

SURFACE **HOG** SURFACE CLEANER

OPERATIONS MANUAL



HOGTM
TECHNOLOGIES



WELCOME 5
 HOG TECHNOLOGIES LIMITED WARRANTY 6
 CAUTION & WARNING LABELS 7

Section 1:

Safety Information

1.1 General Safety 9
 1.2 High Pressure Cleaning Safety 10
 1.3 Nozzle Safety 12
 1.4 Hose Safety 12
 1.5 High Pressure Fitting Safety 13
 1.6 Water Heater Hazard 13
 1.7 Hydraulic System Hazard 14

Section 2:

Surface Hog Systems

2.1 Surface Hog System Introduction 15
 2.2 Skid Mounted Auxiliary Engine 15
 2.3 Auxiliary Engine Throttle Control 16
 2.4 High Pressure Water System 17
 2.5 Hog Arm & Hog Head 24
 2.6 Thru-shaft, Spray Bar, Protectors & Nozzles 29
 2.7 High Pressure Hoses, Connections & Fittings 33
 2.8 Debris Recovery System 35
 2.9 Handheld Pressure Washer 39
 2.10 Electrical System 40
 2.11 Hydraulic System 45
 2.12 Ladder & Tool Box 47

Section 3:

Surface Hog Operation

3.1 Start Up/Shutdown Introduction 49
 3.2 Pre-Operation Inspection 50
 3.3 Filling The Clean Water Tank 51
 3.4 System Startup Procedure 52
 3.5 Setting Pressure Procedure 53
 3.6 Cleaning Procedure 55
 3.7 Routine Shutdown 57
 3.8 Emergency Shutdown Procedure 58
 3.9 Handheld Pressure Washer Operation 59
 3.10 Dumping Debris 61
 3.11 Operating in Freezing Conditions 62
 3.12 Operation Routine Maintenance 62



Section 4:

Lubrication & General Maintenance

4.1 Lubrication & General Maintenance Introduction	65
4.2 Lubrication & Grease Point Locations.....	66
4.3 Clean Water Filter Replacement.....	68
4.4 Bleeding Air From Charge Water Pump.....	70
4.5 Wear Brush Assembly Adjustment.....	71
4.6 Nozzle Installation	72

Section 5:

Scheduled Maintenance

5.1 Scheduled Maintenance Introduction.....	73
5.2 Periodic Maintenance Items	73
5.3 Auxiliary Engine	74
5.4 Vacuum Blower Maintenance	75
5.5 Vacuum Blower Blade Replacement	75
5.6 Vacuum Hose Replacement & Rotation Procedure	77
5.7 High Pressure Hose Installation	78
5.8 Water Heater Burner Maintenance	79
5.9 Changing Hydraulic Fluid & Flushing Tank	80
5.10 Replacing Hydraulic Filters.....	81
5.11 Winterization & Storage Procedures	83
5.12 Surface Hog Maintenance Matrix.....	85

Appendix 1:

Troubleshooting

Pressure Cleaning System Troubleshooting.....	87
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Appendix 2:

Pre-Op Checklist

Pre-Op Check List.....	91
------------------------	----

Appendix 3:

Glossary of Terms

Hog Technologies Terms	93
------------------------------	----

Appendix 4:

Customer Support & Support Web Site

Customer Support	97
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Congratulations on your recent purchase of the Surface Hog! The Surface Hog is the world's most advanced equipment for cleaning pavement surfaces and markings. Your purchase demonstrates your commitment to excellence and positions you as an industry leader in pavement surface cleaning and marking maintenance.

Hog Technologies is excited to welcome you and your crew to the Surface Hog Operators' Team. Together we embrace the challenge of constantly developing our equipment, knowledge and skills so that our highways will be safer for all who rely on them and our pavement surfaces will last longer for those who pay for them. The Surface Hog, in the hands of a trained/certified/licensed operator with this work ethic, will be a fitting complement to our mutual commitment to excellence.

As you know, no machine is capable of outperforming its operator, so we have designed a training experience that will equip your operators with the tools needed to maximize productivity and minimize operational expenses while building our mutual reputation of no surface damage. This manual is designed to be used by your operators during the hands-on training experience administered by a Hog Technologies Certified Trainer. During the training experience your team will be given the basic knowledge and skills necessary to maintain, operate, troubleshoot and repair your Surface Hog.

Please take the time to read this operation manual before attempting to operate your pressure cleaning system. This manual is an important aid in the operation and maintenance of your new equipment. The information is intended as a guide and cannot cover every question you may have about your Surface Hog or every operating situation. We encourage you to contact Hog Technologies for any additional information you might need. We provide support to our customers for all of the equipment we sell. We maintain an experienced support team that is available 24 hours a day 7 days a week along with a well-stocked inventory of parts and accessories for your convenience. Please contact us for any and all of your support issues and questions toll free at (877) HOG-ROAD or online at www.hogtechnologies.com or www.stripehogsupport.com

From our family to yours we take this opportunity to say thank you for the opportunity to support you in our field of expertise. We look forward to many successful years working together to provide maximum productivity at minimal operational cost without damage.





Hog Technologies Limited Warranty

Hog Technologies warrants its components to be free from defects in material and workmanship while under normal use and service. Hog Technologies will, at its option, either repair or replace free of charge any such part that appears to us to be defective in material or workmanship during the warranty period. The warranty evaluation by Hog Technologies as to the cause of the defect shall be conclusive.

For approved warranty shipments, Hog Technologies will provide no charge Fed-ex ground or Fed-Ex Economy shipping. If customer requests expedited shipping, the difference in the shipping costs will be invoiced to the customer.

Hog Technologies reserves the right to request the component(s) to be returned, freight pre-paid, for analysis before proceeding with any warranty claim. The customer shall be responsible for payment of any replacement components requested. If the warranty claim is approved by Hog Technologies, credit will be issued for the components under warranty.

No warranty is made, either expressed or implied, for defects, failures or malfunctions resulting from corrosion, misapplication, over-pressurization, insufficient or lack of maintenance and any modifications to the component as supplied by Hog Technologies.

Any components replaced during the period of warranty will be warranted only during the period of the initial warranty, and no extensions shall be made, unless in writing by Hog Technologies in addition to the provision of the terms of the original warranty.

Hog Technologies will not be liable for damage, abnormal wear or consequential damage to their system components resulting from the use of replacement components that are not furnished by Hog Technologies.

Hog Technologies will not be liable for charges incidental to the removal of damaged or defective components, lost time and profits, or any consequential damages resulting from failure of the component.

Hog Technologies reserves the right to make improvements to future models without the need to retrofit or upgrade prior models. Hog Technologies shall not be obligated to perform retrofits and/or modifications to components manufactured prior to the incorporation of the new design and specifications.

Components that are not originally manufactured by Hog Technologies, including but not limited to, the truck chassis, Jetstream Pump, OMSI (Gear Box), Dresser Roots Blower, are warranted only to the extent of the original manufacturer's warranty and are subject to their allowance to us if found defective by them. Copies of other manufacturers warranty statements are supplied at the time of sale. Hog Technologies will assist with warranty claims on components not originally manufactured by Hog Technologies.

*For approved warranty claims that include labor: If such labor is provided at customer location and not at Hog Technologies headquarters, Hog Technologies reserves the right to invoice customer for reimbursement of travel-related expenses.

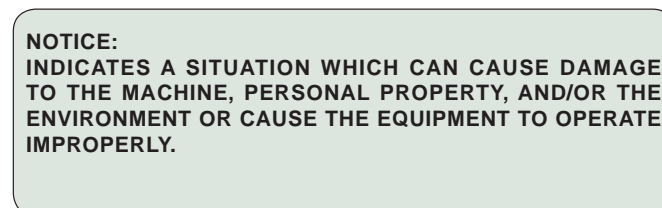
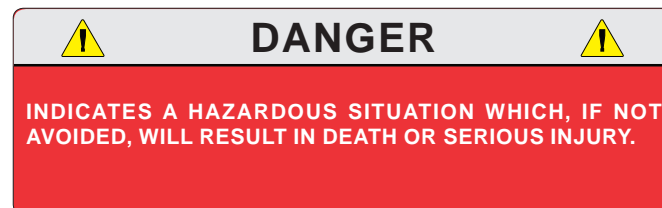
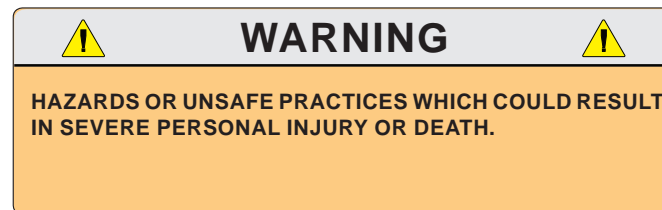
Hog Technologies Warranty Schedule

Warranty starts from the date of acceptance by the purchaser. Date of acceptance shall be defined as the time that the Stripe Hog is received by the purchaser. Acceptance of the Stripe Hog shall imply agreement to the terms and conditions of this warranty.

- **1 - 365 Days: 100% Parts and 100% Labor ***



High pressure, water cleaning equipment can cause serious injury or even death if it is not operated or maintained properly. This manual has been written to include a number of safety instructions to assure the safe operation and maintenance of the equipment. These instructions are in the form of a General Safety Section as well as individual NOTICE, CAUTION, WARNING and DANGER statements. There are also WARNING AND DANGER LABELS located on some components. You should read these warnings carefully and make sure you understand the nature of the hazard as well as the precautions and recommended procedures required to ensure your safety. The following definitions apply:



IMPORTANT NOTE:

Every precaution has been taken by Hog Technologies to reduce the risks associated with possible injury and damage from electrical faults, high pressure water and hydraulic components or mechanical failure. However, your own precaution and good maintenance procedures are necessary in order to maintain a safe working environment.

All instructions given in this book are as seen from the rear looking forward. Common industry terminology is used throughout the manual.





WARNING



INCORRECT USE OF HIGH PRESSURE WATER CLEANING EQUIPMENT MAY CAUSE SERIOUS INJURY OR EVEN DEATH.

DO NOT USE THIS EQUIPMENT WITHOUT PROPER SUPERVISION AND TRAINING.

ALL OPERATING AND MAINTENANCE PERSONNEL MUST BE THOROUGHLY TRAINED IN THE SAFE OPERATION, INSTALLATION AND MAINTENANCE OF THIS EQUIPMENT AND BE PROVIDED WITH ADEQUATE SUPERVISION.

BEFORE ATTEMPTING TO CONNECT, OPERATE, OR REPAIR THIS EQUIPMENT, THOROUGHLY READ THESE INSTRUCTIONS AND ANY SAFETY, WARNING OR INSTRUCTION PAMPHLETS INCLUDED WITH YOUR SHIPMENT.

FOR ANY QUESTIONS CONCERNING SAFE OPERATION AND MAINTENANCE PROCEDURES, CONTACT YOUR HOG TECHNOLOGIES REPRESENTATIVE PRIOR TO USE.

**(772) 223-7393 OR (877) 964-7312
HOG TECHNOLOGIES
WWW.HOGTECHNOLOGIES.COM**



Safety Information

1.1 General Safety

Use Professional Training

Operating high pressure water cleaning equipment requires professional training, including safe work practices and procedures. Only professionally trained personnel should be allowed to setup, operate, or maintain this equipment. If you have not completed the Hog Technologies basic training course, you will be a danger to yourself and others.

Contact with high pressure water can result in severe lacerations or water injection into the bloodstream. If injection occurs in a vulnerable part of the body death may result.

Always Read Instructions

Read this manual and all other high pressure water equipment operation manuals and instructions prior to using any Hog Technologies product. Contact Hog Technologies (877-HOG ROAD) should any questions arise.

Major Component Operation Manuals

The suppliers of some major components such as truck chassis, engines and pumps provide their own operation manuals which have been included with your equipment. You should read the information in this manual and the manuals of other manufacturers completely and have a thorough understanding of all component systems and their proper operation before operating your equipment.

REMEMBER - IT IS YOUR RESPONSIBILITY TO ENSURE THAT YOUR EQUIPMENT IS SAFE FOR YOU AND YOUR CREW. ALWAYS EXERCISE GOOD JUDGMENT WHEN INSTALLING OR REPAIRING EQUIPMENT AND WHILE OPERATING HIGH PRESSURE CLEANING EQUIPMENT.

Work Area Safety

Remember, safety is first! Only set up to work in areas properly protected from traffic and other hazards. Individuals being struck by vehicles or mobile equipment lead to many work zone fatalities or injuries. Work zones need traffic controls identified by signs, cones, barrels and barriers. You should always wear high visibility clothing



with a fluorescent background and made of retro-reflective material to be more visible and reduce the possibility of an accident. Work stations should always be illuminated.

Outfit all operators with proper safety apparel. Always use eye protection to shield from projected debris. Use ear protection to protect from noise levels generated from pump, vacuum and water cleaning heads. It is very important to wear steel toed boots that provide good traction on slippery surfaces such as on top of water and debris tanks.

Never wear loose clothing. Loose clothing can get caught on moving or rotating parts causing serious injury or even death.

Most high pressure water cleaning operations generate noise levels above 90 dB. Hearing protection is required in accordance with OSHA standards.

OSHA's Permissible Noise Exposure	
90 dB	8.0 hours
92 dB	6.0 hours
95 dB	4.0 hours
97 dB	3.0 hours
100 dB	2.0 hours
102 dB	1.5 hours
105 dB	1.0 hours
110 dB	30 minutes
115 dB	15 minutes


WARNING


ALL PERSONNEL EXPOSED TO 90 DB OR GREATER NOISE LEVELS SHOULD RECEIVE INSTRUCTION IN THE CORRECT USE OF EAR PROTECTION SO THAT THEIR NOISE EXPOSURE LIES WITHIN THE LIMITS SPECIFIED BY OSHA. NEVER ALLOW ANYONE NEAR THE WORK AREA WITHOUT PROPER EAR PROTECTION.

REMEMBER: HIGH PRESSURE WATER CAN CAUSE DEBRIS TO BE PROJECTED UNEXPECTEDLY IN AND AROUND THE WORK AREA THAT CAN CAUSE SEVERE INJURY. MAKE SURE ALL PERSONNEL STAY CLEAR OF THE CLEANING AREA AND USE HARD HATS, EYE AND EAR PROTECTION.



Always be sure your work area is clear of people whenever the high pressure pump is engaged.

Use Only Products Intended for High Pressure Water Cleaning Use

Know the pressure ratings of all equipment being used and never exceed the service rating of the weakest component. This system is designed to work with pressures up to but not exceeding 7,250 psi (500 bar). High Pressure water system replacement parts must have a stated minimum burst rating of 1.5 times the maximum operating pressure. All equipment pressure rating and warning tags should be left intact.

Product changes

Hog Technologies is committed to the continuous improvement of our products. As a result, some of the equipment described in this manual or pictured in the catalog may change or no longer be available.

All information, illustrations, and specifications contained in this manual are based on the latest product information available at the time of publication. Hog Technologies reserves the right to make changes at any time, without notice, in colors, materials, equipment, specifications, and models.

If you have questions about the equipment on your Surface Hog, please contact the Customer support Department at (877) HOG ROAD or (001) (772) 214-1714.

Never Alter a Hog Technologies Product

Do not alter any product without written consent from the manufacturer. Any alterations could have serious consequences including bodily harm or death. Alterations without manufacturer consent will void the warranty.

Inspect Equipment

Inspect the condition of all components prior to use. Do not use any item that is in questionable condition. Use only components which are marked with the recommended operating pressure. Never exceed the operating pressure of the weakest component in the system.

IMPORTANT NOTE:

YOUR PRESSURE CLEANING EQUIPMENT USES INTERNAL COMBUSTION ENGINES AND FLAMMABLE FUEL. EVERY PRECAUTION HAS BEEN TAKEN BY HOG TECHNOLOGIES TO REDUCE THE RISKS ASSOCIATED WITH POSSIBLE INJURY AND DAMAGE FROM FIRE OR EXPLOSION, BUT YOUR OWN PRECAUTION AND GOOD MAINTENANCE PROCEDURES ARE NECESSARY TO ENSURE THE SAFE OPERATION OF YOUR EQUIPMENT.

Store Components Properly

Protect all components from damage when not in use. Secure for travel.

Freezing Conditions

The water and vacuum systems, hoses and the high pressure water cleaning head should be drained of all water or filled with an antifreeze solution. For the high pressure pump system, refer to pump manufacturer's procedures for maintaining equipment in freezing climates. If the unit is operated in freezing temperatures or even temperatures below 60 degrees Fahrenheit, it is necessary to operate the system with the high pressure pump engaged and the engine set at IDLE speed only, until the hydraulic fluid temperature rises above 60 degrees Fahrenheit.

1.2 High Pressure Cleaning Safety

Safety First – ALWAYS!

Whenever the high pressure pump is engaged for setting pressure or operations, always be sure work area is clear of people, hands, feet, etc. before engaging the high pressure pump.



WARNING



INJURIES FROM HIGH PRESSURE WATER CLEANING NOZZLES ARE VERY SERIOUS AND CAN RESULT IN A FATALITY. ALWAYS MAKE SURE ALL PERSONNEL ARE A SAFE DISTANCE FROM THE WORK AREA BEFORE THE PRESSURE PUMP IS ENGAGED. NEVER PUT HANDS, FEET OR ANY PART OF YOUR BODY IN OR NEAR THE HIGH PRESSURE STREAM.

Check Water Supply

Use only clean water in any high pressure water system. **DO NOT** accept water drawn from retention ponds, canals or other non-potable sources.





Purge System

Before attaching a spray bar to the Hog Head assembly, engage the high pressure pump at low speed to purge the system. Any dirt or debris in the system can clog nozzle orifices and cause system pressure to spike excessively, causing damage to components.

Check High Pressure Spray Head

Check spray head for smooth and proper operation before each shift. Do not use equipment that has not been checked thoroughly.

Check Control Components

Check all switches and control panel devices to ensure each is working properly before beginning operations. Do not use equipment if any device is malfunctioning.

Use Safety Protection

Always use eye protection to protect eyes from projected debris. Use ear protection to protect from noise levels generated from pump, vacuum and high pressure cleaning operations.

	WARNING	
<p>HIGH PRESSURE WATER CLEANING CAN CAUSE DEBRIS TO BE PROJECTED UNEXPECTEDLY IN AND AROUND THE WORK AREA THAT CAN CAUSE SEVERE INJURY. MAKE SURE ALL PERSONNEL STAY WELL CLEAR OF THE CLEANING AREA AND USE HARD HATS, EYE AND EAR PROTECTION.</p>		

Know Your Surroundings

Always be aware of, and pay attention to your surroundings. – i.e. - truck, hoses, people, walls, moving vehicles, planes, etc.

Test System

With the spray bar and high pressure nozzles installed, operate the pump at low pressure to check for nozzle accuracy and leaks in spray bars, connections or nozzles. Should any repairs or adjustments be necessary, disengage the pump to relieve all pressure before making any required repairs or adjustments.

	CAUTION	
<p>TO AVOID POSSIBLE INJURY AND DAMAGE TO EQUIPMENT, USE ONLY THOROUGHLY TRAINED PERSONNEL TO PERFORM MAINTENANCE OR REPAIRS. ALWAYS TEST ALL COMPONENTS AT LOW PRESSURE.</p>		

Start at Low Pressure

Always start cleaning with the system at low pressure (low RPM) and slowly increase RPM to operating pressure. Engage and disengage the High Pressure and Head Rotation switches two times at operating pressure to check the operation of the pressure pump and thru-shaft motor before starting cleaning operations.

Set System Pressure

With system operating properly, set your pressure according to methods described by pump manufacturer's instructions. Refer to the pump operating manual for specifications and instructions.

Check Dumping Pressure

When setting pressure **ALWAYS** ensure that the system pressure drops to less than 70 psi (4.8 bar) or below immediately when the High Pressure switch is turned off. If this does not reduce system pressure immediately to below 70 psi (4.8 bar) or below, do not use the unit until repairs are made to the system.

Use the Minimum Pressure Required

Do not exceed the operating pressure of the system's lowest pressure-rated component. All equipment pressure rating and warning tags should be left intact.

Be Prepared

If the equipment malfunctions or a malfunction is suspected, immediately stop all pressure cleaning activity and relieve the pressure in the system before attempting any repair. Always follow manufacturer's repair instructions.

Never Pressure Clean When Stopped

Always make sure high pressure is disengaged before forward or reverse motion is stopped. Damage to surface could occur if pressure cleaning continues when the truck is brought to a stop.





WARNING



MOST HIGH PRESSURE WATER CLEANING OPERATIONS PRODUCE NOISE LEVELS THAT EXCEED 90 DB WHICH CAN CAUSE PERMANENT HEARING LOSS.

ALL OPERATORS AND SUPPORT PERSONNEL MUST WEAR EAR PROTECTION IN ACCORDANCE WITH OSHA STANDARDS AND PROVISIONS SHOULD BE MADE FOR REGULAR INSPECTION AND MAINTENANCE.

REMEMBER: HIGH PRESSURE CLEANING CAN CAUSE DEBRIS TO BE PROJECTED UNEXPECTEDLY IN AND AROUND THE WORK AREA THAT CAN CAUSE SEVERE INJURY. MAKE SURE ALL PERSONNEL STAY WELL CLEAR OF THE CLEANING AREA AND USE HARD HATS, EYE AND EAR PROTECTION.

1.3 Nozzle Safety

Check Flow Rating

Combined nozzle flow rate must be compatible with the pump discharge and pressure rating.

Check Pressure Rating

Use only nozzles with a manufacturer's pressure rating of at least the pump's operating pressure or a burst rating of no less than 7,250 psi (517 bar.)

Check Orifices

Prior to installation, make sure the spray bar has no clogged nozzles. Also, check to ensure nozzles are sharp and not excessively worn.

Check Connections

Be sure to never force a nozzle into the spray bar. Clean threads to ensure nozzle is not cross-threading. Use an ample amount of anti-seize on threads only, never on the seat of the nozzle. Inspect the seat area on nozzle to ensure a tight seal. If it is damaged, do not use.

Clogged Nozzles

If a nozzle appears clogged, immediately disengage pump. Remove any clogged nozzles and replace with new nozzles. Clogged nozzles can create excessive pressure in pump.

Remove Nozzle from Service if:

- A) Nozzle is split or damaged.
- B) Nozzle is clogged.
- C) Nozzle water spray is fanned out.
- D) Nozzle's ability to hold pressure is suspect.
- E) Nozzle's hex head is worn excessively.
- F) Nozzle threads are damaged.

1.4 Hose Safety

General

High Pressure water cleaning hoses are tough, but not invincible. They require proper care and handling to achieve the normal service life of 300 - 600 hours. If the hoses are abused, the service life will be much shorter.

Stretched or abused hose can fail prematurely and unexpectedly, which could cause injury to personnel. Hoses that have been exposed to excessive stretching or kinks should be removed from service and discarded.

Check Connections

Check the condition of the connection threads prior to connecting any fittings or hoses. Use an anti-seize compound on all fittings and hoses to prevent "galling," as galling will destroy the threads, fittings and/or hose ends.

Tighten Connections

Properly tighten all high pressure connections. Usually, snug plus a 15% tightening will properly seal connections.

Take Proper Care of Your Hose

- A) Protect the hose from contact with sharp objects, abrasive surfaces and foot or wheel traffic.
- B) Never subject high pressure hose to a tight radius (less than 30" (.8 m) or pull on a coiled hose. Always make sure the hoses are straight with no coils before pulling on the hose to deploy it.



- C) Never pull hard on a high pressure hose or expose the hose to heavy loads like dragging equipment or deploying long lengths of hose. This can stretch the hose and weaken it. Never pull more than 25 feet of hose by a coupler or fitting. Always move long lengths of hose by the hose itself to keep the strain off the fittings.

Check Burst Rating

Do not use a High pressure hose that does not have a listed burst rating or with a burst rating of less than 7,500 psi (517 bar.)

Retire Hose from Service if:

- A) Cover is damaged and reinforcing wires are exposed to rust and corrosion.
- B) Cover is loose and/or has blisters or bulges.
- C) Hose has been crushed or kinked.
- D) End fitting shows evidence of damage, slippage or leakage.
- E) Hose has been exposed to pressures of 2 times the operating pressure.
- F) Hose has been stressed or stretched.

Check Dump Water Hose

Any hose used for returning dumped or bypassed water back to the water tank must have a large enough diameter and psi strength so that potentially dangerous release pressure is allowed full flow and release pressure is contained safely. Keep hose in good condition.

1.5 High Pressure Fitting Safety Fitting Ratings

Use high pressure fittings with a rating of 7,500 psi (517 bar.)

Check Fittings

Do not use fittings that have been cross threaded or have damaged threads.

Fitting Connections

Use anti-seize compound on *all* hose and fitting connections to prevent galling. Do NOT apply anti-seize to the seating area of any connections.

1.6 Water Heater Hazard

When the heater is activated, high pressure water to the hog head and handheld wand is automatically preheated to approximately 150 to 180 degrees Fahrenheit by a fuel oil fired, instant water heater when high pressure is activated.

In some situations, heater components, metal manifolds, valves, handheld wand shaft and other high pressure water components could get hot enough to cause burns if these components are grabbed during operation.

