STRIPE HOG SH8000

OPERATIONS MANUAL

HOG™ TECHNOLOGIES

TABLE OF CONTENTS

TABLE OF CONTENTS

Section 4:
Lubrication & General Maintenance

Section 5:
Scheduled Maintenance

Appendix 1:
Troubleshooting

Appendix 2:
Tools & Spare Parts

Appendix 3:
Daily Report & Pre-Op Checklist

Appendix 4:
Nozzle & Spray Bar Configuration

Appendix 5:
Glossary of Terms

Appendix 6:
Customer Support & Support Web Site

NOTES

Congratulations on your recent purchase of the Stripe Hog! The Stripe Hog is the world's most advanced equipment for removing pavement markings and runway rubber deposits. Your purchase demonstrates your commitment to excellence and positions you as a world leader in the removal of road surface markings and/or airport runway rubber deposits.

Hog Technologies is excited to welcome you and your crew to the Stripe 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 Stripe 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 operators trained by Hog Technologies. During the training experience your team will be given the basic knowledge and skills necessary to maintain, operate, troubleshoot and repair your Stripe Hog.

Please take the time to read this operation manual before attempting to operate your Waterblasting 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 Stripe 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) 223-7393 or online at www.hogtechnologies.com or www.stripehogsupport.com

From our family to yours we would like to take a moment to say Thank you from all of us at Hog Technologies! We look forward to many successful years working together to provide maximum productivity at minimal operational cost without damage. Only together can we both succeed!

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, Waterblasting 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 Stripe Hog 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:

CAUTION

HAZARDS OR UNSAFE PRACTICES WHICH COULD RESULT IN MINOR PERSONAL INJURY OR PRODUCT AND PROPERTY DAMAGE.

WARNING

HAZARDS OR UNSAFE PRACTICES WHICH COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH.

DANGER

INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

NOTICE:
INDICATES A SITUATION WHICH CAN CAUSE DAMAGE TO THE MACHINE, PERSONAL PROPERTY, AND/OR THE ENVIRONMENT OR CAUSE THE EQUIPMENT TO OPERATE IMPROPERLY.

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 WATERBLASTING 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 SAFE OPERATION, INSTALLATION AND MAINTENANCE OF THIS EQUIPMENT AND 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 OPERATIONS AND MAINTENANCE PROCEDURES, CONTACT YOUR HOG TECHNOLOGIES REPRESENTATIVE PRIOR TO USE.

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

1.1 General Safety

Use Professional Training

Operating high pressure Waterblasting equipment requires detailed professional training, including safe work practices and procedures. Only professionally trained personnel should be allowed to setup, operate, or maintain high pressure Waterblasting equipment. If you have not completed the Hog Technologies basic training course you will be a danger to yourself and others. The velocity of water at nozzle tip exceeds that of a bullet coming out of a gun. Contact with the high pressure blast can result in the loss of limb or water injection into the bloodstream. If injection occurs in a vulnerable part of the body death may result.

Always Read Instructions

Read and follow all the manufacturer's 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, tractors, engines, pumps, and drive units, 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 WATERBLASTING 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 to motorists 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 waterblasting 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 ultra-high pressure Waterblasting 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: ULTRA-HIGH PRESSURE BLASTING 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 BLASTING AREA AND USE HARD HATS, EYE AND EAR PROTECTION.

Always be sure your work area is clear of people whenever the ultra-high pressure pump is engaged. When working on the waterblasting heads with an operator in the cab of the truck you should always make sure you can see his hands.

Use Only Products Intended for High Pressure Waterblasting 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 40,000 psi (2758 bar). Ultra-High Pressure parts should be purchased based on a 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 Stripe Hog, please contact the Customer support Department at (877) HOG ROAD or (001) 772-223-7393.

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 HOG TECHNOLOGIES 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.

Tractor Loading and Unloading

The tractor and ramp can be damaged when loading or unloading the optional tractor. It is important to take your time and watch your ground clearance as the tractor is moved to or from the truck or skid unit platform.

Store Components Properly

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

Freezing Conditions

System hoses and the waterblasting heads and system should be drained of all water or filled with an anti-freeze solution. For the 40K 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 oil temperature rises above 60 degrees Fahrenheit.

1.2 Blasting 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 (40k) switch.

⚠ WARNING ⚠

INJURIES FROM ULTRA-HIGH PRESSURE WATERBLASTING 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 Ultra-High pressure system. ***DO NOT*** *accept water drawn from retention ponds, canals or other non-potable sources.*

Purge System
Before attaching spray bar to Hog Head assembly, engage 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 Water Blasting Heads
Check blasting heads 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.

Hog Technologies Tractor Brake
Always set the tractor brake before beginning any testing, pressure testing system or blasting. The force from blasting heads can move tractor backwards causing blast to cross the path of people or equipment.

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 waterblasting operations.

WARNING

ULTRA-HIGH PRESSURE BLASTING 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 BLASTING AREA AND USE HARD HATS, EYE AND EAR PROTECTION.

Know Your Surroundings
Always be aware of and pay attention to your surroundings. – i.e. - truck, hoses, people, walls, moving vehicles, live lanes of traffic, etc.

Test System
With the spray bar installed with proper high cohesive nozzles, 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

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.

Start at Low Pressure
Always start blasting with the system at low pressure (low RPM) and slowly increase RPM to operating pressure. Engage and disengage 40K switch two times at operating pressure to check operation of blasting heads and dump valve before starting blasting 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 Your Stripe Hog Dumping Pressure
When setting pressure ALWAYS ensure that the system pressure drops to less than 100 psi (7 bar) immediately when the 40K STOP switch is pressed. If this does not relieve system pressure immediately to below 100 psi (7 bar) when released, do not use the unit until repairs are made to the dump valve.

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 blasting activity and relieve the pressure in the system before attempting any repair. Always follow manufacturer's repair instructions.

Never Blast When Stopped
Always make sure Ultra-High Pressure is disengaged BEFORE forward or reverse motion is stopped. Damage to road surface will occur if blasting continues when the truck is brought to a stop.

WARNING

MOST HIGH PRESSURE WATERBLASTING 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: ULTRA-HIGH PRESSURE BLASTING 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 BLASTING 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. Refer to the nozzle flow chart in this manual.

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 60,000 psi (4,137 Bar.)

Check Orifices
Prior to installation, make sure the nozzles have no clogged orifices. Also, check to ensure nozzles are sharp and not excessively worn.

Check Connections
Be sure to never force a nozzle into the blasting head. 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. Any particles of the smallest size will clog 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 from blasting.

F) Nozzle threads are damaged.

1.4 Hose Safety
General
Ultra-High pressure 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 Ultra-High pressure hose to a tight radius (less than 30" (.8 m) or pull on a coiled hose. Always make sure the hoses is straight with no coils before pulling on the hose to deploy it.

C) Never pull hard on an Ultra-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.

D) When using a tractor or a hog tool, always operate the equipment well within the maximum distance to avoid straining or damaging hoses.

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 60,000 PSI (4,137 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 Valve Water Hose
Any hose used for returning dumped water back to the pump or vacuum line 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 60,000 psi (4137 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 Dumping Safety
A) Always drain all the liquid from the debris tank before dumping the solids.

B) Always dump on level ground, never uneven or sloped ground.

C) Always choose solid ground, not soft sand or wet soil.

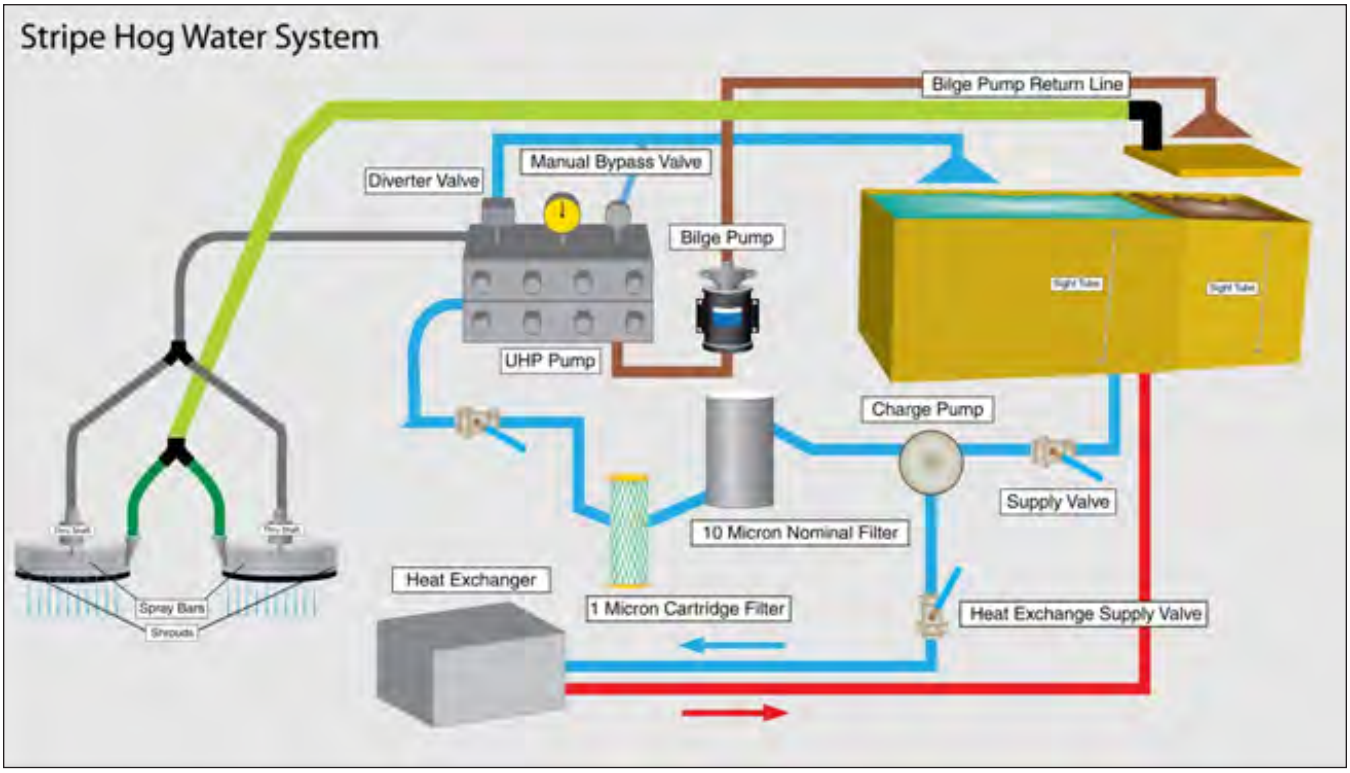
D) Always use the remote control to tilt the tank.

E) Make sure the operator and all personnel are well clear of the truck before tilting the tank.

F) Never allow personnel under a raised tank without safety supports in place.

G) Always be careful to avoid any pinch points which could cause injury.

NOTES



2.1 Stripe Hog System Introduction

The SH8000 waterblasting system is mounted to the truck chassis and powered by the truck engine through a special power take off. The waterblasting system includes an Ultra-high pressure water system, vacuum system, water and debris tanks, hydraulic system, hydrostatic drive system and DC electrical system.

Most components are controlled by switches in a cab mounted control switch panel, Joystick console and PLC screen. Others are controlled by switches or switch panels located on the chassis near the component controlled by the switch or switches.

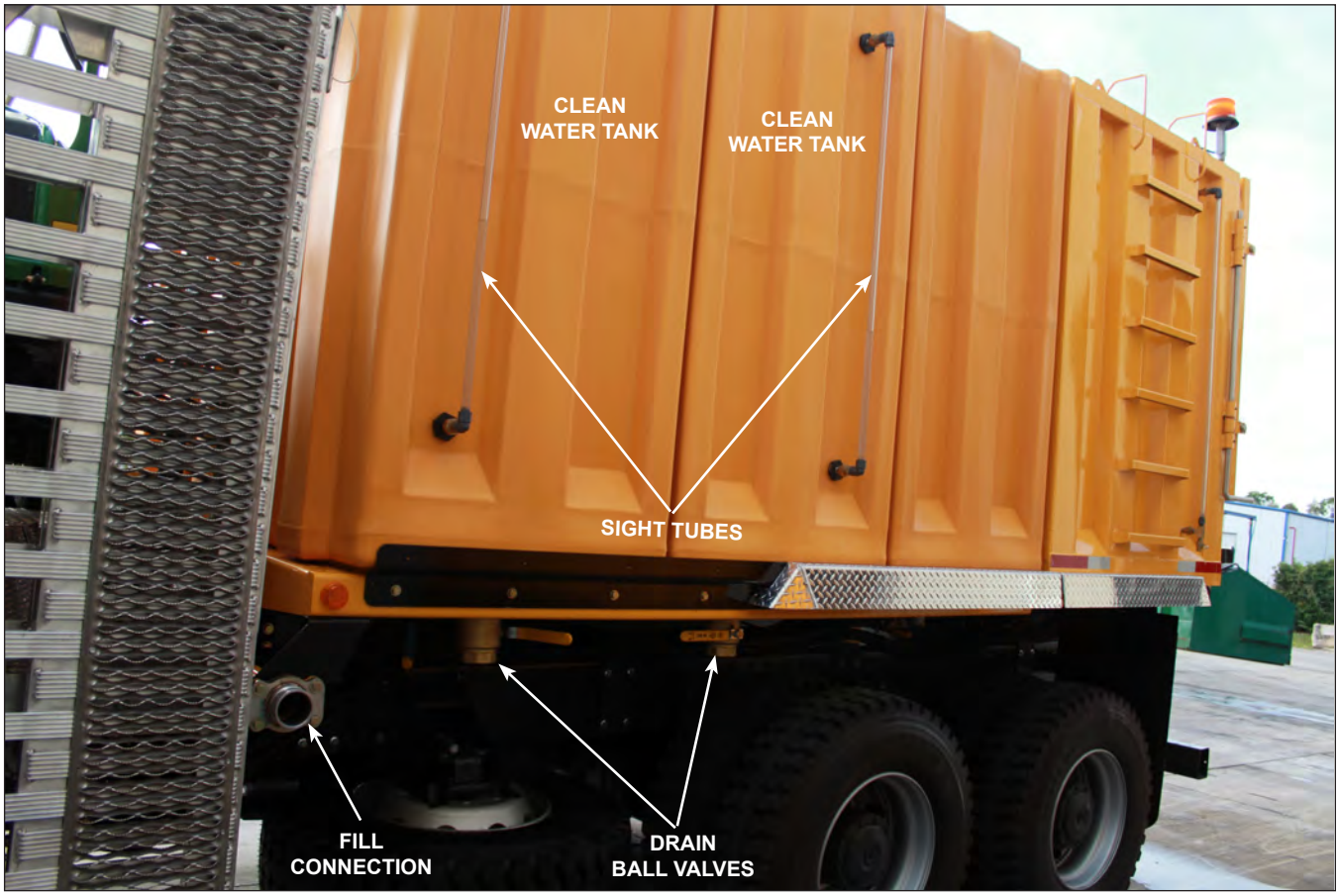
The operation and maintenance requirements for the engine, drive train and chassis components are unique to the manufacturer and the selected options. Each truck chassis manufacturer provides owners information manuals with their product. It is important that you read the manuals carefully and become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

2.2 Ultra-high Pressure Water System

Each manufacturer of the high pressure waterblasting 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 waterblasting system.

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 40K CLUTCH SWITCH TO ACTIVATE THE ULTRA-HIGH PRESSURE SYSTEM.



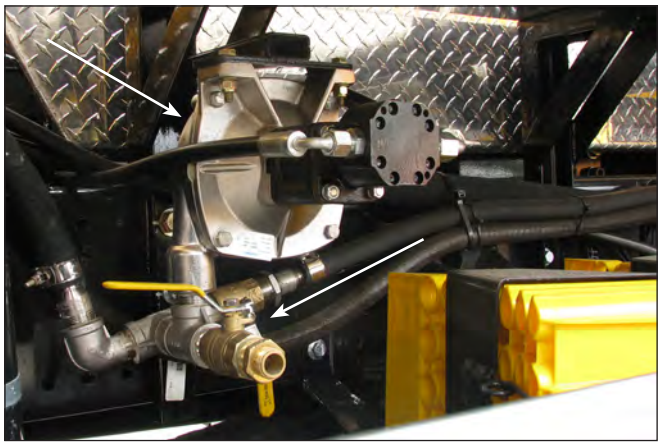
Typical Clean Water Tank Configuration & Valves

Clean Water Tank

The forward tanks on the truck chassis are reserved for the clean water supply. The clean water tanks are a modular design constructed of polyethylene material. The Stripe Hog can accommodate up to three interconnected tanks, each with a capacity of 1000 US gallons (3587 liters) to provide a constant supply of clean, fresh water to the charge water pump. The tanks are coupled together by hoses and fittings at the bottom of each tank. A site tube provides a quick view of the water level from outside the truck. The operator can monitor the water level in the cab using the CLEAN gauge in the Programmable Logic Controller (PLC) located on the joystick console.

The fill connection on either side of the forward 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 tanks closely during filling operations as the flow of water from a hydrant is far greater than the flow through the interconnecting tank hoses and the flow capacity of tank air vent. Overfilling the tank or tanks will cause excessive pressure and damage the tanks. It is normal to pause the water flow several times during filling operations to allow water to flow from the forward tank to the other tanks through the interconnecting hoses and fittings to equalize the water level.

Only use potable water (clean enough to drink) to increase the service life of the components in your Ultra-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 tanks should be flushed frequently with clean, fresh water to prevent the accumulation of debris that may accidently enter the tank. There is a 4” ball valve that allows for quick draining of the tanks when flushing is required. Another valve connected to the tank equalizing hoses provides complete draining for system winterization. A large manhole on the top of each tank provides access to the interior of the tanks for inspection or facilitate tank cleaning.



Charge Pump & Drain Valve

Clean Water Tank Level Sensor

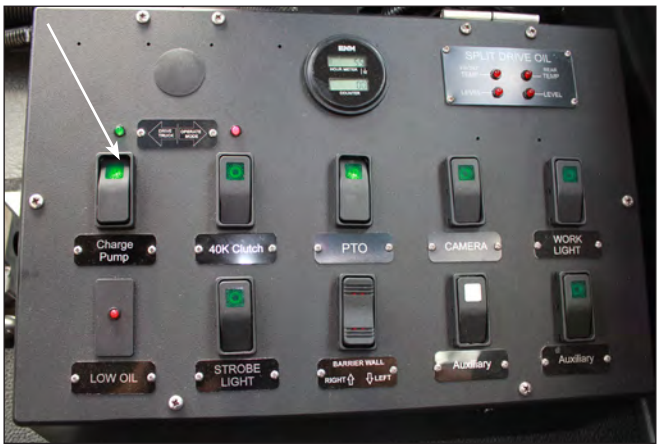
Charge Water Pump

The charge water pump is a hydraulically powered centrifugal pump that provides a constant supply of water to the Ultra-high pressure pump. There is a supply valve located between the clean water tank and the charge water pump that 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 UHP charge pressure and the charge pump impeller could be damaged.

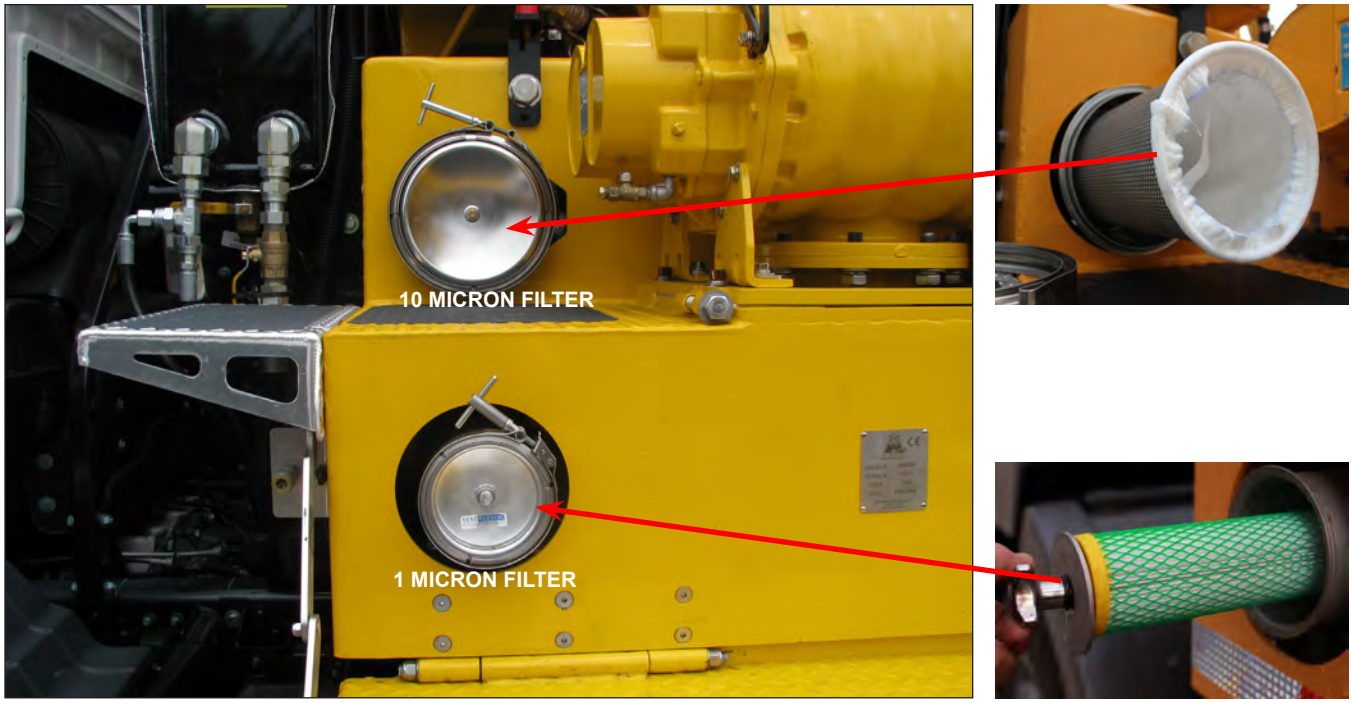
The charge water pump is activated by pressing the rocker switch labeled "CHARGE PUMP" on the console in the cab of the truck. (Refer to Start up Procedure in the Operation section of this manual) Once activated a green light will illuminate to confirm the charge water pump is engaged. A charge pressure gauge located on the Joystick console must be monitored 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 psi (4 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 wines and fluctuating charge water pressures are indications of a water supply problem to the charge pump. If the pressure does not immediately rise and the pump is whining, make sure the 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 blasting if the sound changes. Find and correct the problem before waterblasting operations resume.

Joystick Console & PLC Charge Water Pressure Gauges



Charge Water Pump Switch In Console



Two Stage Filter System

NOTICE:
THE UHP PUMP CAN CAVITATE IF THE CHARGE WATER PRESSURE DROPS BELOW 25 PSI (1.7 BAR.) CAVITATION CAN CAUSE SEVERE DAMAGE TO THE UHP PUMP AND SHOULD NEVER BE ALLOWED TO OCCUR. YOU SHOULD ALWAYS MONITOR THE CHARGE WATER PRESSURE AND NEVER OPERATE THE UHP PUMP WHEN THE CHARGE WATER PRESSURE DROPS BELOW 30 PSI (2.1 BAR.)

Filters

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

The first stage filter is a nominal 10 micron bag filter that traps larger particles and the second stage is a 1 micron cartridge filter that traps smaller particles.

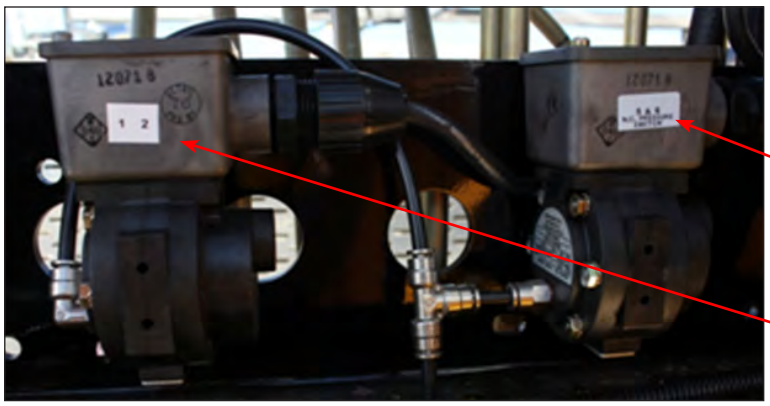
The filters are critical to the proper operation of the Ultra-high pressure water system. They should be checked daily and changed when the charge pressure drops to 30 psi (Refer to filter change procedure in Maintenance section of this manual). Dirty charge water filters are the number one reason for low charge water pressure. Sensors in the charge water system will disengage the 40K clutch and the high pressure pump will shut down if charge water pressure drops below 30 psi (2.1 BAR).

Operating with dirty filters can cause:

- Unwanted particles forced through the filter resulting in premature failure of the parts.
- Cavitation in the ultra-high pressure pump which will result in damage to the pump.
- Reduced flow of lube water to the packing seals which could damage the seals.

Remember that the filters can be under pressure. Always make sure the charge pump switch is OFF, the PTO disengaged 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 ultra-high pressure system. A purge valve located on the low pressure (charge water) side of the pump is opened to purge the system after a filter change or to flush the charge water side of the pump if the system becomes contaminated. This valve is also used when adding anti-freeze during cold weather operations.



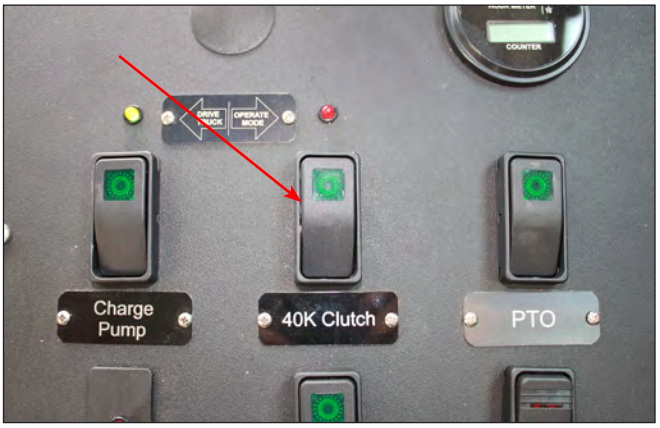
The pressure switch circuit 5 / 6 controls the OMSI 40K Clutch. If the charge water pressure drops below 30 psi for more than 10 seconds the clutch on the clutch will disengage.

The pressure switch circuit 1 / 2 controls the spray bar rotation hydraulic coils. If the charge water pressure drops below 30 psi the spray bars will stop spinning.

Charge Water Pressure Sensors That Disengage The 40K Clutch & Spray Bars When Low Charge Water Pressure Is Detected.

Ultra-High Pressure Pump

The high pressure pump (UHP) is a positive displacement pump that requires a constant water supply from the charge water pump at a minimum of 30 PSI (2.1 Bar) from the charge water system to operate properly and prevent cavitation. A pressure sensitive switch located on the hydraulic manifold near ultra-high pressure pump is a safety feature that disengages the 40K clutch and shuts down the pump when the charge pressure drops below 30 psi. This protects the charge water pump from running dry and helps protect the ultra-high pressure pump from damage due to overheating and cavitation.



40K Clutch Switch

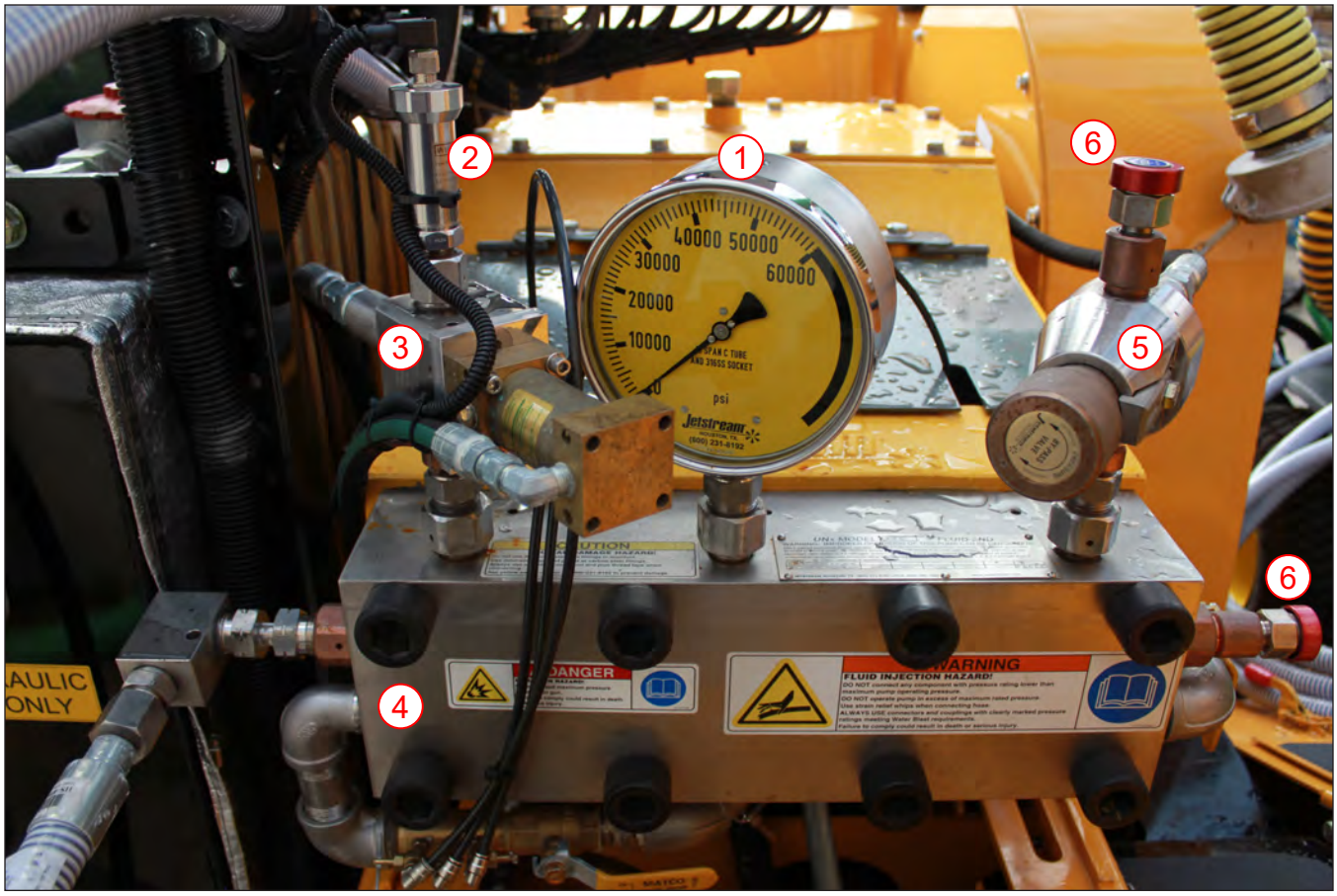
The ultra-high pressure pump is powered by the truck engine thru a power take off (PTO) engaged by the 40K clutch in the OMSI gearbox. The PTO is connected to a pulley and Poly Chain Carbon belt system that drives the pump. It is engaged by pressing the "40K Clutch" switch on the console in the cab of the truck. (Refer to the Startup Procedure in the operation section of this manual). Maximum operating pressure for the Ultra-high pressure pump is 40,000 psi (2,758 bar). Pressure is monitored by the manual high pressure gauge on the Ultra-high pressure pump manifold and a digital gauge on the joystick console in the cab of the truck.

Ultra-High Water Pressure START/STOP Switch

⚠ CAUTION ⚠

ENGAGING THE 40K CLUTCH AT HIGH ENGINE RPM WILL INCREASE WEAR ON THE CLUTCH PLATES AND SHORTEN THE SERVICE LIFE OF THE CLUTCH, DRIVE BELT AND OTHER UHP PUMP COMPONENTS. FOR MAXIMUM SERVICE LIFE, ALWAYS REDUCE ENGINE RPM TO IDLE BEFORE ENGAGING THE 40K CLUTCH.

Maximum operating pressure for the UHP pump of 40,000 psi (2,758 Bar) @ 12 gallons (45 Liters) per minute is achieved at maximum engine RPM. (Typically 1400 RPM) Water pressure is monitored by the high pressure gauge on the pump and a digital gauge in the joystick console. High



Ultra-High Pressure Pump Components

1. High Pressure Gauge
2. High Pressure Sensor
3. Diverter Valve
4. High Pressure Pump Manifold
5. Manual Bypass Valve
6. Rupture Discs

pressure is controlled by the RPM of the engine and/or by adjusting the manual bypass valve on the pump. Since engine RPM also controls the level of vacuum, adjusting the pressure using the manual bypass valve is beneficial when maximum engine RPM is required for vacuum and less than maximum waterblasting pressure or gallons per minute is desired for the material being removed or the waterblasting tools being used.

The Ultra-high pressure pump produces up to 40,000 psi (2,758 BAR) with a flow rate of 12 gallons (45 Liters) per minute at maximum engine RPM. The gallons per minute (GPM) produced by the Ultra-high pressure pump is controlled by pump RPM, plunger diameter, length of stroke and number of plungers. Once the Ultra-high pressure pump is engaged it continually displaces water provided by the charge water pump. The charge water travels through the low pressure side of the manifold of the Ultra-high pressure pump, then through a set of 3 univalves into the 3 stuffing boxes. The plungers then force the water back through the high pressure side of the Univalves and manifold. These Univalves are critical to the operation of the ultra-high pressure pump as they facilitate two functions at the same time. They allow the low pressure water from the charge water pump to enter the stuffing box and the ultra-high pressure water to flow into the ultra-high pressure side of the manifold. Once the water is forced back through the manifold it is directed out to the blasting head or back to the clean water tank by the diverter valve. Without these valves it would be impossible to separate the high and low pressure water from each other. Hog Technologies recommends that you keep 3 fully serviced Univalves in your spare parts system to prevent downtime.

Diverter Valve (Dump Valve)

The diverter valve is a safety feature that is located on the ultra-high pressure pump manifold. When activated it diverts high pressure water from the blasting heads to the clean water tank immediately eliminating the high pressure water at the blasting heads. The diverter valve assembly consists of a hydraulic cylinder, shutoff cartridge, diffuser tube and digital high pressure sensor.

The shutoff cartridge is located inside the body of the diverter valve assembly. It is generally open and controlled by the START/STOP switch on the Joystick console in the cab of the truck. When the START button is pressed the shutoff cartridge is closed by the hydraulic cylinder forcing all high pressure water to the blasting heads. When the STOP button is pressed the hydraulic cylinder opens the shutoff cartridge diverting high pressure water from the blasting heads directly to the bypass hose and the clean water tank. This allows the Ultra-high pressure pump to remain operating at maximum capacity, ready to provide high pressure to the blasting heads immediately. If the charge water pump is turned off or fails, the pressure switch on the hydraulic manifold disengages the 40K clutch and the UHP pump. The pressure in the entire system immediately drops to zero regardless of the diverter valve position.

When setting pressure ***ALWAYS*** ensure that the system pressure drops to less than 100 PSI (7 Bar) immediately when the START/STOP switch is turned off. If system pressure does not immediately drop below 100 PSI when diverter valve is activated, do not use the equipment until repairs are made to the diverter valve.

Manual Bypass Valve

The Manual Bypass Valve is located on top of the ultra-high pressure pump Manifold. The operator can open or close the valve to increase or decrease water volume and pressure to the blasting heads while maintaining optimum engine RPM and torque.

The Manual Bypass assembly consists of a manual adjustment knob, bypass cartridge, diffuser tube, bypass hose and a rupture disc. During high pressure blasting operations, turning the adjustment knob on the manual bypass valve clockwise will decrease the flow of water through the bypass cartridge and system, increasing water volume and pressure to the blasting heads. Turning the adjustment knob counterclockwise will divert more of the high pressure water flow through the manual bypass cartridge to the bypass hose and clean water tank, reducing water volume and pressure to the blasting heads. Bypassing a large volume of water through the manual bypass valve at high pressure can cause the water temperature to rise in excess of 210 degrees Fahrenheit (99 C). Hot water can significantly reduce the service life of the packing seals in the high pressure pump.

Manual Bypass Valve & Rupture Disc

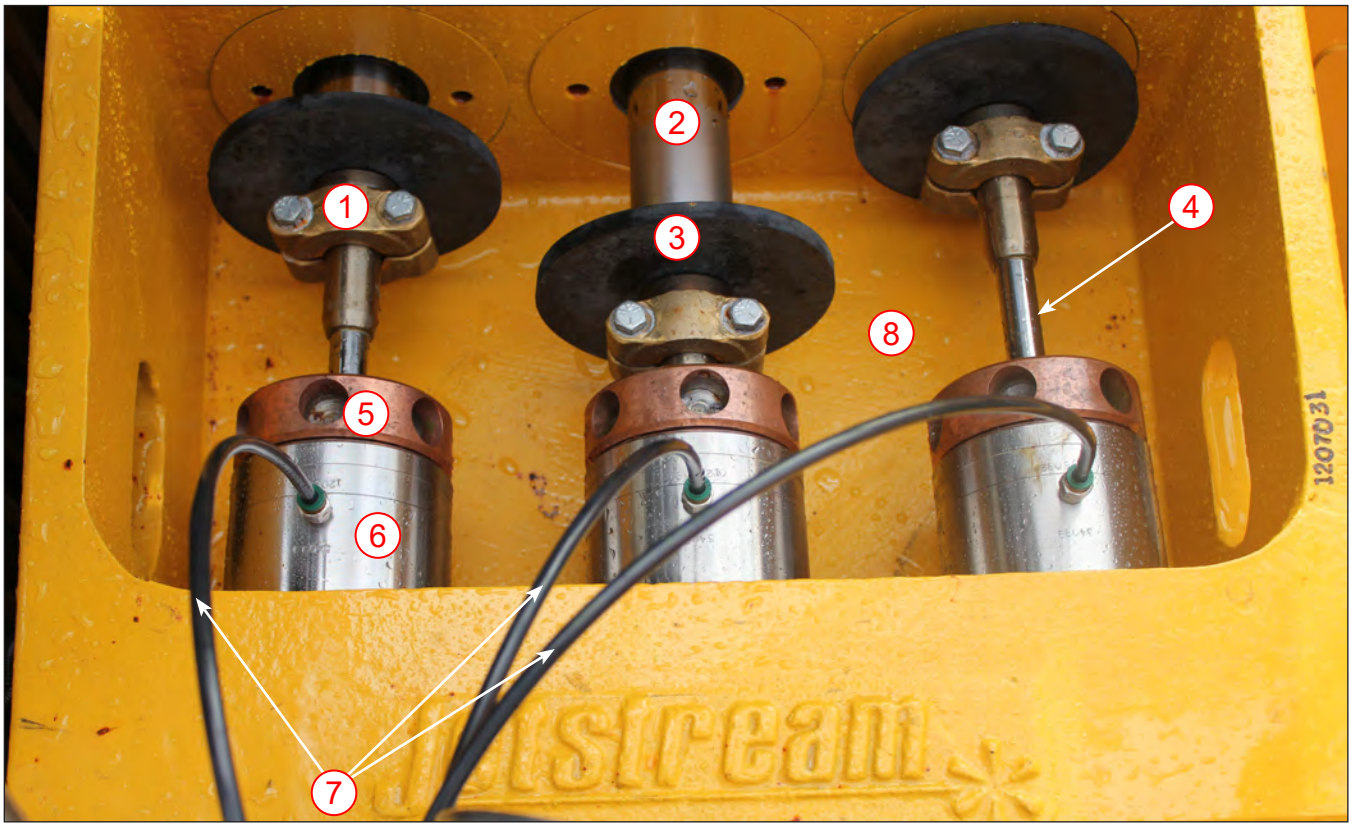
When setting initial blasting pressure, always open the manual bypass valve completely, set the engine and UHP pump to maximum operating RPM and close the diverter valve. Then slowly close the manual bypass valve while monitoring the high pressure gauge until the desired operating pressure is achieved. The manual bypass valve continuously recirculates a small volume of water back to the clean water tank. Once the desired blasting pressure is set, high pressure to the blasting heads can be turned on or off using the diverter valve controlled by the START/STOP switches in the joystick panel.

NOTICE:
THE DUMP VALVE SWITCH ON THE SKIP SPEED REMOTE CONTROL MUST BE IN THE ON POSITION BEFORE THE START/STOP SWITCH ON THE JOYSTICK CONSOLE WILL ACTIVATE THE DIVERTER VALVE TO PROVIDE HIGH PRESSURE WATER TO THE BLASTING HEADS.

Rupture Discs (Burst Discs)

There are two rupture discs installed on the high pressure side of the Ultra-high pressure pump that protect the high pressure waterblasting system against unusually high spikes in pressure. The rupture discs are designed to burst and immediately relieve pressure if the water pressure in the ultra-high pressure system exceeds the disc burst rating. One rupture disc is set to rupture or burst at a higher psi than the other, typically 50,000 psi (3447 BAR) for one disc and 56,000 psi (3861 BAR) for the other. This design is a safety feature to ensure both rupture discs do not burst at the same time which could damage components in the Ultra-high pressure system. The burst rating for each rupture disc is calculated based on 1.25 times the maximum operating pressure of the ultra-high pressure system and 1.4 times the maximum operating pressure of the ultra-high pressure pump. Never operate the system without the properly rated rupture discs installed. If a rupture disc bursts it will have to be replaced prior to resuming Waterblasting operations. (Refer to Rupture Disc Replacement Procedure in the maintenance section of this manual). Always find and correct the problem that caused the rupture disc to burst before reactivating the machine. Test the high pressure circuit at low pressure after replacing a rupture disc to verify proper system operation before resuming high pressure operations.

Typical Rupture Disc & Label



UHP Pump Bilge & Bilge Compartment Components

1. Coupling
2. Pony Rod (Connecting Rod)
3. Deflector
4. Plunger
5. Gland Nut
6. Stuffing Box
7. Lubrication Lines
8. Bilge

Packing Lube Water And Bilge Pump

There are three (3) stuffing boxes, packing seals and plungers in the Ultra-high pressure pump that must be continuously lubricated and cooled to achieve maximum life expectancy. Lubrication and cooling water for the plungers and packing seals is provided by lubrication lines connected to the charge water supply line just below the ultra-high pressure pump manifold.

A metering valve on each line controls the flow of water to the stuffing box. The flow of water to the stuffing box should be checked at the beginning of each shift and periodically during operation. This should be done with the PTO engaged, the charge pump activated and the engine at idle. There should be a steady flow of water from the back of each gland nut. Insufficient water flow to packing glands could cause the stuffing box to overheat and crack or damage to the packing seals or the plunger. Packing seals can also be damaged if the

Charge Water Supply Line & Metering Valves

cooling and lubrication line metering valves are open to wide, allowing excessive water flow to packing glands. For more information on adjusting the flow of the lubrication and cooling water refer to Jetstream Operations manual.

Packing lubrication and cooling water is drained from the high pressure pump by a bilge pump drain system. The system is completely automatic and activated whenever the main battery switch is ON. A fuse in the control switch panel protects the bilge pump circuit from an overload.

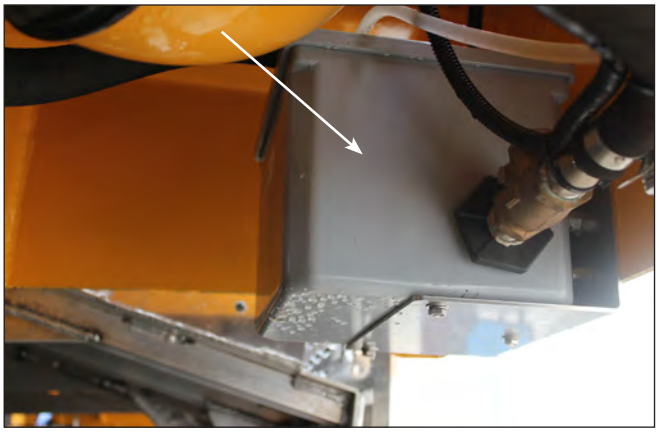
Water drains from the high pressure pump cooling water sump (bilge) by gravity to a sump box equipped with an automatic switch that is connected to the bilge pump. When the water level in the sump box raises enough to activate the automatic switch, the bilge pump is activated and pumps the water from the sump box to the debris tank. When the water level in the sump box is lowered, the switch will turn the pump off.

The sump automatic switch and inside of the sump box are accessed by removing the sump box lid. It is important to periodically remove the lid to inspect the switch and clean out accumulated debris that can restrict water flow to the pump.

Information and owner's manuals for the bilge drain system components are included with this manual. Refer to this information for additional operation and service data.

The following bilge pump system components should be inspected daily or at the start of each shift:

- Inspect the cooling water sump (bilge) in the UHP pump. Clean any debris that may restrict drainage to the bilge pump system.
- Inspect the drain hoses and sump system for loose fittings.
- Monitor the operation of the bilge pump system at the start of each shift to make sure the pump and automatic switch are working properly.



Bilge Pump Sump Box

Bilge Pump

NOTICE:
IT IS IMPORTANT TO PERIODICALLY INSPECT THE BILGE BOX AND REMOVE ANY DEBRIS OR CONTAMINANTS THAT MAY HINDER THE PERFORMANCE OF THE AUTOMATIC FLOAT SWITCH. YOU SHOULD USE WATER BASED GREASE SOLVENT TO CUT ANY OIL THAT ACCUMULATES IN THE BILGE BOX.

Typical 5 Axis Hog Arm

2.3 Hog Arm and Hog Heads

Overview

The Hog Arm assembly is mounted to the front of the chassis, just forward of the bumper All functions or the Hog Heads and arm are controlled by the joystick and switches in the joystick console. The hydraulic system provides the power for all functions of the Hog Arm and the power to drive the hydraulic thru-shaft motors that rotate the spray bars.

The hydraulic system is powered by the truck engine. The truck must be in "Operate Mode" with the PTO engaged and transmission in gear before the hydraulic system will operate. (Refer to the Startup procedure in the Operation section of this manual).

The SH8000 is equipped with 5-Axis Hog Arm. The arm is a two stage design allowing the operator to move the entire arm side to side or only move the forward section using controls in the joystick control console. The arm can also be set to float. Hog Arm Float Mode is activated by pressing the FLOAT MODE switch in the joystick console and should always be used whenever waterblasting operations are underway. FLOAT MODE releases all up and down hydraulic pressure from the arm allowing the blasting heads and arm to move freely up or down with the contour of uneven surfaces

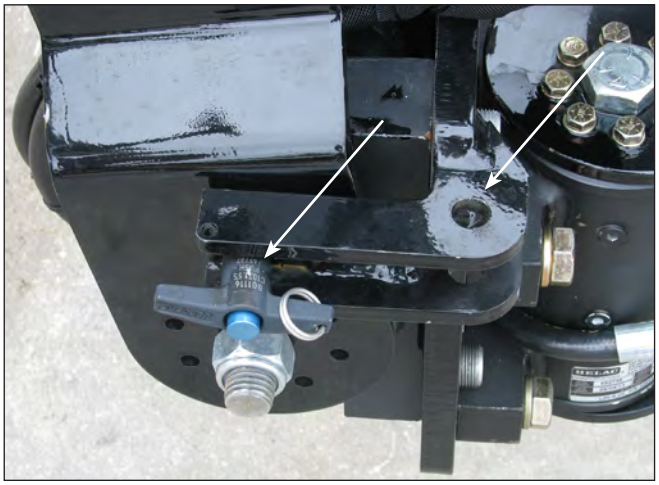
Joystick Control Console & PLC

to prevent damage to the blasting heads and arm during removal operations. The Hog Arm can be moved from left to right but cannot be raised up or down while in Float Mode.

Refer to the Joystick Control Console in this section for additional information on Joystick control functions.

Float Mode Switch

Hog Arm Safety T-Handle Pin Location



Arm Safety T-Handle Pin In Locked Position & Storage Port

WARNING

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

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

Hog Arm

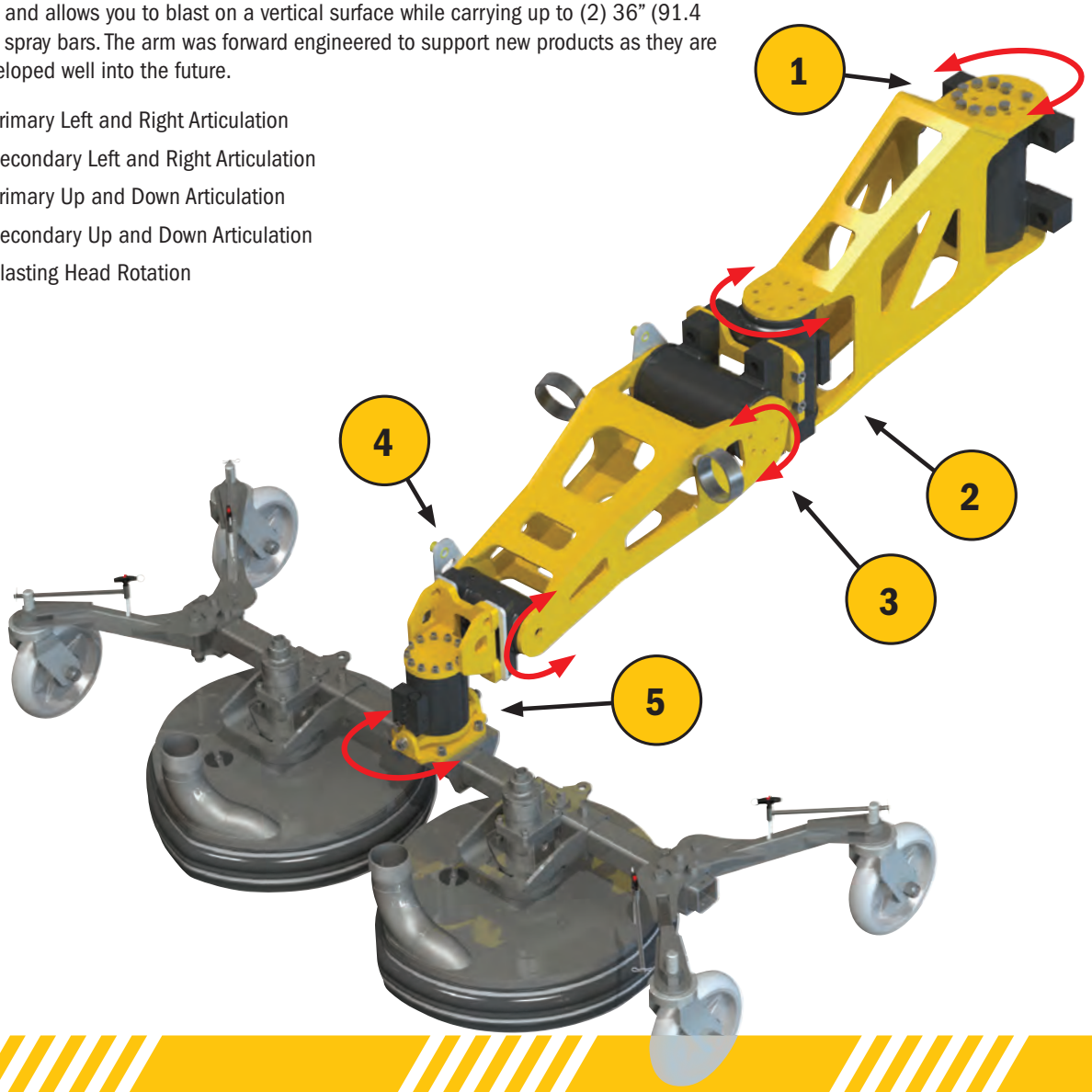
The 5 Axis Hog Arm provides a 12 foot side to side working radius for the blasting Heads. The operator also has the ability to change the orientation of the blasting heads during operation from inside the cab. Using the Joystick controls, the blasting heads can be hydraulically rotated to operate in tandem, parallel or any configuration in between. The 5 Axis Hog Arm system improves productivity by providing adjustment during blasting operations and enabling the simultaneous removal of parallel markings in the side by side (parallel) configuration or rapid removal of single continuous lines with the blasting heads in the tandem configuration.

A manual T-handle pin lock system is utilized to secure the arm and blasting heads in the full up position for safety during travel. There is one lock pin for the main arm and one for the blasting heads. Special storage ports next to each lock provide secure storage for the pins when they are removed during blasting operations. The lock pins are a safety feature that prevent the arm from drifting downward or the blasting heads from rotating while the vehicle is in Drive Mode. The operator must remove the arm lock pin before it can be lowered and the blasting head pin before the heads can be rotated. Make sure the truck is stopped with the parking brake set and the hydraulic system activated before manually removing the arm lock pin.

5 Axis Arm - For Vertical

The 5 axis arm is designed with a much higher load carrying capacity than the 4 axis arm and allows you to blast on a vertical surface while carrying up to (2) 36" (91.4 cm) spray bars. The arm was forward engineered to support new products as they are developed well into the future.

1. Primary Left and Right Articulation
2. Secondary Left and Right Articulation
3. Primary Up and Down Articulation
4. Secondary Up and Down Articulation
5. Blasting Head Rotation



NOTICE:
THE HYDRAULIC SYSTEM MUST BE ENGAGED AND THE HOG ARM RAISED TO RELIEVE THE STRAIN ON THE LOCK PIN BEFORE THE ARM OR BLASTING HEAD LOCKS CAN BE RELEASED. ADDITIONALLY, THE LOCK PIN HANDLES SHOULD BE SECURED IN THE LOCKED POSITION WITH A PLASTIC TIE WRAP OR OTHER TYPE OF FASTENER TO ENSURE IT CANNOT ACCIDENTALLY RELEASE WHILE DRIVING. MAKE SURE THE PINS ARE PLACED IN THE STORAGE PORTS FOR SAFE KEEPING WHEN THEY ARE REMOVED TO OPERATE THE ARM AND BLASTING HEADS.

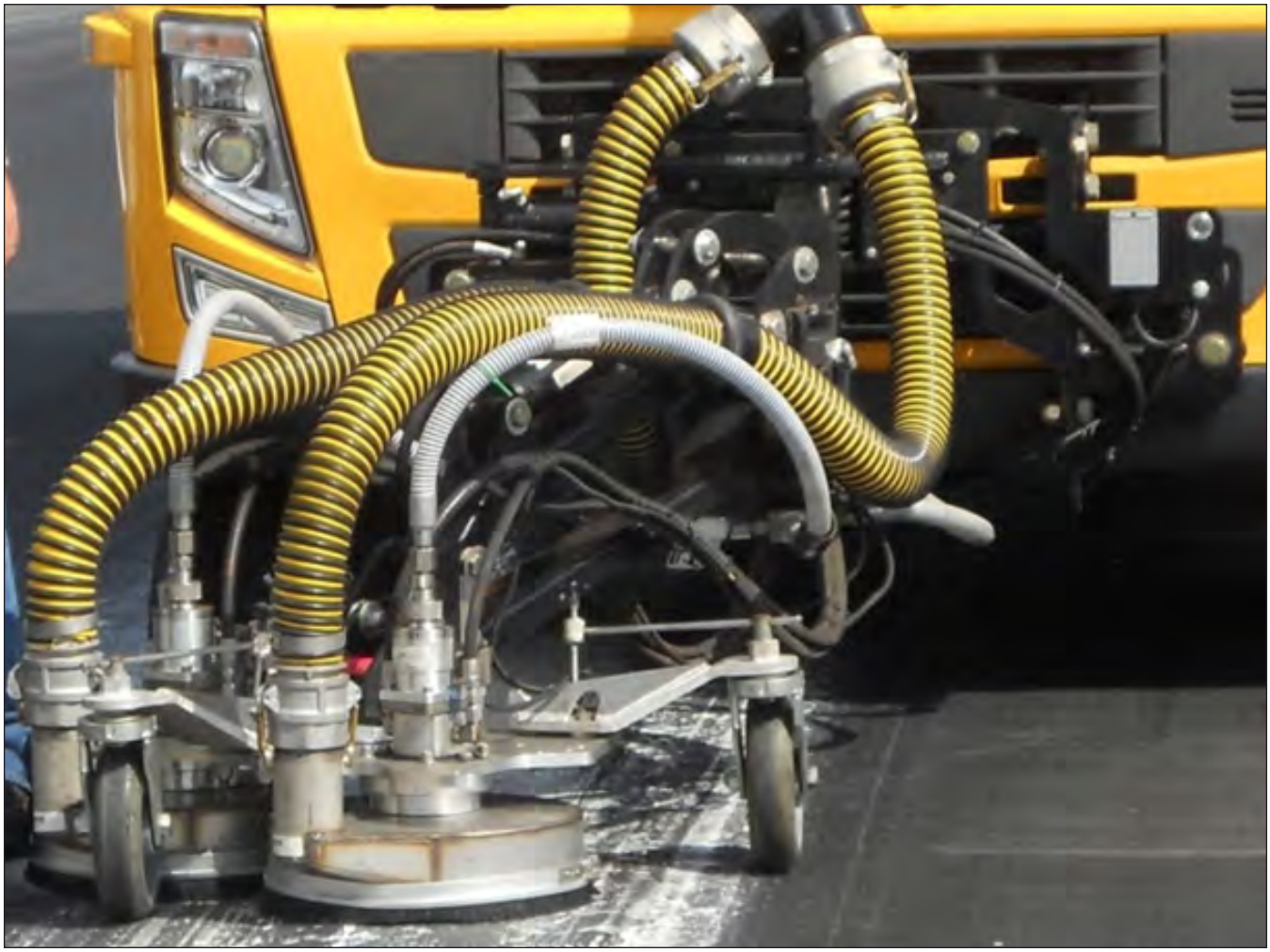
Arm T-Handle Pin Stored In Storage Port

Hog Arm Slide Track (Optional)

An optional slide track Hog Arm mounting system is an available option that enables the operator to manually move the arm to either side of the truck or any place in between. The Hog Arm is mounted to a special chassis plate that rides on heavy duty rollers and slide tracks on the front of the chassis. A quick release T-handle lock pin secures the arm in the selected position.

