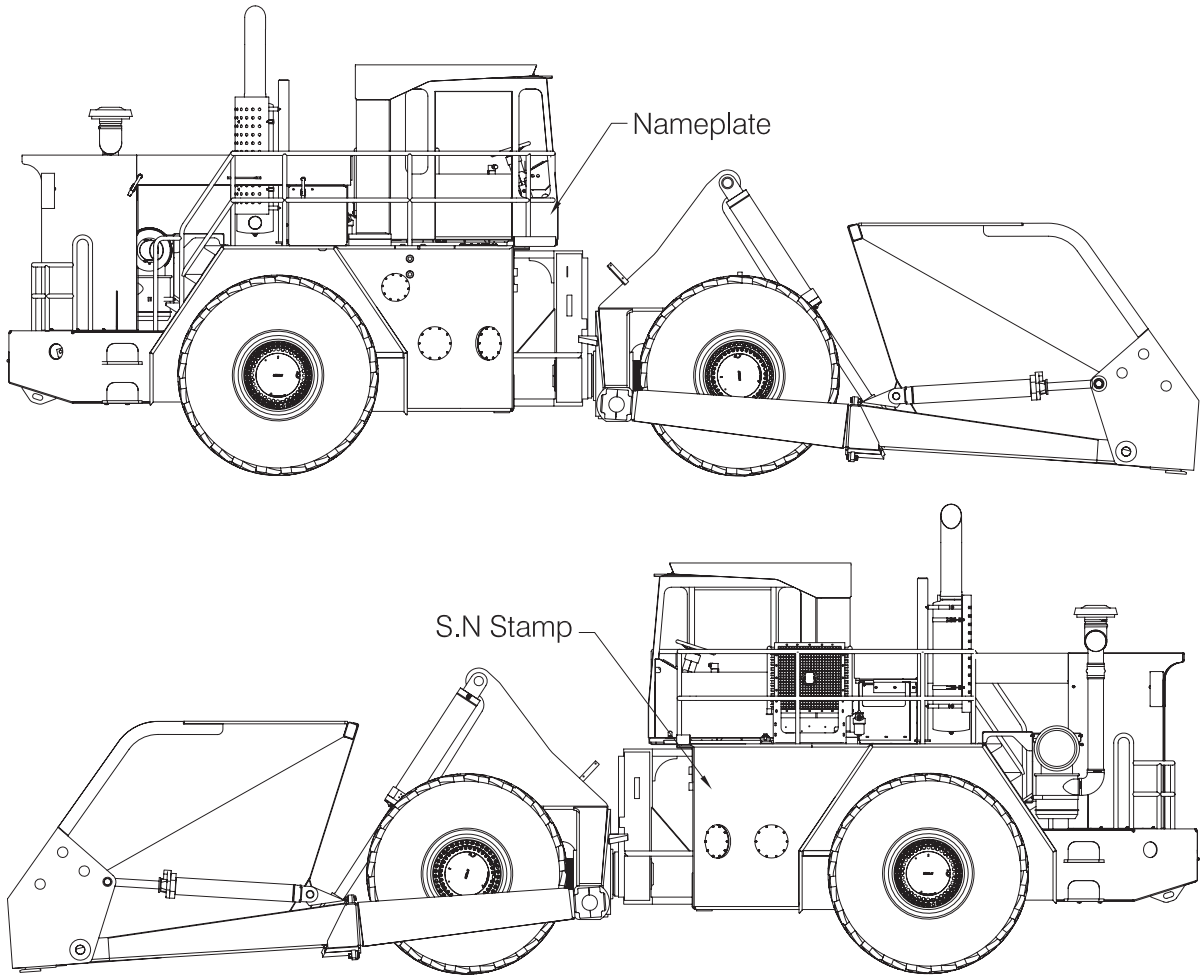


Figure 1-2 Machine Identification

NOTE: The importance of the machine's model and serial numbers 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.

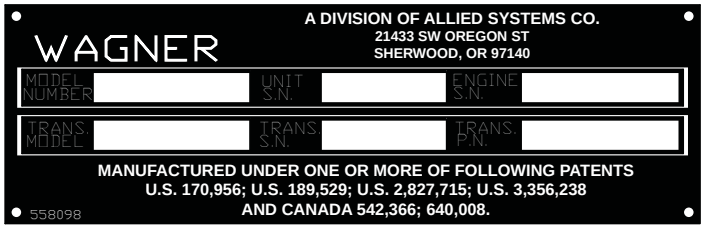


Figure 1-3 Number Plate

1.4 After Receiving Carrydozer

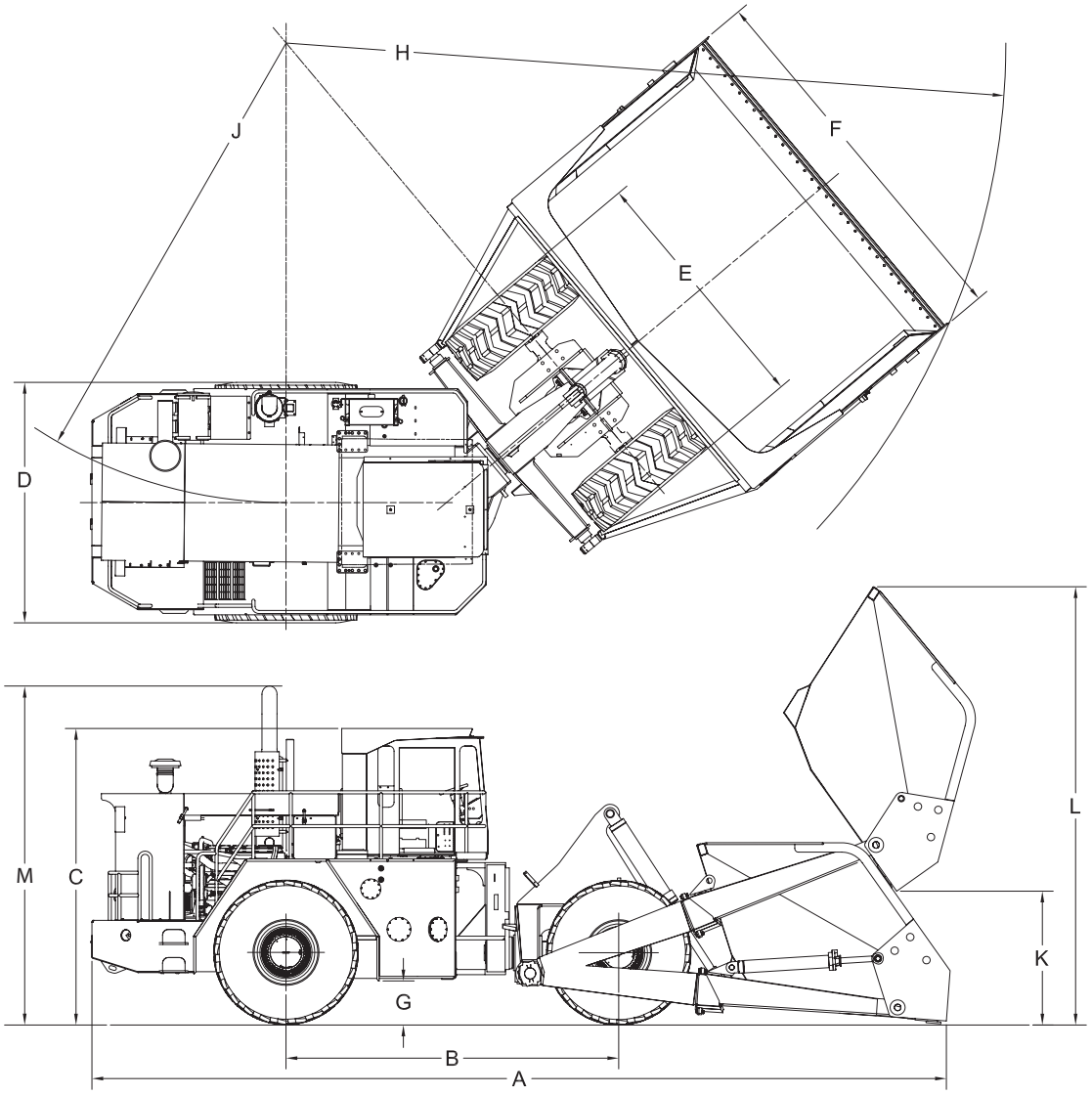
IMPORTANT: Your Carrydozer requires fluid ballast (ie, hydroflated tires) for optimal tractive effort. Some Carrydozers are shipped without this fluid ballast. Make sure to hydroflate the tires on your machine if necessary before beginning work.

Use one of the following for fluid ballast, depending on worksite conditions or preferences:

1. Water
2. Water/Anti Freeze
3. Water/Calcium Chloride
4. Bio Tire, environmentally friendly liquid for better traction.

Contact Allied Systems Company Service Parts Department at 503-625-2560 for assistance if necessary.

1.5 Specifications, CHD100 / CD1000



Dimensions

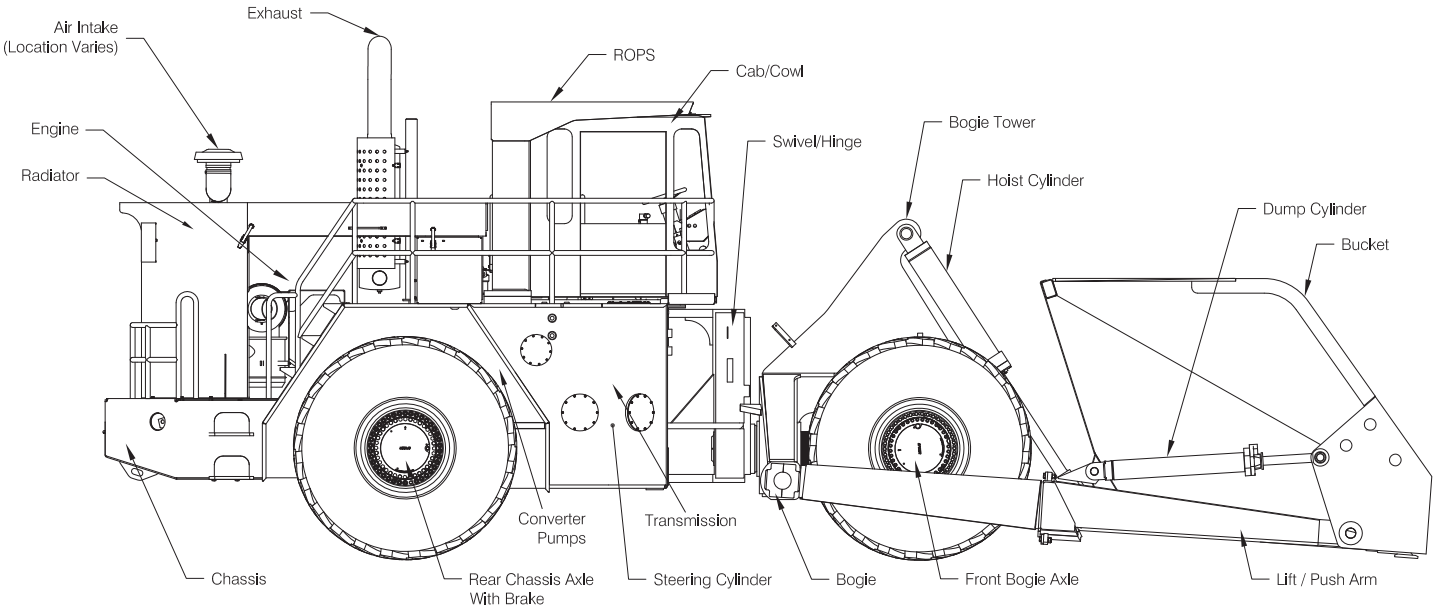
*A.	Overall Length	37’ 11” (11557 mm)
B.	Wheelbase	14’ 9” (4496 mm)
C.	Height to Top of Cab	13’ 2” (4013 mm)
D.	Outside Chassis Width (Tires)	10’ 8” (3251 mm)
E.	Outside Bogie Width (Tires)	11’ 3” (3429 mm)
* F.	Bucket Width	16’ 7” (5054 mm)
G.	Ground Clearance (Chassis)	1’ 11” (584 mm)
	Ground Clearance (Differential)	2’ 0” (610 mm)
H.	Turning Radius - Outside Bucket	31’ 11” (9728 mm)
J.	Turning Radius - Centerline Machine	20’ 5” (6223 mm)
K.	Maximum Dump Height	5’ 11” (1803 mm)
L.	Maximum Height in Dump Position	19’ 5” (5918 mm)
M.	Height to Top of Exhaust	14’ 9” (4541 mm)

*** OPTIONAL EQUIPMENT:** Standard and special options are available. Contact your Wagner dealer for details.

Weights and Functions (approximate)

Unit Weight/Hydroflation.....93,300 lbs (42,358 kg)
Bogie End/Hydroflation.....56,550 lbs (25,674 kg)
Chassis End/Hydroflation.....36,750 lbs (16,685 kg)
Dump Angle at Maximum Height.....54°
Bucket Push & Carry Capacity (CHD).....80 cu/yd(61 cu/m)
Bucket Lift & Carry Capacity (CHD).....40 cu/yd(30.6 cu/m)
Bucket Push & Carry Capacity (CHD).....100 cu/yd(76.5 cu/m)
Bucket Lift & Carry Capacity (CHD).....50 cu/yd(38.2 cu/m)
Bucket Push & Carry Capacity (CD).....40 cu/yd(30.6cu/m)
Bucket Lift & Carry Capacity (CD).....20 cu/yd(15.3 cu/m)
Articulation.....40° each way
Oscillation.....15° each way
Maximum Bucket Forward Tip.....77°
Side Tilt (Optional on 80 yd bucket)..6” each way from horizontal

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.



Engine: Cummins QSX-15
Max Horsepower.....535 @ 2100 RPM
Max Torque.....1806 Ft/Lbs @ 1400 RPM
Bore and Stroke.....5.4" x 6.7"
No. of Cylinders.....6
Displacement.....915 Cu/In (15 liters)

Engine: Caterpillar C-15
Max Horsepower ..... 540 @ 2100 RPM
Max Torque ..... 1819 Ft/Lbs @ 1400 RPM
Bore and Stroke ..... 5.4" x 6.5"
No. of Cylinders 6
Displacement ..... 893 Cu/In (15 liters)

Air Cleaner.....Donaldson Two Stage Dry Type
Electrical System Type..... 24 Volt Negative Ground 24 Volt Start
Alternator ..... 100 AMP
Circuit Breakers (lights) ..... varies *
Circuit Breakers (accessory)..... varies *
Batteries (2) ..... 12 Volt-8D @ 205 AMP Hr. each

Torque Converter:
Clark 8000 Series Single Stage, 3 Elements
Stall Torque Ratio 2.292:1

Transmission:
Clark 8000 Series Power Shift - 4 Speeds Fwd/Rev

Range	Ratio	Speed (Unladen)
1	4.07:1	3.5 mph (5.6 km/h)
2	2.27:1	6.2 mph (9.9 km/h)
3	1.29:1	10.5 mph (16.8 km/h)
4	0.71:1	18.1 mph (29.1 km/h)

* Circuit protection provided by circuit breakers and fuses of appropriate amperage.

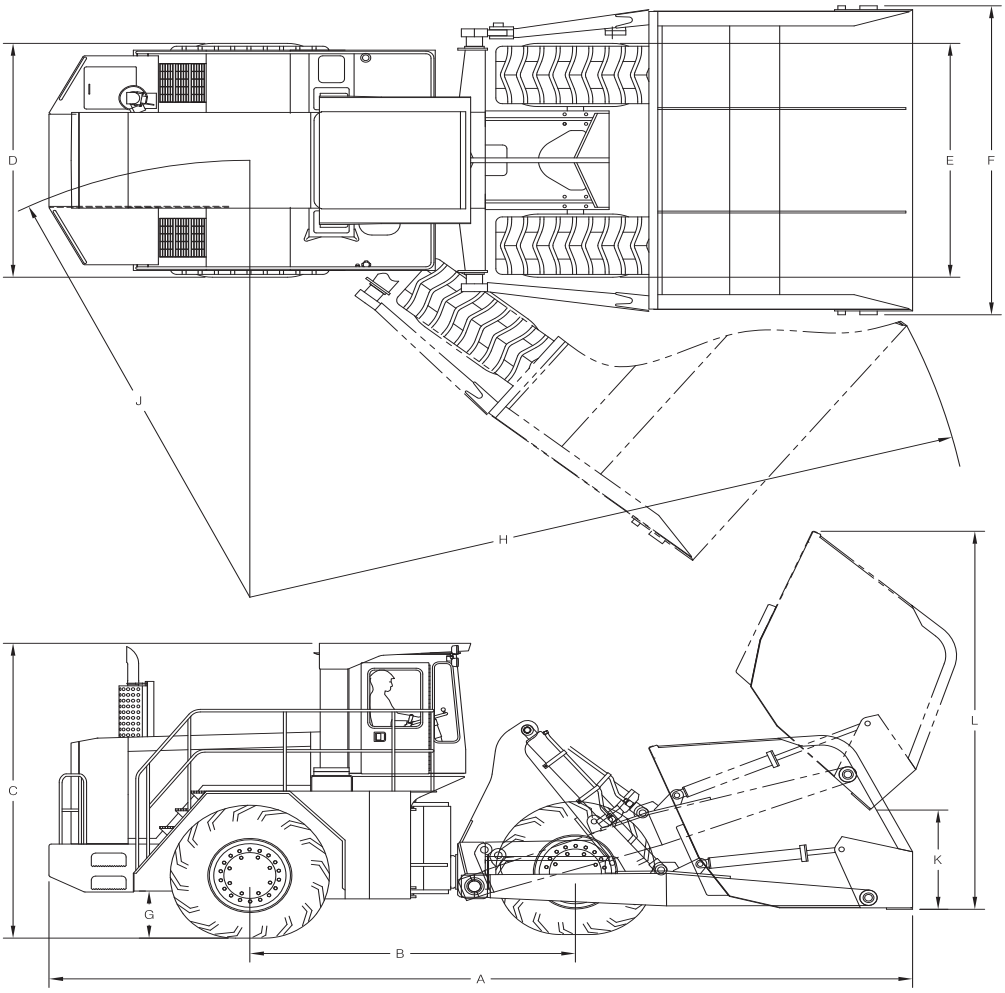
Axles
Make.....Clark
Model (Chassis).....No Spin with Brake
Model (Bogie) .....Posi-Torque
Type ..... Planetary
Brakes (Chassis Only) Hydraulically Actuated/Force Cooled/Wet Disc
Carrier Ratio 4.857:1
Planetary 6.250:1
Total Reduction..... 30.356:1

Tires
Size .....29.50 x 29 Radial
All Tires Must Be Hydroflated

Hydraulic System
Implement Pump..... 57 GPM @ 1900 Engine RPM
Steering Pump..... 77 GPM @ 1900 Engine RPM
Brake Pump..... 6 GPM @ 1900 Engine RPM
Cooler Pump..... 12 GPM @ 1900 Engine RPM
JW/CAC Fan Pump..... 33.6 GPM @ 2100 Engine RPM
Brake Cooling Pump..... 10 GPM @ 2000 Engine RPM
Steering Cylinder (2) ..... 5" x 35.4" (127mm x 899mm)
Dump Cylinder (2) ..... 5" x 36.5" (127mm x 927mm)
Hoist Cylinder (2) ..... 8" x 40.9" (203mm x 1039mm)
Side Tilt Cylinder ..... 6" x 5" (152mm x 127mm)

Service Refill Capacities
Fuel Tank .....295 Gals (1117 liters)
Hydraulic Oil .....255 Gals (965 liters)
Cooling System.....40 Gals (151 liters)
Transmission Circuit .....23 Gals (87 liters)

1.6 Specifications, CHD 60 / CD600



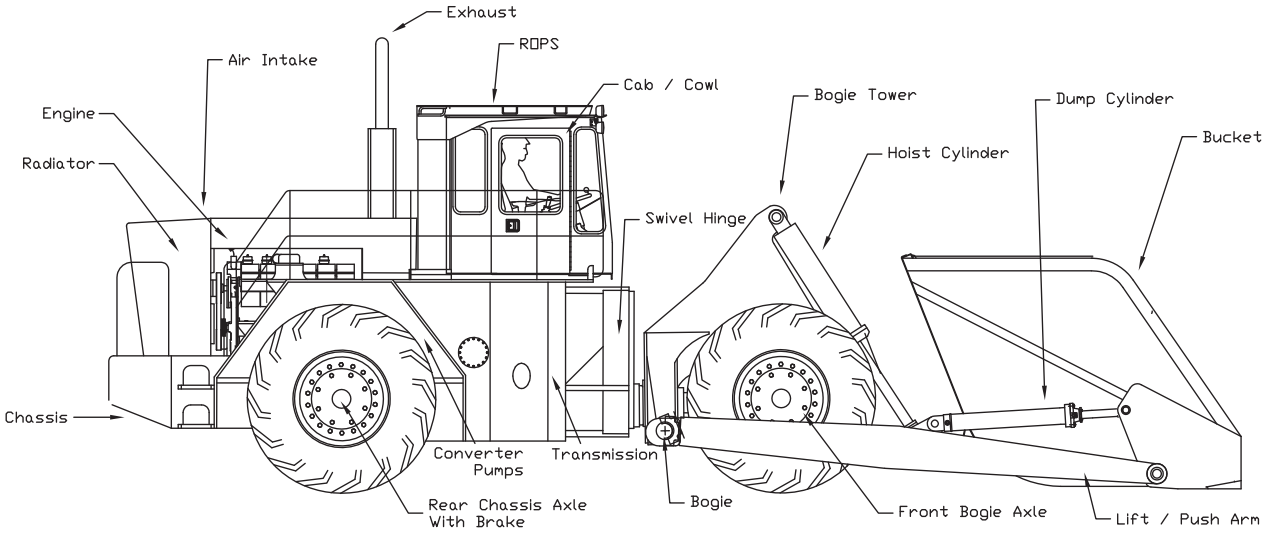
Dimensions

*A.	Overall Length	33’ 2” (10109mm)
B.	Wheelbase	12’ 5” (3785mm)
C.	Height to Top of Cab	12’ 10” (3912mm)
D.	Outside Chassis Width(Tires)	10’4”(3150mm)
E.	Outside Bogie Width (Tires)	10’ 4” (3150mm)
* F.	Bucket Width	13’ 4” (4064mm)
G.	Ground Clearance (Chassis)	1’ 6” (457mm)
	Ground Clearance (Differential)	1’ 8” (508mm)
H.	Turning Radius - Outside Bucket	27’ 10” (8484mm)
J.	Turning Radius - Centerline Mach	19’ 0” (5791mm)
K.	Maximum Dump Height	4’ 2” (1270mm)
L.	Maximum Height in Dump Position	17’ 8” (5385mm)

*** OPTIONAL EQUIPMENT:** Standard and special options are available. Contact your Wagner dealer for details.

Weights and Functions

Unit Weight/Hydroflation	83,400 lbs (37,800kg)
Bogie End/Hydroflation	49,200 lbs (22,300kg)
Chassis End/Hydroflation	34,200 lbs (15,500kg)
Dump Angle at Maximum Height	60°
Bucket Push & Carry Capacity (CHD)	60 cu/yd(45.8cu/m)
Bucket Lift & Carry Capacity (CHD)	30 cu/yd(22.9 cu/m)
Bucket Push & Carry Capacity (CD)	30 cu/yd(22.9 cu/m)
Bucket Lift & Carry Capacity (CD)	15 cu/yd(11.4 cu/m)
Articulation	38° each way
Oscillation	15° each way
Maximum Bucket Forward Tip	78°
Side Tilt (Optional)	6” each way from horizontal



Air Cleaner.....Farr Air Filter and Donaldson Precleaner
Electrical System.....Type 24 Volt Negative Ground/24 Volt Start
Alternator.....100 AMP
Circuit Breakers (lights).....30 AMP
Circuit Breakers (accessory).....17 AMP
Batteries (2).....12 Volt-8D @ 205 AMP Hr. each

Torque Converter
Clark C8612 .....Stall Ratio 2.54:1

Transmission
Clark 6422 Modulated, 4 Speeds Fwd/Rev

Range	Ratio	Speed (Unladen)
1	4.393:1	3.0 mph (4.8 km/h)
2	2.454:1	5.8 mph (9.3 km/h)
3	1.385:1	10.0 mph (16.0 km/h)
4	0.774:1	17.0 mph (27.0 km/h)

Axles
Make.....Clark
Model (Chassis).....No Spin with Brake
Model (Bogie).....Posi-Torque
Type.....Planetary
Brakes.....Spring Actuated/Sump Cooled/Wet Disc
Carrier Ratio.....6.286:1
Planetary Ratio.....4.667:1
Total Reduction.....29.330:1

Tires
Size.....29.5 x 25 Radial
All Tires Must Be Hydroflated

Hydraulic System
Implement Pump..... 70 GPM @ 2200 Engine RPM
Steering Pump..... 70 GPM @ 2200 Engine RPM
Brake Pump..... 12 GPM @ 2200 Engine RPM
Tilt/Brake Cooling Pump (if equipped).13 GPM @ 2200 Engine RPM
Steering Cylinder (2) ..... 5” x 24” (127mm x 610mm)
Dump Cylinder (2) ..... 5” x 37” (12mm x 940mm)
Hoist Cylinder (2)..... 8” x 36” (203mm x 915mm)

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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

Remain at least 25 feet (or in accordance with local regulations) from high voltage electrical wires. Failure to do so may result in injury or death and will damage equipment.

2.5 Rollover Protection Structure (ROPS)

Your Carrydozer has been designed to minimize the potential for a rollover accident. Should a rollover accident occur Wagner Carrydozers are fitted with a Rollover Protection Structure (ROPS).

What is a Rollover Protection Structure?

The ROPS is a structure and attachment system designed to meet specific standards and serves the purpose of reducing the possibility of an operator being injured should the machine roll over. In case of a roll over, the protective structure is designed to absorb energy, deform permanently, and maintain a "zone of protection" for the operator. The ROPS frame must pass a series of static and dynamic crush tests. These tests examine the ability of the ROPS to withstand various loads to verify that the protective zone around the operator station remains intact in an overturn. The tests are extensive and destroy the rollover protective structure.

