Operators Manual

HLT 280

Heavy Lift Transport

Allied Systems COMPANY

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Operators Manual

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Section 1 - Safety Information

Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly. Management should ensure that only qualified properly trained and equipped personnel operate and maintain this equipment.

Read and understand all safety precautions and warnings before operating or performing lubrication, maintenance and repair on this product.

Safety Is Your Business

Why? Because SAFETY, based on knowledge, technical skill, and years of experience has been carefully built into your HLT Transporter. 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 machine 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 machine. It's your responsibility to see that they are carried out.

Precaution Warnings

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

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

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

⚠ CAUTION

Caution: Whenever potential damage to equipment exists, requiring correct procedures for prevention, the term "Caution" is used.

⚠ WARNING

Warning: Whenever potential personal injury or death situations exist, requiring correct procedures or practices for prevention, this "WARNING" symbol is used.

This safety alert symbol indicates important safety messages in this manual. When you see this symbol, carefully read the message that follows and be alert to the possibility of personal injury or death.

Allied Systems cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by Allied Systems is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.

Operation Warnings

You must be trained in the operation of this machine. Be extremely careful if you do not normally operate this machine. Re-orient yourself to the machine before starting, and then proceed slowly. However, you must not operate without having received proper training.

Know your company's yard rules. Follow specific loading directions and procedures. The methods outlined in this manual provide a basis for safe operation. Because of special conditions, your company's handling procedures may be somewhat different from those shown in this manual.

- Always face the ladder when going up and down ladders. Use both hands.
- 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 or its attachments.
- Do not operate this machine if you know of malfunctions, missing parts, and/or misadjustments. These situations can cause or contribute to an accident or damage to the machine. Stop the machine immediately if problems arise after starting.
- All electrical cables and connectors must be in good condition. Use caution in wet weather to avoid danger from electric shock. The hydraulic tank and/or engine block heater must be properly grounded.
- Do not operate the machine before disconnecting hydraulic tank or engine block heaters. Do not start the engine if the key has been tagged 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 accurate in load placement. It's important to know what the load will do when moving.
- Lower or remove the load before leaving the cab or shutting down the engine.
- Electical energy under high voltage can discharge to ground through the machine 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. Do Not Permit Anyone To Come Into Contact With The Machine's Structure.**

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.

Perform all maintenance unless otherwise specified as follows:

1. Vehicle supported on certified safety stands at the four corners.
2. The engine is stopped.
3. The start switch key is off and the key is removed.

Note: Please be advised that the following Safety Procedures are intended to compliment the established regulations of your Corporate Safety Committee.

General Warnings

- Do not attempt to make adjustments, or perform maintenance or service unless you are authorized and qualified to do so.
- Unless specified in this manual, never attempt maintenance or lubrication procedures while the machine is moving or the engine is running.
- Before performing maintenance or service under the machine, move the machine to a level surface, engage the parking brake and stop the engine.
- Remove the ignition key and attach a "DO NOT OPERATE" or similar warning tag to start switch or controls before servicing or repairing the machine. Refer to OSHA's Lockout/Tagout standard for detailed procedures.
- Block the tires to keep the machine from rolling.
- Perform all maintenance and lubrication procedures with

the machine on level ground, parked away from traffic lanes.

- If necessary, support components with appropriate safety stands. Never stand under a component that is supported only by the hydraulics. Make sure it is resting on its mechanical stops.
- 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.
- Use extreme caution when using compressed air to blow parts dry. The pressure should not exceed 30 psi (208 kPa). Never use air to blow yourself off. Air pressure penetrating your skin can be fatal.
- When using pressure air for cleaning, wear a protective face shield and protective clothing.
- Maximum air pressure from the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.
- Do not enter fuel or hydraulic tanks without proper safety equipment. Check your local government regulations for confined space entry requirements.
- Keep the machine, especially the deck, walkways and steps, free of foreign material, such as debris, oil, tools and other items which are not part of the machine.
- Secure all loose items such as lunch boxes, tools and other items which are not part of the machine.
- Know the hand signals and who gives them. Accept signals from one person only.
- Put maintenance fluids in approved container only. Never put maintenance fluids into glass containers.
- Report all needed repairs.
- Do not allow unauthorized personnel on the machine.
- Make sure that all clamps, guards and heat shields are installed correctly to prevent vibration, rubbing against other parts and excessive heat during operation.
- Always have the supplied fire extinguisher on the machine and know how to use it. Inspect and have it serviced as recommended on its instruction plate.

Crushing or Cutting Prevention

- Never attempt adjustments while the machine is moving or the engine is running unless otherwise specified.
- Support vehicle properly when working beneath it. Do not depend on hydraulic cylinders to hold vehicle up. Vehicle can lower if a manual control is moved, or if a hydraulic line breaks.

⚠ WARNING

WARNING : Drive shaft spins at engine speed when engine is running regardless of transmission gear selection.

- Where there are steering linkages, the clearance in the linkage area will increase or decrease with movement of the steering. Stay clear of all rotating and moving parts.
- Keep objects away from moving fan blades. They will throw or cut any object or tool that falls or is pushed into them.
- Do not use a kinked or frayed wire rope cable. Wear gloves when handling the wire rope cable.
- Retainer pins or bolts, when struck with force, can fly out and injure nearby persons.
- Chips or other debris can fly off objects when struck. Make sure no one can be injured by flying debris before striking any object.
- Wear protective glasses when striking a retainer pin or bolt to avoid injury to your eyes.
- Do not attempt to lift the machine with the tow eyes on the front and rear of the vehicle. These are for towing only. Consult Allied Systems for lifting instructions.
- Wear a hard hat, protective glasses and other protective equipment as required by job conditions.
- 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.
- Make certain all protective guards and covers are secured in place on the machine.
- Never rely on the hydraulic system to support any part of the machine during maintenance or lubrication.

⚠ WARNING

Warning: Do Not Park on Grade. If one has to park on grade Chock Wheels.

Burn Prevention

- Use caution when working around hot oils. Always allow lubricating and hydraulic oil to cool before draining. Burns can be severe.
- Diesel fuel and hydraulic oil are flammable. Do not smoke when checking levels or filling tanks. Keep open flames and sparks away from the machine.
- 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.
- 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.
- At operating temperature, the hydraulic tank is hot and can be under pressure.
- Relieve all pressure in air, oil, fuel or cooling systems before any lines, fittings or related items are disconnected or removed.
- 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 produce explosive gases. Keep sparks, flame and cigarettes away. Ventilate when charging or using in an enclosed space. Always shield your eyes when working near batteries. When removing battery cables, always turn the battery disconnect switches 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 on the engine or electrical system, disconnect the battery. An electrical spark could cause a fire, explosion or severe burns.
- Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing.

Fire or Explosion Prevention

- All fuels, most lubricants and some coolant mixtures are flammable. Do not smoke while refueling or in a refueling area. Do not smoke in areas where batteries are charged, or where flammable materials are stored.
- Keep the machine free of oil, grease and trash accumulations. Regular steam cleaning is recommended for fire prevention and general safety.
- Batteries in parallel may be located in separate compartments. See the “Starting the Engine Section” in this guide for specific instructions.

⚠ WARNING

WARNING: If boosting is required, be aware that improper jumper cable connections can cause an explosion resulting in personal injury. When using jumper cables always connect positive (+) cable to positive (+) terminal of battery and negative (-) cable from external source to starter negative (-) terminal. (If not equipped with starter negative terminal, connect to engine block.) 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.
- 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 Transpoters built after November 1, 2004 are supplied with a hand held fire extinguisher. If your unit is not so equiped, 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 equiped, 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 suppliment 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.

POISON DANGER CAUSES SEVERE BURNS

Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote: EXTERNAL - Flush with water. INTERNAL - Drink large quantities water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately. EYES: Flush with water for 15 minutes and get prompt medical attention. Batteries produce explosive gases. Keep sparks, flame, cigarettes away. Ventilate when charging or using in enclosed space. Always wear eye protection when working near batteries

- Clean and tighten all electrical connections. Check daily for loose or frayed electrical wires. Have all loose or frayed electrical wires tightened, repaired or replaced before operating the machine.
- Keep all fuels and lubricants stored in properly marked containers and away from all unauthorized persons.
- Store all oily rags or other flammable material in a protective container, in a safe place.
- Remove all flammable materials such as fuel, oil and other debris before they accumulate on the machine.

Lines, Tubes, Hoses and Cylinders

- Do not bend or strike high pressure lines. Do not install bent or damaged lines, tubes or hoses.
- Repair any loose or damaged fuel and oil lines, tubes and hoses. Leaks can cause fires.

Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them. Inspect all lines, tubes and hoses carefully. Use a piece of cardboard to check for leaks. Do not use your bare hands to check for leaks. Tighten all connections to the recommended torque. Replace if any of the following conditions are found:

1. End fittings damaged, displaced or leaking.
2. Outer hose covering chafed or cut and wire reinforcing exposed.
3. Outer hose covering ballooning locally.
4. Evidence of kinking or crushing of the flexible part of the hose.

This vehicle may be equipped with an Extreme Service Elevating Cylinder (ESC). This cylinder is equipped with an internal accumulator which is charged through an external valve. Consult the service manual for detailed instructions and procedures.

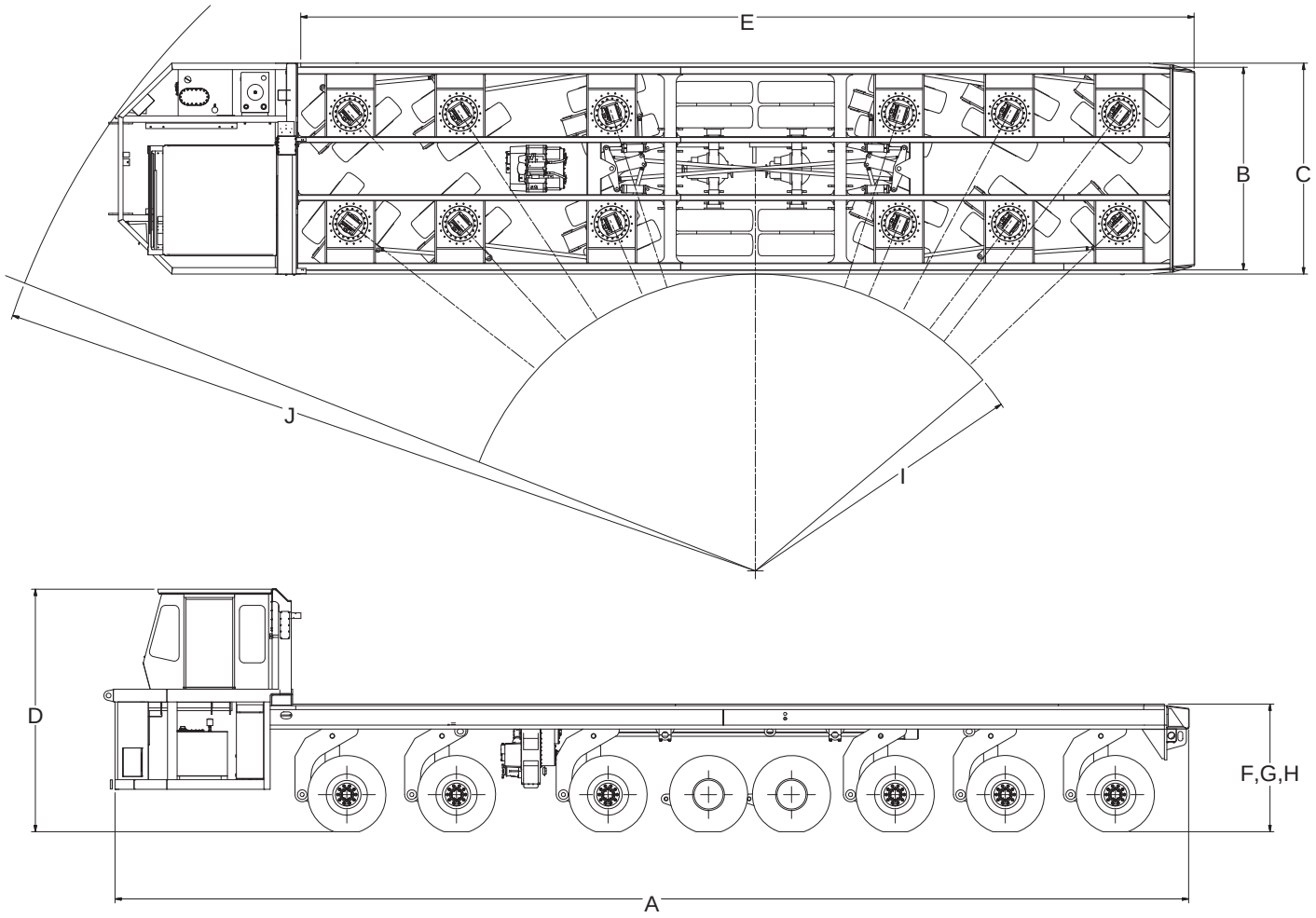
⚠ WARNING

WARNING: HIGH PRESSURE CYLINDER
Do not remove any parts until all pressure has been relieved to avoid possible personal injury. See Maintenance Section for charging and adjustment procedures.

Fire Suppression

- Do not panic!
- Stop the machine and turn off the engine in the clearest area available.
- Lower the vehicle.
- If your machine is equiped with a fire suppression system, and that system has not automatically been activated, manually activate the system.
- 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 suppession system thoroughly inspect the entire machine and recharge or replace the extinguishers and fire suppression system before returning to work.

Section 2 - Specifications



Physical Dimensions

A.	Overall Length	674 1/4”	(56’-2 1/4”)
B.	Width Deck	115 11/16”	(9’-7 11/16”)
C.	Width Overall	132”	(11’-0”)
D.	Overall Height Elevated	162”	(13’-6”)
E.	Platform Length	562”	(46’-10”)
F.	Platform Lowered	70”	(5’-10”)
G.	Platform Ride Height	80”	(6’-8”)
H.	Platform Travel	20”	(1’-8”)
I.	Turning Radius Inner	186”	(15’-6”)
J.	Turning Radius Outer	492”	(41’-0”)

Weights

Gross Vehicle Weight	690,000 Lbs.	345 Tons
Payload Capacity (including pallet)	560,000 Lbs.	280 Tons
Tare Weight	130,000 Lbs.	65 Tons
Axle Line Loaded	86,250 Lbs.	43.13 Tons
Tire Loading/Tire	21,563 Lbs.	10.78 Tons

Section 3 - Operator Instructions

Machine Start and Stop Procedures

Engine Pre-Start

1. Make sure the engine 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.
3. Check for emergency/parking brake engagement: Pull knob to set the spring applied axle mounted spring brakes. This brake will apply automatically when air pressure drops below 60 psi.
4. Check for neutral: Place the shift lever quadrant.
5. Give warning that you are going to start the engine. Remember, there is ample space within the engine, transmission, and driveline compartments for several men, and you cannot see them from the cab. Be sure the area around the unit is clear of all personnel and obstructions.
6. Turn the key switch to the "ON" position. The emergency brake light and circuit lights should come on.