To slide the arm to a different position, lower the arm to the full down position with the blasting head wheels on the surface. Activate Float Mode to eliminate hydraulic up or down pressure, then remove the pin and slide the arm and blasting head to the desired position. Secure the assembly with the lock pin.

Refer to the Operation section for additional instructions on operating the Hog Arm slide track system.

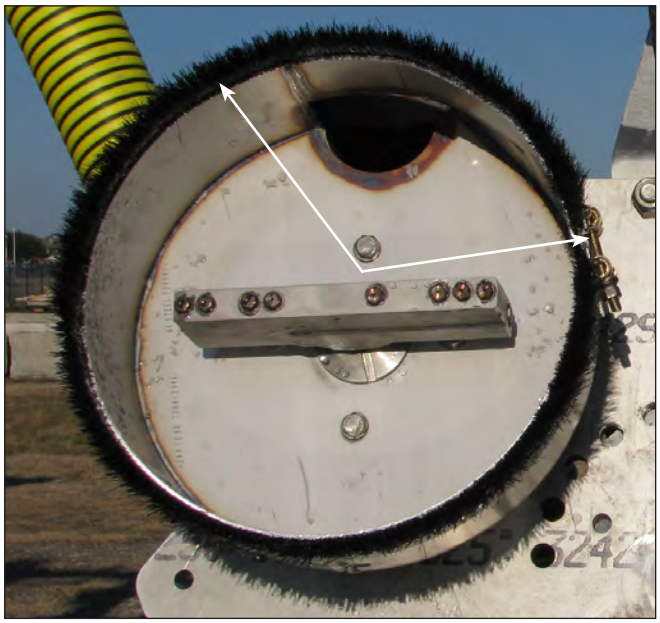


Typical Hog Head In Operation

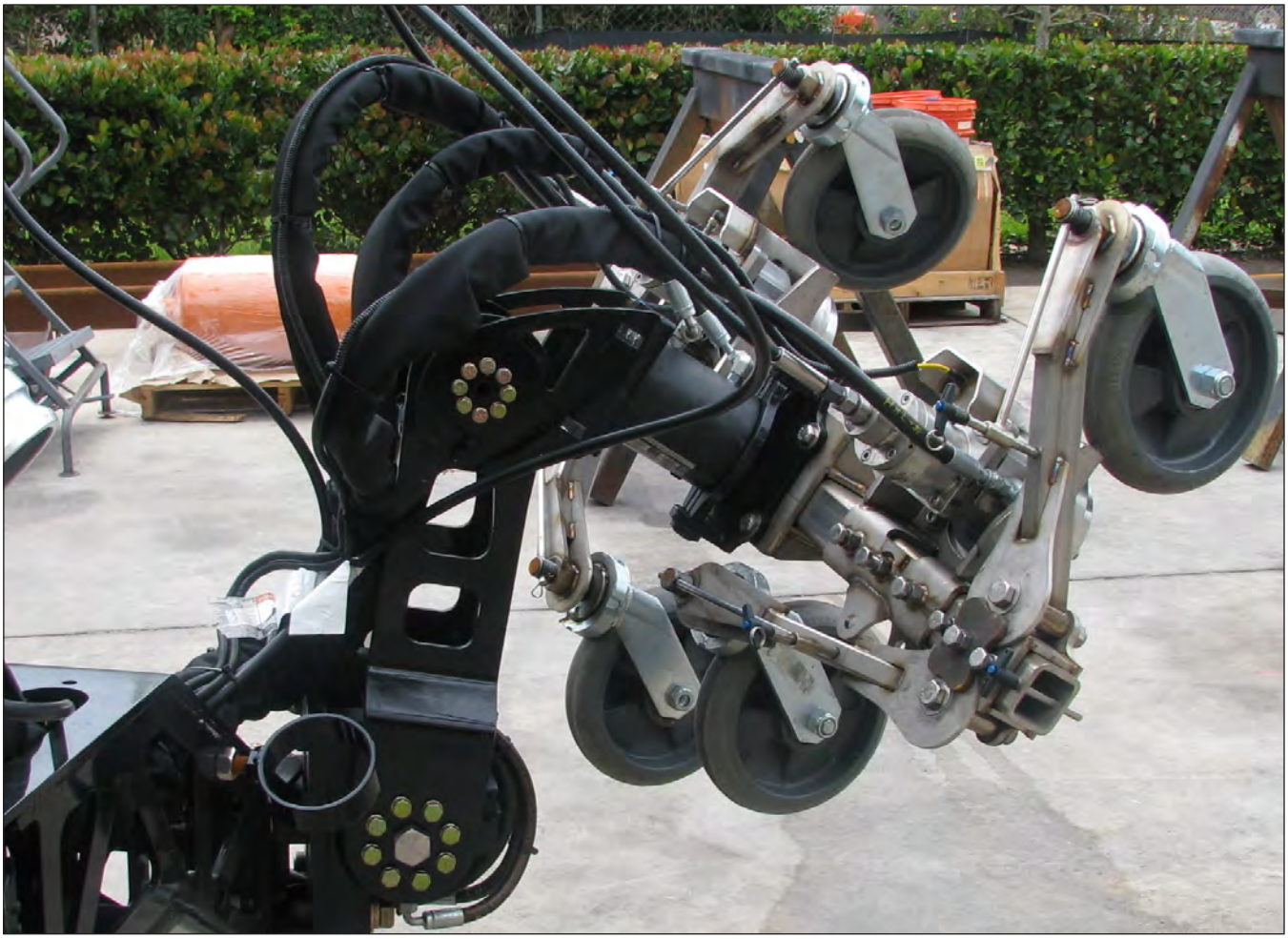
2.4 Hog Head

The Hog Head (blasting head) assembly is a double blasting head design mounted on the end of the Hog Arm. The blasting heads are supported by a tubular head plate chassis with three or four heavy duty castor wheels that support the blasting heads at a preset height to prevent the spray bars from contacting the pavement.

A wear brush clamped to each blasting head shroud provides a partial seal between the blasting head and pavement. The wear brush regulates vacuum air flow into the shroud and reduces the amount of debris and water exiting the blasting head during waterblasting operations. The wear brush is an important safety feature of the blasting head system. It must be adjusted as it wears and replaced as necessary.



Typical Wear Brush & Wear Brush Clamp



Tubular Head Plate, Castor Wheels & Arms

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

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.

The flexible design of the tubular head plate allows the operator to configure the blasting heads in a variety of configurations to accommodate different waterblasting operations. The heads can mounted together on either side of the arm or one blasting head on each side of the arm. The distance between the blasting heads or from the helac cylinder to the blasting head is also adjustable. Special brackets with jam bolts and nuts secure the spray heads and other tubular head plate components in the desired position.

The blasting heads operate simultaneously when activated by the UHP system and the start button in joystick console. The spray bars are rotated by special hydraulic powered motors called thru-shaft motors. 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 is controlled by the PLC (Programmable Logic Controller) and the Head Rotation speed dial on the joystick console.

Spray bar rotation in each blasting head can be independently controlled by the PLC, which allows the operator to choose various speeds between 700 and 3000 RPM or simultaneously controlled using the Head Rotation speed dial. Two operating

modes are available, manual and automatic. In manual mode, the rotation speed of each spray bar is controlled simultaneously by the Head Rotation speed dial on the Joystick console. In automatic mode, the operator uses the PLC to set the maximum RPM for each spray bar, then uses the Head Rotation dial to adjust rotation speed from 0 to the preset maximum. The PLC also enables operators to program and store preset speeds for each spray bar in the memory.

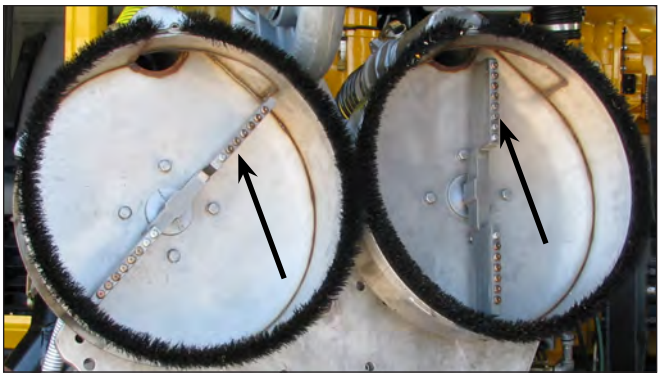
The double blasting head design allows the blasting heads to swivel which enables the operator to control the width of the blast area or set the blasting heads to remove two separate lines at the same time. Additionally, the operator can choose to use different length spray bars on each blasting head to remove two lines of different widths simultaneously or when removing one line with heavy paint buildup and another line with thinner paint.

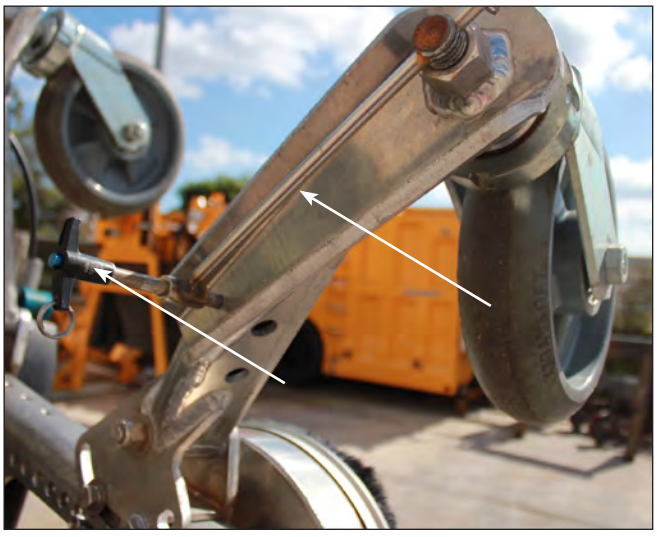
The operator can swivel the heads to any orientation from inside the cab using controls in the joystick console. A helac cylinder at the end of the arm rotates the tubular head plate to set the blasting heads to the desired orientation. Additional adjustments can be made during operation by swiveling the blasting head chassis with the helac cylinder or by moving the arm left or right.

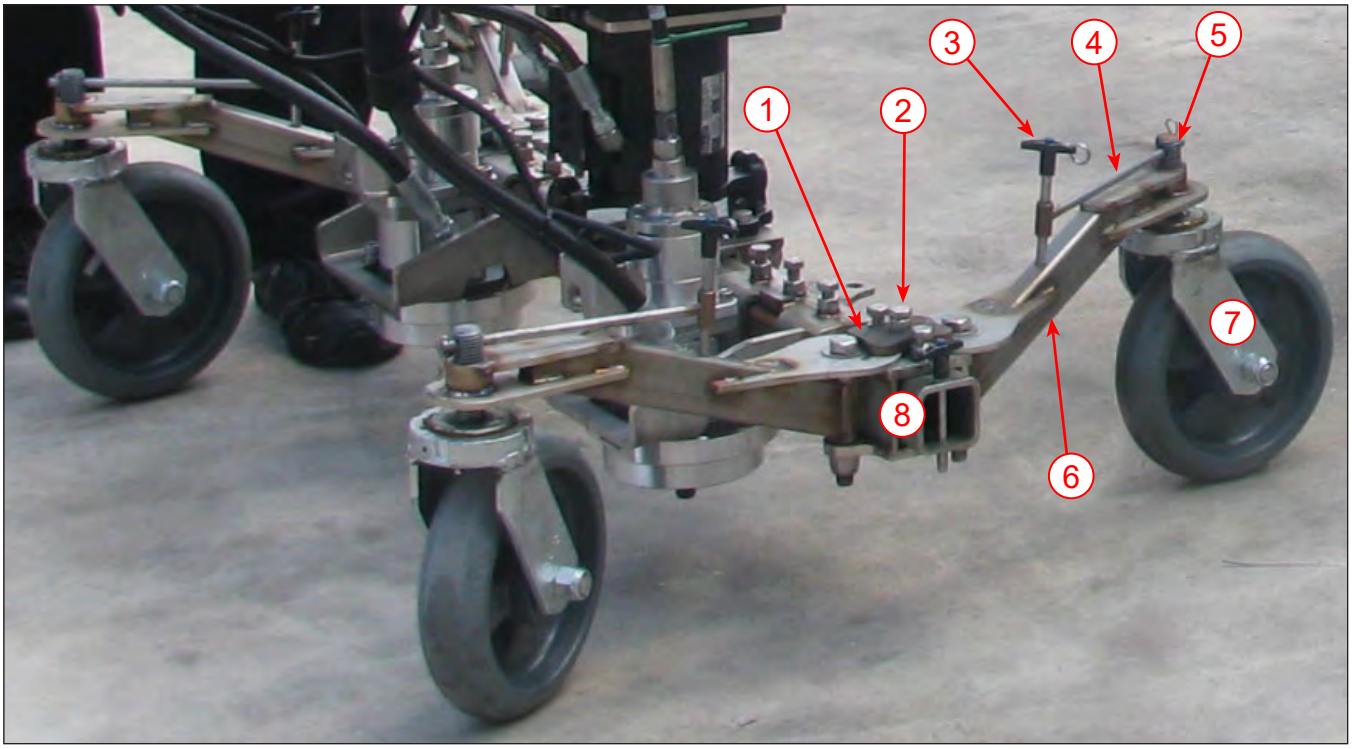
The tubular head plate is equipped with three or four adjustable heavy duty castors wheels that support the blasting heads and prevent the spray bars and shrouds from touching the road surface. The castor wheels are attached to heavy duty arms mounted to the tubular head plate. The arms swivel to allow the wheel location to be adjusted to avoid hazards such as rumble strips and road reflectors or to accommodate other operating situations. The arms are secured in position by adjustable friction plates with a bolt and jam nut locking system. The arms are adjusted by loosening the jam nut and moving the arm to the desired position. Then tighten the jam nut to secure the arm.

The castor wheel mount assemblies are threaded to provide spray bar/blasting head height adjustment. Adjustment rods attached to each castor wheel assembly are used to rotate the threaded shaft to move the wheels up or down. The rods are secured to the arms with T-handle pins to lock the castor wheel assemblies and blasting heads at the desired height. Blasting head height adjustment

Joystick Console, Head Rotation Speed Dial & PLC


Typical Blasting heads Showing Spray Bars


Caster Wheel Adjustment Rod & T-Handle Pin



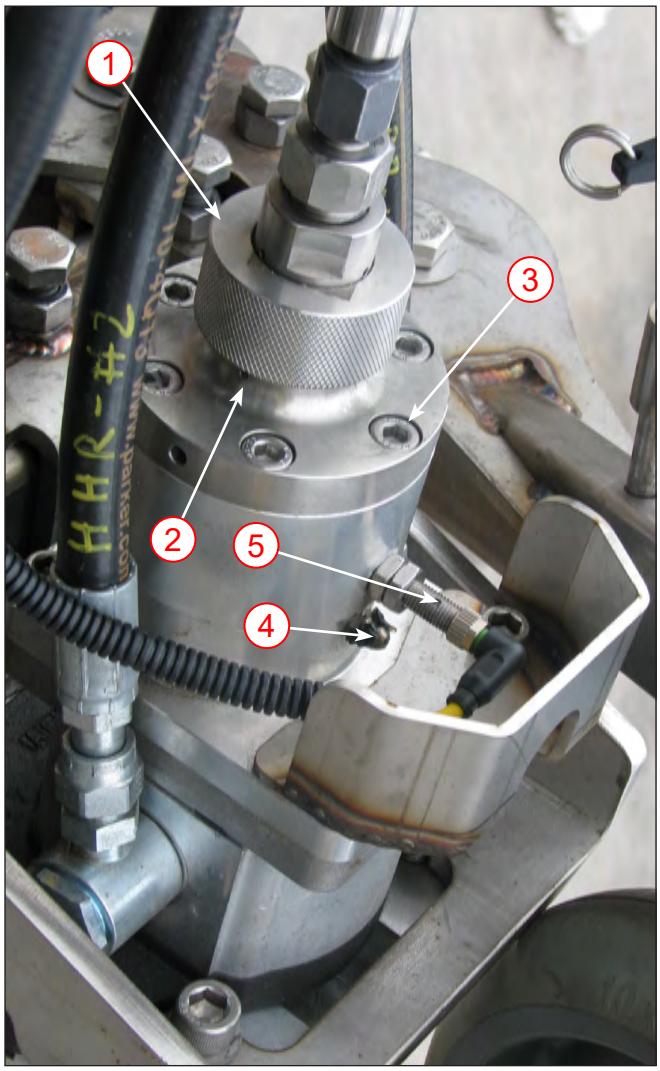
Tubular Head Plate Caster Wheels, Arms & T-Handle Pins

1. Adjustable Friction Plate
2. Friction Plate Bolt & Jam Nut
3. T-Handle Pin
4. Height Adjustment Rod
5. Castor Wheel Assembly Threaded Shaft
6. Castor Wheel Support Arm
7. Castor Wheel Assembly
8. Tubular Head Plate

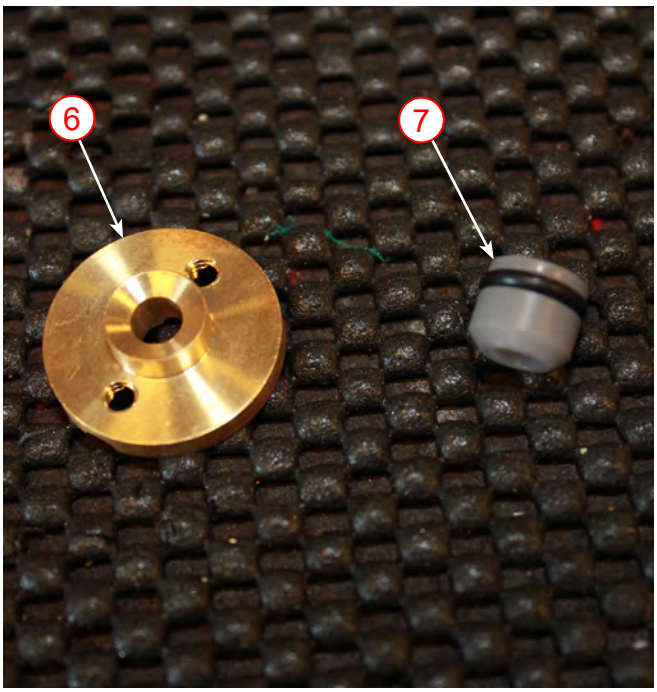
should be checked before each shift and the wheel castors should be inspected for damage and excessive wear daily. The castors and wheels should be greased daily for maximum life expectancy.

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

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



Thru-shaft Motor Components



Swivel Seal & Brass Backup Ring

1.	Swivel Nut
2.	Swivel Seal Weep Hole
3.	Thru-shaft Cover
4.	Grease Fitting
5.	Speed Sensor
6.	Brass Backup Ring
7.	Swivel Seal

2.5 Thru-shaft, Spray Bars, Protectors And Nozzles

Thru-shaft Motor

The hydraulic powered thru-shaft motor rotates the spray bar on the blasting head assembly. The center of the rotating shaft is drilled to allow high pressure water to pass through the shaft to the spray bar. A specially designed swivel seal and brass backup ring create a water tight, high pressure seal at the connection of the high pressure hose to the thru-shaft. The hose is secured to the rotating shaft housing by the swivel nut. ***The swivel nut is hand tightened.*** If the nut becomes loose, the hose will wobble and damage the swivel seal. Additionally, if the swivel nut is overtightened by using a pipe wrench or pliers, the swivel seal will be damaged. The swivel nut must be checked daily to ensure it is tight and that the swivel seal is not leaking. Any water dripping from the weep holes just below the swivel nut while the system is pressurized indicates the seal is leaking and must be replaced. Operating the blasting heads with a leaking swivel seal will cause complete failure of the seal, stopping blasting operations.

The RPM of the thru-shaft motor on each blasting head is independently controlled by the PLC mounted on the Joystick console. A speed sensor on each thru-shaft motor housing continuously monitors the RPM of the thru-shaft/spray bar and sends the data to the PLC where the RPM of each spray bar is displayed on separate windows on the display panel. During blasting operations, the operator can monitor the RPM of each spray bar and make adjustments as necessary.

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 Bars

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 and available in various sizes ranging from six inches to thirty six inches. Aggressive and non-aggressive spray patterns are available for all heads.

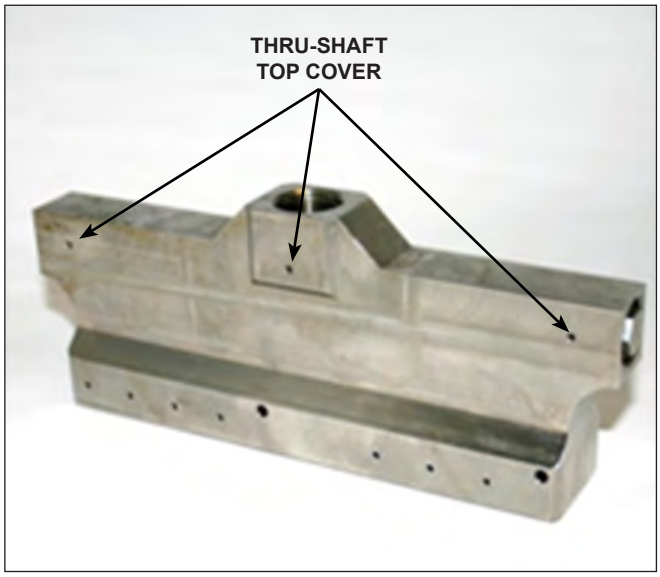
Spray bar selection is determined by requirements of the removal application being performed. The width of the spray bar selected is critical. It should be sized to the width of the line or other material being removed. In most situations, the spray bar selected should be 2" wider than the width of the line to reduce the potential for damage and increase productivity by concentrating the blasting pressure over the painted line.

When selecting a Spray bar the following should be considered:

- The size of the line marking, the spray bar should be 2" wider than the marking.
- The type of marking being removed. (Paint, thermal or rubber)
- The thickness of the material being removed.
- The type of road surface. (Concrete or asphalt)
- Profile requirements per job specifications.

Hog Technologies offers a variety of spray bar configurations to meet requirements of all types of removal projects. Examples of available spray bar configurations are included in the Operation section of this manual. You can also contact our customer support department for assistance in selecting the correct spray bar and/or nozzle configuration for your project at (877) HOG-ROAD.

Refer to the Maintenance section of this manual for instructions to install or replace spray bars and nozzles.



Typical Spray Bar & Spray Protector

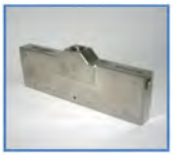
NOTICE:
AFTER INSTALLATION OF NEW NOZZLES AND/OR A SPRAY BAR, THE WEEP HOLES ON ALL HIGH PRESSURE FITTINGS SHOULD BE CHECKED FOR LEAKS UNDER PRESSURE. THIS SHOULD BE DONE PRIOR TO REPLACING THE SPRAY BAR PROTECTORS. THERE SHOULD NOT BE ANY WATER LEAKING FROM AND WEEP HOLES . ANY LEAKAGE IS AN INDICATION OF AN INSTALLATION ERROR, NOZZLE NOT SEATED CORRECTLY OR A DAMAGED COMPONENT.

CAUTION

Before attaching the 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 orifice's and cause system pressure to spike excessively causing damage to components or the rupture discs on the UHP pump to burst.

Spray Bar Configuration Overview

6”(15.2 cm)/14 jet: This spray bar is most effective for 4” (10.2 cm) line removal because the jet pattern is aimed directly on the line with only a 1” overlap area on either side. It allows the operator to remove the line with minimal damage with the best profile on a 4” (10.2 cm) line.



8” (20.3 cm)/13 jet: This spray bar designed for very aggressive or less aggressive removal. You can plug the 5 added holes or use all thirteen nozzles or plug 5 of the holes and use 8 nozzles, depending on the surface and the material you are removing. When used with a double blasting head this spray bar would be in the forward blasting head with a 8’/16 jet in the rear. It is most effective for 6” line removal because the jet pattern is aimed directly on the line with only a 1” overlap area on either side.

8” (20.3 cm)/16 jet: This spray bar is typically used to remove 6” (15.2 cm) lines because it is configured to be very aggressive or least aggressive and provides the best profile of all spray bars. When used in both blasting heads with the same configuration this spray bar will provide the best profile unless the material being removed is very thick.

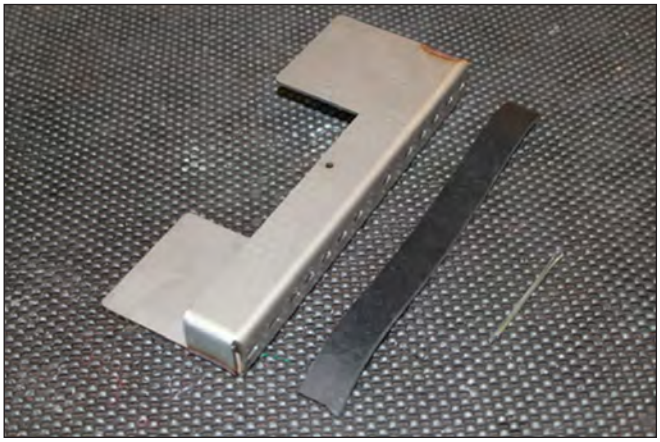
10” (25.4 cm)/16 jet: This spray bar is designed to remove 8” (20.3 cm) lines and will use the same configuration as the 8” (20.3 cm)/16 jet bar. It can be set up to be very aggressive or least aggressive. It will leave the best profile of any of the bars. When used in both blasting heads with the same configuration this spray bar will give you the best profile unless the material being removed is very thick.

14” (35.6 cm)/15 jet: This spray bar is designed to remove large areas of paint, most commonly used on airport runways, taxiways and aprons. There are several different nozzle configurations to fit the removal situation as these bars have a lot of versatility. This style of spray bar is also the preferred choice to use for removing curing compound as you can take up to a 27” (61 cm) wide pass up to 150’ (45.7 m) per minute when using two blasting heads.

14” (35.6 cm)/30 or 22”(55.9 cm)/30 jet: This spray bar is consider the rubber removal bar. When used in both blasting heads, it will provide a 27” (68.6 cm) or 40” (101.6 cm) wide pass. The 30 jet design is the least aggressive spray bar in our inventory and is specifically engineered for airport runways. When either spray bar is used with an average pressure of 32K to 36K psi (2206 to 2482 bar), it will not round the edges off the grooves in the pavement or polish the surface which reduces runway friction. Additionally, these spray bars are designed to remove the rubber on runway paint without removing the paint and increase the reflectivity properties of the paint. The spray bar can also be configured with an aggressive nozzle configuration and higher pressure for removing paint and leaving very smooth profile.

Spray Bar Protector

Each spray bar is equipped with a spray bar protector that is held in place with one or two cotter pins. The spray bar protector shields the nozzles and spray bar from damage caused by debris during blasting operations. Never perform ultra-high pressure blasting operations without the spray bar protector installed as this will dramatically shorten the life of the nozzles and spray bar.



Typical Spray Bar Protector & Gasket

Nozzles

Ultra high pressure is produced by restricting the flow of water at the nozzles on the blasting head. Each nozzle delivers a stream of water at extremely high pressure that is determined by nozzle orifice size and it's Gallon Per Minute (GPM) flow at desired pressure. The performance ranges from least aggressive (.005") to most aggressive (.015"). The condition of the nozzles is critical to removal performance and maintaining a tight, cohesive stream as water is forced through the nozzles. Maximum productivity and 98% removal without damage requires nozzles to be in excellent condition. 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 blasting. If visual inspection of the nozzle spray pattern indicates that the pattern is not in the #1-4 quality range as indicated on the Nozzle Quality Guide, the nozzle must be replaced.

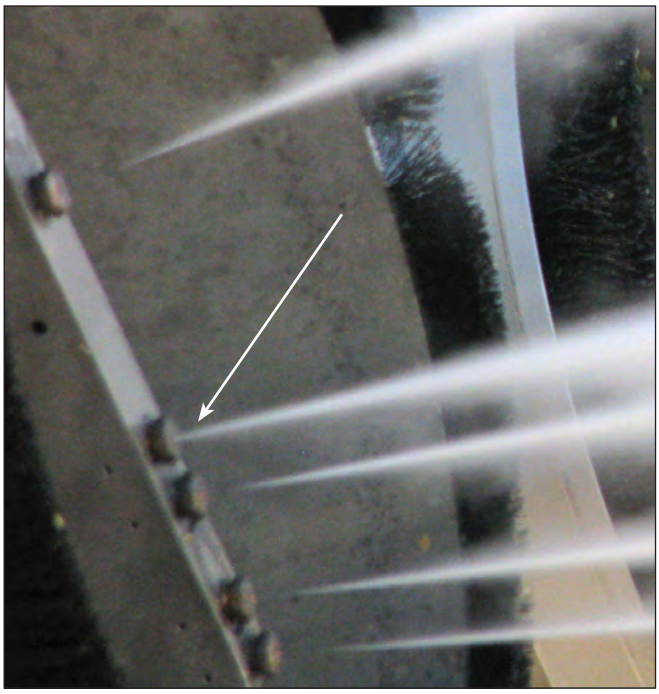
Blasting Heads With Spray Bar Protectors Installed

Testing and inspecting nozzles:

To inspect and test the nozzles, raise the hog head to the full up position and set the parking brake. Then remove the spray bar protectors. The protectors will disrupt the spray pattern causing inaccuracies when inspecting or testing nozzle performance. Once the spray bars protectors are removed and all personnel are well clear of the blasting heads, activate the high pressure system and set the operating pressure to a safe level. Make sure the head rotation speed dial is set to 0 so the spray bars do 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 rates as grade 4 or better (Refer to the Nozzle Quality Guide in this section of the manual) and it is good.

Spray Bar Nozzle

Good Nozzle Spray Pattern



Nozzles Showing Bad Spray Pattern
Nozzle Must Be Replaced

DANGER

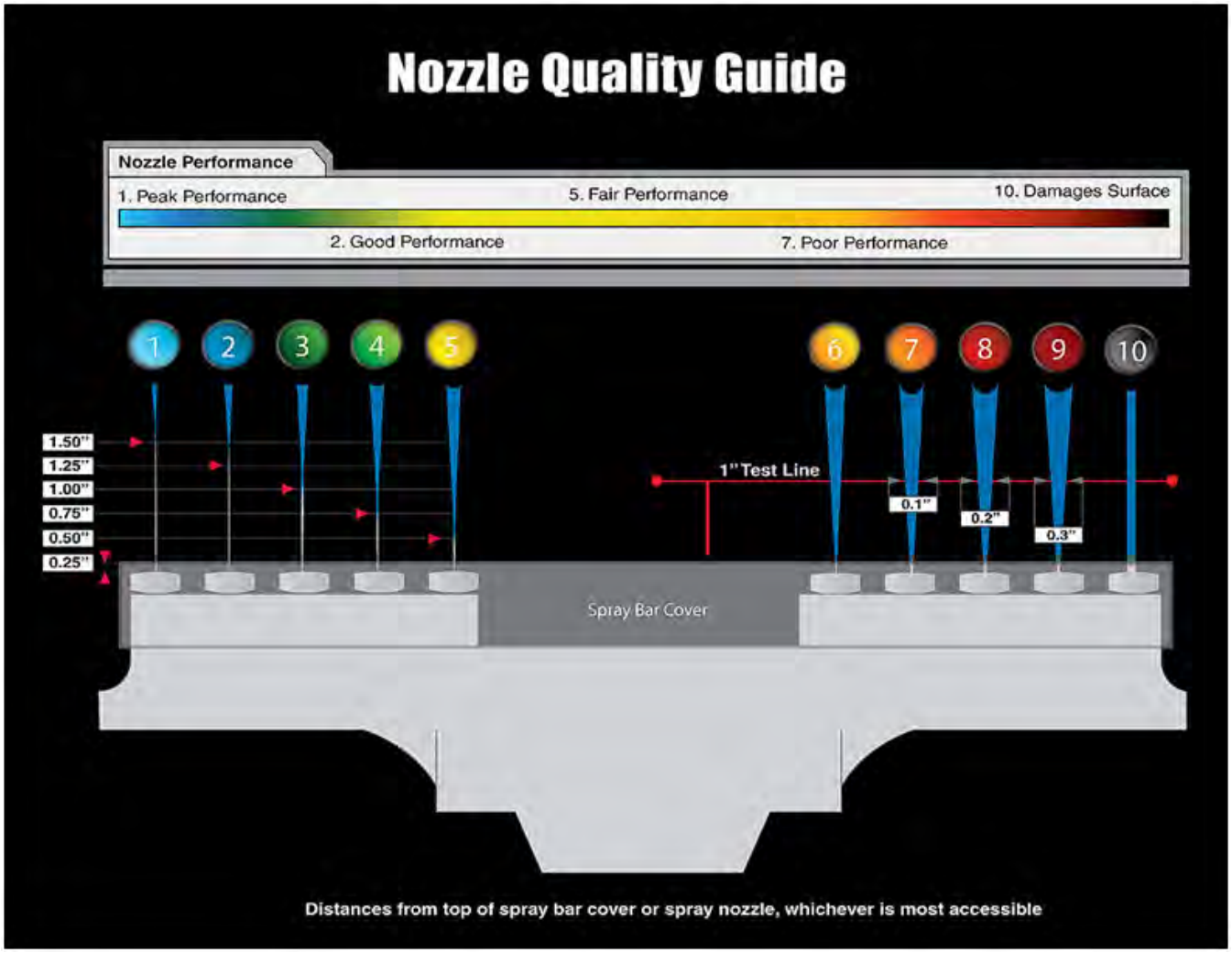
THE HIGH PRESSURE STREAM FROM THE SPRAY NOZZLES CAN CAUSE SEVERE INJURY OR DEATH IF IT COMES IN CONTACT WITH HANDS, FEET OR ANY PART OF A PERSON'S BODY. IT CAN ALSO PROJECT LOOSE DEBRIS IN THE AREA OF THE HOG HEAD WITH ENOUGH FORCE TO CAUSE SERIOUS INJURY, PARTICULARLY TO THE EYES. HIGH PRESSURE WATER 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 AND MAKE SURE THE AREA IS CLEAR OF PEOPLE, HANDS AND FEET BEFORE ENGAGING THE PTO AND 40K PSI SWITCH FOR THE HIGH PRESSURE SYSTEM TO TEST AND INSPECT THE NOZZLES WITH THE HOG HEAD RAISED.

If a nozzle rates as a 5 or higher on the Nozzle Quality Chart it is worn or damaged and must be replaced. Nozzles are easy and quick to replace. Refer to the nozzle replacement procedure in the Maintenance section of this manual for detailed instructions for replacing nozzles.

Nozzles typically last 12-16 hours of blast time, however, you can experience shorter or longer nozzle life, depending on the source and quality of water being used. Any dirt or debris in the system can clog nozzle orifice's causing a spike in the high pressure system which will rupture the burst discs and could cause damage to components.

NOTICE:
NOZZLES MUST ALWAYS BE CHECKED WITH SPRAY BAR PROTECTORS REMOVED TO AVOID INACCURATE READINGS. START THE PUMP AT LOW PRESSURE AND SLOWLY INCREASE TO OPERATING PRESSURE TO CHECK NOZZLE QUALITY AS WELL AS LEAKS ON THE SPRAY BAR, NOZZLES AND HOSES. DISENGAGE THE PUMP AND RETURN ENGINE TO IDLE TO RELIEVE ALL 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 BLASTING OPERATIONS.

You can select different nozzle sizes in a variety of spray bar configurations to accommodate the material to be removed and the type of substrate. The Nozzle Quality Guide and Spray Bar Configuration Diagrams located in the Operation section of this manual will provide assistance in choosing the right nozzle configurations for most removal applications. The number of nozzles in a spray bar should be considered in every removal situation. The number of nozzles and the nozzle orifice size will determine the aggressiveness of the spray

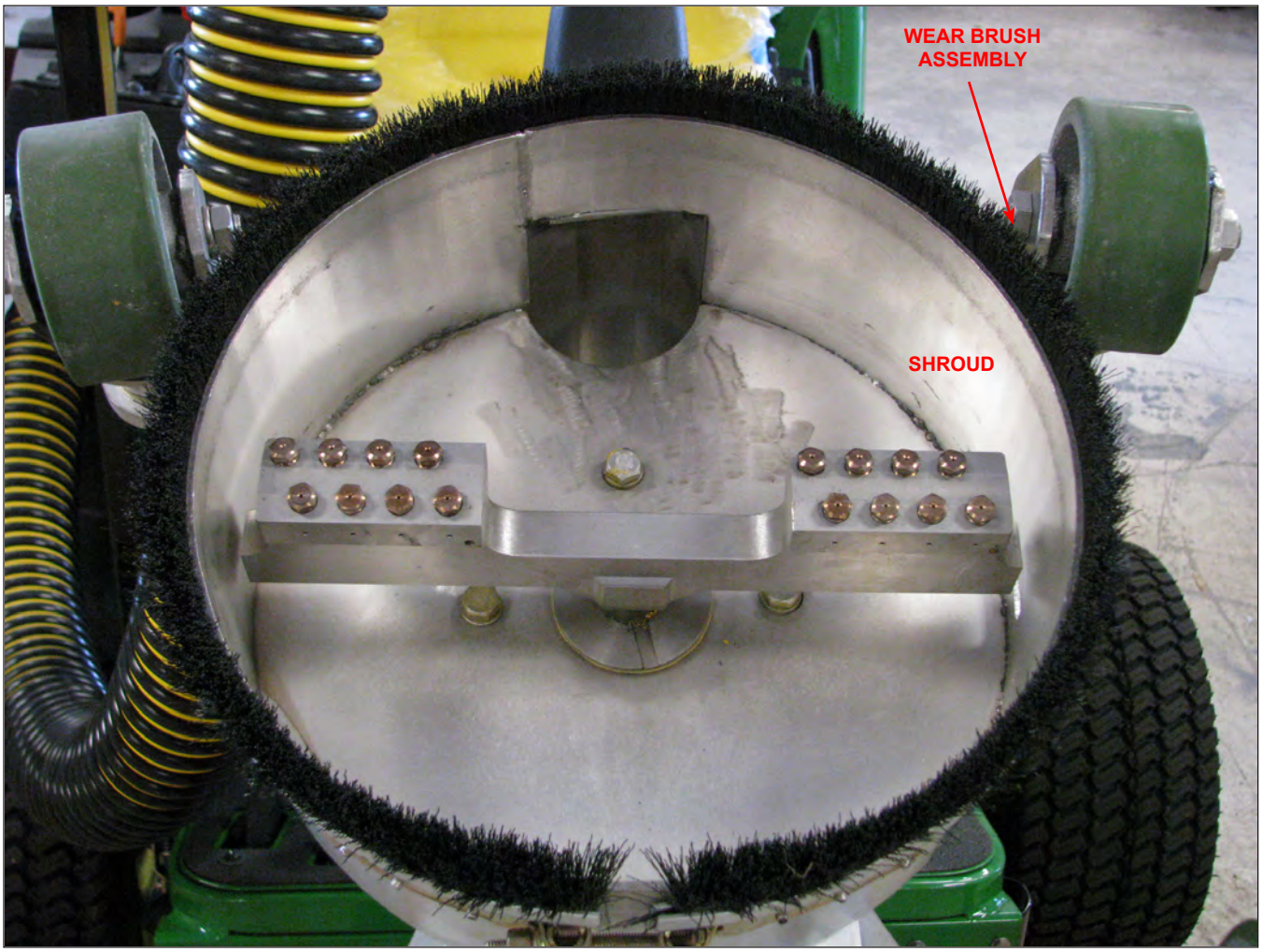


bar. As the operator becomes more experienced, nozzle selection becomes easier. You can also contact Hog Technologies Customer Support toll free at (877) HOG-ROAD for assistance in selecting the proper spray bar and nozzle configuration for your job.

The 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
- Nozzle's ability to hold pressure is suspect
- Nozzle's hex head is worn excessively from blasting
- 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 UHP 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 ultra high pressure waterblasting system.



Blasting Head Shroud & Wear Brush Assembly

Shrouds

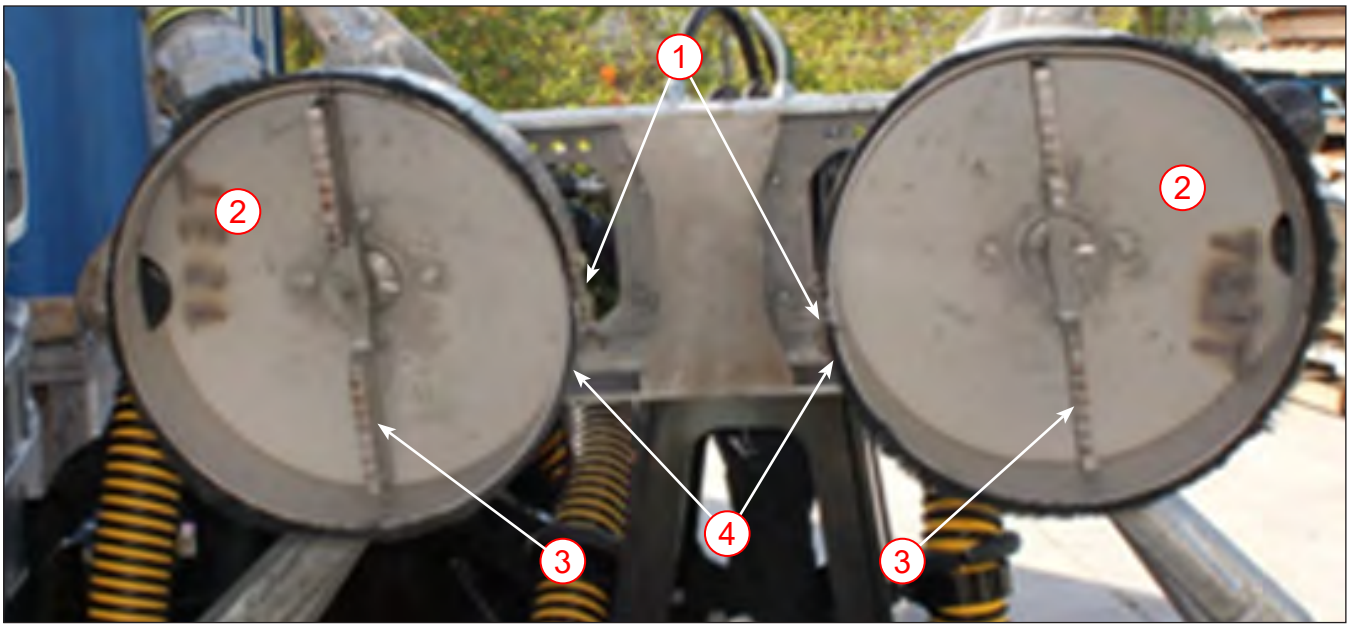
The shroud is the heavy duty stainless steel housing attached to the bottom of the thru-shaft housing that encases the spray bar keeping water and debris contained for optimal vacuum extraction. The vacuum hose is connected to the top of the shroud by cam lock connectors. Shrouds are available in various sizes to accommodate the spray bar selected.

Wear Brush

A wear brush clamped to each blasting head shroud provides a partial seal between the blasting head and pavement. The wear brush regulates vacuum air flow into the shroud and reduces the amount of debris and water exiting the blasting head during waterblasting operations. The wear brush is an important safety feature of the blasting head system. It must be adjusted as it wears and replaced 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 blasting heads to the ground and note the gap between the wear brush and the pavement. Loosen the brush clamp on the blasting head shroud, then slide the wear brush enough to eliminate the gap. Tighten the clamp and recheck. Readjust if necessary.

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

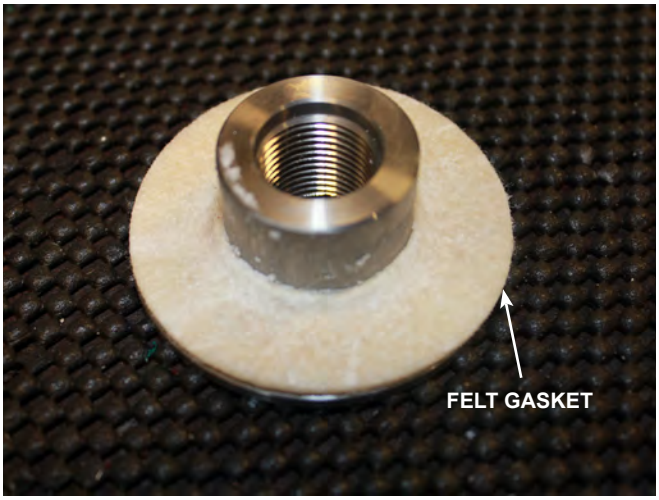


Typical Dual Blasting Heads Showing Shrouds & Wear Brushes

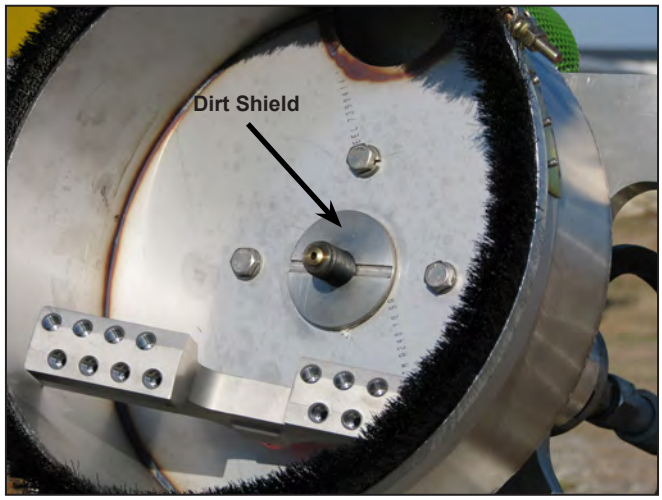
1. Wear Brush Clamps
2. Shrouds
3. Spray Bars
4. Wear Brushes

Dirt Shield

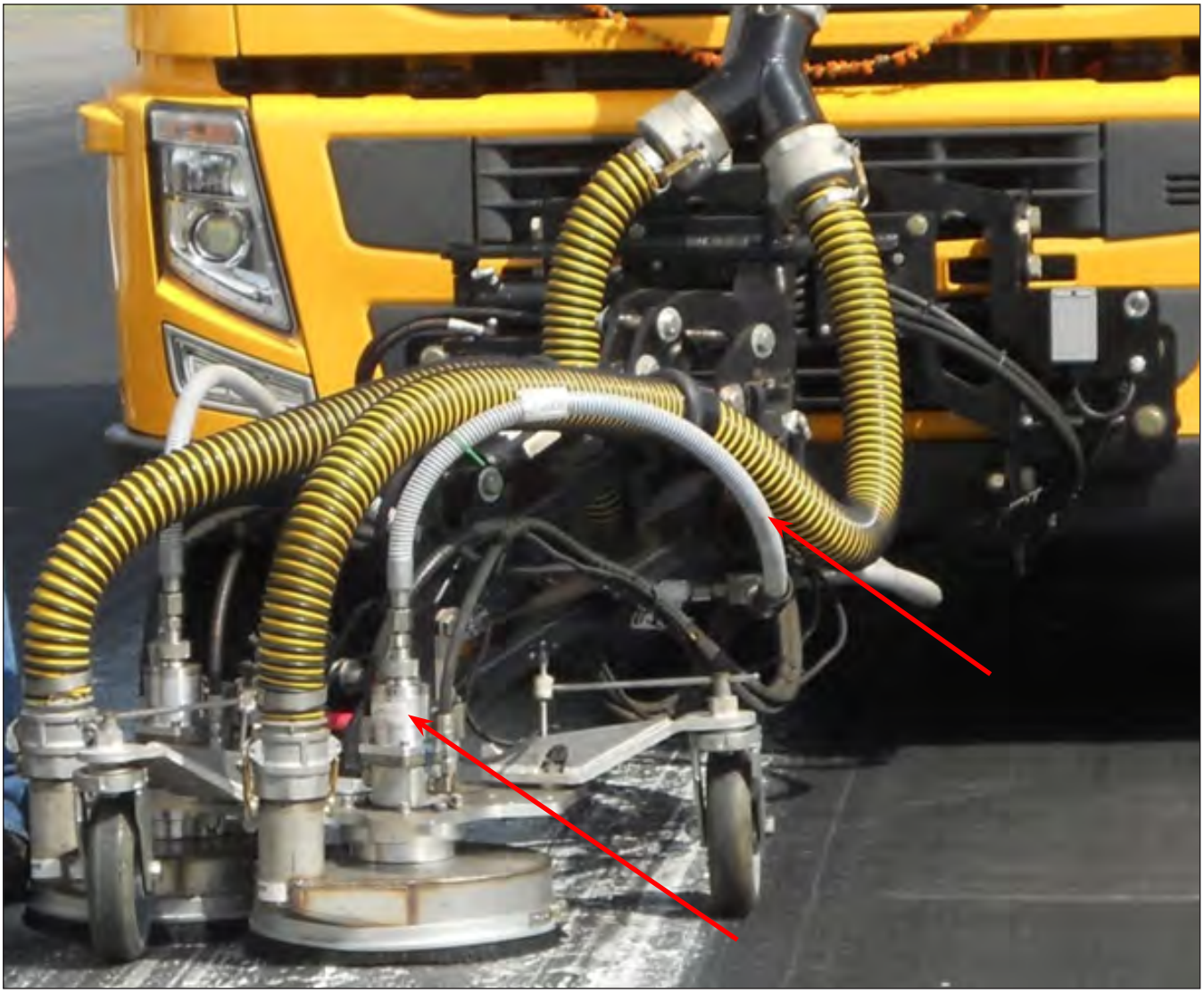
The dirt shield is a threaded stainless steel flat washer that protects the thru-shaft seals and bearings from dirt and debris during ultra-high pressure blasting operations. It is located between the spray bar and the shroud and consists of a special felt gasket that protects the shroud from damage while the spray bar is rotating. The dirt shield should be inspected prior to the start of each shift as part of the pre-start procedure and replaced if it becomes worn or damaged. When installing a dirt shield, it should be adjusted "finger tight." If it is set too tight it will prevent the spray bar from rotating. (Refer to the Dirt Shield Installation procedure in the Maintenance section of this manual for instructions for replacing the dirt shield).



Dirt Shield & Felt Gasket



Dirt Shield Installed



Blasting Heads, Thru-shaft Motor & Ultra High Pressure Hose

2.6 High Pressure Hoses, Connections & Fittings

The ultra-high pressure hoses used in the SH8000 Waterblasting system 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 40,000 psi (2758 Bar) and a listed burst rating of 60,000 psi (4,137 Bar). The primary ultra-high pressure hose transfers the water from the UHP pump to the high pressure "two way" Y connector at the front of the chassis. The connector splits the high pressure water supply to a high pressure hose for each blasting head. The hoses are secured to the blasting head thru-shaft with the swivel nut. A swivel seal and brass backup ring are installed in the fitting at the swivel nut connection creating a Ultra-High pressure seal while allowing the thru-shaft to rotate freely. The swivel seal has a life expectancy of approximately 12 to 16 hours depending on the quality of water.

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 ultra-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 waterblasting 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 the ultra-high pressure hose from contact with sharp objects, abrasive surfaces, foot and/or wheel traffic.

B) Never subject an ultra-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 an ultra-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 40,000 PSI (2758 BAR.) THESE HOSES ARE DIFFICULT TO FIND. 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, crushed or stretched beyond its minimum bend radius.

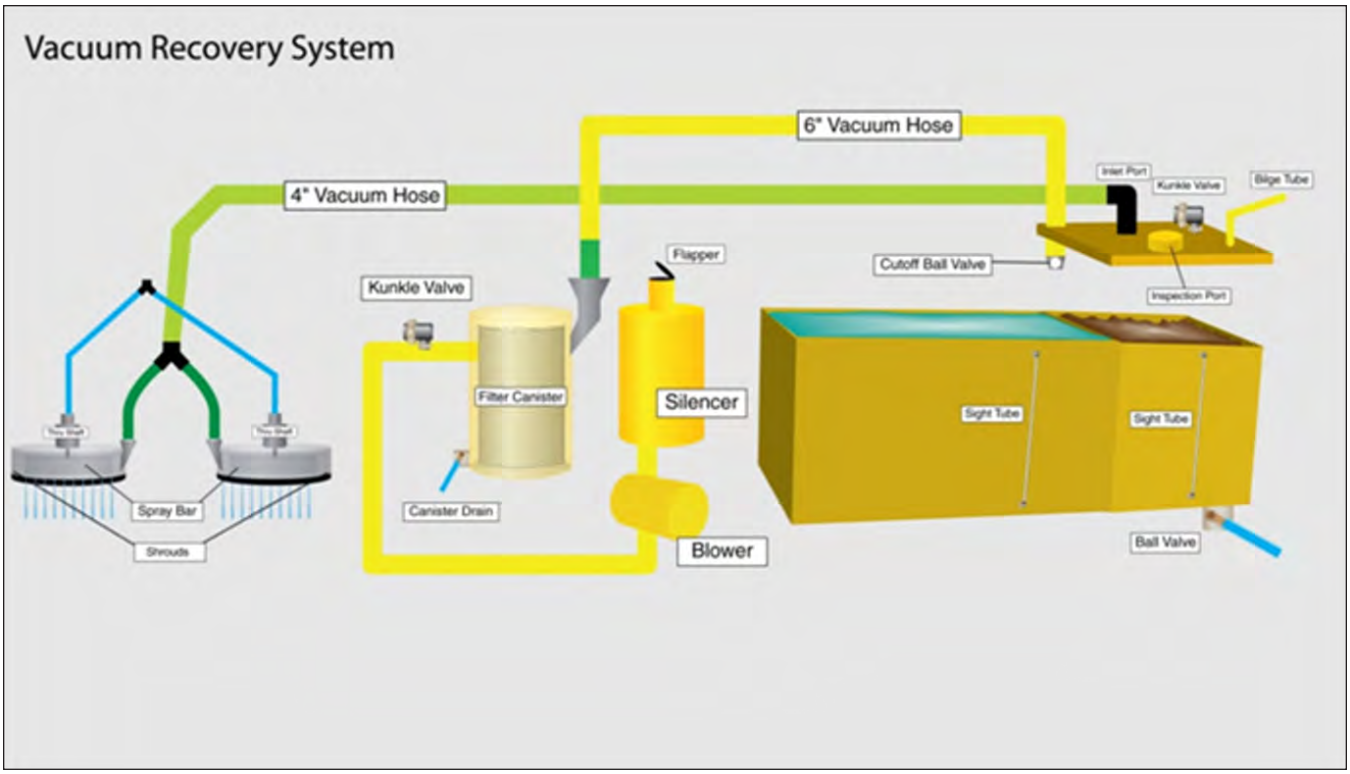
When replacing or connecting fittings or hoses always inspect the threads and use an anti-seize compound on all threads to prevent "galling." (Refer to the High pressure hose installation procedure in the Maintenance section of this manual). Galling is the term for thread damage that occurs from heat 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 blasting heads 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, pressure down the system, tighten the fitting or hose and then check 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 ENGAGING THE PTO AND PRESSING THE START BUTTON TO ACTIVATE THE ULTRA 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 ULTRA HIGH PRESSURE EQUIPMENT. USE ONLY THOROUGHLY TRAINED PERSONNEL TO PERFORM MAINTENANCE OR REPAIRS ON THE HIGH PRESSURE SYSTEM.