The following precautions apply:

- All operators and assistants should be aware of the hazard and the proper procedures to avoid burns.
- Never touch high pressure pipes manifolds or valves during operation with your bare hands. Always wear gloves.
- When using the handheld wand, always wear gloves and be careful not to grab the wand with bare hands immediately after pressure washing operations stop.
- Never activate the pressure washer when low on water. Reduced water flow through the heater can result in superheated water that could damage the heater and high pressure water system components. It will also dramatically increase the potential for burns from grabbing excessively hot components.



WARNING



HIGH PRESSURE METAL PIPES, MANIFOLDS AND VALVES CAN BECOME EXTREMELY HOT AND CAUSE SEVERE BURNS IF THEY ARE GRABBED WITH BARE HANDS. ALL OPERATORS AND ASSISTANTS SHOULD BE AWARE OF THIS HAZARD. ALWAYS WEAR GLOVES AND NEVER REST YOUR HANDS ON VALVES, HIGH PRESSURE MANIFOLDS, METAL PIPES OR OTHER HOT COMPONENTS.





1.7 Hydraulic System Hazard

The hydraulic system operates at high pressure. Always use extreme caution when working around hydraulic systems. A high pressure fluid leak from a damaged hose or fitting can cause severe lacerations to a person's skin or inject hydraulic fluid into the blood stream, which can be fatal.

The following precautions apply:

- Hydraulic hoses and connections must be inspected frequently to ensure they are in good condition and that there are no signs of chaffing or deterioration.
- Make sure hoses are protected from contact with sharp objects or chaffing.
- Stretched or abused hose can fail prematurely and unexpectedly, which could cause injury to personnel. Hoses that have been exposed to excessive stretching, kinks or chaffing should be replaced.

- Always make sure all personnel maintain a safe distance from all hydraulic components and hoses whenever the system is in operation.
- Always depressurize the hydraulic system before removing any hydraulic components, hoses or fittings. Failure to do so could result in serious injury or death.

 WARNING 
INJURIES FROM HIGH PRESSURE HYDRAULIC SYSTEM COMPONENT FAILURES ARE VERY SERIOUS AND CAN RESULT IN SEVERE INJURY OR A FATALITY. ALWAYS MAKE SURE ALL PERSONNEL ARE A SAFE DISTANCE FROM HYDRAULIC SYSTEM COMPONENTS AND HOSES WHENEVER THE ROBOT IS OPERATING.





Typical Surface Hog

2.1 Surface Hog System Introduction

The Surface Hog high pressure water cleaning system is mounted to the truck chassis and powered by a hydraulic pump mounted to the onboard auxiliary engine. The cleaning system includes a high pressure water system, instant water heater, vacuum system, water tank, hydraulic system and a DC electrical system that is totally isolated from the truck electrical system. Most components are controlled by switches in a cab mounted control panel.

The operation and maintenance requirements for the truck engine, drive train and chassis components are unique to the manufacturer and the selected options. Each truck chassis manufacturer provides owners information manuals with their product. It is important that you read the manuals carefully and become familiar with the proper care and operation of engine, drive system, chassis, safety equipment and all components of your truck chassis.

The operation and maintenance requirements for the skid mounted engine are unique to the manufacturer. Each major component of the power unit provides an owners information manual with their product. It is important that you read the manuals carefully and become familiar with the proper care and operation of the engine and related components.

2.2 Skid Mounted Auxiliary Engine

The High Pressure pump, vacuum system, charge water pump and all other hydraulically powered systems are powered by two hydraulic pumps connected to the auxiliary engine. An electronic engine control panel provides complete control of the engine and monitors critical engine functions from the cab. It also provides warnings and/or automatic shutdown to prevent costly engine repairs in the event a critical engine function fails.



A skid mounted tank provides fuel for the auxiliary engine. The fuel system is completely isolated from the truck fuel system. A digital gauge in the engine control panel monitors fuel flow to the engine and total gallons consumed. The fuel tank is equipped with a fuel level gauge mounted in a panel near the high pressure pump. The fuel tank should be filled at the start of each shift.

The auxiliary engine DC electrical system is equipped with an onboard battery, circuit protection and charging system. It is totally isolated from the truck DC electrical system. Refer to the Electrical System section for additional information on the auxiliary engine and pressure cleaning electrical system.

Each hydraulic pump is directly driven by the auxiliary engine. A flexible coupler between the engine and pumps reduces vibration and the possibility of engine damage from a catastrophic pump failure. The hydraulic motors that power the high pressure pump, charge pump and vacuum blower are engaged by switches in the control panel once the auxiliary engine is running.

The engine should be started only when the unit is on the job site and ready to go to work. Always check the fluid levels and all systems before starting the engine.



Typical Skid Auxiliary Engine

2.3 Auxiliary Engine Throttle Control

The operator uses the hare/turtle throttle switch on the engine control panel to select the engine speed, either idle or operating RPM. Press the top (hare) of the throttle rocker switch to raise engine speed to operating RPM. Press the bottom (turtle) of the rocker switch to decrease engine speed to idle.

The engine remains at the selected engine speed until it is increased or decreased by the operator using throttle switch. Consequently, when the High Pressure switch is turned off, the engine RPM remains at the preset speed. This allows the high pressure pump to develop full pressure immediately when the High Pressure switch is turned on.

When cleaning operations are complete, press the bottom (turtle) of the switch to reduce engine speed to idle before shutting down the engine.



Auxiliary Engine Control Panel





Clean Water Tank

- | | |
|--------------------------------|-------------------------------|
| 1. Water Fill Tube | 4. Clean Water Tank |
| 2. Man-Way/Filter Access Hatch | 5. Water Tank Fill Connection |
| 3. Sight Tube | |

2.4 High Pressure Water System

Each manufacturer of the high pressure water system components provides an information and operating manual with its product. It is extremely important that you read the manuals and become familiar with the proper care and operation of the components before operating the pressure cleaning system.

Clean Water Tank

The forward tank on the truck chassis provides storage for the clean water supply. The tank is a modular design constructed of polyethylene material to provide a constant supply of clean, fresh water to the charge water pump. A site tube provides a quick view of the water level from outside the truck during filling operations.



WARNING



HIGH PRESSURE WATER FROM SPRAY JETS OR RUPTURED HOSES CAN CAUSE SEVERE INJURY OR EVEN DEATH. ALWAYS BE SURE WORK AREA IS CLEAR OF PEOPLE, HANDS, FEET, ETC., BEFORE ENGAGING THE HIGH PRESSURE SWITCH.

A bag type filter inside the freshwater tank cleans recycled wastewater pumped to the tank from the debris tank drain system during operation. Filtered wastewater mixes with clean water in the tank to increase cleaning time between tank refills. Refer to the Debris tank and Debris bag at the end of this section for additional information on the wastewater drain system.



Section 2 - Surface Hog Systems



The clean water fill connection on the driver side of the tank accommodates large hoses that are typically connected to a metered source like a fire hydrant to expedite the filling of the tank. Operators must always monitor the tank closely during filling operations as the flow of water from a hydrant may be greater than the flow capacity of tank air vent. Overfilling the tank will cause excessive pressure and damage the tank.

Only use potable water (clean enough to drink) to increase the service life of the components in the high pressure system. Always flush the water source for several minutes prior to filling the tank to help ensure that no debris enters the system. Additionally, the tank should be flushed frequently with clean, fresh water to prevent the accumulation of debris that may accidentally enter the tank or fine silt that can accumulate on the bottom of the tank from recycled wastewater.

There is a 3" ball valve on the passenger side bottom of the tank that allows for quick draining of the tank when flushing is required and complete draining for system winterization. A large man-way hatch on the top of the tank provides access to the wastewater filter bag and to the interior of the tank for inspection or facilitate cleaning when the filter bag is removed. Two other removable hatches provide additional access to each side of the tank to during routine cleaning and flushing operations.

Charge Water Pump

The charge water pump is a hydraulically powered centrifugal pump that provides a constant supply of water to the high pressure pump. A supply valve located between the water tank and the charge water pump controls the flow of water. Always make sure there is at least a half a tank of water and the supply valve is open prior to engaging the charge water pump. If the charge water pump is engaged while this valve is closed or there is no water in the clean water tank, you will not be able to achieve required pressure pump charge pressure and the charge pump impeller or high pressure pump will likely be damaged.

The charge water pump is activated by pressing the rocker switch labeled "CHARGE PUMP" on the switch panel in the cab of the truck. (Refer to Startup Procedure in the Operation section of this manual) Once activated, a green light will illuminate to confirm the charge water pump is engaged.



*Charge Pressure & High Pressure Gauges
Visible Through Cab Rear Window*

Two pressure gauges are visible through the cab rear window, The high pressure gauge is on the passenger side and the charge water pressure gauge is on the driver side. Always monitor the charge pressure gauge closely when engaging the charge water pump. Once engaged, the pressure should rise immediately above 10 psi (.7 BAR) and continue climbing to the normal operating pressure of approximately 60-70 psi (4 - 5 BAR). Water supply problems to the charge pump can be indicated by low water pressure or by the sound of the pump. Fluctuating pump RPM, inconsistent high pitch whines and fluctuating charge water pressure are indications of a water supply problem to the charge pump. If the pressure does not immediately rise and the pump is whining, immediately turn the charge pump off. Make sure the supply valve is open, check both filters and/or bleed the air from the system. Operators should be familiar with the normal sound of the pump and stop cleaning if the sound changes. Find and correct the problem before cleaning operations resume.

NOTICE:
THE HIGH PRESSURE PUMP CAN CAVITATE IF CHARGE WATER PRESSURE DROPS BELOW 25 PSI (1.7 BAR.) CAVITATION CAN CAUSE SEVERE DAMAGE TO THE PRESSURE PUMP AND SHOULD NEVER BE ALLOWED TO OCCUR. YOU SHOULD ALWAYS MONITOR CHARGE WATER PRESSURE AND NEVER OPERATE THE HIGH PRESSURE PUMP WHEN CHARGE WATER PRESSURE DROPS BELOW 30 PSI (2 BAR.)





Man-Way/Water Tank Filter Access Hatch



Clean Water Tank Bag Filter & Gage

NOTICE:
 THE HIGH PRESSURE SYSTEM IS EQUIPPED WITH A PRESSURE SAFETY SWITCH THAT WILL DEACTIVATE THE HIGH PRESSURE PUMP IF CHARGE WATER PRESSURE DROPS BELOW 30 PSI (2 BAR).

Water Tank Bag Filter

Recycled water is pumped from the debris tank, through two centrifuges, then to the filter below the man-way hatch on top of the clean water tank. The filter is a bag type filter that is attached to hooks at the top of a filter cage incorporated into the man-way hatch.

The filter traps large particles that could damage the charge water pump and is an important part of the recycled water system. The filter should be inspected daily and changed frequently.

Cartridge Filters

A two stage filter system in the supply line from the charge pump to the high pressure pump protects the high pressure pump and system from debris or contaminants in the water supply.

Both filters are 20 micron filters that trap particles large enough to damage the high pressure pump or clog nozzles. The filters are critical to the proper operation of the high pressure water system. They should be checked daily and changed when charge pressure drops to 35 psi (Refer to filter change procedure in the Maintenance section of this manual). Dirty charge water filters are the number one reason for low charge water pressure.



Cartridge Filters

Operating with dirty filters can cause:

- Unwanted particles forced through the filter resulting in premature failure of components.
- Cavitation in the high pressure pump which will result in damage to the pump.
- Clogged nozzles or shorter nozzle service life.

Remember that the filters can be under pressure. Always make sure the auxiliary engine and high pressure pump are shutdown, the CHARGE PUMP switch is OFF, and the pressure has been bled from the system before removing the filter caps.

Always thoroughly flush the filter canisters and charge water system when the filters are changed and before activating the high pressure system. Purge valves near the filters and on the low pressure (charge water) side of the high pressure pump can be opened to purge the system after a



filter change or to flush the charge water side of the pump if the system becomes contaminated.

CAUTION

LOW CHARGE WATER PRESSURE CAN QUICKLY DAMAGE THE HIGH PRESSURE PUMP. OPERATORS MUST MONITOR THE CHARGE WATER PRESSURE CLOSELY AND IMMEDIATELY SHUTDOWN THE HIGH PRESSURE AND CHARGE WATER PUMPS IF LOW CHARGE WATER PRESSURE IS INDICATED.

High Pressure Pump

The high pressure pump is a positive displacement pump that requires a constant water supply from the charge water pump at a minimum of 30 PSI (2 BAR) to operate properly and prevent cavitation. The operator must monitor charge water pressure closely during operation and immediately shut-down the cleaning system if charge water pressure drops below 30 psi (2 BAR) to prevent the charge water pump from running dry and protect the high pressure pump from damage due to overheating and cavitation.

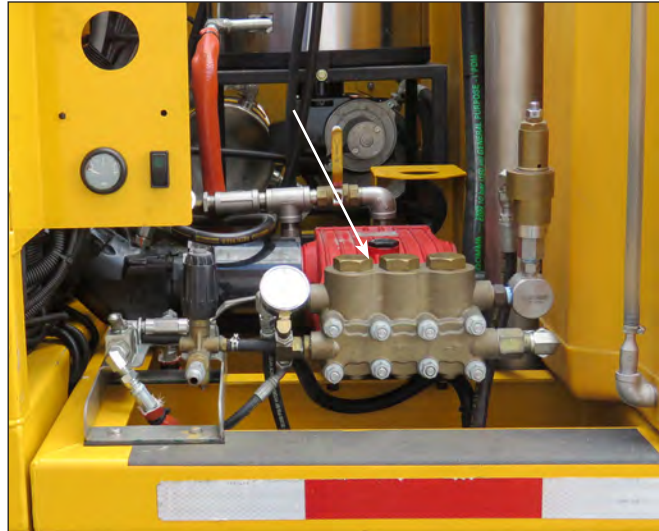
The high pressure pump is powered by the auxiliary engine and hydraulic system. The charge water system must be primed and activated before the high pressure pump is engaged to provide water and proper lubrication to the pump during operation. (Refer to the Startup Procedure in the operation section of this manual).

Maximum operating pressure for the high pressure pump is 7,500 psi (571 bar). Pressure is monitored by the passenger side high pressure gauge visible through the rear window of the truck.

CAUTION

WATER MUST BE IMMEDIATELY AVAILABLE TO THE CHARGE AND HIGH PRESSURE WATER PUMPS DURING OPERATION. BOTH PUMPS COULD BE DAMAGED IF THE CHARGE SYSTEM IS NOT PRIMED AND SUPPLYING WATER TO PUMPS WHEN THE HIGH PRESSURE SYSTEM IS ACTIVATED.

Maximum high pressure pump operating pressure, 6,000 to 7250 psi (413-500 BAR) @ 7-8 gallons (26.5-30.3 Liters) per minute is usually achieved at maximum engine operating RPM (Typically 2350 RPM). Engine operating speed is programed at the factory and selected by pressing the top (hare) of the throttle control switch.



High Pressure Pump

High pressure will increase or decrease with the RPM of the engine. Since engine RPM also controls the level of vacuum, it is important for the engine to be running at maximum operating RPM during operation. This provides the engine speed required to develop proper water pressure for cleaning and vacuum for the debris recovery.

Hog Head ON/OFF Valve

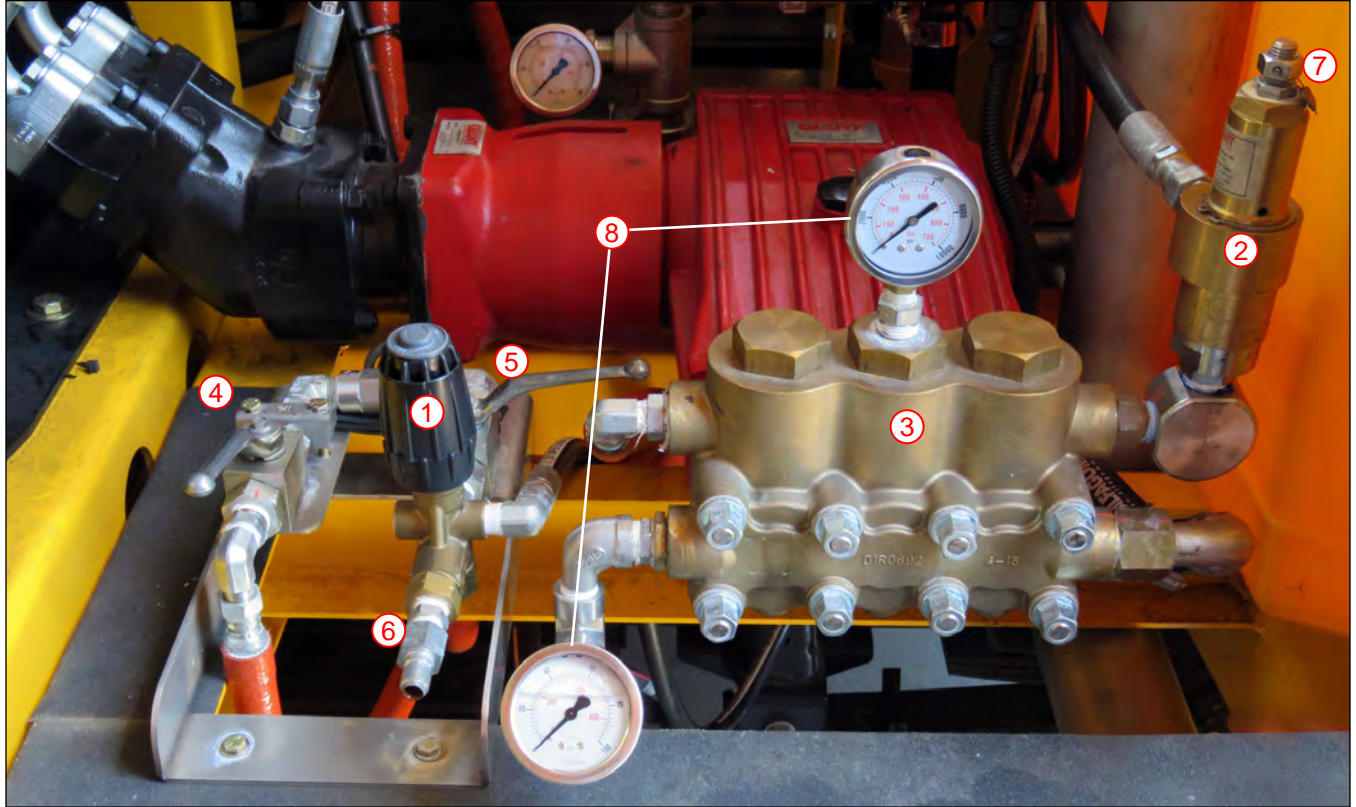
A hydraulically activated ON/OFF valve is located in the pressure line between the high pressure pump manifold and the Hog Head. The valve is controlled by the HIGH PRESSURE switch in the cab switch panel. When activated, the valve opens and high pressure water is sent to the spray bar nozzles. When deactivated, the valve closes and water flow to the spray bar stops. An unloader valve on the high pressure pump manifold automatically opens to divert high pressure water flow to the clean water tank to prevent damage to the system when the Hog Head valve is turned off.

High Pressure Unloader Valve

The unloader valve is located on the high pressure pump manifold. The valve setting can be opened or closed to increase or decrease water volume and pressure to the spray bar. Once high pressure is set, a locknut is tightened to secure valve in the desired position. Typically, the valve is preset at the factory and does not require adjustment except to reduce pressure for special cleaning situations.

The unloader valve assembly consists of a threaded shaft, adjustment nut, locknut, bypass valve





High Pressure System & Unloader Valves

- | | |
|----------------------------------|--|
| 1. Handheld Wand Unloader Valve | 5. Handheld Wand Manual ON/OFF Valve |
| 2. High Pressure Unloader Valve | 6. Handheld Wand Hose Quick Connector |
| 3. High Pressure Pump Manifold | 7. High Pressure Unloader Valve Adjustment & Lock Nuts |
| 4. Spray Bar Manual ON/OFF Valve | 8. Charge Pressure & High Pressure Gauges |

cartridge and a bypass hose to the clean water tank. When setting high pressure, turning the adjustment nut clockwise will decrease the flow of water through the bypass system, increasing water volume and pressure to the spray bar. Turning the adjustment nut counterclockwise will divert more high pressure water flow through the bypass system to water tank, reducing water volume and pressure to the spray bar.

The unloader valve is also a safety pressure relief valve. Maximum system pressure is permanently set to 7500 psi (517 BAR). Safety relief pressure is built into the valve and is not changed when spray bar supply pressure is adjusted.

When setting initial cleaning pressure, always open the valve completely, set the engine to maximum operating RPM. Turn on the HIGH PRESSURE switch and Hog Head valve, then slowly close the unloader valve while monitoring the high pres-

sure gauge until the desired operating pressure is achieved. Lock the valve in position by tightening the locknut and set screw in the locknut. Note that the unloader valve continuously recirculates a small volume of water back to the clean water tank during operation.

Handheld Wand Unloader Valve

Another adjustable unloader valve is located in the high pressure line to the handheld wand connection. The valve setting can be opened or closed to increase or decrease water volume and pressure to the wand.

The bypass valve assembly consists of an adjustment hand knob, bypass valve cartridge and a bypass hose to the clean water tank. When setting high pressure, turning the adjustment knob on the valve clockwise will decrease the flow of water through the bypass hose, increasing water volume and pressure to the wand. Turning the adjustment



Section 2 - Surface Hog Systems



knob counterclockwise will divert more of the high pressure water flow through the bypass hose, reducing water volume and pressure to the wand.

The unloader valve is also a safety pressure relief valve. Maximum handheld wand system pressure is permanently set to 4500 psi (310 BAR). Safety relief pressure is built into the valve and is not changed when wand supply pressure is adjusted.

When setting initial wand pressure, make sure the wand hose is connected to the quick connect fitting near the pump. Have another person hold the wand, making sure it is pointed in a safe direction away from all people and equipment. Close the manual selector valve for the spray bar pressure hose and open the valve for the wand. Open the unloader valve completely and pull the trigger on the wand. Make sure the High Pressure switch is off, then set the engine to maximum operating RPM. With water flowing through the wand nozzle, slowly close the valve while monitoring the wand high pressure gauge until the desired cleaning pressure is achieved. The unloader valve continuously recirculates a small volume of water back to the clean water tank during operation.

Once the desired pressure is set, high pressure to the wand is turned on or off using the trigger on the wand handle.

Water Heater

The high pressure water system is equipped with an "on demand" water heating system that provides a consistent flow of hot water to the high pressure system to improve cleaning performance. When activated by the WATER HEATER switch in the cab switch panel, the water heater will automatically engage when the HIGH PRESSURE switch in the control panel is turned ON and a pressure sensitive switch senses high pressure water flow to the hog head or wand. Pressurized hot water will then be delivered to the Hog Head or hand held wand.

When the WATER HEATER switch is OFF, the water heater system is disabled and only cool water will be delivered to the Hog Head spray bar or hand wand when the HIGH PRESSURE switch is turned ON.



On Demand Water Heater



Water Heater Fuel Oil Burner & Fuel Filter





Control Switch Panel Showing High Pressure & Water Heater Switch Locations

Water is heated by a 12 volt, fuel oil burner that is supplied diesel fuel from the auxiliary engine fuel tank and 12 volt electrical power from the auxiliary engine battery. Water temperature is preset at the factory to maintain 150 to 180 degrees Fahrenheit (66 to 82 degrees Celsius.) Exhaust from the burner exits the water heater through an exhaust pipe at the top of the tank.



Water Heater Switch In Cab Switch Panel

NOTICE:
 BYPASS WATER IS RETURNED TO THE CLEAN WATER TANK DURING OPERATIONS. CONSEQUENTLY, WATER TEMPERATURE AT THE SPRAY BAR OR HANDHELD WAND WILL INCREASE DURING OPERATION.

The 12 volt oil burner is totally self contained and includes a fuel pump, blower and oil igniter. An in-line filter provides clean fuel to the burner and an in-line fuse at the water system battery protects the system from an overload.

Refer to the oil burner manual for additional information on the operation and maintenance of the burner system.



WARNING



WHEN THE HEATER IS ACTIVATED, HIGH PRESSURE METAL PIPES, MANIFOLDS AND VALVES CAN BECOME EXTREMELY HOT AND CAUSE SEVERE BURNS IF THEY ARE GRABBED WITH BARE HANDS. ALL OPERATORS AND ASSISTANTS SHOULD BE AWARE OF THIS HAZARD. ALWAYS WEAR GLOVES AND NEVER REST YOUR HANDS ON VALVES, HIGH PRESSURE MANIFOLDS, METAL PIPES OR OTHER HOT COMPONENTS.





Hog Arm & Hog head

2.5 Hog Arm & Hog Head Overview

The Hog Head and Hog Arm are mounted to the front of the chassis. The hydraulic system provides the power for all functions of the Hog Arm and the hydraulic motor that rotates the spray bar on the Hog Head.

The Hog Head is a single cleaning head design mounted on the Hog Arm. The high pressure pump provides high pressure water to the spray bar and the Hog Fan provides the vacuum to carry dirty water and debris to the debris tank.

The hydraulic system is powered by the auxiliary engine. Switches in the cab control panel control all hydraulic functions of the Hog Arm and Hog Head. The Hog Head can be moved up and down, right and left or can be set to float, which allows the Hog Head to freely move up and down with the contour of uneven surfaces.