Engine Start-up

1. Turn the key switch to the start position.

   NOTE: If engine does not start within 30 seconds, allow the starter to cool for two minutes before re engagement.

2. When 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.
3. If a rise in oil pressure of the engine or transmission is NOT observed within FIVE seconds, or a rise in air pressure is not seen in TEN seconds, shut down the engine and have maintenance check it out.
4. Warm the engine at idle until the air pressure reaches at least 60 psi, then recheck that the transmission is in neutral and the parking brake applied. Continue to warm the engine at 1000 RPM until the engine temp reaches at least 130°F, and the air pressure rises to 120 psi.
5. Observe the gauges for proper readings and operation; also, check the operation of all safety equipment and accessories.
6. Select gear speed, release parking brake and press accelerator for movement.

Engine Shut-Down

1. Lower throttle to idle speed, and let the engine idle for a minimum of (5) minutes in order to normalize internal engine temperatures.
2. Meanwhile, place all controls in neutral and set the emergency brake.
3. To stop the CUMMINS or CATERPILLAR engine, turn the key switch to "OFF" position. DO NOT use the compression release as an engine shutdown device. Stopping the engine in this manner will result in extensive wear to the valve mechanism.

Operator Troubleshooting

The following tables list 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	Emergency shutdown control pulled out	Push control in
	Fuel tank empty	Fill tank
	Fuel shutoff valve at tank closed	Open valve
	Fuel filter blocked	Replace filter
Engine fails to turn over	Battery disconnect switches open	Close switches
	Transmission not in neutral	Place lever in neutral
	Battery low	Have charging system checked
	Battery terminals corroded or loose	Clean and tighten terminals
Engine runs unsteadily and power output low	Insufficient fuel supply	Clean fuel strainers, replace filter, fill tank, tighten fuel lines
	Contaminated fuel	Drain tank and lines, clean strainers, 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, fill as needed
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 converter stall	Have engine checked (governor)

* Also refer to the 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
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 due to insufficient oil	Fill tank to proper level Correct suction leak
	Tubing vibrating	Tighten mounting clamps
Hydraulic system overheating	Low oil level	Fill tank to proper level
	Operating over pressure reliefs	Correct operating procedure

Air and Brake Systems

Symptom	Probable Cause	Corrective Action
Loss of braking efficiency	Air in hydraulic brake system	Check fluid, bleed system
	Low air system pressure	Allow system pressure to build
Brakes won't release	Low air system pressure	Allow system pressure to build

Electrical System

Symptom	Probable Cause	Corrective Action
Engine fails to turn over	Battery disconnect switch(es) open	Close switch(es)
	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

Operator Controls

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.

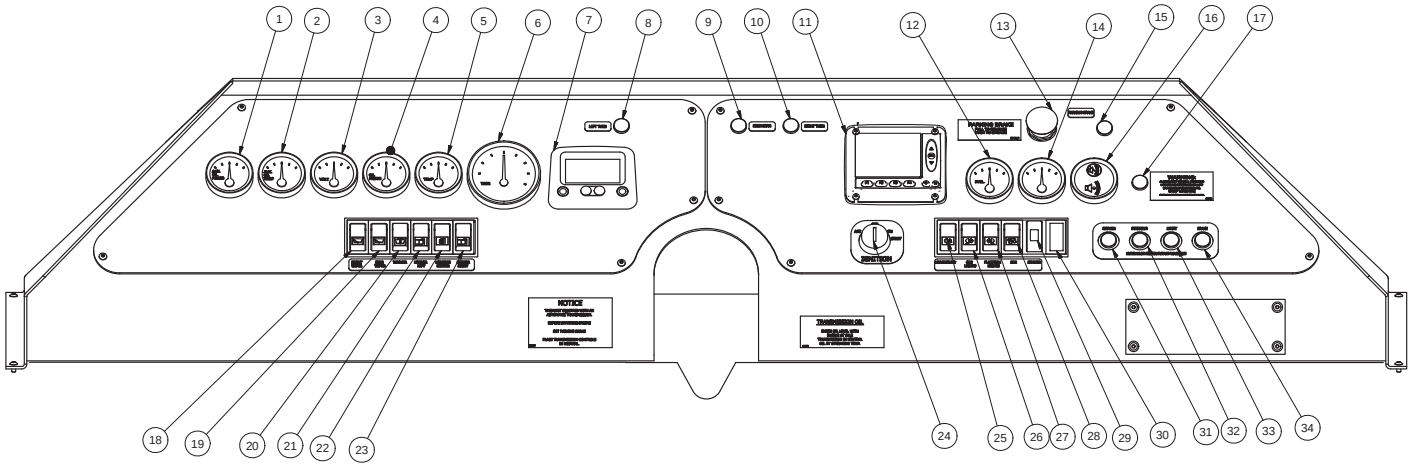


Figure 1 - Dashboard Controls

1.....Gauge, Aux Oil Pressure
2.....Gauge, Aux Oil Temperature (280 F)
3..... Gauge, Voltmeter (24 V)
4..... Gauge, Engine Oil; Pressure
5.....Gauge, Engine Coolint Temperature
6..... Gauge, Tachometer
7.....Powerview Display Module
8.....Left Turn Led, Green
9.....High Beam Led, Blue
10..... Right Turn Led, Green
11..... MD3 IQAN Display
12..... Gauge, Fuel Level
13..... Park Brake Switch
14.....Gauge, Hydraulic Temperature
15.....Parking Brake Light Led, Red
16.....Alarm, Audible
17.....Warning Light Led, Red
18.....Switch, Front Wiper
19..... Switch, Rear Wiper
20.....Switch, Washer On/Off/On
21.....Switch, Mirror Left
22.....Switch, Mirror Heater
23.....Switch, Mirror Right
24..... Ignition Switch
25.....Switch, Head Light
26.....Switch, Cab Lights
27..... Switch, Platform Lights
28..... Switch, Fan
29..... Dimmer Switch
30..... Blank
31.....Return Filter Bypass Warning
32.....Steering Filter Bypass Warning
33.....Hoist Filter Bypass Warning
34..... Brake Filter Bypass Warning

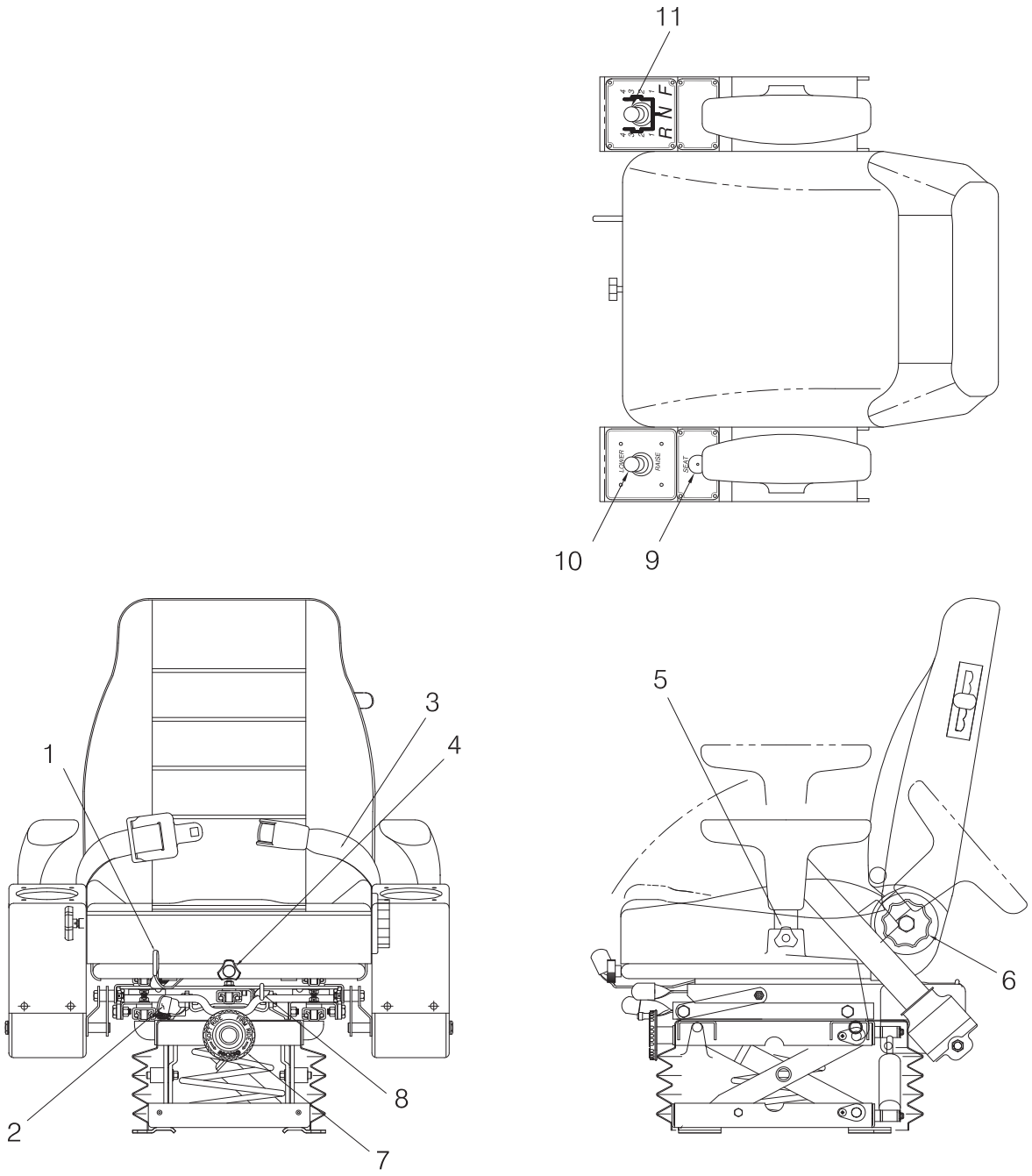


Figure 2 - Seat Controls

1.....Seat Adjust Track Set
2.....Arm Adjust Track Set
3.....Seat Belt
4..... Rake Angle Adjustment Knob
5..... Arm Adjustment Knob
6.....Back Adjustment Knob
7.....Ride Adjustment - Firm/Soft
8..... Seat Height
9..... Seat Swivel Push-button
10..... Elevate/Lower Switch
11.....Transmission Shift Control

Raise or Lower Machine

Use the Elevate/Lower Switch (Item 10, previous page) to raise or lower the vehicle. To set the vehicle's height to its middle position, raise it to its full height, then lower it approximately halfway.

⚠ CAUTION

CAUTION: The vehicle MUST be set to its approximate middle position for normal operation. Failure to properly set the vehicle's height may cause severe equipment damage.

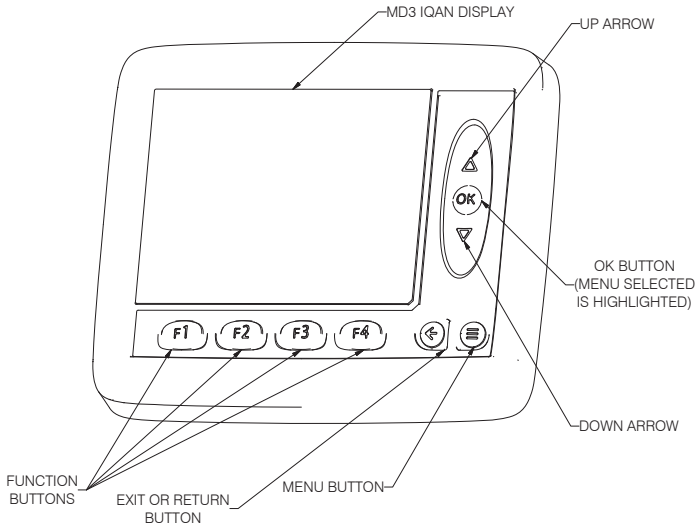


Figure 3 - MD3 IQAN Display

Weight Load System

The MD3 IQAN Display on the instrument panel (see Figure 3) is used to monitor and calibrate the weight load system. This system reads and displays the weight of the load on the machine, and the height of the vehicle.

Main Display Screen

The Main Display Screen (see Figure 4) shows the quadrant weights, the total weight of the load on the machine, the travel condition, and any overweight warnings. The machine must be either raised or lowered as necessary if the Main Display Screen does not indicate "OK TO TRAVEL".

From the Main Display Screen, the operator may either access the System Menu (see Figure 5), or the Main Calibration Screen (see Figure 7).

Figure 4-Main Display Screen

System Menu Screen

To access the System Menu, press the Menu Button. The System Menu contains four options:

F1 – Adjust
F2 – Measure
F3 – Preferences
F4 – Info

Follow on-screen instructions for each option. Press the "Exit" button to return to the Main Display Screen.

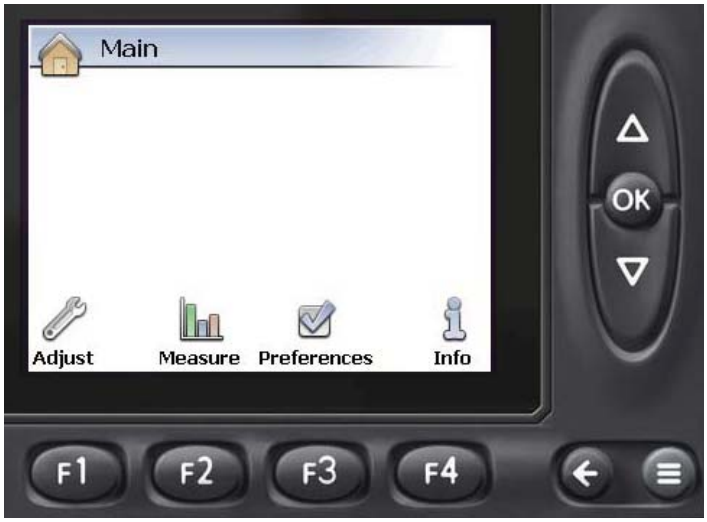


Figure 5 - System Menu Screen (access anytime)

Adjust Menu Screen

The Adjust Menu Screen (see Figure 6), accessed from the System Menu Screen, may be used to adjust warning levels, and the display style of the Main Display Screen. Follow on-screen instructions. Press the "Exit" button to return to the System Menu Screen.