Seatbelts

The ROPS and cab provide a degree of safety during overturns, but operators need more protection. **All operators must wear seatbelts!** Use of a seatbelt ensures that the operator remains securely in the "zone of protection." Seat belts restrain and keep the operator from being thrown against the frame, through a window, or out the door. Seatbelts and seatbelt anchors must be maintained and kept in a functional or operable condition at all times.

Avoiding Rollovers

A rollover can occur on any topography given the right circumstances. All operators should be provided with information on rollover hazards they are likely to encounter, and must be supervised until they are competent to work on their own. Facility managers and operators should take measures to reduce the possibility of rollover hazards. For example:

1. Restricting the places where the machine is to be used.
2. Restricting the speed at which the machine is to be operated.
3. Restricting the use of the machine on the basis of operator competence.
4. Using a different machine, or equipment better suited for the given task.

Replacing your ROPS

It is the position of Allied Systems Company that repair of a modified or damaged ROPS is not possible; the effects of modifications or damage to the strength of steel or on the adequacy of the attachment systems cannot be predicted. The ROPS, including attachment hardware, must be replaced if any of the following has occurred:

1. When visible damage has been sustained, such as cracks, tears, dents, or bends in any member or weld.
2. A machine fire where the fire burned in close proximity to the ROPS.
3. Any time the machine has rolled over.
4. Modifications have been made to any part of the ROPS.

A ROPS must be correctly installed. Installation instructions must be followed. It is crucial that the specified installation hardware be used. A ROPS should never be modified by drilling, cutting, welding, or by any other means. Modifications to a ROPS may seriously weaken the structure and cause it to fail during an overturn. Modifications of any kind will **void** the certification. For questions or concerns, please contact your local dealer or Allied Systems Company Service Department at (503) 625-2560.

2.6 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.

2.7 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.

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.

- 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.

2.8 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.

2.9 Electrical Hazards

- An electric shock could be fatal. Ensure power to the Carrydozer 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.

2.10 Hot Oil Hazards

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

2.11 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.

2.12 Fire Safety

⚠ 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 at least a fire extinguisher at hand.
- Hydraulic fluid is flammable. Do not weld on or near pipes, tubes, or hoses that are filled with fluid.
- Store flammable starting aids in a cool, well ventilated location.
- Remember, there is always a risk of fire.

Fire 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 full working order.
- Fire prevention features provided by the manufacturers should be maintained in operational condition and should be used to supplement the operator's fire prevention efforts. In no case should the features be used or assumed as replacement for diligent operator efforts at preventing fires.

Fire Suppression

- Do not panic!
- Stop the machine and turn off the engine in the clearest area available.
- Lower the bucket.
- If your machine is equipped with a fire suppression system, and that system has not automatically been activated, manually activate the system.

⚠ 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 recharge or replace the extinguishers and fire suppression system before returning to work.

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Section 3

Instruments and Controls

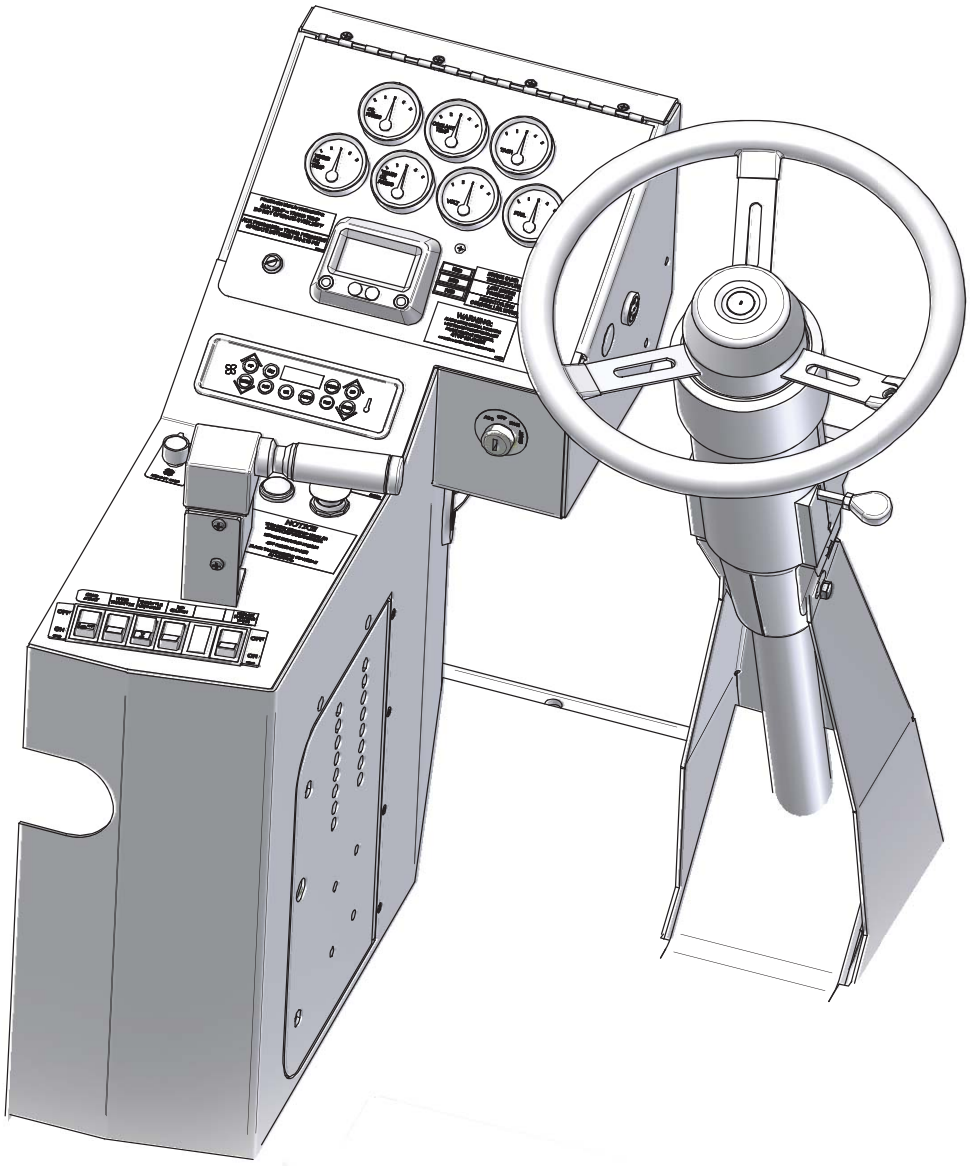


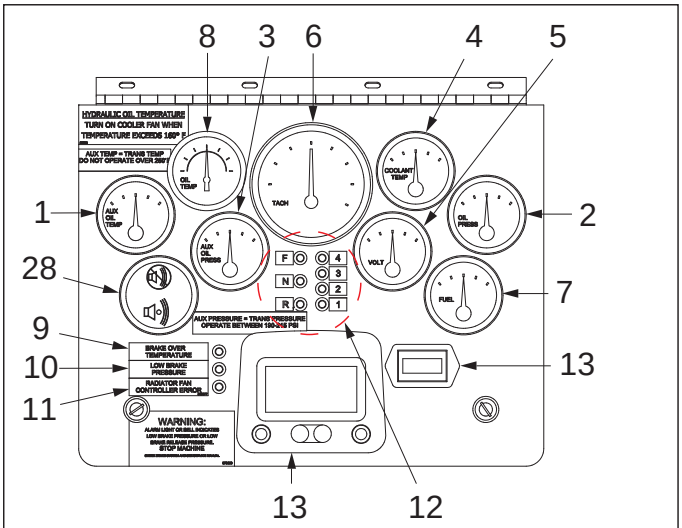
Figure 3-1 Instruments & Controls

3.1 General

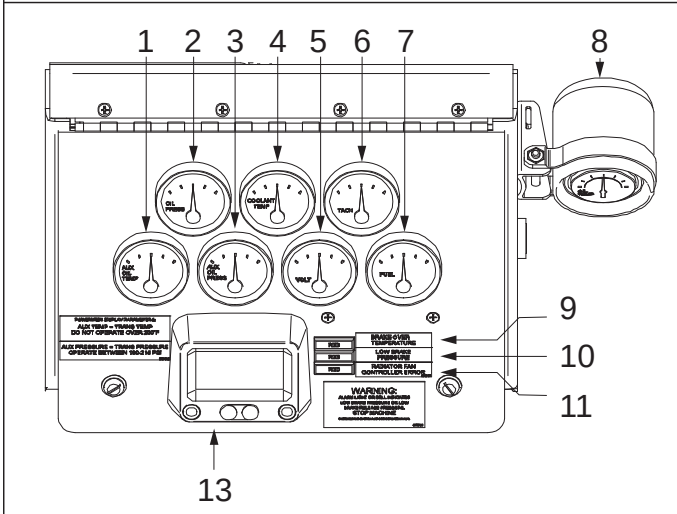
Become thoroughly familiar with the location and use of all instruments and controls before operating this machine. Check all instruments immediately upon starting, again after reaching operating temperatures, and at frequent intervals during operation to assure proper care through prompt detection of irregularities. If any of the instruments do not register properly, stop the engine and have the problem corrected as soon as practical. If the PowerView red warning indicator light (top right indicator light) is illuminated, shutdown the machine immediately (see page 3-19).

3.2 Instruments (Standard Configuration)

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



Serial Numbers: 103294 and above



Serial Numbers: 103290,103291,103292,103293

Figure 3-2 Instrument Panel

1. Transmission Oil Temperature Gauge
Displays transmission oil temperature. Temperature will vary depending on drive-train loading and ambient conditions. Do not continuously operate at temperatures above 250 F.

2. Engine Oil Pressure Gauge
Displays engine lubricating oil pressure; refer to engine manufacturer for normal operating range. Check engine oil level using dipstick according to manufacturer's recommended practices.

⚠ CAUTION

Should this pressure drop below engine manufacturer's specifications during operation, STOP THE ENGINE IMMEDIATELY AND DETERMINE THE CAUSE.

3. Transmission Oil Pressure Gauge
Displays transmission oil pressure. Normal pressure range at operating temperature is 180-220 psi.

4. Radiator Coolant Temperature
Displays engine coolant temperature. If the temperature holds steady at 220° F 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. Loss of coolant will result in an incorrect temperature reading.

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

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

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

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

9. Brake Cooling Over Temperature Warning Light
A warning light on the dash signals the operator if the brake cooling hydraulic oil exceeds 250°F (See item 8).

10. Low Brake Pressure Warning Light
A warning light on the dash signals the operator if the accumulator is under 1200 psi, or if a low actuator pressure condition exists. It is normal for the light to come on when starting the machine, but it should go off within 10 seconds. If the warning light stays on there is a problem in the charge circuit, and the system needs to be checked. A warning will also sound if the brake actuator pressure falls below 1200 psi (See item 10.

11. Radiator Fan Controller Error
A warning light on the dash signals the operator if there is an error with the radiator fan.

12. Direction and Gear Indicator Lights (Used with Joystick Gear Shift option only)

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

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

"R" Reverse
LED is illuminated when Transmission Controller is in the reverse position.

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

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

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

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

13. Powerview Display Module
The Powerview Display Module is a multi-function tool that enables the operator or service personnel to view many different engine parameters as well as engine service codes (see Section 3.14 for more information regarding the operation of the Powerview Display Module).

3.3 Operation Controls (Standard Configuration)

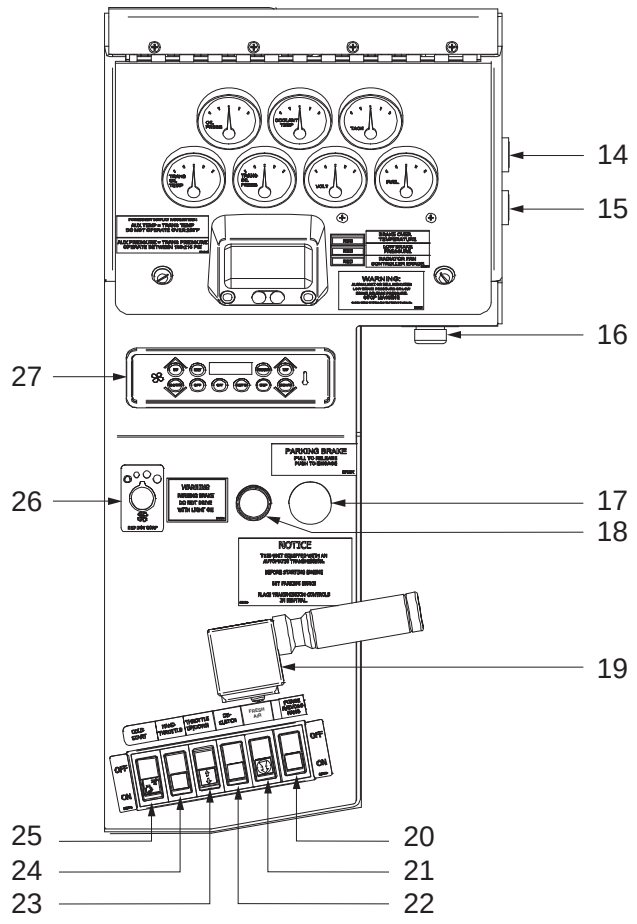


Figure 3-3 Left Hand Console

14. Low Brake Pressure Warning Alarm
An alarm will sound when the hydraulic pressure in the brake accumulators drops below 1200 psi (See item 14).

15. Brake Cooling Over Temperature Warning Alarm
An alarm will pulse when the brake cooling hydraulic oil exceeds 250° F (See item 8).

16. 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.

17. Parking Brake Control
To apply the parking brakes, pull the button out. Applying the Parking Brake will also put the Transmission in neutral. To release the brakes push the button in.

NOTICE

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

18. Parking Brake Indicator Light (red)
This light indicates that the parking brake is ON, and the key switch is ON.

19. Transmission Direction and Range Control

- Push forward to the "F" position to engage in forward.
- Center in the "N" position for 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 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.

20. Purge Radiator/CAC & Oil Cooler Fan Switch
Depressing this momentary switch reverses the fan direction to blow debris off the front of the radiator/ CAC and oil cooler. The fan controller will sense this signal and evaluate if the fan can be slowed, stopped and then rotated in the opposite direction for several seconds. This is a pre set cycle after which the fan will return to its normal direction and operation.

Note: Once the fans are in purge direction, it is advisable to bring the engine rpm to high idle to achieve maximum air flow.

21. Fresh Air Cab Pressurizer Switch
Brings filtered, fresh air from outside into the cab.

22. 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.

23. Hand Throttle Up/Down Switch
Adjusts RPM's up or down when adjacent switch (item 24) is engaged.

24. Hand Throttle Switch On/Off
Overrides foot throttle. To engage flip switch into the on position. Used with item 23.

NOTE: For engine warm up only.

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

26. Remote Ceiling Evaporator Fan Switch
Twist clockwise / counterclockwise to adjust airflow of the ceiling mounted A/C unit. Four adjustments: Off-Low-Medium-High.

27. Cab Environmental Controls
Controls Heat / Air Conditioning

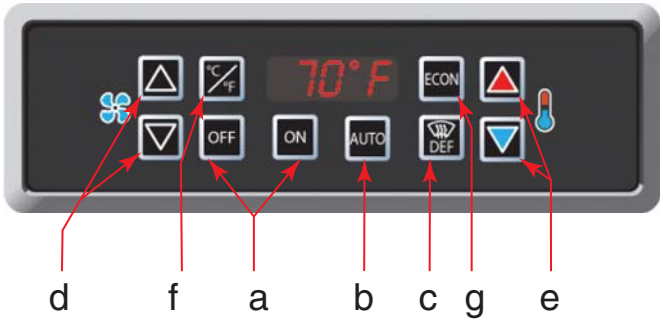


Figure 3-4 Cab Environmental Controls

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. C/F (Celsius/Fahrenheit)
Toggles the display units between degrees Celsius and degrees Fahrenheit. The display will show the units selected.

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

28. PowerView Audible Alarm
The PowerView alarm will sound when the engine ECM sends a warning or shutdown signal. Low oil pressure and high coolant temperature are two conditions that will result in a warning or shutdown condition. Pressing the silencer button will temporarily silence the audible tone for two minutes on warnings and 30 seconds on shutdown conditions.

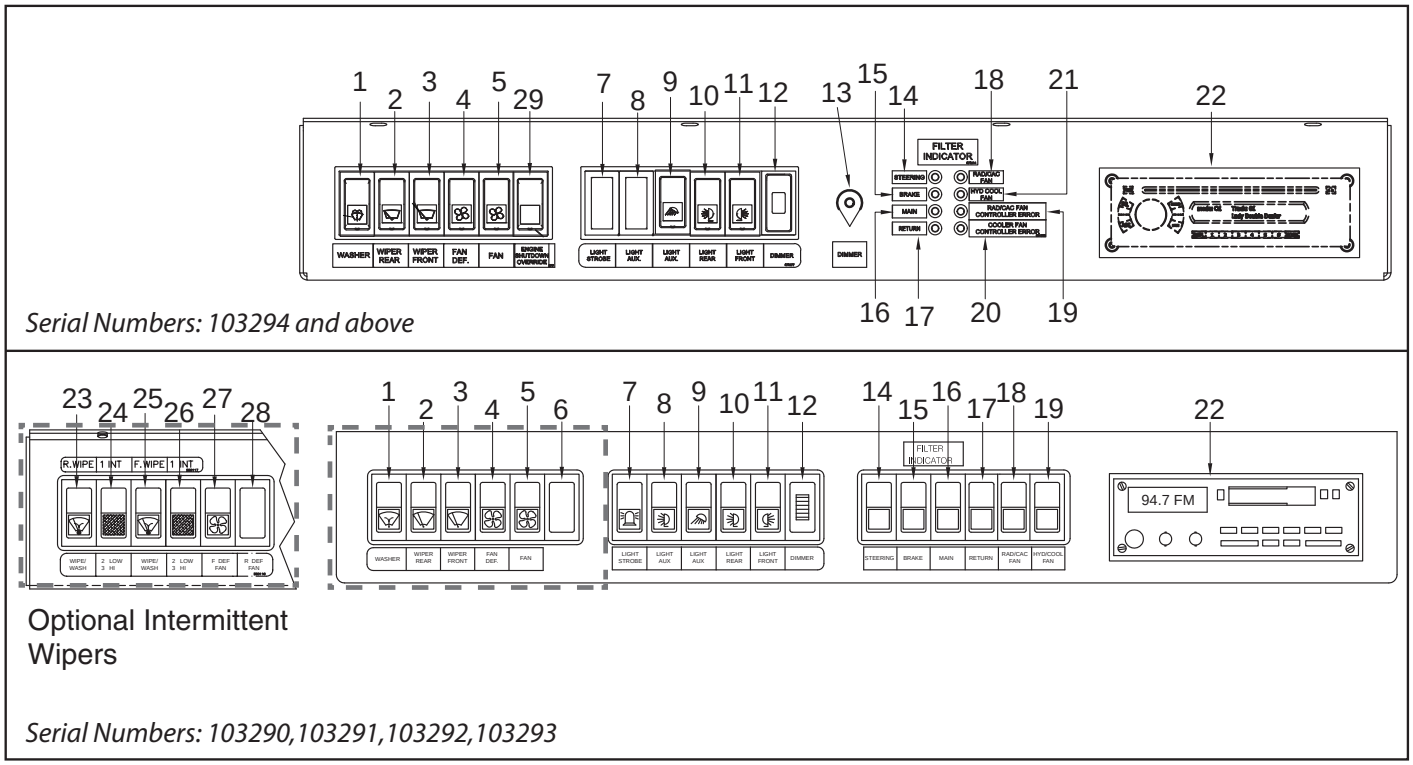


Figure 3-5 Overhead Controls

3.4 Overhead Controls

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

1. **Windshield Wash Switch**
   Three position: Front
   Off
   Rear
2. **Rear Windshield Wiper ON / OFF Switch**
   Three position: Off
   Low
   High
3. **Front Windshield Wiper ON / OFF Switch**
   Three position: Off
   Low
   High
4. **Defroster Fan Switch - Front**
   Two position: Off
   On
   A second switch is located on the fan for low-high.
5. **Fan Switch Rear Window (Option)**
   Two position: Off
   On
   A second switch is located on the fan for low-high.
6. **Blank**
7. **Strobe Light Switch**
   ON / OFF switch for ROPS mounted strobe light/beacon.
8. **Auxiliary Light Switch (Optional)**
   Auxiliary light is mounted on the front of the ROPS.
9. **Auxiliary Lights Switch (Optional)**
   On / Off switch for rear ROPS mounted lights.
10. **Rear Light Switch**
    Chassis mounted rear lights.
11. **Front Light Switch**
    Cab mounted front lights.
12. **Panel Lights Dimmer Control**
    Dims and brightens rocker switches and hydraulic old temperature gauge.
13. **LED Lights Dimmer Control**
    Dims and brightens filter indicator and direction/shift lights

14. Steering System High Pressure Filter Indicator Light*

15. * Brake System High Pressure Filter Indicator Light

16. * Main High Pressure Filter Indicator Light

17. * Hydraulic System Return Filter Indicator

18. * RAD/CAC Fan Filter Indicator Light

19. * Hydraulic Cooler Fan Filter Indicator Light (not on all units)

* 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 indicator light(s) come on and stay on, filter service is required. Indicator lights will illuminate during starting to confirm light operation.

NOTE: In cold operating conditions, these lights may come on and flicker until oil reaches operating temperature. This is normal.

20. RAD/CAC Fan Controller Error Indicator Light
LED is illuminated when the fan controller has discovered an error.

21. Hydraulic Oil Fan Controller Error
LED is illuminated when the fan controller has discovered an error.

22. Stereo Cassette (Optional)
AM /FM Radio and cassette player or CD player.

23. Rear Wiper - Wipe/Wash (Optional)
Three Position: Off
On
Wash

24. Rear Intermittent Wiper Speed (Optional)
Three Position: Intermittent
Low
High

25. Front Wiper - Wipe/Wash (Optional)
Three Position: Off
On
Wash

26. Front Intermittent Wiper Speed (Optional)
Three Position: Intermittent
Low
High

27. Front Defrost Fan
Two Position: Off
On

28. Blank

29. 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.

30. Dome Light Switch (Not Shown)
On/Off switch, mounted on light.

3.5 Fuses and Circuit Breakers

Electrical Protection. Push to reset. Circuit breakers are located on the side panel of the left hand console. Fuse amperage is noted on decal.

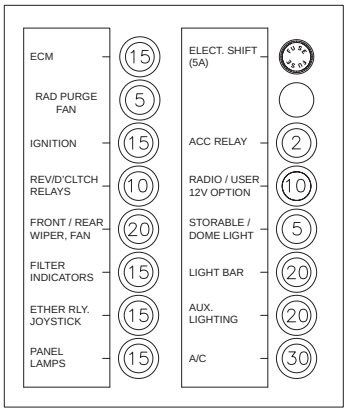


Figure 3-6 Circuit Breakers

A five amp fuse is located on side of junction box behind operators seat (See Figure 3-7).

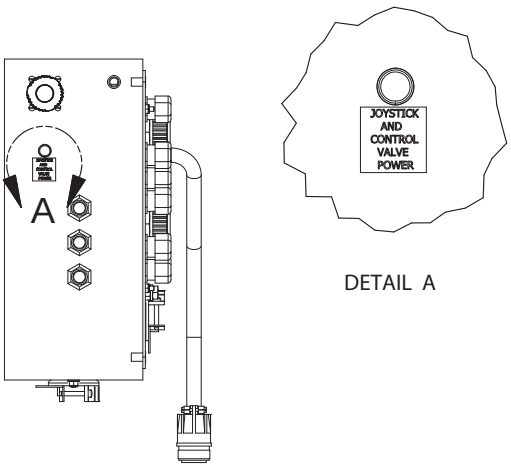


Figure 3-7 Joystick and Control Valve Power Fuse

3.6 Steering and Pedal Controls

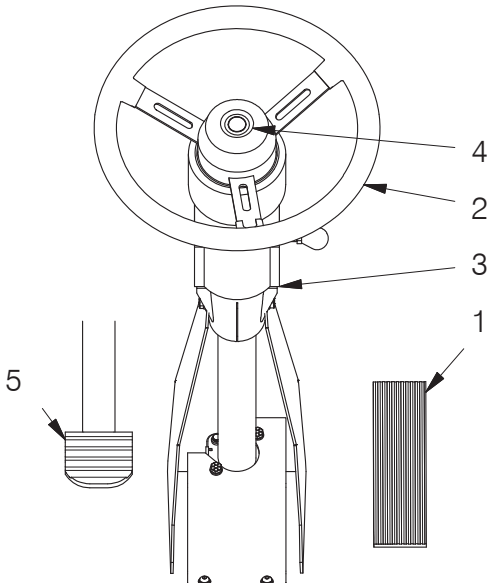


Figure 3-8 Steering & Pedals

1. Accelerator Pedal
Foot controlled engine accelerator pedal.

2. Steering Wheel and Column

3. Telescopic and Tilt Steering Column
To move telescopic wheel in or out, pull lever up to release the lock. To tilt steering wheel, push lever down.

4. Horn Button on Steering Column
Center hub of steering wheel contains horn button. Depress to sound horn.

5. Brake Pedal
Will also "declutch" the transmission if the declutch switch (item 22 page 3-3) is ON.

3.7 Implement Controls (Standard Configuration)

1. Hoist, Dump and Tilt Joystick

- Single lever (mono-stick) control for hoist and dump. Use buttons for side tilt.
- Push the lever forward to lower the bucket.
- Pull the lever back to raise the bucket.
- Move the lever right to dump the bucket.
- Move the lever left to roll the bucket back.
- Push the (top) left button to tilt the bucket left.
- Push the (top) right button to tilt the bucket right.

2. 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. On machines with the optional swing-up armrest, lifting the seat control module will also shut off the controls.