2.7 Vacuum Recovery System

Overview

The vacuum recovery system consists of a high performance blower, vacuum hoses, filter canister, relief valves and a debris tank. The system is powered by the main truck engine and activated whenever the PTO and 40K Clutch is engaged. The blower creates vacuum in the filter canister, debris tank, vacuum hoses and blasting heads. A filter located in the filter canister protects the blower and flexible hoses with quick disconnect fittings provide vacuum to the truck mounted blasting heads.

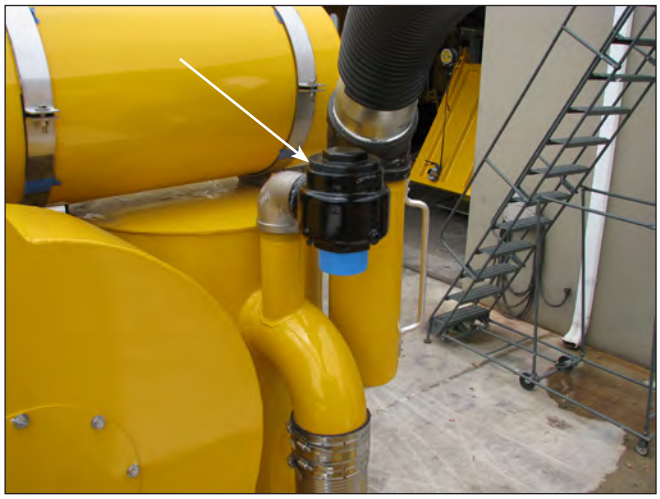
The vacuum recovery system is critical to productivity on most waterblasting projects . Airport specifications require minimal FOD (foreign, objects, debris) after blasting as possible due to the possibility of removal projects on active taxiways and runways.

On road construction sites, vacuum recovery is critical to productivity by removing excess water and debris from the road surface. Paint crews are generally on location to apply new line markings immediately after existing markings have been removed. The efficiency of the vacuum system in removing water and debris from the road surface after blasting determines how quickly the new markings can be applied. The waterblasting vacuum recovery system only leaves a damp strip of moisture on the road surface after removal allowing painting shortly after blasting operations are completed.

Proper Airflow And Safety Valves

Maintaining maximum engine RPM and airflow at the blasting heads is essential for achieving optimum vacuum performance. The vacuum blower creates negative pressure in the blast head shroud pulling air past the wear brush into the shroud, then transporting air, water and debris from the shroud through the 4” vacuum hose to the inlet port on the debris tank. The water and debris is separated from the airflow and deposited into a debris bag or directly into the tank, depending on the truck options selected. The flow of air continues from the debris tank through the 6” vacuum hose to the filter canister where the air is filtered and residual water is separated and collected.

Debris Tank Safety Relief Valve (Kunkle Valve)



Vacuum Canister Safety Relief Valve (Kunkle Valve)

Filtered air flows out of the filter canister through the blower and out the silencer. A stainless steel cutoff ball valve in the vacuum line at the top of the debris tank automatically shuts off the vacuum flow if the tank becomes full, protecting the blower and other vacuum system components.

Consistent and proper airflow is critical to maintaining optimum vacuum pressure. The recommended vacuum gauge reading is between -5 (Hg) and -7(Hg). Maximum vacuum of -7 (Hg) is typically achieved at 1400 RPM (Maximum engine operating RPM). Vacuum pressure is displayed and monitored by the operator on the PLC display located in the cab.

To prevent damage to the vacuum system there are two vacuum safety relief valves called Kunkle valves that open if there is insufficient airflow and consequently excess vacuum in the vacuum system. These valves are preset at the factory and equipped with a data tag that displays the activation preset pressure in inches of mercury (Hg). One Kunkle valve is located on top of the debris tank and the other is on the vacuum filter canister. For proper operation, these safety valves should be checked and maintained periodically (Refer to the maintenance matrix in the maintenance section of this manual). A full debris tank, debris buildup, kinks, clogs or leaks in the system will cause a reduction in airflow at the blasting heads, reducing the efficiency of operation or causing operations to stop completely.

Stainless Steel Vacuum Cutoff Ball Valve

PLC Screen Showing Vacuum Pressure Gauge

Debris Tank, Vacuum Hoses, Canister & Blast Heads

1. Waste Tank
2. Vacuum Hoses
3. Blower Silencer
4. Vacuum Filter Canister
5. Blast Head Vacuum Hoses
6. Blast Head Shrouds & Wear Brushes

Vacuum Hoses

Flexible, easy to change hoses equipped with quick connect cam-lock fittings provide airflow for the vacuum recovery system. The primary, 6" vacuum hose runs from the cutoff ball valve connection on the top of the debris tank to the vacuum hose connection on the vacuum filter canister. Another 6" hose connects the filter canister to the inlet side of the blower. A secondary 4" vacuum hose runs from the inlet port of the debris tank to the "two way" Y connector located at the front of the unit where the two separate 3" inch hoses are connected to the blasting head shrouds and the vacuum system. The secondary vacuum hose has multiple sections equipped with cam-lock fittings to provide quick replacement, service or setup.

Vacuum Hose "Y" Connector & Cam Lock Fittings

Debris buildup, kinks, clogs or leaks in the system will cause a reduction in airflow at the blasting heads, reducing the 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 the debris to break off and be sucked into the debris tank. You should avoid tight bends and maximize the radius of all hose bends to maximize air flow and reduce 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. The wear points are most prevalent in the outside radius of tight bends near the blasting heads and where the debris hose rises above the truck cab or connects to the boom for the optional tractor. The

life of the hoses in these areas can be extended by periodically rotating the hoses 120⁰. Vacuum hoses should be inspected daily and replaced as needed (Refer to the vacuum hose replacement procedure in maintenance section of this manual).

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

Blower And Silencer

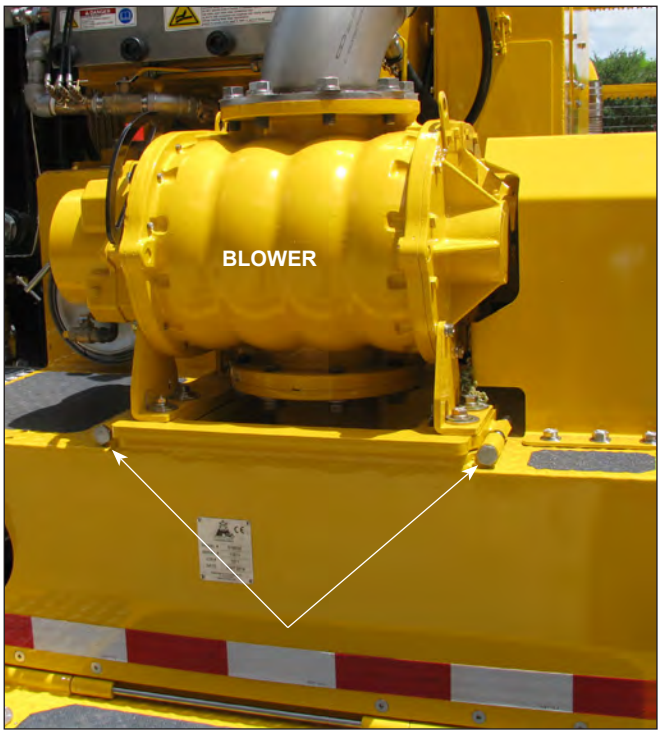
The blower is powered by the truck engine and activated whenever the PTO and the 40K clutch are engaged. It is driven by the OMSI and a poly chain carbon belt. To avoid damaging the belt you must periodically check the belt tension and adjust as necessary using the adjusting bolts on the mounting base of the blower. The tension specification for a new belt is different than the tension specification of a used belt with 20 hours or more of usage. When adjusting the belt tension refer to the procedure in the Maintenance section of this manual and the belt manufacturer's information manual. Never over tighten the belt. Drive belts are extremely strong and can cause severe damage to the PTO, pulleys and the blower. Refer to the Maintenance section of this manual for belt tension specifications and instructions for adjusting the drive belt

The blower bearing housing is equipped with two grease fittings that must be lubricated daily to achieve maximum life expectancy. Refer to the Maintenance Matrix in the maintenance section of this manual and the Root Blower operation manual for lubrication specifications.

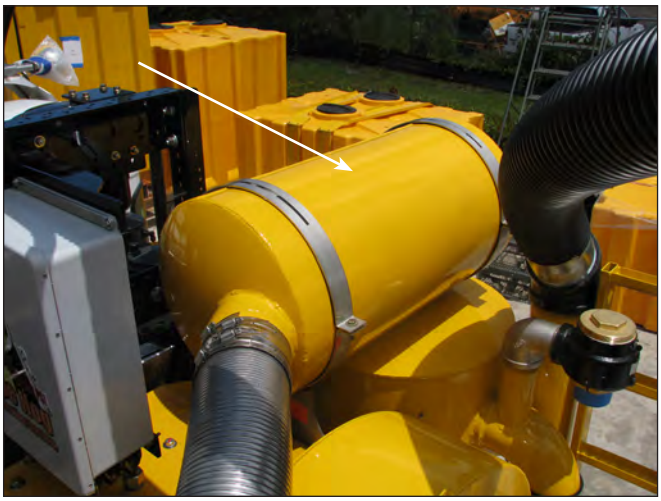
⚠ CAUTION ⚠

THE BLOWER BEARINGS MUST BE LUBRICATED DAILY WITH THE GREASE SPECIFIED IN THE MAINTENANCE MATRIX AND THE BLOWER MANUFACTURER. FAILURE TO LUBRICATE THE BEARINGS DAILY OR USING GREASE OTHER THAN THE GREASE SPECIFIED BY HOG TECHNOLOGIES AND THE BLOWER MANUFACTURER WILL VOID THE WARRANTY.

Blower airflow is expelled through a silencer connected to the outlet side of the blower. A flapper installed at the top of the silencer keeps water and debris from entering the system damaging the blower when the unit is shutdown.



Vacuum Blower & Belt Adjusting Bolts



Blower Silencer

The blower components have extremely small tolerances and it must be protected from the debris. If debris ever gets into the blower impellers, use paint/lacquer thinner or another non-corrosive cleaner to remove any residue build up inside. It will be necessary to disconnect the hose to the silencer in order to clean the blower. If large debris gets into the blower, it can cause severe damage to the blower.

Typical Vacuum Filter Canister

Vacuum Filter Access Door & Filter

⚠ CAUTION ⚠

THE BLOWER'S INTERNAL COMPONENTS HAVE EXTREMELY SMALL TOLERANCES AND MUST BE PROTECTED FROM THE DEBRIS. ANY FOD (FOREIGN OBJECTS OR DEBRIS) INCLUDING EXCESSIVE WATER CAN CAUSE SEVERE DAMAGE TO THE BLOWER.

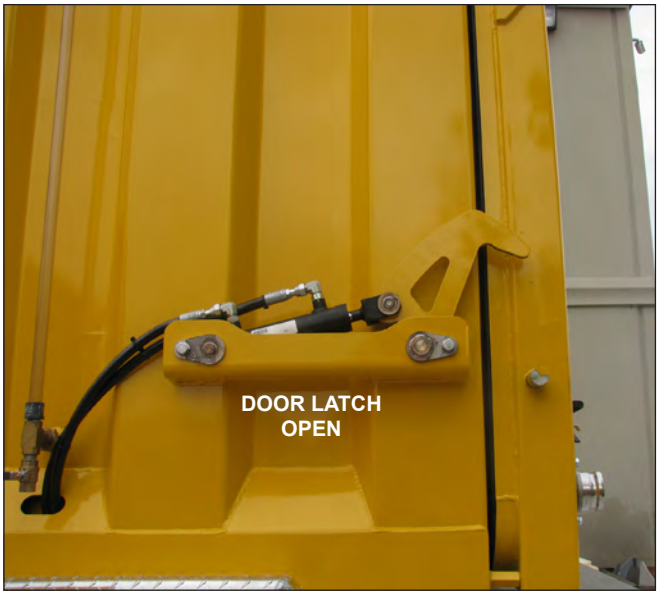
Filter And Filter Canister

The vacuum filter canister houses the vacuum filter which protects the blower from debris. The filter should be checked at the beginning of each shift and periodically during operation. It is normal for some water vapor to travel from the debris tank to the vacuum filter canister where it will accumulate. Therefore, the canister must be drained at the start of each shift and each time the debris tank is drained to ensure water does not accumulate to an unsafe level filter canister. Excessive water in the canister can pass through the vacuum filter and cause severe damage to the blower. There is a manual drain valve connected to a hose at the bottom of the filter canister to remove accumulated water as required. The engine must be at idle and the 40K Clutch disengaged before attempting to drain the canister. Once the water has been drained, close the drain valve to avoid losing vacuum suction during operation. The system will not be able to develop enough vacuum if the canister door is not sealed and latched or when the drain valve is open.

Vacuum Canister Drain Valve & Hose

NOTICE:
THE FILTER CANISTER WILL NOT DRAIN IF THE VACUUM SYSTEM IS OPERATING. ALWAYS MAKE SURE THE SYSTEM IS COMPLETELY SHUTDOWN BY REDUCING ENGINE SPEED TO IDLE AND DISENGAGING THE 40K CLUTCH BEFORE DRAINING THE CANISTER.

Hydraulic Door Latch Closed



Hydraulic Door Latch Open

The vacuum filter is a pleated, reusable filter that is easily accessed through the door on the side of the canister. Once the filter has been removed you should de-grease with detergent and power wash at 2000 psi (138 BAR). A mild solvent solution may be used to clean thermoplastic or tar residue from the filter surface. Always check to ensure there are no damaged areas or holes that could allow debris to get into the vacuum blower or silencer. Replace the filter if it is damaged or shows any sign of deterioration.

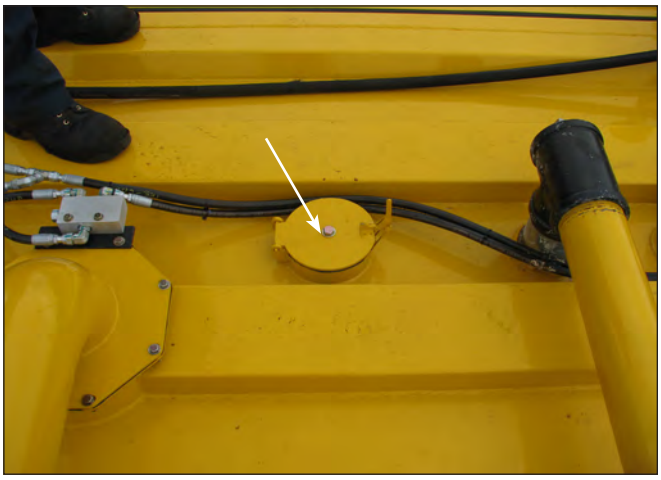
Pneumatic Debris Tank Drain Valve

Debris Tank And Debris Bag

The debris tank is constructed from stainless steel panels. The debris tank door has a hydraulic locking system, a watertight inflatable door seal and hydraulic cylinders that open and close the door.

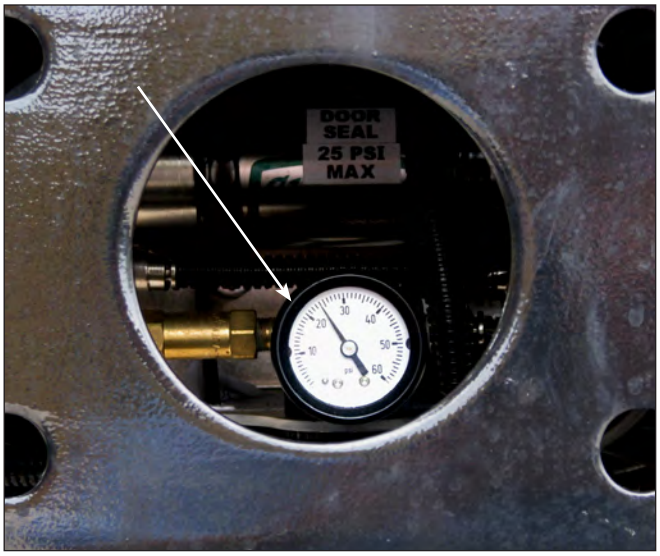
Water is drained from the tank prior to dumping by two pneumatically activated drain valves in the bottom the tank near the door. Another manual ball valve in the door provides drainage in the event that the main drains fail or become clogged. The main drains are controlled by a rocker switch in the debris tank control switch panel or by a switch in the control console in the cab.

All debris water should be drained from the tank prior to deflating the door seal and opening the tank door to dump the debris bag. A site tube on the side of the debris tank indicates the recovered water level and an inspection port on top of the debris tank provides access to monitor the solid



Debris Tank Inspection Port

Inflatable Door Seal



Door Seal Pressure Gauge

waste level. Remember that the vacuum system must be completely shutdown with the engine at idle and the 40K clutch disengaged before water can be drained from the debris tank.

NOTICE:
IF BOTH DRAIN VALVES ARE BLOCKED WITH DEBRIS PREVENTING WASTE WATER FROM DRAINING, THE VACUUM SYSTEM CAN BE BRIEFLY ACTIVATED FOR 30 SECONDS WITH THE VALVES OPEN TO DRAW AIR THROUGH THE VALVES AND CLEAR DEBRIS FROM THE VALVES AND DRAIN FITTINGS.

The pressurized door seal is supplied compressed air by the truck brake system air supply. A solenoid activated pressure valve controlled by a rocker switch in the debris tank control switch panel inflates or deflates the door seal. Seal pressure is monitored by a gauge mounted to the truck chassis below the debris tank door. Normal seal inflated seal pressure is 20-25 psi (1.4 - 1.7 BAR).

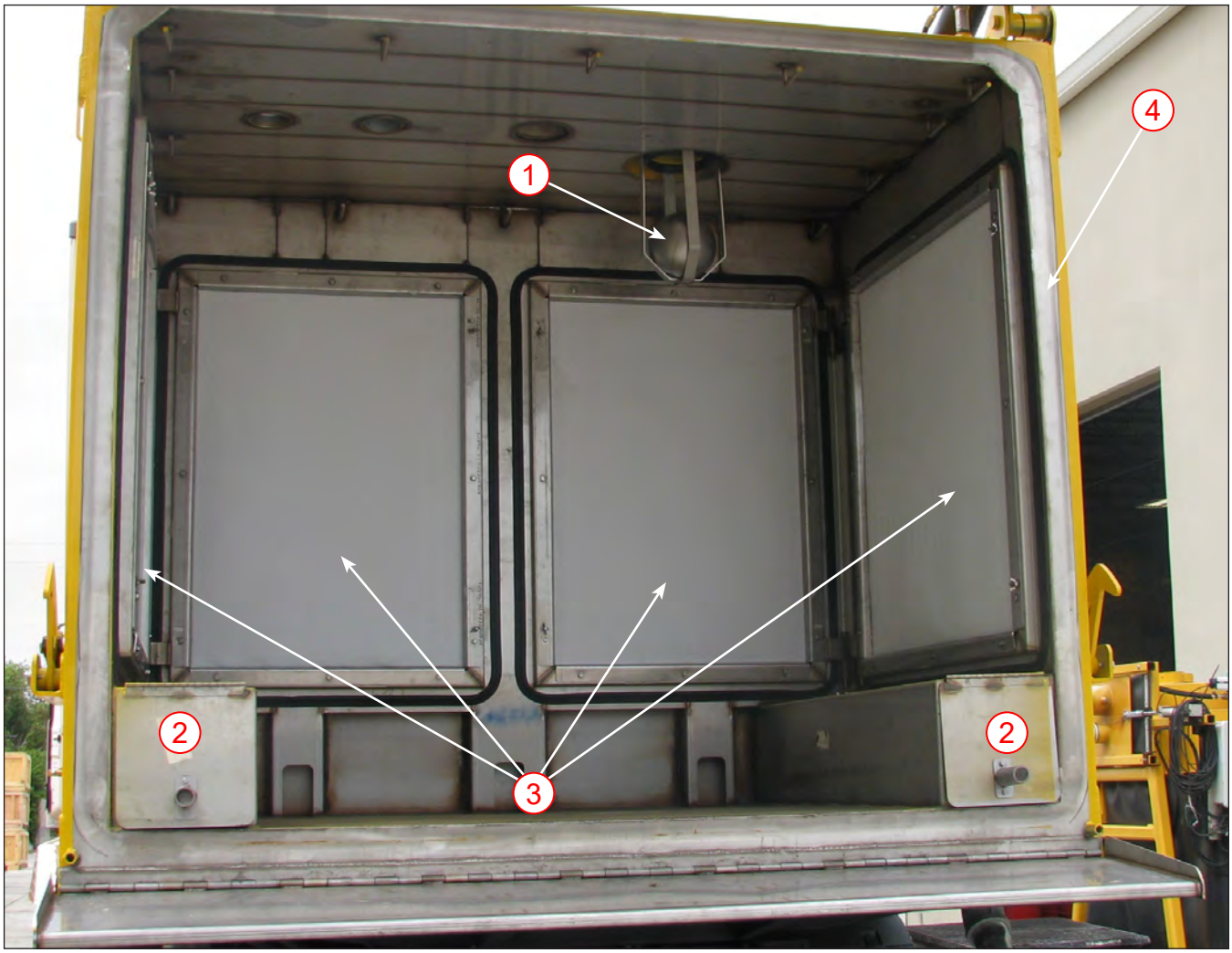
Debris Tank Control Switch Panel

Debris Tank Door Open With Tank Tilted

The debris tank tilts and hydraulic rams open the door for easy dumping. The tank is designed with enough ground clearance to empty into most industrial dumpsters.

The tank is lifted by two hydraulic rams that are controlled by the dump switch remote control unit. The remote dump switch control plugs into the grey junction box located near the waste tank control switch panel on the side of the truck chassis. The remote switch performs different functions depending on the mode selected with the rocker switches on the debris tank control panel. (Refer to the Dumping Debris Procedure in the Operation section of this manual). Note that the debris door seal must be deflated before the hydraulic door latches will release.

Remote Control Switch



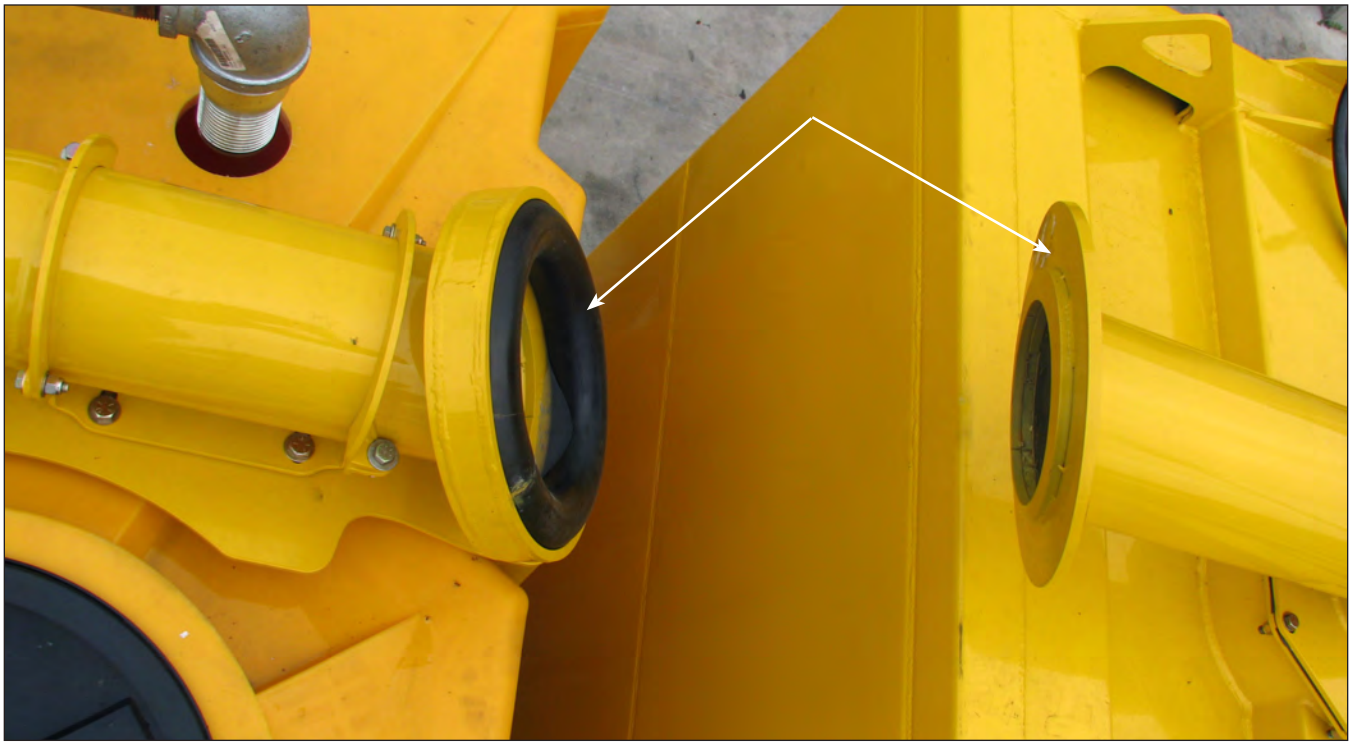
Debris Tank

1. Cutoff Ball Valve
2. Access Covers
3. Optional Filter Panels
4. Door Seal Point of Contact

Airflow at the blasting head moves debris mixed with water from the blasting heads into a debris bag or, if this truck is equipped with optional filter panels, directly to the tank, where solid waste and particles are trapped. The debris bag is mounted on retaining hooks near the top of the stainless steel liner. It is designed to break away and slide out of the tank with the debris during the dumping procedure. The optional filter panels are hinged and swing away from the tank walls. They can be cleaned using a pressure washer set at 2000 psi (138 BAR) maximum pressure.

The walls and floor of the debris tank are made of perforated metal. As the water drains out the sides and bottom of the debris bag or through the filter panels, it flows into the debris tank where it accumulates until it is drained. The debris tank is equipped with two inside access covers that can be lifted to clean out the debris. The cleanout bar consists of multiple nozzles for easy cleanout of fine particles less than 100 microns that have leached out of the debris bag.

There is an aluminum cutoff ball valve that will close and prevent vacuum flow if the debris tank becomes too full. The cutoff valve reduces the possibility for excessive water to flow from the debris tank to the filter canister and damage the blower. If the tank overfills causing the cutoff ball valve to shut off the flow of vacuum, the vacuum safety relief valves or Kunkle valves installed on the vacuum filter canister and the debris tank will automatically open to prevent damage to the vacuum recovery system.



Vacuum Tube Coupler O-ring & Point OF Contact At the Top of the Debris Tank

You can avoid overflow of material in the debris bag by monitoring the water level and dumping the recovered water when ¾ full or when you have downtime. 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 inside the debris tank for a period of more than two days. Debris will harden and conform to the shape of the tank walls making it very difficult to dump.

Once dumping operations are complete it is critical that the door seal and it's point of contact be cleaned to maintain a water tight seal during operations. The O-ring seal and point of contact on the primary vacuum tube on top of the debris tank must also be cleaned before the tank is lowered to the full down position. Also make sure all drain valves are closed before resuming waterblasting operations.

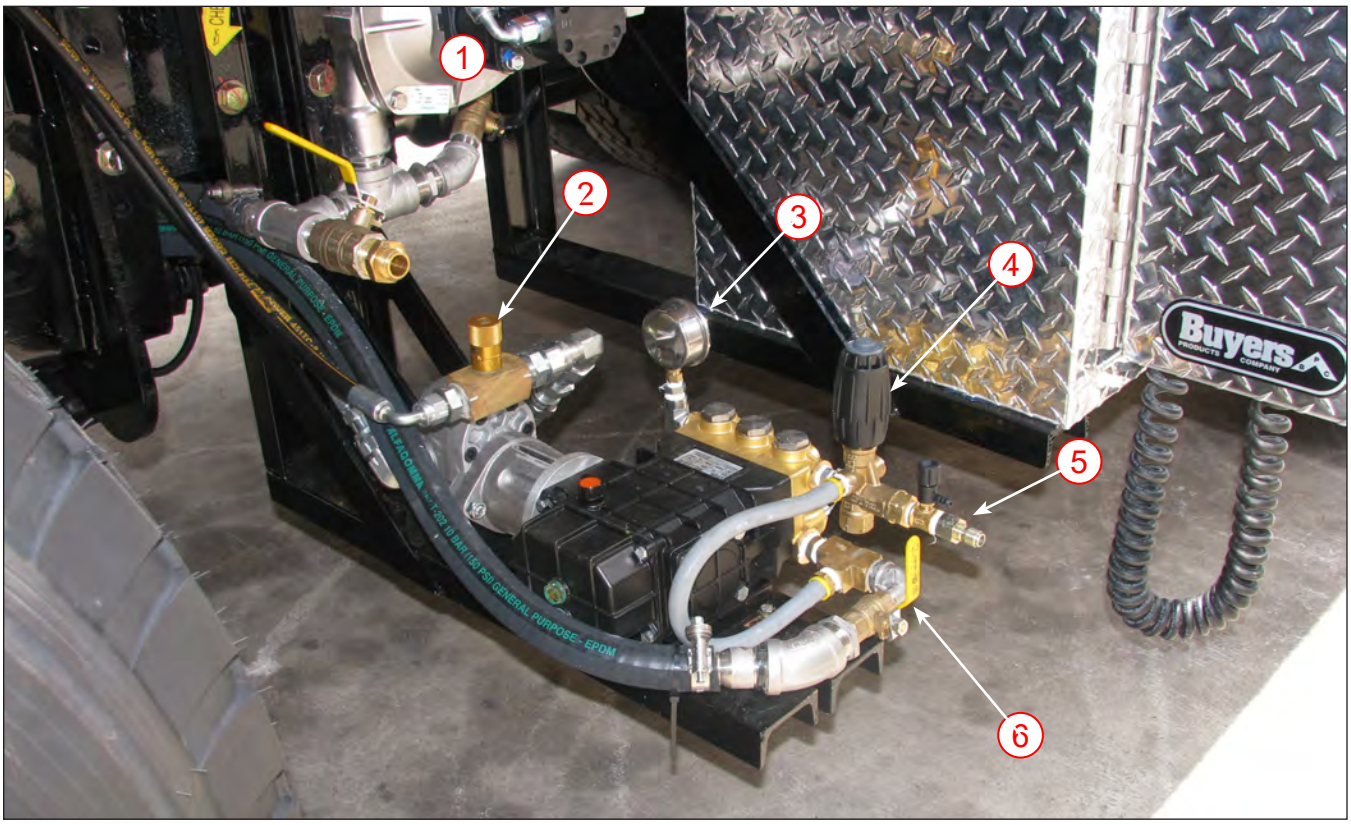
Always comply with local guidelines and state law when dumping recovered water and debris.

WARNING

IF A DEBRIS BAG IS USED AND NOT INSTALLED CORRECTLY IT MAY NOT RELEASE PROPERLY DURING DUMPING THIS COULD CAUSE THE LINER TO SEPARATE FROM THE DEBRIS TANK, DAMAGING THE TANK AND/OR CAUSING PERSONAL INJURY.

WARNING

ALWAYS MAKE SURE THAT ALL PERSONNEL ARE WELL CLEAR OF THE TRUCK AND THE DEBRIS TANK DOOR WHEN DUMPING OPERATIONS ARE IN PROCESS. NEVER ROCK OR JERK THE TRUCK BACK AND FORTH TO DISLODGE MATERIAL STUCK IN THE DEBRIS TANK. THIS CAN CAUSE THE HYDRAULIC RAM AND/OR OTHER COMPONENTS TO FAIL WHICH COULD RESULT IN SEVERE INJURY TO PERSONNEL AND SEVERE DAMAGE TO THE UNIT.



Typical Handheld Pressure Washer

1. Charge Water Pump
2. Hydraulic Flow Control Valve
3. Pressure Gauge
4. Pressure Washer Manual Bypass Valve
5. Quick Disconnect Fitting
6. Clean Water Supply Valve

2.8 Handheld Pressure Washer

A hydraulic powered pressure washer is mounted to the chassis below the charge water pump. It provides up to 4000 psi (276 BAR) to the handheld spray gun. The pressure hose and spray gun connect to a high pressure disconnect fitting on the pump and are stored in the tool box when the handheld pressure washer is not being used.

The pressure washer is powered by the truck hydraulic system. A manually operated hydraulic flow control valve supplies pressurized hydraulic fluid to the hydraulic motor that powers the pump. The hydraulic flow control valve is equipped with colored rings that indicate the valve setting for reference. Another ball valve on the water line turns the water supply to the pressure pump on or off. Pressurized water from the clean water tank is provided to the pump by the charge water system. Always make sure to close the hydraulic pressure and water ball valves whenever the pump is not being used.

Use the following procedures to activate and shut-down 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 engine at idle.
2. Verify that the pressure gauge on the pump indicates 0 pressure, then attach the pressure hose and gun to the quick disconnect fitting.
3. Make sure the truck is in Operate Mode.
   - Automatic Transmission - PTO and Mode switches in the console are ON and the transmission is in 4/4 Lockup.
   - Manual Transmission - PTO switch in the console is ON and transmission shifted to the correct operating gear.
4. Raise the engine speed to 1000 RPM.

5. Make sure the charge water pump is operating, then open the clean water supply ball valve near the pump.
6. Close the charge water supply ball valve to the Jetstream pump. The valve is located under the manifold of the Jetstream pump. This will supply additional water pressure and flow to the pressure washer pump.
7. Slowly turn the knob on the hydraulic flow control valve counterclockwise until the bottom edge of the knob is even with the green ring to activate the hydraulic motor and set proper RPM for the pump.
8. Monitor pressure to the spray gun with the pressure gauge on the pump and use the pressure washer manual bypass valve to set the desired spray gun pressure. Typical pressure settings range from 2000 psi (138 BAR) to 4000 psi (476 BAR).

Shutting down the pressure washer:

1. Slowly turn the hydraulic flow control valve clockwise until it seats in the closed position to deactivate the hydraulic motor and pressure pump.
2. Slowly close the ball valve on the clean water supply, then briefly pull the trigger on the spray gun to remove pressure in the hose.
3. Verify 0 pressure on the pressure gauge and disconnect the pressure hose and gun.
4. Open the charge water supply ball valve to the Jetstream pump. The valve is located below the manifold of the Jetstream pump.
5. Reduce engine speed to idle and properly coil the pressure hose and properly store the hose and gun in the tool box.

Hydraulic Pressure Valve Set To Green Ring
Water Pressure Gauge

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.

2.9 Auxiliary Blasting Tool Connection

General

When a Hog Tool is connected to the auxiliary connections, the Waterblasting electrical system senses that the tool is connected and allows the levers on the tool to control the high pressure water to the blast head and hydraulic fluid flow to the spray bar thru-shaft motor. The truck hydraulic system provides the hydraulic power that rotates the spray bar on the tool. The truck UHP pump and vacuum system provides water pressure and vacuum.

Auxiliary Tool Hydraulic & Control Harness Connections

Control Harness Connection

An electrical harness that runs from the outlet plug on the front of the truck to a plug on the tool connects the control switch levers on the tool with the waterblasting control system on the truck. Once the harness is connected, the operator can control the high pressure water and hydraulic systems on the tool blast head using the control switch levers on the tool.

Walk Behind Auxiliary Blasting Tool

Hydraulic Connection

Hydraulic hoses with quick disconnect fittings are connected from the tool to the truck hydraulic system at the Tool Connection. The hydraulic manifold on the truck controls the fluid flow to the tool. Switches and/or control knobs on the tool provide the operator with full control of the hydraulically activated features.

Vacuum Connection

Some hand operated tools like the Ground Hog (Walk behind) are equipped with blast heads that are designed to be attached directly to the SH8000 vacuum system. Flexible hoses with quick disconnect fittings provide vacuum from the truck to the blast head. Once the hose is connected, vacuum is supplied to the tool whenever the SH8000 is running in Operate Mode and the 40K clutch is engaged.

Make sure to protect the hoses from damage and abrasion from dragging on the pavement. This is particularly important when working a long distance from the truck. In some situations anti-chaffing protection may need to be added to the hoses to protect them in contact areas.

High Pressure Waterblasting Connection
A High Pressure hose routed from the UHP pump on the SH8000 to the tool provides high pressure water to the tool blast head. The manual bypass valve on the UHP pump and engine RPM are used to adjust water volume and pressure supplied to the tool. A control lever on the tool handle activates a switch that controls the dump valve (diverter valve) on the UHP pump to engage or disengage high water pressure water at the tool blasting head.

When the system is activated, it operates much like the truck mounted high pressure water system. The tool must be moving before the high pressure is activated and all waterblasting safety precautions apply.

High pressure hoses and fittings can be dangerous if a hose bursts or a fitting fails during high pressure blasting. Outfit the tool operator with proper safety apparel. Hard hat, safety shield or glasses, gloves, ear protection, etc.

DANGER

THE SINGLE BLASTING HEAD ON THE TRACTOR OR ANY OTHER HOG TOOL WILL BE OVERPOWERED BY THE SH8000 HIGH PRESSURE PUMP IF THE SYSTEM IS NOT ADJUSTED TO THE REDUCED VOLUME FOR A SINGLE BLASTING HEAD. FAILURE TO ADJUST THE SYSTEM WILL PROVIDE TOO MUCH PRESSURE TO THE SPRAY HEAD THAT WILL CAUSE THE RUPTURE DISCS TO BLOW AND COULD CAUSE SEVERE DAMAGE TO THE UHP SYSTEM AND/OR INJURY TO THE OPERATOR OR CREW WHEN THE SYSTEM IS ACTIVATED.

WHEN SWITCHING THE UNIT FROM THE MAIN HOG HEADS TO EQUIPMENT WITH A SINGLE BLASTING HEAD, ALWAYS ENGAGE THE TRUCK 40K SWITCH WITH THE ENGINE AT IDLE AND TURN THE DUMP VALVE ON. GRADUALLY INCREASE THE RPM WHILE ADJUSTING THE MANUAL BYPASS VALVE UNTIL THE DESIRED PRESSURE AND VACUUM FOR THE SINGLE BLASTING HEAD IS ACHIEVED. THIS PROCEDURE MUST BE DONE BEFORE A TRACTOR OR HOG TOOL IS USED AND MUST NEVER BE OVERLOOKED.

2.10 Electrical System

Overview

Your truck can be equipped with either a 12 volt or 24 volt DC electrical system depending on your location and the chassis manufacturer. Typically trucks sold in the United States will be equipped with 12 volt systems and trucks sold in other countries with be equipped with 24 volt systems. The waterblasting electrical system is powered by the truck chassis batteries and is isolated from the truck electrical system. The waterblasting system is always the same voltage as the truck electrical system.

Most trucks are equipped with a main battery switch that activates or deactivates the electrical system and a main circuit breaker that protects truck chassis electrical components. Other heavy duty circuit breakers protect the circuits for the waterblasting electrical system. Some truck chassis do not have a main battery switch and are equipped with only a main circuit breaker that protects the circuits and is used to activate or deactivate the truck electrical system. The main switch and/or circuit breaker is usually located just behind the cab near the batteries. If your truck is equipped with a main battery switch, it must be turned to the ON position before operating the vehicle or waterblasting components. Refer to the truck chassis operation manual for detailed information on the operation of the truck electrical system.

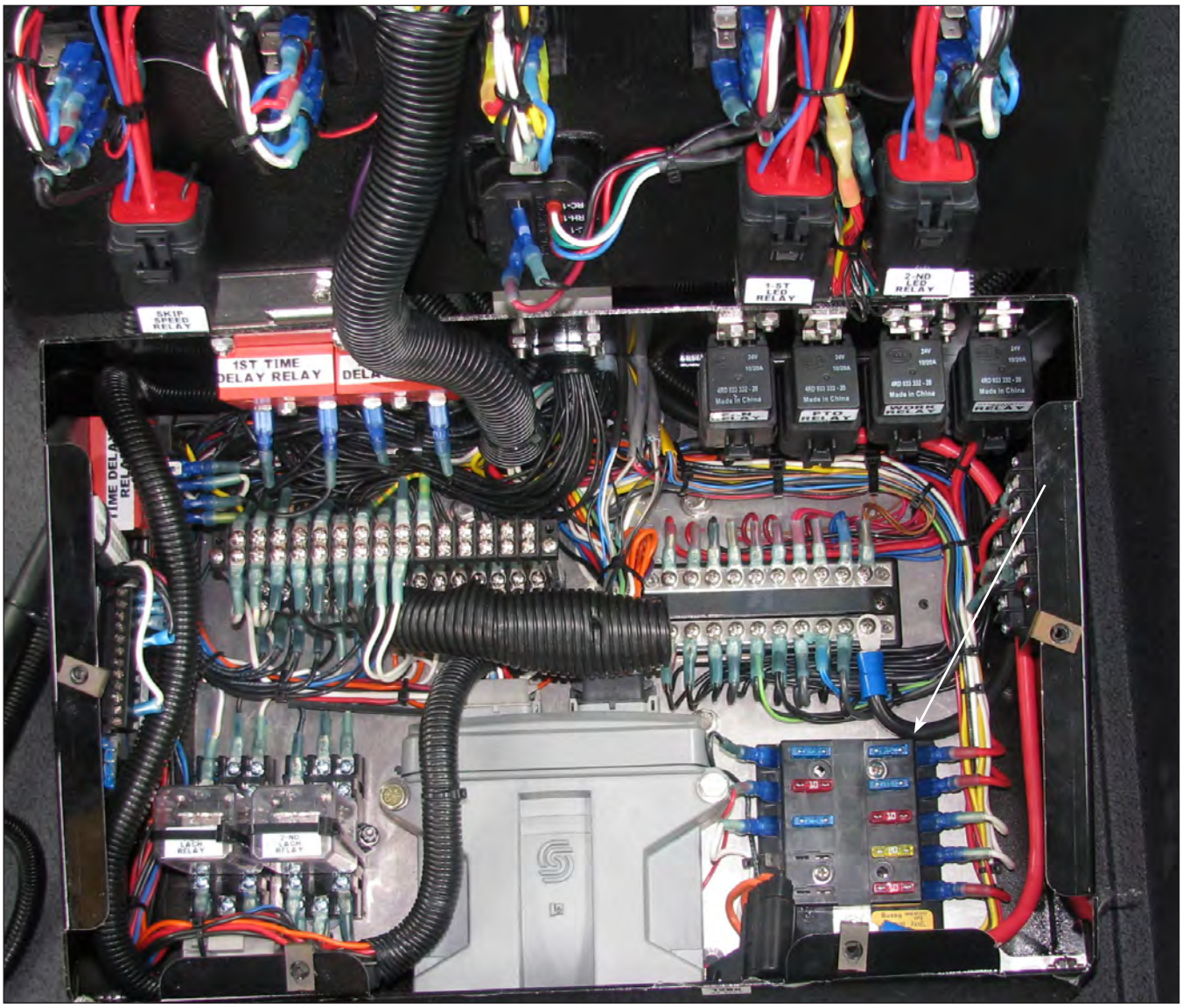
Typical 50 AMP & 30 Amp Main Fuses That Protect Waterblasting Electrical System

50 Amp & 30 Amp Main Circuit Breakers

The waterblasting electrical system is powered and protected by two heavy duty circuit breakers. The breakers are connected directly to batteries or to the truck chassis main switch and are located just behind the cab near the batteries. Heavy duty relays powered by the ignition switch automatically activate the waterblasting electrical system when the truck ignition switch is ON and deactivate it when the truck ignition switch is turned OFF. The only exception is the continuous duty circuits for safety related features such as the camera, work lights and safety strobes, which are always activated. Additionally, the PTO/Mode switch is activated by the truck neutral safety switch to protect OMSI drive components when shifting between Drive and Operate Modes.

The 50 amp circuit breaker is the main circuit breaker that supplies electrical power directly to the fuse panel located in the console switch panel in the cab. Another 30 amp circuit breaker powers and protects the circuit for the dual cooling fans in the hydraulic oil cooler. The 50 amp main breaker must be ON to power the waterblasting electrical system.

The main circuit breakers are equipped with a yellow indicator/reset lever that indicates the status of the breaker (ON or OFF) and is used to reset the breaker if it trips. A test button near the lever can be pressed to test the breaker to ensure it is operating properly.



Inside Of Switch Console Showing Relays & Fuse Panel

This is a heavy duty circuit breaker that typically trips only when there is a fault in the system. If it trips, you should find and correct the problem before resetting the breaker. The breaker is reset by turning the yellow lever to the ON position.

ATC blade type fuses in the fuse panel inside the console switch panel protect the circuits activated by the switches. 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.

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 Stripe Hog electrical system.

Console Switch Panel

2.11 Console Switch Panel

All functions and features of the waterblasting system are activated by labeled rocker switches on the console switch panel in the cab. A green LED light in each switch illuminates to indicate the circuit activated by the switch is ON. The PTO switch activates the circuits for other waterblasting function switches in the panel and shifts the OMNI gear box between Drive Mode and Operate Mode. The PTO switch circuit is energized by the chassis ignition switch. Power is not available to most other waterblasting electrical circuits until the PTO switch is activated.

Refer to the Operation section of this manual for instructions on operating the vehicle and waterblasting equipment in Operate Mode.

The following is a description of the console switch functions and other console components and indicator lights:

PTO Switch

- Energizes the circuits for other waterblasting function rocker switches on the console switch panel.
- Activates the cooling fans in the hydraulic oil cooler.
- Switches the OMSI gearbox between Drive Mode and Operation Mode.
- Activates the PTO hour meter to record waterblasting equipment operating time.
- Energizes the oil pressure gauge for the OMSI gearbox.
- Selects Operate Mode in the engine ECM which changes engine operating parameters to the proper settings for the operation of the waterblasting equipment. Note that some chassis manufacturers provide a separate dash mounted PTO switch which eliminates the switch in the console.

NOTICE:
THE TRUCK IGNITION SWITCH AND THE CONSOLE PTO SWITCH MUST BE ON TO PROVIDE ELECTRICAL POWER TO OTHER WATERBLASTING FUNCTION SWITCHES IN THE CONSOLE. THE CAMERA, WORK LIGHT, STROBE LIGHT AND ACCESSORY SWITCHES ARE ALWAYS ACTIVATED.

Mode Switch (Automatic Transmission Only)
Activates 4/4 Lockup Mode in the transmission when the PTO switch is activated. 4/4 Lockup is a pre-programed Operate Mode for the transmission that selects the gear that provides a 1 to 1 engine/transmission gear ratio at the transmission output shaft and locks the torque converter to eliminate slip. This setting provides the proper RPM to engine powered waterblasting components activated by the PTO and 40K Clutch while in Operate Mode.

NOTICE:
TRUCKS WITH MANUAL TRANSMISSIONS WILL NOT BE EQUIPPED WITH A MODE SWITCH. THE OPERATOR MUST MANUALLY SHIFT THE TRANSMISSION TO THE PROPER GEAR FOR OPERATE MODE. A PLACARD ON THE BACK OF THE SUN VISOR PROVIDES THE STARTUP PROCEDURE AND INSTRUCTIONS FOR PLACING THE TRANSMISSION IN THE PROPER GEAR FOR OPERATE MODE.

Charge Pump Switch
Activates the solenoid valve in the hydraulic manifold that supplies pressurized hydraulic fluid to power the charge water pump.

40K Clutch
Activates the clutch in the OMSI gearbox that powers the drive belts for the ultra high pressure pump and the vacuum blower. (Only engage the 40K clutch with engine at idle speed)

Camera
Activates the video cameras that monitor selected operations of the waterblasting system.

Work Light
Activates the lights that illuminate the blasting area and specific waterblasting system components.

Strobe Light
Activates the safety strobe lights during operations.

Debris Tank Drain
Activates pneumatic powered drain valves located in the bottom of the debris tank that drain the waste water from the tank.

Auxiliary Switches
Reserved for additional equipment installed by Hog Technologies or the truck owner.

Drive Mode Lights

Drive Mode/Operate Mode Lights
Colored LED lights that indicate the status of the operation mode selected.

- Green light illuminated indicates the truck has been successfully shifted into Drive Mode. All waterblasting functions are cancelled and the truck is ready for highway operation.
- Red light illuminated indicates the truck has been successfully shifted into Operate Mode. The truck highway drive train is disabled, the hydrostatic drive is enabled and all water blasting functions are available for activation.

Split Drive Oil Lights
Red LED warning lights that indicate specific problems in the OMNI gear case.

- Front Temp light illuminated indicates the fluid that cools and lubricates the 40K Clutch has exceeded safe operating temperature.
- Left Level light illuminated indicates low fluid level in the forward section of the gear case and the 40K clutch.
- Rear Temp light illuminated indicates the fluid temperature in the hydrostatic and hydraulic pump section of the gear case has exceeded safe operating temperature.
- Right Level light illuminated indicates low fluid level in the rear section of the gear case.

Hour Meter
Activated by the PTO switch. Records the total operating time of the waterblasting equipment.

Typical Joystick Controls, Switches, Gauges, Warning Lights & PLC

2.12 Joystick Console

The joystick console can be located on either side of the cab and adjusted to different angles for operator convenience during operations.

The Hog Arm, blasting head functions and the truck hydrostatic drive are controlled by controls and switches on the joystick console. Digital gauges monitor the vacuum, charge pressure and ultra-high pressure in the waterblasting system.

The following is a description of the joystick console controls, switch functions and other console components and indicator lights:

Joystick Control Lever
The joystick controls the motion of the Hog Arm. Move it forward to lower the arm, pull it back to raise it. Move it to the right and the hog arm moves right, move it left and the arm moves left. Squeeze the red trigger and push left and right to move the secondary section of the Hog Arm left and right. When the joystick is released, the handle automatically returns to the center and the Hog Arm stops in that position.

Joystick Rocker Switch
A momentary switch that activates the spray head swivel control. Squeeze the joystick trigger then simultaneously press and hold the rocker switch. Move the joystick right to rotate the spray heads right. Move the joystick left to rotate the spray heads left. Release the rocker switch to exit swivel control.

START/STOP Switch
The START/STOP switch on the joystick console controls the diverter valve. When the START button is pressed the diverter valve closes and high water pressure from the ultra-high pressure pump is directed to the spray bars on the blasting head. When the STOP Button is pressed the diverter valve opens and the high pressure water is diverted to the clean water tank. Pressure is reduced to 0 psi.

Head Rotation Speed Dial
The maximum rotation speed for each spray head is preset in the PLC. The Head Rotation speed dial controls the speed of both spray bars from 0 to the preset maximum speed. Rotating the dial clockwise increases speed. Rotating it counterclockwise reduces speed. Setting the Head Rotation dial to 0 will stop the rotation of the spray bars.

Truck Speed Dial
Controls the speed of the truck while in Operate Mode. Rotating the dial clockwise increases speed and rotating it counterclockwise reduces speed. Setting the Truck Speed dial to 0 will stop the truck motion.

Forward/Reverse Rocker Switch
A momentary rocker switch that selects the truck direction of travel by shifting the hydrostatic drive system while the unit is in Operate Mode. (Hydrostatic drive engaged.) Travel direction can be changed without hesitation at speeds of up to 30 feet per minute.

WARNING

NEVER SELECT A DIRECTION OF TRAVEL WHILE THE TRUCK IS STOPPED UNLESS THE SPEED DIAL IS SET TO ZERO. SELECTING A DIRECTION WITH THE SPEED DIAL SET ABOVE 0 COULD CAUSE THE TRUCK TO SURGE UNEXPECTEDLY RESULTING IN DAMAGE TO EQUIPMENT, PROPERTY DAMAGE OR INJURY AND EVEN DEATH TO PERSONNEL.

Float Mode 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.

Water and Gearbox Reset Switch
A momentary switch that resets the safety cutout system that disengages the 40K clutch and the waterblasting system when a low charge water pressure, low OMSI lubrication pump pressure, low gearbox fluid or high fluid temperature condition is detected. Once the reset button is pressed, waterblasting and hydrostatic drive systems can be reactivated and normal operations can resume. If the fault that caused the cutout system to activate persists, the unit will operate for 10 seconds before the cutout system disengages the system again. The fault must be found and corrected before operations can resume.

Water & Gearbox Reset Switch
Gearbox Temp/Level & Charge Water Warning Lights

Gearbox Temp/Level/Charge Water Lights
Red LED lights indicating the condition that caused the safety cutout system to activate and disengage the 40K clutch and waterblasting system.

- Gearbox Temp/Level light illuminates when a low fluid level or high temperature fluid condition caused the waterblasting and hydrostatic drive system to be disengaged.
- Charge Water light illuminates when a low water level in the clean water tank, clogged filters or a charge pump problem caused the waterblasting and hydrostatic drive system to be disengaged.

High Pressure Gauge
A digital gauge that monitors the ultra high water pressure to the blasting heads.

Charge Pressure Gauge
A digital gauge that monitors the charge water pressure at the ultra high pressure pump intake.

Screen Control (Normal Operation) Mode

Pot Control (Potentiometer Control) Mode

2.13 Programmable Logic Controller

The PLC (Programmable Logic Controller) is mounted on the joystick console. It is activated when the PTO switch is turned ON.

The Main screen displays debris tank and clean water levels, vacuum pressure and the rotation speed for each spray bar. Buttons at the bottom of the display are used to set the maximum RPM for each spray bar (0-3000 RPM), raise and lower the rotation speed of each spray bar and turn spray bar rotation ON or OFF. The operator can also select different screens to change the PLC operation mode or program different preset maximum head speed RPM settings into the memory.

NOTICE:
THE MAXIMUM SPRAY BAR SPEED (3000 RPM) IS PROGRAMMED INTO THE PLC AT THE FACTORY TO PREVENT THE THRU-SHAFT MOTORS FROM EXCEEDING SAFE OPERATING RPM.

Main Screen Display Showing Controls, Spray Head RPM, Debris & Clean Water Tank Levels & Vacuum Pressure

PLC Control Modes

The PLC has two control modes, Screen Control (Automatic Mode) and Pot Control (Potentiometer Control/ Manual Mode). Screen Control is the automatic mode that allows the operator to adjust the spray bar rotation speed by pressing the UP/DOWN arrows on the bottom left of the PLC display. Potentiometer Operation is the manual mode. The operator adjusts the spray bar rotation speed using the Head Rotation dial on the joystick console.

Use the following procedure to change PLC modes:

1. Press the NEXT button at the bottom of the screen until the Operation screen is displayed.
2. The current operating mode is displayed on the screen. Default mode is Screen Control (Automatic Mode).

Motor 1 Set RPM Screen

Motor 2 Set RPM Screen

3. To change to Potentiometer Mode (Manual Mode), press the POT button at the bottom of the screen. The selected mode is now displayed on the screen.
4. Press the DOOR (Exit) button to return to the Main screen.
5. With the Main screen displayed, press the ON/OFF button to turn spray bar rotation ON or OFF.

Maximum Spray Bar Rotation Speed

The operator can set the maximum RPM for each spray bar independently using the Motor 1 and Motor 2 Set RPM Screens.

Use the following procedure to navigate to "Motor Set RPM" screens and set max RPM:

1. Press the NEXT button at the bottom of the screen until the Motor 1 or Motor 2 screen is displayed.
2. Use the UP/Down arrows to raise or lower the motor speed to the desired RPM. The RPM will increase or decrease 25 RPM each time an arrow button is pressed.
3. Press the DOOR (Exit) button to return to the Main screen.

Once the maximum RPM has been set, spray bar speed is controlled simultaneously using the control UP/DOWN buttons on the PLC or the Head Rotation speed dial on the joystick console. Spray bar RPM will increase until each spray bar reaches the preset maximum RPM. For example; if the left spray bar maximum RPM is set to 1000 and the right spray bar RPM is set to 2000, the speed of both spray heads will increase simultaneously until the left spray head reaches 1000 RPM. As the speed is increased, the left spray bar will stabilize at 1000 RPM and the right spray bar RPM will continue to increase until it reaches 2000 RPM. When spray bar speed is lowered, only the right spray bar with the highest limit will slow down until the limit of the slower limit for the left spray bar (1000 RPM) is reached, then both will continue slow down at the same rate.

Faults Screen

The Faults screen displays any fault condition that exists in the system. When a fault exists, red LED lights will flash on the screen to alert the operator that a fault has occurred.

Use the following procedure to navigate to the Faults screen when a red LED light is flashing:

1. Press the NEXT button to navigate to the faults screen where a description of the fault or faults will be displayed.
2. Press the DOOR button to return to the Main screen.

For additional information on the PLC System refer to the manufacturer's User Guide included with this manual.

Faults Screen - No Faults Displayed

2.14 Skip Meter, Skip Speed Remote Control & Video System

Skip Meter

Most trucks are equipped with a "Skip Meter" that records the distance traveled while in Operate Mode. When the meter is activated, an inductive sensor records the revolutions of the truck drive shaft and converts the readings into linear feet or meters. The data is recorded and saved until the operator deletes it.