Figure 6 - Adjust Menu Screen

Main Calibration Screen

To access the Main Calibration Screen (see Figure 7), from the Main Display Screen, press and hold the "OK" Button for 5 seconds. The Main Calibration Screen contains menu options for creating a custom calibration for the weight load system. The menu options are:

F1 – Calibrate Loaded
F2 – Calibrate Unloaded
F3 – Calibrate Height
F4 – Restore System Defaults

Follow on-screen instructions for each option. Press the "Exit" button to return to the Main Display Screen.

Figure 7 - Main Calibration Screen

Calibration Loaded Screen

Use the Calibration Loaded Screen (see Figure 8) to set the fully loaded state of the machine. Use a load of known weight that is as close to the maximum capacity of the machine as possible, and distribute the weight on the bed as evenly as possible.

This calibration will not work if the Height Indicator is not green. Raise or lower the machine as necessary.

Use the Up and Down Arrow buttons to set the weight of the load. When the correct weight is shown on the screen, press the "OK" button, or F3, to save the loaded set point and return to the Main Calibration Screen. Press F4 or the "Exit" button to return to the Main Calibration Screen without saving.

Figure 8 - Calibrate Loaded Screen

Calibration Unloaded Screen

Use the Calibration Unload Screen (see Figure 9) to set the unloaded state of the machine. Make certain the bed is empty for this calibration.

This calibration will not work if the Height Indicator is not green. Raise or lower the machine as necessary.

When the bed is completely empty, press the "OK" button, or F3, to save the unloaded set point and return to the Main Calibration Screen. Press F4 or the "Exit" button to return to the Main Calibration Screen without saving.

Calibrate Height Menu

Use the Calibrate Height Screen (see Figure 10) to set the calibration for the deck upper and lower limits. The menu options are:

F2 - Upper Limit
F3 - Lower Limit
F4 - Done / Exit

Figure 9 - Calibrate Unloaded Screen

Figure 10 - Calibrate Height Menu Screen

Upper Limit

Use the Upper Limit option (see Figure 11) to set the maximum raised height of deck. Raise the deck to its maximum height, and press F3 to set, or press F4 to exit and return to the calibration height menu without saving.

Figure 11 - Upper Limit Screen

Lower Limit

Use the Lower Limit option (see Figure 12) to set the minimum height of the deck. Lower the deck to it's lowest height and press F3 to set, or press F4 to exit and return to the calibration height menu without saving.

Figure 12 - Lower Limit Screen

Restore Defaults

Use the Restore Defaults option to return the machines calibration to the factory preset.

IMPORTANT: Restoring the factory defaults will erase the current calibration, which cannot be restored once erased.

Powerview Display Module

General

Your Heavy Lift Transporter is equiped 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 Transporter. 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.

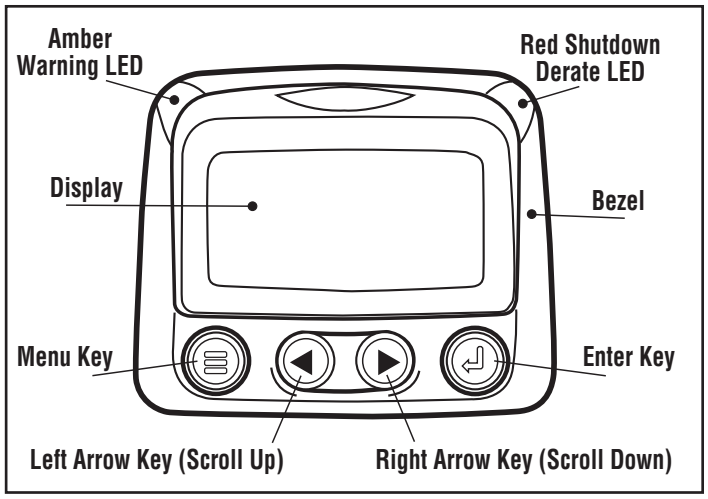


Fig. 13 Powerview Faceplate Features

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

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.

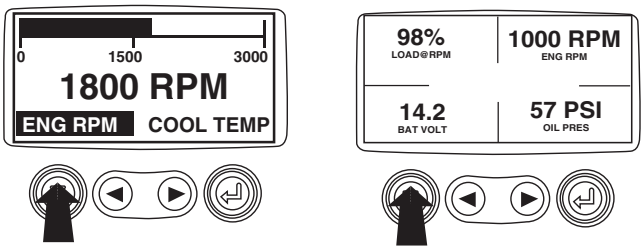
Left Arrow - The Left Arrow Key is touched to scroll through the screen either moving the parameter selection toward the left or upward.

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

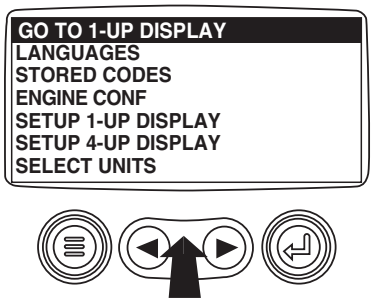
Enter Key - The Enter Key (also known as Enter Button) is touched to select the parameter that is highlighted on the screen.

Main Menu Navigation

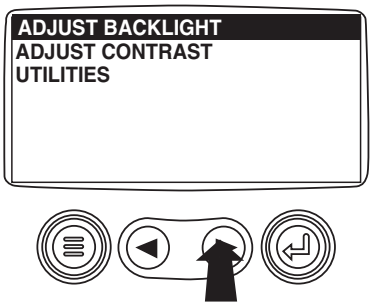
1. Starting at the single or four engine parameter display, touch “Menu”.



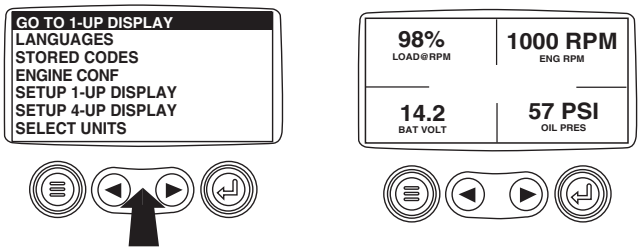
2. The first seven items of the “Main Menu” will be displayed. Touching the “Arrow Buttons” will scroll through the menu selection.



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

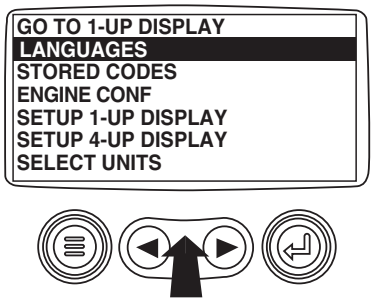


4. Touch the “Arrows” to scroll to the desired menu item or touch “Menu” to exit the Main menu and return to the engine parameter display.

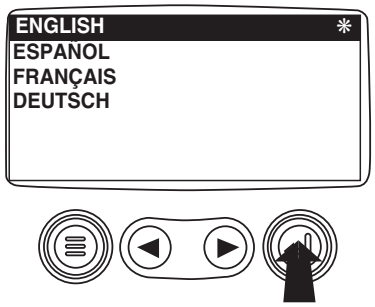


Selecting a Language

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



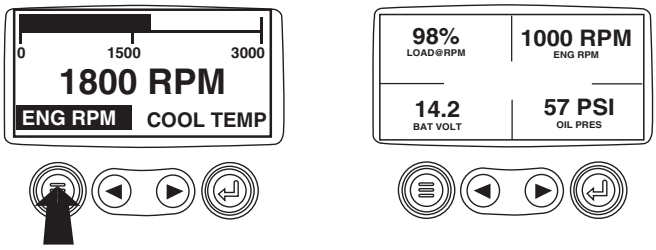
2. The language choices will be displayed. Use the “Arrow” buttons to scroll through the selections and touch “Enter” to make a selection.



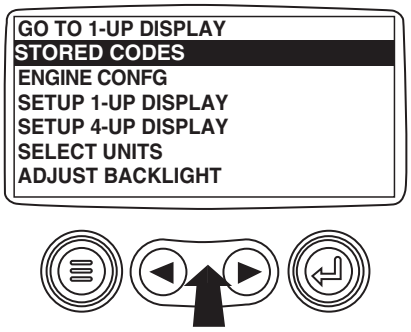
3. Now that you have selected the language, touch the “Menu” button to return to the main menu display.

Stored Fault Codes

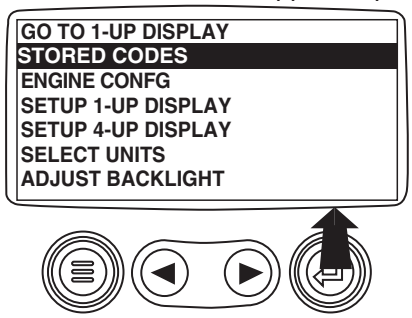
1. Starting at the single or the four engine parameter display touch the “Menu button”.



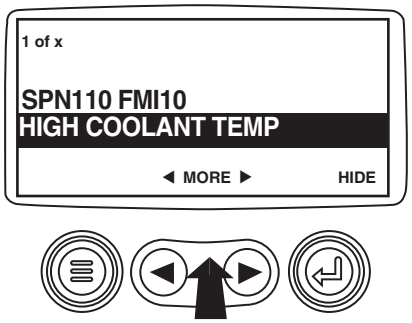
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the Stored Fault Codes is highlighted.



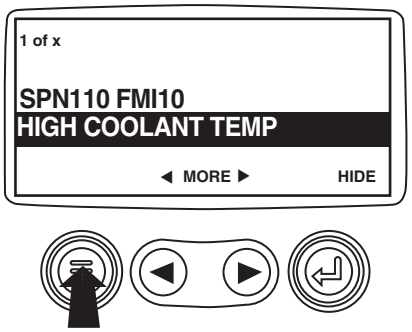
3. Once the “Stored Fault Codes” menu item has been highlighted, touch the “Enter Button” to view the “Stored Fault Codes” (when applicable, consult engine or transmission manufacturer for SAE J1939 supported parameters).



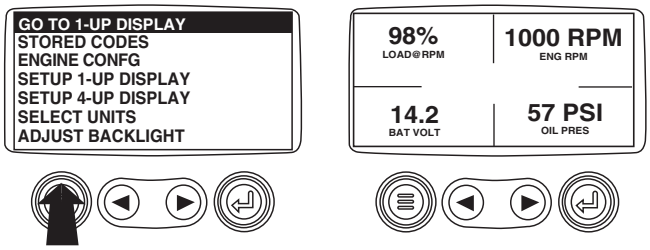
4. If the word “MORE” appears above the “Arrow Buttons” there are more stored fault codes that may be viewed. Use the “Arrow Buttons” to scroll to the next Stored Diagnostic Code.



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

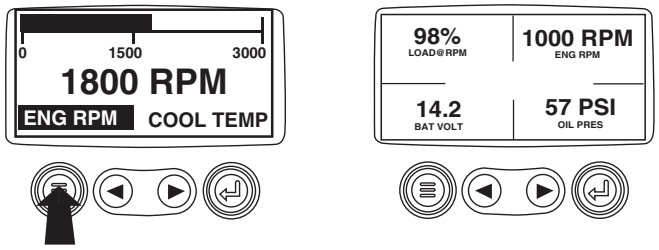


6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

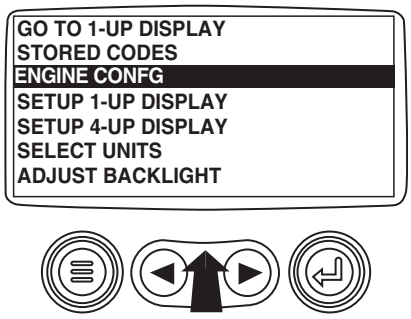


Engine Configuration Data

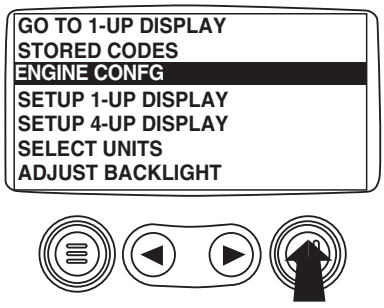
1. Starting at the single or four engine parameter display touch the"Menu Button".



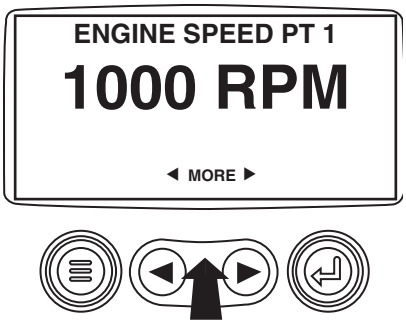
2. The main menu will pop up on the display. Use the "Arrow Buttons"to scroll through the menu until the "Engine Configuration" is highlighted.



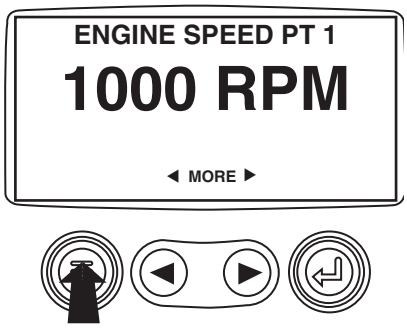
3. Once the "Engine Configuration" menu item has been highlightedtouch the "Enter Button" to view the engine configuration data.



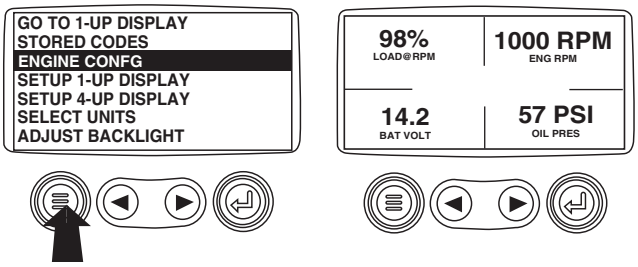
4. Use the "Arrow Buttons" to scroll through the engine configuration data.