The auxiliary engine must be running before the hydraulic system or any other component of the cleaning system will operate. Refer to the Startup procedure in the Operation section of this manual.

Hog Arm

The truck is equipped with 3-axis Hog Arm. Switches in the cab control panel move the arm up and down or right and left.

The arm can also be set to float. Float mode is activated by pressing the FLOAT switch in the control panel and should always be used whenever cleaning operations are underway. Float mode releases all up and down hydraulic pressure from the arm allowing the Hog Head and Arm to move freely up or down with the contour of uneven surfaces, preventing damage to the head and arm during cleaning operations. The Hog Arm can be moved from left to right but cannot be raised up or down while in float mode.





Cab Control Switch Panel

- | | |
|----------------------------------|-------------------------|
| 1. Hog Head High Pressure ON/OFF | 4. Hog Arm FLOAT |
| 2. Hog Arm UP/DOWN | 5. Head Rotation ON/OFF |
| 3. Hog Arm RIGHT/LEFT | |

⚠ WARNING ⚠

ACTIVATING FLOAT MODE WHEN THE HOG HEAD IS OFF THE GROUND OR WITH ARM IN THE UPRIGHT POSITION WILL RELEASE HYDRAULIC PRESSURE AND CAUSE THE ARM AND HOG HEAD TO DROP SUDDENLY WHICH WILL RESULT IN MAJOR DAMAGE TO COMPONENTS AND COULD CAUSE SEVERE INJURY TO PERSONNEL.

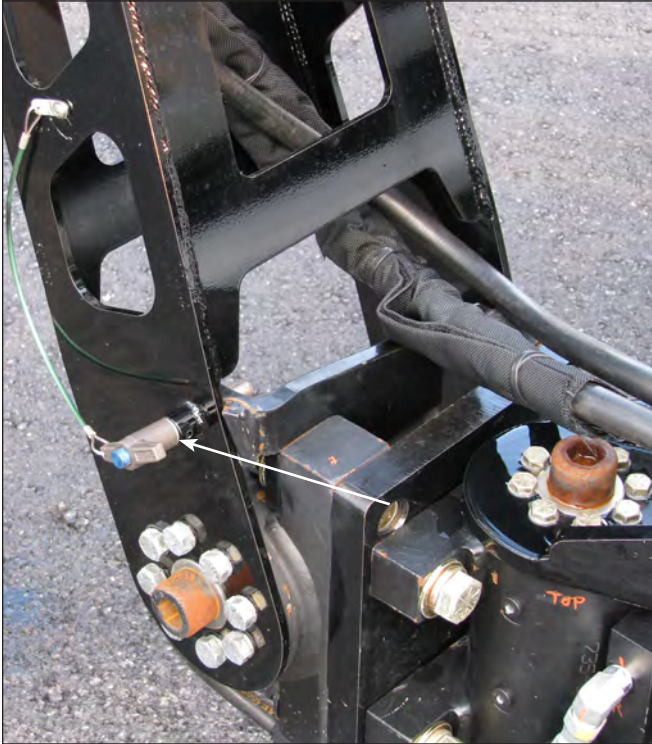
ALWAYS MAKE SURE THE ARM AND HOG HEAD ARE IN THE FULL DOWN POSITION WITH THE CASTOR WHEELS FIRMLY ON THE GROUND BEFORE ENGAGING FLOAT MODE.

When the Arm is raised to the full up position, the arm safety lock pin should be inserted to secure the arm in the up position for transit. The T-handle lock pin is a safety feature that prevents the Hog Arm from being lowered accidentally or drifting down while the vehicle is operating in transport mode.



Hog Arm & Head In Up Position





Hog Arm T-Handle Safety Pin - Hog Arm Secured In The Up Position For Transport



Hog Arm T-Handle Safety Pin Released & Seated In Detent Hog Arm Released & Can Be Lowered For Operation

The operator must remove the lock pin before the Hog Arm can be lowered. To release the pin, make sure the truck is stopped with the parking brake set. Raise the arm slightly to remove the load from the pin, then press the release button and pull the pin out of the arm. Once the pin is clear of the arm, release the button and slide the pin slightly until it seats in the release detent. The detent holds the pin away from the arm and prevents the pin from dangling on the lanyard and interfering with hog arm movement during operations.

To engage the lock pin, raise the Hog Arm until the hole in the arm aligns with the pin. Press the T-handle button and insert the pin. Release the button to lock the pin.

NOTICE:
TO RELEASE THE LOCK, THE HYDRAULIC SYSTEM WILL HAVE TO BE ENGAGED AND THE HOG ARM RAISED SLIGHTLY TO RELIEVE THE STRAIN ON THE PIN.



Hog Head

The Hog Head assembly is a single cleaning head design mounted to a gimbal hinge on the end of the Hog Arm. The gimbal allows the head to rotate back and forth or left and right to follow the contour of the surface.

The head is supported by an integrated chassis with four heavy duty castor wheels that support the head at a preset height to prevent the spray bar from contacting the pavement. A check valve in the top of the cleaning head shroud opens to prevent excess vacuum from developing inside the shroud that could damage components and restrict air flow.

A wear brush clamped to the shroud provides a partial seal between the head shroud assembly and pavement. The wear brush helps regulate vacuum air flow into the shroud and reduces the amount of debris and water exiting the head during cleaning operations.

NOTICE:
ALWAYS MAKE SURE TO CHECK THE HOG HEAD FOR SMOOTH AND PROPER OPERATION BEFORE EACH SHIFT. DO NOT USE EQUIPMENT THAT HAS NOT BEEN CHECKED THOROUGHLY.



Hog Head & Spray Bar



Hog Head Caster Wheels & Wear Brush



Hog Head Vacuum Check Valve



Section 2 - Surface Hog Systems



The spray bar is rotated by a swivel shaft connected to a hydraulic motor. The center of the rotating shaft is drilled to allow high pressure water to pass through the shaft to the spray bar. Spray bar rotation speed is preset at the factory and turned on and off with the Head Rotation switch on the control panel .

The cleaning head is equipped with four adjustable heavy duty castors wheels that support the Hog Head and prevent the spray bar and shroud from touching the surface. The castor wheel mount assemblies are threaded to provide spray bar/cleaning head height adjustment. T-handle adjustment rods attached to each castor wheel assembly are used to rotate each threaded shaft to move the wheels up or down. Locknuts on each shaft are tightened to secure the wheels at the desired height.

Cleaning head height adjustment should be checked before each shift and the wheel castors should be inspected for damage and excessive wear daily. The castors and wheels should be greased daily for maximum life expectancy.

Refer to the Operation and Maintenance sections of this manual for additional information on the operation and maintenance of the castor wheels and Hog Head assemblies.

NOTICE:
FOR MAXIMUM PRODUCTION, STANDOFF DISTANCE SHOULD NEVER BE MORE THAN ONE (1) INCH.

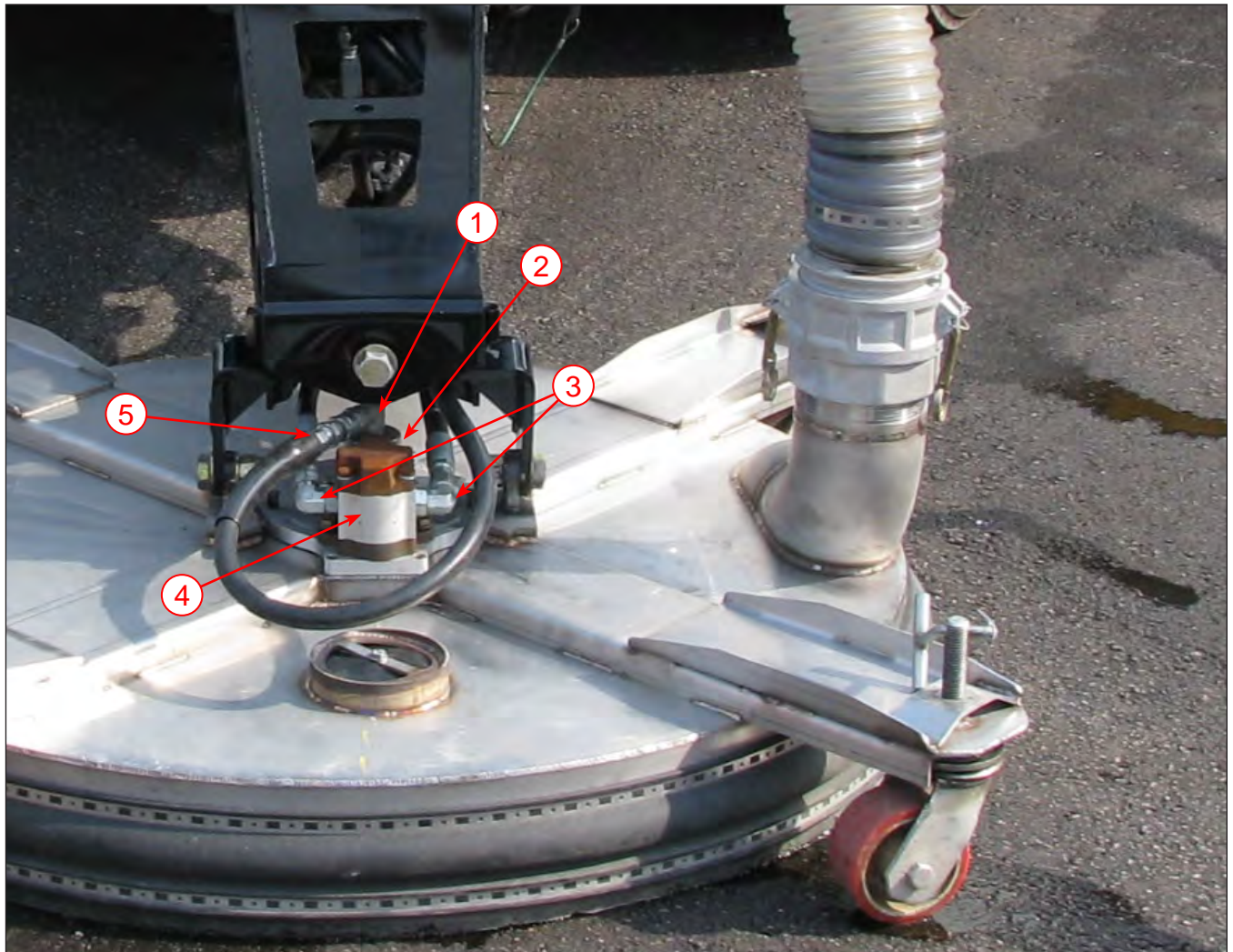


Spray Head Rotation Hydraulic Motor



Caster Wheel Threaded Shafts & Adjustment Handles





Swivel Shaft & Drive Motor

- | | |
|--------------------|-----------------------------|
| 1. Swivel Nut | 4. Hydraulic Motor |
| 2. Swivel Shaft | 5. High Pressure Water Hose |
| 3. Hydraulic Hoses | |

2.6 Thru-shaft, Spray Bar, Protectors & Nozzles

Thru-shaft Motor

A hydraulic motor attached to a belt driven swivel shaft rotates the spray bar on the cleaning head assembly. The center of the rotating shaft is drilled to allow high pressure water to pass through the shaft to the spray bar. The hose is secured to the rotating shaft housing by the swivel nut. ***The swivel nut is hand tightened only.***

The RPM of the thru-shaft motor is preset at the factory and turned on and off with the HEAD ROTATION switch in the control console.



CAUTION



THE THRU-SHAFT MOTOR BEARINGS MUST BE LUBRICATED DAILY WITH THE GREASE SPECIFIED IN THE MAINTENANCE MATRIX. FAILURE TO LUBRICATE THE BEARINGS DAILY OR USING GREASE OTHER THAN THE GREASE SPECIFIED BY HOG TECHNOLOGIES WILL VOID THE WARRANTY.



Spray Bar And Protectors

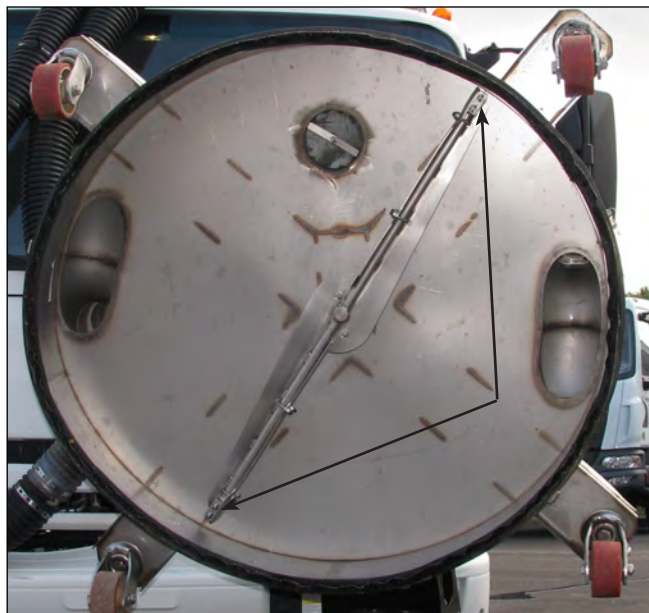
The spray bar is a quick change design that is attached to the threaded thru-shaft. Spray bars are constructed of high quality stainless steel with provision for up to four nozzles.

Each spray bar is equipped with protectors that are held in place with four U-bolts. The protectors shield the nozzles and spray bar from damage caused by debris during cleaning operations. Never perform high pressure cleaning operations without the spray bar protectors installed as this will dramatically shorten the life of the nozzles and spray bar.

Nozzles

High pressure is produced by restricting the flow of water at the nozzles on the spray bar. The nozzles are set at a 15° angle to improve performance.

Nozzles should be inspected before the start of each shift as part of the pre-operation check or when the operator notices a loss in pressure or a change in performance while cleaning. If visual inspection of the nozzle spray pattern indicates that the pattern is not in the acceptable range, the nozzle must be replaced.



Typical Spray Bar, Nozzles & Protectors

NOTICE

BEFORE ATTACHING A NEW SPRAY BAR TO THE HOG HEAD ASSEMBLY, ENGAGE PUMP AT LOW PRESSURE TO PURGE THE SYSTEM. ANY DIRT OR DEBRIS IN THE SYSTEM CAN CLOG NOZZLE ORIFICES AND CAUSE SYSTEM PRESSURE TO SPIKE EXCESSIVELY CAUSING DAMAGE TO COMPONENTS OR ACTIVATION OF THE SAFETY RELIEF VALVE.

Testing and inspecting nozzles:

To inspect and test the nozzles, raise the arm to the horizontal position and set the parking brake. Inspect the spray bar protector. Make sure it is not loose or bent and disrupting the spray pattern. Straighten or adjust protector if necessary.

Once spray bar protector condition is verified and all personnel are well clear of the Hog Head, activate the high pressure system and set the operating pressure. Make sure the Head Rotation switch is off so the spray bar does not rotate. Staying well clear of the water jets, no closer than 18", visually inspect the spray pattern of each nozzle. If the spray is tight with a cohesive stream for 1/2 - 1 1/2 inches from the nozzle, it is good.



DANGER



THE HIGH PRESSURE STREAM FROM THE NOZZLES CAN CAUSE SEVERE INJURY OR DEATH IF IT COMES IN CONTACT WITH HANDS, FEET OR ANY PART OF A PERSON'S BODY. IT CAN ALSO PROJECT LOOSE DEBRIS IN THE AREA OF THE HOG HEAD WITH ENOUGH FORCE TO CAUSE SERIOUS INJURY, PARTICULARLY TO THE EYES. HIGH PRESSURE WATER CAN TEAR OFF SKIN AND INJECT WATER DIRECTLY INTO THE BLOOD STREAM WHICH CAN BE FATAL. ALWAYS DEACTIVATE THE HIGH PRESSURE SYSTEM BEFORE RAISING THE HOG HEAD. MAKE SURE THE AREA IS CLEAR OF PEOPLE, HANDS AND FEET BEFORE ENGAGING THE HIGH PRESSURE SWITCH TO ACTIVATE THE HIGH PRESSURE SYSTEM TO TEST AND INSPECT THE NOZZLES WITH THE HOG HEAD RAISED.

Nozzle life will vary, depending on the type of cleaning performed and other factors. If a nozzle does not meet the specifications described previously, it is bad and must be replaced. Refer to the nozzle replacement procedure in the Maintenance section of this manual for detailed instructions for replacing nozzles.





Hog Head Shroud, Caster Wheels & Wear Brush



Wear Brush & adjustment Clamps

NOTICE:

NOZZLE SPRAY PATTERNS MUST ALWAYS BE CHECKED WITH THE SPRAY BAR PROTECTORS IN GOOD CONDITION AND PROPERLY ADJUSTED TO AVOID INACCURATE READINGS. TURN OFF THE HIGH PRESSURE SWITCH AND SHUTDOWN THE AUXILIARY ENGINE TO RELIEVE ALL WATER AND HYDRAULIC PRESSURE BEFORE MAKING ANY REQUIRED REPAIRS OR ADJUSTMENTS. TO INCREASE THE LIFE EXPECTANCY OF THE SPRAY BARS AND NOZZLES, ALWAYS REMEMBER TO INSTALL THE SPRAY BAR PROTECTORS BEFORE BEGINNING CLEANING OPERATIONS.

A nozzle should be removed from service if any of the following are indicated:

- Nozzle is split or damaged
- Nozzle is clogged
- Nozzle water spray is fanned out at the nozzle
- Nozzle's ability to hold pressure is suspect
- Nozzle's hex head is worn excessively
- Nozzle threads are damaged

When replacing nozzles make sure to check the flow and pressure rating. Use only nozzles with a manufacturer's pressure rating of at least the high pressure pump's maximum operating pressure. We recommend that you only use nozzles, high pressure hoses and fittings supplied by Hog

Technologies to ensure the nozzles and other components are compatible with your high pressure water cleaning system.

Shroud

The shroud is the heavy duty stainless steel housing attached to the Hog Arm gimbal that encases the spray bar, keeping water and debris contained for optimal vacuum extraction. Two vacuum hoses are connected to fittings on each side of the shroud by cam lock connectors.

The shroud is equipped with a vacuum relief valve that improves air flow to the debris tank and prevents excessive vacuum in the shroud. Always inspect the relief valve at the start of each shift to make sure it is in good condition and operating properly. A damaged or worn valve will allow excess air into the shroud, which will reduce shroud vacuum and cause the flow of debris to the debris tank to stop.

Wear Brush

The wear brush clamped to the bottom of the shroud provides a partial seal between the shroud and pavement. The wear brush helps regulate vacuum air flow into the shroud and reduces the amount of debris and water exiting the Hog Head during cleaning operations. The wear brush is an important safety feature of the cleaning head system. It must be adjusted as it wears and re-



Section 2 - Surface Hog Systems



placed as necessary. The brush assembly should be adjusted so the brushes are always making light contact with the pavement.

To adjust the wear brush, lower the Hog Head to the ground and note the gap between the wear brush and the pavement. Loosen the brush clamps

on the shroud, then slide the wear brush enough to eliminate the gap. Tighten the clamps and re-check. Readjust if necessary.

Refer to the Maintenance section of this manual for additional information on adjusting and replacing the wear brush.





High Pressure Hose At Hog Head

2.7 High Pressure Hoses, Connections & Fittings

High pressure hoses are tough but not invincible. They require proper care and handling to achieve maximum life expectancy. Only use high pressure hoses with an operating pressure rating of 7,250 psi (500 bar) and a listed burst rating of 11,500 psi (793 BAR). The primary high pressure hose transfers the water from the high pressure pump to the Hog Head swivel shaft. The hose is secured to the thru-shaft with the swivel nut.

All high pressure hoses, fittings and connections have weep holes. Water leaking from a weep hole while the system is pressurized indicates that there is a worn or defective seal, loose connection or a damaged part. It is critical that the operator and/or maintenance personnel inspect the high pressure hoses, hose connections and fittings prior to the start of each shift, periodically throughout the shift and anytime there is a loss in pressure. Any hose, fitting or component that shows signs of deterioration, wear or leakage should be replaced immediately and before operating any high pressure equipment. A more thorough inspection of all

high pressure pumps and components should be conducted at each routine service interval.

Take proper care of your hoses:

- A) Protect high pressure hoses from contact with sharp objects, abrasive surfaces, foot and/or wheel traffic.
- B) Never subject a high pressure hose to a coil diameter less than 10" (.25 m) or pull on a coiled hose. Always make sure the hose is straight with no coils before pulling on the hose to deploy it.
- C) Never pull hard on a high pressure hose or expose the hose to heavy loads like dragging equipment or deploying long lengths of hose. Never pull more than 25 feet of hose by a coupler or fitting. Always move long lengths of hose by the hose itself to keep the strain off the fittings.





WARNING



HIGH PRESSURE HOSES OF INFERIOR QUALITY OR OF A LOWER PRESSURE RATING THAN SPECIFIED BY HOG TECHNOLOGIES CAN RESULT IN DAMAGE TO EQUIPMENT AND/OR SEVERE INJURY TO PERSONNEL. NEVER USE REPLACEMENT HOSES WITH UNKNOWN PRESSURE RATINGS OR RATED LESS THAN REQUIRED SPECIFICATIONS.

WHEN REPLACING DAMAGED OR WORN HOSES YOU SHOULD ONLY USE HIGH PRESSURE HOSES PURCHASED FROM HOG TECHNOLOGIES WITH AN OPERATING PRESSURE RATING OF AT LEAST 11,500 PSI (793 BAR.) YOU SHOULD ALWAYS KEEP SPARES ON THE TRUCK AS SUGGESTED IN THE SPARE PARTS SYSTEM.

Retire hose from service if:

- A) Cover is damaged and reinforcing wires are exposed to rust and corrosion.
- B) End fitting shows evidence of damage or is leaking.
- C) Hose has been kinked or subjected to a radius tighter than its minimum bend radius.
- D) Hose has been crushed or stretched.

When replacing or connecting fittings or hoses, always inspect the threads and use an anti-seize compound on all threads to prevent "galling." (Refer to the High Pressure Hose Installation procedure in the Maintenance section of this manual).

Galling is the term for thread damage that occurs from heat buildup in the threads of stainless steel fittings. This will destroy the threads and cold weld the fittings together before they are tight.

To prevent system contamination, do not get anti-seize on the seat area of any high pressure water fitting. Always inspect and test the system with the Hog Head up following repairs or at the start of each shift by operating the system at low pressure. Then slowly bring the equipment up to operating pressure while carefully monitoring the replaced components for any leaks. If a leak is detected, shutdown the high pressure system, tighten the fitting or hose and then test it again until no leaks are detected.



WARNING



HIGH PRESSURE WATER FROM NOZZLES OR RUPTURED HOSES CAN CAUSE SEVERE INJURY. ALWAYS MAKE SURE TO CHECK YOUR WORK AREA TO ENSURE IT IS CLEAR OF PEOPLE BEFORE STARTING THE AUXILIARY ENGINE AND ACTIVATING THE HIGH PRESSURE SYSTEM.



WARNING



REFER TO THE GENERAL SAFETY SECTION OF THIS MANUAL FOR A LIST OF PRECAUTIONS TO BE OBSERVED WHEN OPERATING OR SERVICING HIGH PRESSURE EQUIPMENT. USE ONLY THOROUGHLY TRAINED PERSONNEL TO PERFORM MAINTENANCE OR REPAIRS.





Debris Recovery System

Note: The debris tank on your truck may be slightly different

- | | |
|--------------------------|---|
| 1. Debris Tank & Doors | 6. Clean Water Tank |
| 2. Blower | 7. Centrifuges |
| 3. Secondary Vacuum Hose | 8. Debris Tank Sump Gravity Drain Valve |
| 4. Primary Vacuum Hoses | 9. Dirty Water Pump Strainer |
| 5. Hog Head Check Valve | 10. Dirty Water Pump |

2.8 Debris Recovery System Overview

The debris recovery system consists of a high performance blower, vacuum hoses and a debris tank. The system is powered by the auxiliary engine and hydraulic system. The blower creates vacuum in the Hog Head and sends recovered debris to the debris tank.

Flexible hoses with quick disconnect fittings connect the blower to the Hog Head shroud. Another flexible hose and tubing connect the blower to the debris tank.

Maximum vacuum blower RPM is preset at the factory and is monitored by a digital gauge in the control panel. A relief valve on the shroud automatically opens during operation to regulate air flow. It also prevents excessive vacuum in the system. Always check the valve and all vacuum hose connections at the start of each shift to ensure the valve is operating properly and there are no vacuum leaks in the system.

Vacuum Blower

The vacuum blower is mounted above the charge pump filters and driven by the hydraulic system. Auxiliary engine speed must be set near maximum operating RPM to provide proper system vacuum.



Vacuum Blower

The vacuum blower creates negative pressure in the Hog Head shroud, pulling air past the wear brush into the shroud, then transporting air, water and debris from the shroud, through the blower and vacuum hoses to the debris tank. A 100 micron bag filter in the debris tank separates solid debris from the waste water. A pump controlled by a manual and/or automatic switch moves the filtered wastewater from the debris tank, through



Section 2 - Surface Hog Systems



two debris separating centrifuges, then to the bag filter in the clean water tank.