There are two toggle switches on the front of the meter. One toggle switch turns the meter ON or OFF, the other toggle switch is used to start the meter when blasting operations begin and stop the meter when operations stop or are paused. Menu buttons select the meter to read in feet or meters and various recording and data modes. An operating manual for the Skip Meter has been included with your Stripe Hog that provides detailed information on its operation and available data modes.

Skip Meter

Skip Speed Remote Control

The skip speed remote control is a handheld control connected to the joystick console. The control allows the operator to temporarily override the Truck Speed setting on the joystick console and increase truck speed between dashed painted lines to increase productivity while in Operate Mode. The control is equipped with a Skip Speed

Skip Speed Remote Control
Skip Speed Dial & Dump Valve Switch

potentiometer that controls truck speed, a Dump Valve ON/OFF toggle switch that opens or closes the high pressure diverter valve (dump valve) and a momentary trigger in the hand grip that activates the settings on the remote control. This control saves time by increasing the truck speed between lines where removal is not required and reduces wear and tear on the high pressure blasting system by increasing truck speed enough to leave blasting pressure activated between the painted lines.

Skip Speed Remote Control

To use the remote, set the skip truck speed by turning the potentiometer clockwise to the highest safe setting for the current work environment. The setting is usually, but not always, 100 on the dial. This sets the speed the truck will accelerate to when the control is activated (Skip speed). The Dump Valve ON/OFF switch is always in the ON position unless it is required to be turned OFF to shutdown high pressure water to the blastheads in an emergency or other situations that may occur. With the control set, begin blasting the dashed paint lines. ***Note that the Dump Vale ON/OFF switch must be in the ON position before the Start button on the joystick control will activate the high pressure water supply to the blastheads.*** When the blastheads reach the end of a painted line, squeeze the trigger on the skip control. Truck speed will increase to the speed preset on the skip speed remote speed dial. When the blastheads reach the next line, release the trigger. The truck speed will immediately decrease to the blasting operation speed preset on the joystick Truck Speed dial. In most situations, the skip speed can be set fast enough to eliminate the need to shutdown the high pressure water supply to the blastheads between lines without causing damage. This significantly reduces wear and tear on ultra high pressure water system components.


Typical Video Monitor In Cab

Video System

The video system provides improved visibility for the operator during waterblasting operations. Four strategically mounted cameras and a large monitor mounted in the cab allow the operator to view each side of the blasting area, the UHP pump and other primary waterblasting equipment or the rear of the vehicle for safe backing. Refer to the video manufacturer's information for instructions on operating and maintaining the video system.

2.15 Waterblasting Hydraulic System

Overview

The hydraulic system is powered by the truck engine and activated by the PTO switch in the console switch panel. It is equipped with a pump, large reservoir/cooling tank, a high pressure in-line filter and a return filter near the reservoir fill fitting.

An oil cooler with constant ON fans cools the hydraulic fluid during operation. Electric solenoid valves activated by switches in the control switch panel and joystick console direct hydraulic pressure to the various components. Hydraulic oil level and temperature are monitored by a site gauge with an integrated thermometer on the side of the reservoir. The hydraulic system provides the hydraulic power for the Hog Arm, the thru-shaft hydraulic motors that rotate the spray bars and the charge water pump. It also provides hydraulic power to the cylinders that unlock and lift the debris tank door and to the cylinders that tilt the debris tank to dump debris when the tank is full.

Typical Hydraulic Fluid Cooler

Hydraulic Circuit and Pump

The engine driven waterblasting accessory pump is mounted to the OMSI gear case on the truck chassis. It provides high pressure fluid to the hydraulic powered waterblasting accessory systems. Some return fluid is routed through the cooler mounted on the forward side of the clean water tank that removes excess heat from the fluid whenever any hydraulic system is in operation. The circuit is equipped with two pressure relief valves, one on the pump and one in the manifold that prevent excessive pressure in the system. The maximum operation pressure for the hydraulic system is 3000 psi (207 BAR).

Typical Hydraulic Reservoir & Sight Glass

Reservoir

A large reservoir tank mounted on the hydraulic tree 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. A low pressure filter near the reservoir fill fitting cleans the fluid as it flows back into the reservoir.

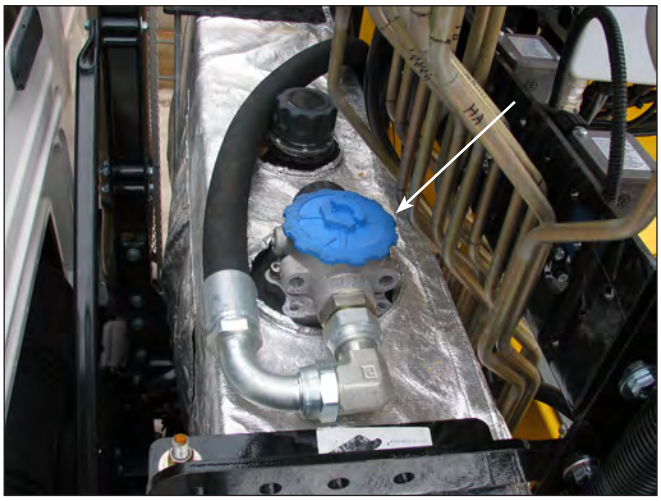
A sight glass and integrated thermometer is used to monitor fluid level and oil temperature. The fluid level should be maintained within the upper level of the sight glass to ensure adequate fluid for operation.

Hydraulic fluid should be changed and the tank flushed on a regular schedule as stated in the Waterblasting Maintenance Matrix located in the Maintenance section of this manual.

NOTICE:
THE HYDRAULIC OIL TEMPERATURE MUST BE ABOVE 60 DEGREES FAHRENHEIT BEFORE OPERATING THE HYDRAULIC PUMP UNDER LOAD. IF THE OIL TEMPERATURE IS BELOW 60 DEGREES F (16 C) YOU SHOULD RUN THE MACHINE IN OPERATE MODE AT IDLE TO CIRCULATE HYDRAULIC FLUID AT LOW PRESSURE UNTIL IT IS WARMED TO OPERATING TEMPERATURE AS INDICATED BY THE THERMOMETER IN THE HYDRAULIC RESERVOIR SIGHT GAUGE. FAILURE TO DO SO COULD RESULT IN DAMAGE TO THE INTERNAL SEALS IN THE PUMP.

Hydraulic System Filters

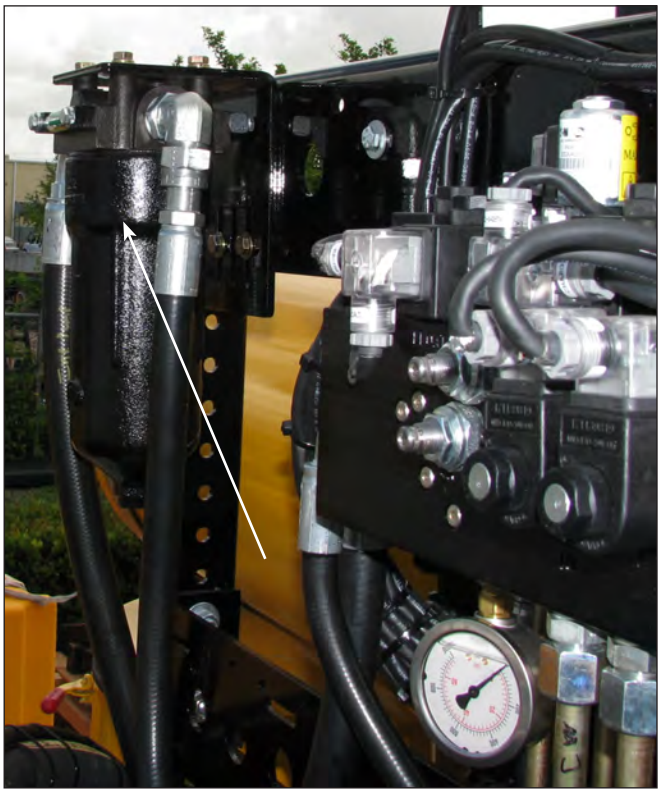
Clean hydraulic fluid that has not been exposed to excessive temperature or become contaminated is essential to the performance of the system. As pumps, cylinders and components wear, they release tiny metal and rubber particles into the hydraulic fluid. These particles act as a grinding compound as they flow through the system. Ordinary dirt and water are common hydraulic fluid contaminants. Any one of these will contribute to premature failure of hydraulic components. Filters on the low pressure and high pressure hydraulic circuits remove these contaminates and increase the life of the fluid and hydraulic components.



Typical Low Pressure Filter

Low Pressure filters

The low pressure filter is a cartridge type filter on the top of the reservoir tank. All return fluid passes through the low pressure filter as it flows back into the tank. The filter should be changed at the same time the hydraulic fluid is changed or if it begins to restrict the return flow.

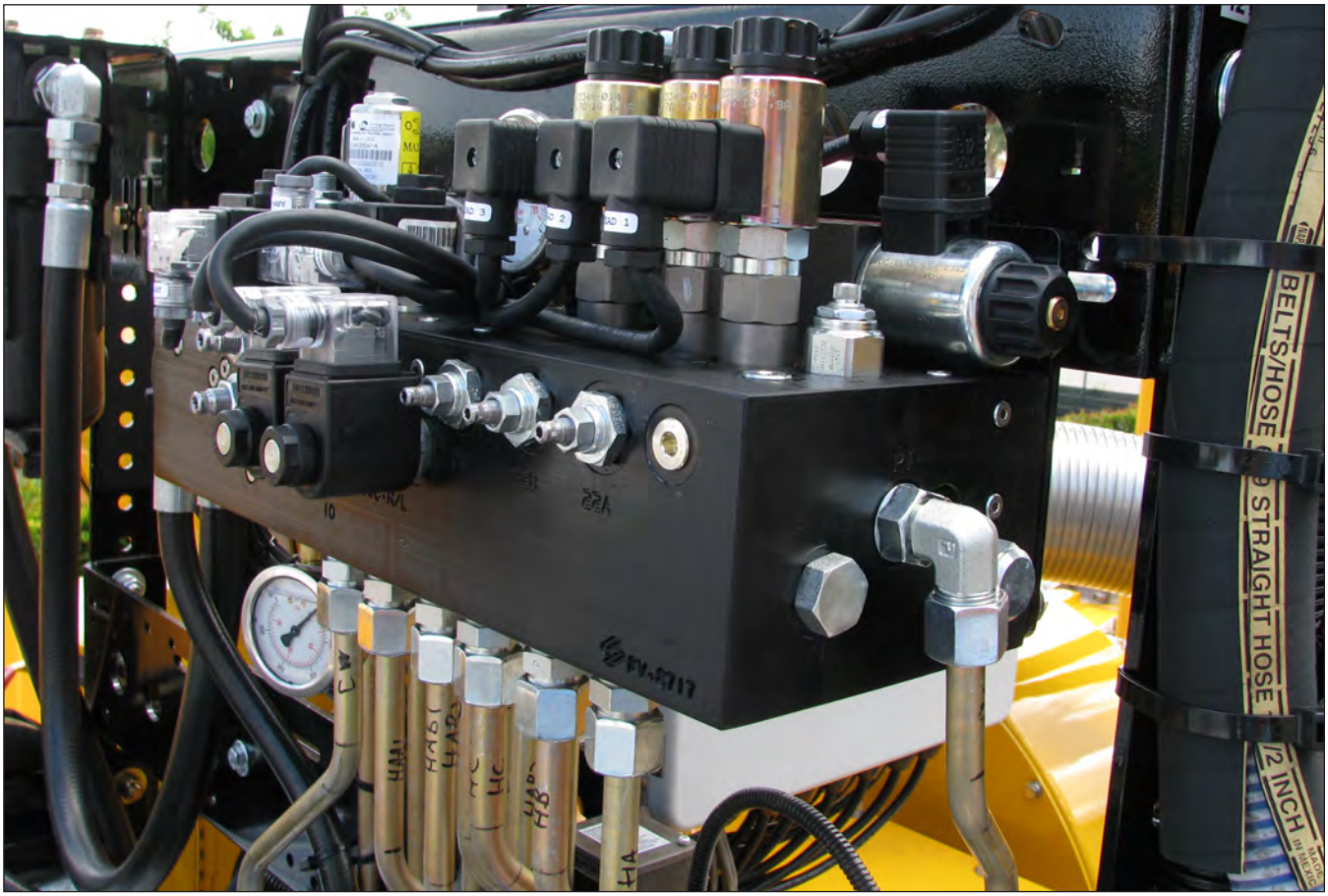


Typical High Pressure Filter

High Pressure Filter

A special fine micron cartridge type filter is located on the hydraulic tree near the manifold in the high pressure circuit between the accessory hydraulic pump and the cylinders, motors and other hydraulic components. The filter removes tiny particles that could be released by the hydraulic pump. The filter element is inside a special canister that can withstand the operating pressure on the high pressure side of the pump.

A color coded site glass on the top of the filter housing indicates the condition of the filter element and alerts the operator when the element is dirty and requires changing. Green indicates the filter element is in good condition, red indicates the filter element is becoming clogged and must be changed. The element should also be changed when the hydraulic oil is changed.



Hydraulic Manifold, Solenoid Valves & Gauges

Hydraulic Manifold

The Hydraulic manifold is mounted on the tree near the fluid reservoir. Electric solenoid valves activated by switches in the control panels direct hydraulic pressure to the various components in the waterblasting hydraulic system. It is also equipped with a regulator between the low and high pressure side of the manifold that is used to adjust the low pressure setting. The solenoid valves are a cartridge type design that are easily replaced in the event of a failure.

Hydraulic Motors and Actuators

The charge water pump and spray bar thru-shafts 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 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 Cylinders

Two types of hydraulic actuators are used in the waterblasting hydraulic systems. Rotary, "Helac" cylinders are used on the Hog Arm and conventional ram type cylinders are used on debris tank components.

Helac cylinders provide a broader range of movement than conventional 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.

The hydraulic cylinders used to lift the debris tank or raise the door are equipped with special counterbalance valves that prevent the door or tank from dropping suddenly if a hose ruptures or a fitting fails.

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 of up to 3,000 psi (207 BAR). Therefore, it is critical that the operator and maintenance personnel inspect the 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.

2.16 Hydrostatic Drive Pump & Motor

The Hydrostatic Drive pump is bolted to the OMSI gearbox. It is activated whenever the truck is in Operation Mode. A swash plate controlled by the Forward/Reverse switch and the Truck Speed dial in the joystick console directs fluid flow and pressure output from the pump, setting the speed and direction of the hydrostatic drive motor. The hydrostatic drive system is a closed loop system that is completely isolated from the waterblasting hydraulic system.

Helac Hydraulic Cylinder On Hog Arm

2.17 Engine & Drivetrain

Overview

The truck chassis and all major components of the waterblasting system are powered by the truck engine. Power is transferred from the engine to the drivetrain and waterblasting system through the chassis transmission and the OMSI gearbox. The OMSI gearbox provides two modes of operation that can be selected by the operator; Drive Mode for transporting the machine on the highway and Operate Mode which activates the hydrostatic drive system that moves the truck at controlled speeds of 0 to 7 mph for waterblasting operations and makes all waterblasting functions available for operation.

The engine and the chassis transmission were specified and installed by the chassis manufacturer. Refer to the truck chassis operation manual for additional information on the engine and transmission.

Engine

The chassis engine powers the truck drivetrain and all waterblasting systems and components. Typically, the maximum engine speed at full load during waterblasting operations is 1400 rpm. The minimum is 1000 to 1150 rpm. Operating the engine below the minimum required rpm will place excess load on the engine, resulting in poor efficiency and could cause it to overheat.

Chassis Transmission

The chassis can be equipped with an automatic or manual transmission. No matter which transmission is installed on your truck, it is essential to select the correct gear for proper operation while in Operate Mode. The hydrostatic drive and waterblasting systems are designed to operate with the transmission output shaft turning the same RPM as the engine or at a 1 to 1 gear ratio. The following outlines the procedure for selecting the correct gear for Operate Mode with automatic and manual transmissions.

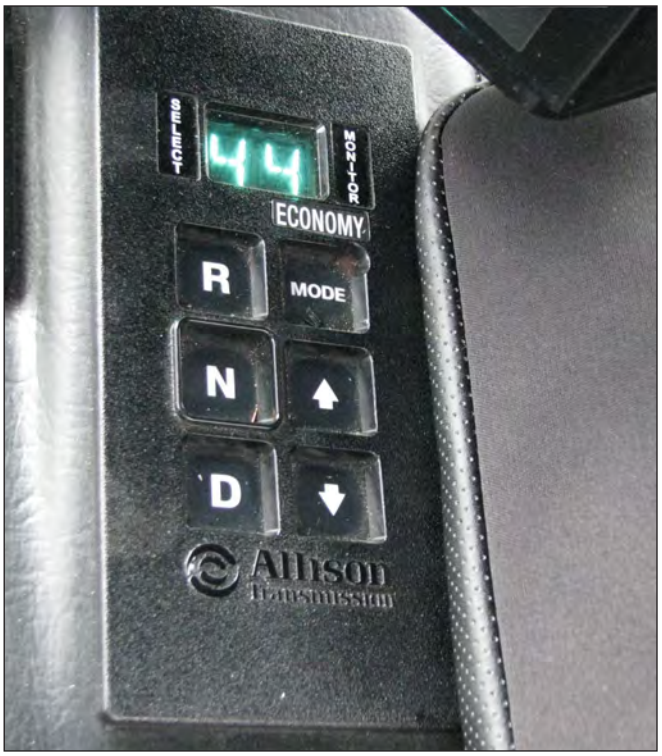
Automatic Transmissions

Automatic Transmissions must meet three conditions to provide the proper RPM for the output shaft. The correct input gear must be selected, the correct output gear must be selected and the torque converter must be locked so that it cannot slip. Normally 4th gear on the input and 4th gear on the output is the correct combination. This is called 4/4 Lockup.

All three conditions are programmed into the engine ECM and are automatically selected with Mode Switch on the Console. When the Mode Switch is ON it sends a signal to the transmission that tells it to select the pre-programmed conditions when the operator puts it into drive. It is extremely important turn the Mode Switch ON and OFF in the proper sequence to avoid severe damage to the transmission and torque converter. Refer to the Start-up Procedure in the Operation section of this manual.

Manual Transmissions

On trucks with manual transmissions the operator must manually select the proper gear for Operate Mode with the shift lever. The correct gear is chassis specific and is posted on the placard on the back side of the sun visor above the steering wheel in the cab. Selecting a lower gear will typically reduce performance but will not cause damage to any part of the system. Selecting a higher gear than posted on the placard will cause the transmission output shaft to turn too fast which will increase the load on the engine and transmission and exceed the designed maximum RPM limitations for the hydrostatic drive and waterblasting system.



Automatic Transmission Gear Selector & LED Screen
PTO Switch ON & 4/4 Lockup Displayed

CAUTION

NEVER SELECT A GEAR HIGHER THAN THE GEAR POSTED ON THE PLACARD. SELECTING A HIGHER GEAR WILL RESULT IN SEVERE DAMAGE TO THE ENGINE, TRANSMISSION AND WATERBLASTING SYSTEM.

2.18 Truck Drive System and PTO

OMSI Drive Overview

The primary drive system has two modes, Drive Mode and Operate Mode. Drive Mode connects the drive shafts from the transmission and gearbox directly to the differential and is the normal mode for highway driving. Operate Mode disconnects the transmission from the differential and connects it to the hydraulic systems that power the hydrostatic truck drive system and all waterblasting features and components.

Controls in the cab allow the operator to switch quickly between Drive Mode and Operate Mode. A specially designed gear-box called the OMSI Drive facilitates this operation by transferring the

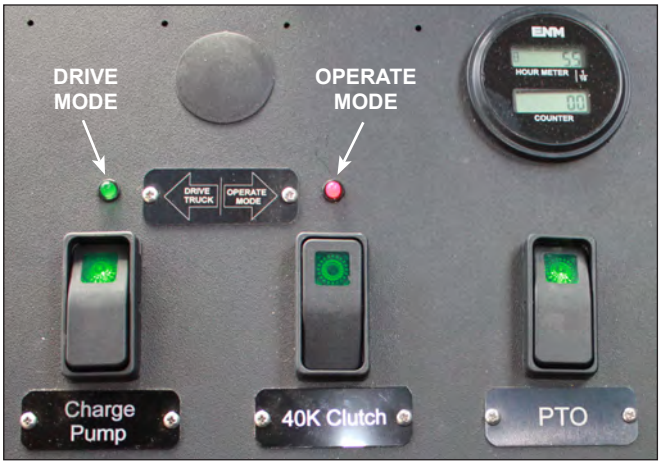
energy in the drive shaft from the differential to a system of hydraulic pumps, a PTO clutch and special belts and pulleys that power the high pressure water pump and vacuum blower. Pneumatically activated control levers on the OMSI shift the unit from Drive Mode to Operate Mode when the PTO switch is activated.

The OMSI Drive is designed with three separate sections; the main gearbox, hydrostatic drive gearbox and 40K clutch. Each section has specific lubrication requirements and specifications. The fluid level in each section must be checked weekly to ensure the drive gearboxes and clutch are full and there are no leaks. The fluid level is monitored by sight glasses on the OMSI main gearbox, the hydrostatic drive gearbox and the 40K clutch. Sensors on the gearbox and red LED warning lights alert the operator to low oil or high fluid temperature conditions. Refer to the OMSI Drive operating and maintenance manual for more information on checking fluid levels and routine maintenance for the OMSI Drive and 40K clutch system.

Shifting OMSI Drive Modes

Changing from Drive Mode to Operate Mode and back again is controlled by the PTO switch on the control switch panel inside the cab and by selecting the proper gear in the transmission. Trucks with manual transmissions have the correct gear to be selected posted on placard on the back of the sun visor above the steering wheel. If your truck is equipped with an automatic transmission, there will be a Mode switch in the console switch panel next to the PTO switch. When the Mode Switch is ON it sends a signal to the transmission that tells it to select the proper gears and lock the torque converter when the operator shifts the transmission into drive after Operate Mode has been activated by the PTO switch. The pre-programmed gear selection is called 4/4 Lockup, which usually displays on the transmission gear selector screen when the Mode switch is ON. Remember that it is extremely important to turn the Mode Switch ON and OFF in the proper sequence to avoid damage to the transmission and torque converter.

NOTICE:
THE NORMAL VEHICLE DRIVE TRAIN IS DISABLED AND THE HYDROSTATIC DRIVE SYSTEM MOVES THE TRUCK WHENEVER OPERATE MODE IS ENGAGED.



Drive Mode Indicator LED Lights

Forward/Reverse Switch & Truck Speed Dial

Drive Mode/Operate Mode

Colored LED lights in the console switch panel display the current operating mode of the truck:

- Green light illuminated indicates the truck has been successfully shifted into Drive Mode. All waterblasting functions are cancelled and the truck is ready for highway operation.
- Red light illuminated indicates the truck has been successfully shifted into Operate Mode. The truck highway drive train is disabled, the hydrostatic drive is enabled and all water blasting functions are available for activation.

When Operate Mode is selected, the Forward/Reverse rocker switch in the joystick switch panel is used to select forward or reverse and the Truck Speed dial on the joystick controls the truck speed in forward or reverse (0 - 7 mph.) Engine RPM

is typically controlled by the truck cruise control that usually can be quickly disengaged by pressing the brake pedal.

Always make sure the Forward/Reverse rocker switch is in the neutral position and the truck speed dial is set to 0 before engaging Operate Mode to avoid the possibility for the truck to surge unexpectedly in forward or reverse when the hydrostatic drive is engaged.

Operate Mode should only be engaged when the truck is on a job site and ready for operations. The truck must be stopped with the engine at idle and transmission in neutral before the OMSI can be shifted from Drive Mode to Operate Mode or from Operate Mode to Drive Mode. In-cab instructions are posted on the placard on the back of the sun visor to assist in proper start-up and shut-down procedures for the drive train and waterblasting system. The instructions are specific to each unit as there are differences between truck chassis, transmissions and drivetrains. There are also significant differences between truck chassis built for use in the USA and chassis built for use in other countries.

CAUTION

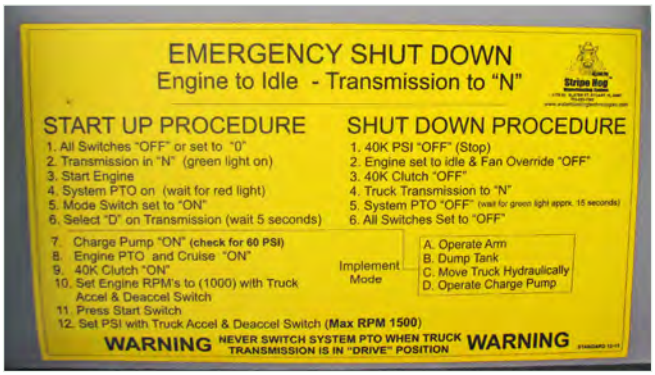
WHEN SHIFTING FROM OPERATE TO DRIVE MODE IT IS IMPORTANT TO "LISTEN" FOR DISENGAGEMENT AND THEN WATCH FOR THE GREEN LIGHT INDICATING THE WATERBLASTING SYSTEM IS INOPERABLE. THIS IS NECESSARY TO INSURE NONE OF THE WATERBLASTING EQUIPMENT FUNCTIONS ARE OPERABLE DURING NORMAL DRIVING OF THE TRUCK.

In some situations slight forward movement of the truck is required to align gear teeth and complete the shift process in the gear case when changing drive modes.

Refer to the Start-up Procedure in Operation section of this manual for additional information.

WARNING

THE TRUCK COULD SURGE FORWARD OR BACKWARD UNEXPECTEDLY WHEN OPERATE MODE IS SELECTED IF THE FORWARD/REVERSE SWITCH IS IN FORWARD OR REVERSE POSITION AND THE SPEED CONTROL DIAL IS NOT SET TO 0. ALWAYS MAKE SURE THE TRUCK SPEED CONTROL DIAL IS SET TO 0 AND THE SWITCH IS SET TO NEUTRAL BEFORE ENGAGING "OPERATE MODE."



Typical Automatic Transmission Startup/Shutdown Placard On Sun Visor

WARNING

IT IS NOT POSSIBLE FOR THE OPERATOR TO SEE PEOPLE OR OBSTACLES THAT ARE IMMEDIATELY BEHIND THE TRUCK IF THE REAR VIDEO CAMERA IS NOT SELECTED. ALWAYS CHECK BEHIND THE TRUCK WITH THE REAR VIDEO CAMERA OR PUT THE TRUCK IN PARK, SET THE PARKING BRAKE AND CHECK BEHIND IT BEFORE DRIVING IN REVERSE. IF YOU HAVE AN ASSISTANT, HAVE HIM STAND AT THE REAR OF THE TRUCK AND DIRECT YOU.

OMSI 40K Clutch

The 40K clutch provides power to the belts and pulleys that drive the high pressure pump and vacuum blower. It is a hydraulic, multi-disc clutch that is controlled by the 40K Clutch switch in the control panel. It is available for activation whenever the OMSI Drive is engaged in Operate Mode. The clutch is engaged by pneumatic pressure from the truck compressed air system and it is lubricated and cooled by the OMSI Lubrication Pump and a fluid cooler mounted to the chassis.

The 40K clutch uses Dextron III transmission fluid. To avoid severe damage to the clutch, the fluid level in the reservoir must be maintained at the proper level. Make sure to check the fluid level in the sight glass on the clutch at least once a week. Refer to the OMSI Drive operating manual for additional information on the 40K clutch.

OMSI Lubrication Pump

The OMSI Lubrication Pump is a small hydraulic pump mounted on the gear case. When activated it continuously draws the lubricating fluid from the bottom of the 40K clutch sump and circulates it through a filter and fan powered cooler, then

returns it to the top port in sump. The pump and cooler fan are activated whenever Operate Mode is selected.

OMSI Gearbox Warning Lights and 40K Clutch Safety Cutout Relay

Four sensors monitor fluid level and temperature in the OMSI gearbox sections. There is a temperature sensor and fluid level sensor in the hydrostatic drive/differential output section (rear section) and a temperature sensor and fluid level sensor in the 40K Clutch section (front section). A red LED light in the Split Drive Oil Panel on the console switch panel will illuminate and the relay that disengages the 40K clutch will be activated if any sensor detects low fluid or high fluid temperature. Another sensor in the 40K clutch lubrication pump circuit will also activate the relay to disengage the 40K clutch and illuminate the red Low Oil LED light in the console switch panel if it senses low fluid pressure.

If the condition that caused a sensor to disengage the 40K clutch was temporary, the cutout circuit can be reset by activating the Water & Gearbox Reset switch in the joystick console and operations can resume. Otherwise the clutch will cutout again after ten seconds and the low oil, high fluid temperature or low fluid pressure condition must be corrected before operations can resume.

The following conditions will activate the warning lights and disengage the 40K clutch:

- The temperature of the 40K clutch fluid exceeds safe operating temperature. The Front Temp warning light is lit.
- The fluid level in the 40K clutch is low. The Front Level warning light is lit.
- The temperature of the fluid in the hydrostatic drive/differential output section exceeds safe operating temperature. The Rear Temp warning light is lit.
- The fluid level in the hydrostatic drive/differential output section is low. Rear Level warning light is lit.
- Low fluid pressure in the 40K fluid lubrication pump circuit. Low Oil warning light is lit.

Split Drive Oil Warning Light Panel

Water & Gearbox Reset Switch
Temp/Level/Charge Water Cutout Indicator Lights

NOTICE:
A SENSOR IN THE LOW PRESSURE WATER SUPPLY TO THE ULTRA-HIGH PRESSURE PUMP WILL ALSO ACTIVATE THE RELAY THAT DISENGAGES THE 40K CLUTCH AND ILLUMINATE THE CHARGE WATER LED WARNING LIGHT ON THE JOYSTICK CONSOLE IF THE CHARGE WATER PRESSURE DROPS BELOW 30 PSI. IT IS IMPORTANT TO CONSTANTLY MONITOR THE WARNING LIGHT AND CHARGE PRESSURE GAUGE TO AVOID LOW CHARGE WATER PRESSURE THAT COULD CAUSE THE CLUTCH TO CYCLE WHICH WILL SHORTEN THE LIFE OF THE CLUTCH PLATES AND CLUTCH FLUID.

2.19 UHP Pump & Blower Drive Belts

The drive belts that connect the 40K clutch to the high pressure pump and vacuum blower are special carbon fiber industrial belts that are designed for high horsepower applications.

The ribbed drive belts are matched to grooved pulleys and have very little stretch. Therefore, they typically don't require adjustment often and proper belt tension is extremely important when adjustment is necessary. Carbon fiber belts are strong enough to cause severe damage to bearings, shafts and other components if they are set too tight. Additionally, if a belt is too loose, it can ride on top of the grooves and thus become too tight.

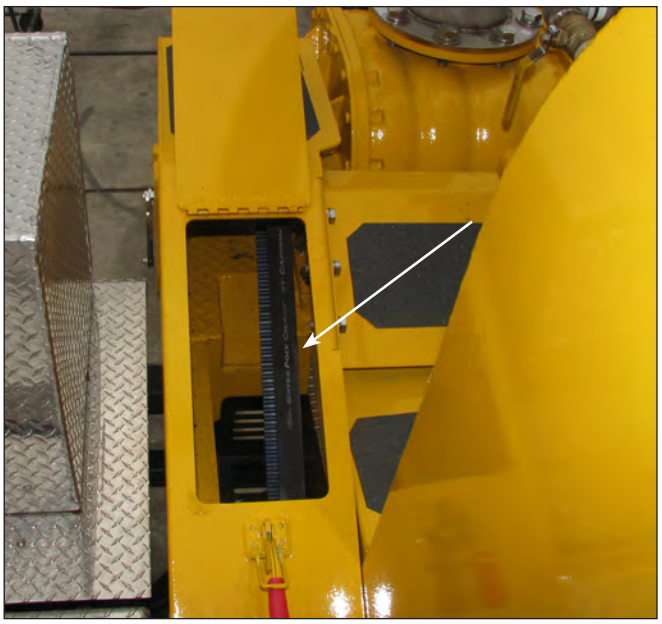
The drive belts for the high pressure pump and vacuum blower are different. Consequently each belt has a different tension specification. Additionally, new belts have a different tension specification than used belts (drive belts with 20 hours or more). Instructions for adjusting the primary drive belts and tension specifications are included in the Maintenance section of this manual.

WARNING

CARBON FIBER DRIVE BELTS CAN CAUSE SEVERE DAMAGE TO PULLEYS, SHAFTS AND BEARINGS IF THEY ARE ADJUSTED TOO TIGHT OR MISALIGNED. THIS CAN CAUSE SEVERE DAMAGE TO DRIVE SYSTEM COMPONENTS AND INJURY TO PERSONNEL IF DAMAGED COMPONENTS ARE THROWN FROM THE MACHINE. ALWAYS MAKE SURE THE BELTS ARE PROPERLY ALIGNED AND SET TO THE BELT MANUFACTURER'S SPECIFICATIONS WHEN THEY REQUIRE ADJUSTMENT. NEVER OVERTIGHTEN THE BELTS.

Make sure you refer to the belt tension specifications in the Maintenance section of this manual or the belt manufactures information manual when adjusting the belt tension and never overtighten them.

Ultra High Pressure Pump Drive Belt

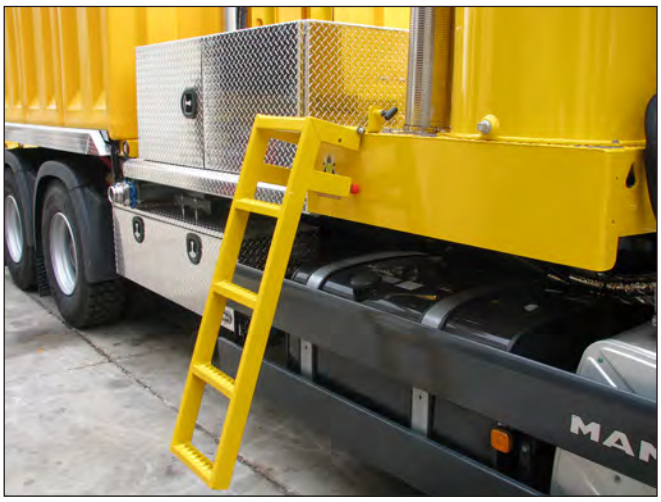


Vacuum Blower Drive Belt

2.20 Inspection Platform, Access Ladders & Air Hose Connection

Ladder

A ladder on the right side of the unit provides access to the waterblasting components located on the chassis between the water tank and the truck cab. The ladder is hinged and has a spring loaded safety pin that locks the ladder in the stored position. To use the ladder, release the safety pin and rotate the ladder to the down position. Return the ladder to the stored position and secure it with the safety pin when service or inspections are complete.

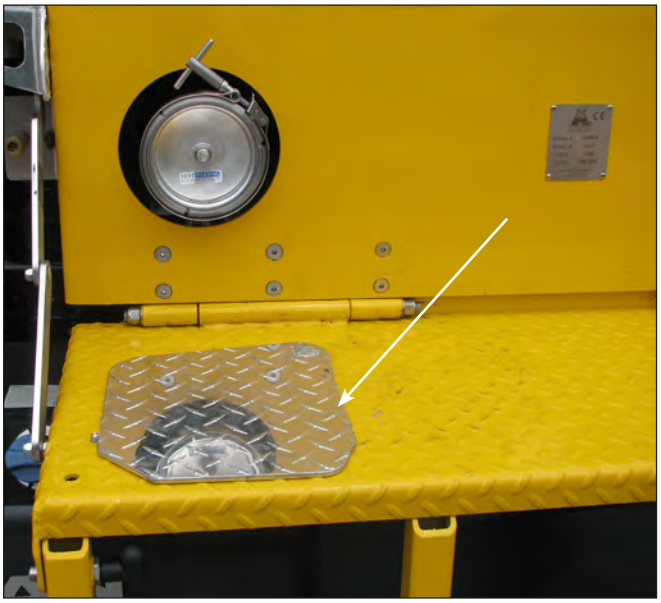


Right Side Access Ladder

Inspection Platform and Ladder

A folding inspection platform with an integrated ladder provides access to the waterblasting equipment on the left side of the unit. The inspection platform is equipped with a hinged filter access plate that opens to provide access to the one micron water filter when the platform is folded. Always make sure the access plate is open when the platform and ladder are folded and closed when the platform and ladder are down.

Return the ladder and platform to the stored position with the access plate open and secure it with the safety pin when service or inspections are complete.



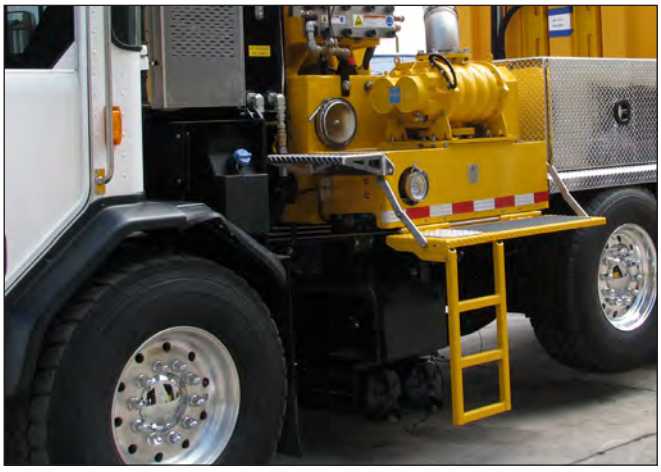
Inspection Platform Access Plate Closed

⚠ CAUTION ⚠

TO AVOID POSSIBLE INJURY TO PERSONNEL, ALWAYS MAKE SURE THE FILTER ACCESS PLATE IS CLOSED WHEN THE INSPECTION PLATFORM AND LADDER ARE DOWN. A PERSON WORKING ON THE PLATFORM COULD ACCIDENTALLY PUT A FOOT INTO THE OPEN ACCESS PORT INJURING A FOOT OR ANKLE OR CAUSING A FALL IF THE PLATE IS NOT CLOSED.

⚠ CAUTION ⚠

ALWAYS RETURN THE LADDERS AND PLATFORM TO THE STORED POSITION AND LOCK THEM WITH THE SAFETY PIN BEFORE OPERATING THE TRUCK. THE LADDER AND INSPECTION PLATFORM STICK OUT FROM THE SIDE OF THE VEHICLE AND CAN CAUSE DAMAGE TO THE LADDER, PLATFORM, TRUCK OR OTHER VEHICLES IF THE TRUCK IS OPERATED WITH INSPECTION PLATFORM OR ACCESS LADDER DOWN.



Inspection Platform & Ladder Folded Down

Service Air and Work Light Switch

A quick connection for a compressed air hose and a toggle switch that activates the work light above the waterblasting components is located below the service platform. Compressed air is supplied to the fitting by the truck compressed air system. The switch is supplied electrical power whenever the truck electrical system is activated.

Always remove and properly store the air hose in the tool box before operating the truck.

Service Air Connection & Work Light Switch

NOTES

3.1 Start Up/Shutdown Introduction

Before operating the Stripe Hog check the fluid levels in the truck engine, transmission, OMSI gearbox and hydraulic system. A thorough understanding of the component systems and their operation is essential to the proper operation of the Stripe Hog. Never allow inexperienced and untrained personnel to operate the Stripe Hog. This manual and the associated manufacturers' information is provided to enhance your knowledge of the Stripe Hog. Make sure you have read them carefully and fully understand the truck and all waterblasting components and systems in theory and operation.

To make operation as safe and productive as possible, it is essential to conduct a thorough prestart inspection before operating the machine. You should walk around the unit and visually inspect the Hog Arm, blasting heads, high pressure hoses, hydraulic hoses, vacuum hoses, and all waterblasting 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 an automatic or manual transmission. This information is provided as a general guide and overview of the process for educational purposes. The exact procedure for your truck may be different, depending on the chassis and the options selected. Hog Technologies includes a quick reference placard usually attached to the drivers side sun visor in the cab, that provides the proper startup and shutdown procedures for your specific truck.

NOTICE:
ALWAYS CHECK THE HOG HEAD NOZZLES AND SPRAY BARS FOR WEAR AND DAMAGE BEFORE EACH SHIFT. REFER TO HIGH PRESSURE HOSES AND NOZZLES IN SECTION 2.7 (WATER BLASTING SYSTEMS) FOR INFORMATION ON INSPECTING SPRAY BARS AND NOZZLES).

3.2 Pre-Start Inspection

The Pre-Start 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-start inspection. The Pre-Op Checklist provides a detailed item by item checklist that should be used when performing a pre-start inspection.

Pre-Start Inspection Items:

1. Check tire condition and air pressure.
1. Inspect all hoses for chaffing and signs of wear.
2. Check fuel level and make sure you have enough for the shift.
3. Check engine and all waterblasting system fluid levels. Refer to the truck operating manual and the Scheduled Maintenance section.
4. Check all waterblasting and vacuum components for oil leaks, damaged or loose bolts and parts.
5. Inspect the Hog Head for loose components and damage.
6. Check that all quick release pins on the ladders and inspection platform are in place, secure and in good condition.
7. Check the vacuum canister for water and the condition of the vacuum filter. Drain water or clean filter as required.
8. Check the vacuum blower and UHP pump drive belt tension and alignment.
9. Inspect clean water tanks, hoses and fittings for leaks and damage. Repair if necessary.
10. Check clean water tank level and fill if necessary.
11. Drain debris tank water and check debris level. Empty if necessary.
12. Make sure debris tank door is closed properly and the seal is inflated.

High Cohesive Nozzle Flow Chart - FLOW - GPM @ Pressure Indicated					
Orifice	**20KPSI**	**26KPSI**	**30KPSI**	**36KPSI**	**40KPSI**
Dia./ins	(1379 Bar)	(1723 Bar)	(2068 Bar)	(2482 Bar)	(2758 Bar)
0.005	0.08	0.09	0.09	0.10	0.11
0.006	0.11	0.12	0.13	0.15	0.15
0.007	0.15	0.17	0. 18	0. 20	0. 21
0.008	0.19	0.22	0. 24	0. 26	0. 28
0.009	0.25	0.28	0. 30	0. 33	0. 35
0.010	0.30	0.35	0. 37	0. 41	0. 43
0.011	0.37	0.42	0. 45	0. 49	0. 52
0.012	0.44	0.50	0. 54	0. 59	0. 62
0.013	0.51	0.59	0. 63	0. 69	0. 73
0.014	0.60	0.68	0. 73	0. 80	0. 84
0.015	0.68	0.78	0. 84	0. 92	0. 97

Nozzle Configuration Chart
Refer to Appedix 4 For Additional Nozzle & Spray Bar Information

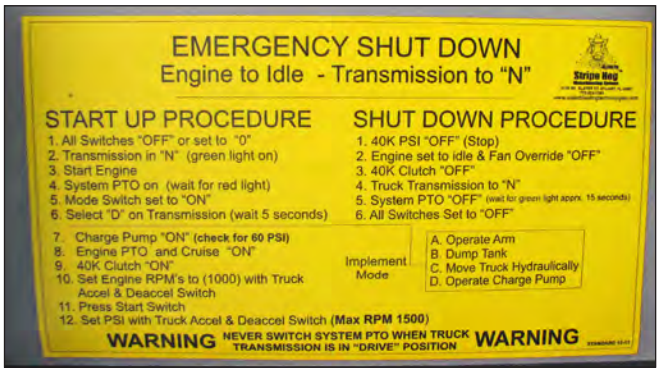
13. Make sure the correct spray bars and nozzles required for the removal project are installed. Replace spray bars and or nozzles if necessary. Refer to the Nozzle Flow Chart in this section and the Flow Chart and Spray Bar Configuration Chart for additional information on choosing the correct spray heads and nozzles.
14. Visually inspect spray bars and nozzles for damage and excessive wear.
15. Make sure all lubrication points, vacuum blower motor bearings and thru-shaft bearings are greased with the specified lubricants. Refer to the lubrication chart and maintenance matrix for additional lubrication instructions and specifications.
16. Check all controls, switches and lights for proper operation.
17. Make sure the Mobile Spare Parts and Tool Systems are complete and onboard. Refer to the Mobile Spare Parts System and Mobile Tool System checklist in Appendix 4.
18. Conduct a final walk around and visually check all components and look for obvious problems that may have been overlooked.

Console Switch Panel Showing Charge Pump, 40K Clutch, & PTO Switches

3.3 Operate Mode/Waterblasting System Startup Procedure

Shifting To Operate Mode

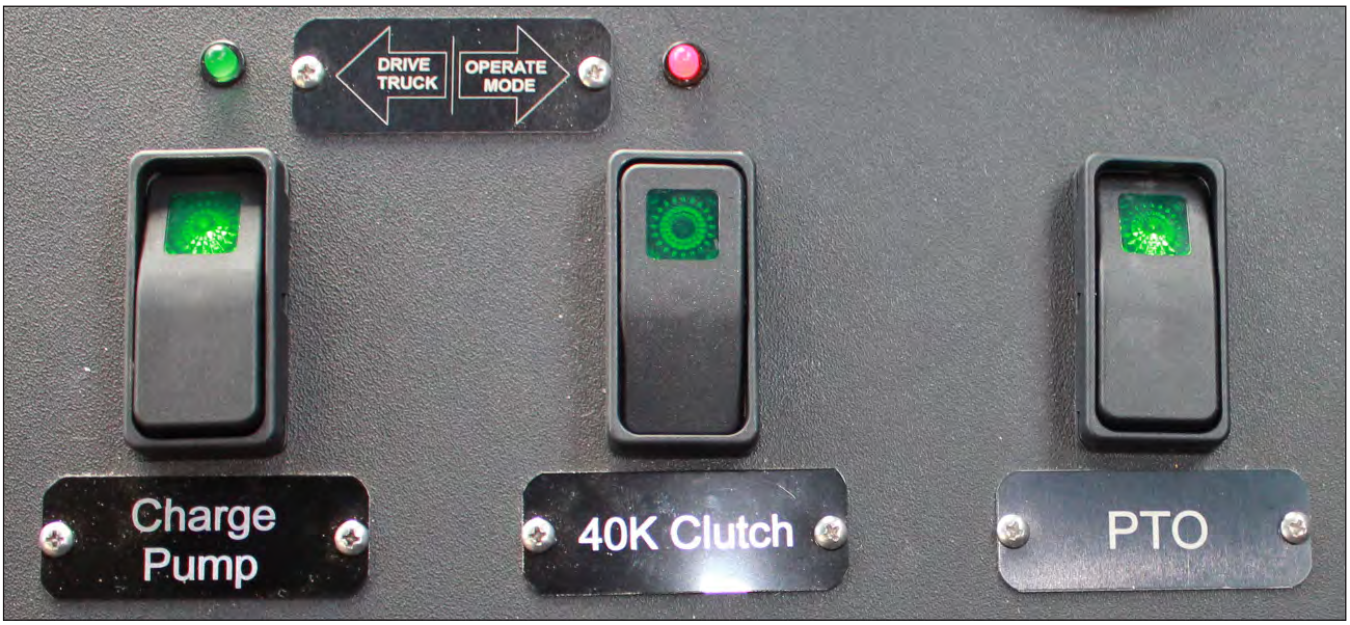
The Startup Procedure to shift the truck from Drive Mode to Operate Mode and activate the waterblasting systems is slightly different for trucks equipped with an automatic transmission than for trucks with a manual transmission. Procedures A and B in the following instructions provide separate general instructions for both types of the transmissions. ***Always refer to the placard on the back of the visor in the cab for specific startup and shutdown instructions for your truck.***



Typical Automatic Transmission
START UP/SHUT DOWN PROCEDURE Placard On Visor

A. Startup procedure to engage Operate Mode on trucks with an automatic transmission:

1. Make sure all switches and speed dials are in the OFF position or set at 0.
2. Be sure the truck transmission is in "N", (*NEUTRAL*) position and the park brake is set.
3. Start truck engine and allow it to run at idle speed.
4. Press the brake pedal and release the park brake.
5. Verify the green Drive Mode LED light is lit.
6. Make sure the truck is not moving, then turn the console PTO switch ON and listen for the PTO to engage. Wait 10 seconds for the green Drive Mode light to go OFF and the red Operate Mode light to turn ON.
7. Turn the Mode switch ON.

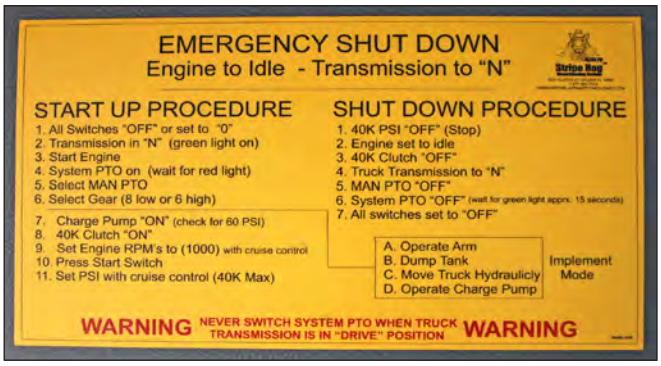


Drive Mode Indicator LED Lights

8. Select "D", (*Drive*), on the truck transmission after the red light is lit. Wait until 4 4 is displayed on the transmission LED.
9. When 4 4 is displayed, the truck has been successfully shifted into Operate Mode and is ready for the operator to activate the waterblasting system.

B. Startup procedure to engage Operate Mode on trucks with a manual transmission:

1. Make sure all switches and speed dials are in the OFF position or set at 0.
2. Be sure the truck transmission is in "N", (*NEUTRAL*) position and the park brake is set.
3. Start truck engine and allow it run at idle speed.
4. Press and hold the clutch pedal and brake pedals. Then release the park brake.
5. Verify the green Drive Mode LED light is lit.
6. Make sure the truck is not moving, then turn the console PTO switch ON and listen for the PTO to engage. Wait 10 seconds for the green Drive Mode light to go OFF and the red Operate Mode light to turn ON.



Typical Manual Transmission
START UP/SHUT DOWN PROCEDURE Placard On Visor

7. With the clutch pedal still depressed and the engine at idle, shift the transmission to the gear stated in the startup instructions on the visor placard.
8. Slowly release the clutch to engage the transmission and Operate Mode drivetrain.
9. The truck has been successfully shifted into Operate Mode and is ready for the operator to activate the waterblasting system.

Activate The Waterblasting System And Set Waterblasting Pressure

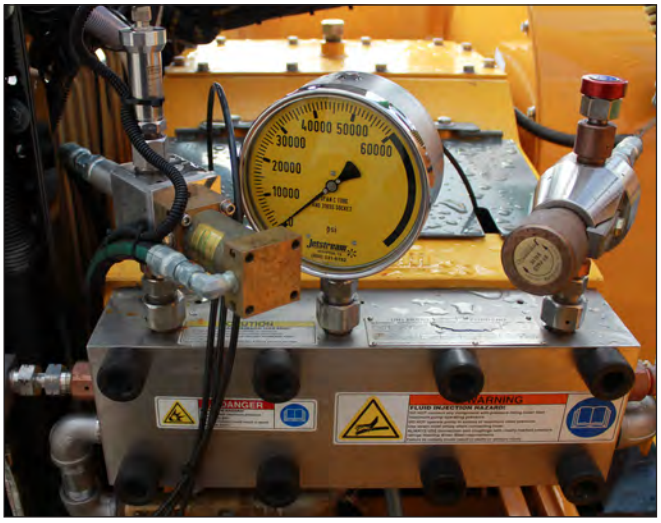
1. With the truck in Operate Mode and the engine at idle, make sure the clean water supply valve is open and the Hog Arm is in the full up position.
2. Turn the Charge Pump switch ON and monitor the charge water pressure gauge. Charge water pressure should rise to 60 psi (4 Bar) within 10 seconds. If no pressure or a lower pressure is indicated, there is a problem that must be corrected before operations can continue.
3. With the charge pump activated, check the water flow at the stuffing boxes. A steady stream of water should be flowing to cool and lubricate the packing. Adjust the metering valves if necessary.
4. Turn the 40K Clutch switch ON to activate the ultra high pressure pump and the vacuum blower.
5. Make sure all personnel are well clear of the blasting heads, then press the START button on the joystick control panel to close the diverter valve and activate high pressure at the spray bars.

NOTICE:
THE DUMP VALVE TOGGLE SWITCH ON THE SKIP SPEED REMOTE CONTROL MUST BE ON BEFORE THE START BUTTON WILL CLOSE THE DIVERTER (DUMP) VALVE AND SUPPLY HIGH PRESSURE WATER TO THE SPRAY BARS.

6. Activate the truck cruise control. Use the Accel/Deaccel switch to slowly increase engine RPM to achieve the desired operating pressure setting (1000 RPM minimum - 1400 RPM maximum). There may be some variation in minimum and maximum RPM depending on the options selected. Use the manual bypass valve to make final pressure adjustments if necessary.

NOTICE:
VACUUM PRESSURE IS TYPICALLY SET WHEN THE ENGINE RPM IS RAISED TO ACHIEVE THE DESIRED BLASTING PRESSURE.

Joystick Control Console With Forward/Reverse Switch, Truck Speed Dial, Head Rotation Speed Dial, START/STOP Buttons, Float Switch, Charge Water Pressure Gauge, UHP Pump Water Pressure Gauge, Joystick & PLC



UHP Pump High Water Pressure Gauge

7. Check the nozzle spray pattern and the spray bar weep holes for leaks.
8. Check all high pressure hose fittings and the Hog Head for leaks.

9. Rotate the Head Rotation speed dial clockwise to test the spray bar rotation and set the desired rotation speed.
10. With the pressure set and the spray bar and nozzles working properly, press the STOP switch on the joystick console so no pressure is supplied to the blastheads and lower the blast heads to the pavement. Press the Float switch to engage Float Mode for the Hog Arm.
11. The truck is now ready to begin waterblasting operations.

WARNING

ANY CONTACT WITH HIGH PRESSURE WATER IS VERY DANGEROUS AND CAN BE FATAL! USE EXTREME CAUTION WHILE RAISING OR MOVING HOG HEAD & ARM ASSEMBLY WHEN HIGH PRESSURE IS ENGAGED.

Stripe Hog In Operation

3.4 Waterblasting Operations

Overview

Before you start the job, you should evaluate the pavement and the material to be removed. Choose the appropriate spray bars and/or nozzles best suited for the job. You should also consider the desired or expected profile of the blasted surface in your selection. There are many variables that affect blasting efficiency, productivity and the profile of the blasted surface. As the operator becomes more experienced, the selection process becomes more refined and easier.

Generally, large, high volume (.015 - .017) nozzles are the most aggressive and provide faster results, but provide greater potential for damage and a course profile. High volume nozzles should be used only on strong pavement (concrete or newer pavement). Small, low volume (.007 - .011) nozzles are less aggressive and will provide somewhat slower results but provide less potential for damage and a smoother profile. Low volume nozzles are well suited for weak pavement (older or damaged pavement). Low volume nozzles are typically a better choice for inexperienced operators on any surface.

Hog Technologies offers an on-site training program that dramatically reduces the learning curve and increases productivity. If you are new to Waterblasting, we highly recommend that you consider this factory training for your operators.

You can also contact Hog Technologies Customer Service department for assistance in choosing spray bars and nozzles or more information regarding the factory training program.

CAUTION

THE PAVEMENT WILL BE DAMAGED IMMEDIATELY IF HIGH PRESSURE BLASTING IS ACTIVATED WITHOUT THE HOG HEAD MOVING. ALWAYS MAKE SURE TRUCK IS MOVING BEFORE SUPPLYING HIGH PRESSURE TO THE BLAST HEADS.

Before Blasting Operations Begin

Evaluate the Pavement and Select a Spray Bar

- Strong pavement withstands high aggression spray bars. This is generally concrete or new asphalt.
- Cracked pavement is weak and will require less aggressive spray bars.
- Brittle pavement is a challenge and will require less aggressive spray bars and reduced pressure.
- Consider spray bar width. Choose a spray bar 2” wider than the line being removed to provide steering tolerance plus slight over spray to reduce the potential for missed areas and need to back up and re-do sections.
- Pre-clean the work area with a power broom if necessary before blasting.

Water Blasting Operation Do's and Don'ts

Do's

- STOP blasting before stopping the truck. Blasting with the unit stopped will damage the pavement, spray bars and blast heads.
- STOP blasting before changing direction.
- When in doubt, choose a less aggressive spray bar. It is always best to error on the side of caution.
- Adjust the forward speed and head rotation to remove 98% of the paint in a single pass to eliminate a second pass and more potential for damage.
- Adjust the pressure for the pavement. Typically blast pressures between 32,000 and 38,000 psi are used.
- Check and clean the vacuum filters frequently to ensure strong vacuum pressure while blasting. Dirty filters and low vacuum will leave excessive paint chips and debris on the pavement slowing productivity.
- Check the charge pressure before blasting operations begin. Change both filters if charge water pressure is below 60 psi (4 BARS) before beginning operations.
- Monitor the water flow to the stuffing boxes frequently to ensure a steady stream is flowing to cool and lubricate the packing.
- Monitor charge pressure frequently during blasting operations to ensure proper charge water pressure while blasting.
- Check the pavement frequently and watch the outer edges of the lines for damage. Continuously make adjustments as required.