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

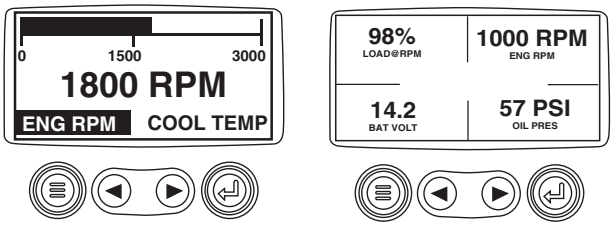


6. Touch the "Menu Button" to exit the Main menu and return to the engine parameter display.



Faults and Warnings - Auxiliary Gage Fault

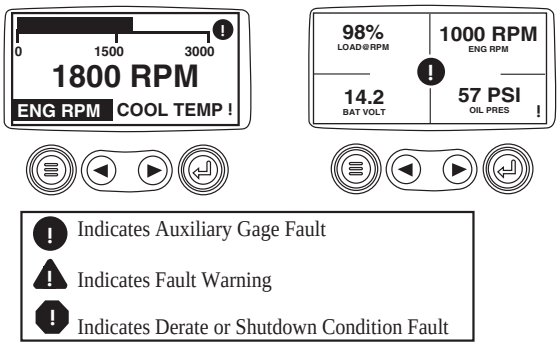
1. During normal operation the single or four parameter screen will be displayed.



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”.

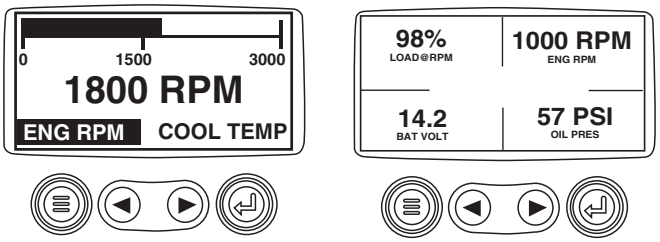
4. The display will return to the single or four parameter screen.



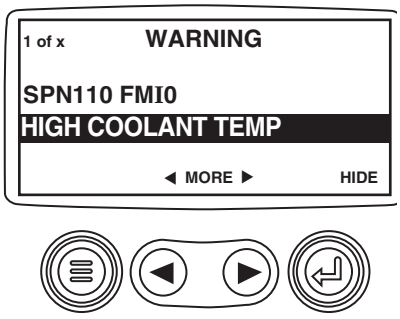
5. Touching the “Enter Button” will redisplay the hidden fault. Touching the “Enter Button” once again will hide the fault and return the screen to the single or four parameter display. NOTE: The fault can only be cleared by correcting the cause of the fault condition.

Active Fault Codes

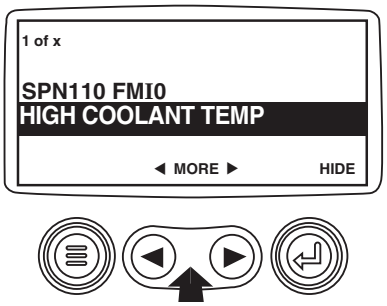
1. During normal operation the single or four parameter screen will bedisplayed.



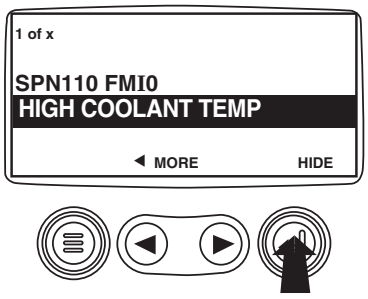
2. When the PowerView receives a fault code from an engine control unit the single or four parameter screen will be replaced with the “ActiveFault Codes” message.



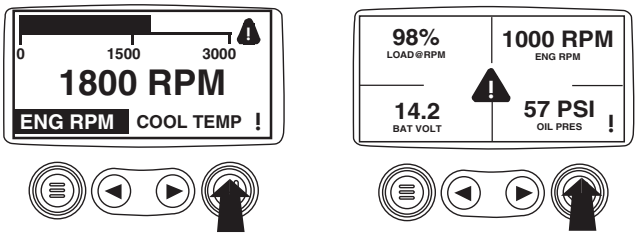
3. If the word “MORE” appears above the “Arrow Buttons” there are more active fault codes that may be viewed. Use the “Arrow Buttons” to scroll to the next “Active Fault Code”.



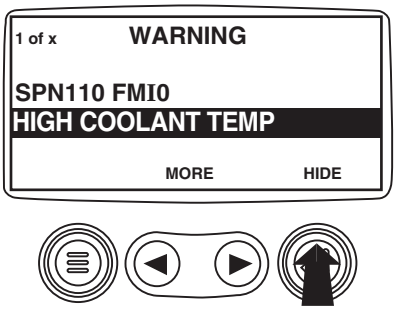
4. To acknowledge and “Hide” the fault and return to the single or four parameter display touch the “Enter Button”.



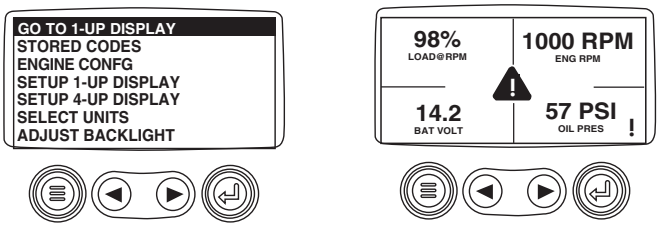
5. The display will return to the single or four parameter display, but the display will contain the “Active Fault” warning icon. Touching the “Enter Button” will redisplay the hidden fault.



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

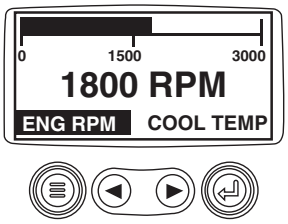


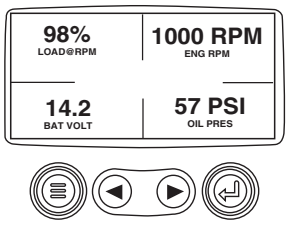
7. The Single or Four parameter screen will display the fault icon until the fault condition is corrected. NOTE: Ignoring active fault codes could result in severe engine damage.



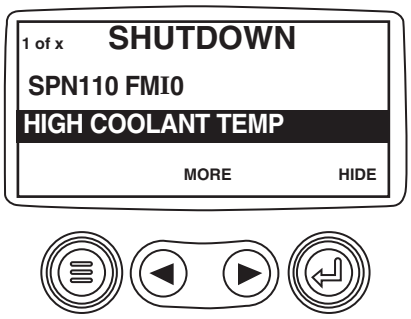
Shutdown Codes

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

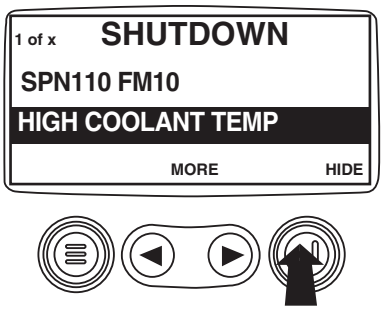




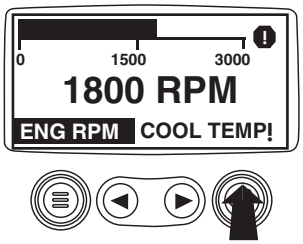
2. When the PowerView receives a severe fault code from an engine control unit the single or four parameter screen will be replaced with the “Shutdown!” message.

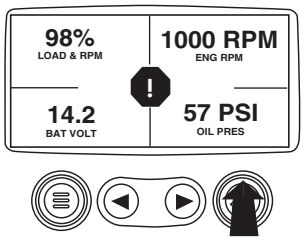


3. To acknowledge and “Hide” the fault and return to the single or four parameter display touch the “Enter Button”.

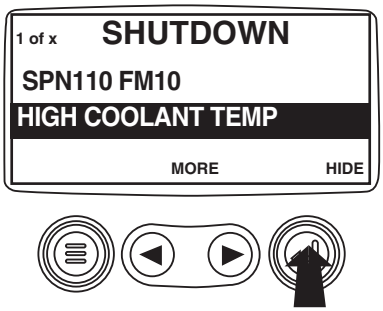


4. The display will return to the single or four parameter display, but the display will contain the “Shut Down” icon. Touching the “Enter Button” will redisplay the hidden fault.

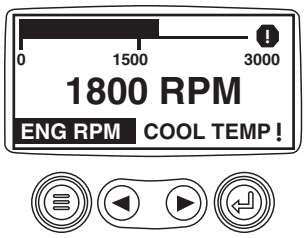


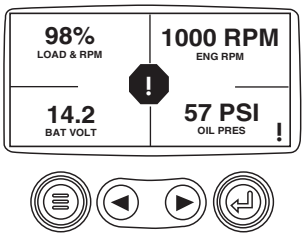


5. Touching the “Enter Button” once again will hide the fault and return the screen to the single or four parameter display.



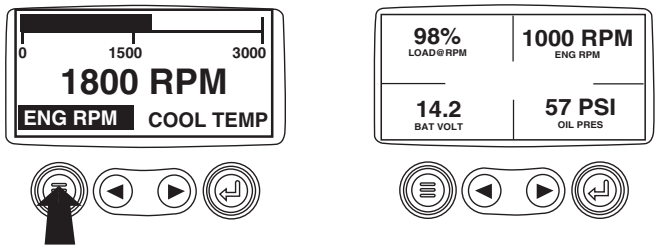
6. The Single or Four parameter screen will display the fault icon until the fault condition is corrected. NOTE: Ignoring active fault codes could result in severe engine damage.



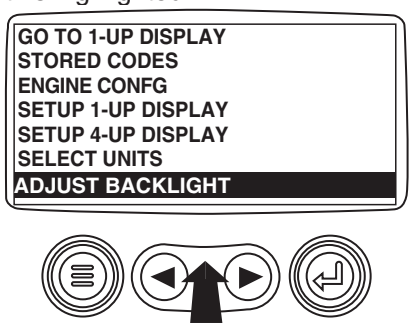


Back Light Adjustment

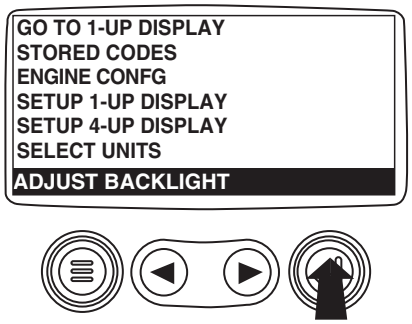
1. Starting at the single or four engine parameter display touch the"Menu Button".



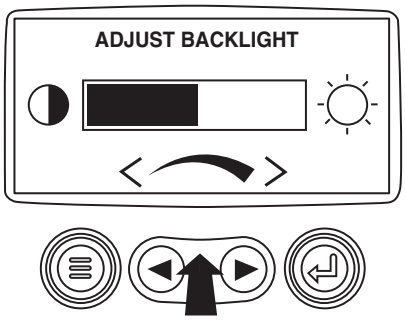
2. The main menu will pop up on the display. Use the "Arrow Buttons" to scroll through the menu until the "Adjust Backlight" is highlighted.



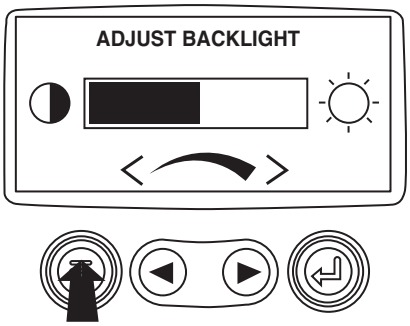
3. Once the "Adjust Backlight" menu item has been highlighted touch the "Enter Button" to activate the "Adjust Backlight" function.



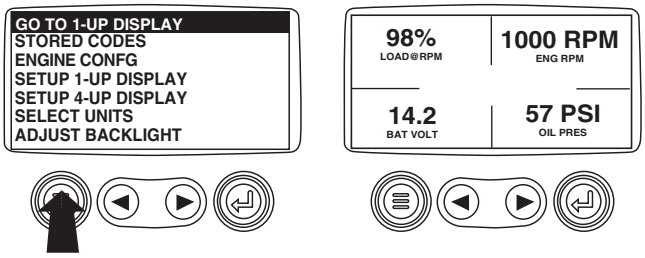
4. Use the "Arrow Buttons" to select the desired backlight intensity.



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

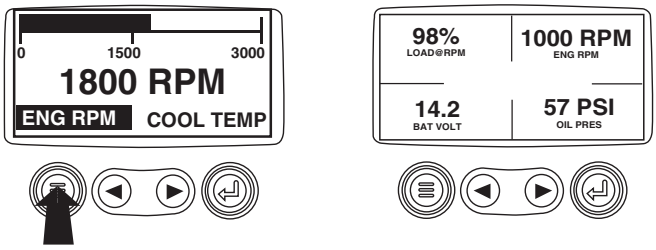


6. Touch the "Menu Button" to exit the Main menu and return to the engine parameter display.

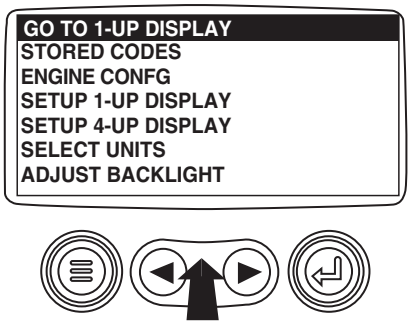


Contrast Adjustment

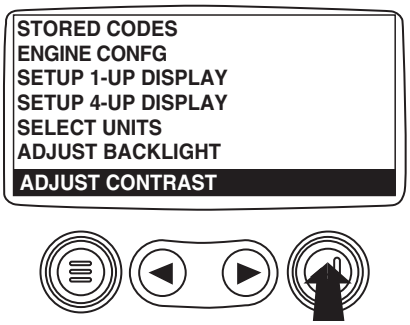
1. Starting at the single or four engine parameter display, touch the “Menu Button”.



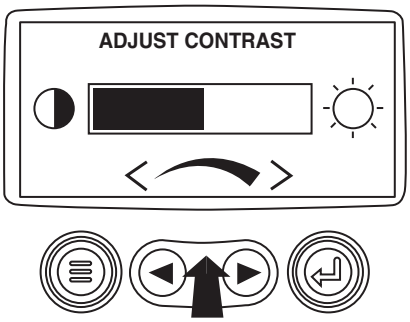
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until “Adjust Contrast” is highlighted.



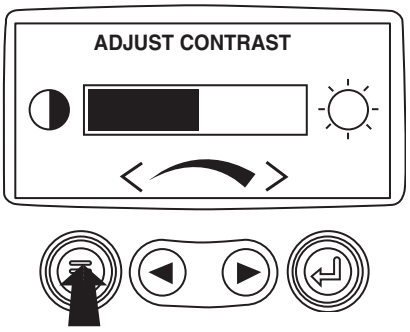
3. Once the “Adjust Contrast” menu item has been highlighted touch the “Enter Button” to activate the “Adjust Contrast” function.