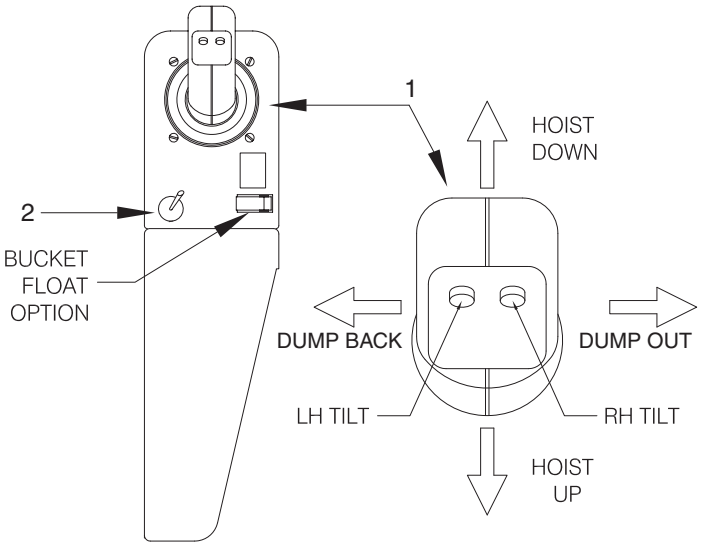


Figure 3-9 Implement Controls

3.8 Seat Controls (Standard Configuration)

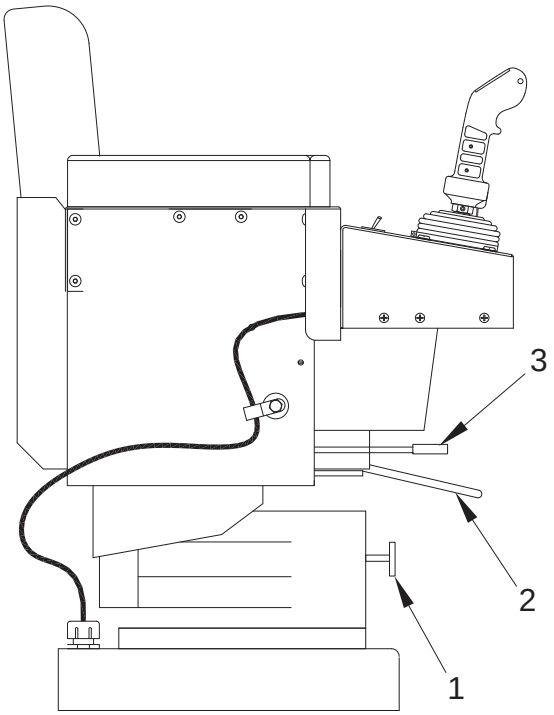


Figure 3-10 Seat Controls

1. **Seat Height Adjustment Control**
   Lift the seat and controls to lock into one of three positions.

2. **Seat Controls Forward and Aft**

3. **Seat Rotate Adjustment**
   Locks seat in forward position and allows rotation for operator ingress and egress.

3.9 Seat Controls (Option) (Joystick Steering Option Displayed)

NOTE: Seat control adjustments and location may vary.

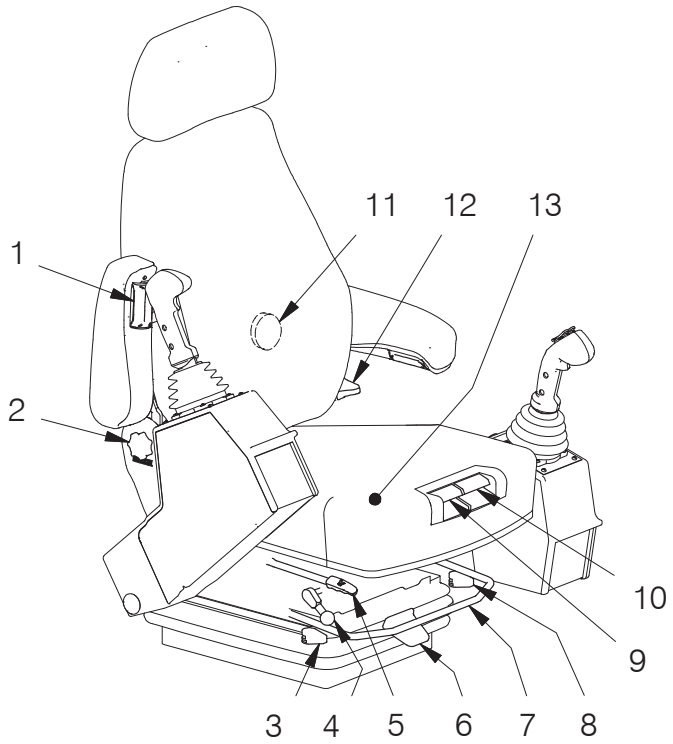


Figure 3-11 Seat Controls

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

1a. **Armrest Positioning Knob**
   Loosen knob to slide armrest forward or backward. Tighten knob once desired position is achieved.

   NOTE: the right armrest control unit (See Figure 3-11) 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".

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 (non adjustable)**
    A switch under the seat cushion senses when the operator is occupying the seat.

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3.10 Left Armrest Control Unit (Joystick Steering Option)

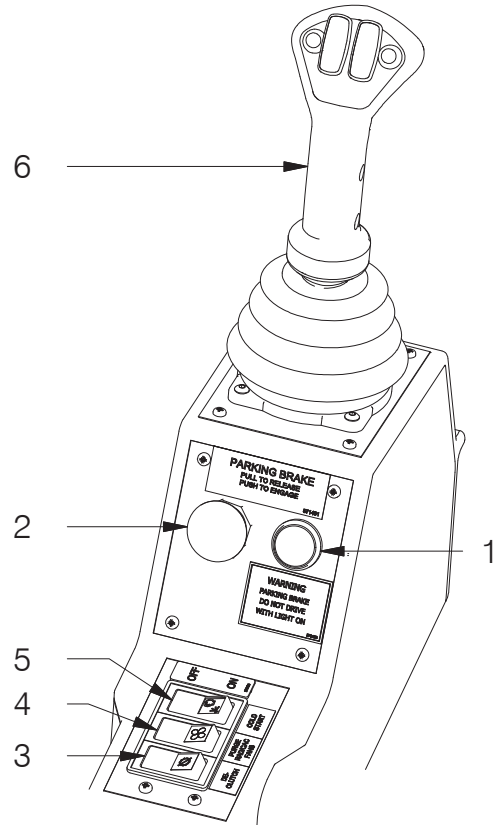


Figure 3-12 Left Armrest Control Unit

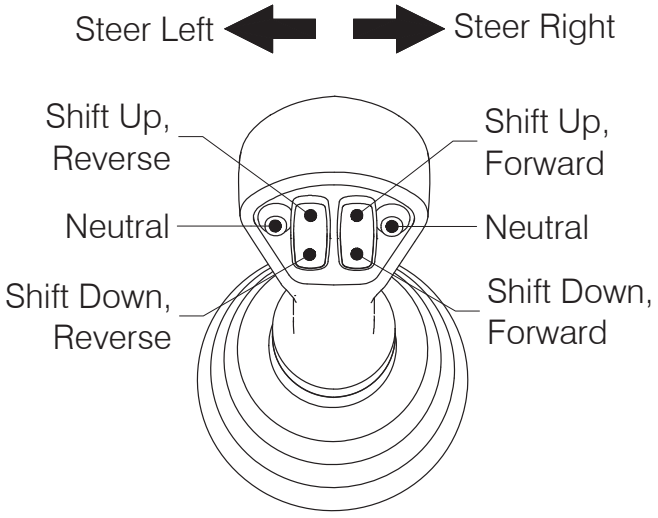


Figure 3-13 Shift/Steer Joystick Detail

1. **Parking Brake Indicator Light (red)**
   This light indicates that the parking brake is ON, and the key switch is ON.

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

3. **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.

4. **Purge Radiator Fan Switch**
   Depressing this momentary switch reverses the fan direction to blow debris off the front of the radiator. This is an automatic cycle after which the fan will return to its normal direction and operation.

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

6. **Shift/Steer Joystick**
   This joystick can steer the machine, and is used to shift the transmission (See Figure 3-12).

   - Move joystick to left to steer left.
   - Move joystick to right to steer right.
   - Push either outside button for neutral.
   - Push the top of left rocker button to shift up in reverse.
   - Push the bottom of the left rocker button to shift down in reverse.
   - Push the top of right rocker button to shift up in forward.
   - Push the bottom of the right rocker button to shift down in forward.

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.

3.11 Right Armrest Control Unit (Joystick Steering Option)

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.

1. **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. With the switch in the OFF position, the implement controls are shut off, including optional bucket float feature.

2. **Hand Throttle Up/Down Switch**
   Adjusts RPM's up or down when adjacent switch (item 3) is engaged.

3. **Hand Throttle Switch On/Off**
   Over rides foot throttle. To engage flip switch into the on position. Used with item 2.

   NOTE: For engine warm up only.

4. **Hoist, Dump and Tilt Joystick**
   Single lever (mono-stick) control for hoist and dump. Use buttons for side tilt (See Figure 3-15).

   - Push the lever forward to lower the bucket.
   - Pull the lever back to raise the bucket.
   - Move the lever right to dump the bucket.
   - Move the lever left to roll the bucket back.
   - Push the left button to tilt the bucket left.
   - Push the right button to tilt the bucket right.

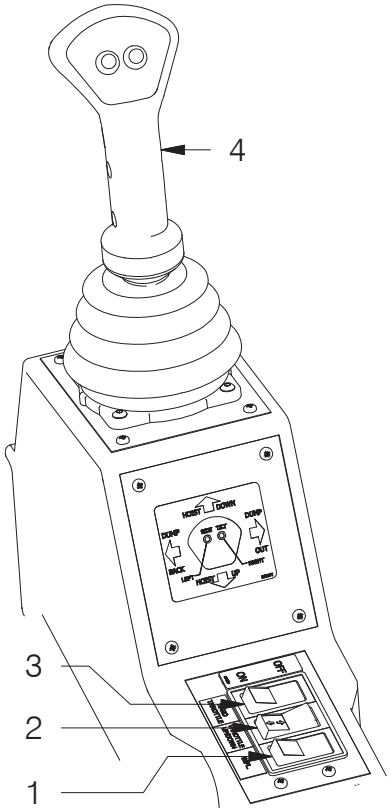


Figure 3-14 Right Armrest Control Unit

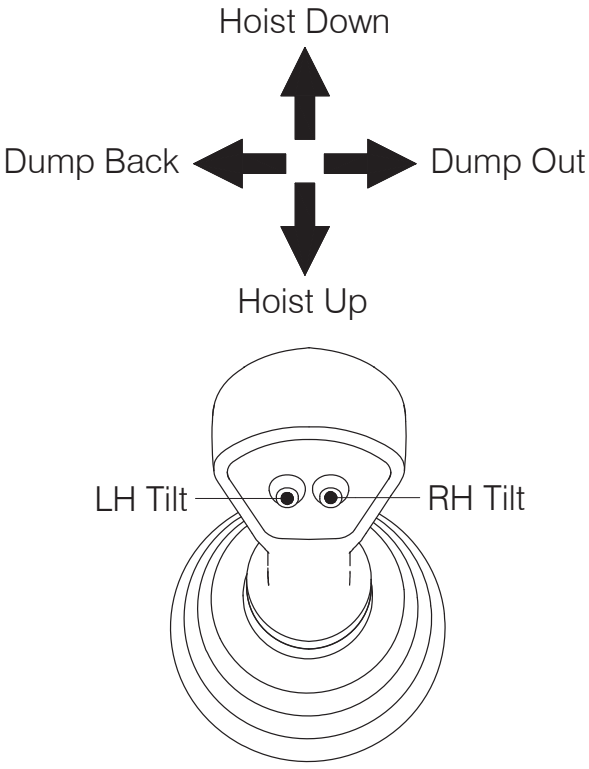


Figure 3-15 Hoist, Dump, and Tilt Joystick Detail

3.12 Right Armrest Control Unit (Bucket Float Option)

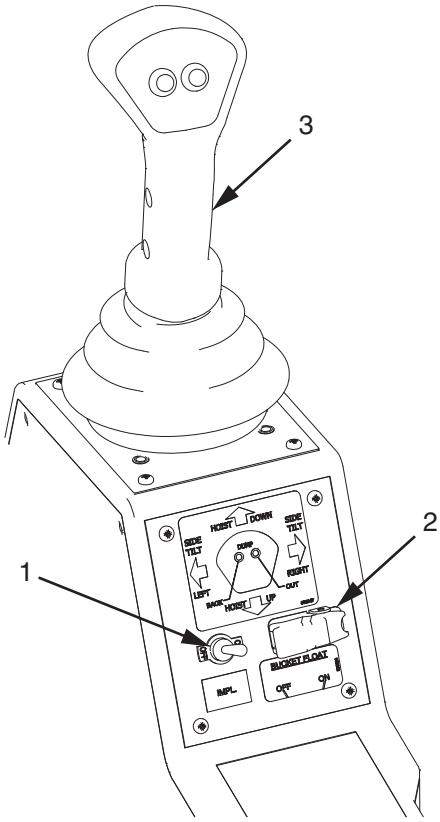


Figure 3-16 Right Armrest Control Unit

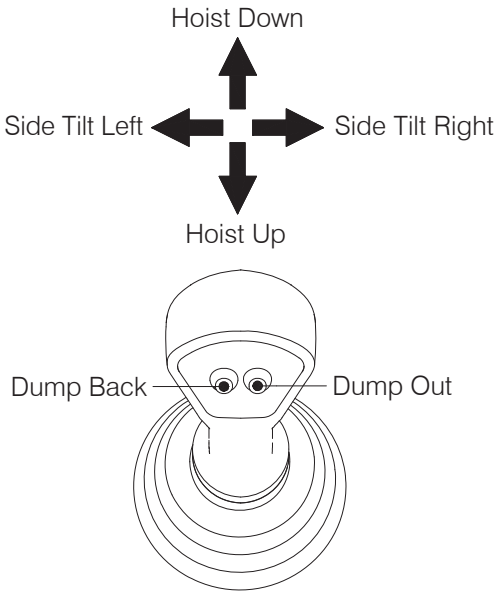


Figure 3-17 Hoist, Dump, and Tilt Joystick Detail

1. **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. With the switch in the OFF position, the implement controls are shut off, including optional bucket float feature.

2. **Bucket Float Switch**
   This covered switch is used to engage the optional bucket float feature. Open cover to access switch.

   Note: The bucket float switch must be in the OFF position in order to raise or lower bucket.

⚠ WARNING

Make sure the bucket is on the ground before switching the bucket float switch to the ON position. The bucket will drop if the bucket float switch is turned to the ON position while the bucket is raised.

3. **Single lever (mono-stick) control for hoist and side tilt.**
   Use buttons for dump function (See Figure 3-17).

   Push the lever forward to lower the bucket.
   Pull the lever back to raise the bucket.
   Move the lever right to side tilt the bucket to the right.
   Move the lever left to side tilt the bucket to the left.
   Push the left button to roll the bucket back.
   Push the right button to dump the bucket.

Intentionally Blank

3.13 Safety Controls

Figure 3-18 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 3-18.

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

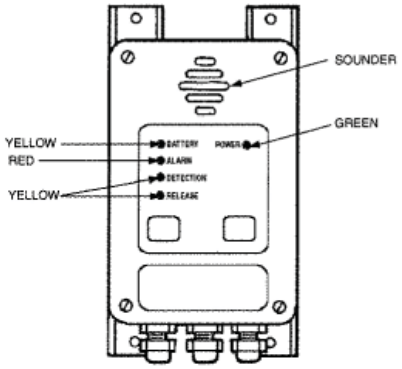


Figure 3-19 Control Module, Indicator Lights

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

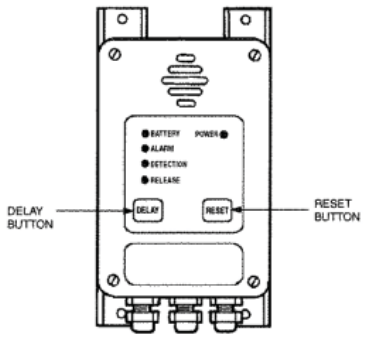


Figure 3-20 Control Module, Front Panel Buttons

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.

Battery Disconnect Switch

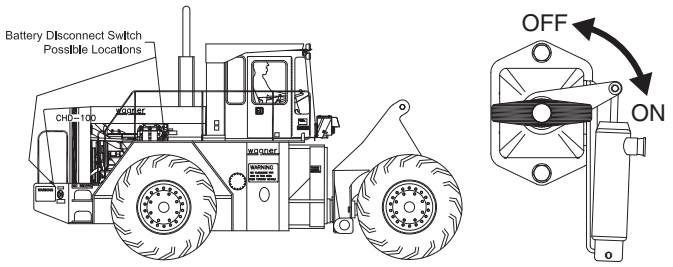


Figure 3-21 Battery Disconnect Switch shown in ON position

The battery disconnect switch will be in one of two possible locations (See Figure 3-21). 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 counterclockwise to disconnect the battery.

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

⚠ 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.

Air Filter Indicator

Standard location is mounted on the air cleaner housing. It indicates air filter restriction by showing "red" zone, the element must be serviced as soon as possible. To reset the indicator, press the button on top (See Figure 3-20).

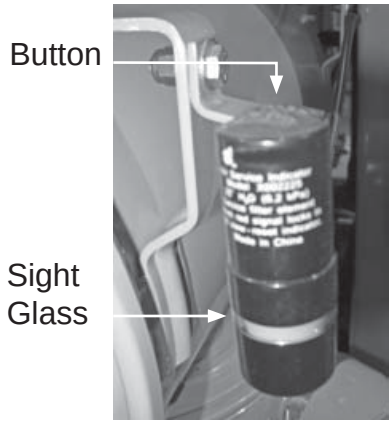


Figure 3-22 Air Filter Indicator

3.14 Junction Box

Junction Box/Data Link Port

Standard location is mounted in the cab, on the rear wall, right-hand side, behind the operator. The junction box includes a data link port, which allows service personnel to get readings from the engine control module (ECM). See Figure 3-24. Some units have a second junction box assembly mounted on the left wall of the cab, behind the operator, containing PLC controllers for various functions. Consult your Parts and Service manuals for details.

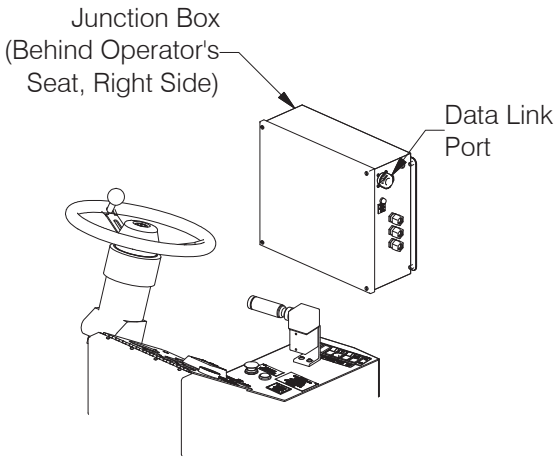


Figure 3-23 Junction Box Location

3.15 PowerView 101 Display Module

Effective date: 12/16/2011

Note: If you are using a Carrydozer purchased prior to 12/16/2011, see page 3-26

General

Your Carrydozer is equipped with a PowerView 101 display module (PV101), 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 Carrydozer. 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 gear position
Coolant temperature	Engine configuration parameters
Oil pressure	Active fault codes
Fuel economy	Stored fault codes
Throttle position	

Faceplate Features

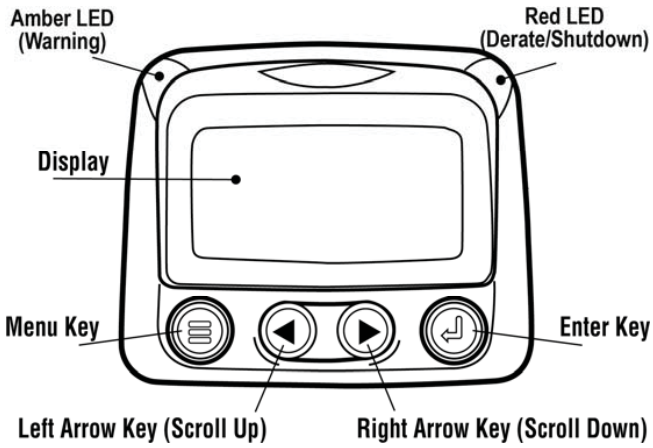


Figure 3-24 PowerView Faceplate Features

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.

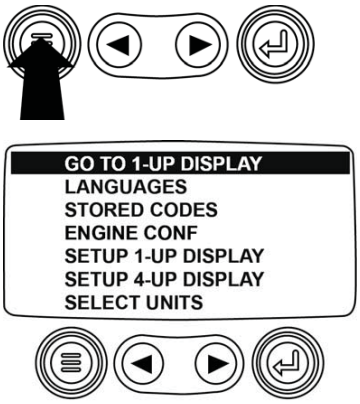
» **Left Arrow** - Scroll the screen or move the parameter selection to the left or upward.

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

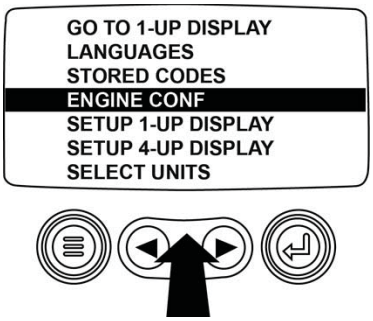
» **Enter Key** - Select a menu or parameter or hide/view an active fault code.

Basic Navigation

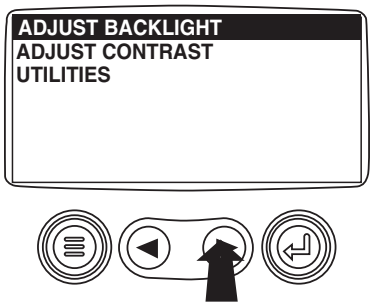
1. When Menu is pressed, the main menu items are displayed.



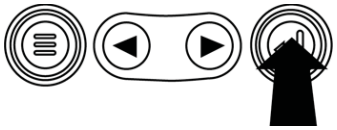
2. Touching the Arrow Keys will move the selection bar to other menu items.



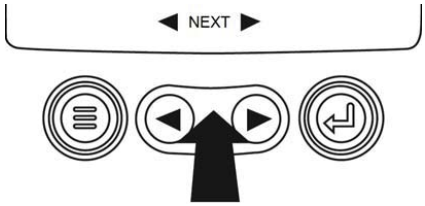
3. Certain menus have multiple pages of items. Scrolling past the top item or bottom item on the current page will reveal other menu items on additional pages.



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

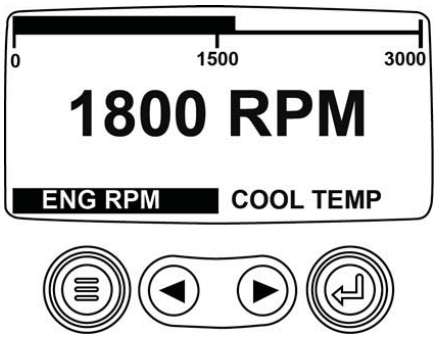
PowerView Menus (First Time Start Up)

6. 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

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

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

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

6. 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.

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

8. 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.

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

10. 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.

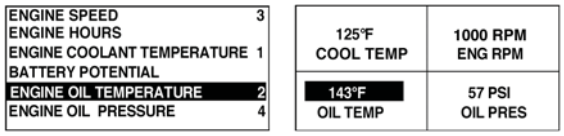
1. Touch Menu and use the Arrow Keys to highlight SETUP 4-UP DISPLAY, then press Enter.

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.

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

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

12. 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

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 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.

3.16 Powerview Display Module

Effective prior to 12/16/2011

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

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

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

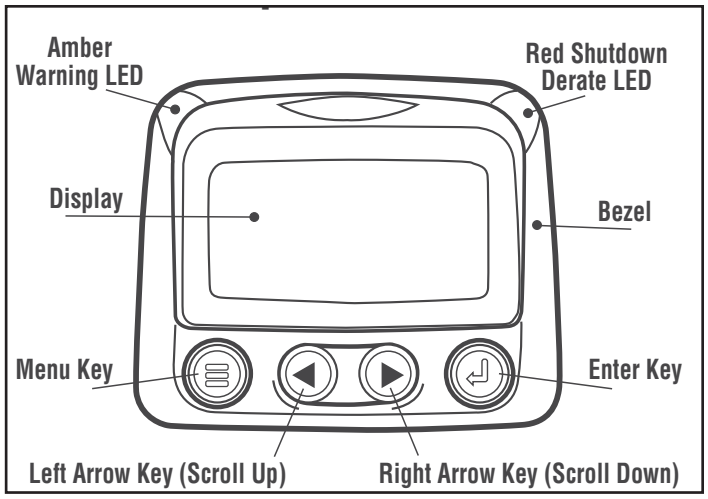


Figure 3-25 Powerview Faceplate Features

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


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

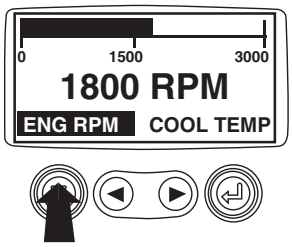

» **Left Arrow** - The Left Arrow Key is touched to scroll through the screen either moving the parameter selection toward the left or upward.

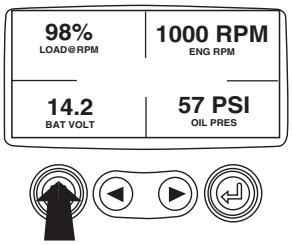

» **Right Arrow** - The Right Arrow Key is touched to scroll through the screen either moving the parameter selection toward the right or downward.


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

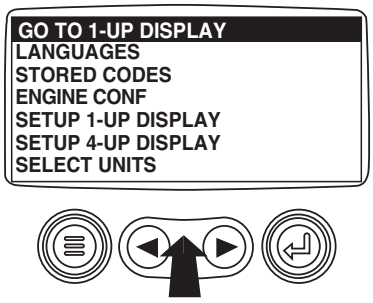
Main Menu Navigation

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

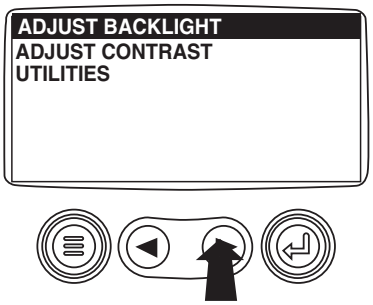




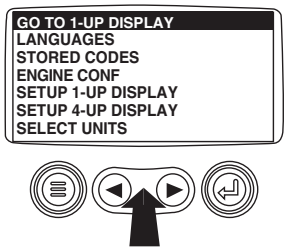
2. The first seven items of the “Main Menu” will be displayed. Touching the “Arrow Buttons” will scroll through the menu selection.