Don'ts

- Do not allow untrained personnel to operate Stripe Hog equipment.
- Do not continue blasting with a damaged nozzle. It can cause damage, waste water, reduce the power of other nozzles and slow production.
- Avoid running the blast head wheels on rumble strips. Always adjust the Hog Arm and the castor wheel support arms on the blast heads to keep the wheels off the rumble strips.
- Do not blast directly on sealed joints in the pavement. Especially weather stripping on bridges or airfields.
- Do not blast over pavement markers/reflectors. Markers can damage the blast head and spray bars and should be removed prior to blasting.
- Do not blast over damaged or uneven pavement that can damage the blast heads and spray bars.
- Do not allow the debris tank to become overfilled. This can cause an unexpected shutdown of the vacuum system. Monitor the tank and empty it before it is full.
- Do not allow the charge pump to run out of water. Water is a lubricant that cools the charge 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.

Waterblasting Procedure

WARNING

THE PROCEDURE SHOULD BE FOLLOWED AS OUTLINED BELOW TO AVOID DAMAGING COMPONENTS ON THE STRIPE HOG WATERBLASTING SYSTEM, REMOVAL SURFACE OR BLASTING HEADS.

1. Complete the startup and setting pressure procedures.
2. Release the truck park brake and move the truck to the removal area.
3. Align the truck with the material to be removed, stopping a short distance before the start point for blasting operations.
4. Rotate the Head Rotation speed dial to set the spray bar rotation speed to the estimated RPM.
5. Make sure the STOP button in the joystick console is pressed to open the diverter valve so no pressure is supplied to the blast heads.

6. Lower the blast heads to the ground and turn the float switch to the ON position to engage Hog Arm Float Mode. ***Do not begin blasting operations without the Float Mode engaged.***
7. Use the joystick controls to move the blast heads to the proper working position.
8. Make sure Forward is selected on Forward/ Reverse switch. Then rotate the Truck Speed dial to set the forward speed to a speed slightly faster than the estimated speed necessary to perform removal.

NOTICE:
YOUR INITIAL FORWARD SPEED SETTING SHOULD ALWAYS BE SET TO A SPEED SLIGHTLY FASTER THAN THE ANTICIPATED BLASTING SPEED TO REDUCE THE POSSIBILITY FOR PAVEMENT DAMAGE AS BLASTING BEGINS.

9. Release the brake. The truck will begin moving forward toward the start point.
10. When the truck is approximately 12 inches ahead of the start point, press the START button on the joystick console to close the diverter valve, supplying high pressure water to the blast heads. ***Remember, never close the diverter valve while truck is sitting still with the blast heads on the ground.***
11. Use the speed dials to adjust head rotation speed and truck forward speed to obtain maximum productivity and the desired profile.
12. To stop blasting, press the STOP button on the joystick console to open the diverter valve and stop high pressure water flow to the blast heads. ***Remember, never supply high pressure water to the blast heads when the truck is stopped.***

PLC and Spray Head Speed Control

The main screen on the PLC mounted to the joystick console displays debris and clean water tank levels, vacuum pressure and the rotation speed for each spray bar. The maximum spray bar speed (3000 RPM) is programmed into the PLC at the factory to prevent the thru-shaft motors from exceeding safe operating RPM.

Main Screen Display Showing Controls, Spray Head RPM, Debris & Clean Water Tank Levels & Vacuum Pressure

Buttons at the bottom of the display are used to set the desired maximum RPM for each spray bar (0-3000 RPM), raise and lower the rotation speed of each spray bar and turn spray bar rotation ON or OFF. The operator can also select different screens to change the PLC operation mode or program different preset maximum head speed RPM settings into the memory.

Once the maximum head rotation speeds are set or selected from memory, the spray bar rotation speed can be raised or lowered between 0 and the preset maximum RPM using the UP/DOWN arrow buttons on the PLC or the Rotation Speed dial on the joystick console.

Refer to section 2.12 Programmable Logic Controller and the PLC User Guide for additional information and operating instructions for the PLC.

3.5 Skip Speed Remote Control

The skip speed remote control is used to temporarily override the Truck Speed setting on the joystick console and increase truck speed between dashed painted lines to increase productivity while in Operate Mode. Increasing skip speed not only saves time by increasing the truck speed between lines where removal is not required, it reduces wear and tear on the high pressure blasting system by increasing truck speed enough to leave blasting pressure activated between the lines without damaging the pavement.

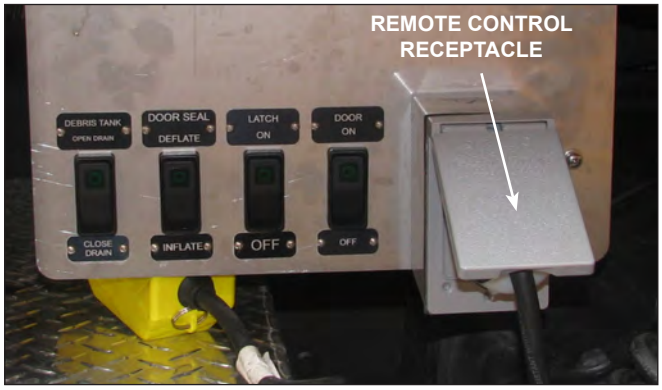
Skip Speed Remote Control

To use the remote, rotate the Skip Speed dial clockwise to the highest safe setting for the current work environment. The setting is usually, but not always, 100 on the dial. This sets the speed the truck will accelerate to when the control is activated (Skip Speed). The Dump Valve ON/OFF switch is always in the ON position unless it is required to be turned OFF to shutdown high water pressure water to the blastheads in an emergency or other situations that may occur. With the control set, begin blasting the dashed paint lines. ***Note that the Dump Valve ON/OFF switch must be in the ON position before the START button on the joystick control will activate the high pressure water supply to the blastheads.***

When the blastheads reach the end of a painted line, squeeze the trigger on the skip control. Truck speed will increase to the speed preset on the skip speed remote speed dial. Just before the blastheads reach the next line, release the trigger. The truck speed will immediately decrease to the blasting operation speed preset on the joystick Truck Speed dial.

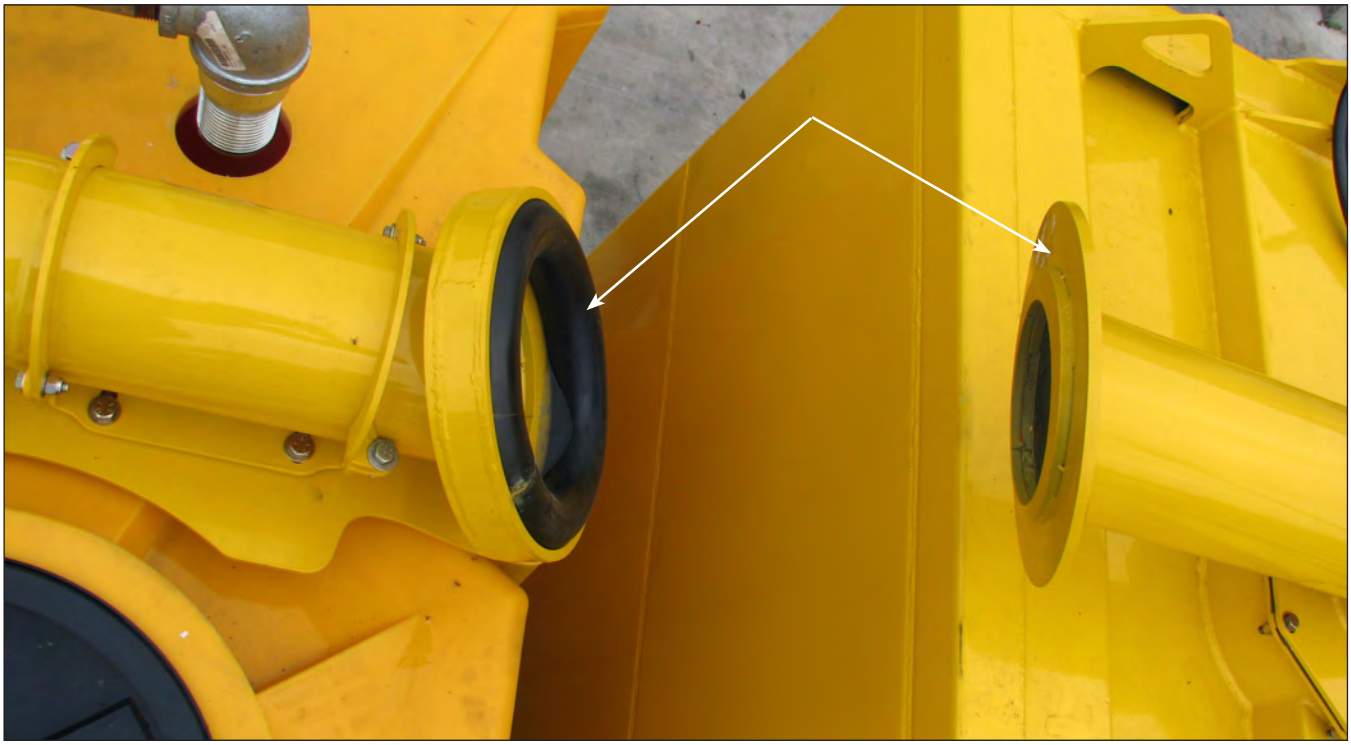
3.6 Dumping Debris Procedure

1. Be sure you are dumping in an approved dump site and that the truck is on solid, level ground.
2. Preform the Startup Procedure to place the truck in OPERATE MODE which will activate the hydraulic system.
3. Drain all water from the debris tank by moving the Debris Tank switch to the OPEN DRAIN position. Allow the tank to completely drain then close the drain valves.
4. Plug the hand remote control in to the grey receptacle next to the debris tank control switch panel.
5. Move the Door Seal switch on the debris tank control panel to the DEFLATE position to completely deflate the air seal on the debris tank door.
6. Move the Door switch on the control panel to the ON position to activate DOOR CONTROL MODE on the remote control. Then press the DOWN button on the remote to close the door slightly to remove pressure on the latch pawls. Turn the Door switch OFF.



Debris Tank Control Switch Panel & Remote Control Receptacle

Hydraulic Door Latch Open



Vacuum Tube Seal & Point Of Contact At The Top Of The Debris Tank

7. Move the Latch switch to the ON position to activate LATCH CONTROL MODE on the remote control. Then press the UP button on the remote to activate the hydraulic door latches and unlock the door. Verify that the latch pawls on each side of the door are completely open. Turn the Latch switch OFF.
8. Move the Door switch to the ON position to activate DOOR CONTROL MODE on the remote control. Then press the UP button on the remote to open the door to the full open position.
9. Move the Door switch to the OFF position to deactivate DOOR CONTROL MODE and activate DEBRIS TANK TILT MODE on the remote control. Note that DEBRIS TANK TILT MODE is activated when all switches in the debris tank control panel are OFF and the remote is plugged into the receptacle.
10. Make sure all personnel are well clear of the truck, then press the UP button on the remote to tilt and dump the debris tank.
11. If the truck is equipped with a debris bag, make sure the bag falls out of the tank.

Debris Tank Remote Control

12. Never rock the truck to make the debris bag fall out. This jerking movement will damage the hydraulic cylinders and possibly break the debris tank hinge pins or mount.
13. Once the debris is removed from the tank, make sure the vacuum hose O-ring seals and seal surfaces at the top of the tank are clean. Then press the DOWN button on the remote to lower the tank to the full down position.
14. Clean out any remaining debris and install a new debris bag or clean the filter panels.
15. Move the Door switch to the ON position to activate DOOR CONTROL MODE on the remote control. Then press the DOWN button on the remote to close the door. Turn the Door switch OFF.
16. Move the Latch switch to the ON position to activate LATCH CONTROL MODE on the remote control. Then press the DOWN button on the remote to activate the hydraulic door latches and latch the door.
17. Make sure the hydraulic door latch pawls on each side of the door are fully engaged. Use the remote to adjust the door or clean the door jam and seal if necessary.
18. Turn the Latch switch OFF and disconnect the hand remote from the grey receptacle box. Properly store the control.
19. Use the Door Seal switch to inflate the debris door seal. Maximum seal pressure is 20-25 psi (1.4 - 1.7 BAR).
20. Inspect the vacuum system filter and drain water from the vacuum canister. Clean or replace the filter if necessary.
21. Make sure all the drain valves are closed, then activate the vacuum system and check for vacuum leaks.
22. Perform the shutdown procedure to deactivate Operate Mode and place the truck in Drive Mode.

Repair vacuum leaks or any other problems before returning the truck to service.

Hydraulic Rear Door Latch In The Secured Position

3.7 Operate Mode/Waterblasting System Shutdown Procedure

The shutdown procedure to shift the truck from Operate Mode to Drive Mode and deactivate the waterblasting systems is slightly different for trucks equipped with an automatic transmission than for trucks with a manual transmission. Procedures A and B in the following instructions provide separate general instructions for both types of the transmissions. ***Always refer to the placard on the back of the visor in the cab for specific startup and shutdown instructions for your truck.***

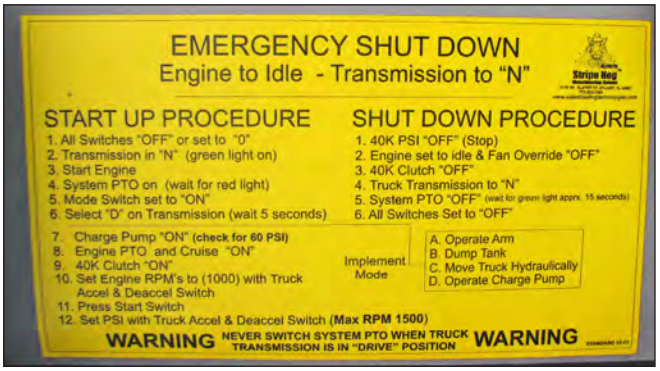
A. Shutdown procedure for trucks with an automatic transmission:

1. Press the STOP button on the joystick console to open the diverter valve and stop high pressure water flow to the blast heads.
2. Turn the 40K Clutch and Charge Water switches OFF.
3. 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.

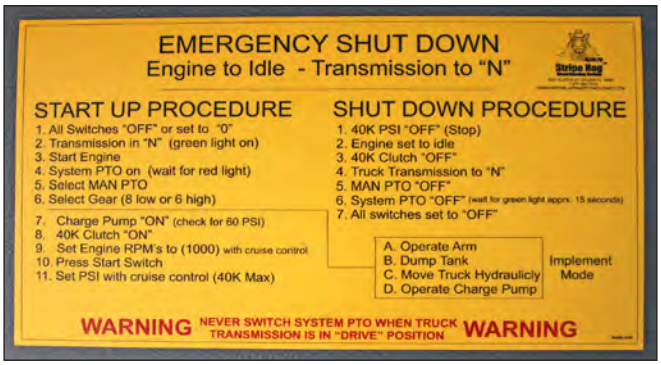
4. Reduce engine speed to idle.
5. Raise the blast heads to the full UP position and lock the Hog Arm with the safety pin.
6. Make sure the truck is stopped and put the Transmission in "N" *(NEUTRAL)*.
7. Turn the PTO switch OFF. Listen for the PTO to disengage. Then wait for the red light to turn OFF and the green light to turn ON. Turn the Mode switch OFF. It is important that this switch is off to prevent the truck transmission from engaging 4th gear lock-up when DRIVE is selected causing the truck to surge forward.
8. Drain waste water from the vacuum canister. Close the valves when draining is complete.
9. Turn all other switches and dials on the control panels to OFF or 0.
10. When the truck is parked, set the parking brake and allow the engine to idle for several minutes to cool internal components, then shut off the engine.

B. Shutdown procedure for trucks with a manual transmission:

1. Press the STOP button on the joystick console to open the diverter valve and stop high pressure water flow to the blast heads.
2. Turn the 40K Clutch and Charge Water switches OFF.
3. 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.
4. Reduce engine speed to idle.
5. Raise the blast heads to the full UP position and lock the Hog Arm with the safety pin.
6. Make sure the truck is stopped, then depress the clutch and shift the Transmission to neutral.
7. Turn the PTO switch OFF. Listen for the PTO to disengage and then wait for the red light to turn OFF and the green light to turn ON. Drain waste water from the vacuum canister. Close the valves when draining is complete.



Typical Automatic Transmission
START UP/SHUT DOWN PROCEDURE Placard On Visor



Typical Manual Transmission
START UP/SHUT DOWN PROCEDURE Placard On Visor

11. Turn all other switches and dials on the control panels to OFF or 0.
12. When the truck is parked, set the parking brake and allow the engine to idle for several minutes to cool internal components, then shut off the engine.

WARNING

WATERBLASTING COMPONENTS COULD BE ACTIVATED ACCIDENTLY WHILE DRIVING IF THE PTO DOES NOT DISENGAGE. THIS COULD RESULT IN SEVERE DAMAGE TO THE TRUCK AND/OR INJURY TO PERSONNEL.

ALWAYS MAKE SURE YOU HEAR THE PTO DISENGAGE DURING SHUTDOWN.

3.8 Emergency Shutdown Procedure

WARNING

IF AN EMERGENCY SITUATION INVOLVING PERSONAL SAFETY OCCURS, THE OPERATOR SHOULD ALWAYS SELECT EMERGENCY SHUTDOWN OPTION 1. THIS PROVIDES IMMEDIATE SHUTDOWN OF THE TRUCK AND ALL WATERBLASTING SYSTEMS TO REDUCE THE POSSIBILITY OF INJURY.

SAFETY CIRCUITS HAVE BEEN INSTALLED IN SOME WATERBLASTING COMPONENTS TO HELP MINIMIZE EQUIPMENT DAMAGE WHEN AN EMERGENCY SHUTDOWN IS ACTIVATED.

To stop all operations immediately use one of the following methods:

1. Turn off the chassis ignition
   - Turn all switches and dials OFF before restarting.

2 A. Manual Transmission - Press the foot clutch and the brake
   - Put the transmission in neutral before releasing the brake
   - Turn all dials and switches OFF before restarting

2 B. Automatic Transmission - Press the brake and put transmission in neutral
   - Turn all switches and dials OFF before restarting.

3.9 Operating in Freezing Conditions

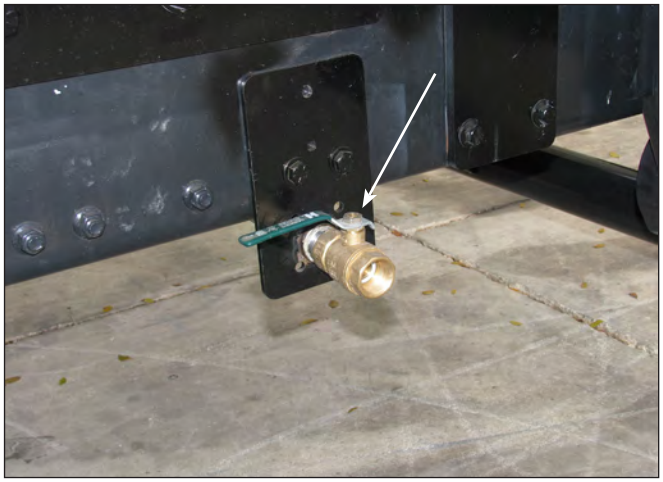
Shutdown

1. 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.
2. Make sure the clean water and debris tanks are drained immediately at the end of each shift.
3. Once the clean water tank is drained using the main drain, open winterizing drain valve mounted on the chassis frame below the water tanks to drain the equalizing hoses and fittings to completely drain the system.
4. All system hoses and the blast head assemblies should be drained of all water and/or filled with an anti-freeze solution. (Non alcohol)
5. When winterizing the ultra high pressure pump, refer to pump manufacturer's procedures for maintaining equipment 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. Pour 2 gallons of anti-freeze into the high pressure pump stuffing box sump so it will drain to the bilge pump sump system. Allow the bilge pump to run until anti-freeze is visible at the bilge pump hose fitting in the debris tank.
8. Drain the vacuum canister immediately at the end of each shift.

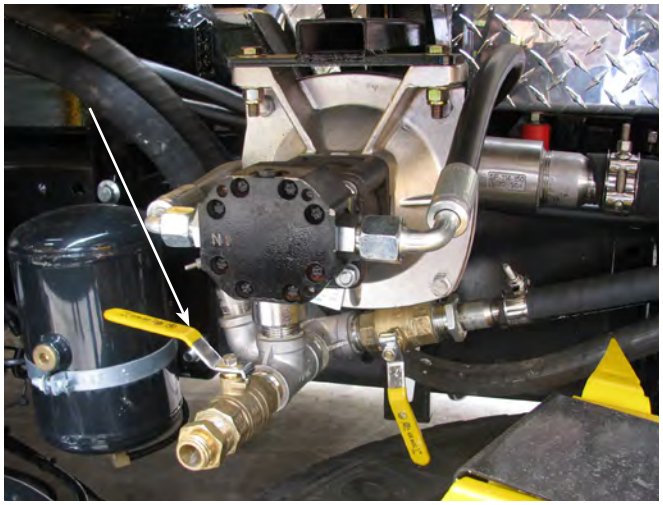
⚠ WARNING ⚠

TO AVOID SERIOUS DAMAGE TO WATERBLASTING 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 WATERBLASTING 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 AS INDICATED ON THE THERMOMETER IN THE RESERVOIR SIGHT GAUGE.

Typical Clean Water Tank Main Drain Valve



Clean Water Tank Winterizing Drain Valve



Charge Water Pump & Drain Valve

3.10 Operation Routine Maintenance

Some components of the ultra high pressure water and vacuum systems may require maintenance during a typical waterblasting shift. This maintenance is considered routine and a component of the waterblasting 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 waterblasting systems and proficiency of the operators.

A well maintained truck using water from a very clean source being operated by an experienced operator 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 the components that could require routine maintenance during a typical waterblasting shift and a brief description of the procedure. Refer to the Lubrication and General Maintenance section of this manual for detailed instructions for routine maintenance items listed.

The following items may require maintenance during a typical shift:

- 10 Micron Filter - The filter should be replaced at the start of each shift and may require replacement during the shift if low charge water pressure is indicated. Shutdown the system, remove the filter clamp and cap, then remove and replace the filter. Reinstall and tighten the cap.
- 1 Micron Filter - The filter should be replaced at the start of each shift and may require replacement during the shift if low charge water pressure is indicated. Shutdown the system, remove the filter clamp and cap, then remove and replace the filter. Reinstall and tighten the cap.
- Purge Air From The Charge Water System - If the clean water filters are replaced 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 ultra high pressure pump. Follow the procedure outlined in the Lubrication and General Maintenance section.
- Blast Head Shroud Wear Brush Adjustment - If the wear brush wears or the shroud clamp becomes loose and the brush looses 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. Remove the safety pin, then rotate the handle on each caster to set the height. Reinsert the safety pin to lock the adjustment.
- Drain Vacuum Canister - The vacuum canister must be checked frequently during operation and drained when more than 6” of water has accumulated in the bottom. Shutdown the vacuum system, uncoil the drain hose and open the canister drain ball valve. Make sure to close the valve and coil the hose before resuming operations.
- Clean The Vacuum Filter - The filter should be cleaned at the start of each shift and may require cleaning during the shift If reduced vacuum pressure is indicated. Shutdown the vacuum system. Open the door on the vacuum canister, then remove and clean the filter. Reinstall the filter, then close and latch the door.
- Drain Debris Tank Water - If the debris tank becomes full of water during a shift, it must be drained to avoid an unexpected vacuum system shutdown. Shutdown the vacuum system and turn the Debris Tank Drain switch on the console switch panel or on the debris tank control switch panel ON to open the drain valves. Turn the Debris Tank Drain switch OFF when draining is complete to close the valves.

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 ultra high pressure water and vacuum systems require daily maintenance or may require maintenance during a typical waterblasting shift. This maintenance is considered routine general maintenance and a component of the waterblasting 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 waterblasting 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.

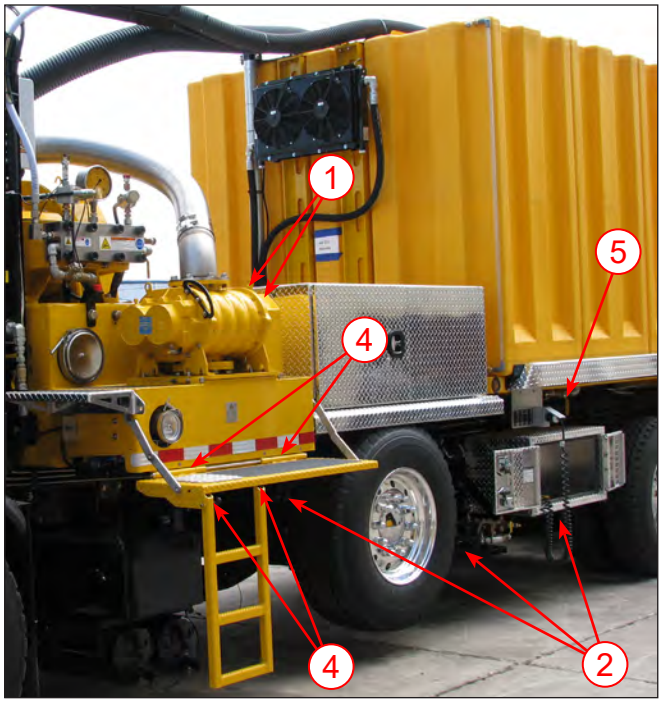
Use the following procedure to place the machine in the service position:

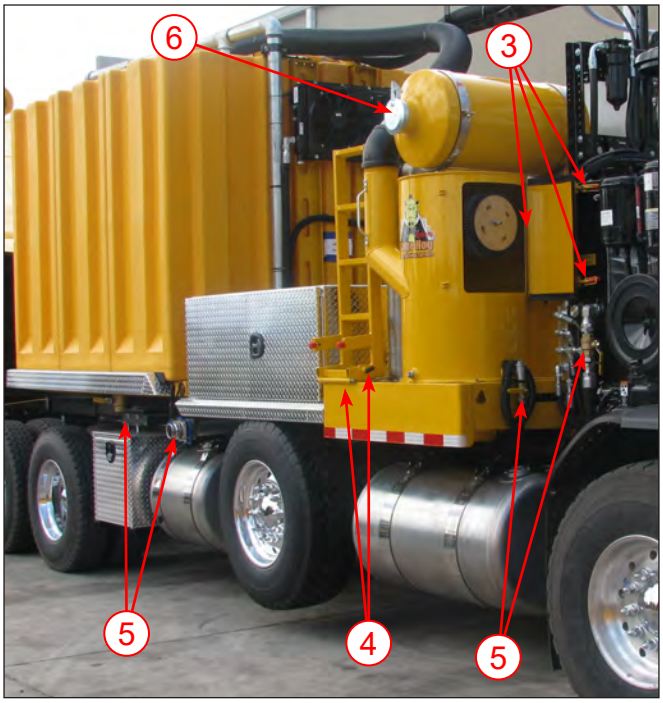
1. Make sure all components lifted hydraulically are in the full down position or properly supported to remove the load from the cylinders and hinges.
2. Shift the truck to Drive Mode before shutdown to prevent accidental activation of waterblasting systems.
3. Park vehicle on a level area and block wheels.
4. Apply parking brake.
5. Shutdown the engine and disable the truck electrical system at the battery switch or main circuit breaker.
6. Follow all Lockout/tagout and additional shutdown procedures established in your company safety guidelines to complete the service position.

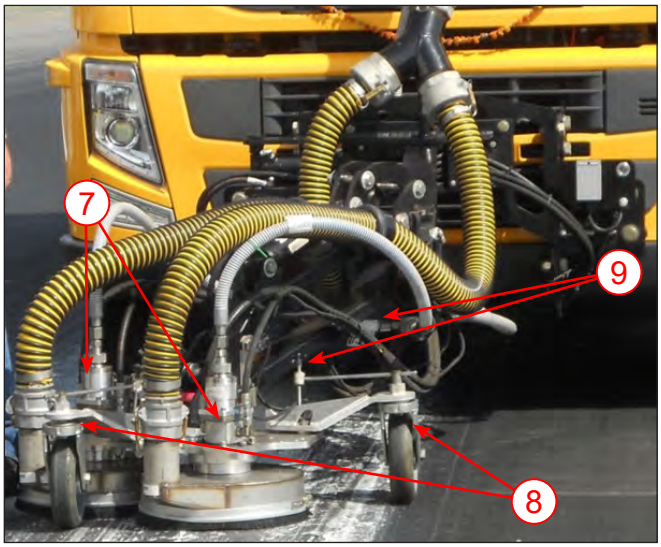
WARNING

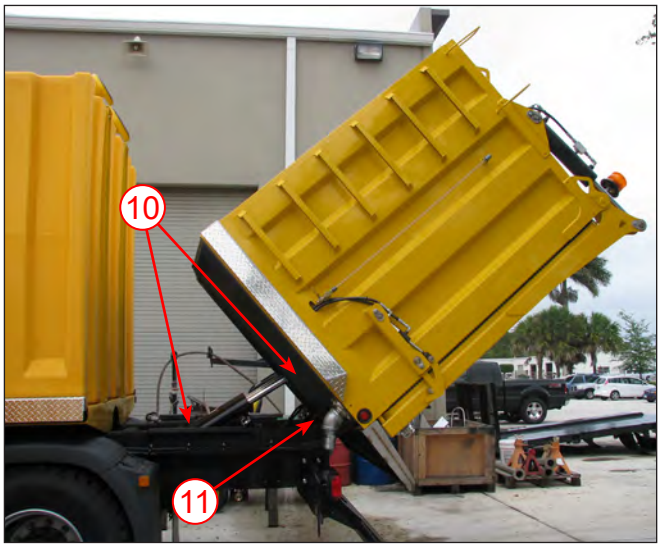
SEVERE INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT CAN RESULT IF THE VEHICLE ROLLS OR IS STARTED UNEXPECTEDLY DURING SERVICE. ALWAYS FOLLOW THE RECOMMENDED PROCEDURES TO PLACE THE UNIT IN THE SERVICE POSITION AND APPLY LOCKOUT/TAGOUT PROCEDURES BEFORE ALLOWING ANYONE TO SERVICE COMPONENTS.

4.2 Lubrication & Grease Point Locations





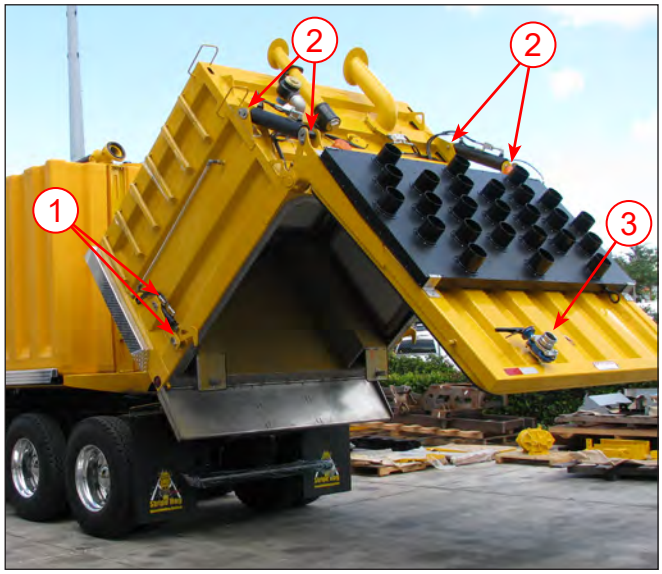


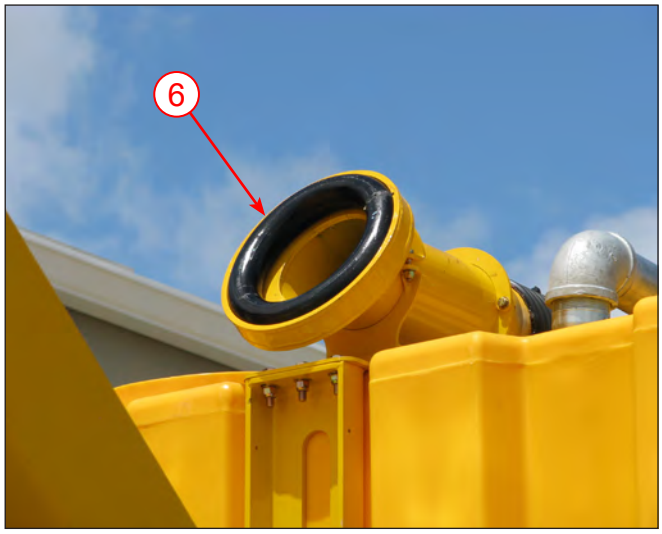


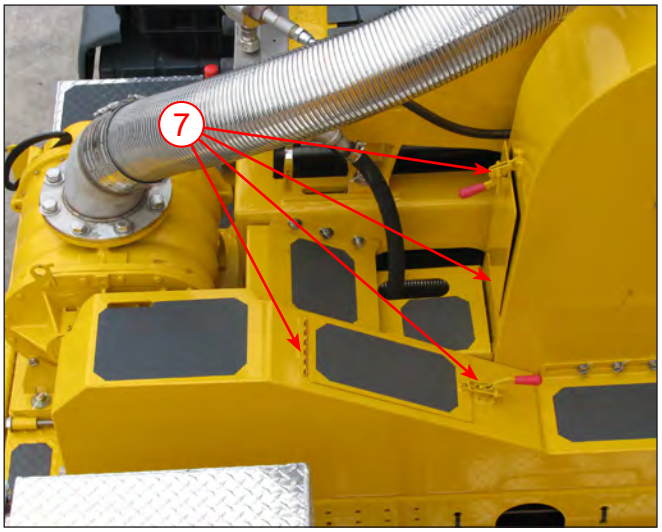
Stripe Hog Lubrication Chart 1

ITEM#	COMPONENT DESCRIPTION		ITEM#	COMPONENT DESCRIPTION
1.	Vacuum Blower Pulley End Bearings		7.	Thru-shaft Motor Bearings
2.	Driveshaft Splines & Universal Joints		8.	Blast Head Chassis Wheels & Casters
3.	Vacuum Door Hinges & Latches		9.	All Blast Head Chassis & Hog Arm Safety Pins
4.	Ladder & Service Platform Hinges & Safety Pins		10.	Debris Tank Tilt Cylinder Bearings
5.	Ball Valves		11.	Debris Tank Tilt Hinges
6.	Silencer Exhaust Flapper Hinges			

Lubrication & Grease Point Locations

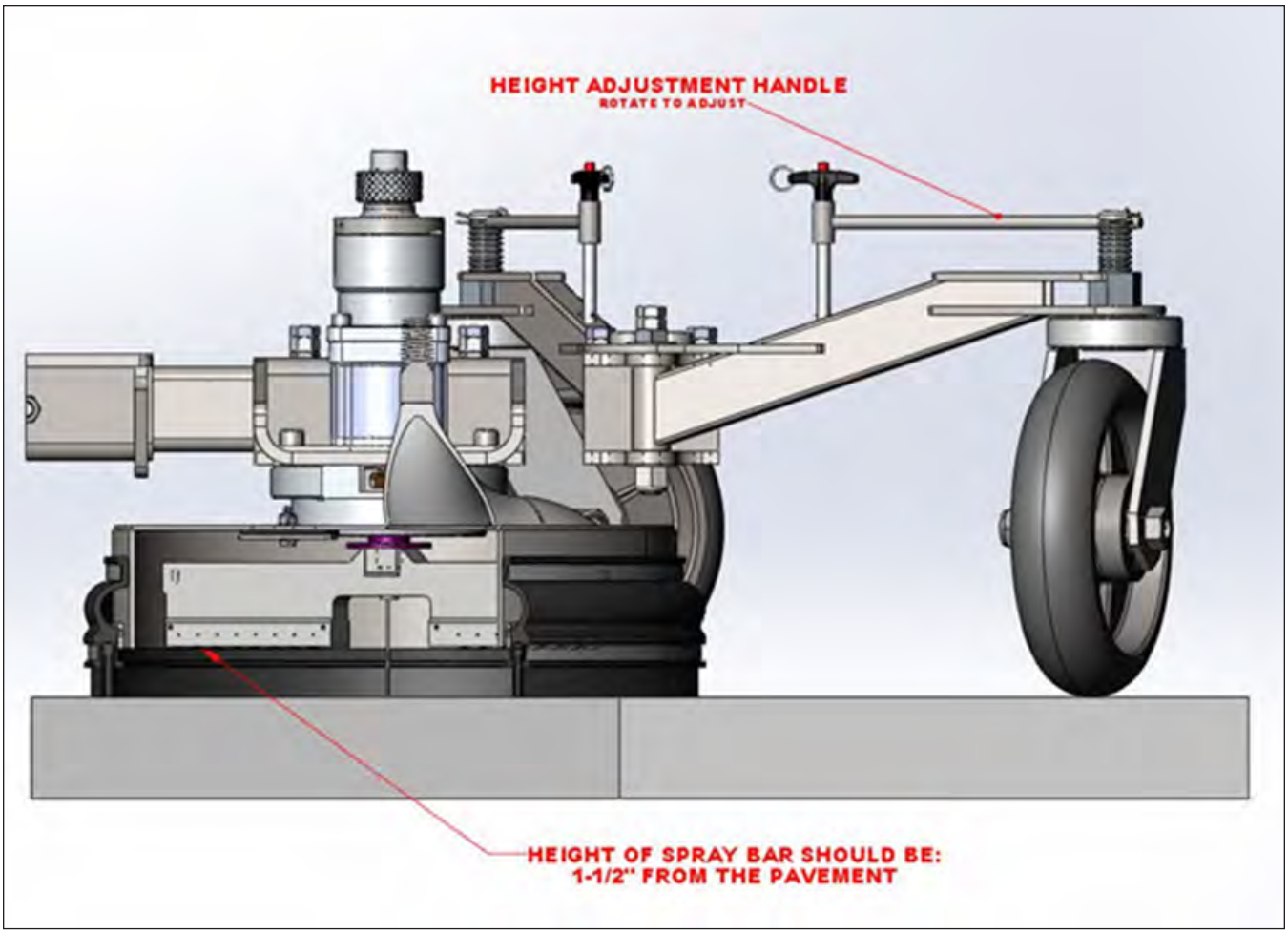






Stripe Hog Lubrication Chart 2

ITEM#	COMPONENT DESCRIPTION		ITEM#	COMPONENT DESCRIPTION
1.	Left Side Hydraulic Debris Tank Door Latch		5.	Right Side Hydraulic Debris Tank Door Latch
2.	Debris Tank Door Hydraulic Open/Close Cylinders		6.	Vacuum Tube Seal
3.	Drain Valve		7.	Drive Belt Access Door Hinges & Latches
4.	Debris Tank Door Hinges			



Blasting Head Standoff Adjustment & Standard Setting

4.3 Standoff Adjustment Procedure

The term "Standoff" refers to the height of the spray bar above the pavement. The standoff distance is set by turning the adjustment handle on the threaded end of each caster wheel yoke.

Standoff directly affects removal performance and should be adjusted regularly based on the following considerations:

- Removal performance. Generally the best standoff distance is 1.5" (46 cm) from the nozzles to the pavement. This is the standard factory setting.
- Clearance for obstacles. The standoff should always be set high enough to provide enough clearance for the shrouds and spray bars to clear obstacles permanently attached in the pavement, such as runway lights or road markers.

It is the operator's responsibility to evaluate the pavement surface and permanently attached obstacles, then set the standoff adjustment to provide clearance at the start of each job. Since pavement obstacle height is unique to each location, never assume that the standoff has been correctly set by any other person or operators who have previously used the truck in a similar circumstance.

To set the standoff distance:

1. Make sure the yokes are correctly installed and locked into position.
2. Raise the Hog Arm to the full up with the heads lock perpendicular to the road surface.
3. Turn off the truck and place it in the service position to ensure that the head cannot accidently move.

4. Remove the spray bar covers.
5. Place a straight edge across the bottom of the wheels and below the spray bar to simulate the pavement surface. Measure from the distance from the straight edge to the spray bar to determine the standoff distance.
6. Remove the safety pins and turn the adjustment handles to raise or lower the castor wheels to achieve the desired distance from the straight edge to the spray bar. Remember that 1.5" (46 cm) is the standard standoff distance. Increase the distance if required to clear road obstacles. Make sure to turn each handle the same number of revolutions to keep the blast heads level.
7. Cross check the measurement by placing the straight edge across the other wheels. Readjust the castor wheels as required to level the blast heads.
8. Before starting operations, confirm proper clearance by moving the blast heads slowly over a typical obstacle in the pavement on the current job while monitoring the clearance. Make additional adjustments if necessary.
9. Be alert for obstacles that are higher than the standoff clearance during removal operations. You must be prepared to avoid the obstacle or stop the truck and adjust the standoff distance to provide additional clearance.

CAUTION

- It is never acceptable to pass over obstacles in the pavement surface that are high enough to hit the shroud. Pavement obstacles can cause severe damage to blast head components.
- Never allow the blast heads to pass over debris.
- Never allow the blast heads to pass over equipment or markers that can be damaged by the shroud, spray bars or the blast from the water jets.
- Always perform a test pass at the start of each job to confirm adequate standoff clearance before beginning normal removal operations.

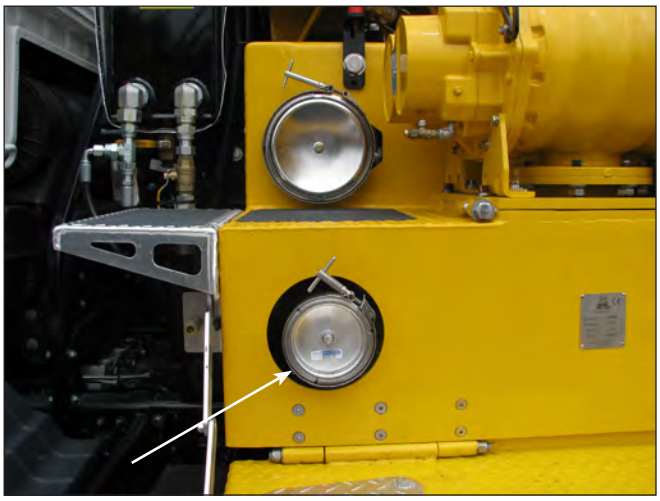
4.4 Clean Water Filter Replacement

10 Micron Bag Filter

⚠ CAUTION ⚠

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 WATERBLASTING 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.



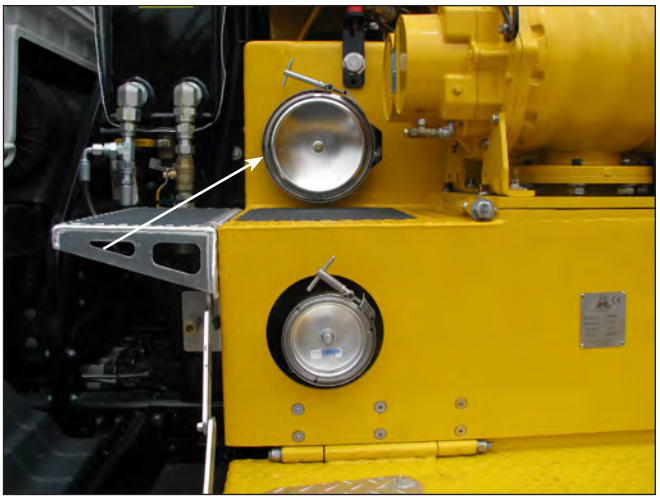
10 Micron Filter Canister

NOTICE:
WHEN REINSTALLING THE RETAINER RING, PLACE A SMALL AMOUNT OF ANTI-SEIZE ON THE RETAINER RING BOLT THREADS TO PREVENT GALLING OF THE THREADS.

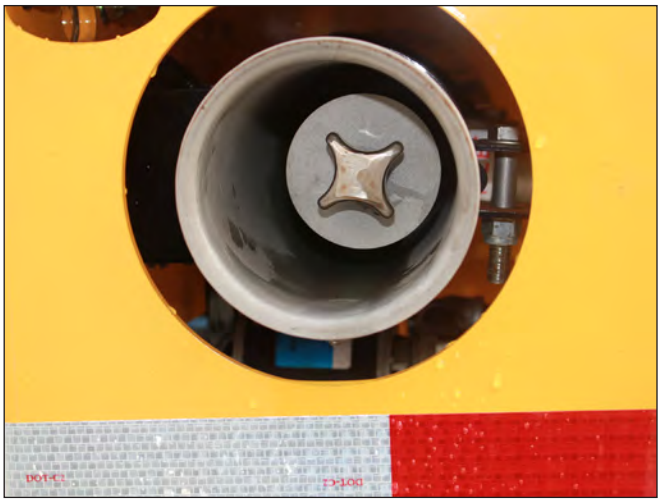
10 Micron Bag Style Filter

Replacing the 10 micron filter:

1. Make sure the waterblasting 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. Remove filter canister lid and retainer ring.
4. Remove the filter and filter cage.
5. Flush the filter canister and cage to remove debris and contaminants if necessary.
6. 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.
7. Push filter and cage into the filter canister until properly seated.
8. Coat the retainer ring threads with anti-sieze and install filter canister lid. Tighten retainer ring bolt.
9. Open the clean water valve and reactivate the waterblasting system. Follow the instructions to bleed air from the charge water system in the next section of this chapter.



1 Micron Filter Canister



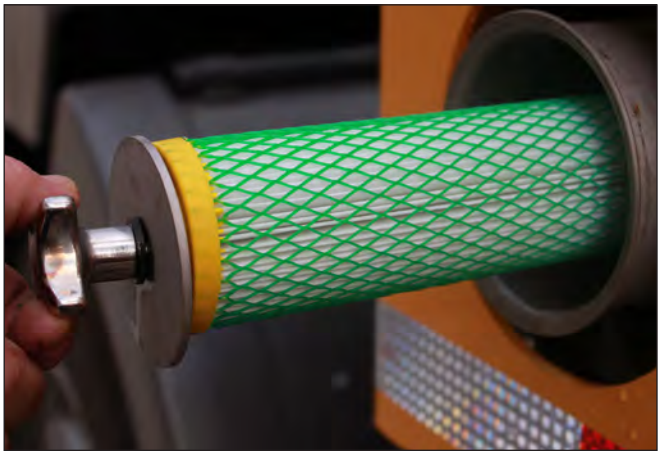
Filter Retainer Hand Bolt

1 Micron Cartridge Filter

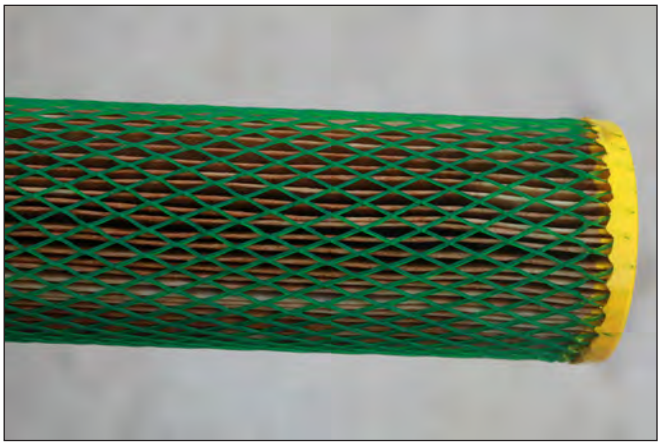
Follow all the precautions outlined in the previous section for the 10 micron filter.

Replacing the 1 micron filter:

1. Make sure the waterblasting 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. Remove filter canister lid and retainer ring.
4. Remove the filter retainer bolt and filter. Then flush filter canister to remove debris and contaminants with clean, fresh water.
5. Apply a thin coat of anti-sieze to the filter retainer bolt threads.
6. Insert the new filter and retainer bolt into the filter canister. Hand tighten the retainer bolt just enough to seat the filter (snug). ***Make sure not to over tighten the bolt and collapse the filter cartridge.***
7. Coat the retainer ring threads with anti-sieze and install filter canister lid.
8. Open the clean water valve, reactivate the waterblasting system and follow the instructions to purge air from the charge water system in the next section of this chapter.
9. Activate the charge pump and flush the low pressure side of the pump and charge water system using the flush valve before operating the UHP pump after changing the filters.



Clean Filter Installation



Typicall Diirty Filter

4.5 Bleeding Air From Charge Water Pump

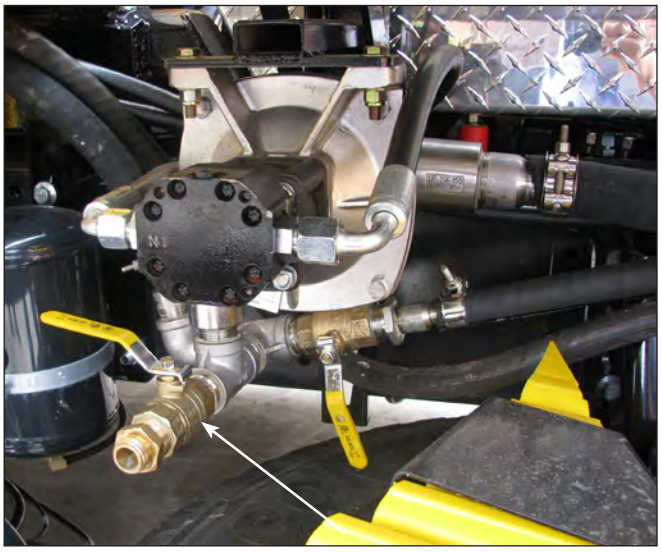
Air must be bled from the charge water system when the filters are changed, the clean water tank is run dry or anytime the charge water system is serviced.

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

1. Make sure the truck is in Operate Mode with the waterblasting system activated. The truck engine must be at idle.
2. Open the clean water supply valve and turn ON the charge water pump.
3. While the charge pump is running, open the discharge valve on the charge water pump for 2 or 3 seconds, then close the valve.
4. Immediately repeat step 3 while monitoring the charge water pressure gauge in the joy-stick console.
5. If pressure does not rise to the normal charge water pressure range within a few seconds, repeat step 3 until pressure rises to the normal range (60 psi - 4 BAR).

Charge Water Pressure Gauge

Clean Water Supply Valve



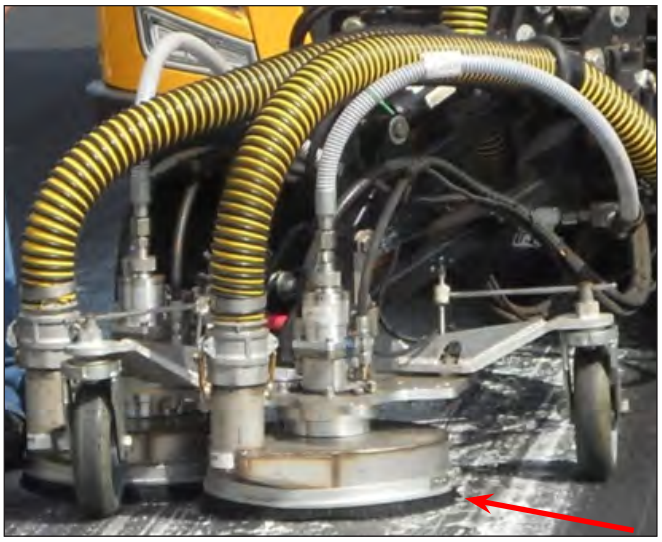
Charge Water Pump Discharge Valve

4.6 Wear Brush Assembly Adjustment

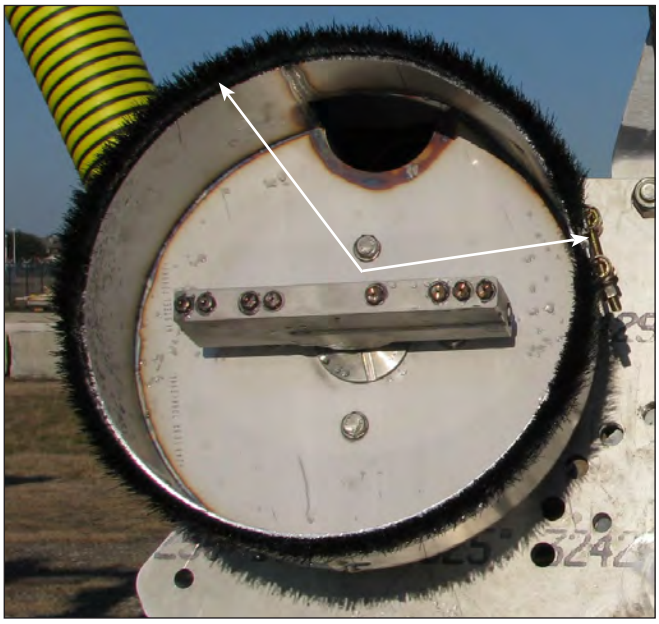
The wear brush bristles will slowly wear during operation. Consequently, the wear brush will require adjustment periodically to keep the bristles in contact with the pavement to provide proper vacuum air flow. It will also need to be adjusted when the standoff distance is increased or when the shroud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

Use the following procedure to adjust the wear brush assembly:

1. Make sure the truck is in Operate Mode and lower the hog head onto a level surface.
2. Turn on the float switch to be sure the heads are flat with the surface.
3. Shutdown the waterblasting system and place the truck in service position.
4. Note the gap between the bottom of the brush and the surface.
5. Loosen the brush clamp on the blast head.
6. Tap the brush down evenly using a dead blow hammer until the bristles are just touching the surface and the gap is eliminated.
7. 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.
8. Tighten the clamp and recheck. Readjust if necessary.



Proper Wear Brush Contact



Wear Brush Bristles & Clamp

4.7 Dirt Shield Replacement

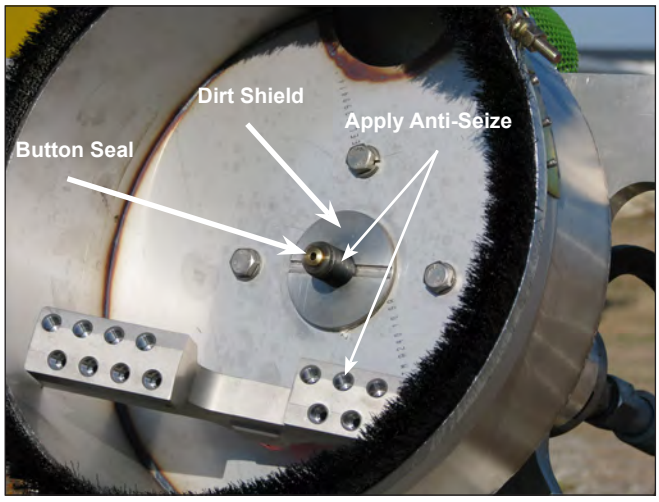
The dirt shield should be inspected daily to ensure it is tightened properly and that the felt seal is in good condition.

Use the following procedure to replace a damaged or worn felt seal:

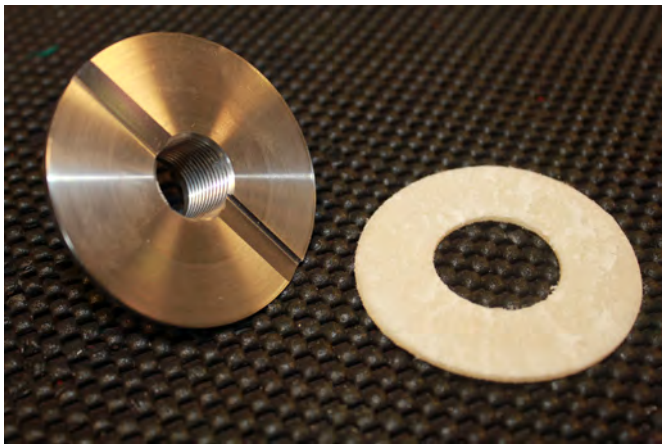
1. Make sure the waterblasting system is shut-down and the truck is in the service position.
2. Hold the thru-shaft so it won't turn with a 3/4" (19 mm) wrench inserted in the slot at the base of the thru-shaft motor.
3. Turn the spray bar counterclockwise by hand until it is free of the shaft.
4. Remove brass button.
5. Use a stainless steel wire brush to clean the dirt from the thru-shaft threads.
6. While still holding the thru-shaft with the wrench, remove the dirt shield by turning it counterclockwise.
7. Remove the felt seal. Then clean the dirt shield and shroud.
8. Place a new felt seal on the dirt shield and apply a light coating of anti-sieze to the thru-shaft threads.
9. Hold the thru-shaft with the 3/4" (19 mm) wrench, install the new dirt shield and hand tighten.