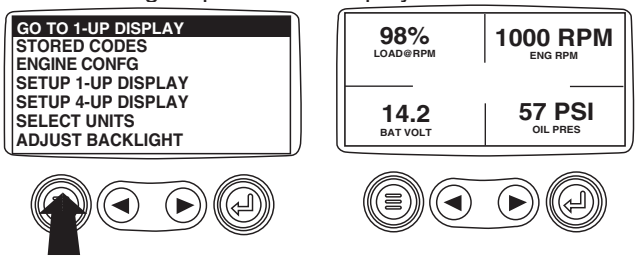
4. Use the “Arrow Buttons” to select the desired contrast intensity.



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

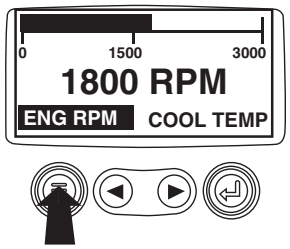


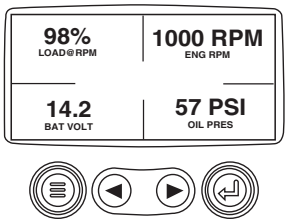
6. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.



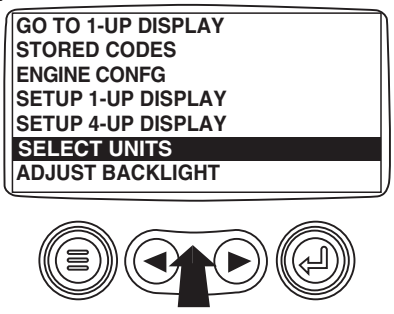
Select Units

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

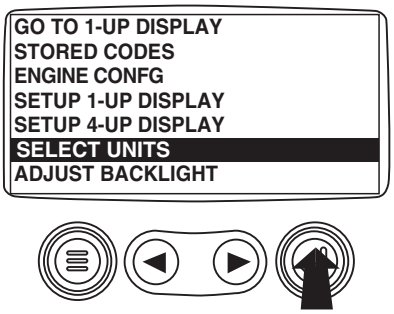




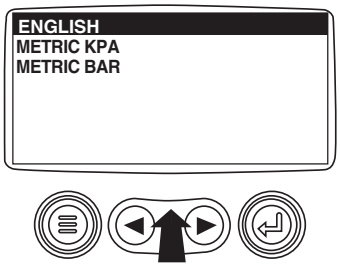
2. The main menu will pop up on the display. Use the arrow buttons to scroll through the menu until the “Select Units” is highlighted.



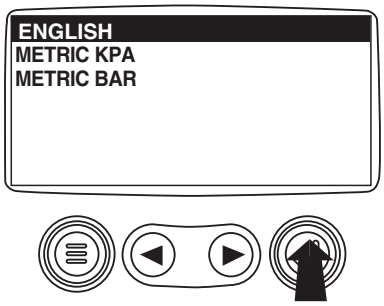
3. Once the “Select Units” menu item has been highlighted touch the"Enter Button” to access the “Select Units” function.



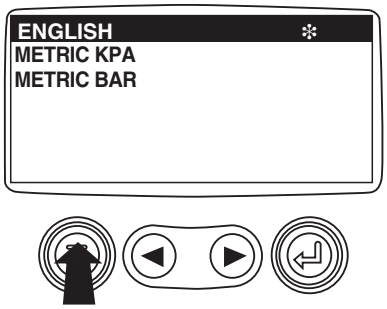
4. Use the arrows to highlight the desired units. “English” for Imperial units i.e. PSI, ºF or Metric kPa, Metric Bar for IS units i.e. kPa, Bar, ºC.



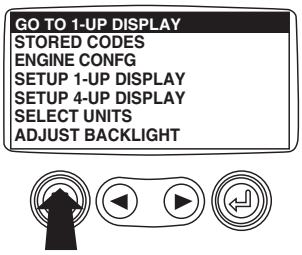
5. Touch the “Enter Button” to select the highlighted units.

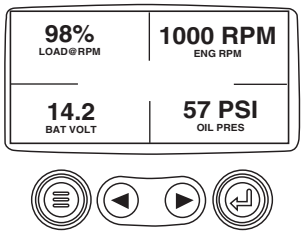


6. Touch the “Menu Button” to return to the “Main Menu”.



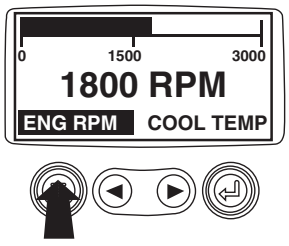
7. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

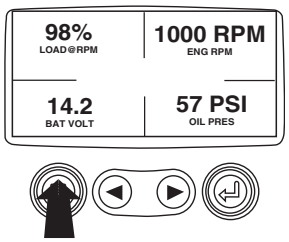




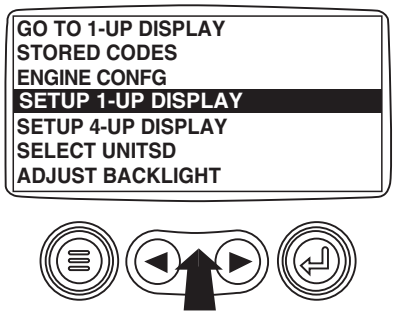
Setup 1-Up Display

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

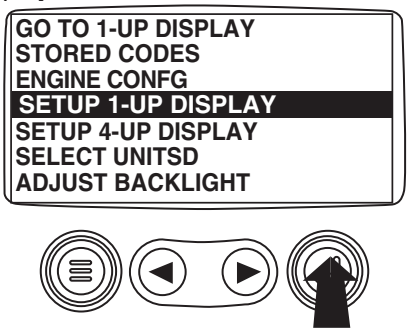




2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the “Setup 1-up Display” is highlighted.

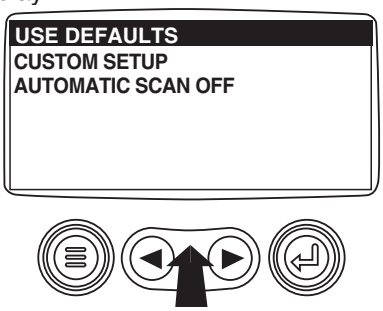


3. Once the “Setup 1-up Display” menu item has been highlighted touch the “Enter Button” to access the “Setup 1-up Display” function.

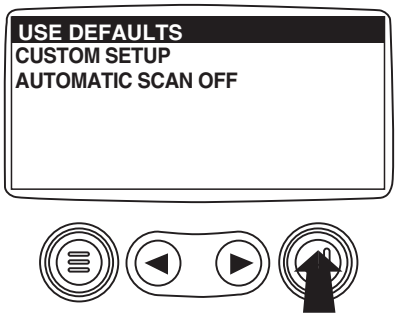


4. Three options are available for modification of the 1-Up display.
   a) **Use Defaults** – This option contains a set of engine parameters: Engine Hours, Engine RPM, System Voltage, Battery Voltage, % Engine Load at Current RPM, Coolant Temperature, Oil Pressure.
   b) **Custom Setup** – This option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

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

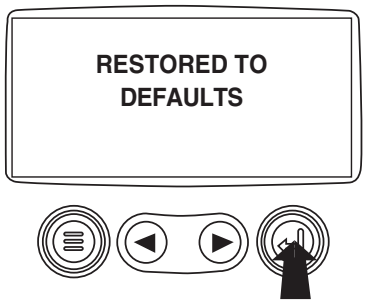


6. Touch the “Enter Button” to activate the “Use Defaults” function.

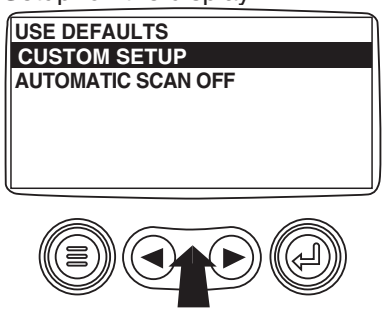


Setup 1-Up Display (Cont)

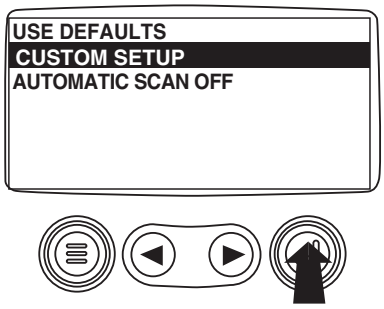
7. A message indicating the “Single Engine” parameter display parameters are reset to the factory defaults will be displayed, then the display will return to the “Custom Setup” menu.



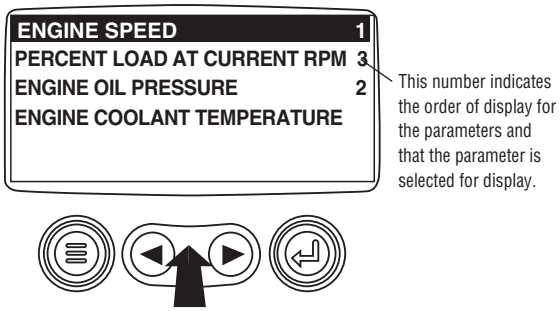
8. **Custom Setup** - To perform a custom setup of the 1-Up Display, use the arrow buttons to scroll to and highlight “Custom Setup” on the display.



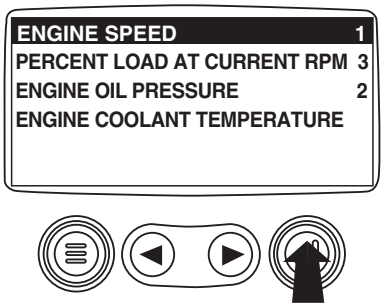
9. Touching the “Enter Button” will display a list of engine parameters.



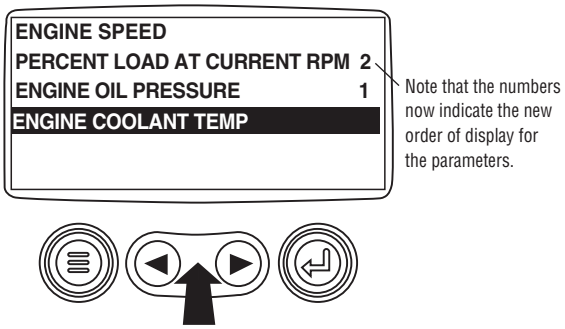
10. Use the “Arrow Buttons” to scroll to and highlight a selected parameter (parameter with a # symbol to right of it).



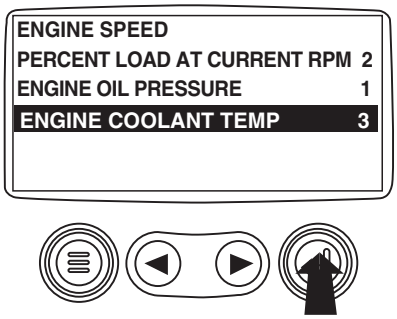
11. Touch the “Enter Button” to deselect the selected parameter removing it from the list of parameters being displayed on the 1-up display.



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



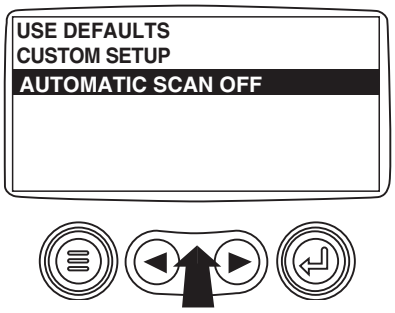
13. Touch the “Enter button” to select the highlighted parameter for inclusion in the Single Engine Parameter Display.



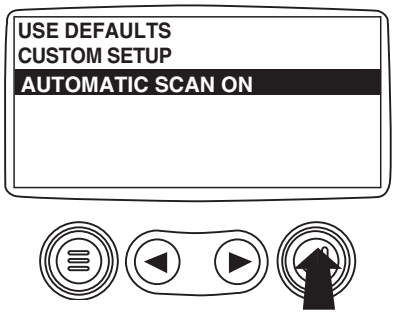
Setup 1-Up Display (Cont)

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

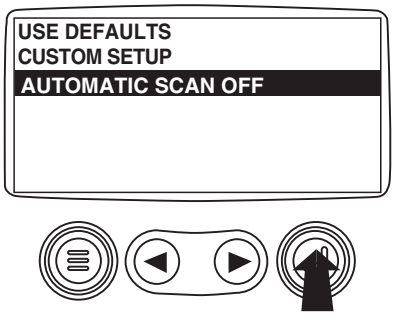
15. **Automatic Scan** - Selecting the scan function will cause the 1-Up Display to scroll through the selected set of parameters one at a time. Use the “Arrow Buttons” to scroll to the “Automatic Scan” function.



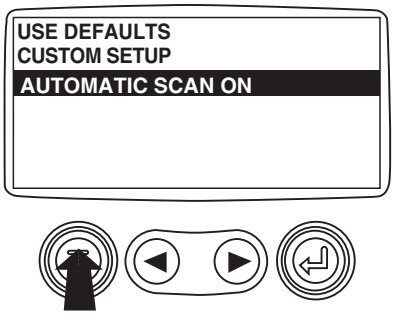
16. Touching the “Enter Button” toggles the “Automatic Scan” function on.



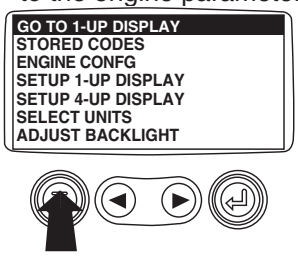
17. Touching the “Enter Button” again toggles the “Automatic Scan” function off.

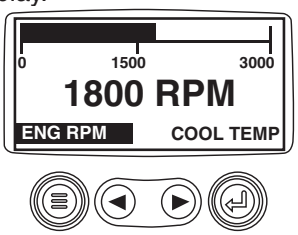


18. Once the “Use Defaults”, “Custom Setup” and “Automatic Scan” functions have been set, touch the “Menu Button” to return to the main menu.