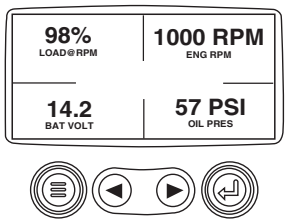


3. Touching the right arrow button will scroll down to reveal the last items of “Main Menu” screen highlighting the next item down.



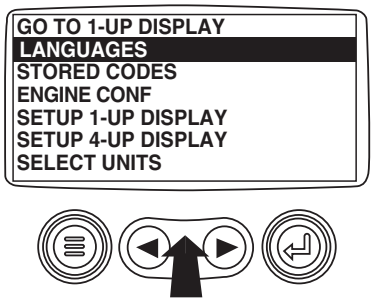
4. Touch the “Arrows” to scroll to the desired menu item or touch “Menu” to exit the Main menu and return to the engine parameter display.



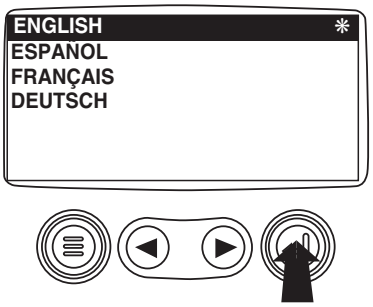


Selecting a Language

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



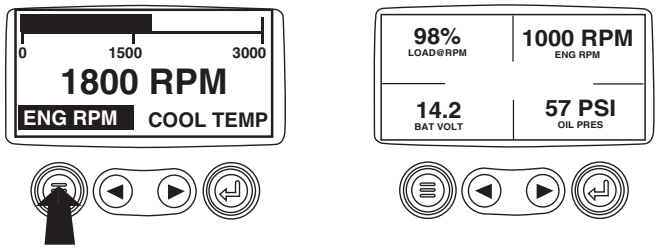
2. The language choices will be displayed. Use the “Arrow” buttons to scroll through the selections and touch “Enter” to make a selection.



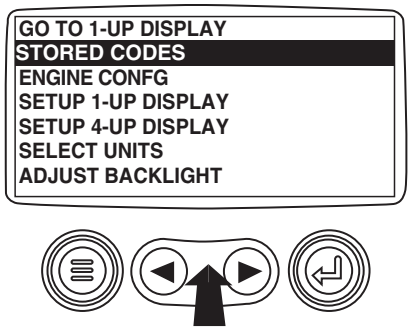
3. Now that you have selected the language, touch the “Menu” button to return to the main menu display.

Stored Fault Codes

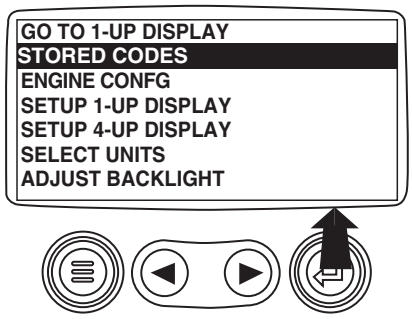
1. Starting at the single or the four engine parameter display touch the “Menu button”.



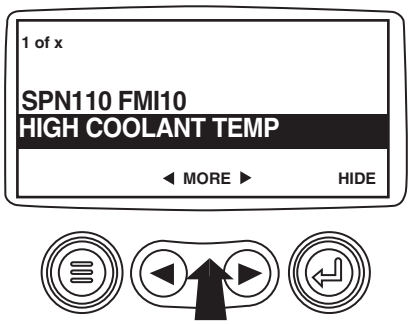
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the Stored Fault Codes is highlighted.



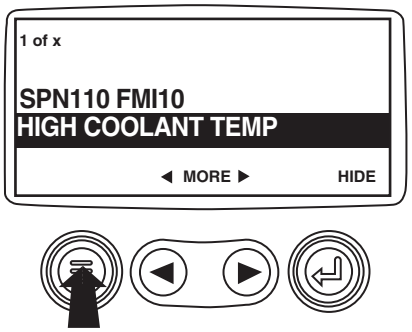
3. Once the “Stored Fault Codes” menu item has been highlighted, touch the “Enter Button” to view the “Stored Fault Codes” (when applicable, consult engine or transmission manufacturer for SAE J1939 supported parameters).



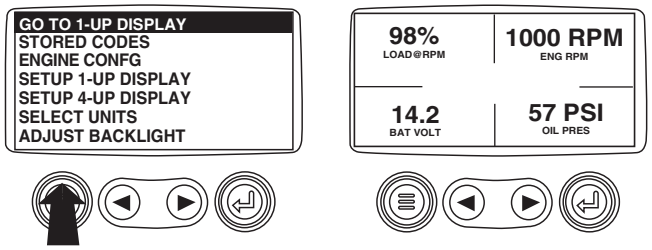
4. If the word “MORE” appears above the “Arrow Buttons” there are more stored fault codes that may be viewed. Use the “Arrow Buttons” to scroll to the next Stored Diagnostic Code.



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

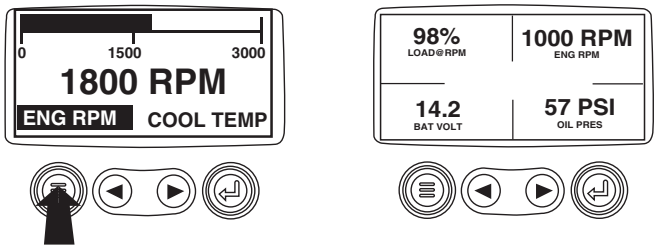


6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

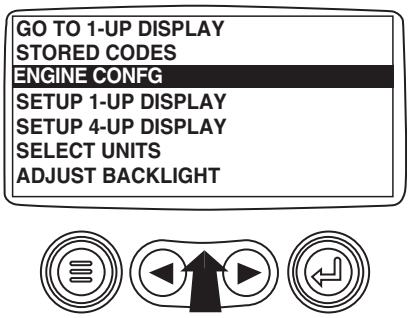


Engine Configuration Data

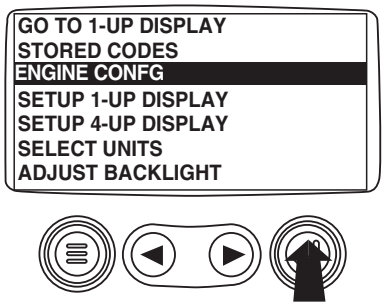
1. Starting at the single or four engine parameter display touch the"Menu Button".



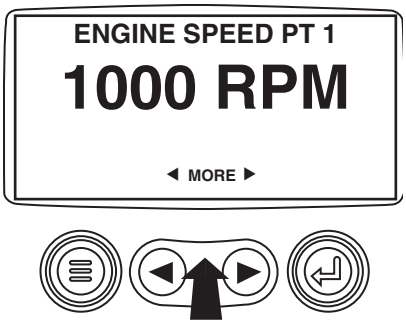
2. The main menu will pop up on the display. Use the "Arrow Buttons" to scroll through the menu until the "Engine Configuration" is highlighted.



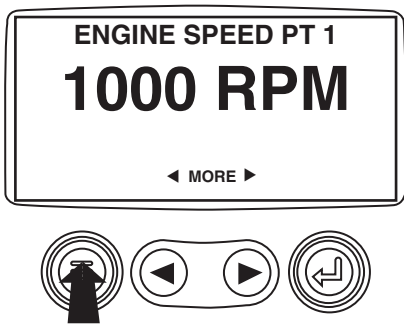
3. Once the "Engine Configuration" menu item has been highlighted, touch the "Enter Button" to view the engine configuration data.



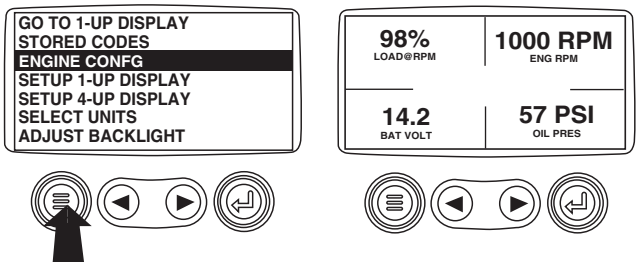
4. Use the "Arrow Buttons" to scroll through the engine configuration data.



5. Touch the "Menu Button" to return to the main menu.

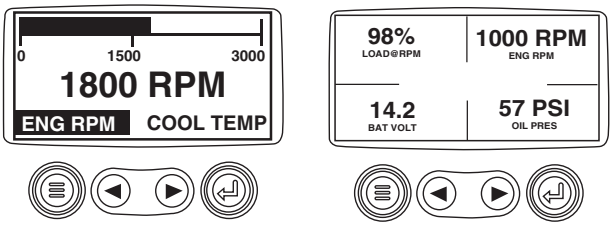


6. Touch the "Menu Button" to exit the Main menu and return to the engine parameter display.



Faults and Warnings - Auxiliary Gage Fault

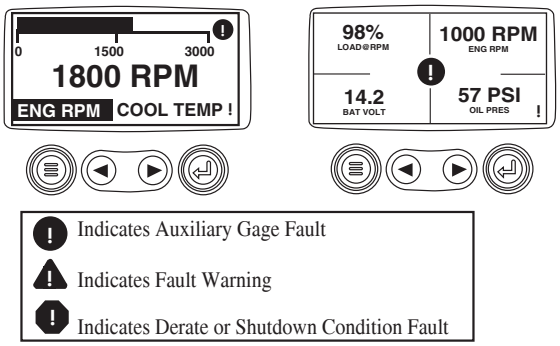
1. During normal operation the single or four parameter screen will be displayed.



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

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

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

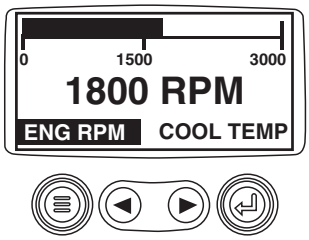


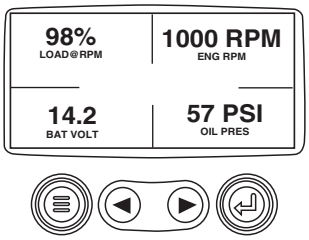
5. Touching the “Enter Button” will redisplay the hidden fault. Touching the “Enter Button” once again will hide the fault and return the screen to the single or four parameter display.

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

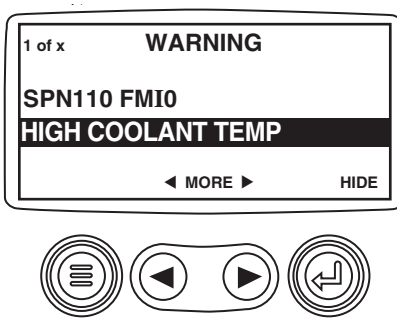
Active Fault Codes

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

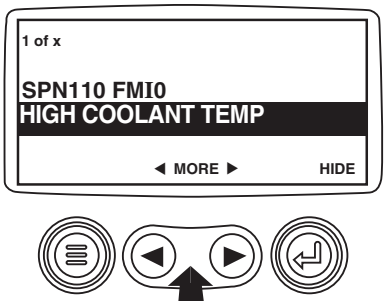




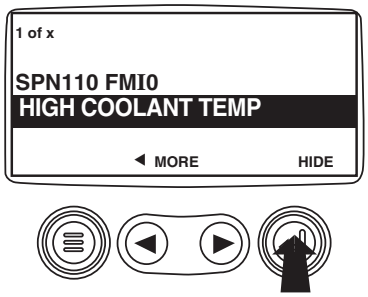
2. When the PowerView receives a fault code from an engine control unit the single or four parameter screen will be replaced with the "ActiveFault Codes" message.



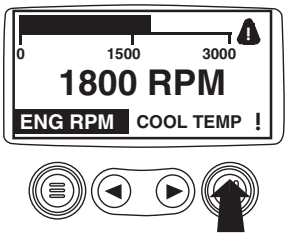
3. If the word "MORE" appears above the "Arrow Buttons" there are more active fault codes that may be viewed. Use the "Arrow Buttons" to scroll to the next "Active Fault Code".

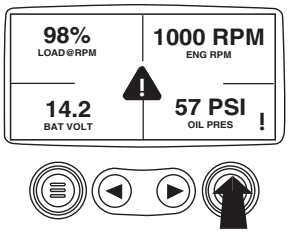


4. To acknowledge and "Hide" the fault and return to the single or four parameter display touch the "Enter Button".

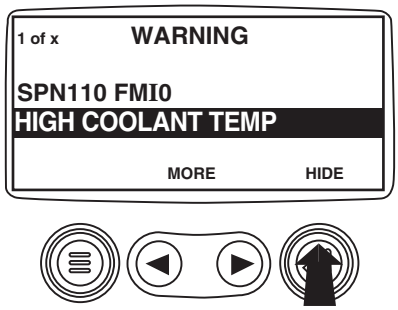


5. The display will return to the single or four parameter display, but the display will contain the "Active Fault" warning icon. Touching the "Enter Button" will redisplay the hidden fault.

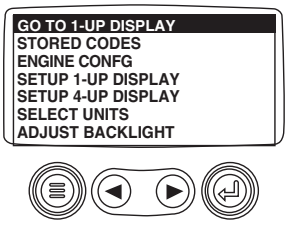


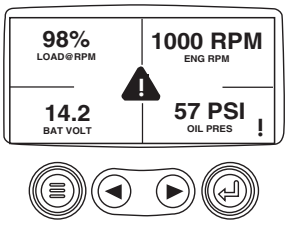


6. Touching the "Enter Button" once again will hide the fault and return the screen to the single or four parameter display.



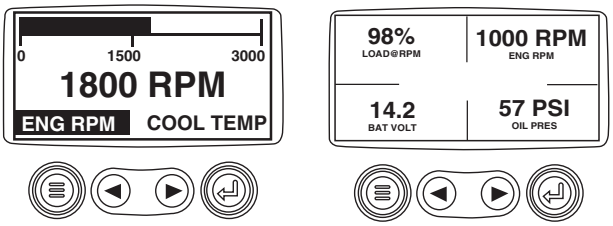
7. The Single or Four parameter screen will display the fault icon until the fault condition is corrected. NOTE: Ignoring active fault codes could result in severe engine damage.



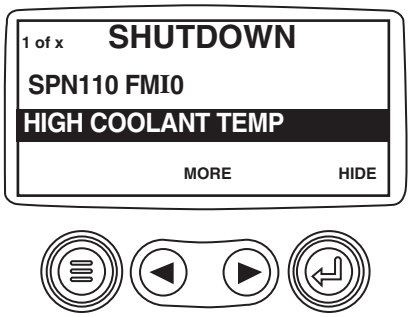


Shutdown Codes

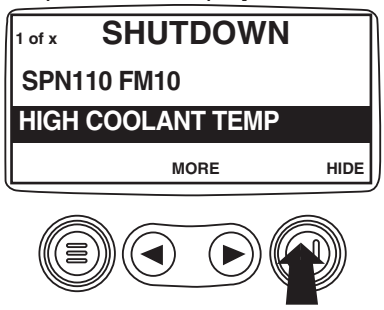
1. During normal operation the single or four parameter screen will be displayed.



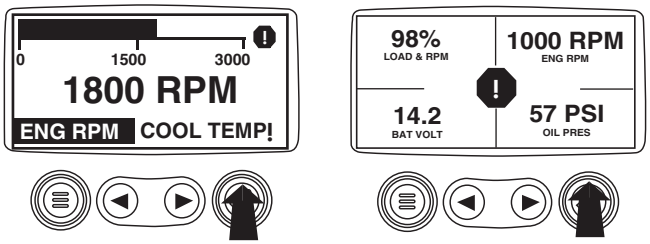
2. When the PowerView receives a severe fault code from an engine control unit the single or four parameter screen will be replaced with the “Shutdown!” message.



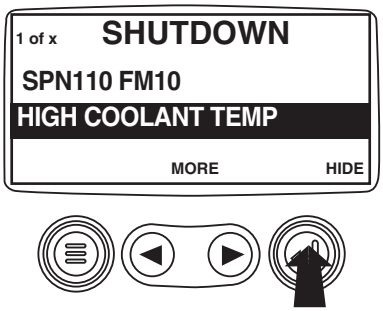
3. To acknowledge and “Hide” the fault and return to the single or four parameter display touch the “Enter Button”.



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

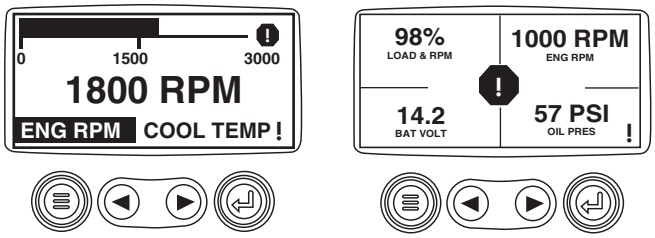


5. Touching the “Enter Button” once again will hide the fault and return the screen to the single or four parameter display.



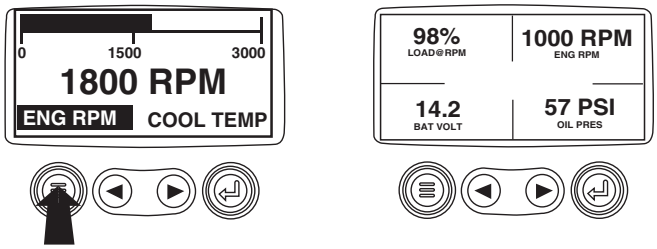
6. The Single or Four parameter screen will display the fault icon until the fault condition is corrected.

   NOTE: Ignoring active fault codes could result in severe engine damage.

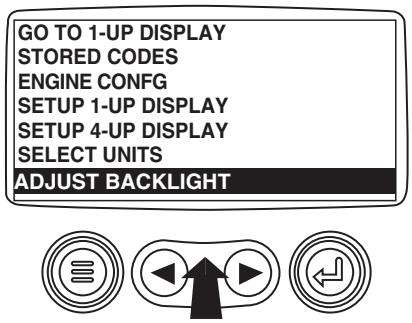


Back Light Adjustment

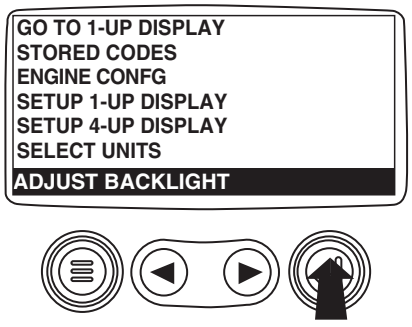
1. Starting at the single or four engine parameter display touch the"Menu Button".



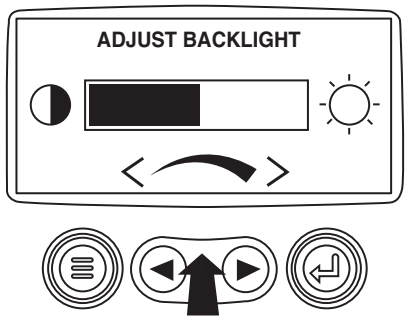
2. The main menu will pop up on the display. Use the "Arrow Buttons" to scroll through the menu until the "Adjust Backlight" is highlighted.



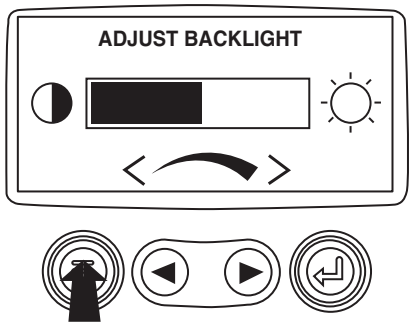
3. Once the "Adjust Backlight" menu item has been highlighted touch the "Enter Button" to activate the "Adjust Backlight" function.



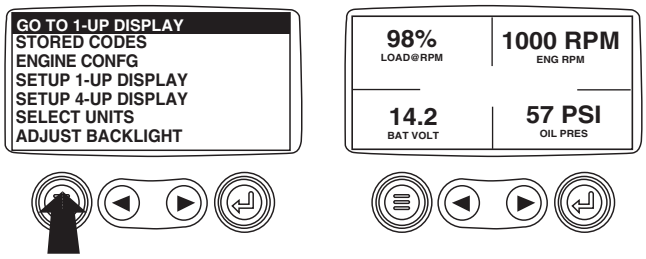
4. Use the "Arrow Buttons" to select the desired backlight intensity.



5. Touch the "Menu Button" to return to the main menu.

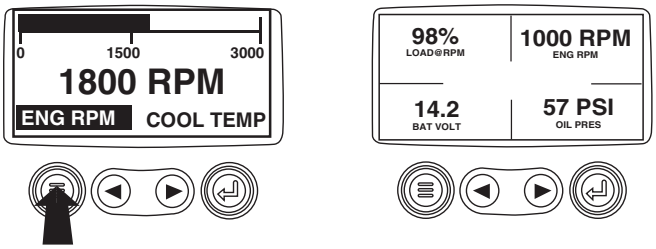


6. Touch the "Menu Button" to exit the Main menu and return to the engine parameter display.

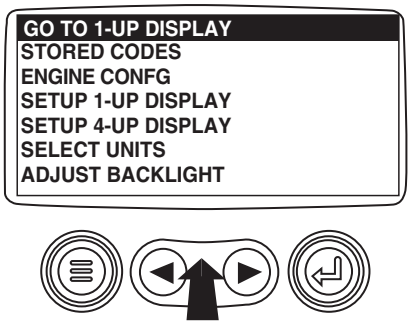


Contrast Adjustment

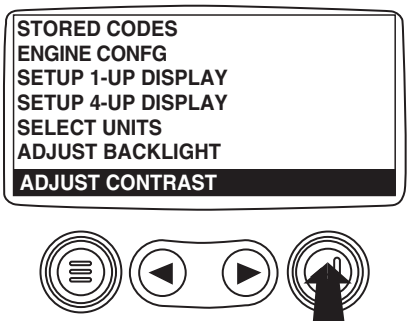
1. Starting at the single or four engine parameter display, touch the “Menu Button”.



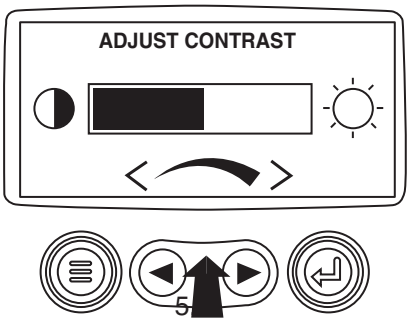
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until “Adjust Contrast” is highlighted.



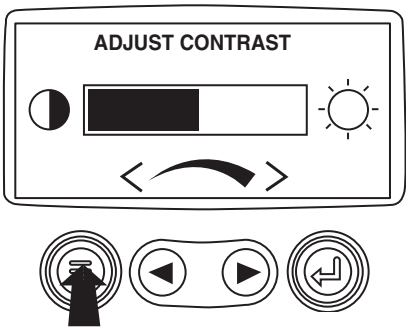
3. Once the “Adjust Contrast” menu item has been highlighted touch the “Enter Button” to activate the “Adjust Contrast” function.



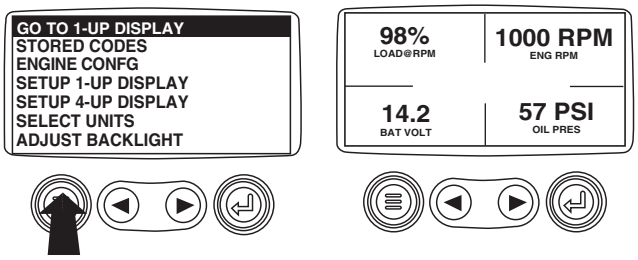
4. Use the “Arrow Buttons” to select the desired contrast intensity.



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



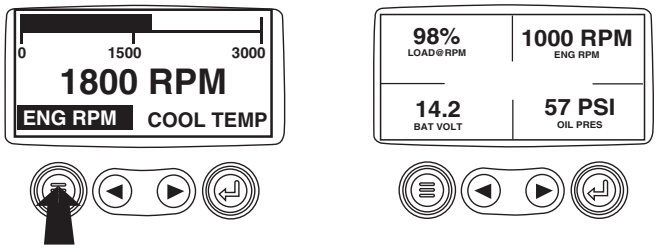
6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.



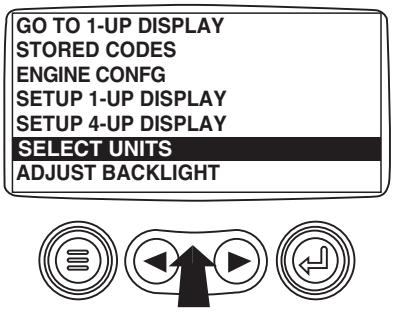
7.

Select Units

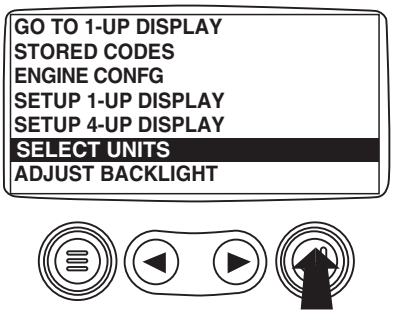
1. Starting at the single or four engine parameter display touch the"Menu Button".



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

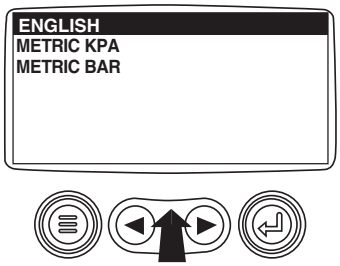


3. Once the "Select Units" menu item has been highlighted touch the"Enter Button" to access the "Select Units" function.

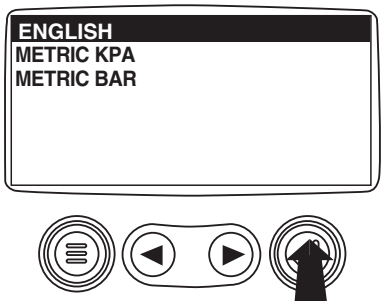


4.

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

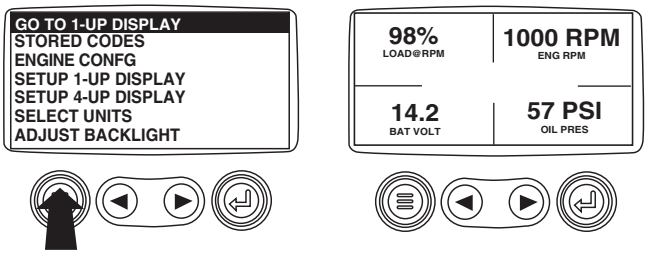


5. Touch the "Enter Button" to select the highlighted units.



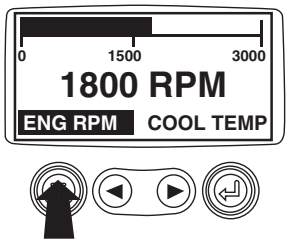
6. Touch the "Menu Button" to return to the "Main Menu".