Consistent and proper airflow is critical to maintaining optimum debris recovery. Vacuum of -3 to -5 (Hg) is typically achieved at or near Maximum engine operating RPM.

The centrifugal blower impeller is equipped with replaceable vanes. Bolts on the blower housing are removed to separate the blower housing to clean components or replace the vanes when necessary.

Refer to the Operation and Maintenance sections for additional information on the operation and maintenance of the blower.

Vacuum Hoses

Flexible hoses provide airflow for the debris recovery system. The primary vacuum hoses run from the intake manifold on the blower to the Hog Head shroud. A secondary vacuum hose runs from the outlet port of the blower to the debris tank tube on the tank.

The primary hoses are equipped with quick release, cam-lock fittings at the Hog Head shroud and slip-on fittings with hose clamps at the blower intake manifold. The secondary vacuum hose is equipped with a cam-lock fitting at the blower and a slip-on fitting with a hose clamp at the tank fitting. These fittings allow quick hose replacement or service.

Debris buildup in the hoses, kinked or clogged hoses and vacuum leaks will cause a reduction in airflow at the Hog Head, reducing efficiency or causing operations to stop completely.

Debris buildup inside the hoses can be removed by periodically tapping the outside walls with a dead blow hammer while the system is operating at maximum vacuum. This will flex the hose walls and cause the debris to break off and be moved to the debris tank. Avoiding tight bends and maximizing the radius of vacuum hoses will maximize air flow, reduce abrasion and the possibility for kinks during operation.

The internal walls of vacuum hoses develop wear points caused from the high velocity of abrasive debris traveling inside the hoses. Wear points are most prevalent in the outside radius of bends near the Hog Head and where the hose rises above the



Debris Tank & Filter Bag

cab. The life of the hoses in these areas can be extended by periodically rotating the hoses 120°.

Vacuum hoses should be inspected daily and replaced as needed. Refer to the vacuum hose replacement procedure in Maintenance section for instructions on replacing vacuum hoses.

NOTICE:
DAMAGED VACUUM HOSES CAN BE REPAIRED USING DUCT TAPE AS A TEMPORARY SOLUTION TO EXTEND THE LIFE OF THE VACUUM HOSE.

Debris Tank

There are two tanks built into the rear of the unit. The forward tank is the clean water tank and the rear tank is the debris tank. The debris tank is constructed from stainless steel panels. The debris tank doors have a manual cam-lock latch system.

A special filter bag (debris bag) is mounted on retaining pins near the top the stainless steel liner inside the debris tank. The vacuum system transports debris mixed with water from the Hog Head directly into the debris bag where solid debris and particles over 100 microns are trapped. Filtered water exits the filter bag and flows by gravity into the debris tank sump where it accumulates until it is drained by the dirty water pump out system.

Filter Bag

The filter bag is biodegradable and designed to slide out of the tank with solid debris when replaced. When installing a new bag, make sure to attach the loops at the top of the filter bag on the rear, horizontal side of the hooks in the tank. Do not wrap the loops around vertical section of



the hooks. The hooks and loops hold the bag in position during operation and are designed to release the bag and allow it to slide out with the debris when removed. The bag will not stay in the proper position during operation and may not release properly during dumping if it is not installed properly.

Dirty Water Drain/Recycle System

The operator can choose to drain wastewater directly to the ground by opening ball valve on the sump or recycle the water to the clean water tank by activating the dirty water pump system.

Dirty Water Transfer Pump

The dirty water pump circuit is activated when the POWER switch in the cab control panel is on. The pump will transfer wastewater from the debris tank sump, through two debris separating centrifuges, then to the filter bag in the clean water tank. The system effectively recycles wastewater to extend operation time between clean water tank refills.

When the pump is activated, an automatic float switch controls the water level in the debris tank sump by activating the pump and moving wastewater from the sump to the clean water tank. The automatic float switch is mounted on the side of the sump. When wastewater in the sump reaches a predetermined level, the float switch will activate the pump. The float will drop when the water level is lowered and automatically turn off the pump.

The dirty water pump is a heavy duty, centrifugal pump. It is protected from large debris that could damage the pump by an in-line strainer located below the debris tank sump. The strainer canister is equipped with a ball valve for back flushing and/or draining the canister. The screen should be removed and cleaned periodically or if it becomes clogged. Always make sure the POWER switch is off when cleaning or back flushing the strainer. Refer to the General Maintenance section of this manual for instructions on cleaning or back flushing the strainer.

The sump water level and pump out system must be monitored periodically during operation and cleaned as necessary.



Dirty Water Pump



Dirty Water Pump Strainer & Drain Valve



Typical Automatic Float Switch In Sump





Gravity Drain Valve



Dirty Water Centrifuges

Dirty Water Centrifuges

There are two debris separating centrifuges in the pressure hose from the dirty water pump to the clean water tank. Pressurized water from the pump causes the impeller in each centrifuge to spin at high RPM which separates debris in wastewater that has passed through the debris tank filter and the pump intake strainer. Drain fittings at the bottom of each centrifuge return separated debris to the debris tank. Cleaned wastewater continues to the final bag filter in the clean water tank to complete the recycle process.

Gravity Wastewater Drain

Wastewater can also be drained by gravity from the sump directly to the ground by opening the drain valve located on bottom of the sump.

Filtered wastewater is usually clean enough to dump in swales alongside the road, vacant fields and designated areas at airports. It should never be dumped directly into lakes and ponds or any standing water. Always check with the authorities to ensure you are dumping within local guidelines. The drain system must be monitored periodically during operation and cleaned as necessary.

Dumping Debris And Replacing Filter Bag

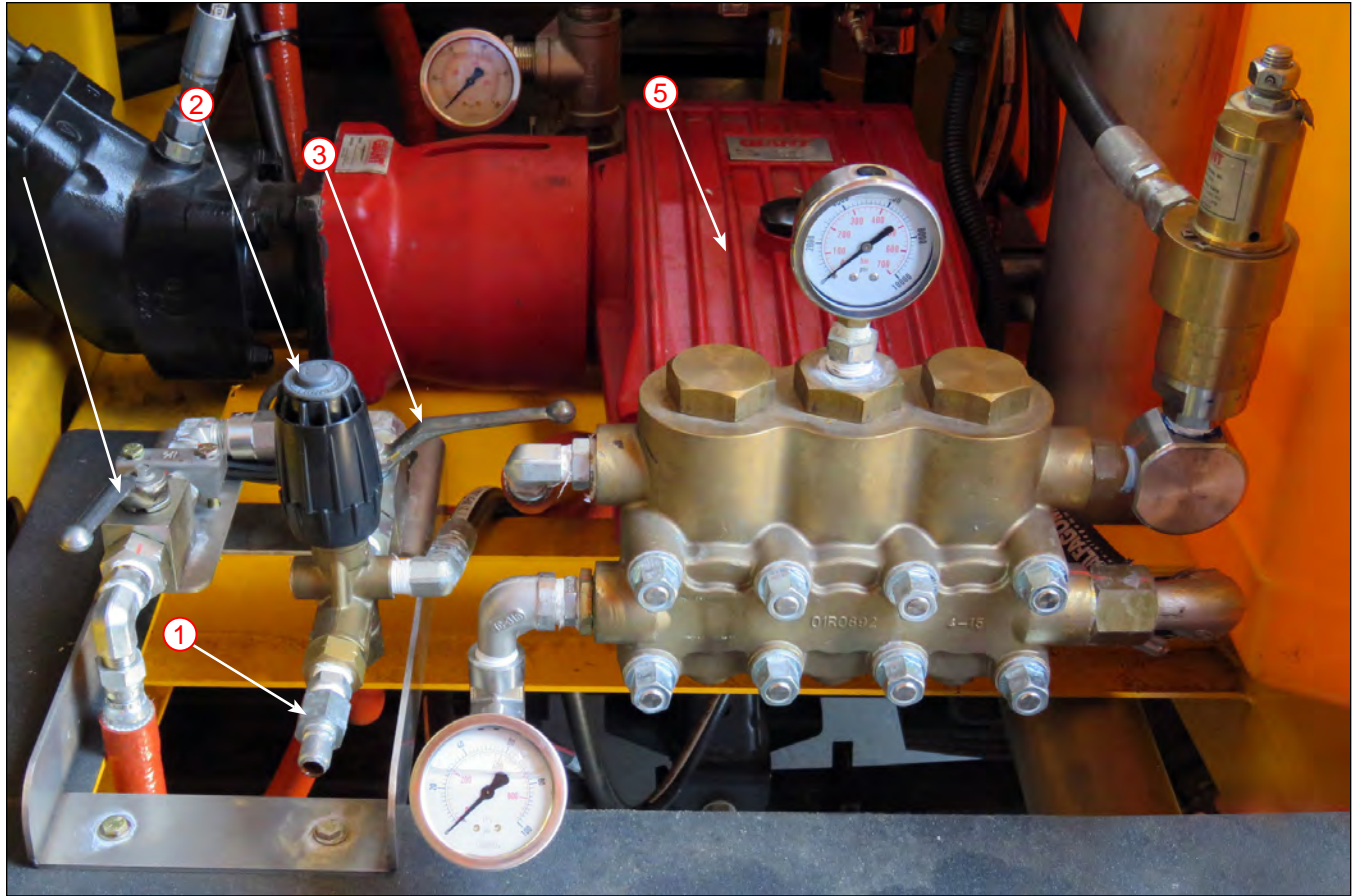
Solid debris is separated from the wastewater in the tank by the 100 micron filter bag. The filter bag needs to be dumped and replaced when it is near full.

Always make sure the vehicle is on level, solid ground before opening the tank doors to remove the filter bag. After dumping, use a hose to clean the tank and sump thoroughly with fresh water. Then install a new filter bag.

The debris bag should be checked at the beginning of the shift as part of the pre-start procedure or when you believe it may be reaching its capacity. It should also be checked at the end of each shift. Debris should never be left in the tank for more than two days. Debris tends to harden and conform to the shape of the tank walls making the bag more difficult to remove.

Always comply with local guidelines and state laws when dumping recovered water and debris. Refer to the Operation section for additional instructions for removing and replacing the filter bag.





High Pressure Pump & Handheld Pressure Washer Circuit

- | | |
|-------------------------------------|--|
| 1. High Pressure Disconnect Fitting | 4. Hog Head High Pressure ON/OFF Valve |
| 2. Adjustable Bypass Valve | 5. High Pressure Pump |
| 3. Wand High Pressure ON/OFF Valve | |

2.9 Handheld Pressure Washer

The high pressure system is equipped with a connection for a handheld pressure washer. It provides up to 4000 psi (276 BAR) to the handheld spray gun (wand). The pressure hose and wand connect to a high pressure disconnect fitting on the pump manifold and are stored in the tool box when the handheld pressure washer is not being used.

High pressure water to handheld wand is activated or deactivated by manual control valves on the high pressure manifold near the pump. An adjust-

able bypass valve allows the operator to adjust high pressure water at the wand. A pressure gauge on the handheld pressure washer circuit indicates water pressure at the wand.

When the handheld pressure washer is activated, the valve that supplies high pressure water to the Hog Head will be closed and the valve that supplies high pressure water to the handheld wand is open.

Refer to the Operation section for the procedure to activate and shutdown the handheld pressure washer.





Main Circuit Breakers & In-Line Fuses

2.10 Electrical System Overview

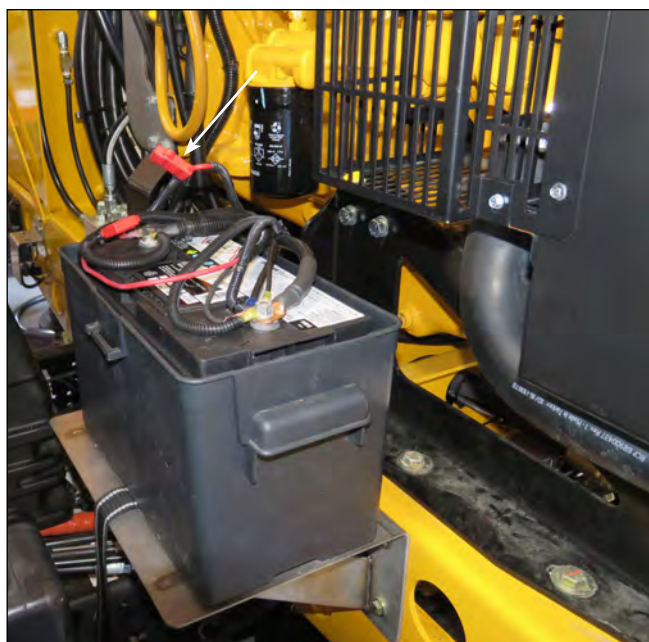
A 12 volt DC electrical system and onboard battery provides electrical power for starting the auxiliary engine and for the switches, solenoids and other electrical components in the high pressure cleaning system. An alternator on the engine recharges the battery whenever the engine is operating. The Surface Hog electrical system is totally isolated from the truck electrical system.

Main circuit breakers near the battery on the passenger side protect the Surface Hog electrical system and can function as the main disconnect to deactivate the electrical system. Other in-line fuses and fuses in the outside electrical box (OTB) protect individual circuits for pressure cleaning components activated by the switches in the control panel.

The auxiliary engine is equipped with onboard circuit breakers and/or fuses that protect the controller, ECM, charging circuit and other engine electrical components. Refer to the auxiliary engine operation manual for more information on the engine electrical system.

Main Circuit Breakers

50 and 30 amp main breakers are connected directly to battery and supply electrical power to the control panel and outside terminal box (OTB) fuse panel when the Surface Hog electrical system is activated by a relay energized by the truck ignition switch. The



Auxiliary Engine Battery & Water Heater Burner In-Line Fuse

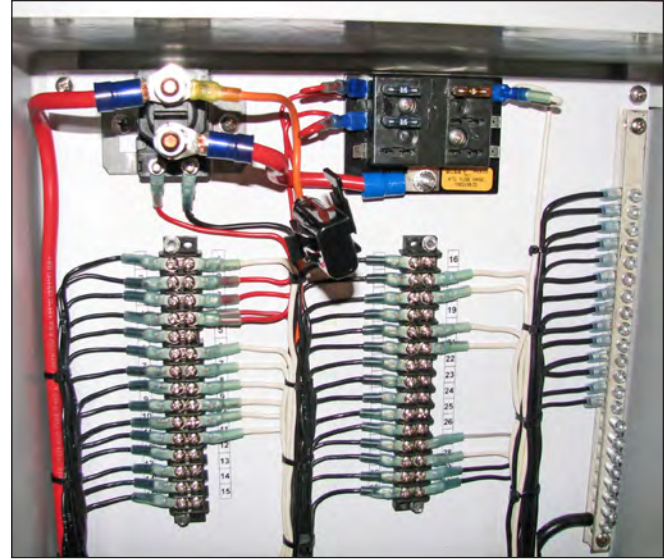
main breakers and truck ignition switch must be on to power the electrical system.

Each main circuit breaker is equipped with a yellow indicator/reset lever that indicates the status of the breaker (ON or OFF/TRIPPED) and is used to reset the breaker if it trips or to turn the breakers and Surface Hog electrical system off.





Outside Terminal Box (OTB)



OTB Fuses & Relays

These are heavy duty circuit breakers that typically trip only when there is a fault in the system. If a main breaker trips, you should find and correct the problem before resetting the breaker. The breaker is reset by moving the yellow lever to the ON position.

Each main breaker can be used as a main disconnect switch by manually moving the yellow lever to the OFF or ON position. Move the lever to the ON position to activate the electrical system. Move the yellow lever to OFF position to deactivate the electrical system.

Accessory Circuit Protection

ATC blade type fuses in the fuse panel inside the OTB protect most circuits activated by the switches. In-line fuses protect other circuits.

NOTICE:

THE CIRCUITS PROTECTED BY IN-LINE FUSES WILL VARY. IN-LINE FUSE LOCATIONS WILL ALSO VARY, DEPENDING ON THE ACCESSORY CIRCUIT PROTECTED. THE MOST COMMON LOCATIONS FOR IN-LINE FUSES ARE NEAR THE MAIN CIRCUIT BREAKERS AND BATTERY, IN THE TRUCK CAB OR IN THE OTB.

The fuses are color coded with the AMP rating printed on the fuse. The fuse body is translucent plastic with the fuse element clearly visible, making it easy to identify a blown fuse.



In-Line Fuse For Switch Panel Relay

When replacing fuses, never replace the blown fuse with a fuse of a different color or higher amperage in an attempt to correct a circuit that is causing the fuse to blow. Using a higher amperage fuse can cause the circuit to overheat, which can damage the circuit and components or cause an electrical fire.

Contact Hog Technologies Customer Service if you need assistance correcting a problem with the electrical system.





Control Switch Panel

Control Panel Switches

Most functions and features of the Surface Hog are activated by labeled rocker switches on the console switch panel in the cab. A green LED light in each switch illuminates when the circuit activated by the switch is ON.

NOTICE:

THE TRUCK IGNITION SWITCH MUST BE ON TO ACTIVATE THE RELAY THAT ENERGIZES THE CONTROL SWITCHES AND SURFACE HOG ELECTRICAL SYSTEM. THE RELAY IS PROTECTED BY AN IN-LINE FUSE LOCATED BELOW THE DASHBOARD NEAR THE DRIVER SIDE DOOR.

NOTICE:

THE TRUCK AND AUXILIARY ENGINES MUST BE RUNNING WITH THE CONSOLE POWER SWITCH ON TO ACTIVATE THE HYDRAULIC SYSTEM. ADDITIONALLY, THE CONSOLE POWER SWITCH MUST BE ON TO PROVIDE ELECTRICAL POWER TO ALL OTHER SWITCHES IN THE CONSOLE. THE WORK LIGHT AND STROBE LIGHT CIRCUITS ARE ACTIVATED WHEN THE POWER SWITCH IS ON.

The following is a description of the console panel switch functions:

POWER

Energizes the circuits for all other rocker switches on the console switch panel, digital gauges, work and strobe light circuits and the cooling fan for the hydraulic system oil cooler. A green LED light in the switch indicates that the power switch is ON and the panel and Surface Hog electrical system is energized.

CHARGE PUMP

Activates the solenoid valve that supplies pressurized hydraulic fluid to power the charge water pump. A green LED light in the switch indicates the charge pump is activated.



CAUTION



THE HYDRAULIC PUMPS ARE DRIVEN BY THE AUXILIARY ENGINE WHENEVER THE ENGINE IS RUNNING AND THE POWER SWITCH ON THE CONTROL PANEL IS ON.

TO PREVENT DAMAGE TO THE PRESSURE PUMP, THE CHARGE PUMP MUST BE ACTIVATED WHENEVER THE HIGH PRESSURE SWITCH IS ON. THE CHARGE PUMP PROVIDES WATER TO THE PRESSURE PUMP FOR COOLING AND LUBRICATION.



VAC

Activates the solenoid valve that supplies pressurized hydraulic fluid to the hydraulic motor that powers the vacuum blower. A green LED light in the switch indicates the blower is activated.

WATER HEATER

Activates the water heater system. When the system is turned on ON, the "on demand" water heater will be controlled by the HIGH PRESSURE switch on the panel and an automatic, pressure sensitive switch in the high pressure water system.

When the WATER HEATER switch is ON, the water heater will automatically be engaged when the HIGH PRESSURE switch is turned ON and the pressure sensitive switch detects high pressure water flow. Pressurized hot water will be delivered to the Hog Head spray bar or hand held wand. When the HIGH PRESSURE switch is turned OFF, high pressure water flow to the spray bar or wand stops and the heater automatically shuts down. The water heater system remains activated on standby.

When the WATER HEATER switch is OFF, the water heater system is disabled and only cool water will be delivered to the Hog Head spray bar or hand wand when the HIGH PRESSURE switch is turned ON.

HIGH PRESSURE

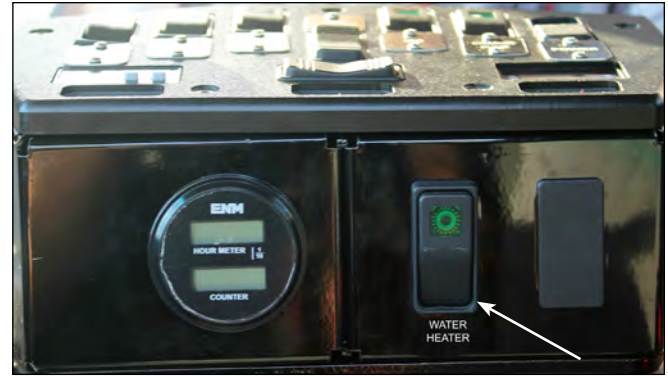
Activates the solenoid valve that supplies pressurized hydraulic fluid to the hydraulic motor that powers the high pressure pump. It also activates the high pressure ON/OFF valve.

The HIGH PRESSURE switch operates in two modes, with the WATER HEATER switch ON; and with the WATER HEATER switch OFF. The following describes the operation of the switch in each mode.

WATER HEATER switch OFF

When the HIGH PRESSURE switch is ON, the high pressure pump is activated and the high pressure water valve opens to deliver cool, high pressure water from the pump to the spray bar on the Hog Head. A green LED light in the switch indicates that the high pressure system is activated.

When the switch is OFF, the high pressure pump is deactivated and the high pressure water valve is closed. High pressure water to the Hog Head is stopped.



Water Heater Switch In Control Switch Panel

WATER HEATER Switch ON

When the HIGH PRESSURE switch is ON, the high pressure pump and water heater system are activated. The high pressure water valve opens and a pressure sensitive switch senses the water flow and engages the water heater, sending heated, high pressure water from the pump to the spray bar on the Hog Head. A green LED light in the switch indicates that the high pressure system is activated.

When the switch is OFF, the high pressure pump is deactivated. The high pressure water valve is closed and the water heater is shutdown. The water heater system remains activated on standby.

NOTICE:

ALWAYS MAKE SURE THE TRUCK IS MOVING, THE CHARGE PUMP SWITCH IS ACTIVATED AND THE SPRAY BAR IS ROTATING BEFORE ACTIVATING THE SWITCH.

HEAD ROTATION

Activates the solenoid valve that supplies pressurized hydraulic fluid to power the hydraulic motor that rotates the spray bar. A green LED light in the switch indicates that the motor is engaged.

FLOAT SWITCH

Activates and deactivates the float mode feature that enables the Hog Head to float freely over uneven road surfaces. A green LED light in the switch indicates that Float Mode is engaged. Always make sure the hog head is down and supported by the caster wheels before engaging the float switch.



Section 2 - Surface Hog Systems



ARM UP/DOWN

A momentary, three position switch that raises and lowers Hog Arm. The center position is OFF. Press and hold the top of the switch to raise the arm, press and hold the bottom of the switch to lower the arm. Release the switch to stop the Hog Arm in the current position.

ARM LEFT/RIGHT

A momentary, three position switch that moves the Hog Arm right or left. The center position is OFF. Press and hold the left side of the switch to move the arm left, press and hold the right side of the switch to move the arm right. Release the switch to stop the arm in the current position.

NOTICE:

THE POWER SWITCH ACTIVATES THE AUTOMATIC SWITCH THAT CONTROLS THE DIAPHRAGM TRANSFER PUMP THAT PUMPS WASTEWATER FROM THE DEBRIS TANK SUMP, THROUGH THE CENTRIFUGES TO THE CLEAN WATER TANK.

VACUUM RPM

A digital LED gauge in the control panel that indicates the current RPM of the vacuum blower.

Hour Meter

Located on the front of the control panel. Indicates the running time for the auxiliary engine.



Fuel Gauge & Work Light Switch Panel

Fuel Gauge and Work Light Switch Panel

The fuel gauge and work light switch are mounted on a panel located near the pressure pump.

Fuel Gauge

Indicates the fuel level in the auxiliary engine fuel tank.

Work Light Switch

A rocker switch that activates the work lights above the pressure cleaning system.





Fuel & Hydraulic Tanks
A) Hydraulic Tank B) Fuel Tank



Hydraulic Tank Oil Level & Temperature Gauge

2.11 Hydraulic System Overview

The hydraulic system is powered by the auxiliary engine. It is equipped with two pumps and a reservoir/cooling tank. The system is equipped with a low pressure filter and two high pressure filters that protect the system from debris. Pressure gauges on the hydraulic manifold and a site gauge at the low pressure filter alert the operator when the filters are dirty and require changing.

An oil cooler with a thermostatically controlled fan cools the hydraulic fluid during operation. Electric solenoid valves activated by switches in the control panel direct hydraulic pressure to the various components. Hydraulic oil level is monitored by a site gauge on the side of the reservoir. The fluid level should be maintained within the upper level of the sight glass to ensure adequate fluid for operation.

Hydraulic Circuit and Pump

The hydraulic pumps are driven by the auxiliary engine whenever the POWER switch is ON. They provide high pressure fluid to the hydraulic motors for the pumps, spray bar, blower and other

hydraulically powered accessories. The circuit is equipped with pressure relief valves that prevent excessive pressure in the system. The maximum operation pressure for the hydraulic system is 3000 psi (207 BAR).

Reservoir

A reservoir tank mounted above the fuel tank behind the cab provides the hydraulic fluid for the system. The pump circulates fluid through the manifold, motors, hydraulic cylinders and other components, then back to the tank.