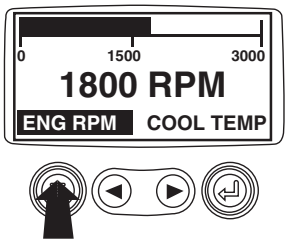
19. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

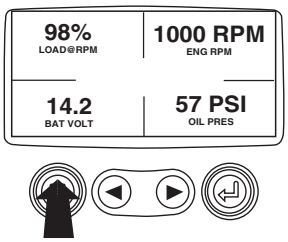




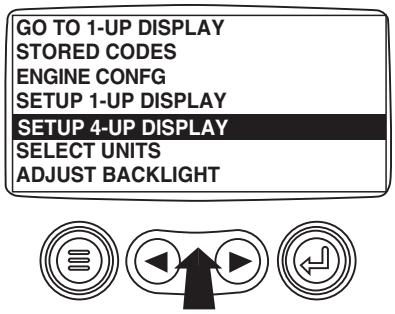
Setup 4-Up Display

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

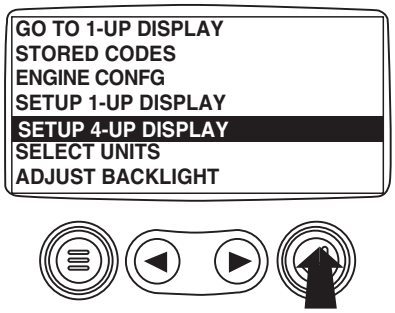




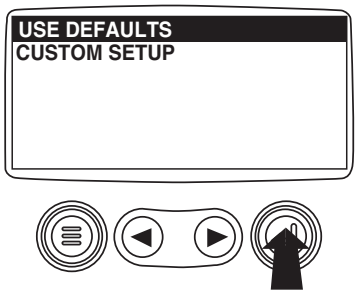
2. The main menu will pop up on the display. Use the “Arrow Buttons” to scroll through the menu until the “Setup 4-Up Display” is highlighted.



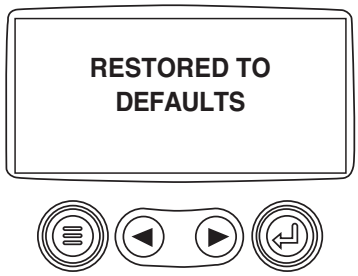
3. Once the “Setup 4-Up Display” menu item has been highlighted touch the “Enter Button” to activate the “Setup 4-Up Display” menu.



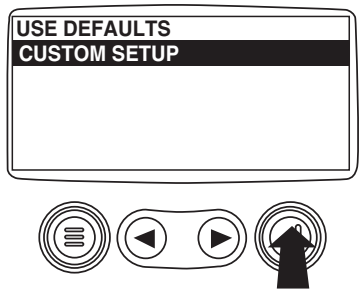
4. Touch the “Enter Button” to activate the “Use Defaults” function. This action will reset the unit to the factory default.



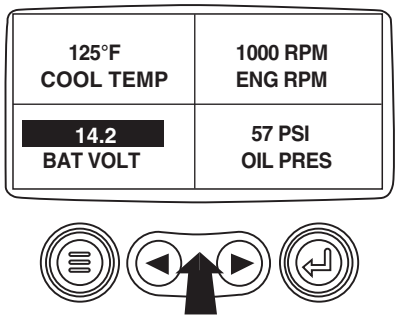
5. The “Use Defaults”screen will be displayed during the reseting period then will automatically return to the “Setup 4-Up Display” menu.



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

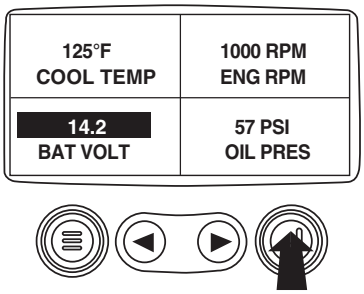


7. The quadrent with the backlit parameter value is the current selected parameter. Use the “Arrow Buttons” to highlight the parameter value in the quadrant you wish to place a new parameter.

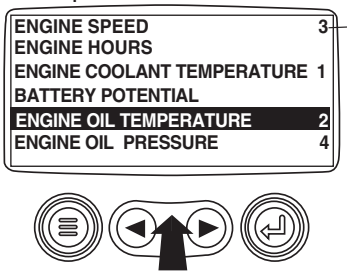


Setup 4-Up Display (Cont)

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

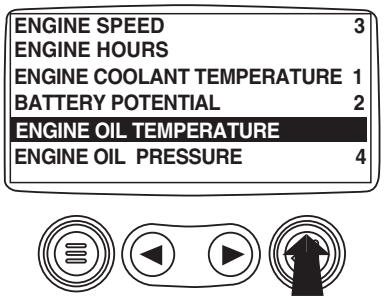


9. The parameter that is highlighted is the selected parameter for the screen. Use the “Arrow Buttons” to highlight the new parameter to be placed in the quadrent selected in the previous screen.

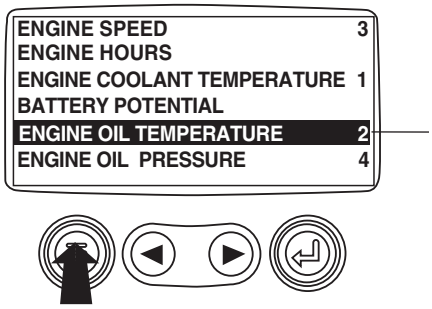


The number to the right of the parameter indicates the quadrant in which it is displayed.
1. = Upper Left Quadrent
2. = Lower Left Quadrent
3. = Upper Right Quadrent
4.= Lower Right Quadrent

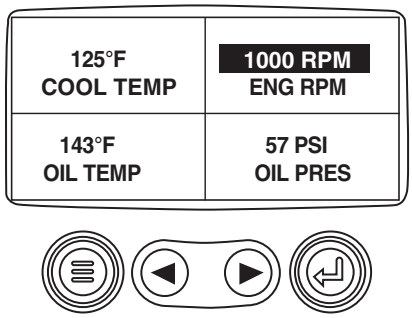
10. Touch the “Enter Button” to change the selected parameter in the quadrant to the new parameter.



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

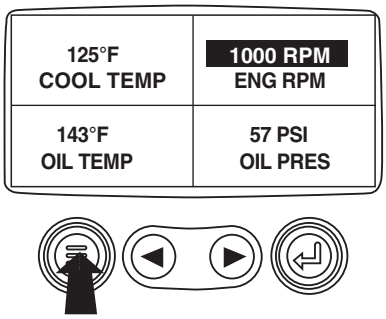


12. The parameter in the selected quadrent has changed to the parameter selected in the previous screen.

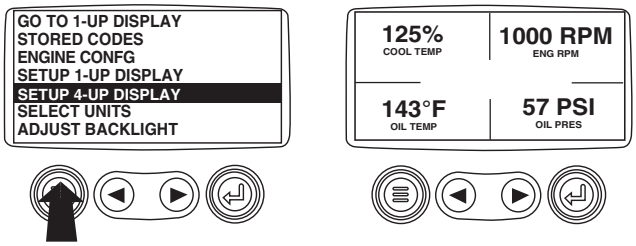


13. Repeat the parameter selection process until all spaces are filled.

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

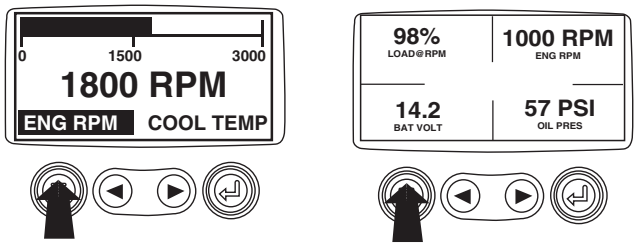


15. Touch the “Menu Button” to exit the Main menu and return to the engine parameter display.

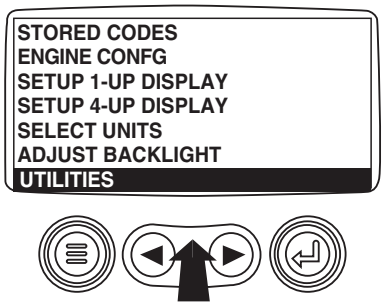


Utilities (Information and troubleshooting)

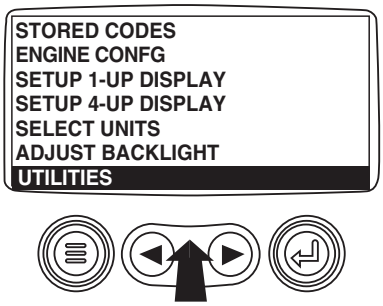
1. Starting at the single or four engine parameter display, touch the “Menu button”.



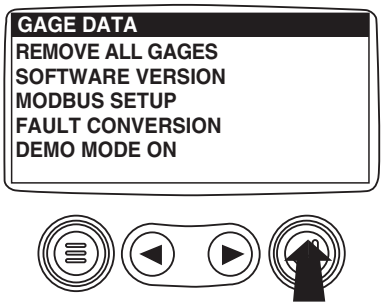
2. The main menu will be displayed. Use the “Arrow buttons” to scroll through the menu until the “Utilities” is highlighted.



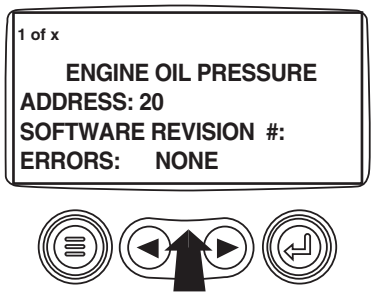
3. Once the “Utilities” menu item has been highlighted, touch the “Enter Button” to activate the “Utilities” functions.



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.



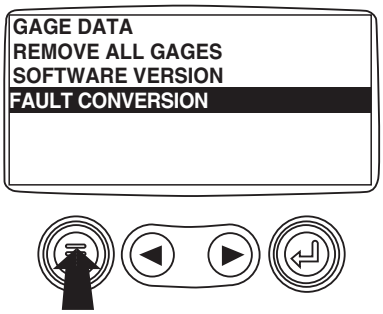
6. Touch “Menu Button” to return to the “Utilities” menu.

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.

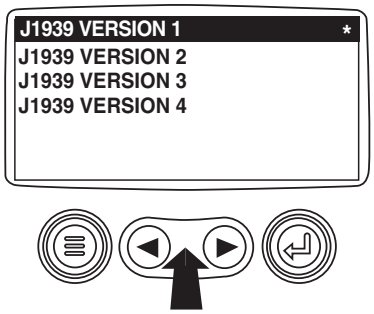
9. Touch “Menu” to return to “Utilities”. Highlight “Fault Conversion” using the “Arrows”. Touch “Select” to enter the Fault convertion menu.



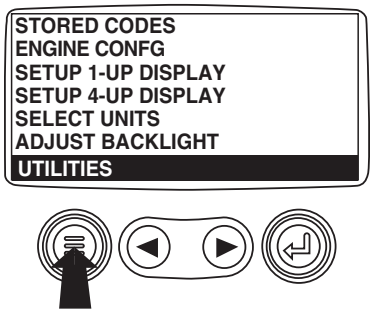
10. Use the “Arrows” to scroll and highlight the version then touch “Select” and an asterisks appears to the right of the selection.

    NOTE: There are four (4) different methods for converting fault codes. The PowerView always looks for J1939 Version 4 and can be set to use one of the 3 other J1939 versions. Most engine ECU’s use Version 4, therefore in most cases adjustment of this menu option will not be required.

    Upon receiving an unrecognizable fault, change to a different J1939 Version. If the fault SPN does not change when the version is changed, the ECU generating the fault is using Fault Conversion method 4. If the SPN number does change but is still unrecognizable, try changing to another J1939 Version not yet used and continue to check the SPN number.

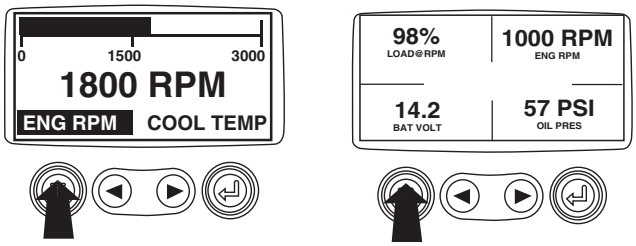


11. Touch the “Menu” button to return to “Utilities” menu. Touch the “Menu” button again to to return to the “Main” menu.

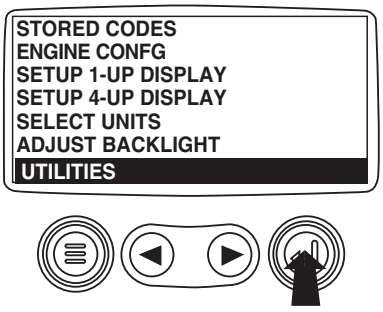


MODBUS Setup

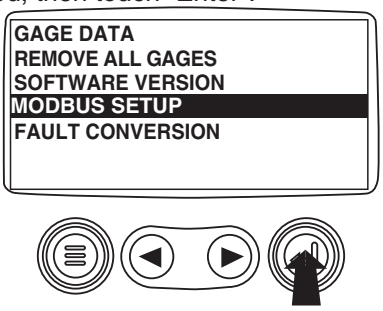
1. Starting at the single or four engine parameter display, touch the “Menu button”.



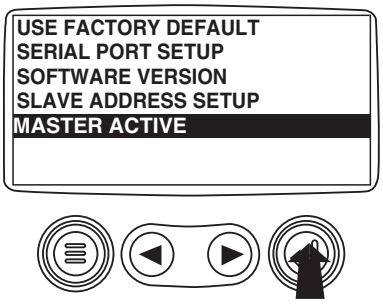
2. The main menu will be displayed. Use the “Arrow buttons” to scroll through the menu until the “Utilities” is highlighted, then touch “Enter”.



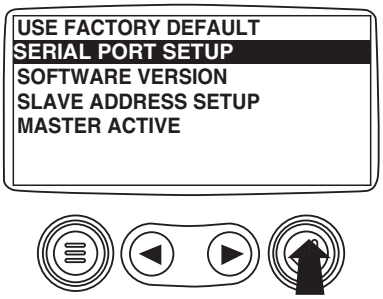
3. Once in the “Utilities” menu use the “Arrows” to scroll through the menu until the “Modbus Setup” menu is highlighted, then touch “Enter”.



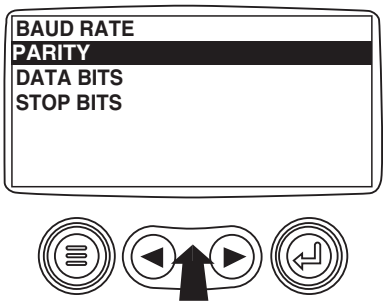
4. Use the “Arrows” to scroll down to and highlight either the “Slave Active or Master Active” modes. Touch the “Enter” button to toggle between master and slave.