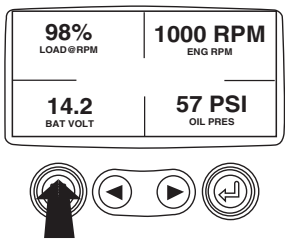
7. Touch the "Menu Button" to exit the Main menu and return to the engine parameter display.



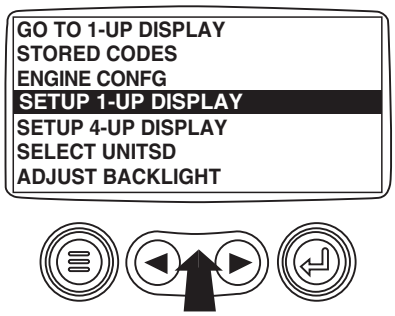
Setup 1-Up Display

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

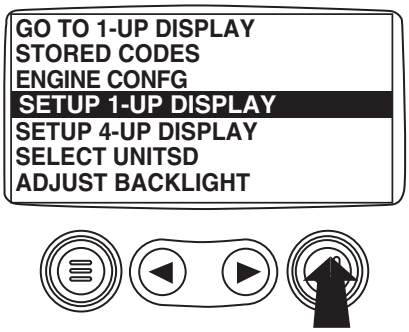




2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the “Setup 1-up Display” is highlighted.

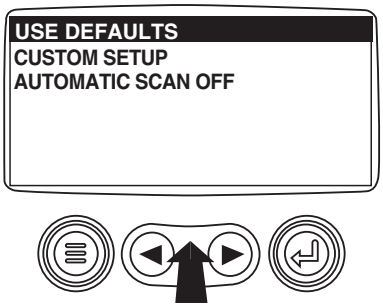


3. Once the “Setup 1-up Display” menu item has been highlighted touch the “Enter Button” to access the “Setup 1-up Display” function.

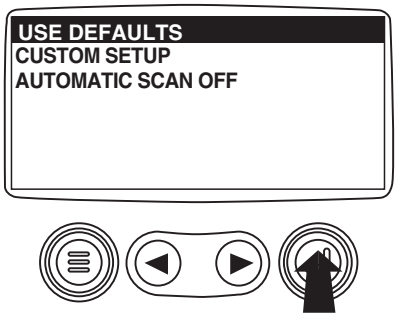


4. Three options are available for modification of the 1-Up display.
   - **a) Use Defaults** – This option contains a set of engine parameters: Engine Hours, Engine RPM, System Voltage, Battery Voltage, % Engine Load at Current RPM, Coolant Temperature, Oil Pressure.
   - **b) Custom Setup** – This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

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

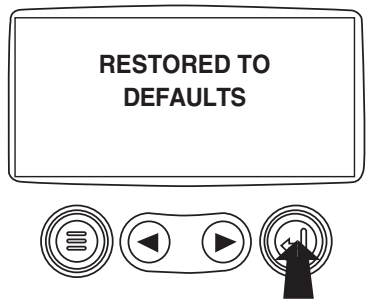


6. Touch the “Enter Button” to activate the “Use Defaults” function.

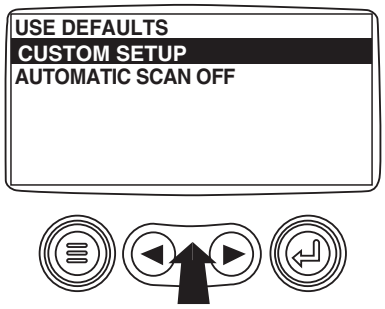


Setup 1-Up Display (Cont)

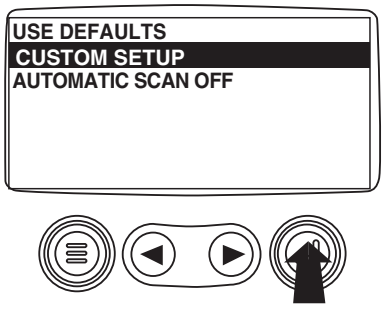
7. A message indicating the “Single Engine” parameter display parameters are reset to the factory defaults will be displayed, then the display will return to the “Custom Setup” menu.



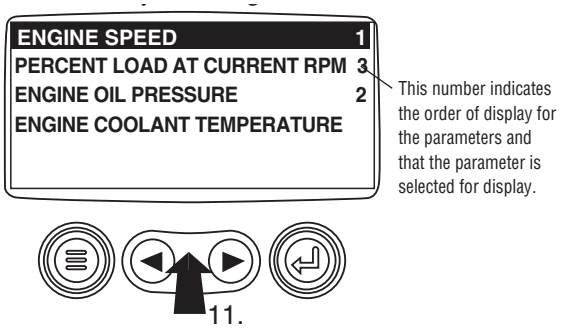
8. **Custom Setup** - To perform a custom setup of the 1-Up Display, use the arrow buttons to scroll to and highlight “Custom Setup” on the display.



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

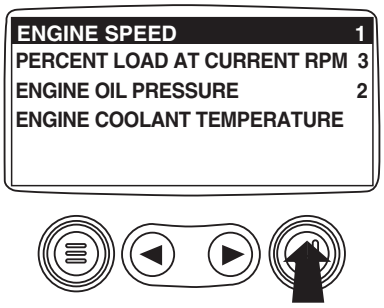


10. Use the “Arrow Buttons” to scroll to and highlight a selected parameter (parameter with a # symbol to right of it).

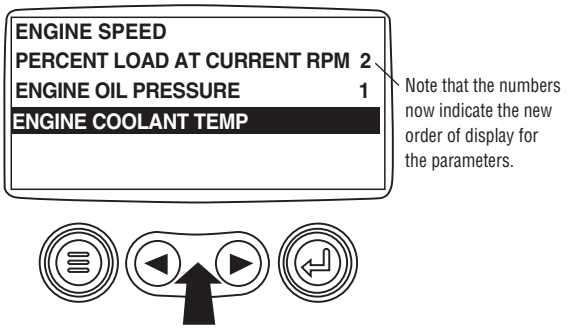


11.

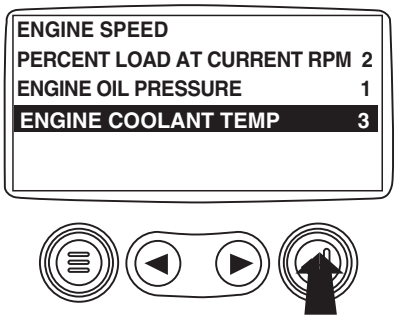
12. Touch the “Enter Button” to deselect the selected parameter removing it from the list of parameters being displayed on the 1-up display.



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



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

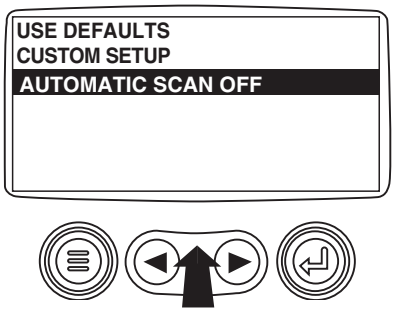


Setup 1-Up Display (Cont)

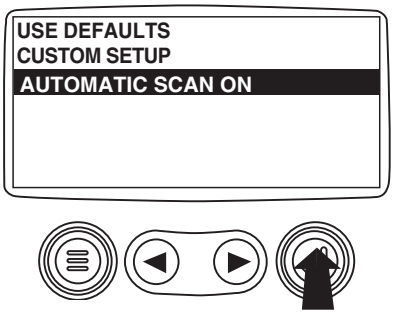
15. Continue to scroll and select additional parameters for the custom 1-Up Display. Touch the “Menu button” at any time to return to the “Custom Setup” menu.

Automatic Scan

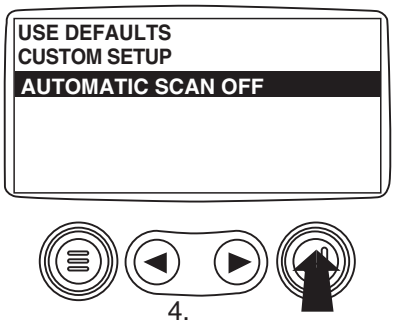
1. Selecting the scan function will cause the 1-Up Display to scroll through the selected set of parameters one at a time. Use the “Arrow Buttons” to scroll to the “Automatic Scan” function.



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

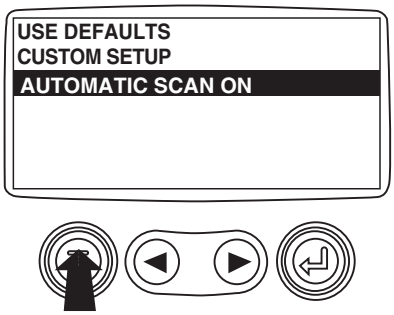


3. Touching the “Enter Button” again toggles the “Automatic Scan” function off.

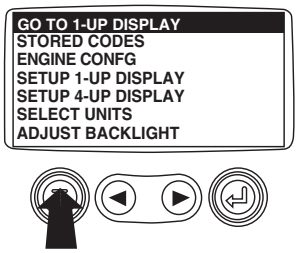


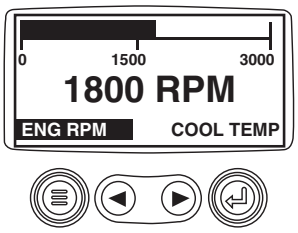
4.

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



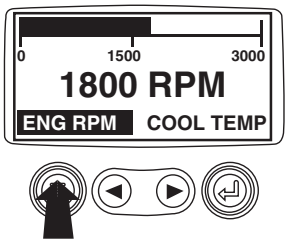
6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

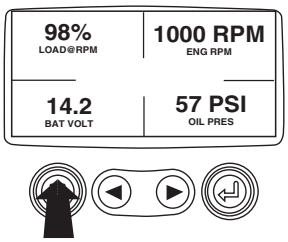




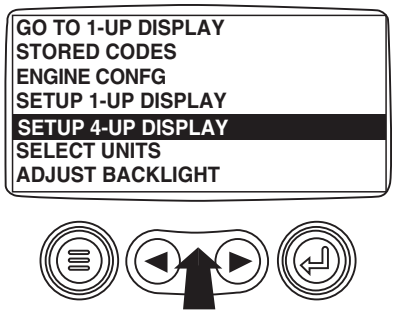
Setup 4-Up Display

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

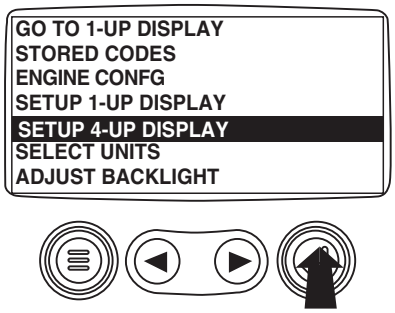




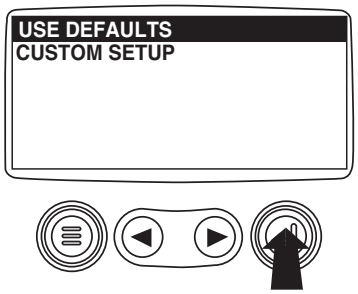
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the “Setup 4-Up Display” is highlighted.



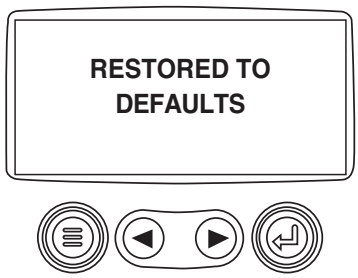
3. Once the “Setup 4-Up Display” menu item has been highlighted touch the “Enter Button” to activate the “Setup 4-Up Display” menu.



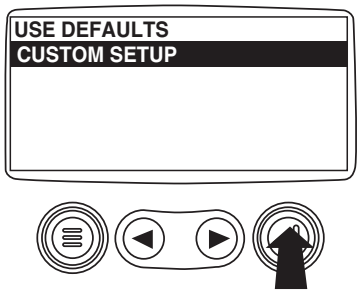
4. Touch the “Enter Button” to activate the “Use Defaults” function. This action will reset the unit to the factory default.



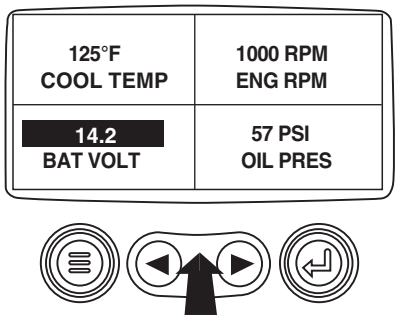
5. The “Use Defaults”screen will be displayed during the re-setting period then will automatically return to the “Setup 4-Up Display” menu.



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

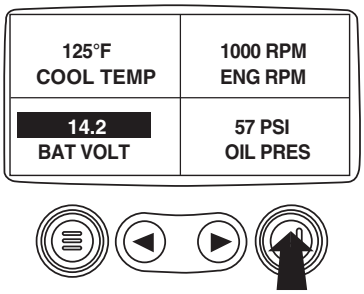


7. The quadrant with the backlit parameter value is the current selected parameter. Use the “Arrow Buttons” to highlight the parameter value in the quadrant you wish to place a new parameter.

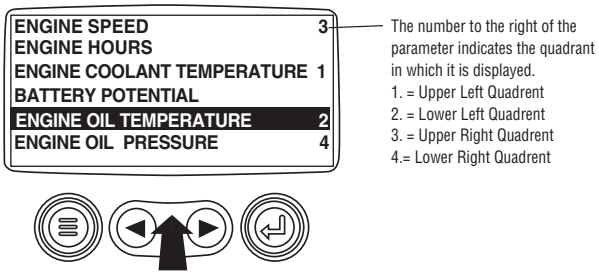


Setup 4-Up Display (Cont)

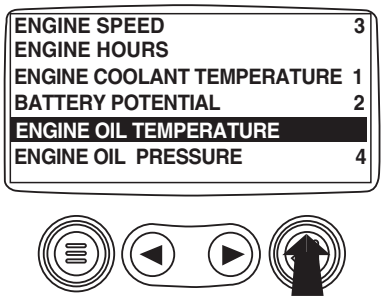
8. Touch the “Enter Button” and a list of parameters will appear.



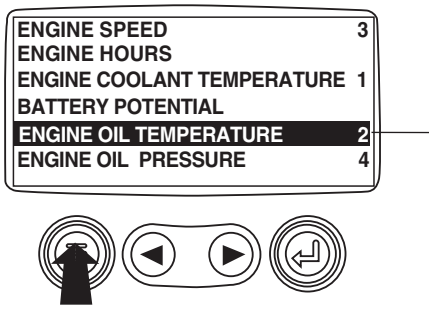
9. The parameter that is highlighted is the selected parameter for the screen. Use the “Arrow Buttons” to highlight the new parameter to be placed in the quadrant selected in the previous screen.



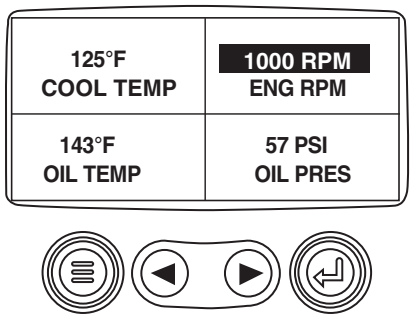
10. Touch the “Enter Button” to change the selected parameter in the quadrant to the new parameter.



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

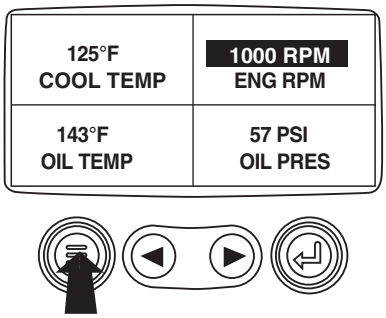


12. The parameter in the selected quadrant has changed to the parameter selected in the previous screen.

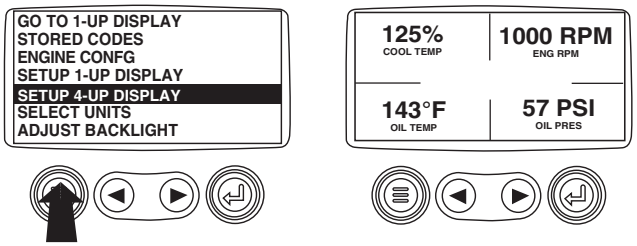


13. Repeat the parameter selection process until all spaces are filled.

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

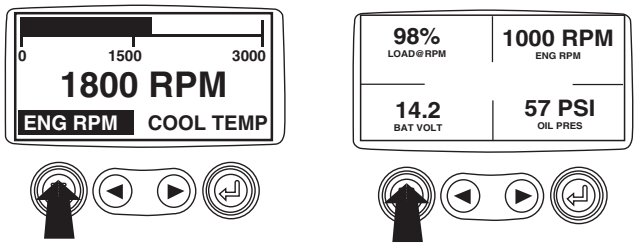


15. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

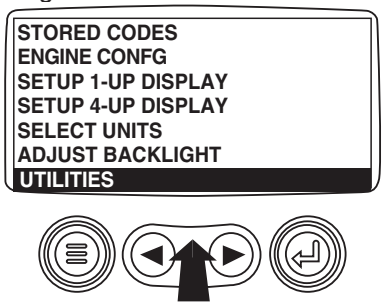


Utilities (Information and troubleshooting)

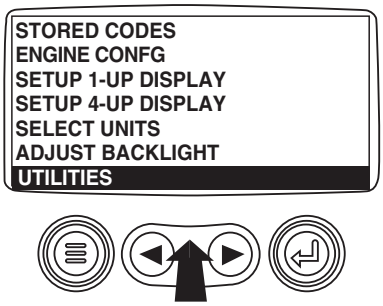
1. Starting at the single or four engine parameter display, touch the “Menu button”.



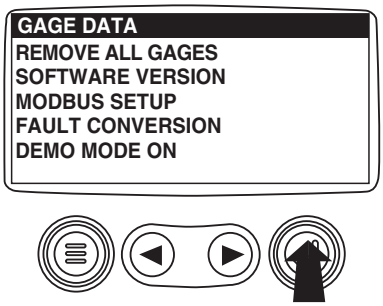
2. The main menu will be displayed. Use the “Arrow buttons” to scroll through the menu until the “Utilities” is highlighted.



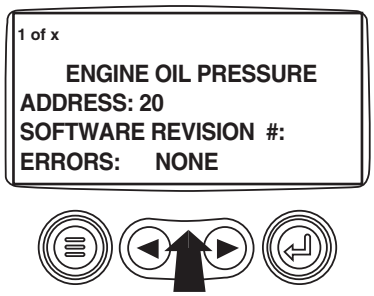
3. Once the “Utilities” menu item has been highlighted, touch the “Enter Button” to activate the “Utilities” functions.



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



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



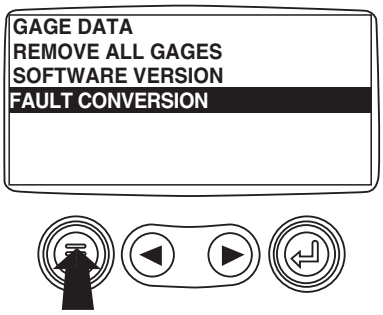
6. Touch “Menu Button” to return to the “Utilities” menu.

Utilities (Information and troubleshooting, cont)

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

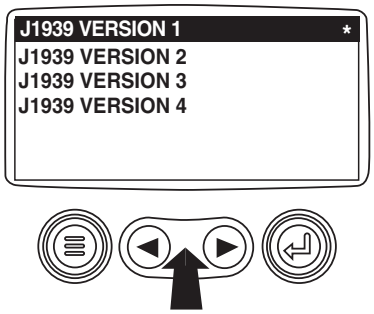
8. When the gage data has cleared, the display automatically returns to the "Utilities" menu. Scroll to "Software Version". Touch "Select" to view the software version currently in the PowerView.

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

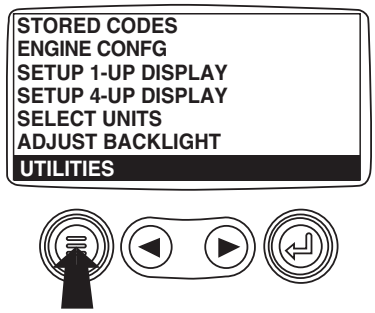


10. Use the "Arrows" to scroll and highlight the version then touch "Select" and an asterisks appears to the right of the selection.

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

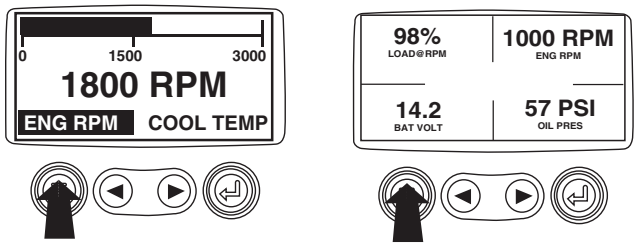


11. Touch the "Menu" button to return to "Utilities" menu. Touch the "Menu" button again to return to the "Main" menu.

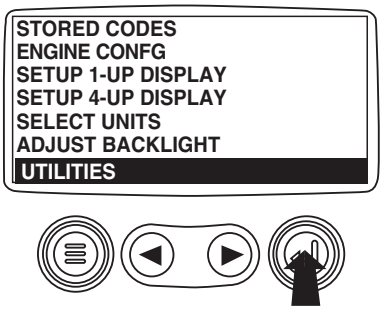


MODBUS Setup

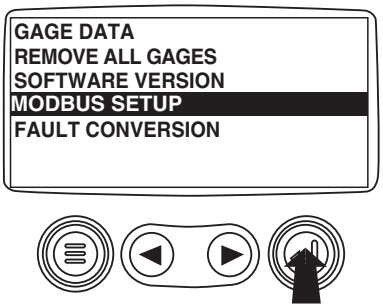
1. Starting at the single or four engine parameter display, touch the “Menu button”.



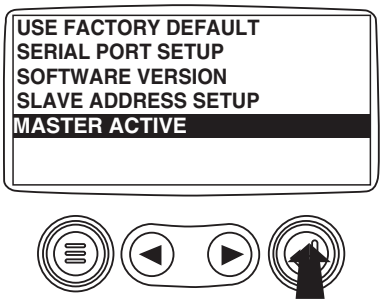
2. The main menu will be displayed. Use the “Arrow buttons” to scroll through the menu until the “Utilities” is highlighted, then touch “Enter”.



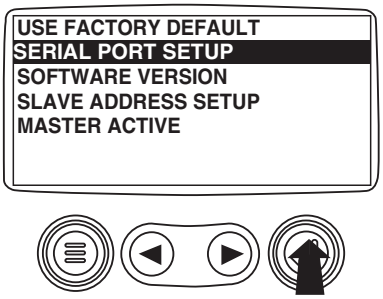
3. Once in the “Utilities” menu use the “Arrows” to scroll through the menu until the “Modbus Setup” menu is highlighted, then touch “Enter”.



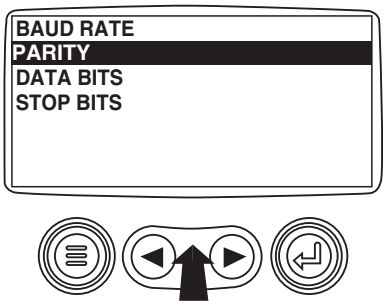
4. Use the “Arrows” to scroll down to and highlight either the “Slave Active or Master Active” modes. Touch the “Enter” button to toggle between master and slave.



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



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



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

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Section 4

Functional Description

4.1 Introduction

Wagner Carrydozers provide the capability to move large amounts of material at low cost and in a short period of time. When operated properly the machine can doze a load of close to the same size as the load contained in the bucket.

The functions and capabilities of the Carrydozer are the result of several systems working together: Power Unit, Drivetrain, Hydraulic system, Electrical system, and the Operator.

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.

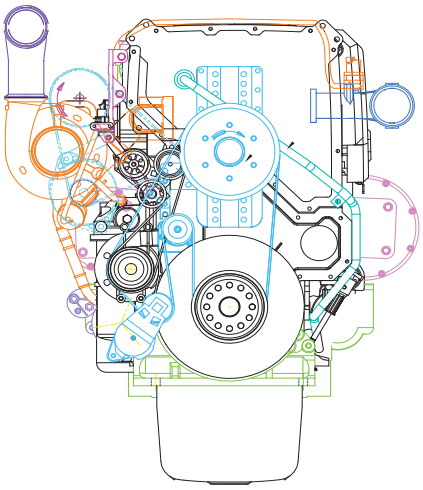


Figure 4-1 Engine (Cummins QSX Shown)

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.

Air Intake System

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

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.

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 overspeeding the engine when the lower range engages.

IMPORTANT! Never shift the range selector up or down without momentarily relaxing the throttle pedal. Severe damage to the drivetrain could result.

⚠ CAUTION

Always brake to a full stop when changing directions. Drivelines are not strong enough to withstand the forces created when heavy 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.

NOTE: Clutch pressure should always be between 180 and 220 PSI. Reference Service Manual.

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

NOTE: Some machines are equipped with an optional front driveline with shear bolts. See Figure 5-7, section 5. These shear bolts are designed to break in the event of excessive torque in the drivetrain, such as a change in direction without stopping first. This driveline acts similar to a fuse, and protects more expensive drivetrain components.

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.

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 four 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.