Hydraulic fluid should be changed and the tank flushed on a regular schedule as recommended by the hydraulic reservoir/cooling tank manufacturer.

Hydraulic System Filters

Clean hydraulic fluid that has not been exposed to excessive temperature or become contaminated is essential to the performance of the system. As pumps, cylinders and components wear, they release tiny metal and rubber particles into the hydraulic fluid. These particles act as a grinding compound as they flow through the system. Or-





Low Pressure Hydraulic Filter



High Pressure Filter

dinary dirt and water are common hydraulic fluid contaminants. Any one of these will contribute to premature failure of hydraulic components.

A low pressure filter in the top of the reservoir tank and two high pressure filters, one for each high pressure circuit, remove these contaminants and increase the life of the fluid and hydraulic components. All return fluid passes through the low pressure filter as it flows back into the tank. The filters should be changed at the same time the hydraulic fluid is changed or if the filters become clogged and restrict the flow.

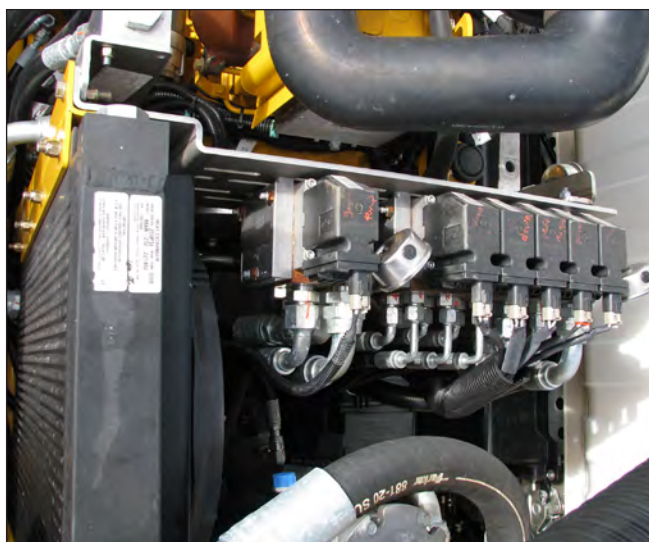
Hydraulic Manifold

Sectional valves mounted on the tree near the fluid reservoir make up the hydraulic control manifold system. An electric solenoid in each valve activated by switches in the control panel directs hydraulic pressure to the various components. The solenoid valves are a cartridge type design that are easily replaced in the event of a failure.

Labeled pressure gauges near the manifold monitor system pressure and the pressure of critical hydraulic circuits. These gauges should be monitored for proper operating pressure several times during each shift.

Hydraulic Motors

The charge water pump, high pressure pump, spray bar thru-shaft and vacuum blower are powered by hydraulic motors. Internal components of the motors are lubricated and cooled by the hydraulic fluid that powers the motor. All hydraulic motors



Hydraulic Manifold

have maximum pressure ratings and RPM settings that should never be exceeded.

Most hydraulic motors are designed to rotate in one direction. If a motor needs to be removed for any reason, always make sure to mark the hoses and ports so they will be installed in the correct position. If the hoses are installed in the wrong ports, the motor will rotate opposite of the designed rotation which will permanently damage the motor.

Hydraulic Actuators

Rotary, "Helac" cylinders are used to move the Hog Arm up or down and right or left. Helac cylinders provide a broader range of movement than conven-



tional ram type cylinders. The cylinders and hinged arm joints are integrated so the joint bearings are lubricated by the hydraulic fluid that powers the cylinders, eliminating grease fittings at the joints and reducing maintenance.

Helac cylinders are sensitive to air. Consequently, special procedures must be used to bleed air from the cylinders when hoses or other hog arm hydraulic equipment is serviced.

All hydraulic systems and cylinders require special procedures for bleeding air from the system after servicing components or replacing hoses. Contact Hog Technologies if you need assistance in bleeding the air from the hydraulic system.

Hydraulic Hoses

The hydraulic system operates at pressures up to 3,000 psi (207 BAR). Therefore, it is critical that the operator and maintenance personnel inspect hydraulic hoses, fittings and other components frequently. A visual inspection of the entire hydraulic system should be conducted each day before operating the unit. Any hose or component that is questionable or shows any sign of deterioration, wear or leakage should be replaced immediately and before operating the unit. A more thorough inspection of the pump and components should be conducted at each routine service interval. Remember that the hydraulic system can be severely damaged if it runs low on fluid.

Protect the hoses from contact with sharp objects or kinks. Never operate the hydraulic system with a damaged hose or a hose that is questionable.

2.12 Ladder & Tool Box

Tank Ladder

A ladder on the passenger side of the debris tank provides access to the top of the tanks. The ladder is hinged and has a T-handle safety pin that locks the ladder in the stored position. To use a ladder, release the safety pin, pull the lower end of the ladder away from the tank and rotate the strut to the horizontal position to support the ladder. When service or inspections are complete, rotate the strut up and push the ladder inward to the stored position. Then secure it with the safety pin.

Tool Box

A heavy duty, lockable tool box is located on the passenger side of the truck chassis. It is used for





Debris Tank Ladder Deployed



Debris Tank Ladder Stored & Secured With T-handle Safety Pin

storing hoses, fittings, extra parts and tools. Always make sure the tool box door is closed, latched and locked before operating the truck.

	CAUTION	
ALWAYS MAKE SURE THE LADDER AND TOOL BOX DOORS ARE LATCHED IN THE STORED OR CLOSED POSITION BEFORE OPERATING THE TRUCK. THE LADDER AND TOOL BOX DOORS STICK OUT FROM THE SIDE OF THE VEHICLE AND CAN CAUSE DAMAGE TO THE TRUCK OR OTHER VEHICLES IF THEY ARE NOT PROPERLY SECURED FOR TRANSPORT.		



NOTES





3.1 Start Up/Shutdown Introduction

A thorough understanding of the component systems and their operation is essential to the proper operation of the truck and pressure cleaning systems. Never allow inexperienced and untrained personnel to operate this equipment. This manual and the associated manufacturers' information is provided to enhance your knowledge of the Surface Hog. Make sure you have read them carefully and fully understand the truck and all pressure cleaning components and systems in theory and operation.

Before operating the Surface Hog, check the fluid levels in the truck engine, truck transmission, auxiliary engine and hydraulic system. To make operation as safe and productive as possible, it is important to conduct a thorough pre-operation inspection before operating the machine. You should walk around the unit and visually inspect the Hog Arm, Hog Head, high pressure hoses, hydraulic hoses, vacuum hoses, and all system

components for obvious signs of leaks, wear and deterioration. The inspection should be conducted in an orderly and consistent fashion to ensure all critical points are inspected each time. Do not operate the unit until all questionable components are repaired or replaced.

The startup and shutdown procedures described in this section are for a typical truck chassis equipped with the Surface Hog high pressure cleaning system. This information is provided as a general guide and overview of the process for educational purposes. The exact procedure for your truck may be slightly different, depending on the chassis and the options selected.

NOTICE:
ALWAYS CHECK THE HOG HEAD NOZZLES AND SPRAY BAR FOR WEAR AND DAMAGE BEFORE EACH SHIFT.



3.2 Pre-Operation Inspection

The Pre-operation Inspection in this section and the Pre-Op Check List in Appendix 4 is provided as a guideline. Additional items should be added to the checklist as determined by company policy, your operating environment, and other factors unique to your situation.

The following instructions provide a general overview and introduction to the pre-operation inspection. The Pre-Op Checklist provides an itemized checklist that should be used when performing a pre-operation inspection.

Pre-Operation Inspection Items:

1. Check tire condition and air pressure. Make sure to check the pressure in the tire on the hydrostatic drive system.
2. Inspect all hoses for chaffing and signs of wear.
3. Check fuel level in the truck and auxiliary fuel tanks. Make sure you have enough for the shift.
4. Check the truck fluid levels.
5. Check the auxiliary engine and all pressure cleaning system fluid levels.
6. Check all high pressure system and vacuum components for oil leaks, loose bolts, and damaged or worn parts.
7. Inspect the Hog Head for loose components and damage.
8. Visually inspect spray bars and nozzles for damage and excessive wear.
9. Water heater tank secure and burner exhaust clear and in good condition.
10. Inspect water heater burner fuel lines and hoses for leaks and damage. Repair if necessary.
11. Inspect clean water tank hoses and fittings for leaks and damage. Repair if necessary.
12. Check clean water tank level and fill if necessary.
13. Make sure debris tank doors are closed properly.
14. Make sure all lubrication points and Hog Head thru-shaft bearings are greased with the specified lubricants.
15. Check all controls, switches and lights for proper operation.
16. Make sure spare parts and a tool kit are onboard.
17. Conduct a final walk around and visually check all components. Look for obvious problems that may have been overlooked.



Clean Water Tank, Sight Gauge & Fill Fitting



3.3 Filling The Clean Water Tank

The clean water fill connection on the driver side of the tank is a quick connect fitting that accommodates large hoses that are typically connected to a metered source like a fire hydrant to expedite the filling of the tank. Only use potable water (clean enough to drink) to increase the service life of the components in your High pressure system.

Filling the freshwater tank:

1. If this is the first time using the water source, flush for several minutes prior to filling the tank to help ensure that no debris enters the system.
2. Connect the fill hose to the water source and flush hose for several seconds.
3. Open the water tank fill valve and connect the hose to the quick connect fill fitting. Secure the hose to the fitting with the cam-lock levers.
4. Slowly open the source valve to begin filling the tank.
5. Open the ball drain valve on the passenger side of the tank for several seconds to flush out debris that may have accumulated on the bottom of the tank, then close the valve.
6. Monitor the tank sight glass closely during fill operations and close the source valve just before the tank is completely filled.
7. Close the water tank fill valve, release the cam-locks and disconnect the fill hose from the fitting.
8. Remove the fill hose from the water source and drain the hose.
9. Store the hose in a clean, safe location.



Clean Water Tank Fill Hose Connection & Valve



Clean Water Tank Drain Valve



CAUTION



OPERATORS MUST ALWAYS MONITOR THE TANK CLOSELY DURING FILLING OPERATIONS AS THE FLOW OF WATER FROM A HYDRANT OR OTHER HIGH VOLUME SOURCE CAN BE FAR GREATER THAN THE FLOW CAPACITY OF TANK AIR VENT. OVERFILLING THE TANK WILL CAUSE EXCESSIVE PRESSURE AND DAMAGE THE TANK.





Control Switch Panel

3.4 System Startup Procedure

Make sure the truck is maneuvered into position and aligned with the starting point of the cleaning job before configuring the truck for work mode.

Startup procedure/Activating Hydraulics:

1. Perform the Pre-Op Inspection.
2. Turn the main circuit breakers ON.
3. Open the supply valve to the charge pump.
4. Start the truck engine and allow the engine to run at idle for several minutes to warm up.
5. Shift the truck transmission into NEUTRAL and apply the parking brake.
6. Make sure all switches are in the OFF position.

7. Start auxiliary engine. Allow the engine to run for several minutes to warm up.
8. Turn on the POWER switch in the console. Verify the Green LED light in the switch is lit.

CAUTION

THE TRUCK AND AUXILIARY ENGINES MUST BE RUNNING WITH THE CONSOLE POWER SWITCH ON TO PROVIDE ELECTRICAL POWER TO ALL OTHER SWITCHES IN THE CONSOLE.

THE HIGH PRESSURE PUMP WILL BE DAMAGED IF THE HIGH PRESSURE SYSTEM IS ACTIVATED WITHOUT THE CHARGE PUMP SWITCH ON. ALWAYS MAKE SURE THE CHARGE PUMP SWITCH IS ON BEFORE ACTIVATING THE HIGH PRESSURE SYSTEM AND PUMP.



3.5 Setting Pressure Procedure

1. Activate the auxiliary engine and cleaning system as described in section 3.4
2. Position the Hog Head so the spray bar and nozzles are visible.
3. Turn on the Charge Pump switch in the console. Listen for sounds indicating that the pump is drawing air or is blocked. Bleed air as needed to achieve full prime.
4. Monitor charge pressure gauge 35–70 psi (2.4-4.8 BAR.)

NOTICE:

CHARGE WATER PRESSURE MUST BE ABOVE 35 PSI (2.4 BAR) TO PROVIDE PROPER CHARGE WATER PRESSURE AND COOLING TO THE HIGH PRESSURE PUMP. DO NOT ENGAGE THE HIGH PRESSURE PUMP IF THE CHARGE WATER PRESSURE IS NOT ABOVE 35 PSI (2.4 BAR.)

5. Make sure all personnel are well clear of the Hog Head and verify that the CHARGE PUMP switch is ON and the HEAD ROTATION switch is OFF.
6. Turn the HIGH PRESSURE switch ON to activate the high pressure pump and send high pressure water to the spray bar.
7. Press the top (rabbit) of the speed control switch to increase engine speed to maximum operating RPM and pressure.

NOTICE:

THE ENGINE RPM WILL AUTOMATICALLY INCREASE TO THE PRESET MAXIMUM OPERATION RPM WHEN THE TOP OF THE SPEED SWITCH IS PRESSED. REFER TO SURFACE HOG SYSTEMS SECTION 2.3 AUXILIARY ENGINE THROTTLE CONTROL.

7. Verify proper cleaning pressure, then check nozzle spray pattern and the spray bar for leaks.
8. Check all high pressure hose fittings and the Hog Head for leaks.
9. Turn the HIGH PRESSURE switch OFF to shutdown high pressure water to the spray bar.
10. With the pressure set and the spray bar and nozzles working properly, turn the High Pressure switch OFF.



Auxiliary Engine Control Panel



Spray Bar & Nozzles Visible

11. If using hot water for the job, turn ON the WATER HEATER switch.
12. The water heater is activated automatically when the HIGH PRESSURE switch is ON. Turn ON the High PRESSURE switch to send hot water to the spray bar.





Hog Arm & Hog Head

13. Verify water heater operation and that hot water is being supplied to the high pressure water system. Then turn the HIGH PRESSURE switch OFF.
14. Check water heater burner fuel lines and water hoses for leaks. Then turn the WATER HEATER switch OFF.

NOTICE;
IF YOU ARE NOT USING HOT WATER FOR THE JOB, SKIP STEPS 11-14.

15. Turn the HEAD ROTATION switch ON to test the spray bar rotation, then turn the switch OFF.
16. Turn the Vac switch On and verify proper Hog Fan RPM, then turn the switch OFF.
17. The truck is now ready to begin cleaning operations.



Hog Arm T-Handle Safety Pin Released & Seated In Detent





Control Switch Panel & Hog Arm RIGHT/LEFT - UP/DOWN Switches

3.6 Cleaning Procedure Hog Arm and Hog Head Operation

1. Activate hydraulic and Pressure Cleaning Systems (refer to Section 3.4)
2. Set auxiliary engine speed to idle.
3. Verify that the POWER switch is ON and all other control panel switches are OFF.
4. Make sure the Float Switch is OFF.
5. Use the Arm UP/DOWN switch in the control panel to raise the arm slightly to take the load off the T-handle safety lock pin.
6. Slide the pin out of the arm until it seats in the release detent.
7. Slowly lower the arm and Hog Head to the down position on the pavement.
8. Activate the Float Switch to engage float mode.



WARNING



ACTIVATING FLOAT MODE WHEN THE HOG HEAD IS OFF THE GROUND OR WITH ARM IN THE UPRIGHT POSITION WILL RELEASE HYDRAULIC PRESSURE AND CAUSE THE ARM AND HOG HEAD TO DROP SUDDENLY WHICH WILL RESULT IN MAJOR DAMAGE TO COMPONENTS AND COULD CAUSE SEVERE INJURY TO PERSONNEL.

ALWAYS MAKE SURE THE ARM AND HOG HEAD ARE IN THE FULL DOWN POSITION WITH THE CASTOR WHEELS FIRMLY ON THE GROUND BEFORE ENGAGING FLOAT MODE.

Engaging The Pressure Cleaning System

1. Activate Hydraulic and pressure cleaning systems (refer to Section 3.4)
2. Set auxiliary engine speed to maximum engine RPM (refer to Section 3.5)
3. Verify charge water pressure.
4. Align the truck with the area to be cleaned, stopping a short distance before the start point for cleaning operations.



5. Use the Hog Arm RIGHT/LEFT control switch to move the Hog Head to the proper working position.

NOTICE:
THE DIRTY WATER PUMP AND WASTEWATER TRANSFER SYSTEM IS ACTIVATED AUTOMATICALLY WHEN THE POWER SWITCH IS ON..

6. Turn the Head Rotation switch ON.
7. If using hot water, turn the WATER HEATER switch ON. If not using hot water, skip this step.
8. Make sure all personnel are clear, press the brake pedal and release the park brake.
9. Use the foot brake and/or accelerator pedal to adjust removal speed.
10. With vehicle moving at the desired speed, turn the high pressure switch ON to send high pressure water to the spray bar and begin cleaning operations.

Remember, never turn on the High Pressure switch while truck is sitting still with the Hog Head on the ground.

Pressure Cleaning Do's and Don'ts

Do's:

- STOP pressure cleaning before stopping the truck. Cleaning with the unit stopped could damage the pavement, spray bar and Hog Head.
- STOP cleaning before changing direction.
- Adjust the forward speed as required to achieve optimum cleaning.
- Check vacuum RPM frequently to ensure strong vacuum pressure while cleaning. A restricted or leaking system with low vacuum will leave excessive debris on the pavement slowing productivity.
- Check the charge pressure before cleaning operations begin. Change both filters if charge water pressure is below 60 psi (4 BARS) before beginning operations.
- Monitor charge pressure frequently during cleaning operations to ensure proper charge water pressure during cleaning operations.
- Check the cleaned surface frequently and adjust truck speed as required for maximum cleaning. Continuously make speed adjustments as required.

Don'ts

- Do not allow untrained personnel to operate Surface Hog equipment.
- Do not continue pressure cleaning with worn or damaged nozzles. This can waste water, reduce cleaning pressure and slow production.
- Avoid running the Hog Head wheels on rumble strips or other raised or cut markings. Always adjust the Hog Arm to keep the wheels clear of all cut or raised markings
- Do not operate the Hog Head over pavement markers/reflectors. Markers can damage the Hog Head and spray bar and should be removed prior to cleaning.
- Do not pressure clean over damaged or uneven surfaces that can damage the Hog Head and spray bar.
- Do not allow the debris bag to become overfilled. Monitor the bag and dump the bag before it becomes full.
- Do not allow the charge pump to run out of water. Water is a lubricant that cools the charge water and high pressure pumps. They will be damaged if they run dry. Always monitor the water level in the clean water tank and refill when it gets low.
- Never activate the water heater when low on water. Reduced water flow through the heater can result in superheated water that could damage the heater and high pressure water system components. It will also dramatically increase the potential for burns from grabbing excessively hot components.
- When the water heater is activated, never touch high pressure pipes manifolds or valves during operation with your bare hands. Always wear gloves.
- When using the handheld wand with the water heater activated, always wear gloves and be careful not to grab the wand with bare hands immediately after pressure washing operations stop.
- Do not activate the HIGH PRESSURE switch with the CHARGE PUMP switch OFF. The charge pump supplies clean water to prime and lubricate the high pressure pump.



3.7 Routine Shutdown

The shutdown procedure should be followed each time the cleaning system is deactivated and the truck is shifted from work mode to drive mode.

The procedures in the following instructions provide general instructions for shifting from WORK mode to DRIVE mode will apply to most trucks. However, your truck may be slightly different, depending on the options selected.

Shutdown procedure:

1. Shutdown high pressure by turning OFF the HIGH PRESSURE switch.
2. If the water heater system is activated, turn OFF the WATER HEATER switch.
3. Stop the truck and set the parking brake.
4. Turn the HEAD ROTATION switch OFF.
5. Turn the CHARGE WATER switch OFF.
6. Allow the vacuum blower to operate for a couple of minutes to clear waste water from hoses and dry out the vacuum system, then turn the Vacuum switch OFF.
7. Reduce the engine speed to idle.
8. Turn the Hog Arm FLOAT switch OFF, then raise the Hog Arm.
9. Align the holes for the safety lock pin and insert the pin to prevent the arm from lowering during transportation.
10. Turn the POWER switch and all other switches OFF.
11. Allow the auxiliary engine to idle for several minutes to cool internal components, then shutdown the engine.

NOTICE:
THE FLOAT SWITCH MUST BE OFF BEFORE THE HOG ARM CAN BE RAISED.



3.8 Emergency Shutdown Procedure



WARNING



IF AN EMERGENCY SITUATION INVOLVING THE POTENTIAL FOR PERSONAL INJURY AND/OR EQUIPMENT DAMAGE OCCURS, THE OPERATOR SHOULD ALWAYS SELECT THE EMERGENCY SHUTDOWN PROCEDURE. THIS PROVIDES IMMEDIATE SHUTDOWN OF THE TRUCK AND ALL PRESSURE CLEANING SYSTEMS TO REDUCE THE POSSIBILITY OF INJURY AND DAMAGE TO EQUIPMENT.

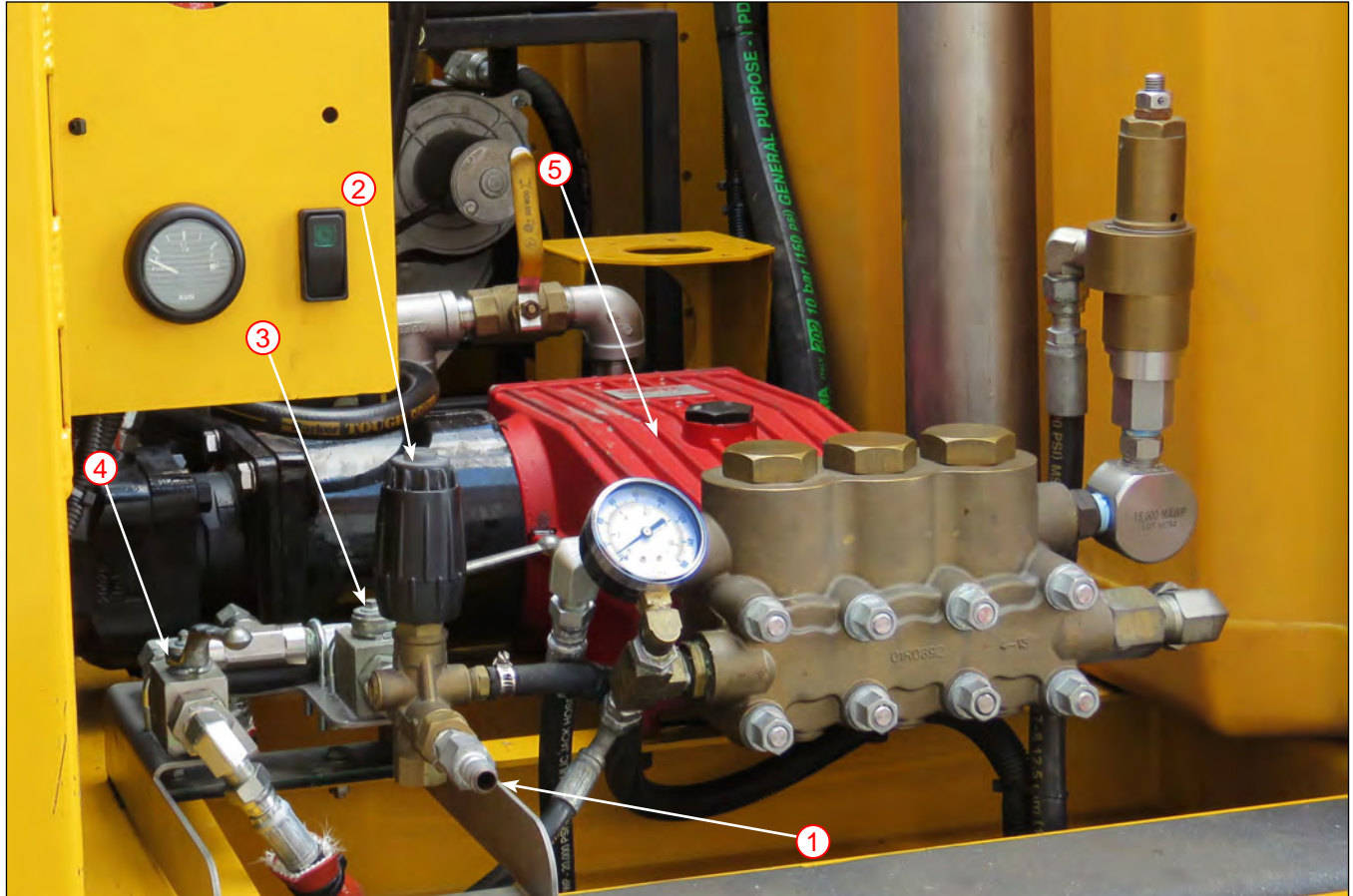
To stop all operations immediately use the following procedure:

1. Stop the truck and hold the brake pedal.
2. Turn the auxiliary engine key switch OFF.
3. This will immediately shutdown the high pressure pump, hydraulic system and all pressure cleaning systems.
4. Turn the truck ignition OFF.
5. When the situation permits, set the park brake and return all control panel switches to the "OFF" position for proper restart.