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



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



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

In Case of Fire
(Units With Optional 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 left door panel near ground level. This way, the system may be actuated by either the operator or by ground personnel.

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

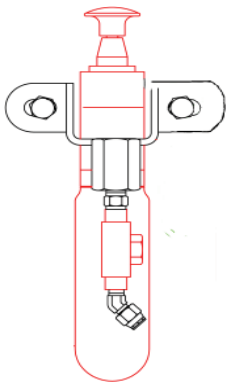


Fig. 14 Fire Suppression Actuator

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

3. Any time the system is discharged, the system must be 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.

NOTE: Some models are equipped with a fire detection system that will automatically discharge the system in the event of a fire.

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

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

Section 4 - Maintenance & Lubrication

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 Heavy Lift Transporter at top operating efficiency. The maintenance and lubrication procedures given here can be performed with a minimum of shop tools.

Safety Precautions

Before performing any maintenance or lubrication, review the following safety precautions. They're included 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 Allied Representative.

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 Load.

   The machine should be unloaded, with the unit down.

⚠ WARNING

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

4. Stop the Engine

⚠ WARNING

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.

Preventive Maintenance

Preventive maintenance is a system that is designed to detect problem areas and prevent equipment failure before trouble can develop to a critical point. 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 of maintenance.

Benefits of Preventive Maintenance

Time spent making the 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 operators control.
- Improves Equipment Availability - by minimizing the chances of breakdown.
- Reduces Unexpected Downtime - crash repairs are expensive and detract from normal scheduled maintenance.
- Reduces Equipment Abuse - provides the ability to predict component life and helps avoid operating equipment to destruction, by replacing parts before they fail.
- 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 of repairs and actual man hours expended on maintenance.

Establishing a Preventive Maintenance Program

The key to an effective preventive 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.

This program proposes the following basic schedule which is based on intervals generally used and accepted.

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 (semi-annually)
- 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 monthly maintenance, the mechanic will first take note of the shift maintenance reports and remedy any discrepancy; then comply with the shift and weekly maintenance, and in addition will perform the checks specified in the monthly 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 file.

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

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 his machine. The comments he 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 this 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.

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 and/or details.

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.

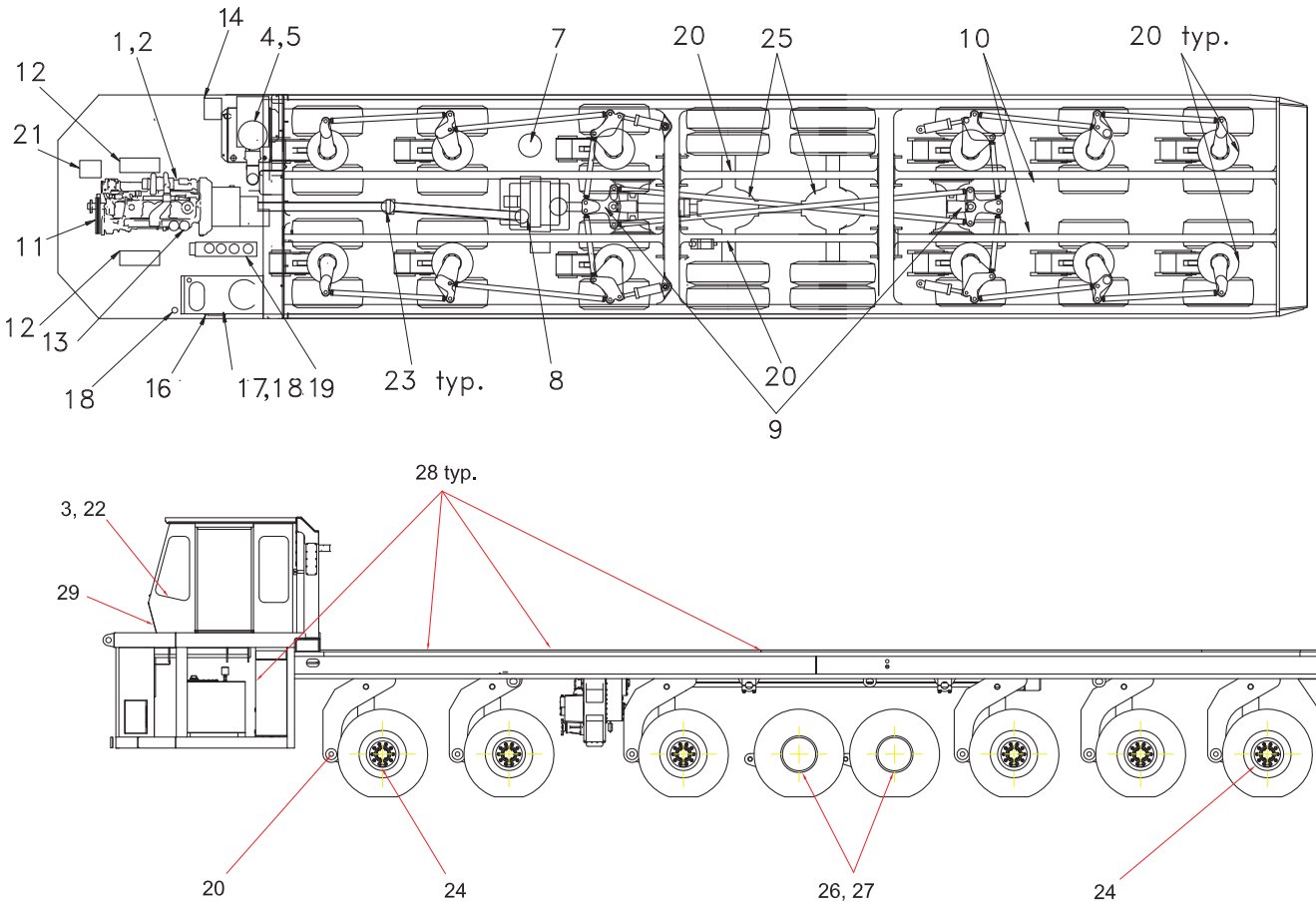
Scheduled Oil Sampling

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 the oil is hot and well mixed to ensure an accurate analysis. Contact your Allied Representative for complete information and assistance in establishing a scheduled oil sampling analysis program for your equipment.

Maintenance Schedule Summary

Component	24 Hours	50 Hours	150 Hours	250 Hours	500 Hours	1000 Hours	1500 Hours	2500 Hours	5000 Hours	6000 Hours
Engine: QSX-15	* Check operators report. * Check levels (oil/coolant) if make-up coolant is required, DCA4 concentration must be checked. * Visually inspect engine for damage, leaks, loose or frayed belts and listen for unusual noises. * Drain water/sediment from fuel tanks and fuel filters. * Check/Clean air cleaner, precleaner and dust pan.		* Check air cleaner piping, hoses, and clamps. * Check restriction indicator. * Clean/Change air cleaner element * Drain	* Change engine oil * Change filters: Oil full flow Oil By-Pass Fuel filter Water Filter * Clean/Change crankcase breather * Air Compressor air filter * Oil Sample			* Adjust valves and injectors	* Replace hoses as required * Check Batteries * Steam Clean engine * Tighten mounting bolts * Check turbo-charger mounting bolts		* Clean and flush cooling system * Clean and calibrate injectors and fuel pump * Inspect: Turbo-charger Vibration damper Air Compressor Fan Hub Idler Pulley Water Pump
Transmission and Torque Converter: Dana 6000 & 8000	* Check oil level with engine running at idle & oil temperature at 180 - 200°F (65-93°C)				* Change oil filter	* Drain and refill system. Drain with oil temperature at 180-200°F (63-93°C)				
Drive Axles: Dana 42T112		* Lube drive shaft * Adjust brakes		* Check levels	* Oil sample			* Drain and refill system		
Hydraulics:	* Check fluid levels * Inspect for leaks * Check PDI visual indicators and temperature gauge		* Replace breather element * Oil sample if last test was above required cleanliness levels		* Oil sample	* Replace oil filter elements * Check and record pressure settings			* Drain hydraulic fluid tank, clean tank and replace fluid	
Chassis:	* Daily inspection - per chart New Vehicle Adjustments: * Brake calipers * Wheel bearings * Axle pivot * Wheel nuts at 2 hours and every 50 hours			* Lubricate and inspect per chart	* Lubricate engine access doors * Inspect steering linkage and idlers * Inspect knee joints	* Re torque axle connection drive pin	* Lubricate steering column U-joint and slip * Check accumulator charge * Inspect / Service knee joints		* Inspect and service steering axles * Inspect steering idlers	* Replace steering idler bearings

Maintenance and Lubrication Checkpoints



Checkpoint		Interval	Checkpoint		Interval
1	Engine Oil Filter	Daily	**16**	Hydraulic Oil Level sight gauge	Daily
2	Engine Oil Level Dipstick	Daily	**17**	Hydraulic tank breather	Every 150 Hours
3	Fuel level gauge/sight gauge	Daily	**18**	Hydraulic return filter gauge	Daily
4	Engine air cleaner (restriction/leaks)	Daily	**19**	Hydraulic pressure filters	Every 1000 Hours
5	Engine pre-cleaner	Daily	**20**	Lubrication points	Every 250 Hours
6	Condition of wheels and tires	Daily	**21**	Cooling system (level, leaks)	Daily
7	Transmission filter	Every 500 Hours	**22**	Gauges and indicators (acceptable readings)	Daily
8	Transmission oil level	Daily	**23**	Driveline lube points	Every 50 Hours
9	Steering idler pivot lube points	Every 250 Hours	**24**	Brake calipers (pads, disks, and lines)	Every 250 Hours
10	Air/hydraulic brake actuator fluid level	Daily	**25**	Differential oil level (2 places)	Every 250 Hours
11	Engine belts (condition and tension)	Daily	**26**	Planetary axle housing oil level (4 places)	Every 250 Hours
12	Batteries	Every 250 Hours	**27**	Drive axles - slack adjuster and cam bushing lube points	Every 250 Hours
13	Engine Fuel Filters	Every 250 Hours	**28**	Engine, deck and frame access door hinges (10 places)	Every 500 Hours
14	Engine Fuel Tank	Daily	**29**	Steering column u-joints and slip (6 places)	Every 2500 Hours

Drivetrain/Engine

For complete service, maintenance, trouble shooting and warranty information for the drivetrain components consult the manufactures handbook included in the Service Manual.

Suspension - General

Proper maintenance and lubrication at regular intervals will assure good performance optimizing the service life of each component. Lubrication, service intervals and service life will vary depending on usage and road conditions

It is recommended that grease points be lubricated every 250 hours unless indicated otherwise. This equates to twice monthly.

Elevating individual axles can be accomplished by lowering machine - turning cylinder ball valve to the closed position - elevating machine.

Tires should be kept within 1 inch (25mm) diameter of each other within any axle set.

Suspension - New Units

When new axles are placed in service, it is important that wheel nuts are checked and tightened after the first 2 hours of operation.

Wheel bearing temperature should be checked after five hours of continuous operation, by placing your hand on the outside of the wheel hub. A comparison between hubs should be equal. If a hub is found to be considerably warmer than the rest, the wheel bearings should be inspected for proper pre-load and lubricant.

Knee joint connection houses journal bearings and should be inspected after 24 hours of operation. Inspect and lubricate following the procedure described later in this section.

The lower arm axle connection should be re torqued after 24 hours of operation to approximately 400 lb/ft or until the axle cannot be rotated over lower arm trunnion. Elevate the axle to do this - axle must be parallel to the deck, i.e. neutral position, BEFORE torquing.

Steer Suspension

⚠ WARNING

Warning: Support vehicle properly when working beneath it. Do not depend on hydraulic cylinders to hold vehicle up. Vehicle can lower if a manual control is moved or if a hydraulic line breaks

Wheel bearings and hubs should be cleaned and repacked at 5,000 hour intervals or yearly. Inspect brake lining wear indicator pins on Steering and Drive Axles. (See Page 41)

Bearings should be repacked with wheel bearing grease suitable for prevailing temperatures. (see Lubrication Spec Table page 47-48) In packing bearings, the lubricant must be packed carefully between the rollers, by hand or with a packer, and must not be just spread on the outside. Care must be exercised to see that dirt, grit, lint, or other contaminants do not get into the bearings.

Remove all old grease from inside hub and wash with cleaning solvent (mineral spirits), and dry thoroughly. Inspect cups for wear, pits or scratches; if any of this is evident, replace the cups. Fill the space in the hub between the two bearing cups with grease.

Remove all old grease from the axle spindle with cleaning solvent (mineral spirits). After drying, spread a thin coat of grease over spindle.

When reassembling, care should be taken to see that the inner bearing is properly seated. Slide the hub and rotor assembly onto axle spindle and push into position. Be sure to support it properly so as to avoid damaging spindle threads. Install outer bearing, spindle nuts, and hub cap.

To adjust bearings, tighten the spindle nut and turn hub and rotor assembly to assure proper seating of bearings. The bearings should be adjusted in accordance with procedure listed below:

1. Assemble bearings, new seal**,** and hub, on axle spindle.
2. Install inner bearing adjustment nut on spindle with dowel facing out.

3. Tighten to 50 lb/ft torque (68 N. M) while rotating hub back and forth.
4. Back off adjusting nut: 1/3 turn (120 degrees).
5. Install nut retainer (perforated washer) reverse retainer, if necessary to engage dowel adjusting nut.
6. Install jam nut and tighten to 350 lb/ft. (475 N. M).
7. Install hub cap gasket and hub cap.

Brake Friction Disc Lining Wear Check Procedure Steering Axles

At regular intervals, depending on usage and road conditions, it is necessary to check brake lining wear indicator pins.

The brake must be applied before making the wear indicator check!

1. Clean thoroughly the area around the wear indicator.
2. Push wear indicator pin against the reaction plate.
3. When the wear indicator pin is flush with the indicator nut face or raised casting surface the friction and lining disc must be replaced.
   (See Figure: 15 and 16)

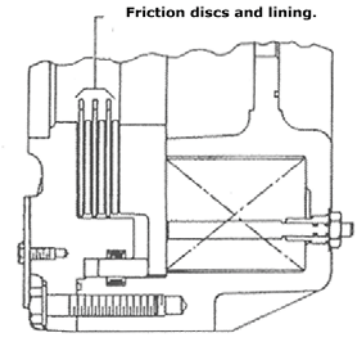


Figure: 15 Indicator Pin, Steering Axles

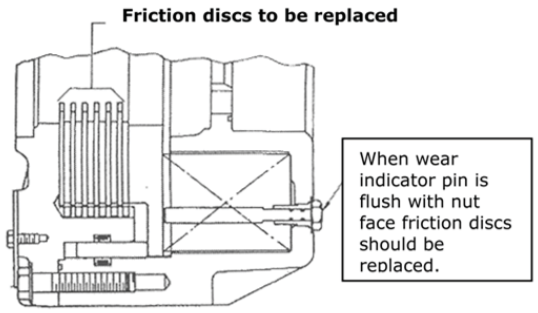


Figure: 16 Indicator Pin Shown Flush

Brake Friction Disc Lining Wear Check Procedure Drive Axles

Depending on usage and road conditions, it is necessary to check brake lining wear indicator pins.