NOTICE:
ONLY HAND TIGHTEN THE DIRT SHIELD. NEVER USE TOOLS TO TIGHTEN THE DIRT SHIELD. IF THE DIRT SHIELD IS TIGHTENED MORE THAN HAND TIGHT IT WILL CAUSE THE SPRAY BAR TO ROTATE SLOWLY OR NOT ROTATE AT ALL.

10. Activate the charge water system and purge the blast head at low pressure to remove debris that could clog the nozzles.
11. Shutdown the waterblasting system and return the truck to the service position.
12. Install a new brass button seal, hold the thru-shaft with the wrench and reinstall the spray bar.



Typical Dirt Shield Installation



Brass Dirt Shield & Felt Seal

13. 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.
14. Install the spray bar protector.

Typical Spray Bars With Protectors Installed

4.8 Nozzle Installation

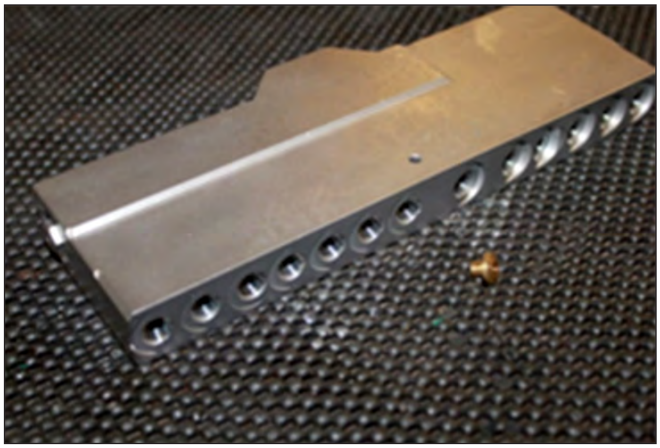
The condition of the nozzles is critical to removal performance and maintaining a tight, cohesive stream as water is forced through the nozzles. Maximum productivity and 98% removal without damage requires all nozzles to be in excellent condition. Nozzles should be inspected before the start of each shift as part of the pre-operation check or when the operator notices a loss in pressure or a change in performance while blasting. If visual inspection of the nozzle spray pattern indicates that the pattern is not in the # 1-4 quality range, as indicated on the Nozzle Quality Guide, the nozzle must be replaced.

Spray Bar Protector, Cotter Pin & Gasket

Use the following procedure when replacing nozzles:

1. Make sure the Hog Arm and blasting heads are in the full up position and locked with the safety pin.
2. Make sure the waterblasting system is shutdown with the truck in the service position.
3. Remove the spray bar protector cotter pin and the spray bar protector.
4. Remove worn or damaged nozzles.

5. Activate the truck and the waterblasting system.
6. Turn the charge pump on and flush debris from the spray bar with low charge pressure water.
7. Once the spray bar is flushed, deactivate the waterblasting system and shutdown the truck.
8. Apply a light coat of anti-seize to the threads on the new nozzles.
9. Install the nozzles into the spray bar being careful not to get any anti-sieze on the seat area of the nozzle or the spray bar.
10. Tighten each nozzle finger tight. Then torque each nozzle to 10 ft lbs.
11. Reactivate the truck and the waterblasting system by following the steps in the Start Up Procedure.
12. Set the Head Rotation speed dial to 0, then turn the 40K Clutch switch ON to activate the ultra high pressure water system.
13. Make sure all personnel are well clear of the blasting heads, then press the START button to activate the high pressure system and set the operating pressure to a safe level. Staying well clear of the water jets, no closer than 18”, visually inspect the spray pattern of each nozzle.
14. Confirm at least a 1 inch, needle tight, water jet is coming from each nozzle.
15. Deactivate the waterblasting system and shutdown the truck.
16. Replace the spray bar protective cover and gasket.



Typical Spray Bar & Nozzle

Nozzle Pressure Test - All Nozzles Good

4.9 Rupture Disc Replacement

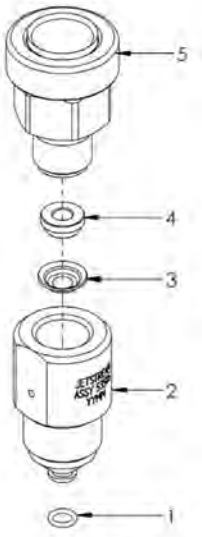
If a rupture disc bursts, find and correct the problem that caused excessive pressure, then use the following procedure to replace the rupture disc. Refer to the drawing at the bottom of this page for additional reference.

Replacing the rupture disc:

1. Use two wrenches, one to prevent the base from turning and the other to turn the rupture disc cap, to remove the rupture disc cap assembly from the base.
2. Remove the hold down ring from the base (Item 4 in drawing below) and set it in a clean, safe location.
3. Remove the blown rupture disc.
4. Insert a new rupture disc into the base assembly. Be sure it is the same pressure rating as the one being replaced.
5. Place the hold down ring on top of the rupture disc.
6. Install the rupture disc cap assembly on the base and tighten to specification.

Typical Rupture Disc Rating

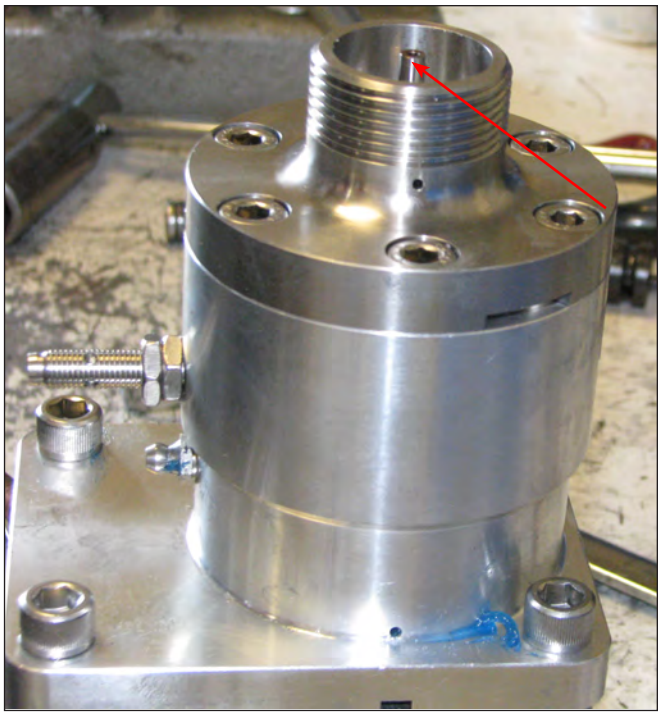
Rupture Disc Assembly On Manual Bypass Valve



#	DESCRIPTION
1	O-ring
2	Base 40K Male Port 9/16” High Pressure Male
3	Rupture Disc
4	Hold Down Ring
5	Cap

Rupture Disc & Holder Assembly

Thru-shaft Cover Housing & Swivel Nut



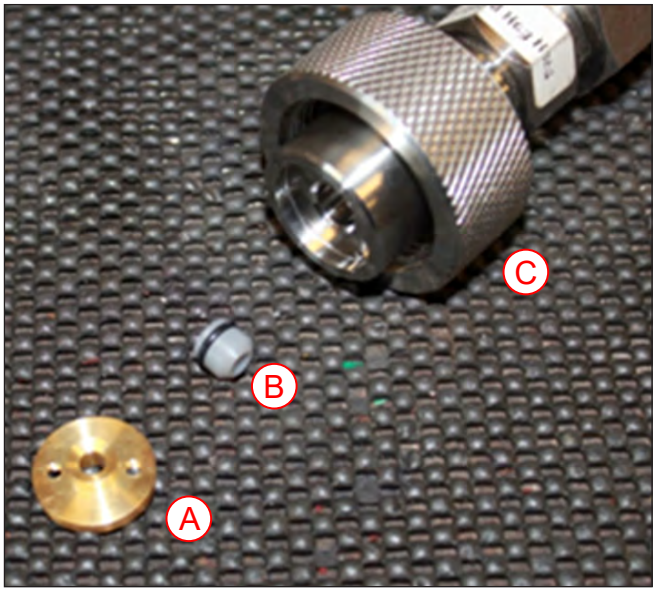
Swivel Tit In Thru-shaft Cover Housing

4.10 Swivel Seal Replacement

The swivel seal must be inspected at the start of each shift and replaced at the first sign of leakage to avoid damage to the swivel nut and thru-shaft cover housing. Swivel seal leakage is indicated by water dripping from the weep holes in the housing just below the swivel nut.

Use the following procedure to replace the seal:

1. Make sure the waterblasting system is shut-down and the truck is in the service position.
2. Loosen the swivel nut on the top of the thru-shaft motor. Be sure to pull the hose and adapter straight up so you don't bend the swivel tit inside the fitting.
3. Rotate the end of the high pressure hose toward you until the swivel seal adapter is visible.
4. Insert two 6-32 screws into the brass back-up ring. Tighten the screws evenly to push the brass back-up ring out of the high pressure hose adapter.



A. Brass Back-Up Ring
B. Swivel Seal
C. Swivel Nut Assembly

5. Once the brass back-up ring is removed, inspect the swivel seal seat and the edges of the seat in the back-up ring closely. If there is any sign of wear or damage, replace the brass back-up ring. It is recommended that the back-up ring be replaced every 3rd or 4th swivel seal replacement.
6. Insert the swivel seal removal tool into the bottom of the worn swivel seal and turn counterclockwise until the tool grips the swivel seal. Continue turning the tool counterclockwise while pulling on the swivel seal until the seal is removed.
7. Make sure all debris has been cleaned out of the swivel seal adapter and the thrust housing cap at the top of the thru-shaft motor.
8. Apply a small amount of silicone grease on the O-ring for the swivel seal and on the swivel tit. This provides lubrication for the seal and swivel tit at startup when the swivel seal connection and thru-shaft are dry.
9. Install the brass back-up ring onto the swivel tit with the beveled seat facing up. Make sure the brass back-up ring is seated completely.
10. Install the lubricated swivel seal onto the swivel tit with the beveled edge facing down. Be sure the swivel seal is seated against the brass back-up ring.
11. Make sure the swivel seal adapter is perfectly aligned with the thru-shaft motor and install the swivel seal adapter onto the thru-shaft motor.
12. Hand tighten the swivel nut.

NOTICE:
IT IS VERY IMPORTANT TO KEEP THE ADAPTER ALIGNED STRAIGHT RELATIVE TO THE THRU-SHAFT MOTOR WHILE PUSHING THE ADAPTER OVER THE SWIVEL SEAL AND ONTO THE THRU-SHAFT COVER HOUSING. IF THE ADAPTER IS NOT STRAIGHT, THE SWIVEL TIT COULD BECOME BENT OR BROKEN DURING INSTALLATION.

NEVER USE TOOLS TO TIGHTEN THE SWIVEL NUT. THE SWIVEL SEAL AND NUT WILL BE DAMAGED IF THE NUT IS TIGHTENED MORE THAN HAND TIGHT.

4.11 Vacuum Canister & Filter

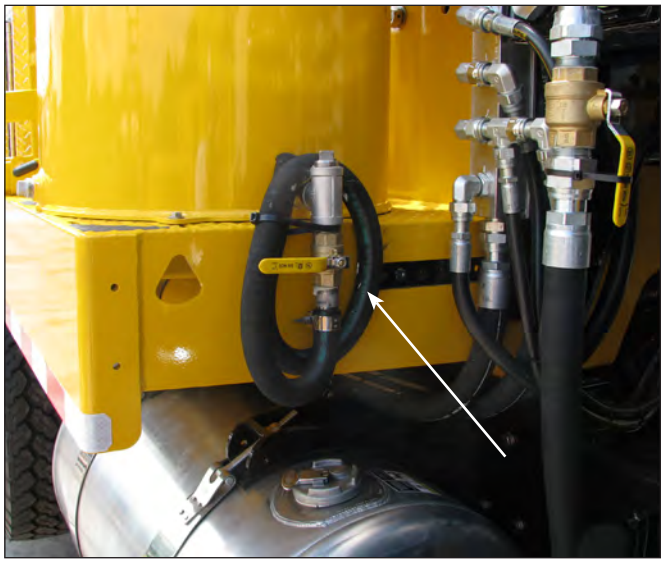
The vacuum filter canister houses the vacuum filter to protect the blower from debris and should be checked at the beginning of each shift. It is normal for water vapor to travel from the debris tank to the vacuum filter canister and gradually accumulate. Therefore, the canister should be drained at the start of each shift, each time the debris tank is drained and whenever the vacuum filter is serviced to ensure excess water does not collect to an unsafe level in the bottom of the filter canister. There is a manual drain valve at the bottom of the filter canister to remove excess water as needed.

The filter canister contains a pleated, reusable vacuum filter that can be easily removed through the door on the side of the canister. The vacuum filter should be inspected and cleaned before each shift.

Vacuum Filter Access Door, Filter & Wing Nut

Use the following procedure to drain the canister and remove and clean the vacuum filter:

1. Make sure the waterblasting system is shutdown and the truck is in the service position.
2. Open the filter access door and drain accumulated water from the canister. Close the valve when draining is complete.
3. Remove the wing nut that secures the vacuum filter to the canister and remove the filter.
4. Use a detergent degreaser to cut the oil and grease, then power wash the filter with pressure not exceeding 2000 psi.
5. Thoroughly inspect the filter for holes and damage. Replace the filter if its condition is questionable, it is damaged or has holes that could allow debris to get into the blower.
6. Install the cleaned or new filter and secure it with the wing nut. Hand tighten the wing nut. ***Make sure not to over tighten the wing nut and collapse the filter.***
7. Close and latch the filter access door.



Filter Canister Drain Valve & Hose

Typical Pleated Vacuum Filter

5.1 Scheduled Maintenance Introduction

Most components of the waterblasting system require specific maintenance at scheduled intervals recommended by the component manufacturer or Hog Technologies. Maintenance schedules and service procedures for the primary components of the waterblasting 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 this section identifies the recommended service and/or lubrication intervals for each primary component of the SH8000 Waterblasting system. You should become familiar with the maintenance and lubrication requirements of all components. Some of the lubrication points on components such as the blower, ultra high pressure pumps and thru-shaft motor 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 waterblasting 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.

Ladders and Inspection Platforms

Monthly/200 Hours:

- Lubricate and inspect all hinges.
- Inspect and lubricate safety pins and latches. Replace damaged or worn out safety pins or spring loaded safety latches immediately if the spring becomes weak or damaged.

Access Door Hinges And Latches.

Monthly/200 Hours:

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

Bilge Pump And Automatic Switch

Weekly/50 Hours:

- Supply water to the high pressure pump stuffing box sump and monitor the operation of the bilge automatic switch, bilge pump and drain system. Correct any problems found.

Monthly/200 Hours:

- Remove the lid on the automatic switch sump and clean out accumulated debris that could interfere with the switch operation or water flow to the pump.
- Test the switch for proper operation.

5.3 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 a high pressure hose:

1. Make sure the waterblasting 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. Remove the spray bar protector.
9. 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 motor.
10. Turn the spray bar counterclockwise by hand until it is free of the shaft.
11. Remove Brass button.

Typical High Pressure Water Hose

12. Use a stainless steel wire brush to clean the dirt from the thru-shaft threads.
13. Activate the charge water system and purge the blast head at low pressure to remove debris that could have entered the system while changing the hose.
14. Shutdown the waterblasting system and return the truck to service position.
15. Apply a light coat of anti-sieze to the thru-shaft threads.
16. Install a new brass button seal, hold the thru-shaft with the wrench and reinstall the spray bar.
17. 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.
18. Install the spray bar protector and gasket.
19. Activate the water blasting system and operate the ultra high pressure system to check the new high pressure hose for leaks.

5.4 Ultra High Pressure Pump Scheduled Maintenance

The 40K UHP pump operates at very high pressure and has specific lubrication and maintenance requirements. Refer to the Maintenance Matrix in this section and the pump manufacturer's operating and maintenance manual for lubrication specifications and maintenance schedules.

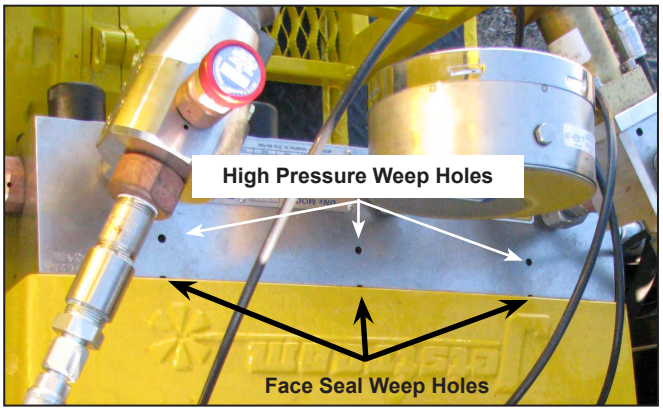
Daily Inspection and Maintenance

- Check the crankcase lubricating oil level.

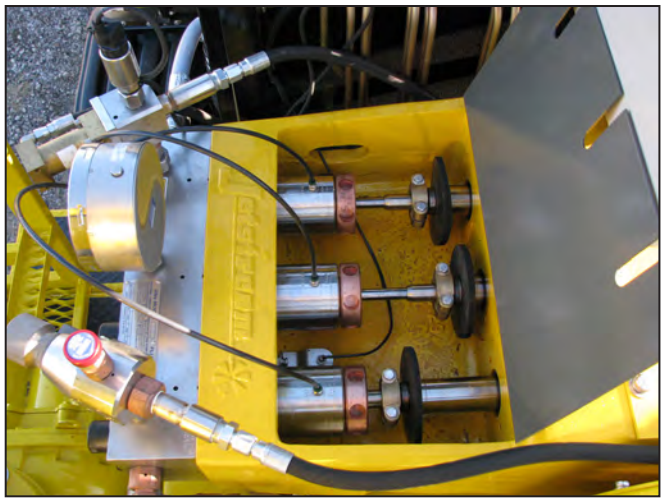
NOTICE:
THE PROCEDURE FOR CHECKING THE CRANKCASE OIL LEVEL IS DIFFERENT FOR WHEN THE PUMP HAS NOT BEEN OPERATING FOR 5 OR MORE HOURS AND WHILE THE PUMP IS IN OPERATION. REFER TO UHP PUMP CRANKCASE OIL LEVEL CHECK PROCEDURE IN THIS SECTION FOR THE CORRECT PROCEDURES FOR CHECKING THE CRANKCASE OIL.

- Check for obvious loose mounting nuts and bolts.
- Inspect all hoses, fittings, valves and seals for leaks and proper operation. Repair or replace leaking or malfunctioning components before operating the system.
- Make sure cooling water is flowing to the plunger packing seals when the charge water is activated. Constant water flow is essential to lubricate and cool the seals. Adjust flow with the metering valves or replace packing if necessary.
- Make sure the cooling water sump and drain are clean for proper drainage.
- Check for water dripping from the UHP Pump manifold weep holes during the high pressure test. Water dripping from the square holes indicates the face seals are leaking. Water leaking from round holes indicates the high pressure seals are leaking. Find and correct the problem before waterblasting.
- Test the diverter (dump) valve for proper operation daily. Never operate the system if the dump valve is not working properly.
- Test the manual bypass valve and make sure it is operating properly.

UHP Pump & Packing Lube Metering Valves



UHP Pump Weep Holes



UHP Pump Packing Lube Lines & Sump

100 Hour Maintenance

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

- Change crankcase lubricating oil after the first 100 hours when the pump is new and every 500 hours thereafter.
- Service the UNI-VALVES. Refer to High Pressure Pump UNI-VALVE Service in this manual and the high pressure pump operation and maintenance manual for instructions and additional information.

Important:
Make sure to install the safety plug in crankcase drain valve when oil draining is complete. The safety plug prevents crankcase oil from draining if the valve is accidentally opened.

200 Hour Maintenance

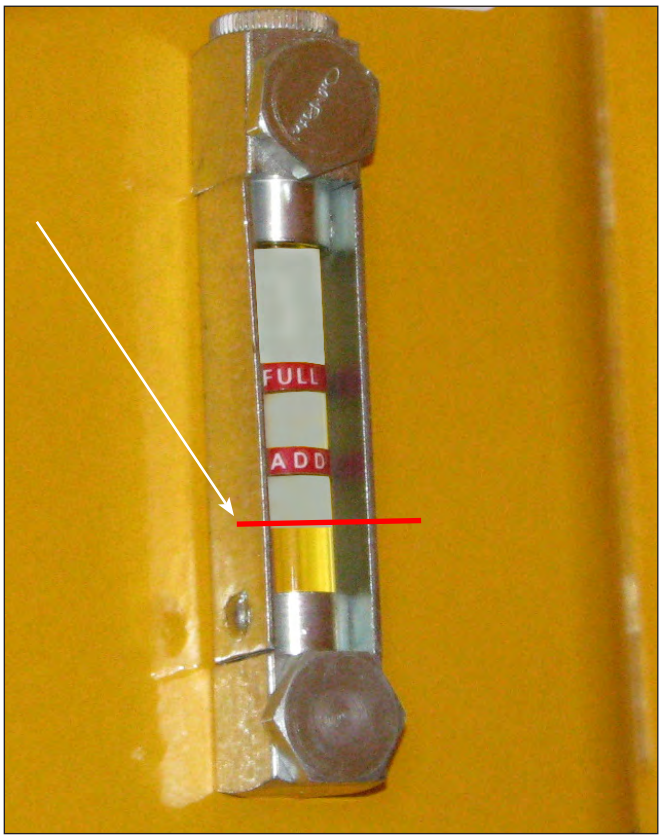
Perform all daily and 100 hour maintenance along with the items outlined in this section.

- Check pulley clearances and drive belt tension.
- Check and tighten all mounting bolts and hardware.
- Check and tighten plunger coupling bolts.
- Inspect and lubricate the diverter valve to keep it operating properly.
- Inspect and lubricate the manual bypass valve to keep it operating properly.

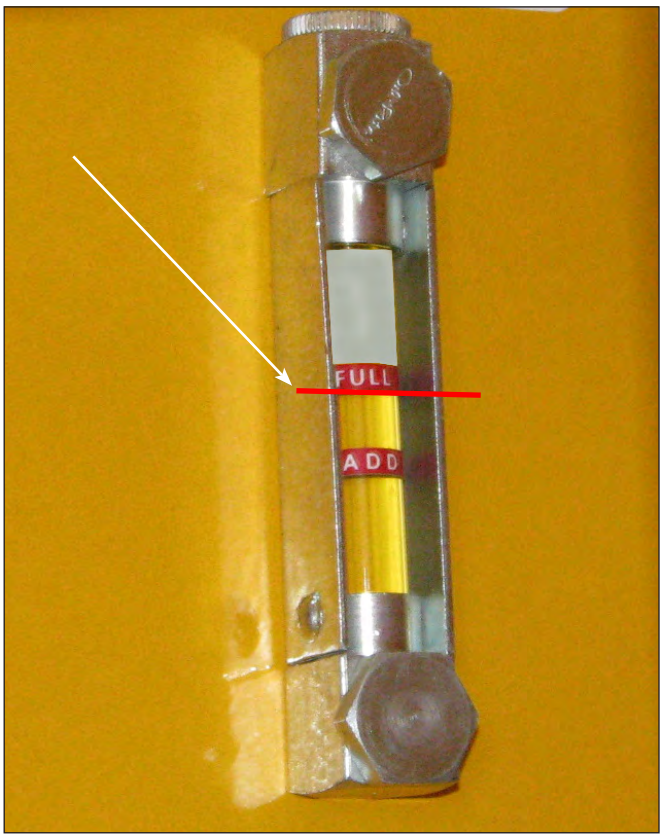
500 Hour Maintenance

Perform all daily, 100 and 200 hour maintenance along with the items outlined in this section.

- Change crankcase lubricating oil.



Crankcase Oil Level - Pump Running



Crankcase Oil Level - Pump Shutdown 5 To 8 Hours

5.5 Checking UHP Pump Oil Level & Changing Crankcase Oil

Checking Oil Level

Jetstream ultra high pressure pumps have specific procedures for checking the crankcase oil while the pump is operating and when it is shutdown. Following the correct procedure is critical to maintaining the correct oil level and to prevent the possibility of overfilling the crankcase, which will damage the pump.

The pump power end uses a splash/gravity oil circulation system for internal lubrication and oil distribution. The crankcase has an upper sump that is filled by the splashing action of the crankshaft as it rotates. Oil slowly drains from the upper sump through small holes which provide lubrication to certain components that would not be properly lubricated otherwise.

The upper sump holds a large volume of oil that drains very slowly back into the main sump. Consequently, there is a significant difference in the oil level while the pump is operating and when it is shutdown. It takes 5 to 8 hours for oil in the upper sump to completely drain to the main sump after the pump is shutdown. As a result, the pump must sit overnight before an accurate crankcase oil level is indicated in the sight glass when the pump is not operating.

Because of the crankcase design, the most accurate way to check the oil level during operation is while the pump is running. The following section outlines the procedures for checking the crankcase oil level with the pump running or when the pump is shutdown. Always make sure the truck is parked on level ground with the wheels blocked before checking the crankcase oil level.

Crankcase Oil Level - Pump Operating:

1. Make sure the crankcase oil level is at the full mark, then turn the 40K Clutch ON to activate the high pressure pump.
2. Operate the pump for 20 to 30 minutes to allow the upper sump to fill and the oil level in the main sump to stabilize.

3. With the pump still engaged, reduce the engine RPM to idle and check the oil level in the sight gauge. The oil level should be half way between the ADD mark and the bottom of the sight gauge.
4. If the oil level is near the bottom of the sight gauge, oil must be added to the crankcase.

Crankcase Oil Level - Pump Not Operating:

1. Make sure the pump has been shutdown for at least 5 to 8 hours or overnight.
2. Check the oil level in the sight gauge. The oil level should be right at the FULL line.
3. If the oil level is less than half way between the FULL and ADD marks on the sight gauge, oil must be added to the crankcase.

Adding Oil

When oil is required it can be added through the breather port at the top of the crankcase or through the back plate fill port, depending on which port is most accessible on your unit. Always clean the area around the fill port before removing the plug to add oil to reduce the possibility of dirt and debris entering the crankcase when the fill plug is removed.

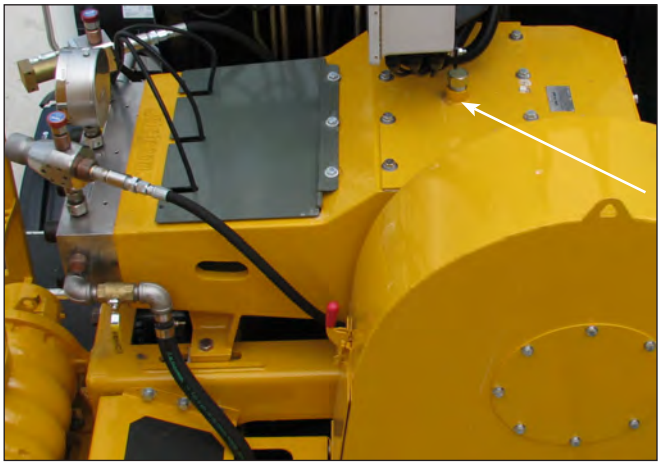
It is best to add oil using the back plate fill port when possible. The oil will be added directly to the main oil sump and the level will register immediately on the sight gauge. When the breather port at the top of sump is used, oil is added to the upper sump and it can take up to several hours before the oil will drain to the main sump and the correct oil level will be indicated on the sight gauge.

CAUTION

THE FOLLOWING PRECAUTIONS APPLY TO AVOID DAMAGE TO THE PUMP:

- **NEVER RUN THE PUMP WHEN THE OIL LEVEL IS BELOW THE ADD MARK OR NOT VISIBLE IN THE SIGHT GAUGE.**
- **DO NOT OVERFILL OIL SUMP.**
- **ONLY USE A HIGH GRADE, NON DETERGENT 80W90 GEAR OIL IN JETSTREAM PUMPS.**
- **JETSTREAM PUMPS DO NOT CONSUME OIL DURING OPERATION. A SIGNIFICANT LOSS OF OIL IS AN INDICATION OF A LEAK SOMEWHERE IN THE PUMP CRANKCASE. OIL LEAKS NEED TO BE REPAIRED AS SOON AS POSSIBLE IN ORDER TO PROTECT THE ENVIRONMENT AND THE PUMP.**

Back Plate Fill Port - Preferred Oil Fill Location



Breather Port - Alternate Oil Fill Location

WARNING

OPERATING THE PUMP LOW ON OIL WILL CAUSE SEVERE DAMAGE TO THE POWER END OF THE PUMP.

UNDER NO CIRCUMSTANCES SHOULD YOU RUN THE PUMP IF THERE IS NO OIL SHOWING IN THE SIGHT GAUGE.

Changing Crankcase Oil

The crankcase is filled with 80w90 high grade non detergent gear oil that is a high viscosity and flows slowly at room temperature or below. Since many crankcases hold up to 9 gallons (34 liters) of oil, it is best to operate the pump long enough to raise the temperature of the oil to normal operating temperature before draining the oil.

Draining the crankcase oil:

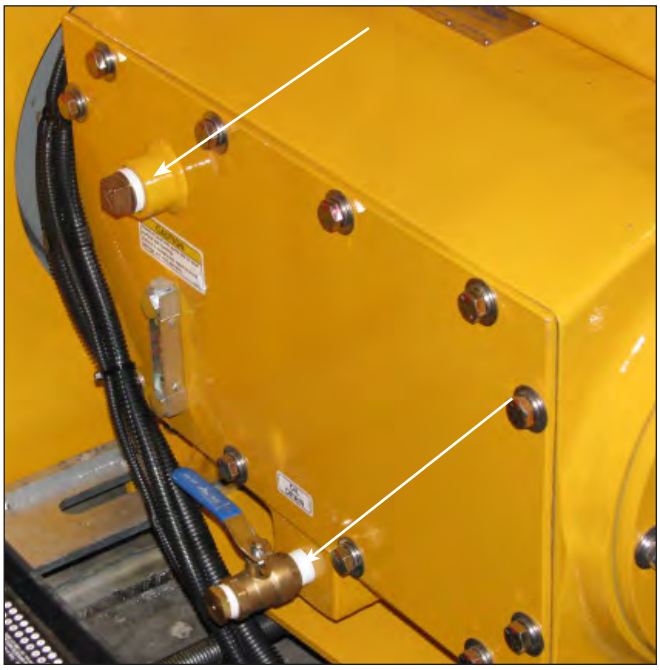
1. Make sure the waterblasting system is shut-down with the truck in the service position.
2. Remove the safety plug at the oil drain ball valve fitting.
3. Attach a drain hose to the ball valve fitting and route the hose to a suitable waste oil container capable of handling at least 10 gallons (38 liters) of oil.
4. Open the drain valve and drain the oil.
5. When draining is complete, close the valve and insert the safety plug. Make sure the safety plug is clean to avoid contamination. Tighten the plug to specifications.
6. Wipe up any spilled oil and properly dispose of the waste oil and oil soaked rags.

Crankcase Oil Drain Valve & Safety Plug

Filling the crankcase with fresh oil:

When refilling the crankcase oil can added through the breather port at the top of the crankcase or through the back plate fill port, depending on which port is most accessible on your unit. Always clean the area around the fill port before removing the plug to add oil to reduce the possibility of dirt and debris entering the crankcase when the fill plug is removed.

We recommend that the back plate fill port be used to fill the crankcase whenever possible. The oil will be added directly to the main oil sump and the level will register immediately on the sight gauge. When the breather port at the top of sump is used, oil is added to the upper sump and it can take up to several hours before the oil drains to the main sump and the correct oil level is indicated on the sight gauge.



Back Plate Fill Port - Preferred Oil Fill Location
Crankcase Oil Drain Valve

1. Clean the area around the back plate fill port and remove the plug.
2. Make sure the drain valve is closed and the safety plug is installed in the valve fitting and tightened.
3. Add the recommended amount of high grade, non-detergent, 80w90 gear oil to the crankcase. Refer to the pump manufacturer's Operation and Maintenance manual and/or the Maintenance Matrix in this chapter for the correct quantity of gear oil.
4. Verify the crankcase oil level when filling is complete following the instructions for checking the oil level in the previous section of this chapter.
5. Make sure the fill plug is clean and insert the plug into the filler port. Tighten the plug to specifications.
6. Wipe up any spilled oil and properly dispose of the waste oil and oil soaked rags.

5.6 High Pressure Pump UNI-VALVE Service

The UNI-VALVE cartridges will require service every 100 hours or if the following conditions are present:

- Water leakage appears at weep holes in the top of the manifold.
- Pump discharge is pulsating or erratic with charge water pressure in the normal operating range.
- The valves are suspected as the cause of other poor pump performance symptoms.

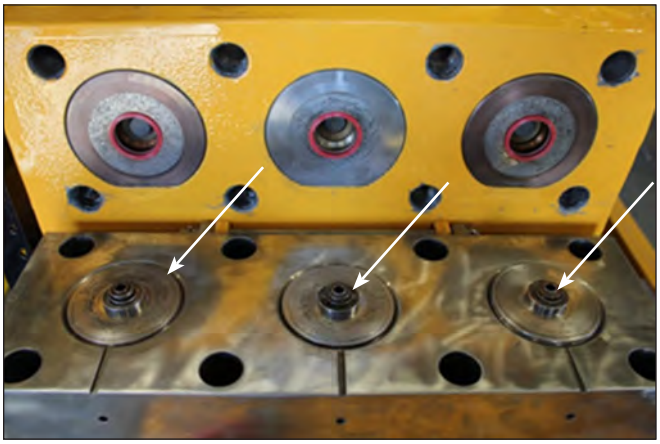
NOTICE:
ALWAYS CHECK FOR WATER DRIPPING FROM THE UHP PUMP WEEP HOLES DURING HIGH PRESSURE TEST. WATER DRIPPING FROM THE SQUARE HOLES INDICATES THE FACE SEALS ARE LEAKING. WATER LEAKING FROM THE ROUND HOLES INDICATES THE HIGH PRESSURE VALVE SEALS ARE LEAKING.

Removing UNI-VALVES:

1. Make sure the waterblasting system is shut-down with the truck in the service position.
2. Remove the valves using a 2 lb hammer and 7/8" Allen wrench (Jetstream tool) to loosen the 8 head bolts in an "X" pattern. Finish removing by hand or with an impact wrench.
3. Rotate the hinged UHP pump manifold until it is resting on the support.
4. There is a groove machined into each UNI-VALVE. Use two flat screwdrivers placed at opposite sides of the valve to extract each one.
5. Cover the manifold with a clean rag to protect the sockets from dirt and other contamination.

Installing UNI-VALVES:

1. Clean the valve sockets to make sure no dirt and debris enters the UHP pump.
2. Lubricate the sockets and UNI-VALVE cartridges with the grease provided in the Mobile Spare Parts System.



UNI-VALVES Installed In Head

Figure 1: A. Univalve Body & Seat - B. Suction Valve

3. Set the valve cartridge in place. Rock the cartridge slightly until it drops into position.
4. Use the palm of your hands and press equally on each side to press the valve cartridges into place.
5. Replace the face seal in each stuffing box. Use grease to help hold it in place during assembly.
6. Apply a thin coat of anti seize to the head bolt threads.
7. Carefully rotate the head into position, insert the head bolts and tighten finger tight.
8. Tighten the head bolts evenly in a crisscross sequence beginning with the center bolts. Tighten the bolts snug.
9. Finish tightening the head bolts in a crisscross sequence beginning with the center bolts using the 2 lb hammer and the 7/8" Jetstream tool. Hit the Jetstream tool 3 times with the hammer.

NOTICE:
IT IS A GOOD IDEA TO REMOVE THE UHP HOSE AND FLUSH THE UHP MANIFOLD WITH WATER BEFORE SETTING PRESSURE

Lapping Valves And Seats

The suction valve seat surfaces in the UNI-VALVE cartridges should be lapped every 100 hours to remove small pits or grit inclusions as preventative maintenance. Slight damage in the seating surface can also be repaired with the lapping procedure.

Lapping a valve to the seat creates a unique suction valve to UNI-VALVE cartridge seat seal. If the valve is moved to another cartridge, it must be lapped to that seat for a proper seal.

Disassemble and lap the valve and seat of one UNI-VALVE cartridge at a time to keep the parts with that cartridge. Always inspect the valve cartridge for damage, then separate the suction valve from the cartridge and lay the parts out on a clean surface. Inspect them thoroughly for damage. If any component is cracked or badly pitted or worn, it will have to be replaced. Refer to the legend in this section for descriptions of wear, damage and imperfections that will need to be addressed.

If the suction valve and seat are in acceptable condition or a new cartridge and suction valve is being installed, use the following procedure to lap the valve and seat.

Lapping the seating surfaces:

1. Separate the suction valve from the valve cartridge.
2. Carefully inspect the valve seat and the suction valve to make sure they are in acceptable condition.
3. Apply approximately 1/8 teaspoon of 600 grit lapping compound to the valve seat and spread evenly.
4. Hold the body of the UNI-VALVE cartridge (A) in one hand and the suction valve (B) in the other. Figure 1.
5. Push the two parts together.

LEGEND

Shiny Line	Indicates a cut or a crack
Cuts caused by a leak	Can be lapped if not too deep
Cracks in the univalve	Cannot be repaired, replace the univalve
Shiny dot is a pit caused by calcium	Can be lapped out
"V" shape on top of a hole	Can be lapped out, check the inner wall of the univalve for damage

Figure 2: A. Univalve Body - B. Suction Valve Valve Cartridge Rotated 90⁰ Counterclockwise

Figure 3: A. Univalve Body - B. Suction Valve Suction Valve Rotated 90⁰ Clockwise

6. Use approximately 5 lbs of pressure on the suction valve (B), and rotate it 180 degrees clockwise, then 180 degrees counterclockwise on the valve cartridge seat (A).
7. Each 180 degree clockwise/180 degree counterclockwise movement is considered one rotation. Complete 5 rotations.
8. Rotate valve cartridge (A) 90 degrees counterclockwise while maintaining the position of suction valve (B). Repeat steps 6 and 7. Figure 2.
9. Rotate suction valve (B) 90 degrees clockwise while maintaining the position of valve cartridge (A). Repeat 6 and 7. Figure 3.
10. Rotate valve cartridge (A) 90 degrees counterclockwise while maintaining the position of suction valve (B). Repeat steps 6 and 7. Figure 4.
11. Continue steps 6-9 for 2 minutes at about 120 rotations per minute.

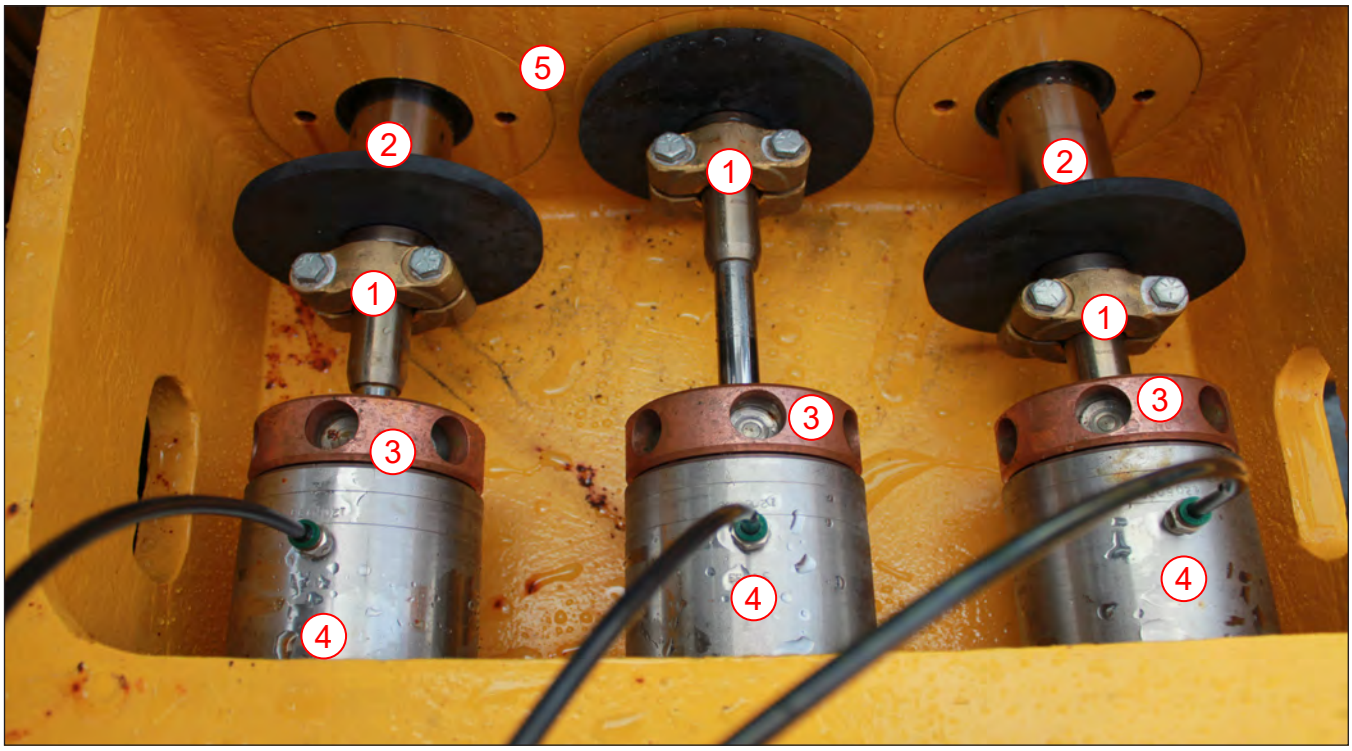
Figure 4: A. Univalve Body - B. Suction Valve Valve Cartridge Rotated 90⁰ Clockwise

12. Remove the suction valve and clean both pieces thoroughly with brake cleaner. Be sure to thoroughly clean the holes in the UNI-VALVE to ensure no debris can get in the new grit. Blow off the components with compressed air after cleaning them with brake cleaner.

Steps 3-11 = One Cycle

12. Inspect the sealing surfaces on both pieces very carefully to determine whether to stop or to complete another cycle. The shiny places are evidence of damage and/or wear. Consult the legend to determine the cause and indications of typical wear patterns
13. If additional cycles are required, apply 1/8 teaspoon of 150 grit lapping compound to the suction valve, then repeat steps 3-12 until the shiny spots are no longer visible and the surface is perfectly smooth with a consistent color.
14. Alternate grit sizes every 3 or 4 cycles until lapping is complete. The final cycle should always be completed with 600 grit compound.
15. Follow the same procedure for the discharge valve on the other side of the UNI-VALVE cartridge.
16. Reassemble the UNI-VALVE with new O-rings and seals.
17. Lubricate the O-rings and seals with the grease provided in Mobile Spare Parts System box # 2.
18. Reinstall the UNI-VALVE cartridges into the manifold.

NOTICE:
NEVER USE DRY COMPOUND WHEN LAPPING UNI-VALVES. KEEP 3 FULLY LAPPED UNI-VALVES ON HAND TO AVOID DOWNTIME. NEVER USE UNAPPROVED MACHINERY SUCH AS DRILLS TO SPEED UP THE LAPPING PROCESS.



Jetstream Ultra High Pressure Pump Bilge

1. Plunger Coupling & Bolts
2. Pony Rods
3. Glandnuts
4. Stuffing Boxes
5. Power Frame

5.7 High Pressure Pump Stuffing Box Packing Replacement

The packing creates the seal at the ultra high pressure pump plungers in the stuffing boxes. When excessive water begins flowing through a stuffing box, the packing will need to be replaced.

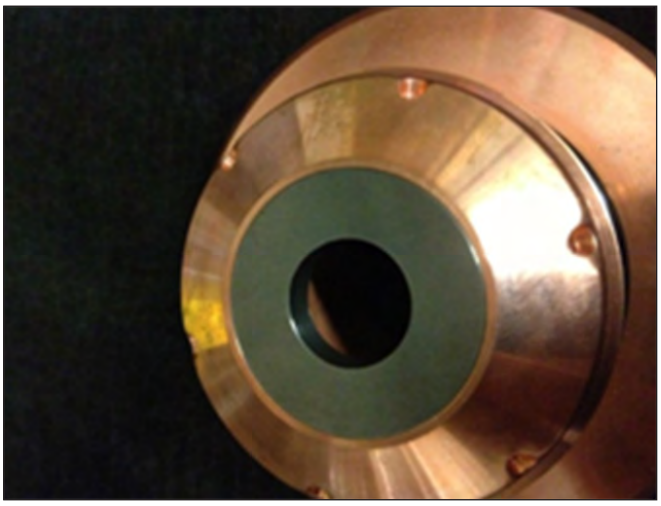
Typical Packing Replacement

The procedure in this section is for packing that is worn and leaking excessively, but is not stuck.

Use the following procedure to replace the packing:

1. Identify the stuffing box with the worn or damaged packing.
2. Turn off the 40K clutch, charge water pump and the waterblasting system. Then place the truck in the service position.
3. Rotate the high pressure pump drive pulley to move the pony rod all the way back against the power frame at the crank shaft end of the pump. This will provide the clearance required to remove the gland nut and plunger.
4. Use the 7/8” Allen wrench (Jetstream tool) supplied in the waterblasting tool system. Insert the round end wrench into the hole on the gland nut. Use a 2 lb hammer to hit the Jetstream tool in a counterclockwise direction to loosen the gland nut.
5. Use a ratchet wrench with a 9/16” socket to remove the brass plunger coupling bolts and nuts.
6. Remove the gland nut, plunger and packing assembly. If the packing will not come out, refer to the stuck packing removal procedure in this chapter.
7. Remove the old packing from the plunger. Then clean debris out of the stuffing box and the lubrication holes in the gland nut.
8. Check the carbide guide bushing for nicks, cracks, breaks or excessive wear. Replace if necessary.

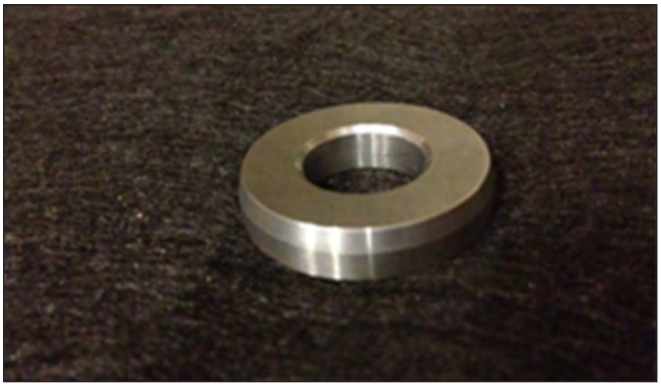
Stuffing Box, Glandnut, Packing & Pony Rod



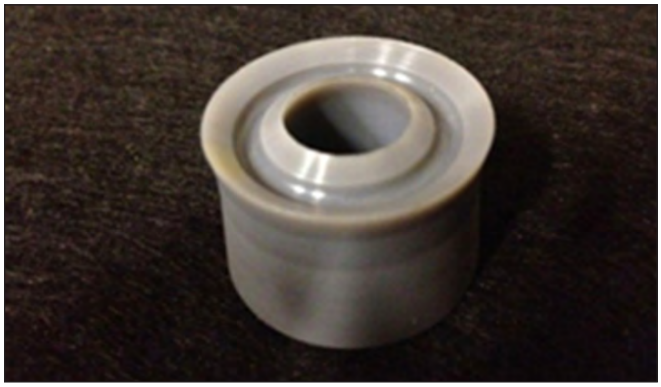
Guide Bushing & Carbide Ring

9. Check the plunger for scoring and wear. Polish or replace if necessary.
10. Reinstall the guide bushing in the gland nut and apply anti-seize to the gland nut threads.
11. Insert the plunger fully into the gland nut. Be careful to not dislodge the guide bushing.
12. Install new packing onto the plunger. Push it tight against the guide bushing.
13. Carefully install the plunger, packing and gland nut assembly into the stuffing box
14. Hand tighten the gland nut. Then insert the Jetstream Tool into the gland nut and hit the tool three times with the hammer in a clockwise direction to tighten.
15. Slide the plunger back against the pony rod. Reinstall the plunger coupling to the plunger and pony rod. Make sure both halves of the plunger coupler face the same way.

Plunger



Carbide Ring



Packing

16. Tighten the coupler bolts evenly to specifications.
17. Activate the truck and shift it to Operate Mode. Then activate the waterblasting system.
18. Turn on the charge water pump and verify that the lubrication water is flowing normally. Use the metering valves to adjust water flow to the packing if necessary.
19. Verify proper operation.

Stuck Packing Replacement Procedure

Use this procedure to free the packing when it is stuck in the stuffing box and attempts to remove it following the standard procedure have failed.

NOTICE:
THE STEPS IN THIS PROCEDURE SHOULD ONLY BE PERFORMED AS A LAST RESORT. IT WILL REQUIRE THE TRUCK TO BE PLACED IN OPERATE MODE WITH THE WATERBLASTING SYSTEM ACTIVATED BY FOLLOWING THE STEPS IN THE START UP PROCEDURE.

1. Perform steps 1 thru 6 in the typical packing replacement procedure.
2. Thread the gland nut back into the stuffing box 3 full turns. Make sure at least 3 threads are engaged in the stuffing box.
3. Pull the plunger out until it is against the pony rod. It is important for the plunger to be against the pony rod to prevent damage to the plunger from being forced out of the stuffing box suddenly by charge water pressure which will be activated in the next step.
4. Make sure both water supply valves are open and all personnel are clear of all waterblasting components. Activate the truck and waterblasting system following the steps in the Startup Procedure. ***Do not activate the 40K clutch.***
5. Make sure all personnel are well clear of all waterblasting components and turn on the charge pump for 5 seconds then turn it off.
6. Shutdown the water blasting system and the truck engine.
7. Remove the gland nut from the back of the stuffing box. The charge water pressure should have pushed the damaged packing out.
8. If packing is still stuck, repeat steps 1 through 7. The damaged packing is usually pushed out on the first try, however, several attempts may be required in some cases.

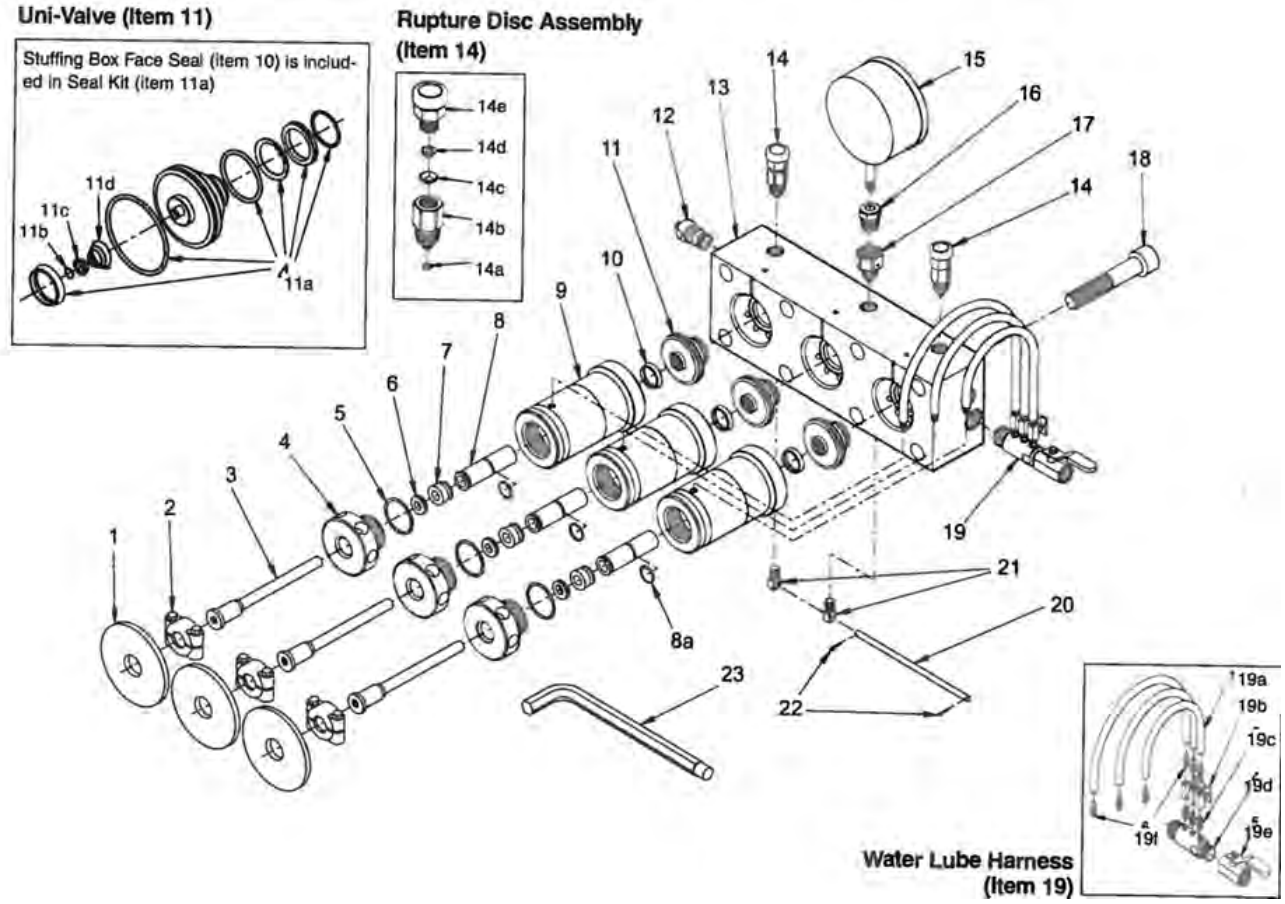
NOTICE:
IF THIS OPTION FAILS, THE HIGH PRESSURE MANIFOLD WILL NEED TO BE OPENED TO REMOVE THE STUFFING BOX AND EXTRACT THE PACKING.

Once the packing has been removed from the stuffing box, continue with steps 6 thru 19 in the typical packing replacement procedure.

⚠ DANGER ⚠

ENGAGING THE 40K CLUTCH DURING THE STUCK PACKING PROCEDURE WILL CAUSE SEVERE DAMAGE TO THE GLAND NUT, STUFFING BOX AND PLUNGER. IT COULD ALSO RESULT IN INJURY TO PERSONNEL. ALWAYS MAKE SURE THE 40K CLUTCH IS NOT ACTIVATED AT ANY TIME DURING THE STUCK PACKING REMOVAL PROCEDURE.