Auxiliary Engine Control Panel & Ignition Key Switch





High Pressure Pump & Handheld Pressure Washer Circuit

- | | |
|-------------------------------------|--|
| 1. High Pressure Disconnect Fitting | 4. Hog Head High Pressure ON/OFF Valve |
| 2. Adjustable Bypass Valve | 5. High Pressure Pump |
| 3. Wand High Pressure ON/OFF Valve | |

3.9 Handheld Pressure Washer Operation

The high pressure system is equipped with a connection for a hand held pressure washer. It provides up to 4000 psi (276 BAR) to the handheld spray gun (wand). The pressure hose and wand connect to a high pressure disconnect fitting on the pump manifold and are stored in the tool box when the handheld pressure washer is not being used.

High pressure water to handheld wand is activated/deactivated by manual control valves on the high pressure manifold near the pump. An adjustable bypass valve allows the operator to adjust high pressure water at the wand. A pressure gauge on the handheld pressure washer circuit indicates water pressure at the wand.

When the handheld pressure washer is activated, the valve that supplies high pressure water to the Hog Head will be closed and the valve that supplies high pressure water to the handheld wand is open.

Refer to the Operation section for procedures to activate and shutdown the high pressure system.

Use the following procedures to activate and shutdown the handheld pressure washer.

Activating the pressure washer:

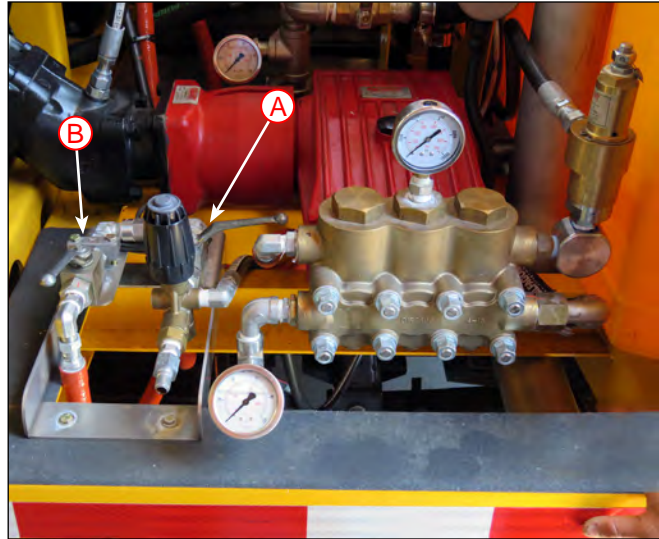
1. Make sure the truck is parked on level ground with the parking brake set and the truck and auxiliary engines shutdown. Refer to section 3.7 for the routine shutdown procedure.
2. Verify that the wand pressure gauge on the pump indicates 0 pressure, then attach the pressure hose and wand to the quick disconnect fitting.



Section 3 - Operation



3. Close the Hog Head high pressure supply valve and open the wand high pressure valve.
4. Make sure someone is holding the wand and the tip is point away from all people and the machine.
5. Activate the auxiliary engine and cleaning system as described in section 3.4.
6. Raise the engine speed to operating RPM.
7. If using hot water, turn the WATER HEATER switch ON and have all operators wear gloves to protect hands from hot valves, hand wand and components. If not using hot water, skip this step.



High Pressure Manifold & Control Valves
A) Wand Pressure Valve B) Hog Head Pressure Valve



WARNING



WHEN THE WATER HEATER IS ACTIVATED, HIGH PRESSURE METAL PIPES, MANIFOLDS AND VALVES CAN BECOME EXTREMELY HOT AND CAUSE SEVERE BURNS IF THEY ARE GRABBED WITH BARE HANDS. ALL OPERATORS AND ASSISTANTS SHOULD BE AWARE OF THIS HAZARD. ALWAYS WEAR GLOVES AND NEVER REST YOUR HANDS ON VALVES, HIGH PRESSURE MANIFOLDS, METAL PIPES OR OTHER HOT COMPONENTS.

8. Make sure the charge water and high pressure pumps are operating at proper pressure.
9. Use the pressure washer manual bypass valve and wand pressure gauge to set the desired wand pressure. Typical pressure settings range from 2000 psi (138 BAR) to 4000 psi (476 BAR).
10. With the wand still pointed away from all people and the machine, squeeze the trigger to begin pressure cleaning with the wand.



WARNING



NEVER LAY THE WAND ON THE GROUND OR TRUCK WITH HIGH PRESSURE SUPPLIED TO THE WAND. IF THE TRIGGER FAILS OR IS ACCIDENTALLY ENGAGED, AN UNATTENDED WAND WILL WHIP VIOLENTLY CAUSING DAMAGE TO EQUIPMENT AND SERIOUS INJURY OR EVEN DEATH TO PERSONNEL.

Shutting down the pressure washer:

1. Shutdown the high pressure cleaning system and the truck and auxiliary engines. Refer to section 3.7 for the routine shutdown procedure.
2. Open the Hog Head high pressure supply valve and close the wand high pressure valve.

3. Briefly pull the trigger on the spray gun to remove pressure in the hose. Verify 0 pressure on the pressure gauge and disconnect the pressure hose and gun.
4. Properly coil the pressure hose and properly store the hose and gun in the tool box.



WARNING



HIGH WATER PRESSURE ESCAPING FROM A DAMAGED OR DETERIORATED PRESSURE HOSE OR GUN CAN CAUSE SEVERE INJURY TO PERSONNEL. NEVER OPERATE THE HANDHELD PRESSURE WASHER WITH A HOSE OR SPRAY GUN THAT IS DAMAGED OR NOT OPERATING PROPERLY.

ALL HIGH PRESSURE HOSE MAINTENANCE PROCEDURES AND PRECAUTIONS OUTLINED IN THE HIGH PRESSURE HOSES, CONNECTIONS AND FITTINGS SECTION OF THIS CHAPTER APPLY TO THE HANDHELD PRESSURE WASHER SYSTEM.



WARNING



HIGH PRESSURE WATER SUPPLIED TO THE HANDHELD WAND IS HEATED WHICH CAN CAUSE SOME COMPONENTS TO BECOME HOT ENOUGH TO BURN YOUR HANDS. TO AVOID INJURY, ALWAYS WEAR GLOVES WHILE OPERATING THE HANDHELD WAND OR OPERATING THE HIGH PRESSURE SELECTOR VALVES.



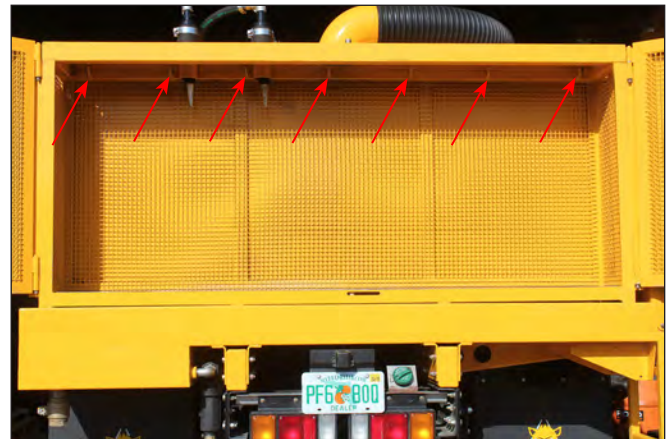
3.10 Dumping Debris

Solid debris (larger than 100 microns) is separated from the wastewater by the filter bag which needs to be removed and replaced when the bag/debris tank is near full. Before removing the bag, be sure you are dumping in an approved dump site and that the truck is on solid, level ground. Then use the following procedure to remove the debris bag and dump the waste.

1. Put the truck in park and set the park brake.
2. Make sure the pressure cleaning system and auxiliary engine are shutdown.
3. Make sure all wastewater is drained from the debris tank sump. Open the gravity drain valve to completely drain the tank if necessary. Close the drain valve when the sump is drained.
4. Release the debris tank door latch and open both doors. It is normal for some water to pour out as the door opens so you should be prepared to step back as the doors are opened.
5. With a person on each end of the debris bag, pull the bag out of the tank.
6. When bag removal/dumping is complete, use a hose or the handheld pressure washer to clean the tank and liner thoroughly with fresh water. Make sure to clean the automatic float switch for the dirty water pump out system.
7. When the tank is clean install a new filter bag. Check that the bag is installed properly and that the dirty water pump intake line is not blocked. Also make sure the automatic float switch is free.
8. Then close the doors and secure them with the latch.



Debris Tank & Filter Bag



Debris Tank & Filter Bag Hooks



3.11 Operating in Freezing Conditions Shutdown

1. Shutdown the high pressure cleaning system and the truck and auxiliary engines. Refer to section 3.7 for the routine shutdown procedure.
2. Allow the vacuum blower to operate for a couple of minutes after shutting down the high pressure and charge water pumps to clear waste water from hoses and dry out blower system.
3. Make sure the clean water tank, water heater and debris tanks are drained immediately at the end of each shift.
4. All system hoses and the Hog Head assembly should be drained of all water and/or filled with an anti-freeze solution. (Non alcohol)
5. Refer to the high pressure pump manufacturer's procedures for maintaining and operating the pump in freezing climates.
6. Open the drain valve at the charge water pump and allow the hoses and pump to completely drain. With the valve still open, activate the pump briefly to pump out any remaining water, about a cupful. Then close the valve.
7. Remove the dirty water pump strainer and run the pump briefly to drain the pump hoses. Then clean and reinstall the strainer.
8. Follow all other instructions in the Routine Shutdown Procedure.



CAUTION



IF YOU OPERATE IN FREEZING TEMPERATURES OR EVEN TEMPERATURES BELOW 60 DEGREES FAHRENHEIT (16 DEGREES CELSIUS), IT WILL BE NECESSARY TO OPERATE THE SYSTEM, INCLUDING ENGAGING THE BLOWER AND HIGH PRESSURE PUMP, AT IDLE SPEED ONLY UNDER LOAD, UNTIL HYDRAULIC FLUID HEATS UP ABOVE 60 DEGREES FAHRENHEIT (160 CELSIUS).

3.12 Operation Routine Maintenance

Some components of the high pressure water system and Hog Head require preventative routine maintenance during a typical shift. This maintenance is considered routine and a component of the pressure cleaning process. The frequency for maintaining the items listed in this section will vary, depending on the quality of the clean water supply, the overall condition of the pressure cleaning systems and proficiency of the operators.

A well maintained truck operated by an experienced operator and using water from a very clean source may only require routine maintenance at the beginning or end of each shift. A poorly maintained truck, poor quality clean water supply, or truck that is not being operated properly could require routine maintenance several times during a shift.

The following is a list of components that typically require maintenance during a typical pressure cleaning shift and a brief description of the procedure. Refer to the Lubrication and Maintenance section of this manual for detailed instructions for maintenance items listed.

The following items typically require maintenance during or at the beginning of a typical shift:

- 20 Micron Filters - The filters should be removed and cleaned or replaced at the start of each shift and may require cleaning or replacement during the shift if low charge water pressure is indicated. Shutdown the system, open the pressure relief valves and remove the filter clamp and cap. Then remove and clean/replace the filter. Reinstall and tighten the cap.



WARNING



COMPRESSED AIR TRAPPED IN THE FILTER CANISTERS CAN CAUSE THE CAP TO BE PROJECTED FROM THE CANISTER AS THE CAP IS LOOSENED. IN SOME SITUATIONS, THE CAP CAN BE PROJECTED WITH ENOUGH FORCE TO CAUSE SERIOUS INJURY OR DEATH TO PERSONNEL.

ALWAYS MAKE SURE TO OPEN THE PRESSURE RELIEF VALVE ON EACH FILTER TO ENSURE THERE IS NO PRESSURE IN THE CANISTER BEFORE LOOSENING THE CAP.



- Clean Water Tank Bag Filter - The filter should be replaced at the start of each shift and may require replacement during the shift if flow into the tank becomes restricted. Shutdown the system and open the man-way hatch. Then remove and replace the filter. Close and secure the hatch.
- Purge Air From The Charge Water System - If the clean water filters are serviced or the operator allows the clean water tank to run dry, air will be introduced into the charge water system that must be purged before the system will prime and supply clean water to the high pressure pump. Follow the procedure outlined in the Lubrication and Maintenance section.
- Blast Head Shroud Wear Brush Adjustment - If the wear brush wears or the shroud clamp becomes loose and the brush loses contact with the pavement, the wear brush will need to be adjusted. Make sure the Hog Arm is in the down position with the castor wheels firmly on the pavement. Loosen the clamp and adjust the wear brush so it is making light contact with the pavement, then tighten the clamp.
- Adjust Caster Wheel Height - Adjustment may be required to increase shroud distance from the pavement to clear obstacles like road markers or decrease clearance when no obstacles are present. Loosen the locknut, then rotate the handle on each caster to set the height. Tighten the locknut to secure the adjustment.
- Dirty Water Pump Strainer - If the flow from the dirty water pump becomes restricted, the in-line strainer will need to be removed and cleaned. Shutdown the pressure cleaning system and turn the POWER switch OFF. Then remove clean and reinstall the strainer.



NOTES



Lubrication & General Maintenance

4.1 Lubrication & General Maintenance Introduction

Lubrication Points

You should become familiar with the location of all components that require frequent lubrication and include them in the general maintenance schedule. Some of these lubrication points require specialized lubricants. The lubrication points shown in the photos and listed in the Lubrication Charts on the following pages in this section provide a guide to the location of the lubrication points on your machine.

NOTICE:
IT IS NOT POSSIBLE TO SHOW ALL VALVES, HINGES, LATCHES AND SAFETY PINS ON THE LUBRICATION CHARTS. RELATED ITEMS NOT SHOWN SHOULD ALSO BE INCLUDED IN YOUR MAINTENANCE ROUTINE.

Refer to the Maintenance Matrix chart in the Scheduled Maintenance section in this manual and component manufacturer's operating and/or maintenance manuals for lubricant specifications and maintenance schedules.

Some lubrication points require grease daily or weekly. In extremely wet or dirty conditions, the requirements could increase. The lubrication frequency outlined in this section should be considered the minimum requirement.

Before operating or performing any maintenance on the vehicle make sure the machine is properly shutdown and secured in the service position.

General Maintenance

Some components of the high Pressure water and vacuum systems require daily maintenance or may require maintenance during a typical pressure cleaning shift. This maintenance is considered routine general maintenance and a component of the process. The service procedures for these items are described in this section of the manual. The frequency for maintaining general maintenance items will vary, depending on the quality of the clean water supply, the overall condition of the pressure cleaning systems and proficiency of the operators.



CAUTION



THE GENERAL MAINTENANCE PROCEDURES OUTLINED IN THIS SECTION MUST BE FOLLOWED EXACTLY TO AVOID DAMAGING COMPONENTS AND/OR VOIDING THE WARRANTY.

Scheduled Maintenance

Components that are typically serviced periodically or at specific hours of operation are considered scheduled maintenance items. The service procedures for those items are described in the Scheduled Maintenance section of the this manual.

Service Position

Properly shutting down and securing the machine for service is critical to the safety of the operator and/or service personnel.

Use the following procedure to place the machine in the service position:

1. Make sure the Hog Head is either in the down position or properly supported to remove the load from the cylinders and hinges.
2. Park vehicle on a level area and block wheels.
3. Apply parking brake.
4. Shutdown the truck and auxiliary engines. Disable the pressure cleaning system by turning OFF the main breakers near the auxiliary engine battery.
5. Follow all Lockout/tagout and additional shutdown procedures established in your company safety guidelines to complete the service position.



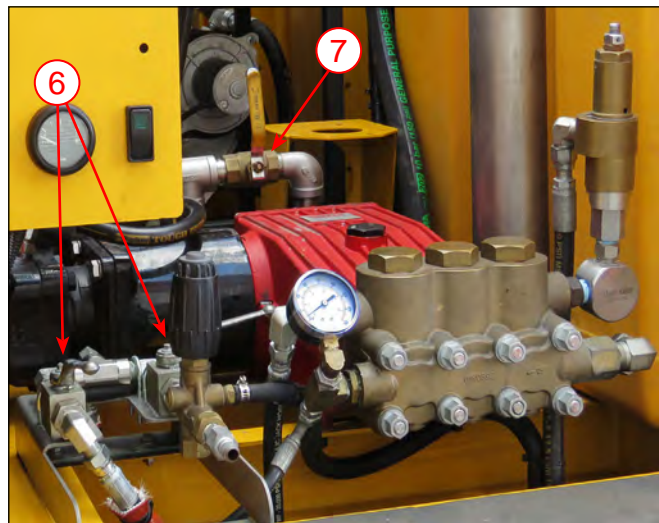
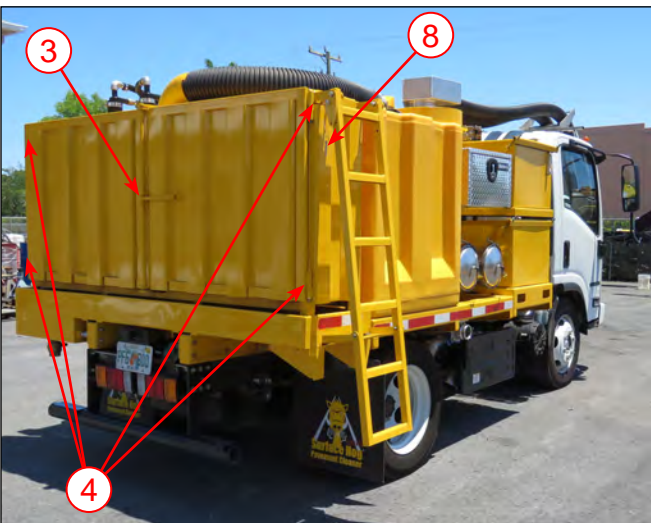
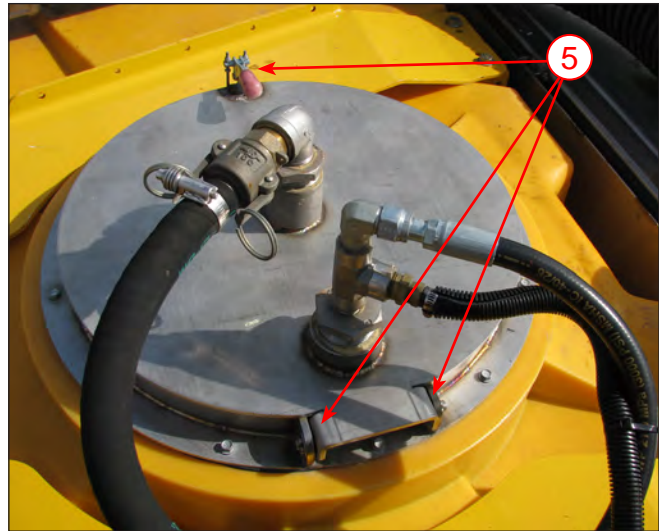
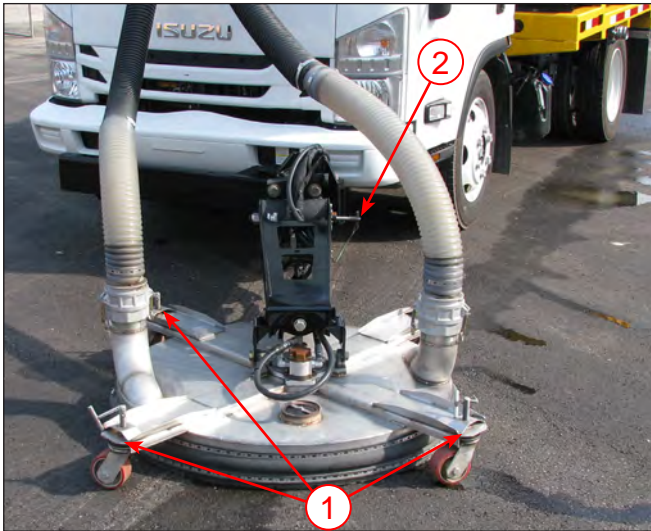
WARNING



SEVERE INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT CAN RESULT IF THE VEHICLE ROLLS OR AN ENGINE IS STARTED UNEXPECTEDLY DURING SERVICE. ALWAYS FOLLOW THE RECOMMENDED PROCEDURES TO PLACE THE UNIT IN THE SERVICE POSITION AND APPLY LOCKOUT/TAGOUT PROCEDURES BEFORE ALLOWING ANYONE TO SERVICE COMPONENTS.



4.2 Lubrication & Grease Point Locations

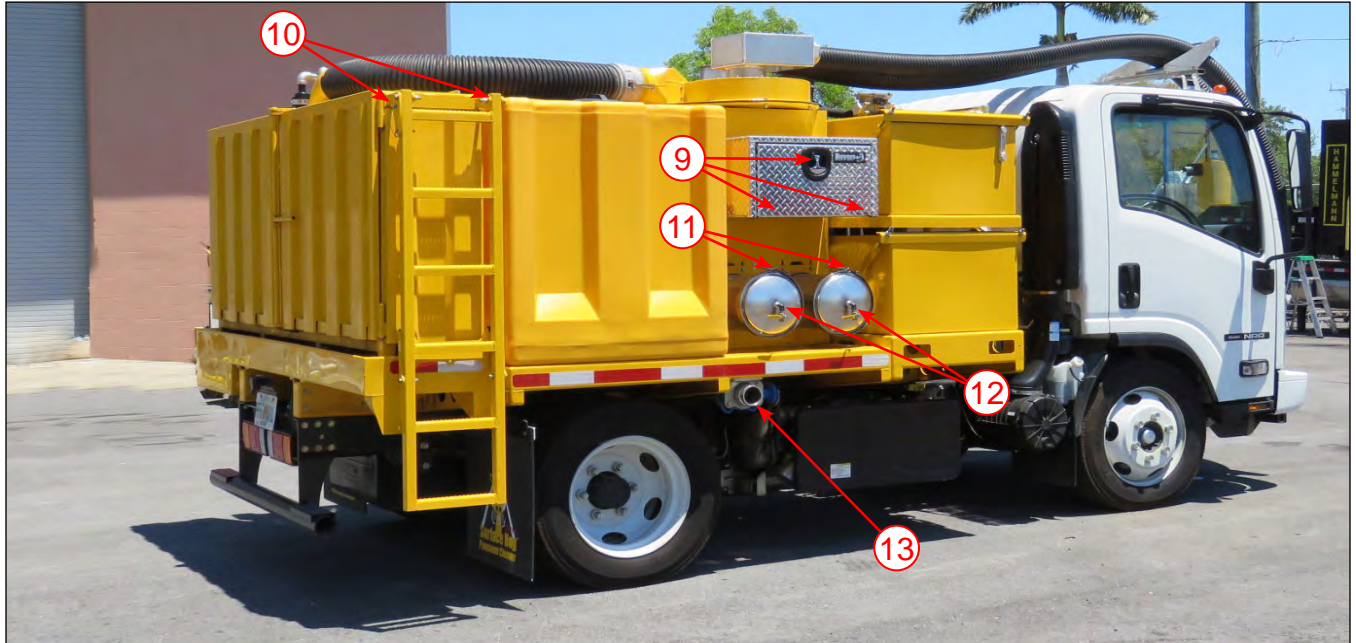


Surface Hog Lubrication Chart 1

ITEM#	COMPONENT DESCRIPTION	ITEM#	COMPONENT DESCRIPTION
1.	Hog Head Chassis Wheels & Casters	5.	Man-Way Hatch Hinge & Latch Bearings
2.	Hog Arm Safety Pin	6.	Spray Bar/Handheld Wand Selector Valves
3.	Debris Tank Door Latch Bearings	7.	Charge Pump Ball Valve
4.	Debris Tank Door Hinges	8.	Ladder Safety Pin



Lubrication & Grease Point Locations



Surface Hog Lubrication Chart 2

ITEM#	COMPONENT DESCRIPTION	ITEM#	COMPONENT DESCRIPTION
9.	Tool Box Latches & Hinges	13.	Clean Water Tank Drain Valve
10.	Ladder Hinges	14.	Clean Water Tank Fill Valve
11.	Filter Clamp Threads	15.	Debris Tank Drain Valve
12.	Filter Drain Valves	16.	Dirty Water System Strain Valve





Clean Water Tank Man-Way Hatch



Bag Filter In Filter Cage

4.3 Clean Water Filter Replacement Clean Water Tank Bag Filter

A bag filter in the clean water tank filters recycled wastewater as it is returned to the clean water tank. The filter must be checked frequently and changed when flow becomes restricted.

Replacing the bag filter:

1. Make sure the pressure cleaning system is shutdown and the truck is in the service position.
2. Open the man-way hatch and remove the filter from the filter cage.
3. Place a new filter bag inside the filter cage. Filter bag must be fully expanded to the end of the cage to provide proper filtration and water flow.
4. Close the man-way hatch and secure the latch.



Typical Bag Filter





20 Micron Filter Canisters



Typical 20 Micron Filter Cartridge

20 Micron Cartridge Filters

Charge water from the clean water tank to the charge water pump is filtered by two 20 micron cartridge style filters. The filters should be cleaned before each shift and replaced as required. Both filters should be serviced or replaced at the same time.



WARNING



THE FILTER CANISTER LIDS CAN BE EJECTED FROM THE CANISTER IF THE RETAINER RING IS LOOSENED WHILE THE CHARGE WATER SYSTEM IS PRESSURIZED. THIS CAN RESULT IN DAMAGE TO THE FILTER AND COULD CAUSE INJURY TO PERSONNEL.