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. When the wear indicator pin becomes flush with the spot-faced casting surface, the friction discs must be inspected (see Figure 17 and 18).
5. The wear pin in figure 18 has no factory set standout. Inspect discs when wear pin becomes flush with the spotface.
6. Replace cap and torque to 25 Ft. - Lbs. [27-34 Nm] as required.

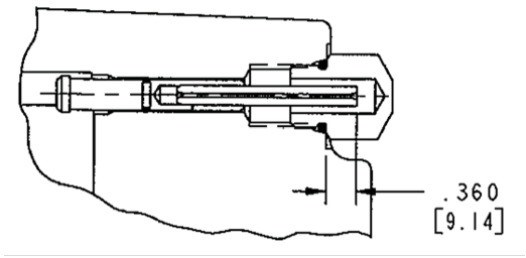


Figure: 17 Indicator Pin, Drive Axles

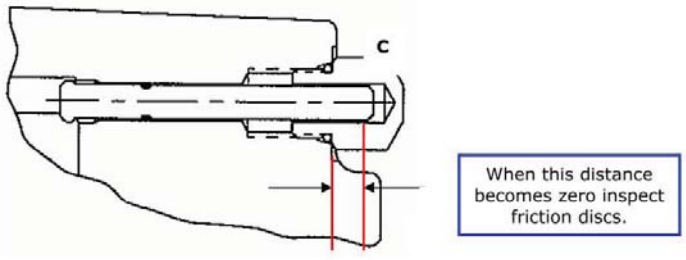


Figure: 18 Indicator Pin Shown Flush

Turntable Bearing

Bearing should be lubricated every 250 hours. There are six lube points located around the inside circumference.

Elevating Cylinder

Bearings should be lubricated every 250 hours. There are two lube points, one each at the upper and lower bearings.

Knee Joint

Knee joint journal bearings should be lubricated every 250 hours. There are two lube points - inside and outside at the knee joint.

The journal bearings should be inspected for wear every 2500 hours. Relieve weight from axles. Elevate axle and push lower arm side to side or with a fore - aft rocking motion of the tires feel for any play between the turntable and the lower arm.

Axle Connection

The axle connection should be checked and adjusted as required every 1000 hours. The axle connection is non lubricated. It functions by the deflection of the compressed polyurethane bushing.

The lower arm axle connection should be torqued to approximately 400 lb/ft or until the axle cannot be rotated over lower arm trunnion. Elevate axle to do this - axle must be parallel to the deck, i.e. neutral position, BEFORE torquing.

Drive Suspension

General

The drive axles and suspension are housed within an isolated module. The connection between the main frame and the drive module is accomplished by means of four steel encased rubber bushings, coupling with a standard axle hanger arrangement.

The axle connection is non lubricated. To inspect bushings place a tapered end bar between the main frame and drive frame close to the hanger-bushing arrangement and pry down to see if play exists. Visually inspect for collapsed or extruded rubber or wear/defects in the hanger.

Elevating Cylinder

Bearings should be lubricated every 250 hours. There are 2 lube points - upper and lower bearings.

Knee Joint

Knee joint journal bearings should be lubricated every 250 hours. There are two lube points - inside and outside at the knee joint.

The journal bearings should be inspected for wear every 2500 hours. Relieve weight from axles. Elevate axle and push lower arm side to side or with a fore - aft rocking motion of the tires feel for any play between the turntable and the lower arm.

Axle Connection

Bearings should be lubricated every 250 hours. There are 2 lube points - upper and lower bearings.

The axle connection should be checked and adjusted as required every 1000 hours. The axle connection is non lubricated. It functions by the deflection of the compressed polyurethane bushing.

Torque Arms

The torque arm tapered ball sockets are permanently sealed and do not require additional lubrication. With brakes applied and engine running, (approx. 1000 rpm) put the machine into forward then reverse gear. Watch for movement or play within the ball socket and within the taper of the mounting bracket. Replace worn parts. Before dismantling torque arm, measure the length center to center. Reassemble to the same length.

Drive Axles

See Clark-Hurth service manuals included in the Service Manual.

Daily Service Check List

10 HOURS OR DAILY

Before Engine Startup, Check the Following				
Item		**OK**	**No**	**Add**
1	Engine (Check oil level, check for leaks)			
2	Hydraulic Tank (Check oil level, check for leaks)			
3	Hydraulic Cylinders (Check for leaks)			
4	Radiator (Check coolant level, check for leaks, are fins clean and unobstructed?)			
5	Air Cleaner (Check indicator, clean or change element, empty dust cup)			
6	Engine Belts (Check for adjustment and wear)			
7	Air Tanks (Check drain valves for correct operation)			
8	Wheels and Tires (Check condition and pressure)			
9	Hydraulic Brake Fluid (Check fluid level)			

After Engine Startup, Check the Following				
Item		**OK**	**No**	**Add**
1	Engine (Does it sound normal?)			
2	Air Intake System (Check for leaks and damage)			
3	Exhaust System (Check for leaks and excessive smoke)			
4	Instruments and Controls (Check for normal operator and readings)			
5	Transmission (Check oil level at operating temperature, check for leaks)			
6	Lights and Back-up Horn (Check operation)			

Note Anything Abnormal or In Need of Repair

Lights_____Defroster_____Reverse Warning Horn_____
Horn_____ Windshield Wipers_____
Heater_____Air Conditioner_____

Operator_____Supervisor_____Date_____
Model_____Serial Number_____Hour Meter_____

Service Maintenance Check Lists

50 HOURS OR WEEKLY

1	Repeat previous intervals	OK_____	NO_____
2	Lubricate drive shaft	OK_____	NO_____
3	Check for fluid leaks - (oil, fuel and water)	OK_____	Repair_____
4	Check brakes for adjustment and wear	OK_____	Repair_____
5	Check wheel lug nuts and studs mechanically	OK_____	Repair_____
6	Record engine RPM	High_____	Stall_____

250 HOURS OR MONTHLY

1	Repeat previous intervals	OK_____	NO_____
2	Lubricate service points per lube chart	OK_____	NO_____
3	Take engine oil sample for analysis*	OK_____	NO_____
4	Change engine oil and filter*	OK_____	NO_____
5	Check axle differential oil level	OK_____	Add_____
6	Check axle planetary oil level	OK_____	Add_____
7	Change cooling system filter	OK_____	NO_____
8	Check all hydraulic pressures and record	OK_____	NO_____
9	Check fire suppression actuator	OK_____	Repair_____
10	Check brake lining wear indicator pins	OK_____	Repair_____
11	Check and adjust the parking brake	OK_____	NO_____
12	Check battery electrolyte level	OK_____	Add_____

* Normal drain period and filter change intervals are 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.

Service Maintenance Check Lists

500 HOURS OR QUARTERLY

1	Repeat previous intervals	OK_____	NO_____
2	Take samples from transmission, axles, and hydraulic system for analysis*	OK_____	NO_____
3	Drain and refill transmission, change filter*	OK_____	NO_____
4	Service fuel filters*	OK_____	NO_____
5	Service hydraulic filters*	OK_____	NO_____
6	Lubricate engine and frame access doors	OK_____	NO_____
7	Inspect steering linkage and idlers	OK_____	Repair_____
8	Inspect brake system and components	OK_____	Repair_____

1000 HOURS OR SEMI-ANNUALLY

1	Repeat previous intervals	OK_____	NO_____
2	Change hydraulic oil and filters *	OK_____	NO_____
3	Clean and flush cooling system	OK_____	NO_____
4	Check pins and bushings for wear	OK_____	Repair_____

2500 HOURS OR ANNUALLY

1	Repeat previous intervals	OK_____	NO_____
2	Drain, flush and refill differentials *	OK_____	NO_____
3	Drain, flush and refill planetaries *	OK_____	NO_____
4	Check and recharge accumulators, record pressure	OK_____	NO_____
5	Replace hoses as required, steam clean engine, tighten mounting bolts and turbocharger mounting bolts	OK_____	Repair_____
6	Drain hydraulic tank, flush tank and refill	OK_____	NO_____
7	Lubricate steering column	OK_____	NO_____
8	Inspect knee joints	OK_____	Repair_____

* Normal drain period and filter change intervals are 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.

Service Maintenance Check Lists

5000 HOURS

1	Repeat previous intervals	OK_____	NO_____
2	Drain hydraulic fluid tank, flush tank, and replace fluid	OK_____	ADD_____
3	Inspect and service steer axles	OK_____	ADD_____
4	Inspect steering idlers	OK_____	Repair_____

6000 HOURS

1	Repeat previous intervals	OK_____	NO_____
2	Clean and calibrate injectors and fuel pump	OK_____	NO_____
3	Inspect - turbocharge, vibration damper, air compressor, fan hub, idler pulley, water pump	OK_____	NO_____
4	Replace steering idler bearings	OK_____	NO_____

Lubricants and Capacities

System and Tank Capacities

Engine Crankcase .....10.2 U.S. Gallon (38.76 liters)
Cooling System .....12 U.S. Gallon (45.6 liters)
Transmission/Converter .....19 U.S Gallon (72.2 liters)
Axle - Differential - Rear .....4.375 U.S Gallon (16.625 liters)
Axle - Differential - Front .....4.375 U.S Gallon (16.625 liters)
Axle - Planetary Hubs (each) .....2 U.S Gallon (7.6 liters)
Hydraulic Tank .....150 U.S. Gallon (570 liters)
Fuel Tank .....130 U.S. Gallon (494 liters)
Flow Divider Gearbox .....1 U.S. Gallon (3.8 liters)

Recommended Lubricant Specifications Table

Engine

Prevailing Ambient Temperature	Fluid to be Used
Cummins	**MIL-L-2104D**
-13°F (-25°C) to 95°F (35°C) 14°F (-10°C) and above 32°F (0°C) and above	SAE 10W-30 SAE 15W-40 SAE 20W-40
Detroit Diesel	**MIL-L-46152E**
32°F (0°C) and below 32°F (0°C) and above	SAE 30 SAE 40 Note: Multi-Grade oils are not recommended for Detroit Diesel Engines
Caterpillar	**MIL-L-2104D**
-13°F (-25°C) to 50°F (10°C) -4°F (-20°C) to 104°F (40°C) 5°F (-15°C) and above	SAE 5W-20 SAE 10W-30 SAE 15W-40

Transmission/Converter Hydraulic System

Prevailing Ambient Temperature	Fluid to be Used
	MIL-L-2104E
30°F (-1°C) and above -10°F (-23°C) and above -30°F (-34°C) and above -65°F (-55°C) to 0°F (-18°C)	SAE 30 Transmission Fluid SAE 10W Transmission Fluid Mobel 424 Transmission Fluid MIL-L-46167
All	Grade 10 TYPE C-2 - C-3

Axle

Prevailing Ambient Temperature	Fluid to be Used
	MIL-L-2105C
-40°F (-40°C) to -10°F (-23°C)	SAE 75W
-40°F (-43°C) to 0°F (-18°C)	SAE 75W-80
-13°F (-34°C) to 100°F (37°C)	SAE 80W-90
10°F (-12°C) above	SAE 85W-140
	additive (friction modifier for posi-torque) 2-5% by volume

Chassis and Driveshaft Lubrication

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

Brakes

Prevailing Ambient Temperature	Fluid to be Used
All	Uses Main Hydraulic System Oil

Main Hydraulic System

Prevailing Ambient Temperature	Fluid to be Used
All	Mobel 424

Flow Divider

Prevailing Ambient Temperature	Fluid to be Used
Above 10°F (-12°C)	SAE 80W-90

Fuel Specifications

Fluid	Specification
Fuel	No. 2 Diesel

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

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

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

Because 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. It is important to change fluids and filter elements at the intervals specified in this manual.

Steps for checking and filling the Hydraulic Tank

1. Lower the Machine to its lowest position.

2. Shut down the machine and allow it to cool. The hydraulic oil must be cool to obtain an accurate level reading.

3. Open the engine compartment access door on the left side of the machine, under the cab.

4. Check the hydraulic oil level on the sight gauge on the hydraulic tank. The oil level should be between the “Full Cold” mark and the “Low” mark indicated on the tank.

5. If the oil level is at the “Low” mark, add 12.5 gallons of approved hydraulic oil (See Figure 19) to return the oil level to the “Full Cold” mark. Fill the tank at the fill valve located on the left side of the tank.

6. Note that the oil level will raise when the machine is warmed up, and may be above the “Full Cold” mark.

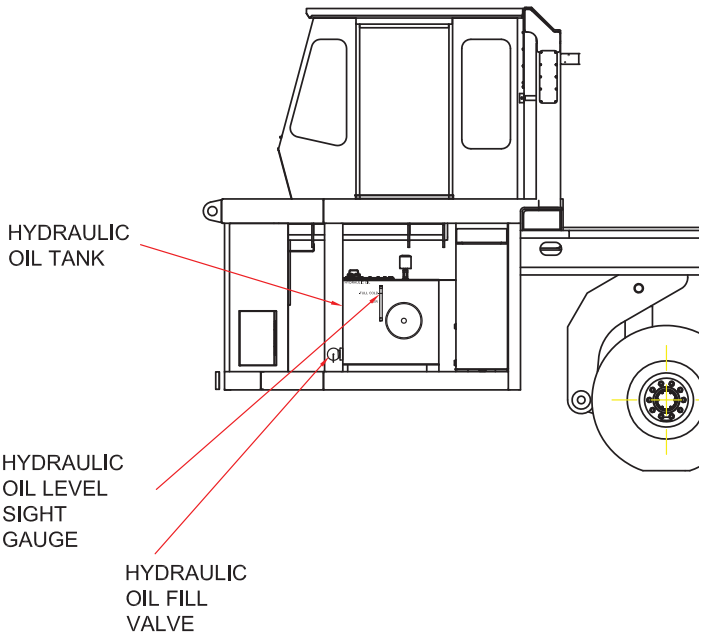


Figure: 19 Hydraulic Site Gage Location

NOTES