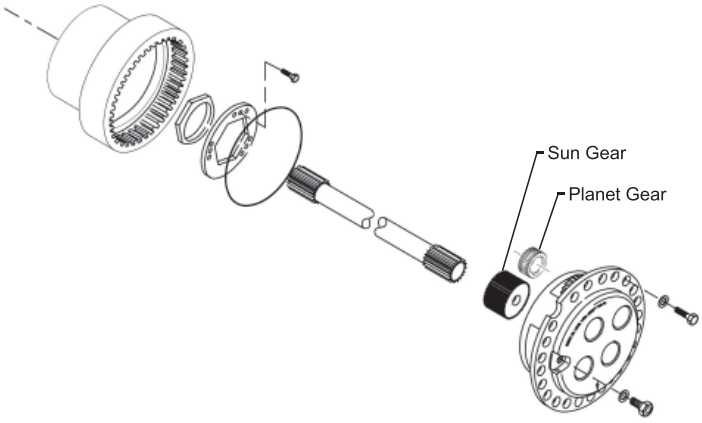


Figure 4-2 Planet Assembly

Chassis & Bogie
The chassis provides a mounting for the rear axle. The bogie provides a mounting for the front axle. The chassis & bogie assemblies are fully articulated for steering, and can oscillate to negotiate uneven terrain. Steering is accomplished by hydraulic cylinders.

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.

Service Brakes
The service brakes are a conventionally modulated “wet disc” brake system, hydraulically applied, incorporating the durability of an oil immersed enclosed brake with the positive stopping action achieved by hydraulically applied force. The service brakes utilize a “forced cooling” system. A pump supplies a constant supply of oil, which circulates through the brakes, and back to the hydraulic reservoir.

The service brake system begins with the hydraulic tank oil flow to a load sense pressure compensated pump. The pump sends oil to a high pressure filter. After the high pressure filter, oil is sent to an accumulator. From there, oil is supplied through the parking brake manifold and brake pedal valve to the brakes.

Parking Brake
The parking brake is a reverse modulated dry disk brake system, spring applied, and hydraulically released. In the event of loss of hydraulic pressure, immediate application of the parking brake occurs. Oil pressure is required to release the parking brake. It is not required to apply it.

The parking brake system begins with the hydraulic tank oil flow to a pressure compensated pump. The pump sends oil to a high pressure filter. After the high pressure filter, oil is sent through a charge valve to an accumulator. From there, oil is supplied to the parking brake manifold, through a solenoid valve, which opens when energized, and on to the parking brake.

Hoist, Dump & Tilt
The hoist and tilt system is what makes the Carrydozer capable of doing work. It allows the bucket to be raised, tilted forwards, backwards, to the right or to the left. This allows the operator to move the desired load to the desired location with minimal loss of material. Every time the bucket is moved this system is being used.

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, dump, 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.

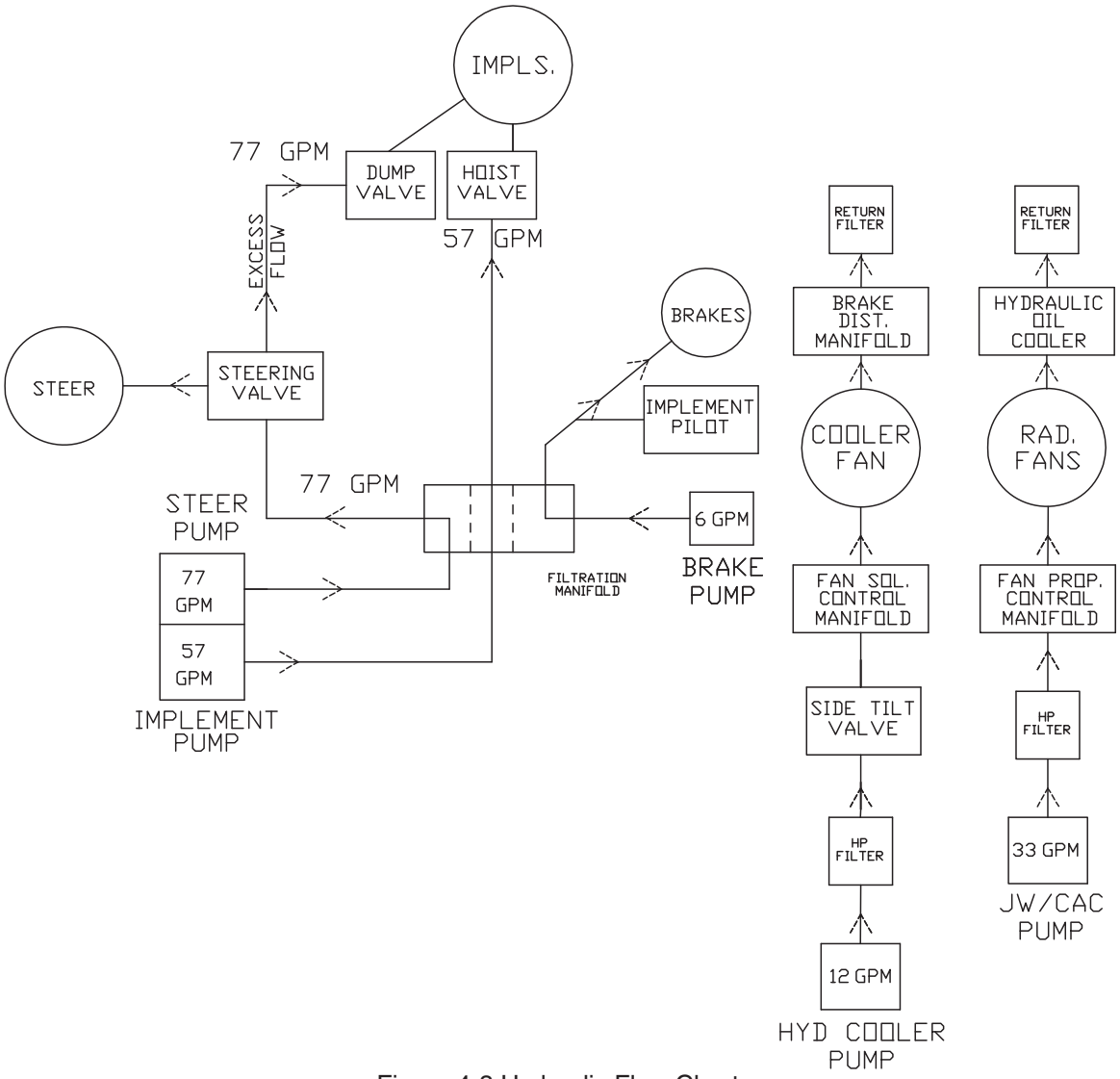


Figure 4-3 Hydraulic Flow Chart

4.5 Electrical System

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.

Fuses

Two 400 Amp fuses in parallel provide protection from overcurrent conditions that might arise.

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 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.

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.

Section 5

Operation

5.1 Introduction

You, the operator, have a key position in your company's material 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 Carrydozer, 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.

Material Handling
The Wagner Carrydozer was developed for fast cycle times in pushing light to medium bulk materials distances of 200 to 800+ feet. Cycle times and volumes under 200 feet are limited by the distance required to load the bucket, and the time required for bucket roll out and dump.

In comparing the Carrydozer bucket to the conventional straight, or "U" type dozer blade, four unique and basic ideas are engineered into the Carrydozer bucket:

1. The bucket retains all the original material within the confines of the bucket throughout the dozing cycle.

2. The bucket will retain all of the material as it may become necessary to lift the bucket slightly to reduce a break in traction and maintain maximum speed.

3. The bucket, in addition to carrying a full load, will push nearly as much in front of the bucket, thus producing more volume per hour than a conventional Dozer of the same size. This capability is possible because the material weight within the bucket is transferred to the drive wheels, producing maximum traction throughout the dozing cycle.4. The articulated design permits dozing maximum bucket loads around turns with minimal spill from the sides.

5.2 Break in Period

IMPORTANT: Your Carrydozer requires fluid ballast (ie, hydroflated tires) for optimal tractive effort. Some Carrydozers are shipped without this fluid ballast. Make sure to hydroflate the tires on your machine if necessary before beginning work.

Use one of the following for fluid ballast, depending on worksite conditions or preferences:

1) Water
2) Water/Anti Freeze
3) Water/Calcium Chloride

Contact Allied Systems Company Service Parts Department at 503-625-2560 for assistance if necessary.

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 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.

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!

5.3 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.

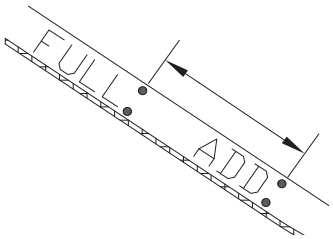


Figure 5-1 Typical Dipstick

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

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. The coolant level sight glass is located on the surge tank (see Figure 5-2). Fluid Level checks should be done on level ground. 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.

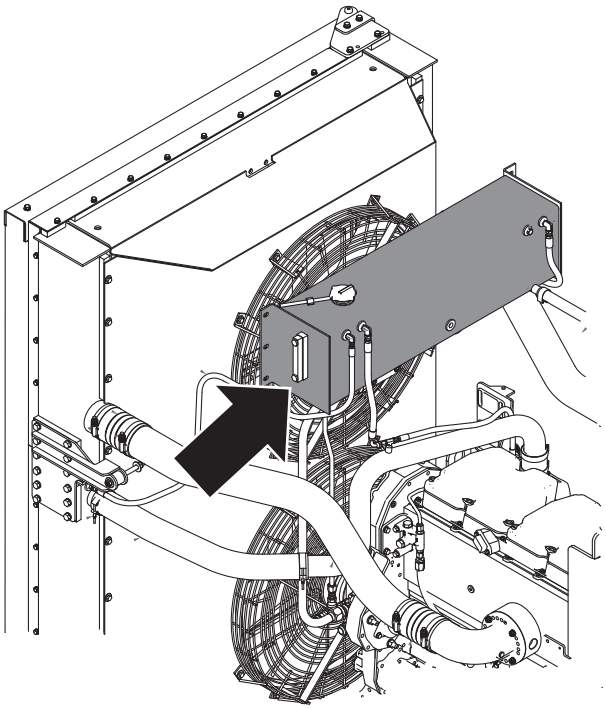


Figure 5-2 Coolant Sight Glass Located on Surge Tank

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

⚠ 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 sight glass for the main hydraulic tank are located on the front right corner of the chassis, under the deck (See Figure 5-3).

IMPORTANT! See warning below for tank venting procedure.

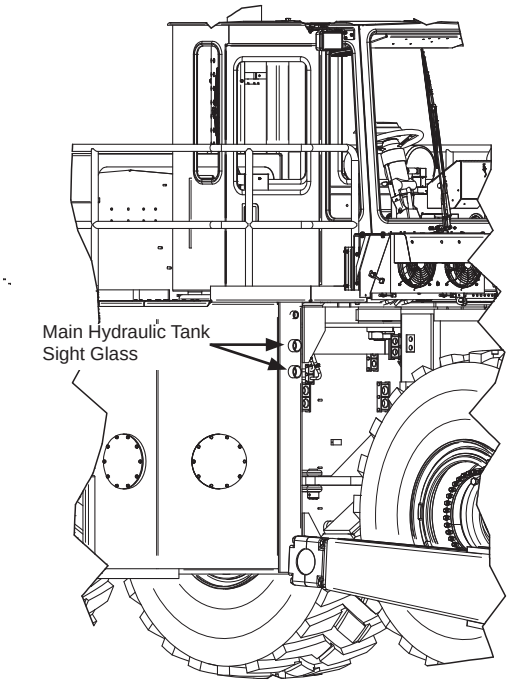


Figure 5-3 Hydraulic Tank Sight Glass

The oil level should be checked with the hoist cylinder extended and bucket rolled back. The oil level should be at or near the upper sight gauge for the main hydraulic tank. Refer to section 6 for hydraulic oil filling procedures. Fill with approved hydraulic fluid as required (See Lubricant Specifications Chart, Section 6). Do not overfill.

⚠ WARNING

Always open the tank breather petcock (located on the breather pipe) before removing the plug in the filter cover plate or adding oil at the return manifold. 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.

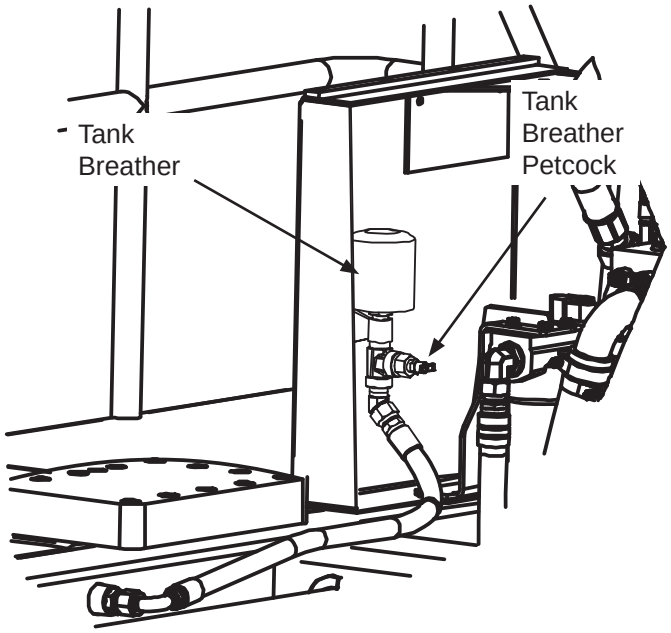


Figure 5-4 Tank Breather Petcock

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

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

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

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

Engine Pre-Start

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

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

3. Check for emergency/parking brake engagement: 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

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 Carrydozer 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 (21° C / 70° F or higher).

   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 dump 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

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.

   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 dump 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

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

⚠ 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

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

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

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

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 (21° C / 70° F or higher).

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 dump 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

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

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

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.

5.4 Using Booster Batteries

NOTICE

Always disconnect radiator fan controller and hydraulic fan controller before charging or jump starting batteries as damage can occur (see Figure 5-5 and 5-6).

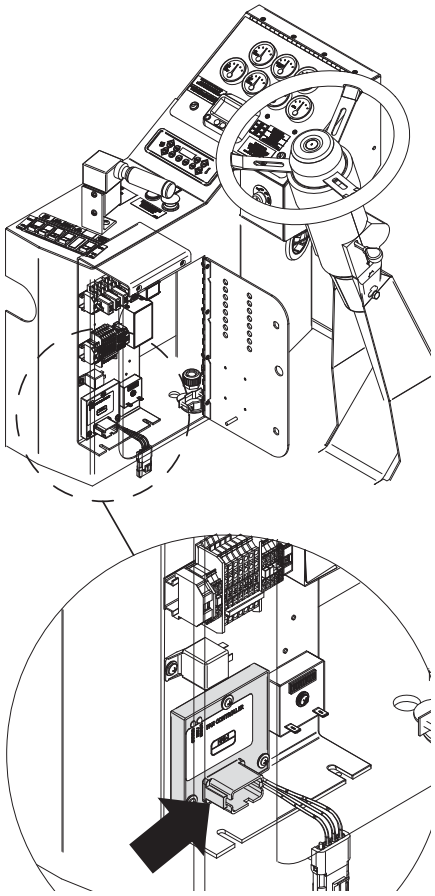


Figure 5-5 Radiator Fan Controller located in Control Console

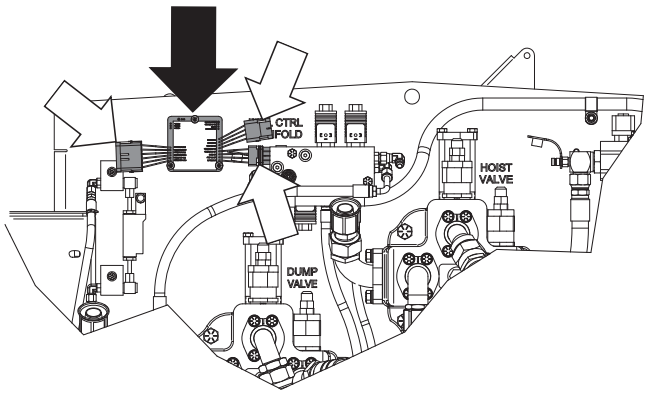


Figure 5-6 Hydraulic Fan Controller located on valve plate behind cab

⚠ 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 (see Battery Disconnect Switch in section 3).

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

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

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. When possible, 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.

5.5 Moving, Stopping and Steering

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

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

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 bucket, if required, to clear any obstructions you might encounter.
5. Release the parking brake and put the transmission range selector into 1st gear.

⚠ 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

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.

Machines with optional driveline with sheer bolts:

NOTE: Some machines are equipped with an optional front driveline with shear bolts. See Figure 5-7. These shear bolts are designed to break in the event of excessive torque in the drivetrain, such as a change in direction without stopping first. This driveline acts similar to a fuse, and protects more expensive drivetrain components.

NOTICE

Once the shear bolts break, the driveline should be serviced immediately.

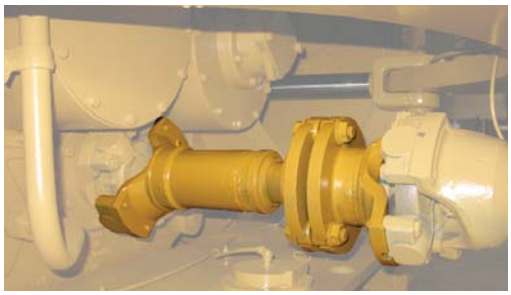


Figure 5-7 Front driveline assembly with sheer bolts

Steering

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

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

   NOTE**:** It is recommended that you keep the declutch in the **ON** position for normal operation**.** If a downgrade is encountered, the De-clutch control may be placed in the **OFF** position, and the transmission will remain in gear while braking. If it becomes necessary to use the Carrydozer for pickup and carry, such as for cleanup the de-clutch should be in the **ON** position.

5.6 Dozing on the Level

1. To obtain maximum load retrieval of chip Carrydozer, **start doze on as level a grade as possible.** Lower the bucket and move into the pile (See Figure 5-8).

2. Fill the bucket gradually.

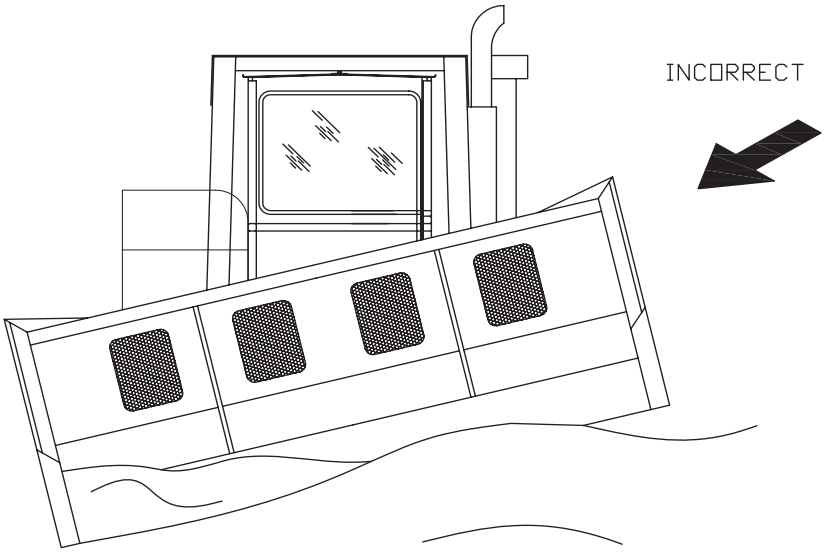


Figure 5-8

3. Do not cut in one slot only, keep the pile as level as possible (See Figure 5-9)

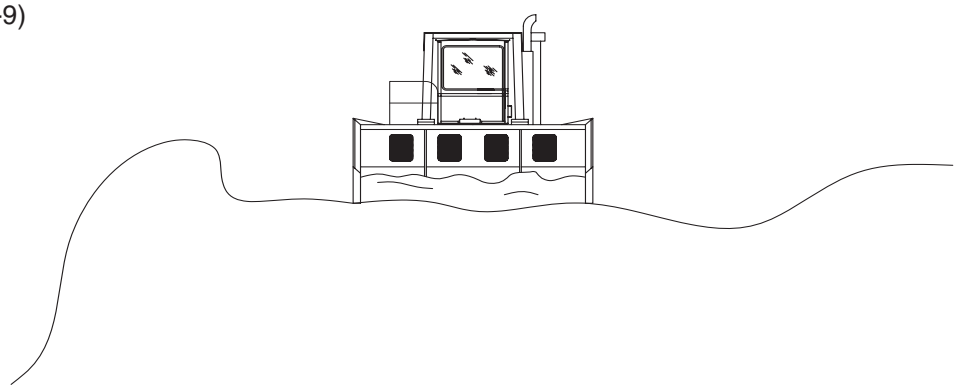


Figure 5-9

4. Tilt the bucket slightly forward to increase the cut when working in compacted material. This will reduce the drag on the bottom of the bucket (See Figure 5-10).

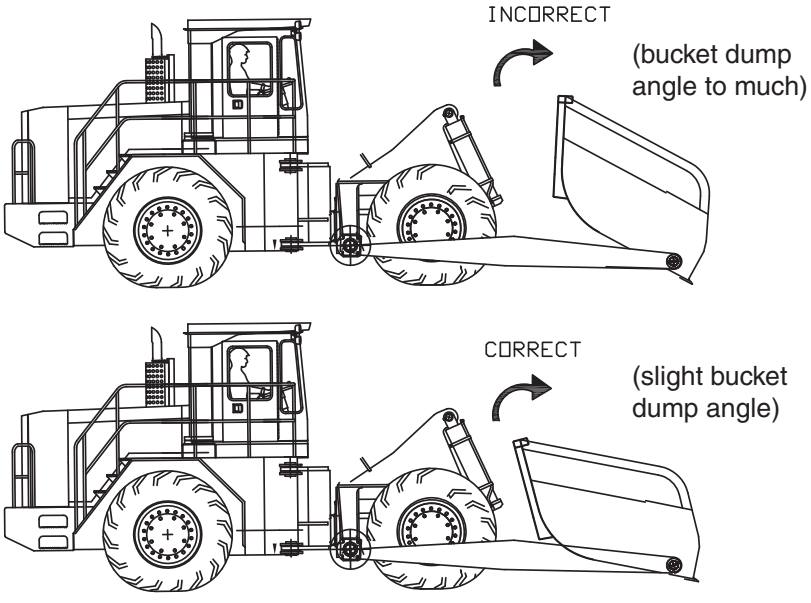


Figure 5-10

5.7 Cutting on a Knoll

When cutting on a knoll or a steep grade, tilt the bucket slightly. This allows the bucket to load more freely (See Figure 5-11).

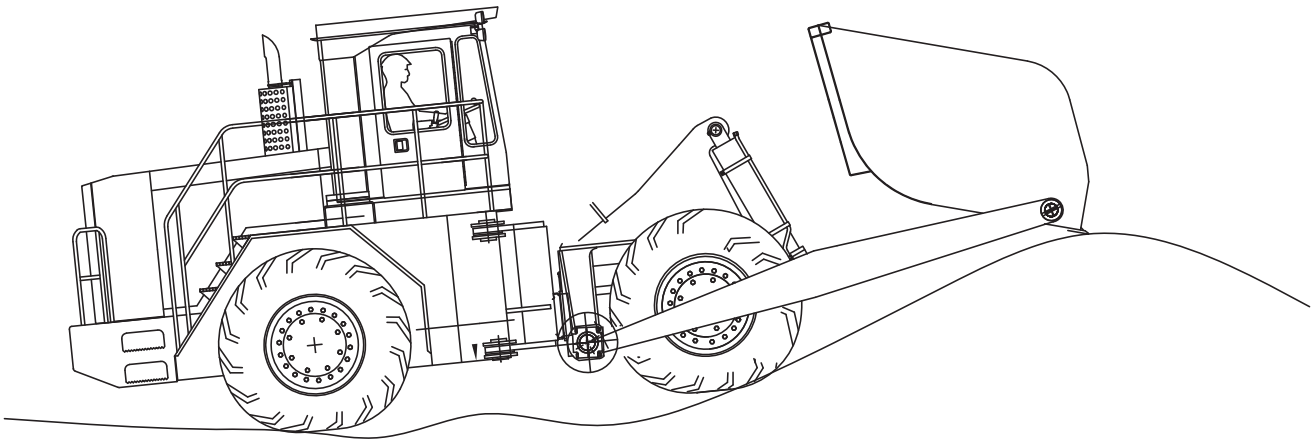


Figure 5-11

5.8 Reclaiming

Start to hoist and dump a load approximately 20 feet from the reclaim in-feed or the edge of the pile. Spending less time at the reclaim will increase the cycle time. This will also reduce the chance of slipping into the reclaim (See Figure 5-12).

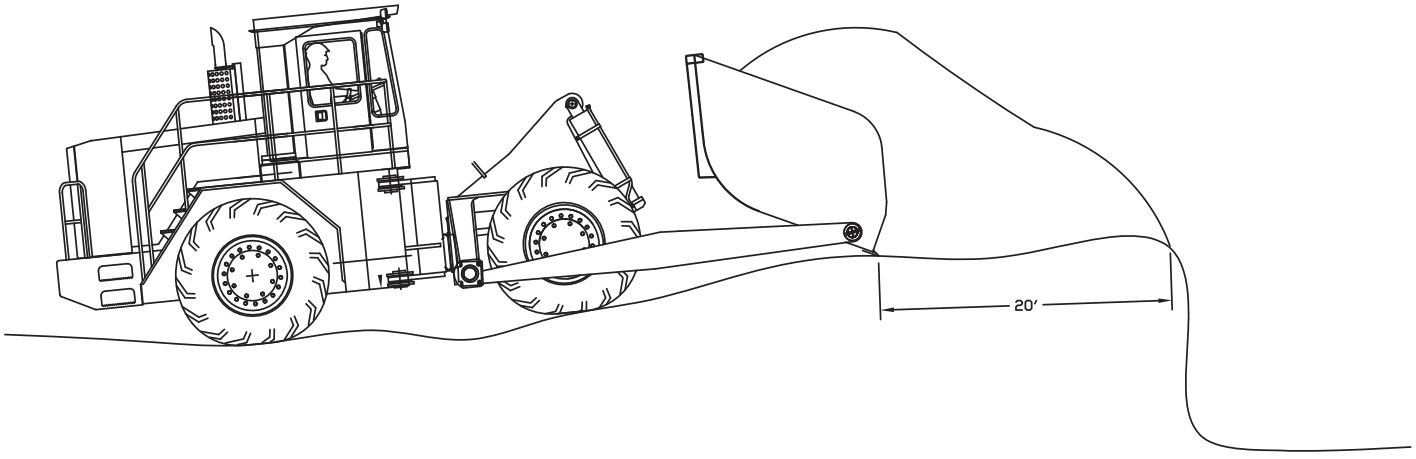


Figure 5-12

5.9 Knocking Down a Cone

⚠ WARNING

Never place yourself or Carry-dozer under the overhang (See Figure 5-13). Approach from the outside of the overhang with the bucket.