ALWAYS MAKE SURE THE HIGH PRESSURE SYSTEM AND CHARGE PUMP ARE DISENGAGED, THE CLEAN WATER SUPPLY VALVE IS OFF AND THE PRESSURE HAS BEEN BLED FROM THE SYSTEM BEFORE REMOVING THE FILTER LIDS.

NOTICE:

WHEN REINSTALLING THE RETAINER RING, PLACE A SMALL AMOUNT OF GREASE ON THE RETAINER RING BOLT THREADS TO PREVENT GALLING OF THE THREADS.

Replacing the 20 micron filter:

1. Make sure the pressure cleaning system is shut-down and the truck is in the service position.
2. Close the clean water supply valve and bleed pressure from the charge water system.
3. Open the drain valve on each filter canister lid to ensure all pressure is bled from the system and to partially drain the filters.

4. Remove each filter canister lid and retainer ring.
5. Remove each filter, then flush canisters to remove debris and contaminants with clean, fresh water.
6. Clean or replace the filters.
 - a. If cleaning the filters, use a garden hose and spray nozzle to wash the dirt and debris from the filter until it is clean.
 - b. If replacing the filters, remove all protective packaging from the filters and stage them next to filter canisters.
3. Insert the cleaned or new filter into each filter canister.
4. Coat the retainer ring threads with grease and install filter canister lid.
5. Make sure retainer ring is properly centered on the lid and canister flanges. Then tighten the retainer ring securely.
6. Carefully inspect each retainer ring for proper installation.
7. Open the clean water valve, reactivate the pressure cleaning system. Follow the instructions to purge air from the charge water system in the next section of this chapter.
8. Activate the charge pump and flush the low pressure side of the pump and charge water system using the flush valve before operating the high pressure pump after changing the filters.

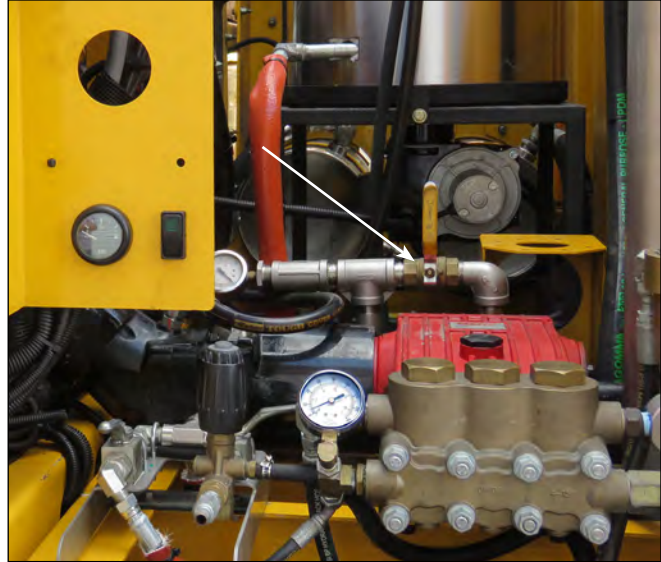


4.4 Bleeding Air From Charge Water Pump

Air must be bled from the charge water system when the filters are changed, the clean water tank is run dry or anytime the charge water system is serviced.

Use the following procedure to bleed air from the charge water system:

1. Open the clean water supply valve.
2. Activate the auxiliary engine and cleaning system as described in section 3.4
3. With the truck and auxiliary engines running at idle speed, activate the charge pump and open the discharge valve on the charge water pump for 2 or 3 seconds, then close the valve.
4. Open the drain/purge valves on each 20 micron filter canister lid until all air is purged from the filters and a solid stream of water is flowing from each valve. Then close the valves.
5. Immediately repeat step 3 while monitoring the charge water pressure gauge.
6. If pressure does not rise to the normal charge water pressure range within a few seconds, repeat steps 3 and 4 until pressure rises to the normal range (60 psi (4 BAR)).
7. When the charge pressure stabilizes at 60 psi (4 BAR) or higher, the system is purged and ready for operation.



Charge Pump Discharge Valve



20 Micron Filter Cartridge Drain/Purge Valves



4.5 Wear Brush

Assembly Adjustment

The wear brush bristles will slowly wear during operation. Consequently, the wear brush will require adjustment periodically to keep the bristles in contact with the pavement to provide proper vacuum air flow. It will also need to be adjusted when the standoff distance is increased or when the shroud and/or wear brush is replaced.

Use the following procedure to adjust the wear brush assembly:

1. Make sure the truck and auxiliary engines are running at idle speed and the POWER switch in ON to activate the pressure cleaning electrical and hydraulic systems.
2. Lower the Hog Head onto a level surface.
3. Turn on the FLOAT switch to be sure the head is flat with the surface.
4. Shutdown the pressure cleaning system and place the truck in service position.
5. Note the gap between the bottom of the brush and the surface.
6. Loosen the brush clamp on the Hog Head.
7. Tap the brush down evenly using a dead blow hammer until the bristles are just touching the surface and the gap is eliminated.
8. Make sure the brush bristles are not pressed hard against the pavement. If the brush is set too tight against the surface, it will cause premature wear to the bristles resulting in reduced vacuum air flow and accelerated brush wear.
9. Tighten the clamp and recheck. Readjust if necessary.



Wear Brush & Adjustment Clamps



Proper Wear Brush Contact



4.6 Nozzle Installation

The condition of the nozzles is critical to cleaning performance. Nozzles should be inspected before the start of each shift as part of the pre-operation check. They should also be inspected when the operator notices a loss in pressure or a change in performance while cleaning.

If visual inspection of the nozzle spray pattern indicates that the pattern is not in the acceptable range, the nozzle must be replaced.

Nozzle Replacement Procedure:

1. Position the Hog Head, so you have easy access for visual inspection of nozzles.
2. Activate the high pressure system and raise pressure to operating pressure. (Refer to section 3.5)
3. Inspect the nozzle spray pattern (keep a distance of at least 18" from the nozzles)
4. Turn the HIGH PRESSURE switch OFF and shut-down the truck and auxiliary engines. (Refer to section 3.7)
5. Turn the CHARGE PUMP switch OFF and place the truck in the service position.
6. Remove worn or damaged nozzles.
7. Activate the auxiliary engine and cleaning system as described in section 3.4.
8. With the truck and auxiliary engines running at idle speed, activate the charge water pump and purge the spray bar at low pressure to remove debris that could clog up the nozzles
9. Once the spray bar is flushed, deactivate the pressure cleaning system and shutdown the truck and auxiliary engines. (Refer to section 3.7)
10. Turn the POWER and CHARGE PUMP switches OFF and place the truck in the service position.
11. Apply a light coat of anti-seize to the threads of the new nozzles.
13. Install the nozzles being careful not to get any anti-seize on the seat area of the nozzle or the spray bar.
14. Tighten each nozzle finger tight. Then torque each nozzle to no more than 10 ft lbs. The nozzle fan must be in line with the spray bar when it the nozzle is tight.
15. Reactivate the high pressure cleaning system (Refer to sections 3.4 and 3.5) and raise system pressure to operating pressure.
16. Inspect new nozzles for proper spray pattern.



Spray Bar & Nozzles



Scheduled Maintenance

5.1 Scheduled Maintenance Introduction

Some components of the pressure cleaning system require specific maintenance at scheduled intervals recommended by the component manufacturer or Hog Technologies. Maintenance schedules and service procedures for those components of the pressure cleaning system are covered in this section.

The information on components manufactured and supplied by other manufacturers outlined in this section is a general overview of the maintenance recommended and steps required. Always refer to the component manufacturer's manuals for more detailed information and additional maintenance information.

The Maintenance Matrix at the end of this section identifies the recommended service and/or lubrication intervals for each component of the pressure cleaning system. You should become familiar with the maintenance and lubrication requirements of all components. Some of the lubrication points on components such as the thru-shaft spindle bearings require specialized lubricants. The use of any lubricant other than the lubricant specified will void the warranty on those components.

The maintenance intervals outlined in this section are considered typical for units used in normal operating conditions. Units used in extremely dirty conditions, high temperatures or other severe duty applications will require more frequent service.

 **CAUTION** 

THE SCHEDULED MAINTENANCE PROCEDURES IN THIS SECTION MUST BE FOLLOWED EXACTLY TO AVOID DAMAGING COMPONENTS AND/OR VOIDING THE WARRANTY.

5.2 Periodic Maintenance Items

The primary components in the pressure cleaning system have specific stated service intervals. Other components that support primary equipment require periodic inspection and routine maintenance. Many of those items are mentioned in this section.



Access Door Hinges And Latches.

Monthly/200 Hours:

- Lubricate and inspect all hinges.
- Inspect and lubricate latches. Replace damaged or worn out hinges or latches immediately.

Safety Pins

Weekly/50 Hours:

- Lubricate the retaining ball or sliding shaft on safety pins.
- Inspect and test for proper operation. Replace damaged, corroded or worn out pins immediately.

Ball Valves

Monthly/200 Hours:

- Open and close ball valves at least once each month to keep them free and operating properly.
- Lubricate and inspect valve shafts and handles. Replace if badly corroded.

Charge Water Pump And Hoses

Weekly/50 Hours:

- Inspect the charge water pump, hoses and fittings for leaks and signs of wear or deterioration. Any questionable or leaking component should be repaired or replaced before operating the system.
- Run the pump and listen for unusual noises and proper operation. Find and correct the cause of unusual noises or erratic operation.

Waste Tank Dirty Water Pump And Automatic Switch

Weekly/50 Hours:

- Remove and clean the dirty water pump strainer screen. Test the pump for proper operation.
- Fill the debris cage sump with water and monitor the operation of the automatic switch, pump and drain system. Correct any problems found.

Monthly/200 Hours:

- Thoroughly clean and flush the float for the automatic switch with clean water. Make sure the switch moves freely.
- Test the switch for proper operation.

5.3 Auxiliary Engine

Proper auxiliary engine maintenance is essential to the proper performance and reliability of the pressure cleaning system. You should perform all recommended maintenance according to the manufacturer's recommendations. Maintenance schedules and procedures are outlined in the engine owner's manual. They should be followed exactly.

Daily Inspection and Maintenance

- Check the crankcase oil level.
- Check the coolant level.
- Inspect the alternator/water pump belt. Make sure it is in good condition and adjusted properly.

300 Hour Maintenance

Perform all daily maintenance along with the items outlined in this section.

- Change the oil and filter.
- Change the air filter.
- Inspect the engine for loose bolts and nuts.
- Inspect all cooling hoses for deterioration and damage.

Refer to the engine owner's manual and service manual for additional required maintenance and service information.



Typical Auxiliary Engine



5.4 Vacuum Blower Maintenance

Blower Overview

The vacuum blower typically operates at 4000 to 6000 RPM. It is powered by a hydraulic motor and, consequently, requires little routine maintenance except for daily inspections for loose, worn and damaged components and to replace the blades when they become worn.

Daily Inspection and Maintenance

- Check for obvious loose mounting nuts and bolts.
- Inspect the hydraulic motor and hoses for leaks, chaffing or other problems.
- Check the blower housing bolts. Make sure they are in good condition and tightened to specifications.
- Check all vacuum hose connections. Make sure all cam-lock fittings are secure and push on connections are tight.

200 Hour Maintenance

Perform all daily maintenance along with the items outlined in this section.

- Inspect and tighten all mounting bolts, hose clamps and hardware.
- Inspect blower fan blades for excessive wear and damage. Operate vacuum system and monitor vacuum at the Hog Head. Service or replace the blades if low vacuum pressure is present.
- Inspect all hoses and fittings for signs of deterioration, chaffing and leaks. Repair or replace as necessary.
- Tap vacuum hose walls with a dead blow hammer while the system is operating at maximum vacuum to flex the hose walls and cause built up debris to break off and be sucked into the debris tank.
- Inspect and rotate the vacuum hoses 120° to increase the life of the hoses.

5.5 Vacuum Blower Blade Replacement

Vacuum blower blades need to be replaced if they become worn or damaged. Excessive noise, vibration and low vacuum pressure at the Hog Head are indications that the blades need to be replaced.



Vacuum Blower

The blower blades must be replaced as a set. Never replace only one or two blades. The new blades will not be the same size and weight as the old blades, which will cause the blades and drive plate to be out of balance. This will result in severe vibration and damage the blower during operation.

Replacing vacuum blower blades:

1. Lower the front implement and Hog Head to the pavement.
2. Make sure the pressure cleaning system is shutdown and the truck is in the service position.
3. Release cam-lock fittings and hose clamps. Then remove the vacuum hoses from the blower housing.
4. Remove the bolts and nuts securing the blower housing to the base plate and remove the housing.
5. Thoroughly clean the housing and inspect it for damage and excessive wear. Replace the housing if necessary.
6. Clean and inspect the housing seal. Replace if necessary.
7. Hold the blades so they can't rotate and loosen the center hub bolt. Remove the hub cap and bolt.
8. Slots in the hub and drive plate secure the blades. With the hub cap removed, slide the hub end of the blade out of the hub. As the blade slides out of the hub, it will release the slotted tab that locks the blade to the drive plate. Repeat this step for all the blades.



Section 5 - Scheduled Maintenance



NOTICE:

IF THE BLADES ARE WELDED TO THE FAN PLATE, THEN REMOVE THE TWO SET SCREWS IN THE SHAFT BETWEEN THE BLADES AND REMOVE THE ENTIRE IMPELLER. REINSTALL THE NEW IMPELLER AND THEN SKIP TO STEPS 11 - 15.

9. Clean the drive plate and hub.
10. Install the new blades by inserting the slotted tab on the outer end of the blade into the drive plate slot while sliding the hub end into the slot in the hub. The slotted tab will lock into the drive plate as the blade slides into the hub. Repeat for all the blades.
11. Install the hub cap and bolt. Tighten to 40 ft lbs.
12. Make sure the housing seal is clean and position the housing on the base plate and align the holes in the housing with the holes in the base plate.
13. Tighten the bolts in a crisscross pattern.
14. Verify that the housing is properly centered and square to the base plate.
15. Attach the vacuum hoses to the blower and secure the cam-lock fittings and hose clamps.



Blade, Slotted Tab & Hub Slot



Hub Cap On Blades & Bolt Location



Blades Installed On Drive Plate & Hub Cap Installation





Hog Head Vacuum Hoses

5.6 Vacuum Hose Replacement & Rotation Procedure

Debris buildup, kinks, clogs or leaks in the system will cause a reduction in airflow at the Hog Head, reducing efficiency of operation or causing operations to stop completely. Debris buildup inside the hoses can be removed by periodically tapping the outside walls with a dead blow hammer while the system is operating at maximum vacuum. This will flex the hose walls and cause built up debris to break off and be sucked into the debris tank.

The internal walls of vacuum hoses develop wear points caused from the high velocity of abrasive debris traveling inside the hoses. The wear points are most prevalent in the outside radius of tight bends near the Hog Head and where the debris hose rises above the truck cab.

The life of the hoses in these areas can be extended by rotating the hoses 120° every 50 hours. Vacuum hoses should be inspected daily and replaced as needed.

Make sure the pressure cleaning system is shut-down with the truck in the service position before rotating or replacing vacuum hoses.

NOTICE:
DAMAGED VACUUM HOSES CAN BE REPAIRED USING DUCT TAPE AS A TEMPORARY SOLUTION TO EXTEND THE LIFE OF THE VACUUM HOSE.

Vacuum Hose Replacement

1. Release the cam-locks or loosen the hose clamps at the hose connection fittings.
2. Remove the old vacuum hose assembly.
3. If the cam-lock fittings are in good condition and can be reused, cut the old hose off of the fittings. Then install the fittings in the new vacuum hose.
4. Connect the new vacuum hose assembly and close the cam-locks or tighten the hose clamps.

Vacuum Hose Rotation

1. Mark the position of the hose, then release the cam-locks or loosen the hose clamps at the hose fittings.
2. Using the marks as a reference, rotate the hose 120 degrees.
3. Secure the hose in the new position with the cam-locks and/or hose clamps.



5.7 High Pressure Hose Installation

The high pressure hoses should be inspected weekly or every 50 hours and replaced as required. Use the following procedure when replacing a pressure hose.

When replacing damaged or worn high pressure hoses, check the burst rating marked on the hose. Always use a replacement hose with an equal or greater pressure rating.

Replacing the Hog Head high pressure hose:

1. Make sure the pressure cleaning system is shutdown with the truck in the service position.
2. To avoid contamination that could clog nozzles, always make sure hose fittings and the area around the hose connections are thoroughly cleaned.
3. Remove the old high pressure hose and cap the fittings to prevent contamination.
4. If the hose to be replaced is routed through a tight area, use the 7/8" hose coupler fitting in the Spare Parts System and attach an end of the new hose to the fitting on the old hose. Cap the other fitting on the new hose to prevent contamination, then carefully pull the old hose out while guiding the new hose into place.
5. If the new hose will be routed on its own and not pulled through by the old hose, cap both ends to prevent contamination and carefully route the hose into position.
6. Verify the routing of the hose, making sure it is not in contact with sharp edges or near a source of heat that could damage the hose. Install anti-chaffing or heat deflectors to protect the hose if necessary.
7. Remove the caps and apply a light coat of anti-seize to the threads of each fitting. Then attach the fittings and tighten to specifications.
8. Hold the thru-shaft so it won't turn with a 3/4" (19 mm) wrench inserted in the slot at the base of the thru-shaft housing.
9. Turn the spray bar counterclockwise by hand until it is free of the shaft.
10. Remove brass button.
11. Use a stainless steel wire brush to clean the dirt from the thru-shaft threads.
12. Activate the charge water system and purge the Hog Head at low pressure to remove debris that could have entered the system while changing the hose. (Refer to section 3.4)
13. Shutdown the system and return the truck to service position.
14. Apply a light coat of anti-seize to the thru-shaft threads.
15. Install a new brass button seal, hold the thru-shaft with the wrench and reinstall the spray bar.
16. Tighten the spray bar by turning it clockwise ***slowly*** until it stops. Then seat the seal by turning the spray bar another 15%. Make sure you remove the wrench when the installation is complete.
17. Activate the pressure cleaning system and operate the high pressure system to check the new high pressure hose and fittings for leaks.



5.8 Water Heater Burner Maintenance

The water heater oil burner is powered by the water cleaning electrical system and supplied fuel from the auxiliary engine fuel tank. It requires little routine maintenance except for daily inspections for fuel leaks, loose components and for proper operation. The fuel supply line is equipped with a fuel filter that should be changed whenever the auxiliary engine fuel filter is serviced.

You should perform all recommended maintenance according to the manufacturer's recommendations. Maintenance schedules and procedures are outlined in the oil burner manual. They should be followed exactly.

Daily Inspection and Maintenance

- Inspect water heater mounting bolts and mounting hardware. Tighten or replace as required.
- Check fuel oil supply lines and fittings to verify there are no leaks.
- Check water hoses and fittings for leaks, damage and chaffing.

Monthly Inspection and Maintenance

- Observe combustion air openings and vent system for integrity. Openings must be clean and free of obstructions.
- Check oil lines and fittings to verify there are no leaks.
- Observe burner ignition and performance to verify smooth operation.

NOTICE:
SHUT THE SYSTEM DOWN IF YOU OBSERVE ABNORMAL OR QUESTIONABLE OPERATION. CALL A QUALIFIED SERVICE AGENCY FOR PROFESSIONAL INSPECTION AND SERVICE.

Annual Maintenance

Perform all daily and monthly maintenance along with the items outlined in this section.

- Change the in-line fuel oil filter.
- Have the burner inspected, tested and started by a qualified service technician.



Water Heater Burner & Burner Fuel Filter

Changing The Burner Fuel Filter

The fuel filter should be changed at least annually or whenever the auxiliary engine filter is serviced. Use the following procedure to replace the filter.

Replacing the oil burner fuel filter:

1. Make sure the pressure cleaning system is shutdown with the truck in the service position.
2. To avoid contamination, always make sure hose fittings and the area around the hose connections are thoroughly cleaned.
3. Turn off the fuel supply valve.
4. Loosen the hose clamps on each end of the filter and remove the hoses.
5. If excessive fuel oil flows from the fuel tank line, temporarily plug the hose.
6. Note the fuel flow direction indicated on the new filter and install the hoses on each end.
7. Tighten the hose clamps. Be careful not over-tighten the clamps and cut the hose.
8. Activate the auxiliary engine and cleaning system as described in section 3.4 and inspect the burner fuel system for leaks.



5.8 Hydraulic System Scheduled Maintenance

Hydraulic System

The hydraulic pumps operate at very high pressure and have specific maintenance requirements. You should perform all recommended maintenance according to the pump manufacturers' specifications.

Hydraulic fluid should be changed and the tank flushed on a regular schedule in accordance with the hydraulic component manufacturer's recommendations. Hog Technologies recommends changing the fluid at least once every 600 hours.

Daily Inspection and Maintenance

- Check the hydraulic fluid level each day or immediately following the repair of a blown hose, leaking fitting or any hydraulic system service.
- Inspect all hoses, fittings, valves and seals for leaks and proper operation. Repair or replace leaking or malfunctioning components before operating the system.
- Monitor the cooling fan operation and make sure it is activating when necessary, sounds normal and pulls a strong flow of air through the cooler.

Refer to the Maintenance Matrix in this section for fluid specifications.

200 Hour Inspection and Maintenance

- Change the low pressure filter in the return line. The filter removes any debris that may enter the system and should be changed every 200 hours or more frequently if necessary.
- Change the high pressure filters in the high pressure circuits. The filters remove any debris that may enter the system and should be changed every 200 hours or more frequently if necessary.
- Inspect the cooling fins for the oil cooler and clean as necessary. The cooler is critical in maintaining acceptable oil temperatures in the hydraulic system and must be kept clean to maintain efficiency.

600 Hour Inspection and Maintenance

- Drain hydraulic fluid and flush hydraulic tank.



Hydraulic Fluid Tank

5.9 Changing Hydraulic Fluid & Flushing Tank

The reservoir tank must be drained and flushed at regular intervals. Only qualified service technicians should drain and flush the system or replace hydraulic fluid filters.



WARNING



ALWAYS DEPRESSURIZE THE HYDRAULIC SYSTEM BEFORE REMOVING ANY HYDRAULIC COMPONENTS, HOSES OR FITTINGS. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

NOTICE:

- BEFORE PERFORMING ANY MAINTENANCE PROCEDURE, MAKE SURE THE PRESSURE CLEANING SYSTEM IS SHUTDOWN WITH THE TRUCK IN THE SERVICE POSITION AND ON LEVEL GROUND.
- MAKE SURE THE HYDRAULIC SYSTEM IS NOT PRESSURIZED AND THE FLUID IS COOL.
- MAKE SURE THE HYDRAULIC TANK, FILTERS AND ALL RELATED COMPONENTS ARE THOROUGHLY CLEANED BEFORE SERVICING TO PREVENT CONTAMINATION.
- MAKE SURE ALL PARTS ARE CLEAN BEFORE FINAL ASSEMBLY.



Drain & Flush the hydraulic tank and replace the pick tube filter:

1. Make sure the hydraulic system is not pressurized and the fluid is cool.
2. Remove the fill cap to allow air to enter the tank as the fluid drains.
3. Drain the tank into a suitable container by removing the drain plug.
4. When the tank is drained, use a bright light through the fill fitting to inspect for sludge buildup and other contamination.
5. Flush the tank until it is clean using fresh hydraulic fluid.
6. Reinstall the drain plug.
7. Add fluid until the tank is full. Monitor the fluid level using the sight gauge.
8. Replace the fill cap and tighten.



Typical Low Pressure Hydraulic Filter With Indicator Gauge

5.10 Replacing Hydraulic Filters

Before performing any maintenance procedure, make sure the waterblasting system is shutdown with the truck in the service position.

Low Pressure Filters

The low pressure filter is a cartridge type filter located in the return line at the top of the tank. The filter is equipped with an indicator gauge that monitors the condition of the filter and alerts the operator when a filter change is required.

Changing the low pressure filter element:

1. Loosen the bolts on the filter canister cap until the cap is loose enough to rotate. It is not necessary to remove the bolts.
2. Rotate the cap until the bolts align with the large holes in the cap, then remove the cap.
3. Remove the filter element and insert the new filter.
4. Install a new seal on the cap and lubricate the seal with hydraulic fluid.
5. Install the cap and rotate it to the secured position. Then tighten the cap bolts in a criss-cross pattern.
6. Inspect the filter for leaks when the hydraulic system is activated.



High Pressure Filters

The high pressure filters are a cartridge type filter located in a special high pressure canister. There is a filter in each hydraulic pump high pressure circuit.

Make sure to verify that all pressure is bled from the system before removing the filter canister. Monitor the hydraulic pressure gauge to verify 0 pressure in the system, then use the following procedure to change the filter.

Changing the high pressure filter element:

1. Verify 0 pressure in the system, then use a socket wrench to loosen the bolt at the bottom of the filter canister.
2. Remove the canister and dirty filter element from the filter head.
3. Thoroughly clean the filter canister and install the new element.
4. Place a new seal on the canister and lubricate with hydraulic fluid.
5. Replace the canister and tighten bolt to specifications.
6. Monitor the filter closely for leaks when the hydraulic system is activated.