5.8 Ultra High Pressure Pump Assembly



ITEM	PART NUMBER	DESCRIPTION
1	K26488	Deflector
2	K51737	Plunger Coupling
3	K53562	#6 Plunger
	K53563	#7 Plunger
	K53564	#8 Plunger
4	K54102	Gland Nut
5	K26465	O-ring
6	K27480	#6 Guide Bushing
	K27481	#7 Guide Bushing
	K27482	#8 Guide Bushing
7	K54117	#6 Packing
	K54118	#7 Packing
	K54119	#8 Packing
8	K54097	#6 Sleeve

Ultra High Pressure Pump

ITEM	PART NUMBER	DESCRIPTION
	K54098	#7 Sleeve
	K54099	#8 Sleeve
8a	K26523	O-ring
9	K54100	Stuffing Box
10	K54126	Stuffing Box Seal
11	K53496	Uni-Valve
11a	K54144	Seal Kit
11b	K27538	Retaining Ring
11c	K55232	Spring Retainer
11d	K27510	Spring
12	K53673	7/8” Type “M” Male
13	K53457	Manifold
14	K53506	Rupture Disc Holder
14a	K27503	O-ring
14b	K53577	Base
14c	K27485	Disc, 50,000 psi burst pressure
	K27486	Disc, 56,000 psi burst pressure
14d	K53579	Hold down Ring
14e	K53580	Cap
15	K27489	Gauge (0-60,000 psi)
16	K28091	Anti-vibration Gland Set
17	K53573	Adapter, Male Port x 9/16” HP Female
18	K26501	Manifold Bolt
19	K53796	Water Lube Harness
19a	K26470	Hose (order in feet)
19b	K27476	Needle Valve
19c	K26466	Nipple
19d	K53793	Lube Manifold
19e	K27102	Ball Valve
19f	K26875	Hose Fitting
20	K50296	Trunnion Rod
21	K51660	Trunnion
22	K26469	Cotter Pin
23	K50890	Pump Wrench

5.9 Diverter Valve Assembly

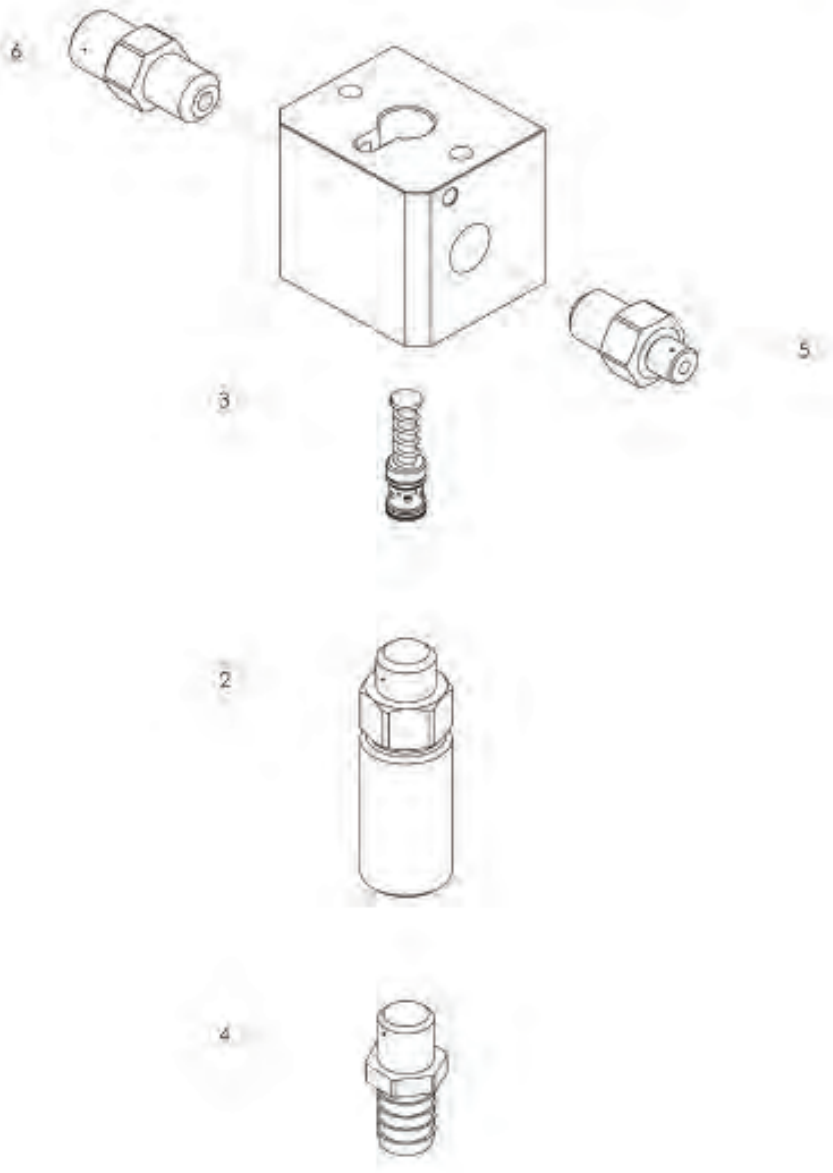
The diverter valve should be inspected and lubricated every 200 hours to keep it operating properly. Replace components as required.

Diverter (dump) Valve Repair

(Hydraulically operated)

1. Remove diffuser tube (2) with cartridge (3). Remove cartridge (3) from slotted end and replace with a new cartridge (3). Replace diffuser tube (2) into valve body (1).

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	K53547	BODY
2	1	K51865	DIFFUSER
3	1	K53476	C-40 CARTRIDGE
4	1	K25797	HOSE FITTING
5	1	FT916HPX5mm	HOSE FITTING
6	1	FT916HPX78	HOSE FITTING

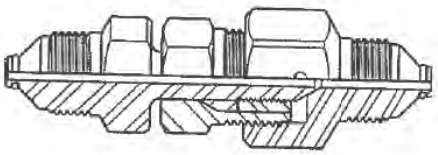


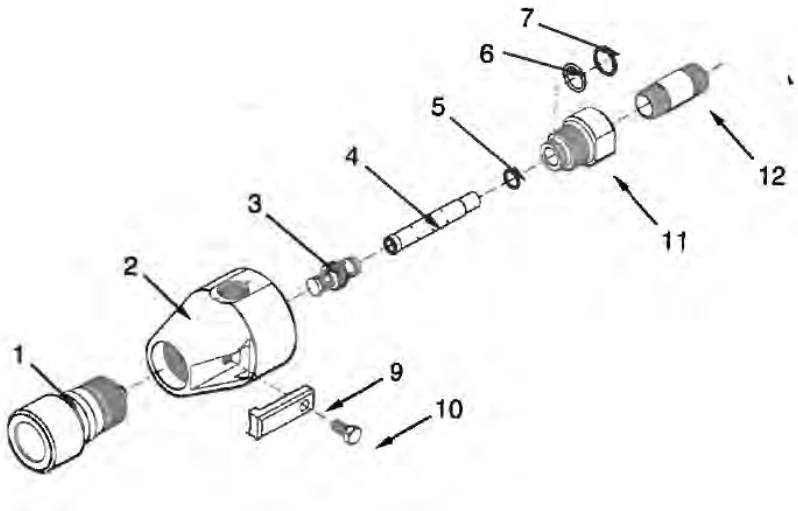
5.10 Manual Bypass Valve

The manual bypass valve should be inspected and lubricated every 200 hours to keep it operating properly. Replace components as required.

Manual Bypass Valve Repair

1. Remove outlet adapter (11). Pull cartridge (3) out. If cartridge (3) is stuck together and not releasing pull the pin and cartridge body apart to inspect the seats for cuts and other damage. Replace the cartridge as necessary.
2. Check diffuser (4) for damage or wear from bypass water.
3. Check all O-rings, replace any that are damaged. Lubricate all O-rings with silicone lubricant.
4. Replace cartridge (3) and reassemble to the bypass valve body (2) making sure to anti-seize all stainless steel threads.





ITEM	PART NUMBER	DESCRIPTION
1	K52145	Adjustment Knob
2	K53714	Body
3	K53726	Cartridge
4	K53727	Diffuser
5	K26453	O-ring
6	K27642	O-ring
7	K53725	Backup Ring
9	K50796	Latching Arm
10	K25594	CapScrew
11	K53720	Outlet Adapter
12	K27645	Nipple
Not Shown	K25933	Outlet Hose (Order in Feet)

5.11 Vacuum Blower Scheduled Maintenance

Blower and Filter Canister

The vacuum blower operates at an extremely high RPM and has specific lubrication and maintenance requirements. It is also very susceptible to damage from debris because of the tight tolerances in the blower impellers. Refer to the Maintenance Matrix in this section and the blower manufacturer's operating manual for lubrication specifications and maintenance schedules.

Be sure the vacuum filter is always in good operating condition so it fully protects the blower from collecting vacuumed debris internally. If paint debris ever gets into the blower impellers, use a paint or lacquer thinner or other non-corrosive cleaner to remove any residue build-up inside. It will be necessary to remove the silencer in order to clean the blower. Remember that if large debris gets into the blower, it can cause severe damage to the blower. Refer to Vacuum Canister & Filter in the General Maintenance section of this manual for instructions on maintaining the vacuum system and cleaning the filter.

Daily Inspection and Maintenance

- Check for obvious loose mounting nuts and bolts.
- Check the oil level in the gear end of the blower. It should be within 1/4" of the overflow plug threads.
- Grease blower drive end bearings with the lubricant recommended by the blower manufacturer.
- Clean the vacuum filter before each shift and drain the filter canister at least once every 2 hours of operation. Filters may be cleaned with a pressure washer up to 2000 PSI (138 bars). A mild solvent solution may be used to clean thermoplastic or tar residue from the filter surface.
- Inspect the filter for holes or thin areas that could allow vacuumed water or debris to get into the vacuum blower or silencer. Clean, secure filtration is necessary to keep your vacuum blower in good operating condition. Replace if necessary.
- Check the vacuum canister door seal. Clean or replace the seal if necessary.

100 Hour Maintenance (New Blower)

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

- Change blower gear case lubricating oil after the first 100 hours and every 500 hours thereafter. Service the blower as recommended in the blower operating manual.

Important:
Make sure to install the safety plug in crankcase drain valve when draining is complete. The safety plug prevents crankcase oil from draining if the valve is accidentally opened.

200 Hour Maintenance

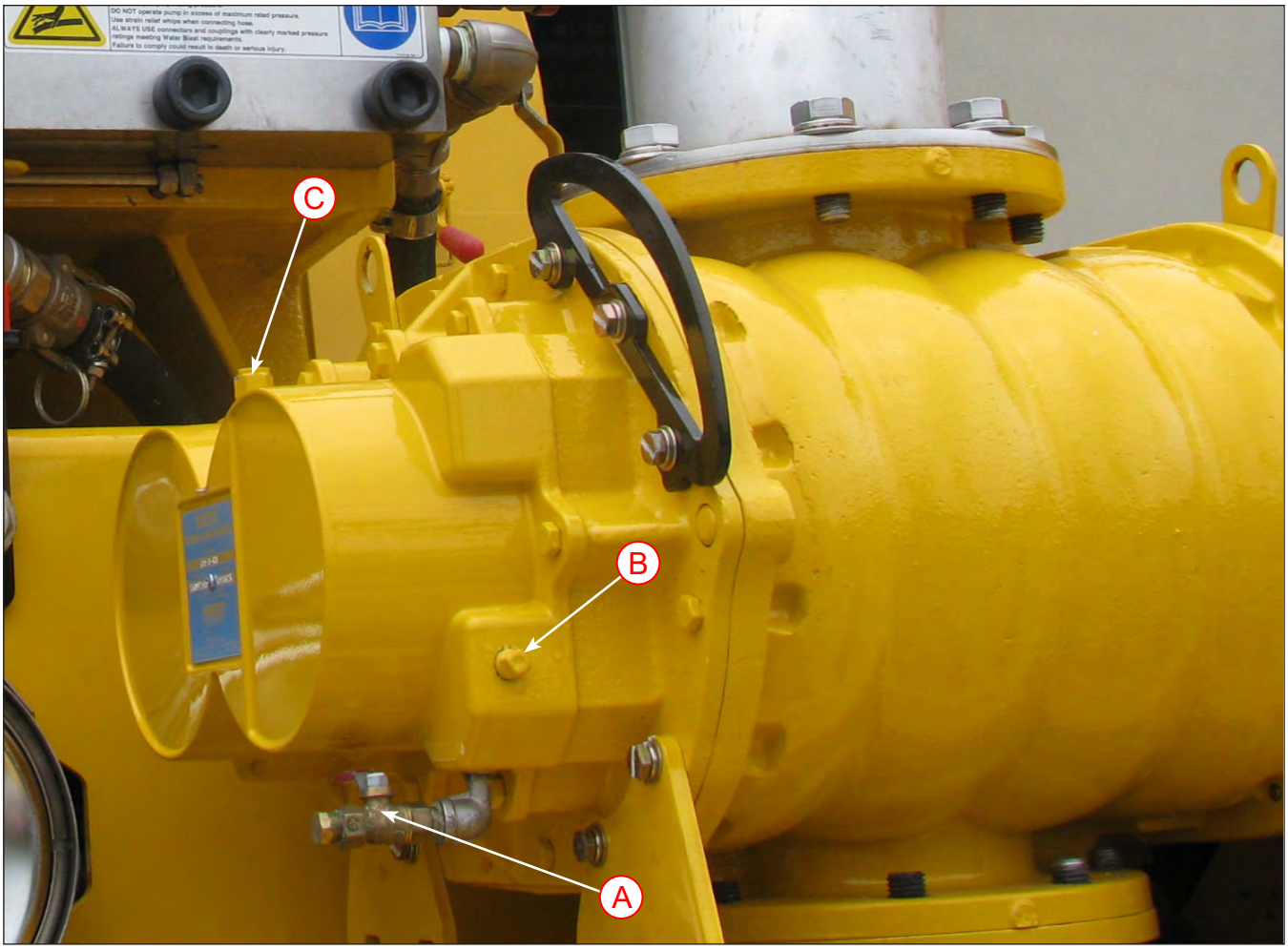
Perform all daily maintenance along with the items outlined in this section.

- Check pulley clearances and drive belt tension.
- Inspect and tighten all mounting bolts, hose clamps and hardware.
- Lubricate drain ball valves. Make sure to open and close all ball valves at least once every 200 hours to keep them free and operating properly.
- Inspect, clean and lubricate the vacuum relief valves to keep them operating properly.
- 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 120^0 to increase the life of the hoses.

500 Hour Maintenance

Perform all daily and 200 hour maintenance along with the items outlined in this section.

- Change blower gear case lubricating oil. Service the blower as recommended in the blower operating manual.



Typical Vacuum Blower Gear Case Drain, Oil Level & Oil Fill Plugs
A. Drain Valve & Safety Plug B. Overflow Plug C. Breather/Oil Fill Plug

5.12 Checking & Changing Blower Gear Case Oil

The blower gear case oil level should be checked daily or at least every 50 hours of operation. The oil should be changed every 500 hours.

When changing or checking the gear case oil, always clean the area around the breather and overflow plugs before they are removed. This will reduce the possibility of dirt and debris from entering the gear case when the fill plugs are removed.

Checking The Gear Case Oil Level

1. Make sure the waterblasting system is shutdown with the truck in the service position and on level ground.
2. Remove the overflow plug on the side of the gear case. The oil should be within 1/4" of the bottom of the plug threads.
3. If the oil is low, remove the breather plug and add oil until the oil level is even with the bottom of the overflow hole.
4. Replace the breather and overflow plugs. Tighten to specifications.

Changing the Gear Case Oil

Draining the gear case:

1. Make sure the waterblasting system is shut-down with the truck in the service position and on level ground.
2. Remove the safety plug at the oil drain ball valve fitting.
3. Attach a drain hose to the ball valve fitting and route the hose to a suitable waste oil container capable of handling at least 2 quarts (2.9 Liters) of oil.
4. Open the drain valve and drain the oil.
5. When draining is complete, close the valve and insert the safety plug. Make sure the safety plug is clean to avoid contamination. Tighten the plug to specifications.

Refilling the gear case:

1. Clean the area around the breather plug on the top of the gear case and remove the plug.
2. Make sure the drain valve is closed and the safety plug is installed in the valve fitting and tightened.
3. Add the recommended amount and type of gear oil to the gear case. Refer to the blower manufacturer's Operation and Maintenance manual and/or the Maintenance Matrix in this chapter for the correct quantity and type of gear oil.
4. Verify the gear case oil level when filling is complete following the instructions for checking the oil level in the previous section of this chapter.
5. Make sure the breather plug is clean and insert the plug into the port. Tighten to specifications.
6. Wipe up any spilled oil and properly dispose of the waste oil and oil soaked rags.

Vacuum Blower Drain Valve & Safety Plug

5.13 Blower & UHP Pump Drive Belt Adjustment Procedure

Checking Belt Tension

Check drive belt tension, pulleys and belt alignment every 200 hours. Adjust or replace as required. The proper way to check belt tension is to use a tension tester. While a simple spring scale type tester will do the job, the more sophisticated sonic tension meter is the only method recommended by Hog Technologies.

Make sure the waterblasting system is shutdown with the truck in the service position before checking the belt tension or adjusting the belts.

Using a sonic tension meter to check belt tension:

The sonic tension meter detects the vibration frequency in the belt span and converts that measurement into the actual static tension in the belt.

Begin by entering the belt unit weight, belt width and the span length. To measure the span vibration, press the "measure" button on the meter, tap the belt span while holding the microphone approximately 1/4" (.6 Mm) away from the back of the belt. The tension meter will display the static tension vibration frequency. If the frequency is lower than the minimum recommended frequency, the belt should be tightened. If it is higher than the maximum recommended frequency the belt should be loosened.

Blower Belt Tension Frequency Specifications:

- New Belt = 46-48 Hz
- Used Belt (more than 20 hours of operation) = 39-41 Hz

UHP Pump Belt Tension Frequency Specifications:

- New Belt = 61-63 Hz
- Used Belt (more than 20 hours of operation) = 52-55 Hz

NOTICE:
THE PROCEDURE IN THIS EXAMPLE IS FOR THE GATES SONIC TENSION METER. SONIC METERS FROM DIFFERENT MANUFACTURERS WILL REQUIRE PROCEDURES UNIQUE TO THOSE METERS.

Typical Gates Sonic Tension Meter

Blower Drive Belt Tension Adjustment

1. Loosen the four bolts on the slotted hoes on the mounting plate just enough to allow the plate to move. Make sure not to loosen them too much.
2. Rotate the adjusting bolts on each side of the blower mount equally to adjust the belt to the proper specification. Use a sonic tension meter to test for proper tension. (See specifications in this section)
3. Tighten the bolts on the slotted holes.
4. Start the engine, engage the PTO and activate the 40K clutch at idle speed for 30 seconds.
5. Deactivate the 40K clutch; disengage the PTO and shutdown the engine.
6. Check that the belt is riding on the center of the pulleys. If it is riding hard on either side of the pulleys, the blower will have to be aligned slightly using the mounting plate adjusting bolts. Repeat alignment and tension steps until the belt is set to the proper tension and centered on the pulleys.

Blower Mounting Plate Bolts

Blower Adjusting Bolts

NOTICE:
APPLY GREASE OR ANTI SEIZE TO THE THREADS OF THE BLOWER AND UHP PUMP ADJUSTING BOLTS EACH TIME THE BELTS ARE ADJUSTED TO HELP PREVENT CORROSION AND ENSURE THE ADJUSTING BOLTS WILL TURN WHEN ADJUSTMENT IS REQUIRED.

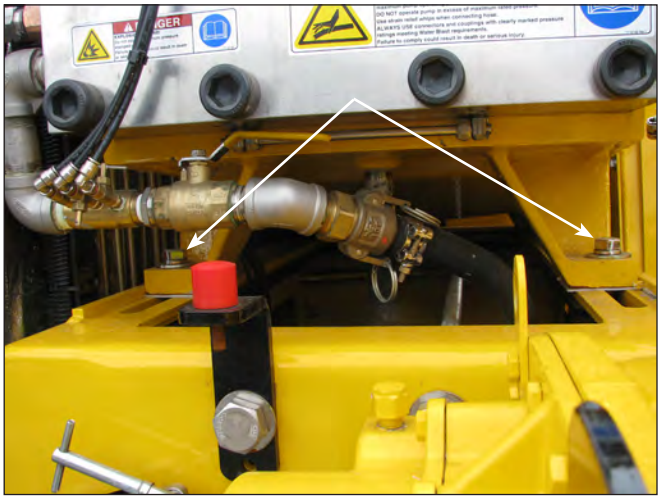
WARNING

THE DRIVE BELTS CAN CAUSE SEVERE DAMAGE TO PULLEYS, SHAFTS AND BEARINGS IF THEY ARE ADJUSTED TOO TIGHT OR MISALIGNED. THIS CAN CAUSE SEVERE DAMAGE TO DRIVE SYSTEM COMPONENTS AND INJURY TO PERSONNEL IF DAMAGED COMPONENTS ARE THROWN FROM THE MACHINE. ALWAYS MAKE SURE THE BELTS ARE PROPERLY ALIGNED AND SET TO THE BELT MANUFACTURERS SPECIFICATIONS WHEN THEY REQUIRE ADJUSTMENT. NEVER OVER TIGHTEN THE BELTS.

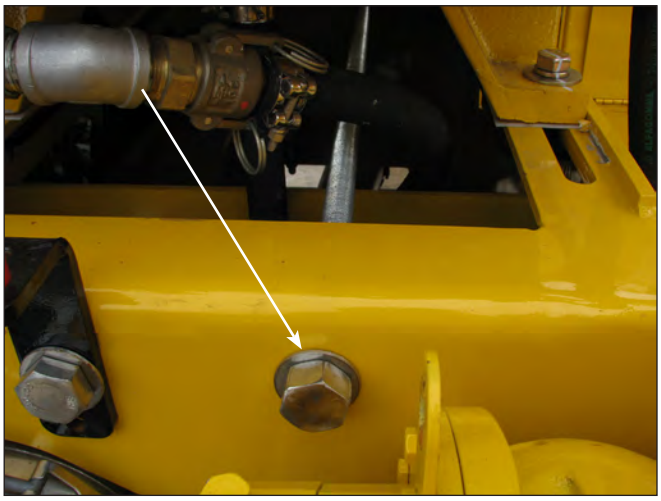
UHP Pump Drive Belt Tension Adjustment

1. Loosen the four bolts on the mounting legs of the UHP pump.
2. Turn the center adjusting bolt clockwise to tighten belt to proper tension.
3. Once you have achieved the proper tension tighten the UHP mounting leg bolts.
4. Recheck the belt tension once bolts are tightened.
5. Start the engine, engage the PTO and activate the 40K clutch at idle speed for 30 seconds.
6. Deactivate the 40K clutch, disengage the PTO and shutdown the engine.
7. Check that the belt is riding on the center of the pulleys. If it is riding hard on either side of the pulleys, the blower will have to be aligned slightly using the mounting plate adjusting bolts. Repeat alignment and tension steps until the belt is set to the proper tension and centered on the pulleys.

NOTICE:
APPLY GREASE OR ANTI SEIZE TO THE THREADS OF THE BLOWER AND UHP PUMP ADJUSTING BOLTS EACH TIME THE BELTS ARE ADJUSTED TO HELP PREVENT CORROSION AND ENSURE THE ADJUSTING BOLTS WILL TURN WHEN ADJUSTMENT IS REQUIRED.



UHP Pump Mounting Leg Bolts



UHP Pump Center Adjusting Bolt

5.14 Vacuum Hose Replacement & Rotation Procedure

Debris buildup, kinks, clogs or leaks in the system will cause a reduction in airflow at the blasting heads, reducing the 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 blasting heads 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 120^0 every 200 hours. Vacuum hoses should be inspected daily and replaced as needed.

Make sure the waterblasting system is shutdown 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.

Blast Head Vacuum Hoses

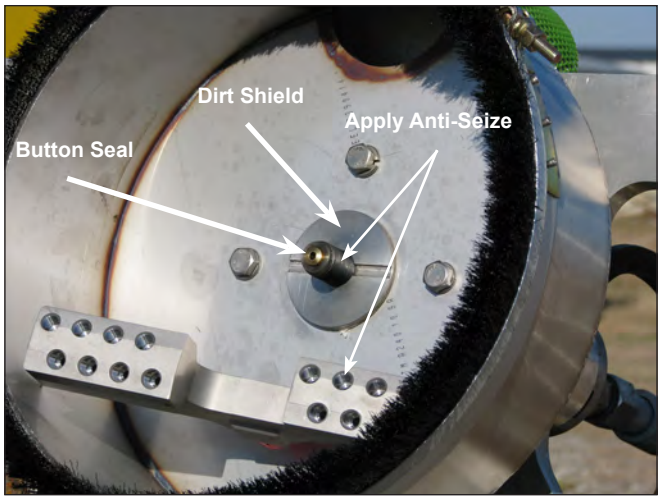
Vacuum Hose Replacement

1. Release the cam locks 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.

Vacuum Hose Rotation

1. Mark the position of the hose, then release the cam locks 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.

Shroud Installed



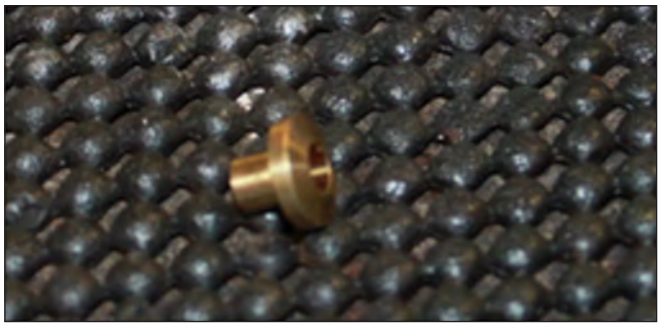
Spray Bar & Dirt Shield Components

5.15 Shroud Installation

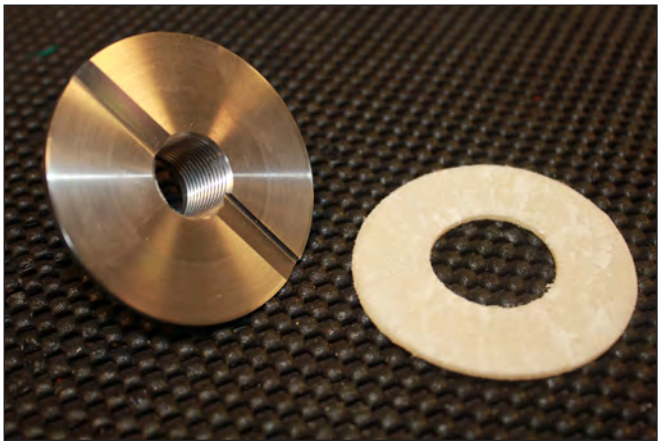
If the shroud becomes damaged, it must be replaced following the steps outlined in this section.

Removing the shroud:

1. Raise the Hog Arm and blasting heads to the full up position and lock them with the safety pin.
2. Make sure the waterblasting system is shutdown with the truck in the service position.
3. Remove the vacuum hose from the shroud.
4. Remove the spray bar protector.
5. Hold the thru-shaft with a 3/4" (19 mm) wrench inserted in the slot at the base of the thru-shaft motor to prevent it from turning.
6. Turn the spray bar counterclockwise by hand until it is free of the shaft.
7. Remove Brass button.
8. Use a stainless steel wire brush to clean the dirt from the thru-shaft threads.
9. While still holding the thru-shaft with the wrench, remove the dirt shield by turning it counterclockwise.
10. Remove felt seal. Then clean the dirt shield and shroud.
11. Loosen and remove the bolts holding the shroud in place.
12. Remove the shroud from the blast head.



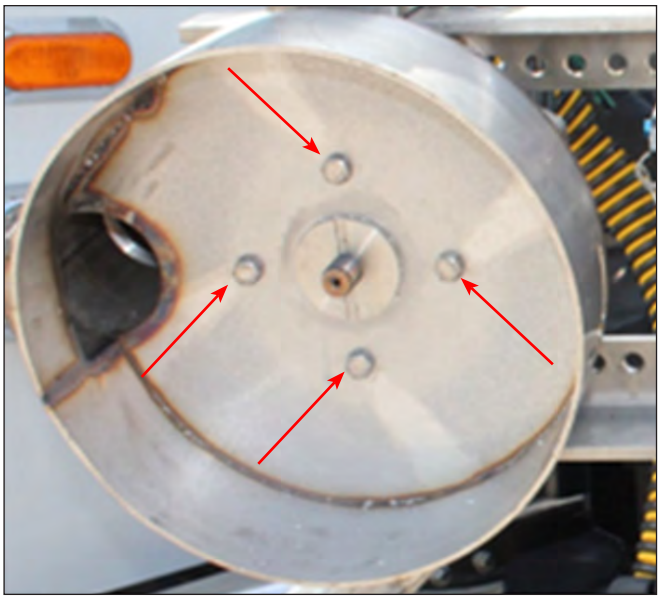
Typical Spray Bar Button Seal



Dirt Shield & Felt Seal

Installing a new shroud:

1. Clean the bottom of the thru-shaft motor housing of dirt and debris.
2. Place the new shroud on the housing and align the bolt holes. Insert the shroud bolts and tighten finger tight.
3. Clean the dirt shield and install a new felt seal.
4. Apply anti-seize to the thru-shaft shaft threads and hold the thru-shaft with the 3/4" (19 mm) wrench.
5. Install the dirt shield and seal. Adjust the shroud slightly if necessary to align the center hole in the shroud with the shoulder on the dirt seal.
6. Verify shroud alignment and hand tighten the dirt shield.



Shroud Mounting Bolts

NOTICE:
ONLY HAND TIGHTEN THE DIRT SHIELD. NEVER USE TOOLS TO TIGHTEN THE DIRT SHIELD. IF THE DIRT SHIELD IS TIGHTENED MORE THAN HAND TIGHT IT WILL CAUSE THE SPRAY BAR TO ROTATE SLOWLY OR NOT ROTATE AT ALL.

7. With the dirt shield installed, tighten the shroud bolts to specifications.
8. Activate the charge water system and purge the blast head at low pressure to remove debris that could clog the nozzles.
9. Shutdown the waterblasting system and return the truck to the service position.
10. Install a new brass button seal, hold the thru-shaft with the wrench and reinstall the spray bar.
11. 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.
12. Install the spray bar protector.
13. Reinstall the vacuum hose to the shroud.

Spray Bar Protector, Cotter Pin & Gasket

5.16 Hydraulic System Scheduled Maintenance

Hydraulic System

The hydraulic pump operates at very high pressure and has 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 Waterblasting and the hydraulic component manufacture'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.
- Check the pressure indicator on the high pressure filter and make sure it is well within the green zone. Change the filter cartridge when the indicator moves near or into the red zone.
- 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 at the hydraulic oil reservoir fill cap. The filter removes 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.

5.17 Changing Hydraulic Fluid & Flushing Tank

The reservoir tank is equipped with a removable clean out and inspection plate near the bottom of the tank. When the fluid is changed, the clean out plate should be removed to inspect the tank and remove any sludge or debris accumulated on the bottom. It also provides access to the strainers on the supply tubes. 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.

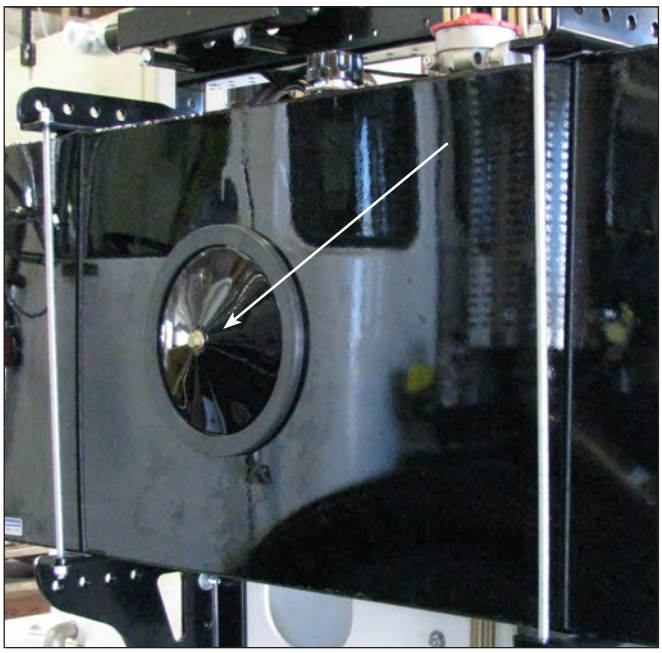
NOTICE:

- **BEFORE PERFORMING ANY MAINTENANCE PROCEDURE, MAKE SURE THE WATERBLASTING SYSTEM IS SHUTDOWN WITH THE TRUCK IN THE SERVICE POSITION AND ON LEVEL GROUND.**
- **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.
1. Remove the fill cap to allow air to enter the tank as the fluid drains.
2. Drain the tank into a suitable container by removing drain plug at the bottom of the tank.
3. When the tank is drained, loosen the bolt in the center of the inspection plate and remove the plate. Use a bright light to inspect for sludge buildup and other contamination.
4. Remove sludge and contaminates, then flush the tank until it is clean using fresh hydraulic fluid.
5. Clean the screens on the pickup tubes.

6. Flush the tank again with fresh fluid to remove contaminates from cleaning the screens. Then install drain plug.
7. Put a new seal on the inspection plate, coat the seal with hydraulic fluid and install the plate. Tighten the center bolt snug to secure the plate.
8. Add fluid until the tank is full. Monitor the fluid level using the sight gauge.
9. Replace the fill cap and tighten.



Typical Hydraulic Tank Inspection Plate

5.18 Replacing Hydraulic Filters

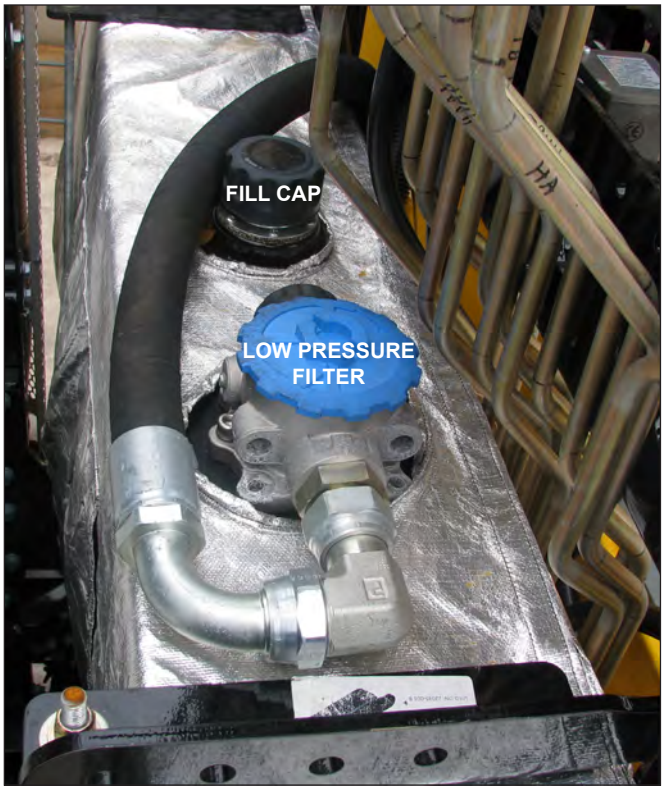
Before performing any maintenance procedure, make sure the waterblasting system is shutdown with the truck in the service position.

Low Pressure Filter

The low pressure filter is a cartridge type filter located at the top of the tank. Use the following procedure to change the filter.

Changing the low pressure filter element:

1. Rotate the filter cap counterclockwise to loosen and remove the cap.
2. Remove the dirty filter element from the canister.
3. Thoroughly clean the canister and insert the new element.
4. Install a new seal on the cap and lubricate the seal with hydraulic fluid.
5. Replace the cap and hand tighten.
6. Inspect the cap for leaks when the hydraulic system is activated.



Hydraulic Tank Low Pressure Filter & Tank Fill Cap

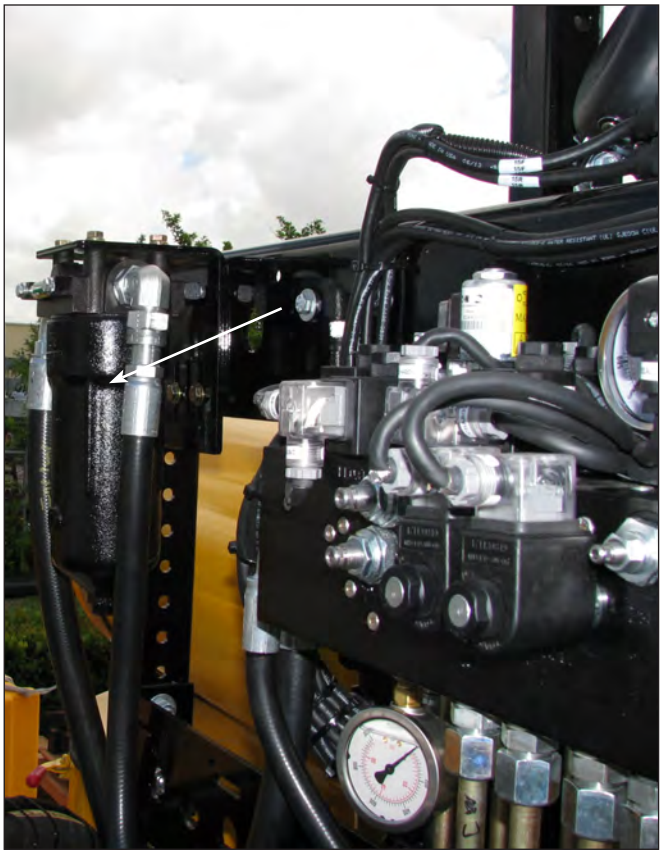
High Pressure Filter

The high pressure filter is a cartridge type filter located in a special high pressure canister. Use the following procedure to change the filter.

This filter is in the hydraulic system 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.

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.



High Pressure Filter

5.19 OMSI Drive

Maintenance schedules for the OMSI Drive and 40K Clutch are outlined in the OMSI Drive operating manual included with your SH8000. They should be followed exactly.

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

50 Hour Inspection and Maintenance

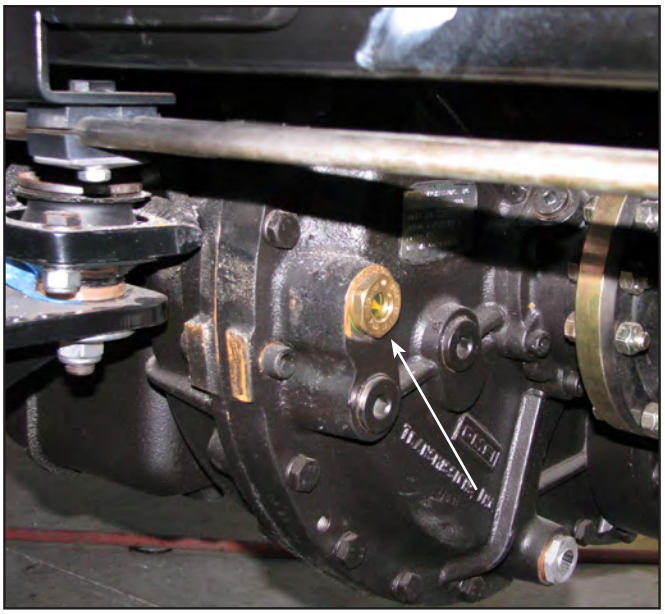
- Check fluid level in the OMSI Drive site glasses and inspect for signs of leakage. There are three site glasses, the main gearbox oil level on the passenger side near the frame, the hydrostatic drive oil level on the passenger side at the hydrostatic planetary and on the 40K clutch oil level on the forward passenger side of the OMSI Drive. Refer to the pictures in this section for the site glass locations and add fluid as required.
- Inspect components for loose bolts and make sure universal joints are tight.

100 Hour Inspection and Maintenance (New Units Only)

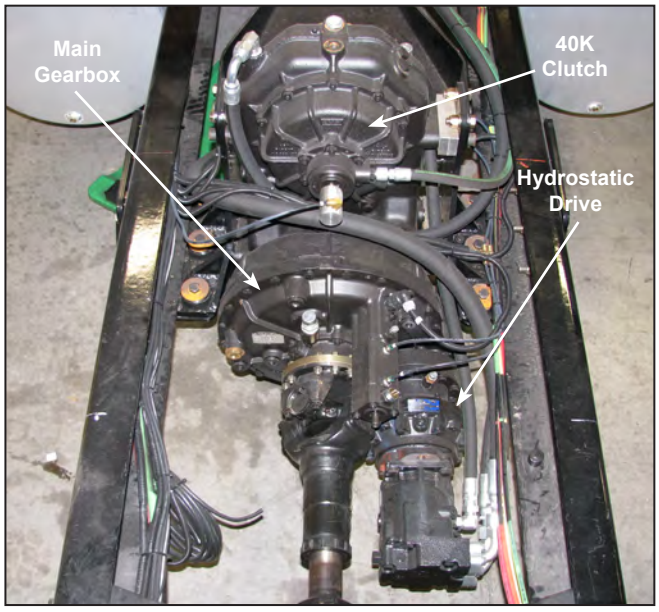
- Grease drive shaft splines and universal joints.
- Change fluid in OMSI Drive components as recommend in the operators manual.

200 Hour Inspection and Maintenance:

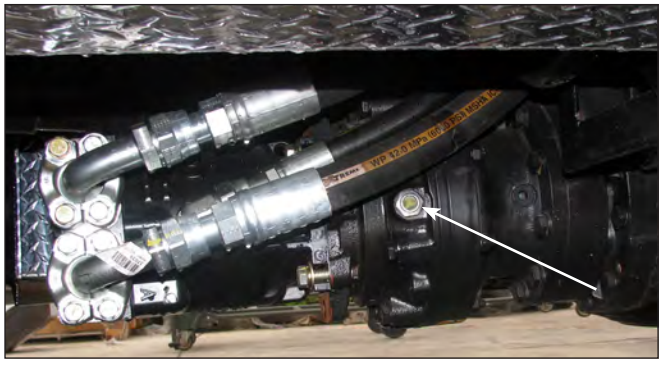
- Grease drive shaft splines and universal joints.
- Change fluid in OMSI Drive components as recommend in the operator's manual.



OMSI Drive Main Gearbox Oil Level Site Glass



OMSI Drive Component Site Glass Locations



Hydrostatic Drive Gearbox Oil Site Glass

40K Clutch Sight Glass

5.20 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.

Water freezing in the pump, vacuum system, and fittings will expand, causing irreparable damage to components.

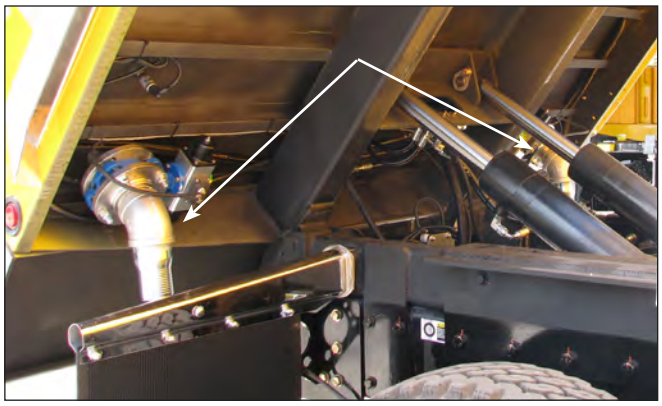
Vacuum System Shutdown & Winterizing

Water freezing in vacuum system components can cause serious damage to the blower, silencer, filter canister, drain valves and other vacuum system components. It is important to follow the proper procedure when shutting down the vacuum system during cold weather operations or winter storage to ensure accumulated water is removed from critical areas in the system.

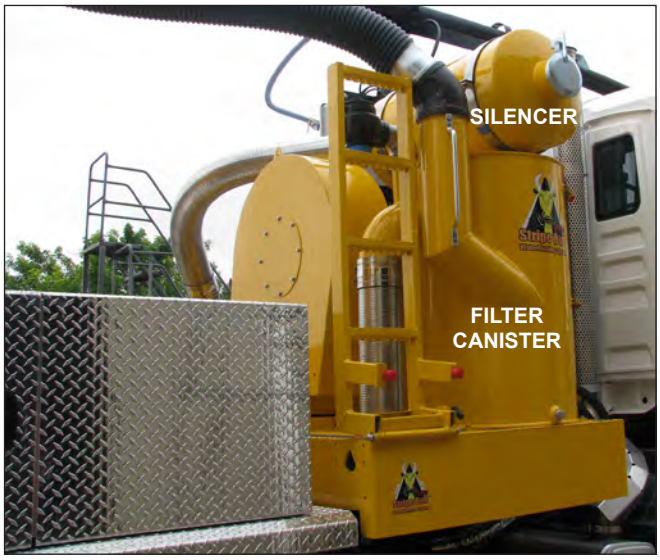
Use the following procedure to shutdown and winterize the vacuum system:

1. 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.
2. Activate the Debris Tank Drain switch to open the drain valves and drain waste water from the debris tank.
3. Drain any accumulated water from the vacuum filter canister.
4. If the machine will be shutdown for an extended period:
   - Dump the debris tank and completely clean the tank with clean fresh water. Make sure to thoroughly flush the drain valves and allow all water to completely drain from the tank and valves.
   - Thoroughly clean the vacuum filter canister and the filter.
5. Leave the drain valves open on the vacuum canister and debris tank. Lower the debris tank to the full down position. Then close and latch the door.

Vacuum Canister Drain Valve & Hose



Debris Tank Drain Valves



Vacuum System Blower, Silencer & Filter Canister

6. Inflate the debris door seal and activate the vacuum system with the valves open for several minutes to remove any residual moisture from valves, hoses, filter canister, blower and silencer.
7. Shutdown the vacuum system and close all valves and access doors.

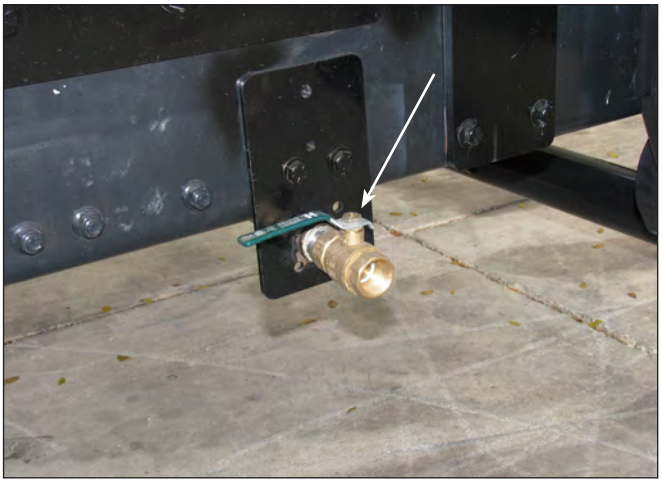
Typical Clean Water Tank Main Drain Valve

High Pressure Water system Winterizing

There are two options available for winterizing the high pressure water system. Drain all clean water, debris and vacuum tanks, pumps and hoses (Option 1) or drain the tanks and circulate a 50/50 mixture of antifreeze through the remainder of the system (Option 2).

Completely draining the system may be less desirable for trucks used in daily operations. Since all water is drained from the system, it will be necessary to prime the charge water system and purge air from the UHP pump when the waterblasting system is restarted. However, this option is usually the best choice for equipment that will be stored for an extended period in cold climates.

Circulating anti-freeze through the system is preferred by many operators for trucks operating daily during freezing weather because startup and shutdown procedures are quicker. GLYCOL based windshield washer or RV potable water system antifreeze is circulated through the system to protect components from freezing.



Clean Water Tank Winterizing Drain Valve

Winterizing Option 1 - Draining the System

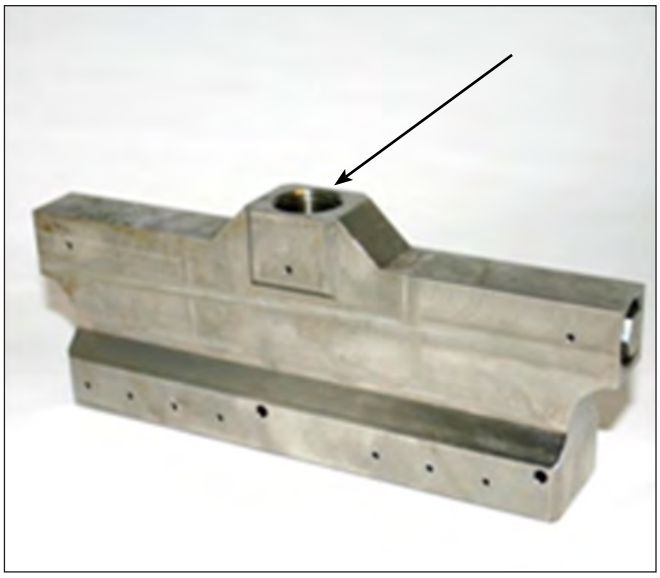
Use this option when antifreeze is not available or when the equipment will be stored for an extended period in below freezing temperatures.

Use the following steps to completely drain the water from the system:

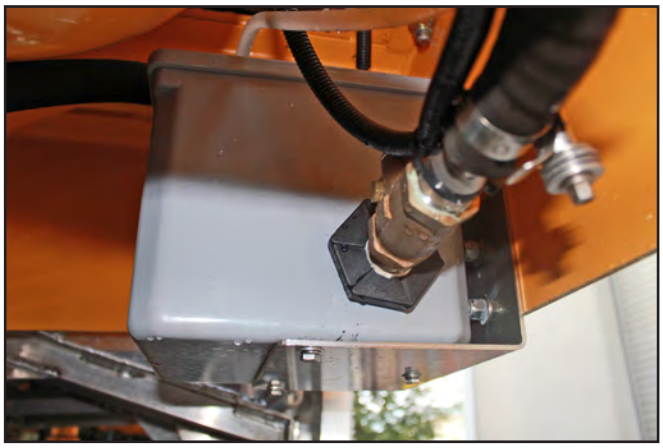
1. Make sure the truck is parked on level ground and that the waterblasting system is shutdown with the truck in the service position.
2. Make sure the vacuum system is properly winterized, then drain the clean water tanks completely.
3. Open the clean water system winterizing valve mounted on the chassis below the tanks to remove the water from the equalizing hoses and other clean water hoses and fittings that are below the tank drain valves.

Charge Water Pump & Drain Valve

4. Open the clean water supply valve between the tanks and the charge pump.
5. Open the inlet valve at the charge pump.
6. Open the inlet valve on the UHP pump manifold.
7. Remove the high pressure hose from the thru-shaft and drain all water from the hoses. Reinstall hoses to prevent contamination when draining is complete.
8. Remove the spray bars. Drain the water, then cap the inlet fitting and store.
9. Disconnect the hose from the diverter valve on the UHP Pump Manifold and drain all water from the hose.
10. Remove the lid from the bilge pump sump and drain the water from the drain hose.
11. Disconnect the inlet and outlet hoses from the bilge pump and drain the hose.
12. Briefly activate the bilge to remove trapped water from the pump, about a cupful.
13. Connect an air pressure hose to the drain valve fitting at the charge pump and blow clean air through the open system at low pressure. Open and close valves as necessary to increase airflow to specific areas.
14. Remove the caps on both clean water filter canisters and completely drain the water. Then install new filters.



Typical Spray Bar & Inlet Fitting



Bilge Pump Sump

Reactivating a truck with a drained system:

1. Make sure the truck is parked on level ground and the waterblasting system is shutdown with the truck in the service position.
2. Reinstall any disconnected hoses and add clean fresh water to the clean water tanks.
3. Press the Start button on the joystick console to close the diverter valve before the charge pump is engaged.
4. Follow normal Start Up procedures and make sure the truck is in Operate Mode with the waterblasting system activated. The truck engine must be at idle.
5. Open the clean water supply valves and turn ON the charge water pump.

Bilge Pump

6. While the charge pump is running, open the discharge valve on the charge water pump for 2 or 3 seconds, then close the valve.
7. Immediately repeat step 6 while monitoring the charge water pressure gauge in the joystick console.
8. If pressure does not rise to the normal charge water pressure range within a few seconds, repeat step 3 until pressure rises to the normal range (60 psi - 4 BAR).
9. Turn the charge pump OFF when the clean clear water is flowing from the thru-shafts indicating that all air and debris has been flushed from the system.
10. Follow the spray bar install procedure to reinstall and test the spray bars.

WARNING

TO REACTIVATE A TRUCK THAT HAS BEEN WINTERIZED BY DRAINING THE SYSTEM IN FREEZING CONDITIONS, ALL LOW FITTINGS AND HOSES WHERE WATER CAN ACCUMULATE AND FREEZE AFTER DRAINING MUST BE HEATED TO THAW THE ICE. ALSO PURGE ALL AIR FROM THE SYSTEM USING THE CHARGE WATER PUMP AT START UP.

WARNING

TO AVOID SERIOUS DAMAGE TO WATERBLASTING 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 WATERBLASTING 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 AS INDICATED ON THE THERMOMETER IN THE RESERVOIR SIGHT GAUGE.

Winterizing Option 2 - Circulating Antifreeze Through The System

This option is preferred for trucks operating daily during freezing weather. GLYCOL based windshield washer or RV water potable water system antifreeze is circulated through the system to protect components from freezing. This procedure requires 15 to 20 US gallons (58 to 76 liters) of antifreeze to properly winterize the waterblasting system. Make sure you have enough antifreeze on hand before starting the winterizing procedure.

CAUTION

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

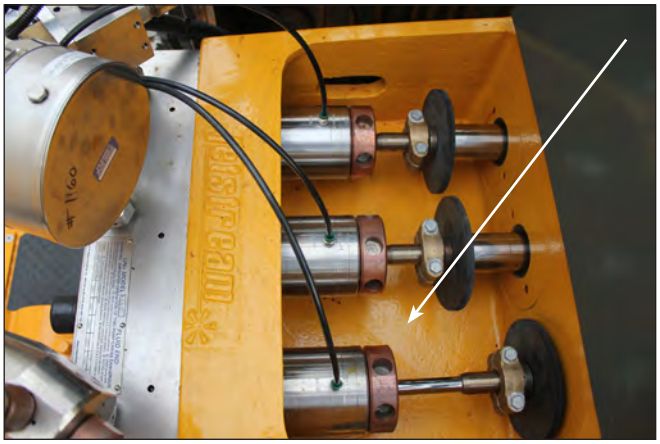
Use the following procedure winterize the waterblasting system with antifreeze:

1. Make sure the truck is parked on level ground and the waterblasting system is shutdown with the truck in the service position.
2. Make sure the vacuum system is properly winterized, then drain the clean water tanks completely.
3. Close the tank drain valves and pour 15 to 20 US Gallons (58 to 76 liters) of glycol based windshield washer or potable water system antifreeze into the clean water storage tank.
4. Remove the spray bars. Drain the water, then cap the inlet fitting and store.
5. Reactivate the truck in Operate Mode and turn the PTO switch ON. ***Do not activate the 40K clutch at anytime during winterizing operations.***
6. Engage the charge pump and allow it to run until undiluted antifreeze flows from both thru-shafts and the bilge pump. Then shutdown the charge pump and the waterblasting system.
7. Test the antifreeze flowing from the thru-shafts to ensure it is of a high enough concentration to protect the water system at the expected temperatures.
8. Disconnect the bilge pump hose at the debris tank fitting.
9. Pour 2 gallons of anti-freeze into the high pressure pump stuffing box sump so it will drain to the bilge pump sump system.
10. Allow the bilge pump to run until anti-freeze is visible at the bilge pump hose fitting in the debris tank. Then shutdown the pump and reconnect the hose.

Reactivating a truck winterized with anti-freeze:

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 tanks.
2. Press the Start button on the joystick console so that the diverter valve is closed before the charge pump is engaged.
3. Position each thru-shaft over a container to collect the antifreeze.
4. Follow normal Start Up procedures to activate the waterblasting system.
5. With the engine at idle, turn the PTO and Charge Water switches ON to engage the charge pump and flush the antifreeze from the system.
6. Turn charge pump OFF when the clean clear water is flowing from the thru-shafts.
7. Follow the spray bar installation procedure to reinstall and test the spray bars.



UHP Pump Stuffing Box Sump

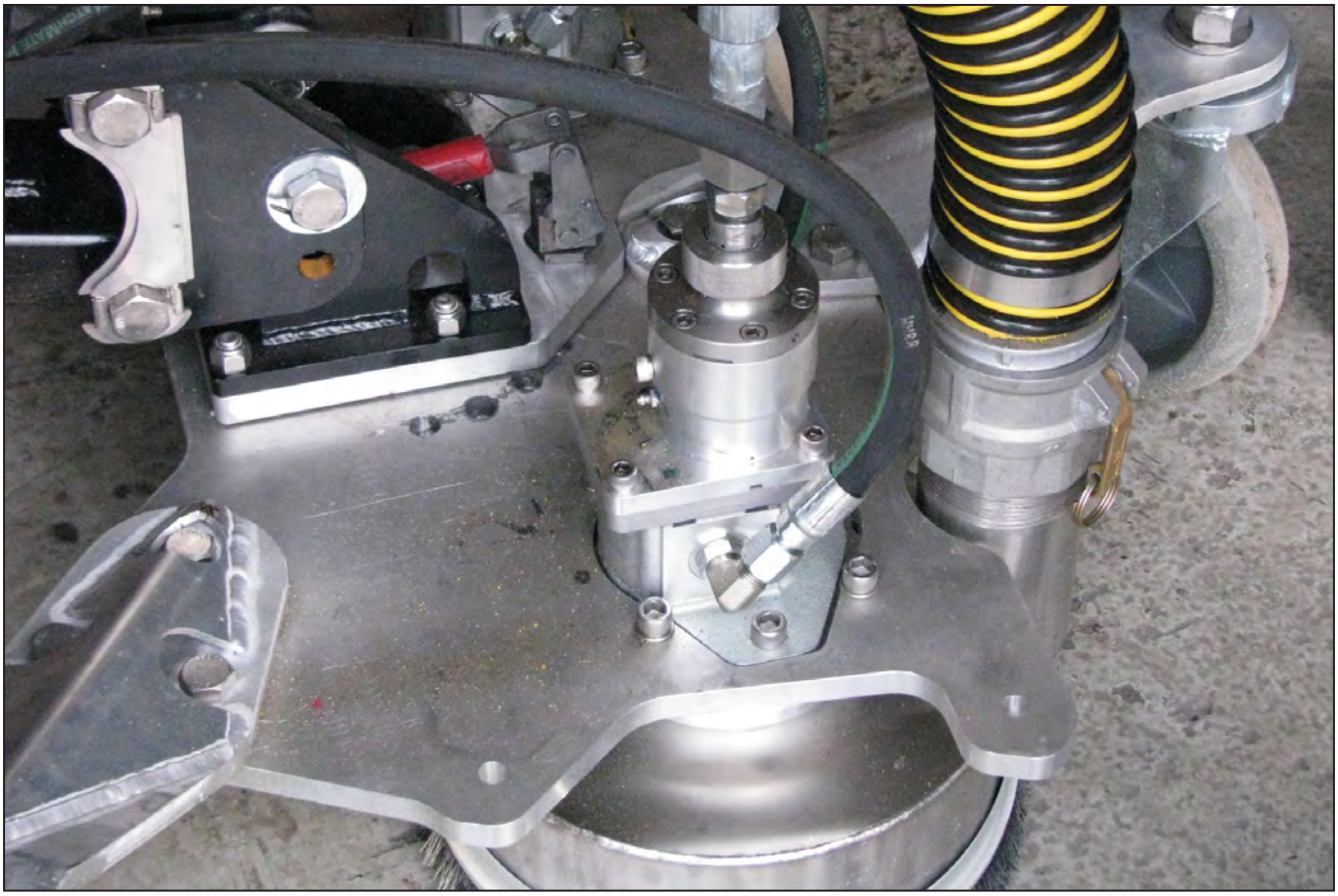
NOTICE:
IF YOU ARE INTENDING TO REUSE THE RECOVERED ANTIFREEZE, MAKE SURE TO TEST IT AND MAKE SURE THE ANITFREEZE MIXTURE HAS NOT BECOME DELUTED TO THE POINT WHERE IT WILL NOT PROTECT THE WATER SYSTEM AT THE EXPECTED TEMPERATURES.