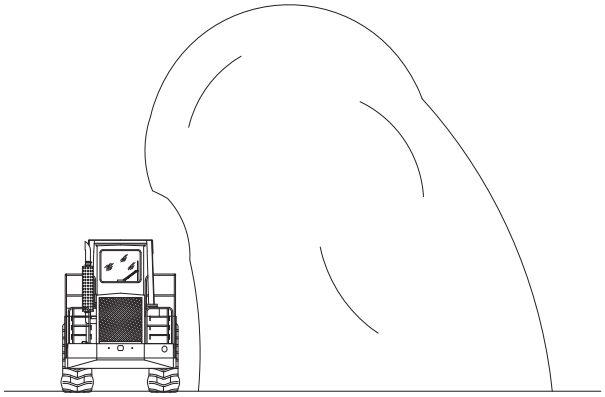


Figure 5-13

1. If it becomes necessary to knock down an overhang, use the following procedure as shown in Figure 5-14.

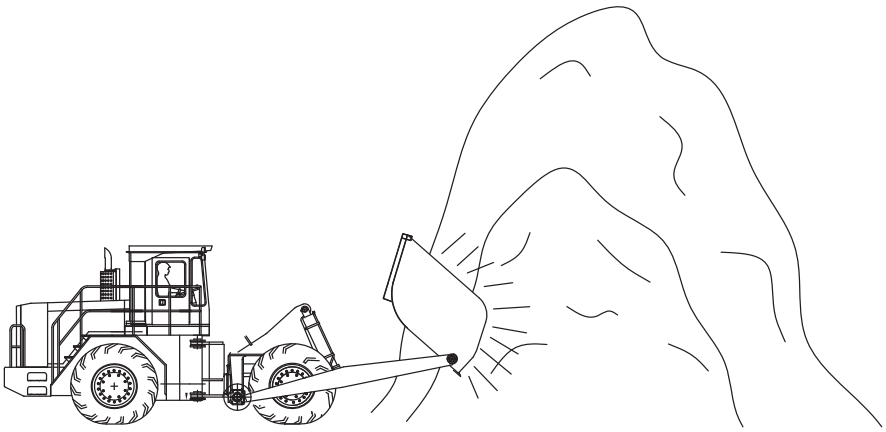


Figure 5-14

2. Do not cut into a cone with the bucket too high. If you enter the pile with the bucket too high, the wheel opposite the pile will be much lower making an uneven cut. Only cut into the cone with the bucket down and level (See Figure 5-15).

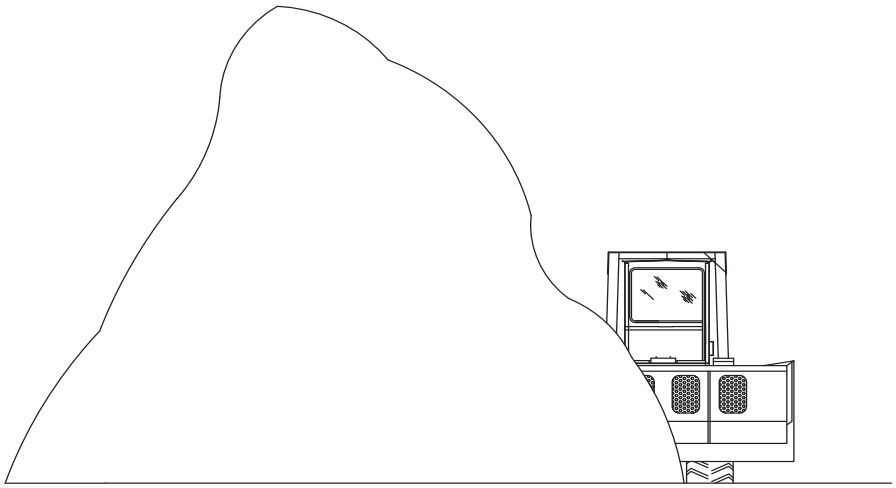


Figure 5-15

3. Cut down the hump in dozing path. If you have a build up or mound of material in the path in which you are dozing, you will need to cut the mound out or you will continue to loose material when dozing over it. Thus increasing the size of the mound with each pass (See Figure 5-16).

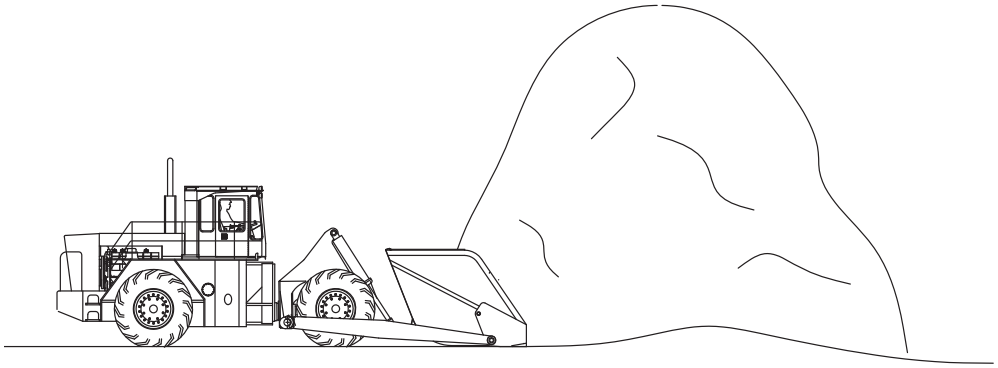


Figure 5-16

4. Cut at different angles. This will make the job of knocking down a discharge pile much easier (See Figure 5-17).

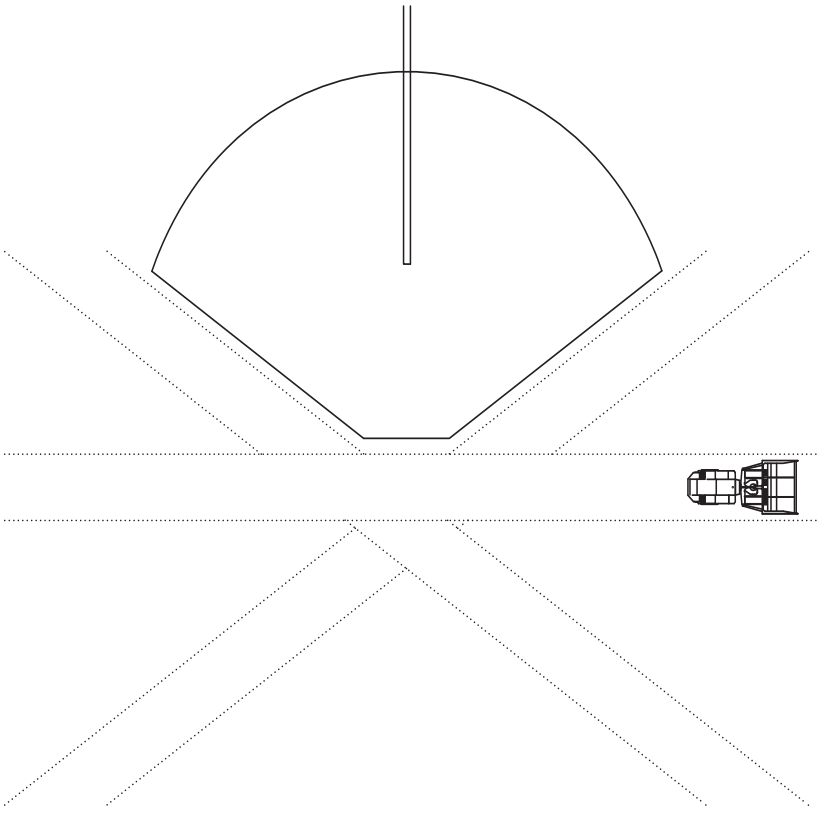


Figure 5-17

5.10 Cutting on the Edge of a Pile

1. When cutting on the edge of a pile, be certain to leave at sufficient berm. There are safety as well as practical reasons for this procedure (See Figure 5-18).

⚠ WARNING

The width of berm required for safety purposes is dependent on the slope of the pile and the nature and condition of the material. The berm should never be less than 2 ft wide, and in many cases, should exceed 2 ft.

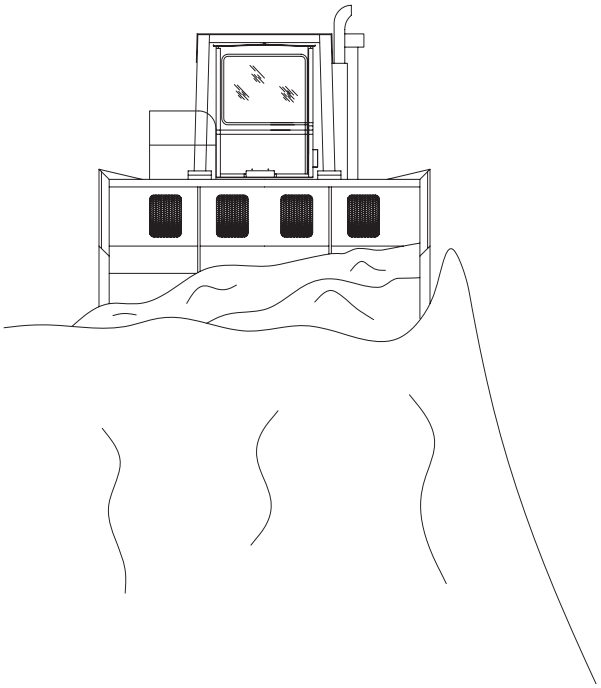


Figure 5-18

2. You can back blade with the bucket tilted forward, with no damage to the machine (See Figure 5-19).

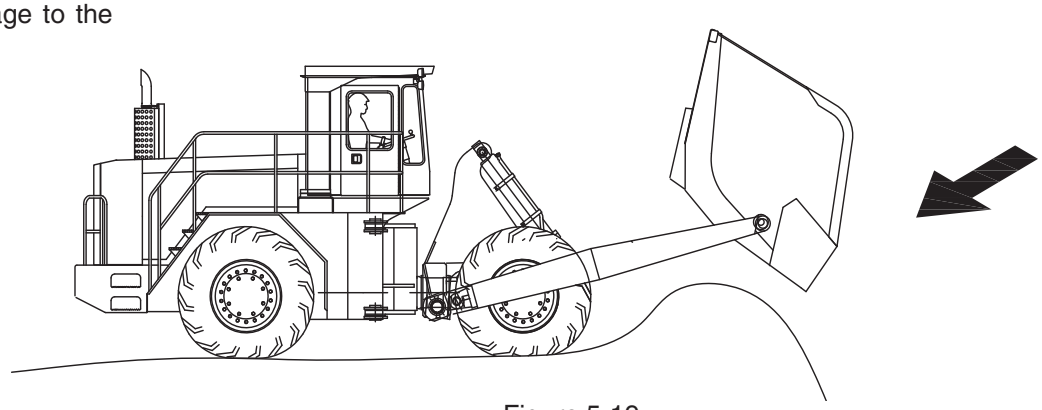


Figure 5-19

3. Building a road off a pile (See Figure 5-20).

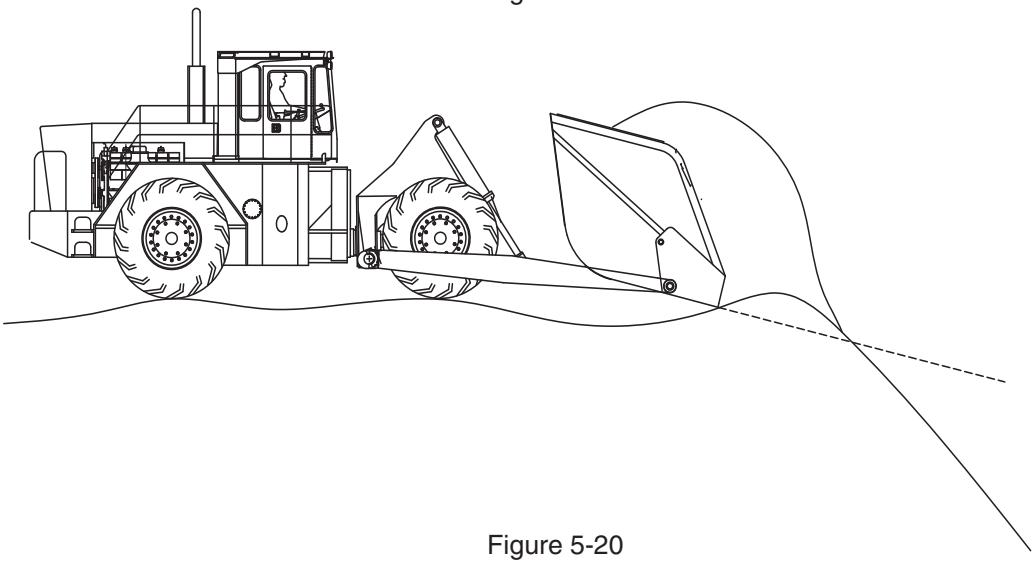


Figure 5-20

5.11 Familiarize Yourself

1. During the familiarization period we suggest your passes be made on relatively level terrain. This will acquaint you with the true feel of the controls and machine handling while loading.

2. Start your pass with the bucket rolled back against the stops. The angle of the cutting blade has been set at the factory for the correct loading angle, or rake.

3. Position the machine as far back as possible, and headed toward the dump area. This will give you time to fill the bucket and feel the control action without being in a hurry.

4. As you become familiar with the feel of the controls, and the action of the bucket during different loading actions, you will recognize the advantages and where to use the procedure of "tilting the bucket forward" to gain additional cutting pressure.

5.12 Getting the Job Done

1. Lower the bucket until it is resting flat on the ground. Selecting first gear and forward direction, proceed at about one half (1/2) the throttle and observe the material flow into the bucket. At this point if the material appears not to be flowing fast enough, apply slight down pressure. This will immediately increase the flow, and the material will appear to "boil." As this occurs, release the down pressure and maintain the boil until the bucket becomes full and the engine begins to lose RPM's. Slowly apply throttle to maintain boil, being careful not to spin the wheels. With a little practice you will be able to perceive this before it occurs. Now you are ready for the feel of weight transfer.

2. Hoist the bucket slightly, returning the joystick to the neutral position as soon as engine RPM's pick up or spinout is avoided. You will immediately notice an increase of material boiling into the bucket. Maintain this until the bucket is full. At this time you can raise the bucket to the planing position, advancing up and down as necessary to maintain load without losing or boiling material. With a little practice on this phase of operation, you will discover how easy it is to maintain a smooth work area. This is very important to fast cycle times, particularly on return runs. Learning to spread to an even smooth depth is perhaps the most difficult phase of operating. As with any machine you have operated, soon with familiarity and understanding you will find yourself making all the correct moves automatically.

3. Take a good look at the bucket cutting edge. Notice how it projects below the bucket hinge pin as it tilts forward during the dump cycle. First it is ever so slight, continuing to increase at a very fast rate as the bucket rolls out, until the total projection is about 12" to 18", depending on the model.

4. With the projection below the grade so to speak, you realize if the bucket is not raised this amount during dump or roll out, you would actually start to dig at a time when you were ready to dump. This, of course, would not only cause you to stall or spinout, but would leave a very rough or washboard dump area, as you attempt to raise the bucket after the digging started.

5. With this in mind, you know as you start to roll the bucket out to dump you must hoist, or raise the bucket the amount of the projection below grade. Because the hoist control and the rollout control lever are on the same lever, the dump and hoist function is relatively easy to coordinate at this critical moment. Here again, the usual **practice makes perfect** cliché is a fact. Understanding this requirement, it soon becomes automatic for perfect grade and dump control. Remember you only have to hoist 12" to 18" for clearance when dumping and maintaining grade. However, the thinner you spread the slower you roll out the bucket. This is because dumping the material too fast reduces the traction weight and more material is dumped in front of the bucket than can be pushed with an empty machine. Thin spread requires constant practice, and precise control. Once achieved, this skill is very useful for stocking out where compaction is so important.

5.13 Conveyor Chute Operation

1. Side casting, or dozing out from discharge pile usually is a matter of moving high volumes of material in a relative short period of time. This requires picking up a full load in a short space, and dozing it out 300 to 800 feet.

2. Because traction is so important, try to keep loose material from building up in the area where you are dozing and filling the bucket. You can do this by starting back from the base of the pile, lowering the bucket to ground level without digging or picking up material. Approach the pile at an angle to penetrate it with approximate one third to one half the width of the bucket. As the bucket fills and spin out appears imminent, apply lift or hoist pressure only as needed to prevent tire slippage, and steer slightly away from the pile. This will also give additional relief to the engine RPM's and tire slippage.

3. While this type operation makes it difficult to completely fill the off corner, the excess amount in the full corner usually will offset the low corner. The average volume moved each pass far exceeds the straight or "U" blade type machine. In addition, you must remember the material picked up in the bucket each pass remains there until you selectively dump it. Several passes from each side will aid in obtaining maximum loads, and keeping a smooth level grade.

4. Continued dozing from one side and the occasional sloughing of the pile will sometimes cause an undesirable slope to the grade. This can easily be straightened out by moving away from the pile approximately one half the machine width for one pass. This allows one half the bucket on the high side to cut out to the lowest level, thus leveling to the original grade.

5. We know of no one who has read "How To Do" instructions and become an expert in one try; however, we are confident that after you have read these instructions and familiarized yourself with the concepts and capabilities of this unique Carrydozer, you will know how to start and with practice become an efficient operator.

5.14 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.

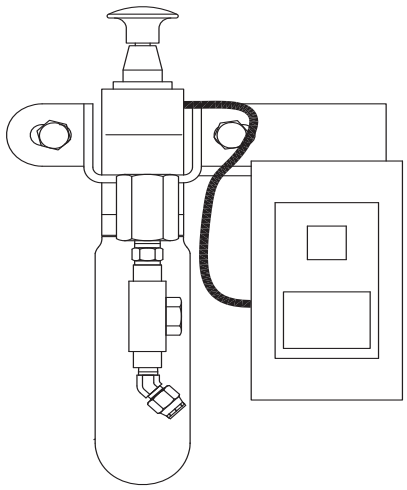


Figure 5-21 Fire Suppression Actuator With Optional Fire Detection System

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 inspected, refilled and recharged before resuming operation. All maintenance and servicing should be performed by a qualified service technician from your local authorized service center for your fire suppression system.

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 work shift as required. These materials build up in tight corners and are highly combustible. To do a thorough job, remove the access panels. See Section 2 for fire safety information.

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 Carrydozer 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 bucket down.

⚠ WARNING

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

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

5. **Install Articulation 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 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 Carrydozer.

⚠ CAUTION

Never operate the Carrydozer with the locking pins in the locked position. Damage to the articulation hinge boxes will result.

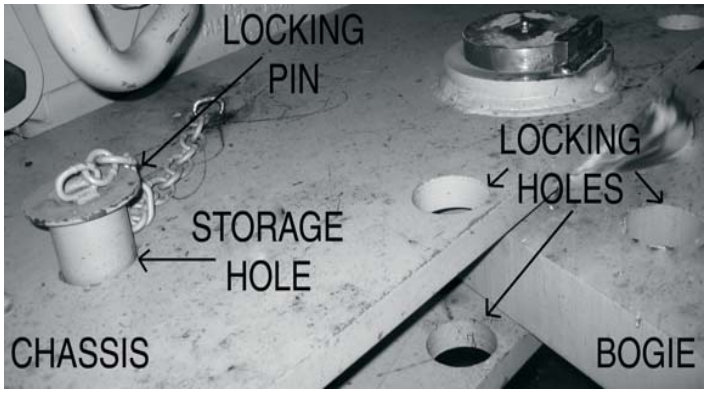


Figure 6-1 Bogie Locking Pin In Storage Hole

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

6.3 Preventive Maintenance

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

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

Preventive Maintenance

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

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

Specific maintenance should be completed using the following intervals:

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

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

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

Additionally, any time a major component is repaired or replaced, the serial number for that component should be recorded.

6.4 Shift Maintenance

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

Shift Maintenance Checklist

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

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

Using the Checklist

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

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

6.5 Scheduled Maintenance

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

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

Scheduled Maintenance Checklist

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

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

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

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

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

Using the Checklist

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

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

6.6 Scheduled Oil Sampling

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

6.7 Lubricant Selection & Specifications

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

Because many brands of fluid are available, it is not practical to test each one. Selecting the correct fluid should be done with the help of a reputable oil supplier who is responsible for the quality of the fluid. Our lubricant recommendations are based on commercial products that have given satisfactory results in normal operation. In all cases, the lubricant supplier assumes all responsibility for the performance of his product and for product liability.

When changing fluids use the following guidelines:

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

Listed below are the lubricants used for initial factory fill:

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

TRANSMISSION/CONVERTER
Mobilfluid 424 (Factory Fill)

DRIVE AXLES
Mobilube HD 85W-140 (Factory Fill)
Mobil Delvac Synthetic Gear Oil 80W-140 (Optional)

Clark Posi-Torque (Bogie Axle)
Lubrizol #6178 Additive

HYDRAULIC SYSTEM
Mobilfluid 424

GENERAL CHASSIS LUBRICATION
Mobilgrease Special No. 2

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

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

6.8 Hydraulic Oil Cleanliness

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

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

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

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

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

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

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

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

Figure 6-2 ISO 4406-1999 Fluid Cleanliness Codes

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

⚠ CAUTION

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

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

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

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

6.9 Wet Disk Brakes

Hydraulically applied, spring released, liquid cooled brake friction disk lining wear check procedure.

NOTE: The brake must be applied before making the wear indicator check.

1. Clean thoroughly the area around the wear indicator.
2. Remove cap.
3. Push wear indicator pin in against reaction plate.
4. Inspect discs when wear pin becomes flush with the spotface (See Figure 6-3).
5. Replace cap and torque to 25 lb/ft [27-34 Nm] as required.

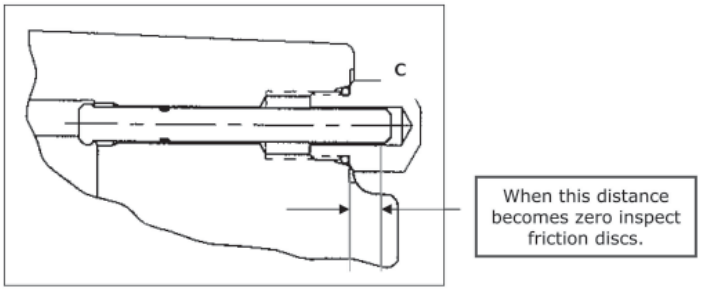


Figure 6-3 Wet Disk Brake Test

Manual Parking Brake Release

If brake hydraulic pressure is lost, the spring applied parking brake will engage. The brake accumulators may provide enough hydraulic pressure to release the parking brake if it becomes necessary to move the machinery. If the accumulators are depleted however, and it becomes necessary to move the machinery, external hydraulic pressure must be applied with a port-a-power, or equivalent, to release the parking brake.

Begin by relieving all hydraulic pressure from the brake/parking brake system. Then, remove the hose shown in Figure 6-4 at the parking brake manifold located at the rear of the cab, and connect to a port-a-power or equivalent, and pressurize the hose to 1350 psi. This should release the parking brake.

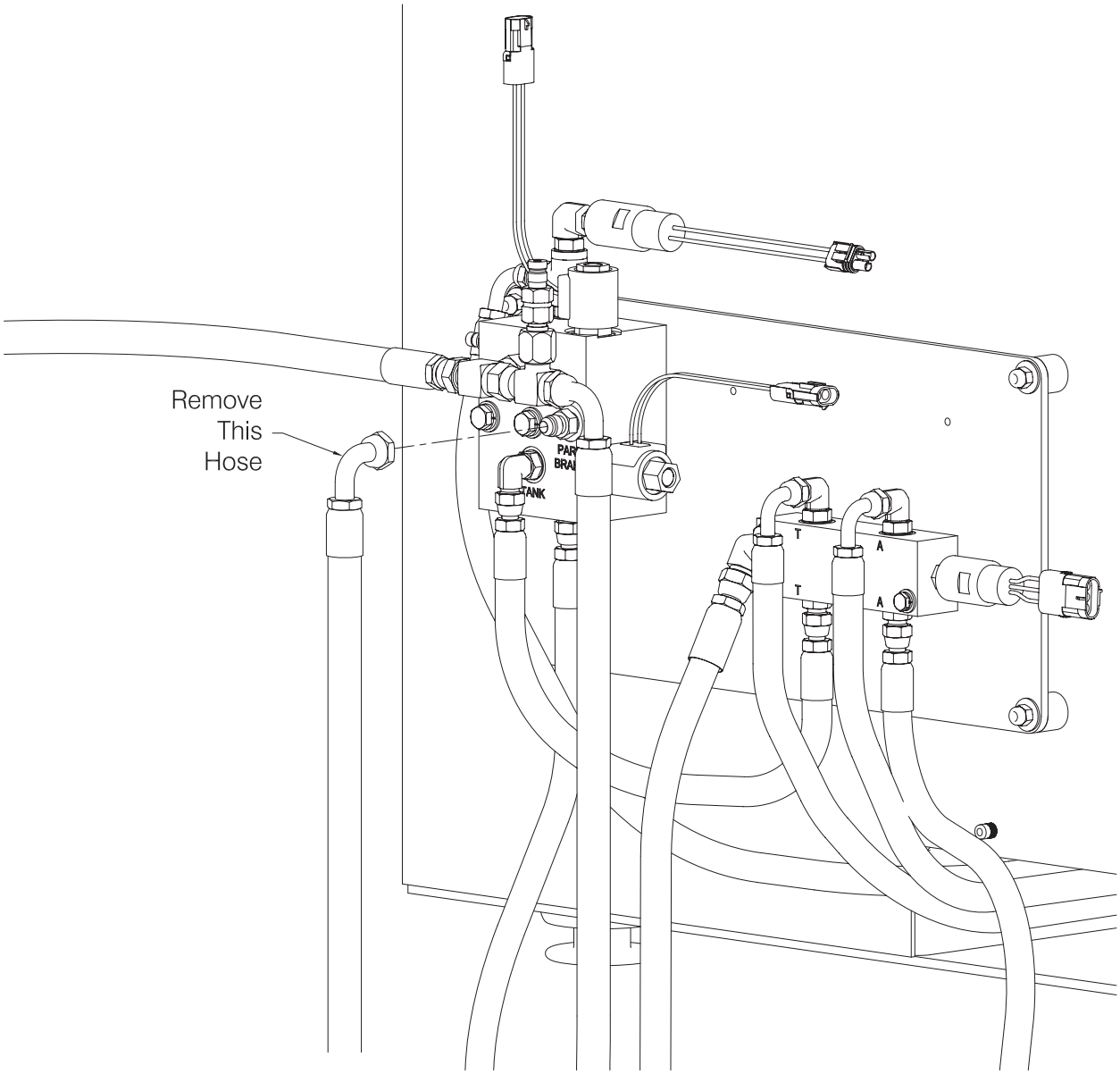


Figure 6-4 Brake Valve Mounted at Rear of Operator's Cab

6.10 Welding

NOTICE

Always disconnect radiator fan controller, hydraulic fan controller and electronic control module (ECM) before welding as damage can occur (see Figures 6-5, 6-6 and 6-7).