Note:

Refer to the filter manufacturer's manuals for additional information and instructions for servicing the hydraulic system.



Typical High Pressure Hydraulic Filter



5.11 Winterization & Storage Procedures

When operating the truck in freezing temperatures, it is extremely important to properly winterize the water and vacuum systems whenever the truck is shutdown.

Pressure System Shutdown and Winterizing

Water freezing in vacuum system components can cause serious damage to the blower, drain valves and other vacuum system components. Water freezing in pressure cleaning water components can cause serious damage to pumps, filter canisters, water heater, valves and other water system components.

It is important to follow the proper procedure when shutting down the vacuum and pressure cleaning water systems during cold weather operations or for winter storage to ensure all water is removed from critical areas and those systems are protected with antifreeze.

Completely draining the systems is difficult and time consuming. Consequently, circulating antifreeze through the system is the preferred method to winterize the pressure cleaning system.

For trucks operating daily during freezing weather, this method provides much quicker startup and shutdown procedures. The procedure requires a 50/50 mixture of water and glycol based RV potable water system antifreeze to be circulated through the system to protect components from freezing.

35 to 40 US gallons (132 to 152 liters) of premixed antifreeze at a 50/50 water antifreeze ratio is required to properly winterize the water and vacuum systems. Make sure you have enough antifreeze on hand before starting the winterizing procedure.



CAUTION



NEVER USE ALCOHOL BASED ANTIFREEZE SOLUTIONS TO WINTERIZE THE PRESSURE CLEANING SYSTEM. USING ALCOHOL BASED ANTIFREEZE SOLUTIONS TO WINTERIZE THE HIGH PRESSURE WATER SYSTEM WILL DESTROY THE SEALS AND O-RINGS

Use the following procedure to shutdown and winterize the pressure cleaning system:

1. Shutdown high pressure water to the Hog Head by turning OFF the HIGH PRESSURE switch.
2. Stop the truck and set the parking brake.
3. Turn the HEAD ROTATION and CHARGE PUMP switches OFF.
4. Allow the vacuum blower to operate for a couple of minutes while the auxiliary engine is still running at operating speed to clear waste water from hoses and dry out the vacuum system. Then turn the VACUUM switch OFF.
5. Reduce the auxiliary engine speed to idle and allow it to run at idle speed for a couple of minutes to cool internal engine components.
6. Turn the POWER switch and all other control panel switches OFF.
7. Shutdown the auxiliary engine.
8. Drain all water from the clean water tank, water heater and waste tank sump.
9. Open the clean water fill valve and allow all water to drain from the fill pipe.
10. If the machine will be shutdown for an extended period, remove debris from the debris tank and completely clean the sump with clean fresh water. Make sure to thoroughly flush the drain valves and allow all water to completely drain from the tank and valves.
11. Pressure cleaning water system hoses and all Hog Head components should be drained of all water.
12. Open the bleeder valve at the charge water pump and allow hoses to completely drain. With the valve still open, activate pressure cleaning system and charge pump briefly to pump out any remaining water, then close the shutdown the system and close the valve. (Refer to sections 3.4 and 3.7)
13. Remove the dirty water pump strainer and run the pump briefly to drain the pump hoses, then clean and reinstall the strainer.
14. Pour 20 gallons of 50/50 antifreeze mixture into the clean water tank.
15. Activate the auxiliary engine and cleaning system as described in section 3.4



Section 5 - Scheduled Maintenance



16. With the engine at idle speed, activate the CHARGE WATER and HIGH PRESSURE switches until antifreeze flows from the spray bar nozzles for 20 or 30 seconds. Then turn the HIGH PRESSURE and CHARGE WATER switches OFF.
17. Pour 5 gallons of 50/50 antifreeze mixture into the debris tank sump. Activate the dirty water pump until antifreeze flows from the hose fitting in the clean water tank for 20 or 30 seconds. Then turn OFF the pump.
18. Open the debris tank gravity drain valves and allow antifreeze to flow from the valves.
19. Shutdown the auxiliary engine and pressure washing system. (Refer to section 3.7)
20. Turn OFF the POWER switch and all other control panel switches.
21. When winterizing the high Pressure pump, refer to pump manufacturer's procedures for additional instructions for operating and maintaining high pressure pumps and equipment in freezing climates.
22. Follow all other instructions in the Routine Shutdown Procedure. (Refer to section 3.7)
23. Leave the drain valves open on the debris tank sump.

Reactivating a truck winterized with antifreeze:

Note that the steps in this procedure are intended to recover as much of the antifreeze from the system as possible.

1. Add clean fresh water to the clean water tank.
2. Start the truck and auxiliary engines to activate the pressure cleaning system (refer to Section 3.4)
3. Position the spray bar over a container to collect the antifreeze.
4. With the engine at idle speed, activate the CHARGE WATER and HIGH PRESSURE switches. Allow clean water to flow and push all the antifreeze out the spray bar into a container.

5. Once the water flows clear, turn the HIGH PRESSURE and CHARGE WATER switches OFF. Then shutdown the auxiliary engine and pressure cleaning system.
6. At this point you're ready to continue with complete startup procedure (Refer to section 3.4)

NOTICE:

IF YOU ARE INTENDING TO REUSE THE RECOVERED ANTIFREEZE, MAKE SURE TO TEST IT AND MAKE SURE THE ANTIFREEZE MIXTURE HAS NOT BECOME DILUTED TO THE POINT WHERE IT WILL NOT PROTECT THE WATER SYSTEM AT THE EXPECTED TEMPERATURES.

REMEMBER THAT THE ANTIFREEZE WILL BE SLIGHTLY DILUTED EACH TIME THE SYSTEM IS WINTERIZED, WHICH WILL CAUSE THE FREEZE PROTECTION TEMPERATURE TO RISE. THE AMOUNT OF DILUTION WILL VARY, DEPENDING ON THE VOLUME OF FRESHWATER IN THE SYSTEM AT THE TIME OF WINTERIZATION.



CAUTION



TO AVOID SERIOUS DAMAGE TO PRESSURE CLEANING HYDRAULIC COMPONENTS WHEN OPERATING IN FREEZING TEMPERATURES OR TEMPERATURES BELOW 60 DEGREES FAHRENHEIT (160 CELSIUS), IT IS NECESSARY TO OPERATE THE HYDRAULIC SYSTEM AND OTHER PRESSURE CLEANING COMPONENTS INCLUDING THE BLOWER AND HIGH PRESSURE PUMP, WITH THE ENGINE AT IDLE, UNTIL THE HYDRAULIC FLUID REACHES A TEMPERATURE OF 60 DEGREES FAHRENHEIT (160 CELSIUS) OR ABOVE.



WARNING



TO AVOID SERIOUS DAMAGE OR INJURY TO PERSONNEL FROM FIRE OR EXPLOSION, NEVER ACTIVATE THE WATER HEATER WHEN THE WATER LINES ARE FILLED WITH ANTI-FREEZE. ALWAYS DRAIN THE ANT-FREEZE AND FLUSH THE SYSTEM WITH FRESHWATER BEFORE TURN THE WATER HEATER ON.



5.12 Surface Hog Maintenance Matrix

EQUIPMENT	COMPONENT	INTERVALS	LUBRICANT SPECIFICATIONS
Truck Engine	Oil and Filter	Refer To Truck Operating Manual	Refer To Truck Operating Manual
Truck Engine	Fuel Filters	Refer To Truck Operating Manual	Refer To Truck Operating Manual
Truck Transmission	Oil and Filter	Refer To Truck Operating Manual	Refer To Truck Operating Manual
Truck Differential	Differential Oil	Refer To Truck Operating Manual	Refer To Truck Operating Manual
Truck Drive Line	Drive Shafts	At Each Chassis Service	Mobil PolyRex EM Grease
Auxiliary Engine	Oil and Filter	Refer To Truck Operating Manual	Refer To Truck Operating Manual
Auxiliary Engine	Fuel Filters	Refer To Truck Operating Manual	Refer To Truck Operating Manual
Hydraulic System	Hydraulic Fluid Filters	Every 200 Hours or As Required	NA
Hydraulic System	Hydraulic Fluid Reservoir	Every 600 Hours or Once Per Year/Which Ever Comes 1st	Aw68
High Pressure Pump	Oil	Refer To Pump Operating Manual	Refer To Manufacture's Specifications
Hog Head	Chassis Wheels and Casters	Daily	Mobil PolyRex EM Grease
Hog Arm Safety Pin	Pin Locking Ball & Button	Weekly	General Purpose Oil
Debris Tank	Debris Tank Door Hinges	Weekly More Frequently If Required	Mobil PolyRex EM Grease
Unit General Lubrication Points	Door Hinges – Ball Valves – Latches – Pins - Etc.	Weekly More Frequently If Required	General Purpose Oil

This chart is a guide only. It should never be used to supersede equipment manufacturer's specifications. Please refer the manufacturer's operation and maintenance manuals for additional information.



NOTES



Pressure Cleaning System Troubleshooting

PROBLEM	CAUSE AND SOLUTION
Noises & Vibrations	
Blower system noise.	<ul style="list-style-type: none"> • Blower impellers are clogged with paint and debris. Disassemble and clean blower. Rebuild or replace if necessary. • Blower muffler is clogged. Clean muffler. • Blower mount bolts are loose. Tighten Bolts. • Loose blower hydraulic drive motor coupler. Tighten or replace drive motor coupler. • Hydraulic drive motor is worn. Replace drive motor.
Hog Head noise.	<ul style="list-style-type: none"> • Hog Head rotation extremely high. Turn head rotation dial counterclockwise to reduce head speed. • Spray bar is hitting shroud (1). Shroud is bent or damaged. Repair or replace shroud. • Spray bar is hitting shroud (2). Water swivel bearings are loose causing spray bar to hit shroud. Repair water swivel assembly.
High pressure pump noise.	<ul style="list-style-type: none"> • High pressure pump coupler is loose. Tighten or replace drive motor coupler. • There is an internal problem with the pump. Repair the pump.
Hog Arm & Hog Head	
Hog arm won't raise.	<ul style="list-style-type: none"> • Float mode activated. Disengage float function. • Hydraulics not engaged. Start auxiliary engine and turn the POWER switch on to activate hydraulic system. • Hydraulic fluid low. Add fluid to the hydraulic fluid reservoir. • Hose or fitting broken or leaking. Tighten loose fitting or replace broken hose or fitting.
Spray bar doesn't spin or spins slowly.	<ul style="list-style-type: none"> • Hydraulics not engaged. Make auxiliary engine is running and POWER switch is ON to activate hydraulic system. • Debris packed around thru-shaft or spray bar. Clean thru-shaft or spray bar. • Hog Head shroud is concave and not convex. Repair or replace shroud. • HEAD ROTATION switch is OFF. Turn On HEAD ROTATION switch. • Electric connection is unplugged or no voltage to coil. Check that LED light on coil is lit and repair circuit or replace coil as necessary.



PROBLEM	CAUSE AND SOLUTION
UHP Pump & High Pressure System	
High pressure and/or charge pressure gauges fluctuating or pulsing.	<ul style="list-style-type: none"> • Clean water tank is low on water. Fill tank • Auxiliary engine speed is too low and hydraulic system is not turning the charge pump at proper RPM. Raise engine speed to operating RPM. • Hog head high pressure water selector valve is not opened all the way. Open valve. • Water filters are clogged. Clean or replace filters.
Water dripping from high pressure hose weep holes.	<ul style="list-style-type: none"> • Hose fitting loose or damaged. Tighten fitting or replace hose and fittings.
Water dripping from weep hole on water shaft high pressure hose connection.	<ul style="list-style-type: none"> • Seal is worn or damaged. Replace internal seals. • Cracked water shaft. Remove and inspect shaft assembly. Replace cracked water shaft.
Low charge water pressure. (30 PSI/2 BAR or less).	<ul style="list-style-type: none"> • Auxiliary engine speed is too low and hydraulic system is not turning the charge pump at proper RPM. Raise engine speed to operating RPM. • Charge water pump is not activated or supply valve is closed. Open supply valve or activate charge water pump. • Dirty clean water filters. Change filter bag and cartridge. • Clean water tank is empty. Fill tank with water. • Clogged impeller on pump. Disassemble pump and clean or replace impeller. • There is an air leak in the suction hose. Find and repair leak. • Debris in water hose from tank. Flush or replace intake water hose.
Low pressure at nozzles.	<ul style="list-style-type: none"> • Auxiliary engine speed is too low. Raise auxiliary engine speed. • Worn or blown nozzles. Change nozzles. • Nozzles are leaking. Tighten or replace nozzles. • Oversized nozzles. Install correct nozzles. • Water leaks in high pressure hoses, fittings. Tighten loose fittings or replace defective hoses and damaged fittings. • Low charge water pressure. Refer to low charge water pressure problems.



PROBLEM	CAUSE AND SOLUTION
<i>Vacuum System</i>	
Low vacuum pressure.	<ul style="list-style-type: none"> • Auxiliary engine speed is too low and hydraulic system is not turning the vacuum blower at proper RPM. Raise engine speed to operating RPM. • Hog Head relief damaged or stuck open. Repair or replace leaking valve. • Debris tank is full. Dump tank.
<i>Vacuum System</i>	
Vacuum loss or failure.	<ul style="list-style-type: none"> • Worn or damaged shroud wear boot. Replace wear boot. • A vacuum hose is worn through or damaged. Replace worn or damaged vacuum hose. • Vacuum hose plugged with debris. Hit hose with dead blow hammer to breakup debris. Replace hose if necessary.



NOTES



Pre-Op Check List	
Tires	Grease Points
<input type="checkbox"/> Tire Pressure - Front	<input type="checkbox"/> Hog Head Casters & Wheels
<input type="checkbox"/> Tire Pressure - Rear	Tank System
Lighting Systems	<input type="checkbox"/> Clean Water Tank Full & Not Leaking
<input type="checkbox"/> Brake Lights	<input type="checkbox"/> Fittings, Sight Tubes
<input type="checkbox"/> Turn Signals	<input type="checkbox"/> Check Vac Hoses For Leaks
<input type="checkbox"/> Parking Lights	<input type="checkbox"/> Debris Bag In Place - Debris Level OK
<input type="checkbox"/> 4-Way Lights	<input type="checkbox"/> Dirty Water Pump Strainer Clean
<input type="checkbox"/> Strobe and Work Lights	<input type="checkbox"/> Debris Tank Doors Closed & Latched
<input type="checkbox"/> Reverse Lights	Water Heater
<input type="checkbox"/> Headlight: High-Beams	<input type="checkbox"/> Fuel Lines Secure & Not Leaking
<input type="checkbox"/> Headlight: Low-Beams	<input type="checkbox"/> Water Tank Secure & Not Leaking
Electrical & Accessories	<input type="checkbox"/> Water Hoses Secure & Not Leaking
<input type="checkbox"/> Wipers	<input type="checkbox"/> Burner Exhaust Clear And In Good Condition
<input type="checkbox"/> Horn	Hog Head & Spray Bar
<input type="checkbox"/> Console Switches	<input type="checkbox"/> Spray Bar & Nozzles OK
<input type="checkbox"/> Back Up Beeper	<input type="checkbox"/> Spray Bar Protector OK
<input type="checkbox"/> DRIVE/WORK LED Lights	<input type="checkbox"/> No Loose Components Or Damage
<input type="checkbox"/> Waterblasting Master Breakers ON	Operational Testing
<input type="checkbox"/> Digital Vacuum Gauge Operating	<input type="checkbox"/> Truck Engine Operation
<input type="checkbox"/> Inspect Electrical Box	<input type="checkbox"/> Auxiliary Engine Operation
General	<input type="checkbox"/> All Switches & Controls Work
<input type="checkbox"/> Filling Hose And Wrench Onboard	<input type="checkbox"/> Engage/Disengage Charge Pump
<input type="checkbox"/> Accident/Incident Decals	<input type="checkbox"/> Charge Pump _____ PSI
<input type="checkbox"/> All Wires, Brake Lines & Hydraulic Lines Secure	<input type="checkbox"/> High Pressure ON/OFF Valve Operation
<input type="checkbox"/> All Components Are Neat And Organized	<input type="checkbox"/> High Pressure Pump _____ PSI
Mobile Spare Parts and Tool System	<input type="checkbox"/> Water Heater Producing Hot Water
<input type="checkbox"/> Mobile Spare Parts System Complete	<input type="checkbox"/> Spray Bar Rotation
<input type="checkbox"/> Tool Kit Onboard	<input type="checkbox"/> Hog Arm Operation
Fluid Levels	<input type="checkbox"/> Water filters Clean
<input type="checkbox"/> Truck Engine Oil	<input type="checkbox"/> Vacuum Blower Operation
<input type="checkbox"/> Automatic Transmission Oil	<input type="checkbox"/> Dirty Water Pump System Operating
<input type="checkbox"/> Truck Radiator & Coolant Level	
<input type="checkbox"/> Auxiliary Engine Oil Level	
<input type="checkbox"/> Auxiliary Engine Radiator & Coolant	
<input type="checkbox"/> Hydraulic Oil Level	
<input type="checkbox"/> Truck & Auxiliary Engine Fuel Level OK	



NOTES



Hog Technologies Terms

Clean Water Tank Bag Filter – Traps larger particles that comes from the recycle system as it enters the clean water tank.

100 Micron Debris Bag – Installed in debris tank on hooks to collect debris and filter water.

Ball Valve – ON/OFF valves used to control water flow and draining tanks.

Basic Training Course – On-site training to operate and maintain the Surface Hog.

Spray Head – The shroud and spray bar that deliver high pressure water to the pavement.

Blower – Pulls airflow through the vacuum system.

Brush Assembly – Attaches to the bottom of the shroud providing a partial seal between the spray head and surface to reduce the amount of debris and water exiting during cleaning operations.

Wear Brush Clamps – Clamps on the shroud that secure the brush and provide adjustment.

Burst Rating – The PSI (BARS) at which a component will rupture.

Manual Pressure Valve – Located on the high pressure pump hand held wand circuit. It is used to manually adjust pressure to the hand held pressure washing tool and recirculates excess water back to the clean water tank.

Cam Lock Connector – Installed at the end of each vacuum hose fitting to secure the hose.

Cavitation – Occurs when liquid is subjected to rapid changes of pressure that cause the formation of cavities in the flow of water that can damage equipment.

Charge Pressure – Pressurized water supply to the High Pressure pump.

Charge Pressure Gauge – Gauge that displays the charge pressure in PSI.

Charge Pump – Centrifugal pump that supplies water to the high pressure pump.

Chassis – Steel frame that holds the truck body and motor.

Circuit Breaker - A device for interrupting an electric circuit to prevent excessive current, as that caused by a short circuit, from damaging components in the circuit or from causing a fire.

Clean Water Tank – Located on the rear of the chassis used to store the clean water supply for the pressure cleaning system.

Debris Tank – Collects all debris removed from the cleaned surface through the vacuum hose.

Main Pressure Valve – A tool adjusted pressure valve that sets maximum pressure to the spray heads and recirculates excess water back to the clean water tank.

Fill Connection – Located on the driver side of the truck and accommodates large hoses to fill the water tank.

Fill Hose – Hose used to connect fill connection to clean water source.

Fill Valve – A Valve that accommodates large hoses used for filling the clean water tank.

Flapper – Installed on the top of the auxiliary engine exhaust silencer to keep water and debris from entering the exhaust system.



Float Mode – Releases up or down hydraulic pressure on the Hog Arm to allow the Hog Head assembly to float over uneven surfaces to avoid damage to the blast head.

GPM – Gallons Per Minute of water produced by the high pressure pump.

Head Rotation Switch – Turn spray bar rotation ON and OFF during cleaning operations.

Hg – Symbol that indicates inches mercury. Used to measure vacuum air flow.

Hog Arm – The arm that raises, lowers and moves the Hog Head right and left.

Hog Head Assembly – Attaches to the front of the chassis and consists of the Hog Arm, spray bar, shroud, wheels and casters.

Debris Tank Sump – Area at the bottom of the debris tank that catches recovered water that drains through the 100 micron debris bag.

Impeller – The rotating internal component in a pump or blower that moves the water or air.

Debris Tank Inlet Port – Receives water and debris from the vacuum hose connected to the Hog Head.

Switch Console – A switch panel in the cab of the truck that houses the switches that control the pressure cleaning system.

Man-Way – Opening on the top of the clean water tank that provides access to the interior of the tank and the bag filter.

High Pressure Gauges – Gauges on the high pressure pump that display the operating pressure of the pump.

OSHA – Government agency tasked with maintaining a safe and healthy work environment.

Potable Water – Clean water that is suitable for drinking.

PSI – Pounds Per Square Inch, a unit of pressure.

Restriction – Limit the amount of water or air that can pass through a given area.

Retaining hooks – Hooks on the inside of the debris cage used to hold the 100 micron debris bag.

RPM – Revolutions Per Minute.

Shroud – The stainless steel circular component that protects the spray head from debris.

Silencer – Muffles the sound of the exhaust from the auxiliary engine.

Sight Tube – Clear pipe on side of the clean water tank that indicates the level of the water.

Spray Bar – Rectangle stainless steel component attached to the thru-shaft that holds the nozzles.

Standoff Distance – Distance from the spray bar to the surface.

Surface Hog – High pressure water cleaning equipment manufactured by Hog Technologies to clean airport ramps, tarmacs and other surfaces.

Supply Valve – Located between the clean water tank and the charge pump that is used to control the flow of water.

T-Handle Adjustment Rod – Used to manually adjust the castors and wheels on the hog head assembly.





T-Handle Pin Lock System – Used on the Hog Arm as a safety feature to prevent the hog arm from drifting downward while the truck is in Drive Mode. Also used to secure the ladder in the stored position.

High Pressure Hose – Hose that connects to the thru-shaft and the high pressure pump.

High Pressure Pump – Piston type positive displacement pump that supplies high water pressure water to the spray bar.

Vacuum Hose – Hose that connects to the spray head shroud that transports airflow to the debris Tank.

Vacuum Hose Wear Points – Areas inside a vacuum hose that become worn and weak from abrasion created by the high velocity debris travelling inside the hose.



NOTES





Customer Support

24 / 7 CUSTOMER SERVICE

Hog Technologies Customer Service Department stands ready to answer your questions and provide technical assistance 24 hours a day, 7 days a week.

Customer Service can also assist you with part orders.

Always contact Hog Technologies Customer Service Department for assistance and cross reference specifications for parts you intend to purchase locally.

PARTS

All replacement parts are available directly through Hog Technologies.

Get the parts you need when you need them.

Next day delivery is available in most locations.

Same day delivery available in some areas for parts ordered before 10 AM Eastern Standard Time

CUSTOMER SERVICE HOT LINE - 772-223-7393

www.hogtechnologies.com

www.stripehogsupport.com

Hog Technologies will not be responsible for damages or loss caused by substituted parts purchased locally or from another vendor or manufacturer.



WARNING



NEVER ATTEMPT TO USE COMMONLY AVAILABLE PLUMBING PARTS, FITTINGS, AND HOSES IN HIGH PRESSURE SYSTEMS! ALL FITTINGS TO BE USED WITH HIGH PRESSURE OPERATIONS MUST BE PROPERLY DESIGNED, STAMPED, RATED AND APPROVED BY HOG TECHNOLOGIES! FAILURE TO HEED THIS WARNING MAY RESULT IN DAMAGE TO COMPONENTS AND SEVERE INJURY OR DEATH!



Stripe Hog Support Web Site

The header features the Stripe Hog logo (a stylized pig head) and the text "Stripe Hog Support" in large yellow font. Below the logo is the text "40,000 PSI Stripe Hog Waterblasting System". A search bar is located on the right. The navigation menu includes: Home, Training, Ambassador Club, Marketing, Stripe Hog Store, and Contacts. A large photograph of a group of people in business attire stands in front of a modern building. The HOG TECHNOLOGIES logo is prominently displayed on the right side of the header.

You are here [Home](#)

[Mike](#) [Logout](#)



Typical Registration & Log On Window

[VIDEO HELP](#)



Welcome to the Stripe Hog Support Center!
 This resource is exclusive to Stripe Hog customers. In order to view the complete menu above and website you must be logged in. If you own or operate a Stripe Hog please login or register.

REGISTER	LOG ON
User Name: <input type="text"/>	User Name: <input type="text"/>
First Name: <input type="text"/>	Password: <input type="text"/>
Last Name: <input type="text"/>	
Display name: <input type="text"/>	
Email Address: <input type="text"/>	
<input type="button" value="REGISTER"/>	<input type="button" value="Login"/>

(0111) (772) 214-1714. This number that will find an available customer support representative 24/7.

We are excited to take your call any hour of the day. Please don't hesitate to call if we can help.

The "Ambassador Club" is added to the site • Tuesday, November 11, 2008

The Ambassador Club is a place for Hog Technologies, Stripe Hog owners and operators to communicate so we all can benefit and become stronger. As an owner/operator of the Stripe Hog you are in an elite group. Welcome!

[Home](#) | [Stripe Hog Training](#) | [Ambassador club](#) | [Marketing](#) | [Stripe Hog Store](#) | [Contacts](#) |





HOGTM
TECHNOLOGIES

3170 SE Slater Street
Stuart, Florida 34992

(001) (772) 214-1714 P (001) 772-223-5461 F

www.hogtechnologies.com