1. Turn off the engine. Place the key start switch in the OFF position.

2. Disconnect 12 pin connector on radiator fan controller (see Figure 6-5).

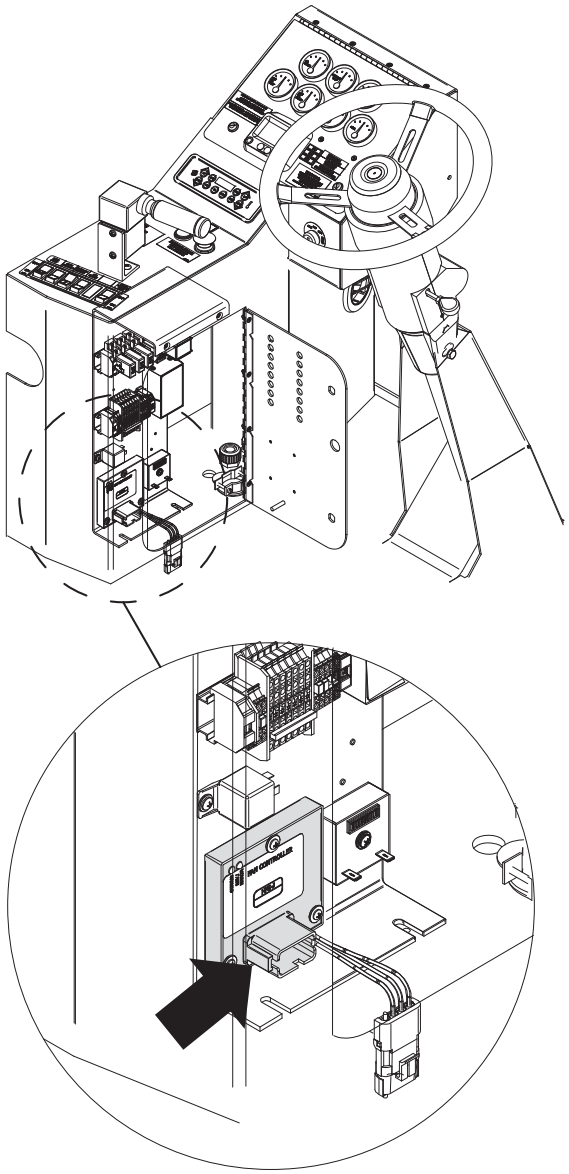


Figure 6-5 Radiator Fan Controller located in Control Console

3. Disconnect the three connectors on hydraulic fan can controller (see Figure 6-6).

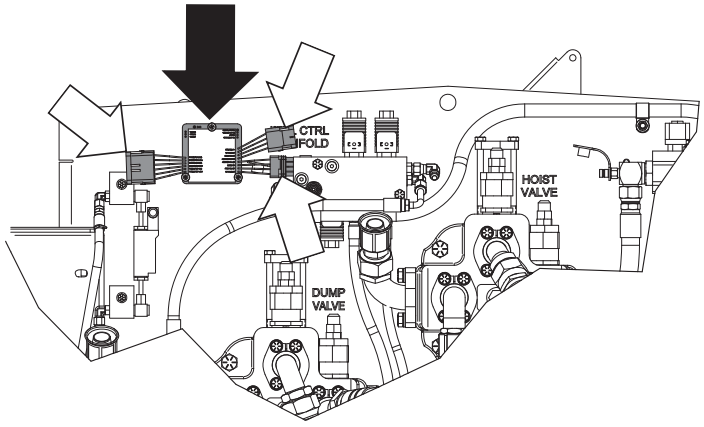


Figure 6-6 Hydraulic Fan Controller located on valve plate behind cab

4. Set the battery disconnect switch to OFF (see Figure 6-7).

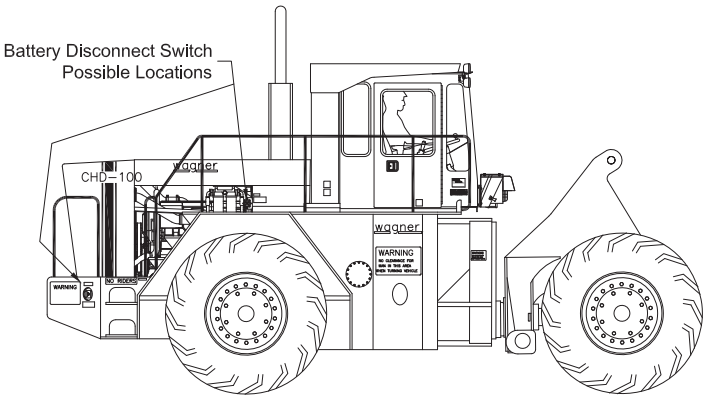


Figure 6-7 Battery Disconnect Switch Locations

5. Disconnect the electrical control module (ECM) harness and place the harness so the connector is away from the ECM module.

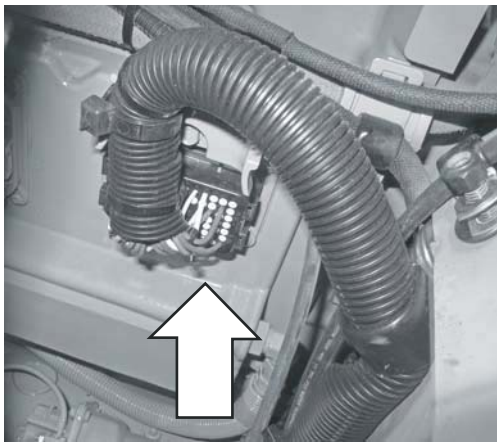


Figure 6-8 Electronic Control Module
located on engine on right side of Carrydozer

NOTICE

Do not ground the welder to electrical components such as the ECM or sensors. Improper grounding can cause damage to the drive train bearings, hydraulic components, electrical components, and other components.

Clamp the ground cable from the welder to the component that will be welded. Place the clamp as close as possible to the weld. This will help reduce the possibility of damage.

3. Clamp the ground cable from the welder to the component that will be welded. Place the clamp as close as possible to the weld.

4. Protect wiring harnesses from welding debris and from spatter. Use proper welding procedures.

6.11 Shift Maintenance Checklist

Always refer to manufacture's (e.g. engine, transmission, axle) maintenance manual before performing any maintenance.

EVERY 10 HOURS OR DAILY

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

Before Starting the Engine - Check The Following:

REF	ITEM	OK	NO	ADD
16	ENGINE (Check oil level - check for leaks)	☐	☐	_____
8	HYDRAULIC TANK (Check oil level - check for leaks)	☐	☐	_____
1	RADIATOR (Check coolant level - check for leaks)	☐	☐	_____
1	RADIATOR & OIL COOLER FANS (Are fins clean and unobstructed?)	☐	☐	
3	AIR CLEANER (Check indicator - clean or change element as required, empty dust cup)	☐	☐	
7	ENGINE BELTS (Check for adjustment and wear)	☐	☐	
18	WHEELS & TIRES (Check condition and pressure)	☐	☐	_____
___	LUBRICATE CHASSIS (Refer to lube chart)	☐	☐	
___	WALK AROUND INSPECTION of structure: welds, leaks, damaged components, etc...	☐	☐	
___	FIRE SAFETY CHECK (Check for accumulated debris in engine compartment, etc)	☐	☐	

After Starting Engine - Check The Following:

16	ENGINE (Does it sound normal?)	☐	☐	
11	INSTRUMENTS (Check for normal readings)	☐	☐	
11	FILTER INDICATOR LIGHTS (Change filters if filter indicator light is illuminated)	☐	☐	
11	CONTROLS (Check for normal operation)	☐	☐	
5	EXHAUST SYSTEM (Check for leaks and excessive smoke)	☐	☐	
4	AIR INTAKE SYSTEM (Check for leaks and damage)	☐	☐	
10	TRANSMISSION - After warming to operation temp.- (Check oil level - check for leaks)	☐	☐	_____
11	PURGE RADIATOR/OIL COOLER FANS (2 minutes after starting engine)	☐	☐	
11	DECLUTCH FUNCTION	☐	☐	

Note Anything Abnormal or in Need of Repair

LIGHTS_____ DEFROSTER_____ REVERSE WARNING HORN_____
HORN_____ WINDSHIELD WIPERS_____
HEATER_____ AIR CONDITIONER_____
DECLUTCH_____ GAUGES_____

OPERATOR_____ SUPERVISOR_____ DATE_____
MODEL_____ SERIAL NUMBER_____ HOUR METER_____

6.12 Lubrication Points

10 HOURS

REF		FITTINGS
9	STEERING CYLINDER PINS	4
15	HOIST CYLINDER PINS	2
28	DUMP CYLINDER PINS	4
14	SIDE TILT CYLINDER PINS	2
29	LIFT ARM TO BUCKET PINS	2
6	HINGE PIN - UPPER*	1
24	HINGE PIN - LOWER*	1

50 HOURS

21	DRIVELINE - CONV TO TRANS*	3
20	DRIVELINE - TRANS TO REAR AXLE*	3
22	DRIVELINE - TRANS TO SWIVEL*	3
25	DRIVELINE - SWIVEL FRONT AXLE*	2
23	DRIVELINE - SUPPORT BEARING	1
13	SWIVEL BEARING	1
30	DIFFERENTIAL PINION SHAFT BEARINGS	2

* Use handgun or lower pressure adaptor; lubricate sparingly.

250 HOURS

7	FAN DRIVE BEARING (not all engines)	1

6.13 Maintenance Checklist

EVERY 50 HOURS OR WEEKLY

1. Repeat the 10 hour check	OK_____	NO_____
2. Check for fluid leaks - oil, fuel, water, transmission	OK_____	REPAIR_____
3. Check wear indicator on wet disk brakes (See page 6-6)	OK_____	REPAIR_____
4. Check wheel lug nuts and studs mechanically; retorque	OK_____	REPAIR_____
5. Check battery electrolyte level	OK_____	ADD_____
6. Lubricate chassis - refer to Lubrication chart	OK_____	NO_____
7. Record engine rpm	High_____	Stall_____
8. Check for structural damage - inspect chassis & attachments for bending, cracking & broken welds	OK_____	Repair_____
9. Drain, flush and fill planetaries/differential carrier assembly (First 50 Hrs Only)	OK_____	NO_____

EVERY 250 HOURS OR MONTHLY

1. Repeat the 50 hour check	OK_____	NO_____
2. Change engine oil & filters* (Check Engine Manufactures Operators and Maintenance Manual)	OK_____	ADD_____
3. Take engine oil sample for analysis*	OK_____	NO_____
4. Change fuel filters* (Check Engine Manufactures Operators and Maintenance Manual)	OK_____	REPLACE____
5. Check axle differential oil level	OK_____	ADD_____
6. Check axle planetary oil level	OK_____	ADD_____
7. Change cooling system filter	OK_____	REPLACE____
8. Check all hydraulic pressures and record	OK_____	NO_____
9. Check fire suppression actuator	OK_____	NO_____
10. Check supplemental coolant additive concentration	OK_____	NO_____
11. Check antifreeze concentration	OK_____	NO_____

EVERY 500 HOURS OR QUARTERLY

1. Repeat the 250 hour check	OK_____	NO_____
2. Change Hydraulic filters*	OK_____	REPLACE____
3. Change Transmission filters*	OK_____	REPLACE____
4. Take oil samples from transmission, axle, and hydraulic system for analysis*	OK_____	NO_____
5. Check Accumulator pressure	OK_____	NO_____

EVERY 1000 HOURS OR SEMI-ANNUALLY

1. Repeat the 500 hour check	OK_____	NO_____
2. Change transmission oil and filters	OK_____	ADD_____
3. Clean and flush cooling system	OK_____	ADD_____
4. Drain, flush and fill differential*	OK_____	ADD_____
5. Drain, flush and fill planetaries*	OK_____	ADD_____
6. Check pins and bushings for wear	OK_____	REPLACE____
7. Steam clean machine, inspect for structural cracks	OK_____	NO_____
8. Change cab pressurizer filter	OK_____	NO_____
9. 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. Change hydraulic oil and filters*	OK_____	ADD_____

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

_____

_____

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

_____

_____

Repairs:

Problem:_____

_____

_____

_____

Parts: _____

_____

_____

_____

Mechanic: _____ Hours Labor: _____

Operator: _____ Supervisor: _____

Machine Model: _____ Equipment No: _____

Date: _____ Shift:_____ Hour Meter: _____

6.14 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 the Maintenance and Lubrication Chart (See Figure 6-8). This provides an additional aid in locating each check point.

Before Starting Engine

16 **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

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.

8 **Hydraulic Oil Level**
Always check the hydraulic oil level prior to operation. The sight glass for the main hydraulic tank are located on the front right corner of the chassis, under the deck.

The main hydraulic tank may be filled by either of two methods. **Important: See warning on this page for tank venting procedure.** With the gravity fill method, remove the plug in the filter cover plate and add oil. With the pressure fill method, use the quick connect fitting above the oil level sight glass to supply pressurized oil. Fill the main hydraulic tank until the oil shows in the upper sight glass (See Figure 6-9).

The oil level should be checked with the hoist cylinder extended (down). The oil level should be at or near the upper sight glass for the main tank. Fill with approved hydraulic fluid as required (see Lubricant Specifications Chart, page 6-4). Do not overfill.

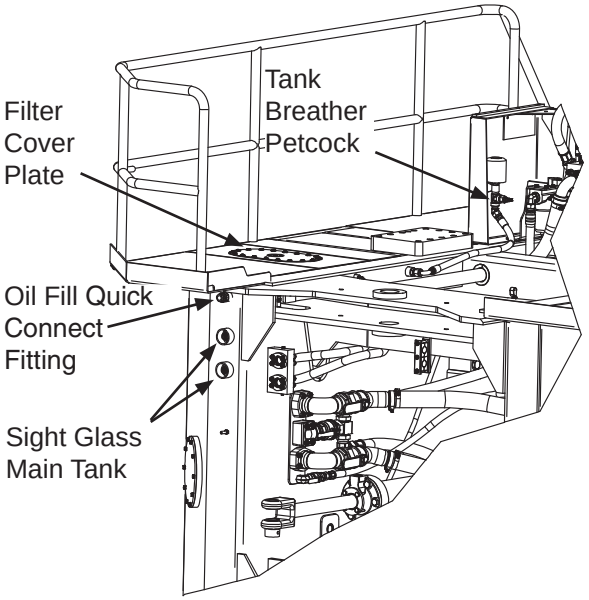


Figure 6-9 Hydraulic Oil Fill Location

⚠ WARNING

Always open the tank breather petcock (located on the breather pipe) before removing the filter cover plate, the plug in the cover plate, or adding oil at the return manifold. Failure to vent tank can result in injury or a substantial oil spill. Be sure to close the petcock before operating the machine.

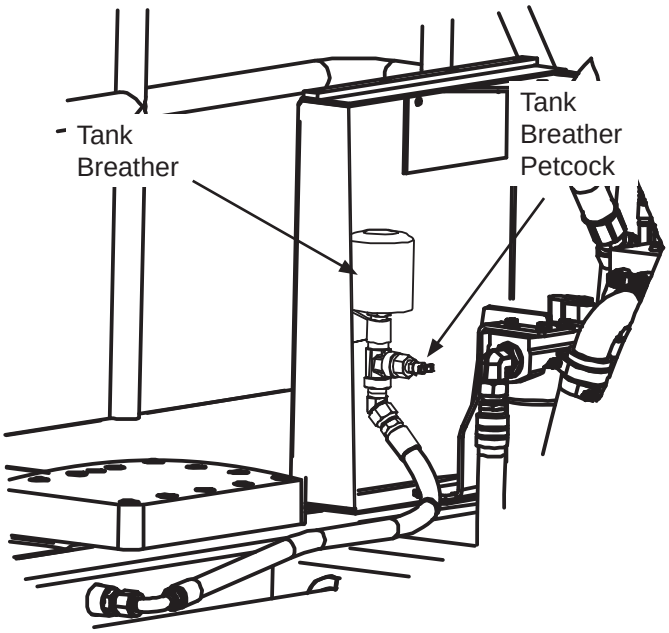


Figure 6-10 Tank Breather

1 Engine Coolant Level
Daily inspection of the coolant level is recommended. The coolant level sight glass is located on the surge tank (see Figure 5-2). Fluid Level checks should be done on level ground. Remember to compensate for the loss of antifreeze when adding water.

⚠ 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.

2 Brake System Accumulators
The pre-charge needs to be checked periodically. If the accumulators needs to be recharged, fill with pure, dry nitrogen only.

3 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.

7 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 (See Figure 6-11). Inspect serpentine belt and tensioner for looseness and noise. If any belt is loose or worn, report to maintenance for corrective action.

Engine	Belt Deflection Inches (mm)
Cummins	3/8 to 5/8 (9.5 to 15.9)
Cat	3/8 to 9/16 (9.5 to 14.3)

Figure 6-11 Belt Deflection (V-Belt)

18 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. When you receive a new unit or install a new wheel on your present unit, it is most important to torque the lug nuts daily or every eight hours of operation for the first four or five days of service. Check the studs and nuts for proper torque every 50 hours or weekly thereafter.

19 Structural Inspection
Steam clean the machine and inspect for structurally cracks. If cracks are present repair before resuming operation. Refer to 80-850 for information on how to properly weld structural cracks.

After Starting Engine

17 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.

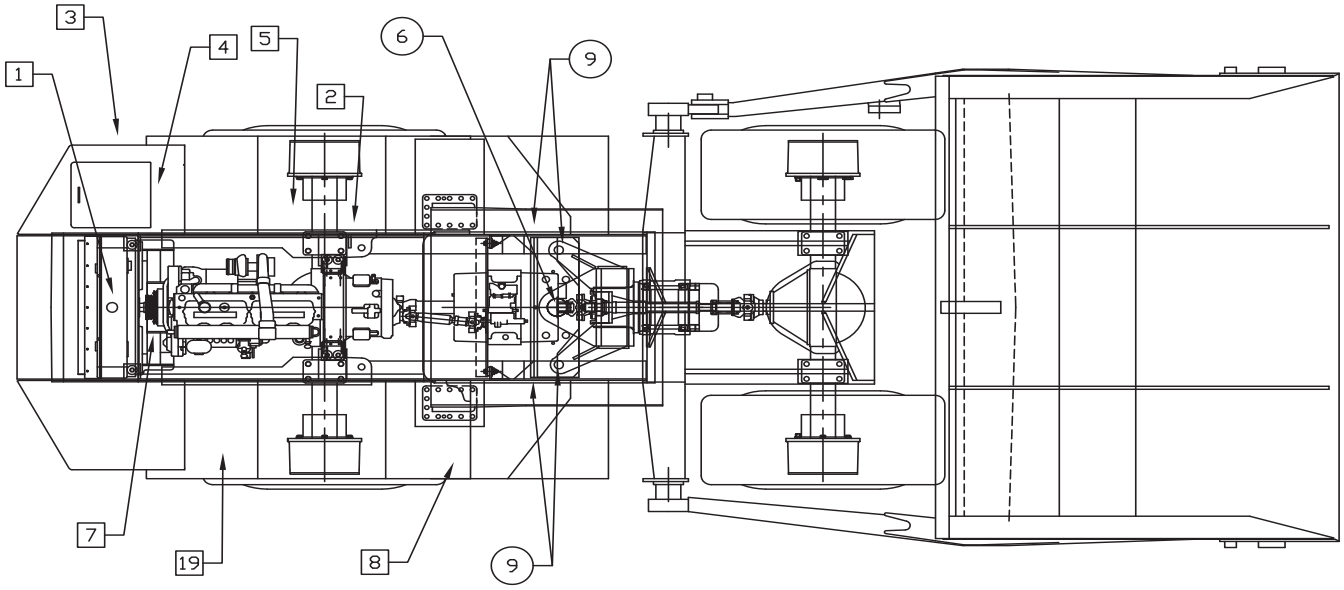
11 Instruments
Check all instruments for normal readings immediately after starting engine. Make sure that pressures and temperatures are within acceptable limits. Also, check that all controls function properly. They should be smooth and responsive.

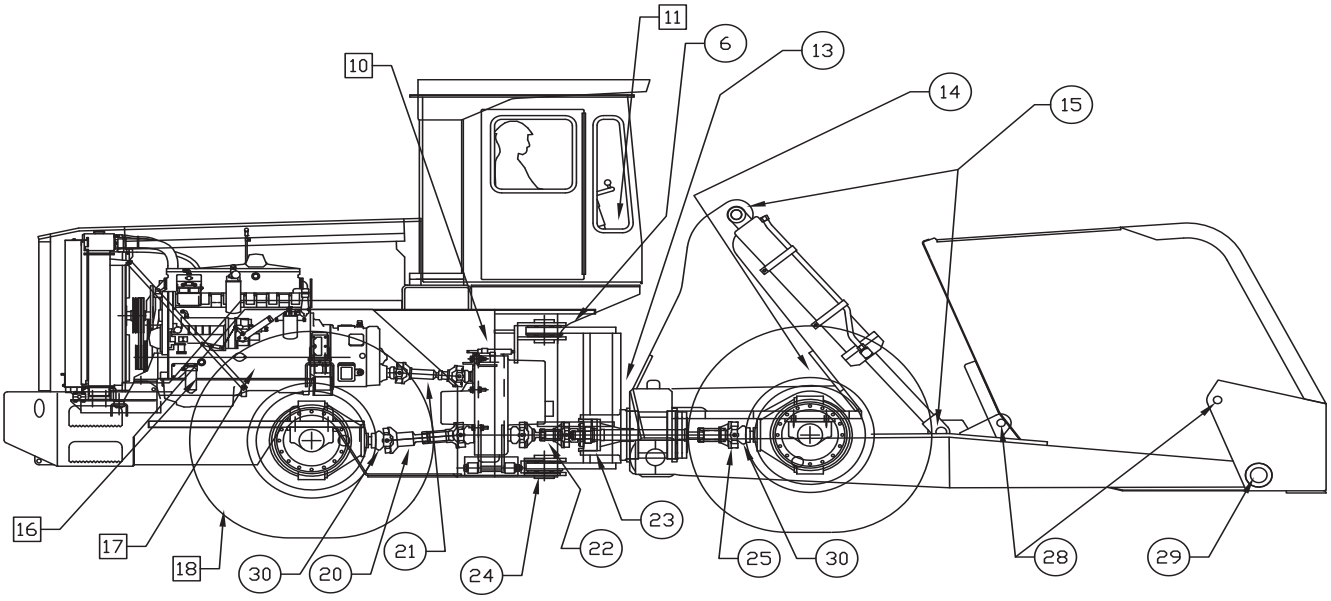
4 Air intake system
Inspect all connections for damage, loose clamps, and air leaks. Look for damaged fittings and loose connections. Do not operate the machine if leaks are present. Dirt could enter the engine intake and cause severe damage.

5 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.

10 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.

Maintenance & Lubrication Points





Circled numbers indicate Lubrication points

Boxed numbers indicate Maintenance checks

Figure 6-12 Maintenance And Lubrication Chart

NOTE**:** Due to variations in engine types and models, the indicated location of engine filters (fuel, oil, coolant) may not be exact. Consult your specific engine service manual for exact locations.

6.15 Operator Troubleshooting

The following table 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
	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
	Bucket float “on”	Turn off bucket float
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

Transmission / Converter*

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

Wet Disk Brake System

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Loss of braking efficiency	Air in hydraulic brake system	Check pump
	Loss of accumulator pressure	Have maintenance check system
	Low system pressure	Wait for system pressure to recharge

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

Hydraulic System

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

Electrical System

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

6.16 Maintenance Specifications

Wheel Lug Torque
Front..... 500 ft-lbs(678 N m)
Rear..... 500 ft-lbs (678 N m)

Tire inflation Pressure
Front 29.5 x 29.....65 PSI Max (448 kPa)
Rear 29.5 x 29.....55 PSI Max (380 kPa)

Component Capacities & Lubrications

COMPONENT OF SYSTEM	U.S. GALLONS	LITERS	LUBRICATION TYPE*
Engine crankcase	See Engine Service Manual		Engine Oil
Fuel Tank			
CHD 100 / CD 1000	295	1117	Diesel Fuel
CHD 60 / CD 600	180	681	Diesel Fuel
Cooling System			
CHD 100 / CD 1000	40	151	Water / Antifreeze **
CHD 60 / CD 600	14.5	55	Water / Antifreeze **
Hydraulic System			
CHD 100 / CD 1000	255	946	Hydraulic Oil
CHD 60 / CD 600	160	606	Hydraulic Oil
Transmission System ***	23	87	Transmission Oil
Differential	13.25	50	Gear Lube
Planetary Hubs (Each)	2.5	9.5	Gear Lube
Chassis Grease Fittings	~As required~	~As required~	Chassis Grease

* See Lubricant Specifications, Page 6-4

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

***Includes brake cooling circuit capacity.

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

6.17 Recommended Overhaul Schedule

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

Extreme duty is defined as continuous dozing on slopes or in either poor or excellent traction conditions. An example of poor traction conditions would be pine chips where an example of an excellent traction condition would be hog fuel.

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 proper maintenance and lubrication, and genuine Wagner filters are used.

Recommended Drivetrain Overhaul Intervals (Hours)

Component		Standard Duty	Extreme Duty
Engine	Cat	18,000	14,000
	Cummins	16,000	12,000
Torque Converter		20,000	12,000
Pumps		10,000	6,000
Transmission		24,000	12,000
Differentials	Front	10,000	6,000
	Rear	30,000	20,000
Planet Assemblies	Front	10,000	6,000
	Rear	30,000	20,000