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.

WARNING

TO AVOID SERIOUS DAMAGE TO WATERBLASTING 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 WATERBLASTING 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 AS INDICATED ON THE THERMOMETER IN THE RESERVOIR SIGHT GAUGE.

5.21 Thru-Shaft Motor Bearing Pre-Load



Introduction

The thru-shaft assembly is a key component in the Stripe Hog system. It is responsible for turning the spray bar and holds the blasting head components together. With proper, routine care your thru-shaft assemblies will provide you with many years of reliable service.

We call it the thru-shaft assembly because the shaft that holds and spins the spray bar runs through the hydraulic motor. The Thru-Shaft itself has up to 12 gallons per minute of water running through it at up to 40,000 psi. The friction of that much flow at that high of pressure causes a net thrust of 1,000 lbs.

To support the Thru-Shaft against the thrust, we use an angular contact bearing that we call the "thrust bearing." This bearing is found inside the top section of the assembly as you can see in the schematics and exploded parts view in later pages. It is imperative that the thru-shaft be held in a precise vertical position so it can perform properly. This is accomplished using what we call a spanner nut. The spanner nut threads onto the thru-shaft and rests on top of the thrust bearing. By turning the spanner nut clockwise, we can raise the thru-shaft position in the assembly. Conversely, by turning it counterclockwise we can lower it within the assembly. Turning the spanner nut is called "Adjusting the Preload."

It is important to set the preload on a regular basis. It only takes about 20 minutes to complete the process and we recommend it to be done every 40 hours of use. As the thrust bearing wears down the thru-shaft is lowered. As the shaft lowers, the motor becomes less powerful and less efficient because oil can bypass the internal gears.

We have developed a specific process to walk you through step by step. In the following pages you will learn all that you need to know to ensure many years of reliable service. We highly recommend that you follow the procedure carefully and exactly as described. If you have any questions please contact the Technical Support Team. We are available 24 hours every day of the year.

Tools and Materials Required

Tools

2 - Medium Sized Flat Blade Screwdrivers

1 - Medium Sized Channel Lock Pliers

1 - 3/4” (19 mm) Open End Wrench

1 - 15/16” (24 mm) Deep Well Socket

1 - 1 1/8” (28 mm) Deep Well Socket

1 - 1/2” Drive Rachet Wrench

1 - 1/2” Drive Torque Wrench

1 - Spanner socket (weldment tool)
(Supplied in your Tool Kit)

1 - 6 mm Allen Wrench

1 - Feeler Gauge .015”

1 - Small Hammer

Supplies

- Anti-Seize
- Grease Gun and Mobile Poly Rex EM Grease
- Rags or Paper Towels
- Brake Cleaner

NOTICE:
USE ANTI-SEIZE COMPOUND ON BOLT AND THRU-SHAFT THREADS AND THREADED HOSE CONNECTIONS TO PREVENT GALLING.

WARNING

INJURIES FROM ULTRA-HIGH PRESSURE WATER BLASTING IS 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.

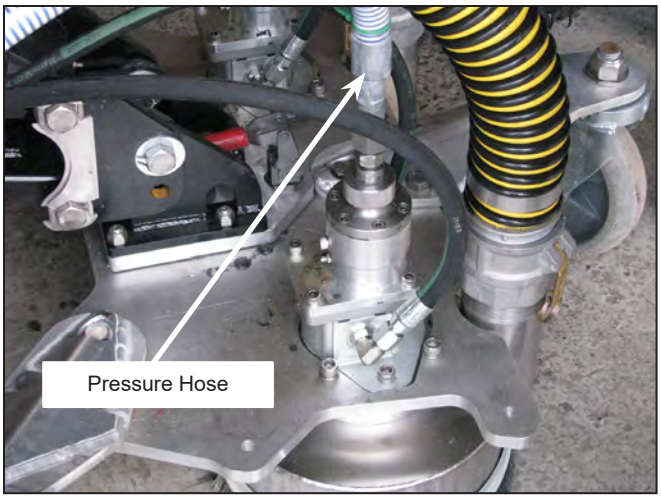


Figure 1: High pressure hose on top of the thru-shaft motor

Figure 2: High pressure hose removed

Step 1

Remove the High Pressure Hose

Remove the high pressure hose from the top of the thru-shaft motor by turning the hand nut at the base of the hose counterclockwise. If the hand nut is too tight to turn by hand, use the channel lock pliers to free it, then continue loosening it by hand. Figure 1 and 2.

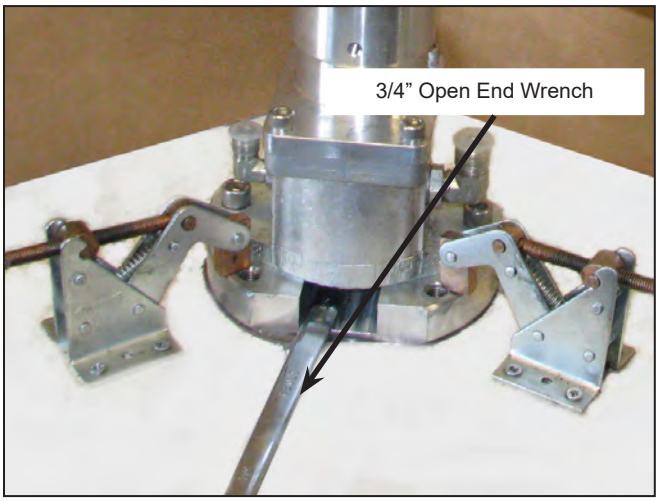


Figure 3: Thru-shaft motor on work bench showing position of slot and 3/4" open end wrench.

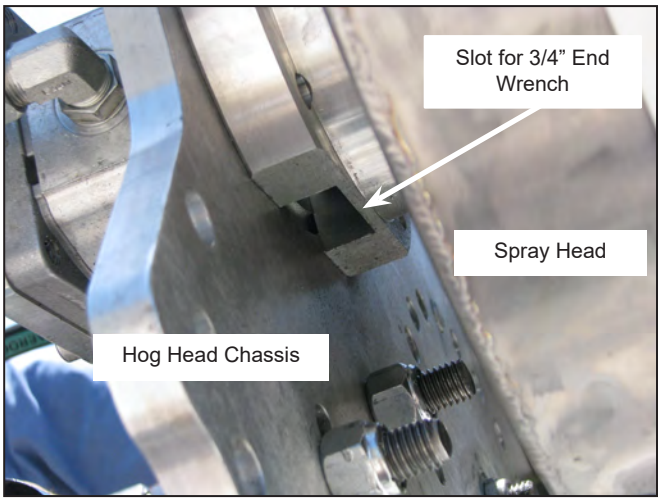


Figure 4: Location of slot in thru-shaft motor mounted on hog head for 3/4" open end wrench.

Step 2

Insert Wrench to Hold Thru-Shaft

Insert the 3/4" (19mm) open end wrench through the slot in the base of the thru-shaft motor. The slot is located between the hog head chassis and the spray head. Figure 3 and 4.

Figure 5: Use two medium flat head screwdrivers to remove the thrust housing cap. Note that the bolts are loose and left in place to prevent thrust housing cap from falling and being damaged during removal.

Step 3

Remove Thrust Housing Cap

Use a 6mm Allen wrench and a cross pattern to remove the 6 Allen head bolts that secure the thrust housing cap to the thrust housing. Make sure to leave each bolt loose and turned 3 threads in as shown in figure 5. The loosened bolts will allow the cap to be removed and prevent the possibility of the cap falling once it is free from the thrust housing.

Use the two medium sized, flat head screwdrivers and insert them into the slots at each side of the base of the thrust housing cap. Slowly and carefully twist the screwdrivers to work the cap evenly off the thrust housing until it is free. Figure 5.

Note that the O-ring seal in the thrust housing cap will provide some resistance until it is clear of the thrust housing. The cap will tend to "pop" slightly when the O-ring clears the base.

Once the thrust housing cap is free, remove the Allen bolts and the cap.

Inspect the cap and O-ring seal for damage. Replace O-ring if necessary and place the cap assembly in a safe, clean location. Figure 6.

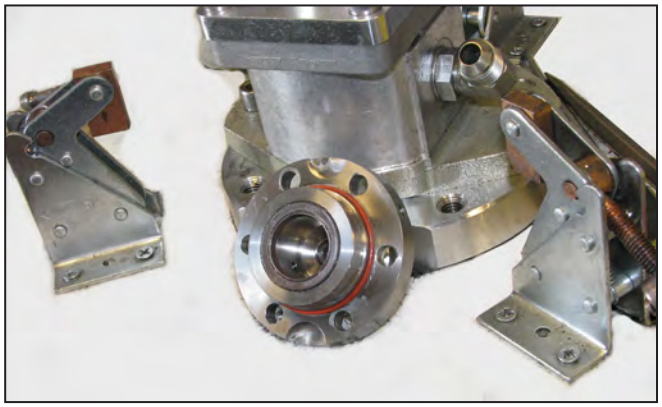


Figure 6: Thrust housing cap removed. Note the O-ring seal and the slots for the screwdrivers. Make sure the cap and O-ring is in good condition and clean.

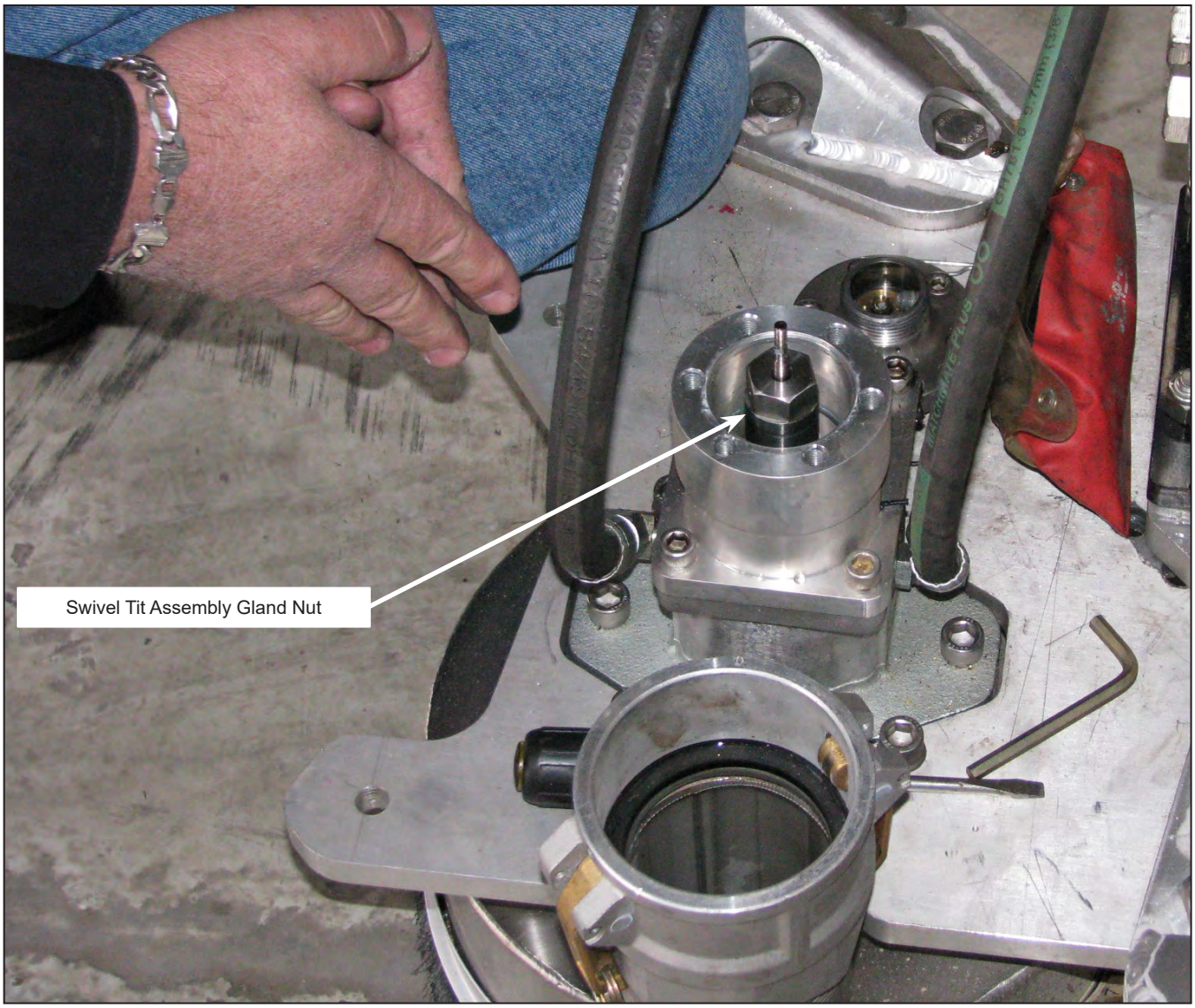


Figure 7: Swivel Tit gland nut to be removed by turning counterclockwise with a 15/16" deep well socket or box end wrench.

Step 4

Remove Swivel Tit Assembly/Gland Nut

While holding the thru-shaft with the 3/4" (19mm) open end wrench through the slot in the motor base, use a 15/16 (24mm) deep well socket or box end wrench to remove the swivel tit gland nut by turning it counterclockwise. Inspect the swivel tit assembly and set it in a safe, clean location. Figure 7 and 8.

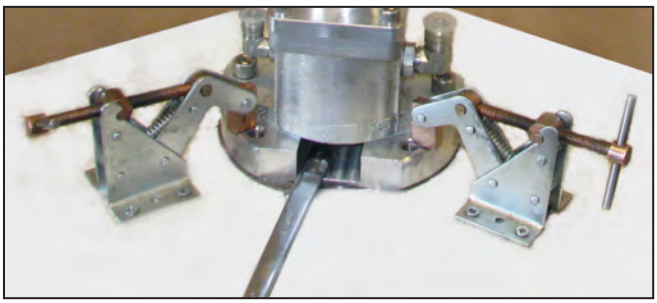


Figure 8: 3/4" (19 mm) open end wrench holding thru-shaft and preventing it from turning while removing swivel tit assembly/gland nut.

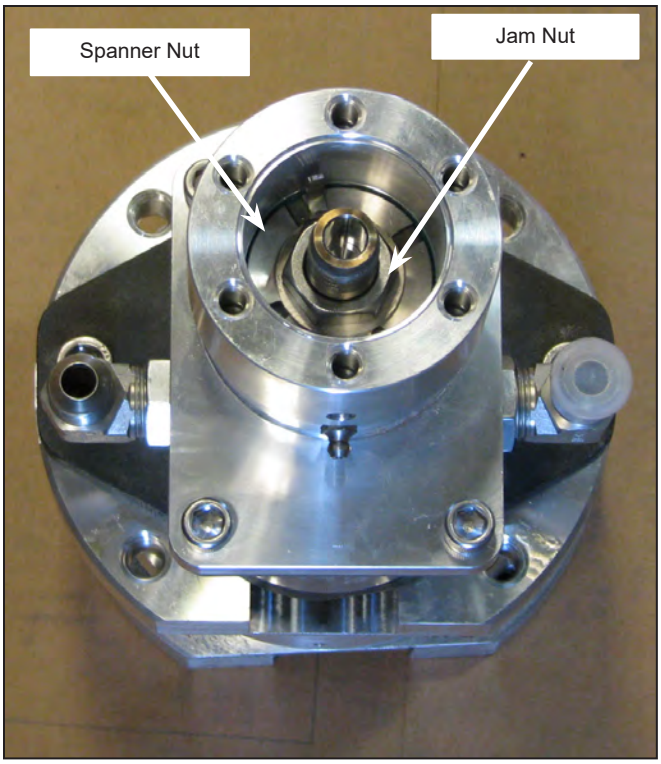


Figure 9: Jam nut and seal nut. Make sure to loosen Jam nut 4 full turns first.

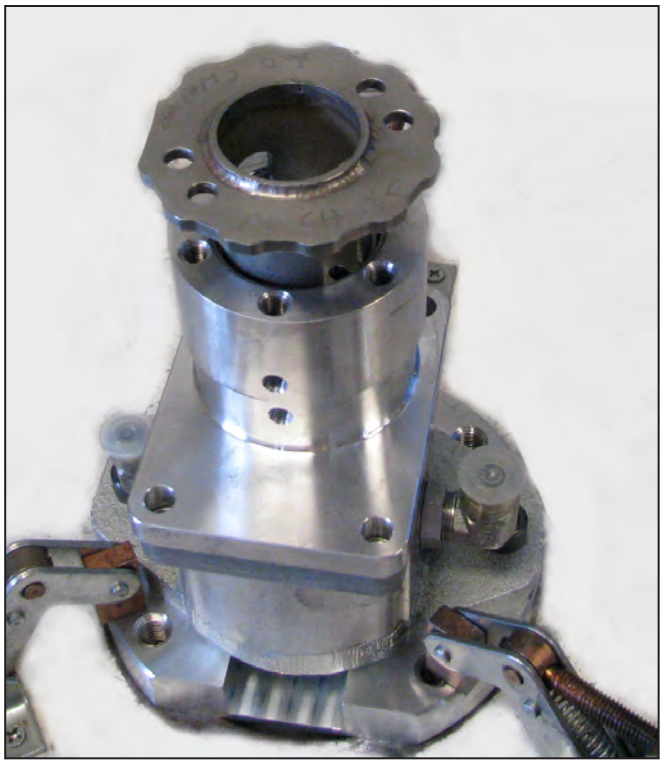


Figure 10: Use spanner to turn spanner nut.

Step 5

Loosen Jam Nut and Set the Bearing Preload

Insert the Spanner Tool and center on the Thrust Housing Cap Bolt holes.

Make sure the spanner Tool rests down into the tiny slots in the spanner nut and is down evenly all around the thrust housing. Figure 10.

Install two cap bolts and turn them until finger tight.

While Holding the Thru-Shaft with the 3/4" wrench through the slot in the motor base, use a 1 1/8" deep well socket to loosen the jam nut two full turns. Figure 11.

While holding the Thru Shaft Remove the Cap Bolts and tighten the Spanner tool as far as possible.

Continue to hold the Thru-Shaft and loosen the Spanner Nut 1/4 turn.

Install two Cap Bolts finger tight to hold the Spanner Tool in place. Figure 11.

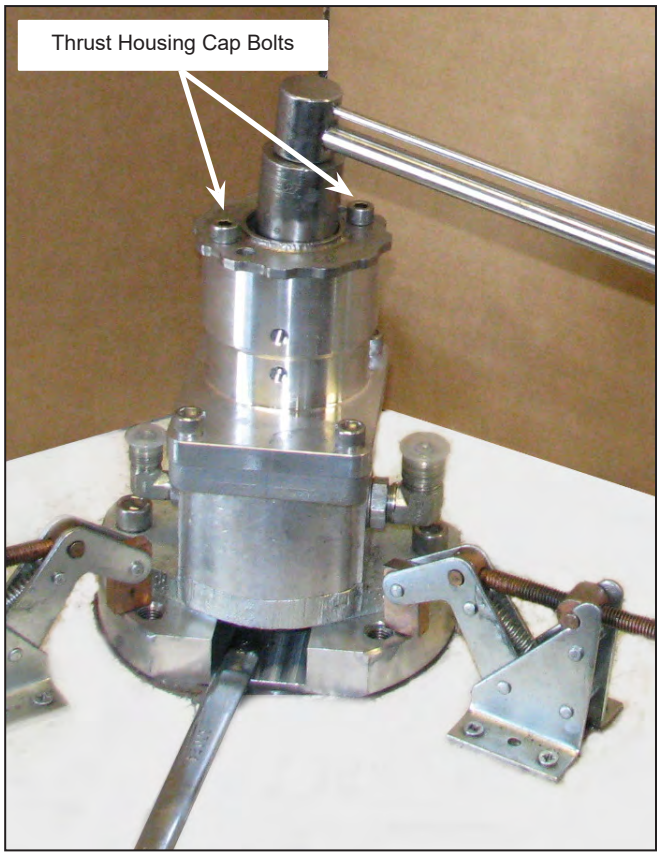


Figure 11: Spanner tool secured with thrust housing cap bolts.

WARNING

WHEN LOOSENING THE SPANNER SOCKET AND SEAL NUT ONE BOLT HOLE TO SET THE BEARING PRELOAD OR WHEN TIGHTENING THE JAM NUT, IT IS CRITICAL THAT THE THRU-SHAFT IS HELD FIRMLY WITH THE 3/4" (19MM) OPEN END WRENCH SO THAT IT DOES NOT MOVE AT ALL. IF THE WRENCH AND THRU-SHAFT MOVE DURING THIS PROCEDURE, THE BEARING PRELOAD WILL BE INCORRECT AND THE THRU-SHAFT MOTOR WILL NOT OPERATE PROPERLY.

IF THE THRU-SHAFT MOVES DURING WHILE SETTING THE BEARING PRELOAD, YOU MUST REPEAT STEP 5 TO ENSURE PROPER BEARING PRELOAD.

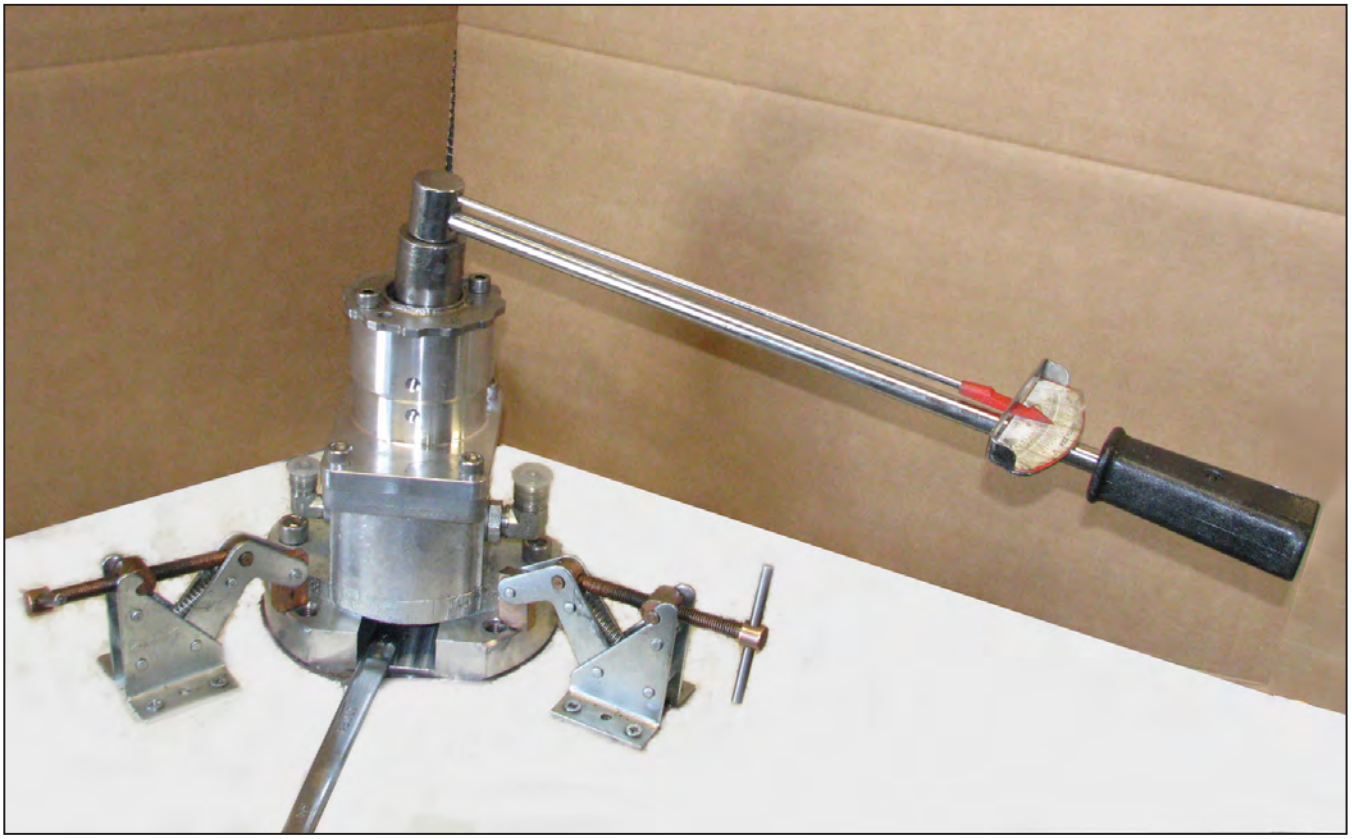


Figure 12: Thrust housing cap bolts securing the spanner tool are snug and a torque wrench and 1 1/8" deep well socket is used to tighten the jam nut to 50 Ft lbs.

Step 6
Set the Jam Nut Torque and Remove Spanner socket (Weldment Tool)

Tighten the bolts holding the spanner socket to "snug."

While holding the thru-shaft with the 3/4" (19mm) open end wrench through the slot in the motor base and the spanner socket held with the thrust housing cap bolts, use a 1 1/8" (28mm) deep well socket and a torque wrench to tighten the jam nut to 50 ft lbs. Figure 12. ***Make sure the thru-shaft and 3/4" (19mm) open end wrench do not move at all during this procedure!!***

Remove the thrust housing cap bolts from the spanner socket and remove it from the housing. Now it is safe to move the thru-shaft.

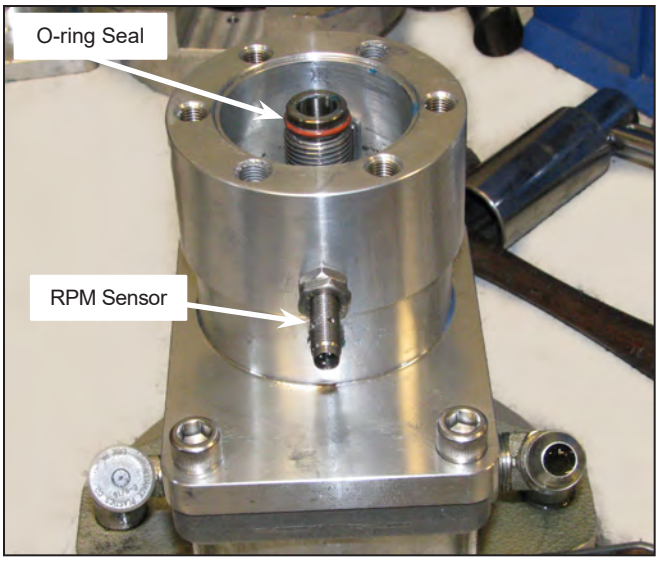


Figure 13: O-ring seal seat at the top of the thru-shaft greased and the threads below the seal coated with anti-seize.

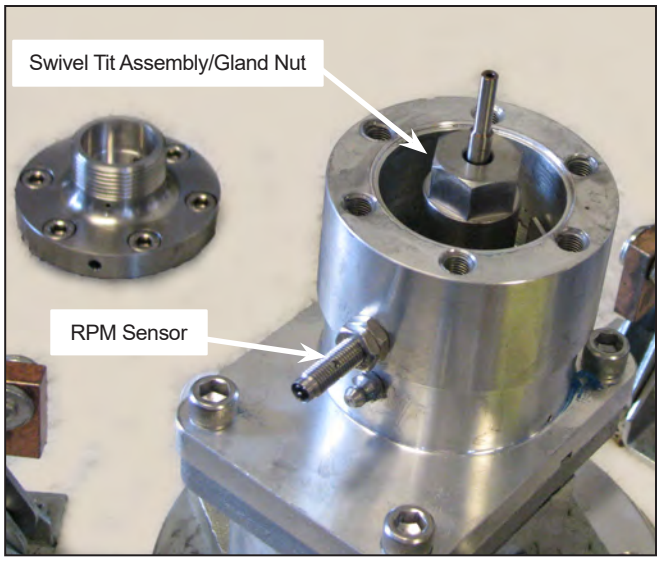


Figure 14: Swivel tit assembly/gland nut installed on the thru-shaft and torqued to 50 Ft lbs.

Step 7

Set The Rpm Sensor To Counter Washer Gap

Set the gap between the rpm sensor and the counter washer tabs. Use a feeler gauge of .015 (fifteen thousandths) to set the gap. Turn the Thru-Shaft until one tab lines up with the Sensor. Make sure that you do not scrape the rubber end with the tab as it will ruin the sensor. Figures 13 & 14.

If the gap is more than .015" use a flat screw driver and hammer to lightly tap the tab closer to the sensor.

If the gap is tighter than .015" use a flat screwdriver to pry the tab away from the sensor.

Turn the Thru-Shaft until the other tab lines up with the sensor and repeat the process. It is important that you keep the gap within two thousandths either way. If there is more than .05 thousandths variance from one tab to the other it can confuse the PLC system and stop head rotation.

Step 8

Install The Swivel Tit Assembly/Gland Nut.

Inspect the O-ring seal near the top of the thru-shaft and make sure it is not damaged. Replace the O-ring if it shows any sign of nicks, cuts, deterioration or wear. Then apply a light layer of grease to the O-Ring. The grease will help the swivel tit assembly slide over the O-ring and reduce the possibility for the O-ring to be pushed out of the seat or damaged as the swivel tit assembly is installed. Figure 13.

Apply anti-seize to the thru-shaft threads. The anti-seize is extremely important and will prevent the stainless steel threads on the shaft and swivel tit assembly from galling and seizing. ***If anti-seize is not used and the threads seize, the thru-shaft and the swivel tit assembly will be ruined and the thru-shaft motor will have to be completely disassembled and rebuilt!!***

While holding the thru-shaft with the 3/4" (19mm) open end wrench, install the swivel tit assembly/gland nut and hand tighten. Then use a 15/16" (24mm) deep well socket and a torque wrench to tighten swivel tit assembly/gland nut to 50 ft lbs. Figure 14.

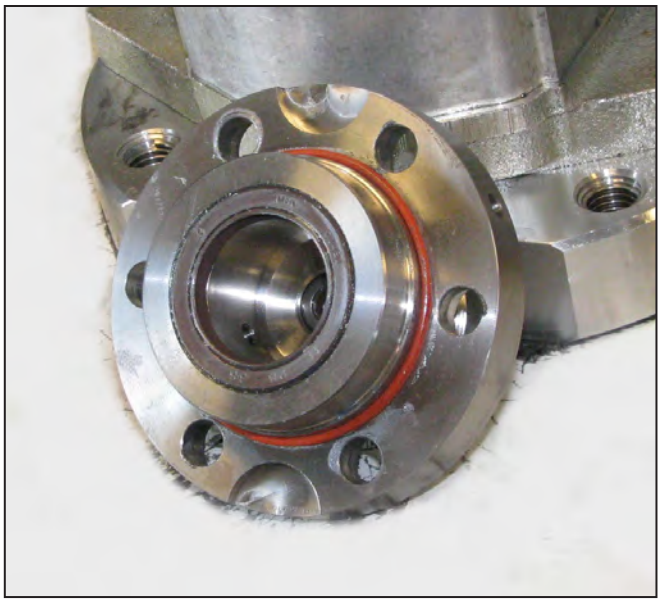


Figure 15: Inspect and grease the O-ring seal on the thrust housing cap.

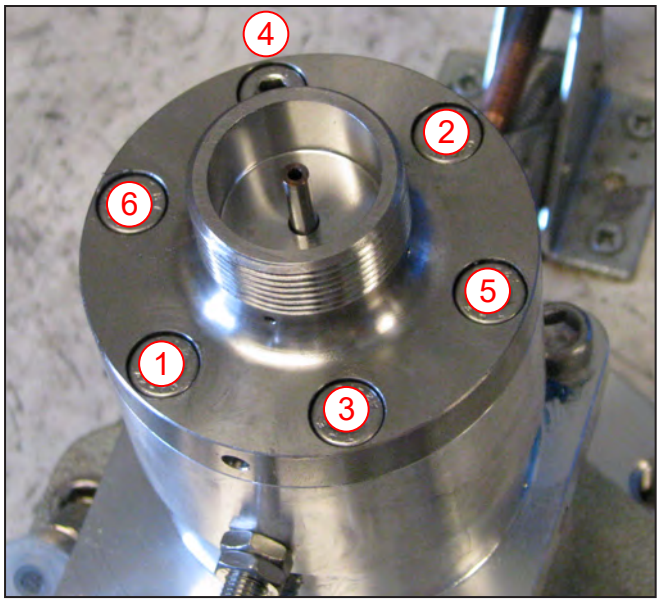


Figure 16: Apply anti-seize to the thrust housing bolts and tighten them in a crisscross pattern to snug using a 6 mm Allen wrench.

Step 9

Install The Thrust Housing Cap.

Inspect the O-ring seal in the thrust housing cap. Replace the O-ring if it shows any sign of nicks, cuts, deterioration or wear. Then apply light layer of grease to the O-Ring. The grease will help the cap assembly slide into the torque housing and reduce the possibility for the O-ring to be pushed out of the seat or damaged as the assembly is installed. Figure 15.

Set the thrust housing cap on top of the thrust housing and carefully press it into the housing. Align the bolt holes in the cap to the threaded holes in the thrust housing. Apply Anti-seize to the 3/8" Allen bolts and hand tighten using a crisscross pattern. Use the 6 mm Allen wrench to tighten the thrust housing cap bolts to "snug" using a crisscross pattern. Figure 16.

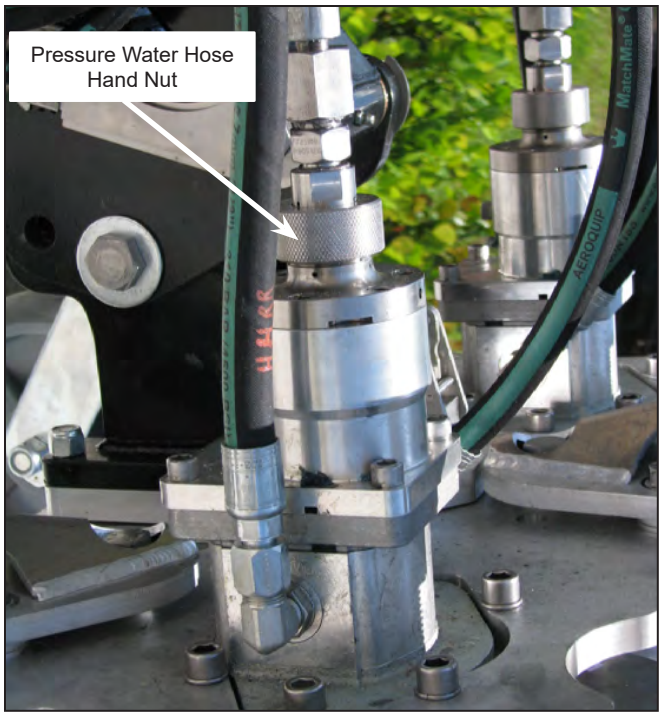


Figure 17: Apply anti-seize to the thrust housing threads and install the high pressure water line.

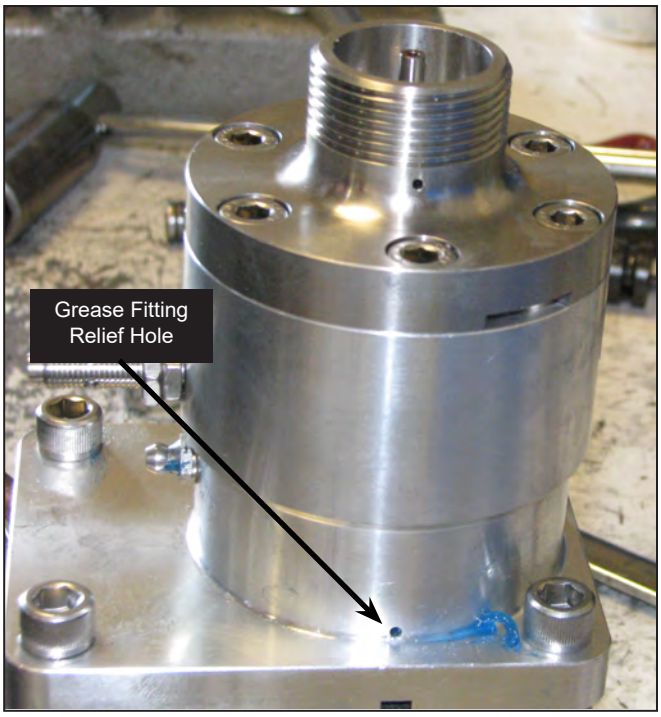


Figure 18: Thru-shaft bearing grease fitting and grease relief holes in thrust housing base.

Step 10

Install the High Pressure Water Hose and Grease the Thru-Shaft Bearings.

Apply anti-seize to the threads on the top of the thrust housing cap and install the high pressure water hose. Hand tighten the hand nut on the pressure hose.

Use a grease gun and apply grease to the thru-shaft bearing until grease comes out of the relief hole on the side of the thrust housing.

Step 11

Run the Thru-Shaft Motor Without Water Pressure, Then Under Full Water Pressure.

Remove all tools and materials from the hog head and raise it to the full up position.

Activate the hydraulic system and run the thru-shaft motor at maximum rpm for 15 minutes. ***Make sure not to apply water pressure during this step.***

Running motor without water pressure will fully test the thru-shaft motor operation and allow the bearings and seals to work themselves in. If the spray bar does not turn initially, use a 2' piece of wood or a broom handle to rotate the spray head counterclockwise to get it started. Figure 19.

If the thru-shaft motor is assembled properly, it will start on its own each time it is activated from this point forward. If it continues to stall on start up, contact Hog Technologies Customer Service for assistance.

Once the initial run up is complete and with the spray head still turning at maximum rpm, make sure all personnel are well clear of the spray head and apply full water pressure. Run the thru-shaft motor for another 15 minutes. Figure 20.

When testing is complete and with the unit still running at maximum pressure, check the weep holes in the thrust housing cap just below the high pressure hose connection for water leakage. If water is dripping from the holes, the swivel seal in the hose fitting will need to be changed. If no water is dripping from the weep holes and the spray bar is still rotating at maximum rpm, your unit is ready to be put back into service. Figure 21.

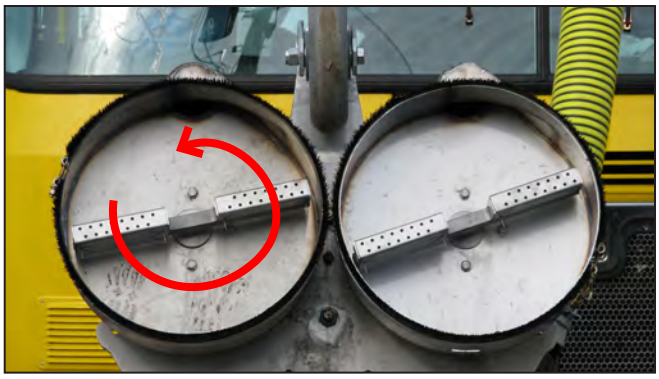


Figure 19: Counterclockwise spray head rotation. Operate 1st 15 minutes at maximum rpm with no water pressure.

Figure 20: Operate another 15 minutes at maximum rpm and full water pressure.

WARNING

INJURIES FROM ULTRA-HIGH PRESSURE WATERBLASTING 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.

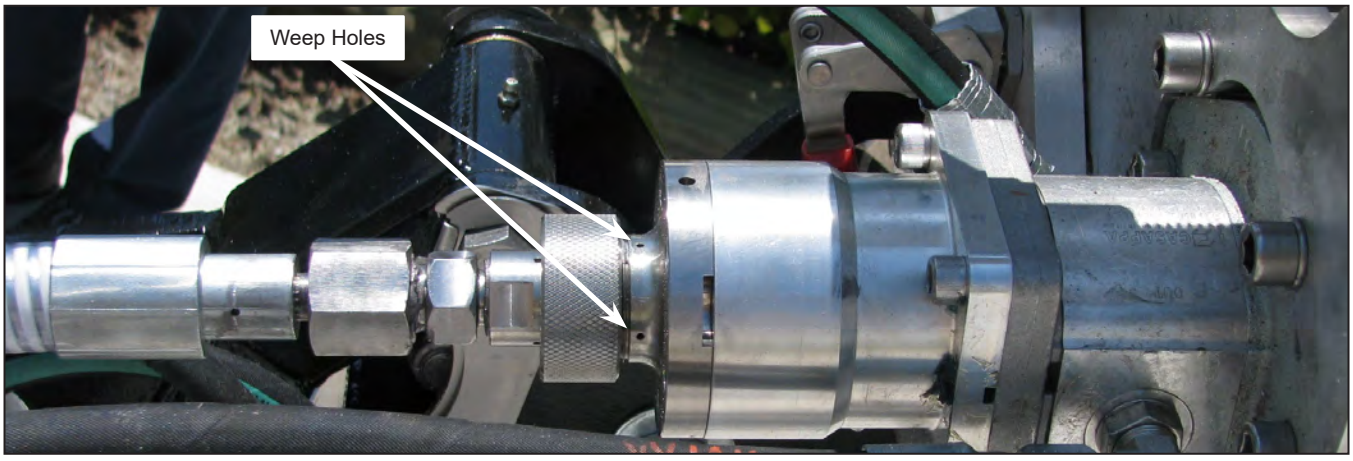
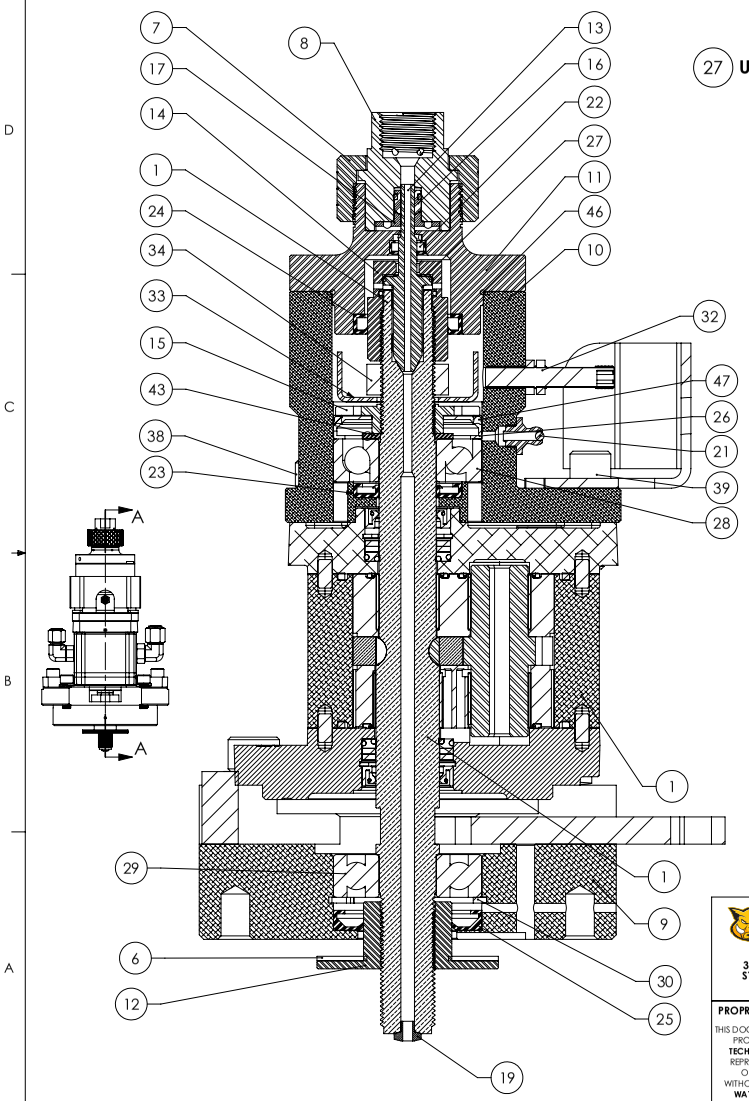


Figure 21: Check for water dripping from weep holes just below the high pressure water hose connection.



27 USE ONLY ACCORDING TO ENGINEERING RECOMMENDATIONS

WATERBLASTING TECHNOLOGIES REVISIONS

REV.	ZONE	DESCRIPTION	DATE	ENG APPROVAL
01	-	ECN 15-026	6/12/2015	DG
G	-	ECN 15-026	6/12/2015	DG
H	-	ECN 16-103	12/2/2016	DG

ITEM NO.	20025-001C/QTY.	PART NUMBER	DESCRIPTION
1	1	20026-001	MOTOR, THRU SHAFT, HOG HEAD, ROTATION
2	1	37037	ADAPTER, 90, 8X8, MORB/MORS
3	1	37057	ADAPTER, 90, 6X6, MORB/MORS
4	1	37507	CAP, 6, FORS
5	1	37508	CAP, 8, FORS
6	1	50097	DETAIL, SEAL, FELT, GASKET, DIRT
7	1	50098-001	DETAIL, NUT, SWIVEL
8	1	50099-001	DETAIL, ADAPTER, SWIVEL, SEAL
9	1	50100-001	DETAIL, ADAPTER, FLANGE, THRU SHAFT
10	1	50101-001	DETAIL, HOUSING, THRUST ASSEMBLY, THRU SHAFT
11	1	50102-001	DETAIL, COVER, THRUST ASSEMBLY, THRU SHAFT
12	1	50103	DETAIL, SHIELD, DIRT, THRU SHAFT
13	1	50105-001	DETAIL, TIT, SWIVEL
14	1	50106-001	DETAIL, NUT, GLAND, THRU SHAFT
15	1	50107-001	DEATIL, NUT, SEAL, GREASE, THRU SHAFT
16	1	52052-001	SEAL, SWIVEL
17	1	52100	RING, BACKUP, BRASS
18	2	52101-001	FILTER, DEBRIS, WRENCH SLOT, THRU-SHAFT
19	1	52102-001	SEAL, BRASS BUTTON
20	6	60135	SCREW, SHCS, M8, SS
21	1	60146	FITTING, ZERK, GREASE, M8
22	1	60153	SEAL, UPPER, SWIVEL SHAFT
23	1	60158	SEAL, LOWER, THRUST ASSEMBLY
24	1	60159	SEAL, UPPER THRUST ASSEMBLY
25	1	60160	SEAL, LOWER HOUSING
26	1	60161	SEAL, LOWER THRUST ASSEMBLY
27	1	60266-001	WASHER, BRASS, COMPRESSION, SWIVEL TIT
28	1	60950	BEARING, ANGULAR CONTACT BALL, THRUST ASSEMBLY
29	1	60951	BEARING, RADIAL, DOUBLE SEAL, LOWER HOUSING
30	1	60952	RING, INTERNAL RETAINING, STEEL
31	4	67048	HELICAL INSERT, 3/8-16, SS
32	1	68290	PROXIMITY, SWITCH, METALIC
33	1	70153-001	FABRICATION, WASHER, COUNTER, THRU SHAFT
34	1	70837	NUT, JAM, SS
35	1	71155-001	WRENCH, THRU SHAFT ASSEMBLY
36	1	72317-001	FABRICATION, GUARD, PROXIMITY SENSOR, THRU-SHAFT
37	1	80044-001	WELMENT, TOOL HOGHEAD, ASSEMBLY, THRU SHAFT
38	2	90000-1333	SCREW, SHCS, 3/8-16, SS
39	2	90000-1360	SHCS, 3/8-16, SS
40	2	90001-0711	SCREW, SHCS, M12, SS
41	4	90001-0713	SHCS, M12, SS
42	4	90075-0010	SPLIT LOCK WASHER, M12, SS
43	1	90080-0220	SHIM, ROUND
44	1	90092-1005	O-RING, SWIVEL TIT
45	1	90092-1007	O-RING, SILICONE, SWIVEL TIT
46	1	90092-1023	O-RING, UPPER THRUST ASSEMBLY
47	1	90095-0281	O-RING, SEAL, DOUBLE COUNTER

HOG TECHNOLOGIES
3341 S.E. SLATER STREET
STUART, FLORIDA 34997
(772) 223-7393

-	-
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N/A	-
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONS ±1/32
ANG: MACH ± 0°30' BEND ± 2°
DECIMALS .XX ± .01
.XXX ± .005
HOLE Ø .XX ± .005
INTERPRET GEOMETRIC TOLERANCING PER: ASME Y14.5M
MATERIAL N/A
FINISH N/A
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	DG	7/15/2008
CHECKED	DG	-
ENG APPR.	DG	02/26/08
MFG APPR.	-	-
Q.A.	-	-

PERP ⊥ .003/IN
STRAIGHTNESS — .005/IN
FLATNESS ▱ .005/IN
THREADS:
EXTERNAL - CLASS 2A
INTERNAL - CLASS 2B
MACHINED SURFACES: 63 U.O.S

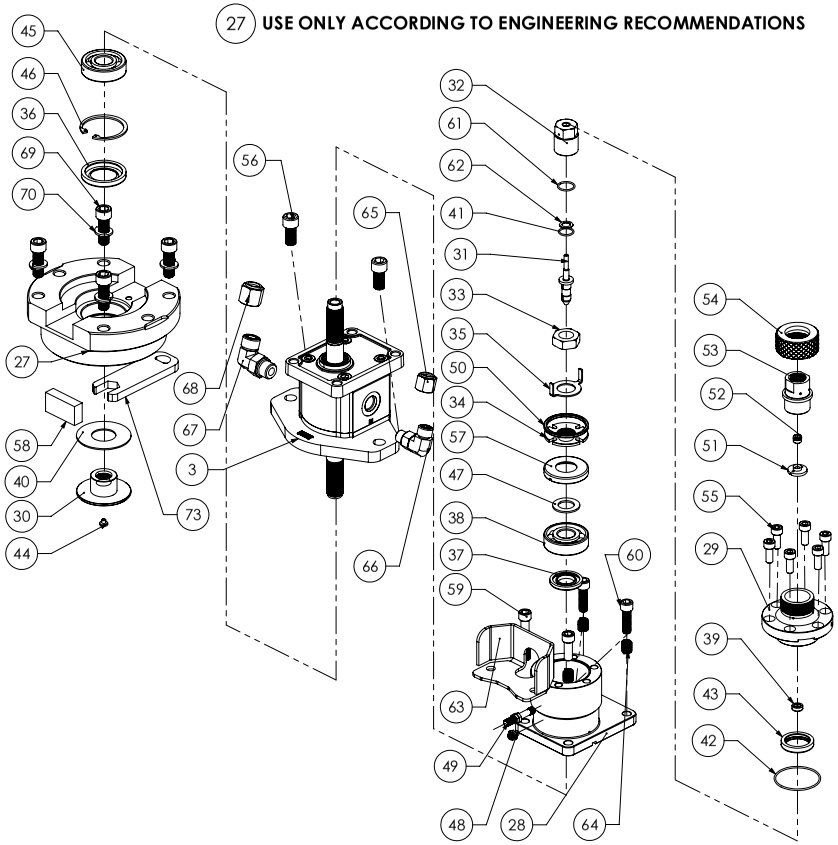
TITLE: ASSEMBLY, HEAD, THRU, SHAFT, HOG HEAD

PART NO. 20025-001C

SIZE B | DWG. NO. 20025 | REV H

OLD PART NO. CS1000-TS

SCALE: 2:3 | WGT: 20.42 LBS | SHEET 1 OF 4

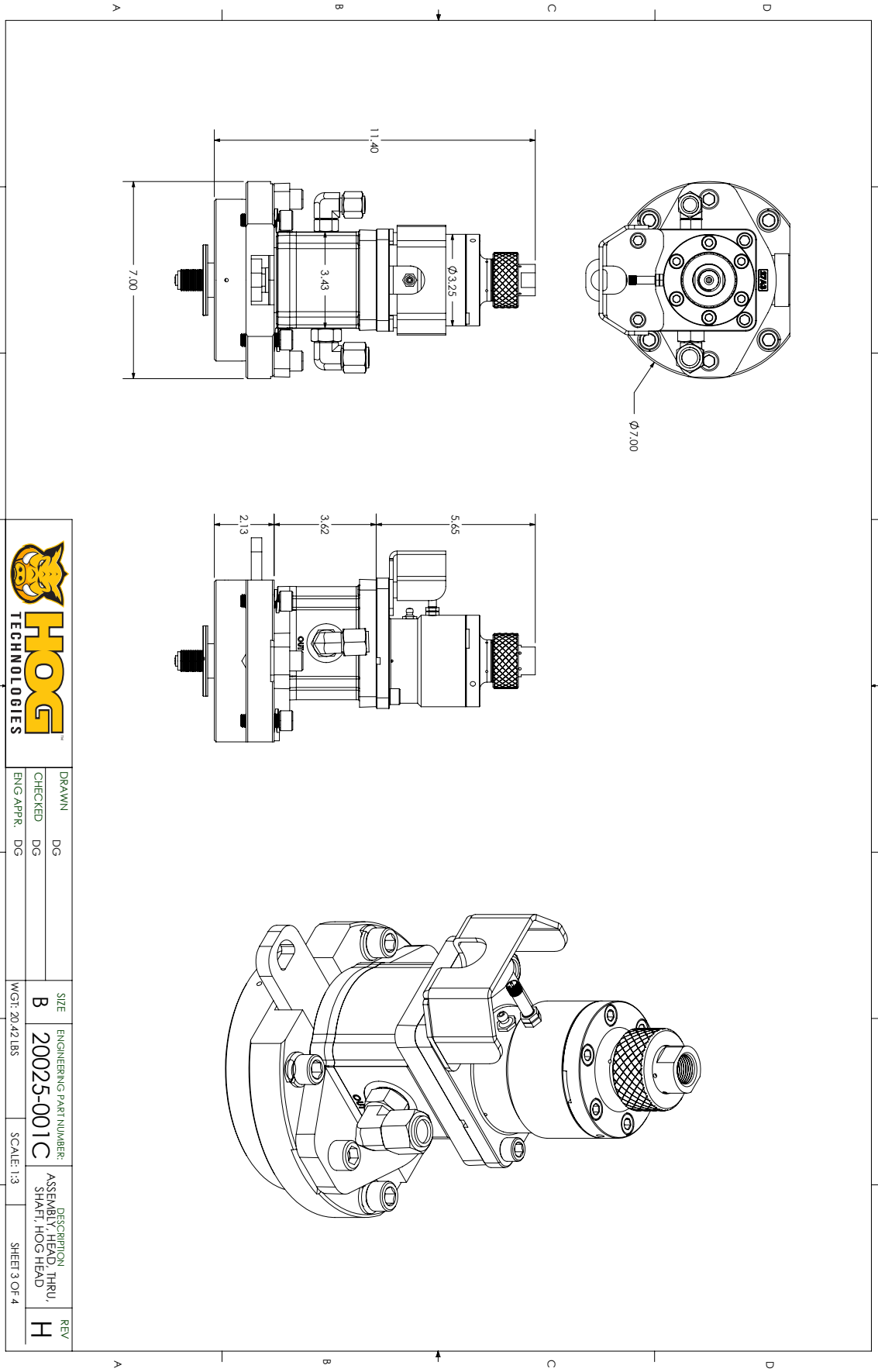


ITEM NO.	20025-001C/QTY.	PART NUMBER	DESCRIPTION
1	1	20026-001	MOTOR, THRU SHAFT, HOG HEAD, ROTATION, CASAPPA
2	1	37037	ADAPT, 90, 8X8, MORB/MORS
3	1	37057	ADAPT, 90, 6X6, MORB/MORS
4	1	37507	CAP, 6, FORS
5	1	37508	CAP, 8, FORS
6	1	50097	SEAL, FELT, GASKET, DIRT .063 THICKNESS
7	1	50098-001	DETAIL, NUT, SWIVEL
8	1	50099-001	DETAIL, ADAPTER, SWIVEL, SEAL
9	1	50100-001	DETAIL, ADAPTER, FLANGE, THRU SHAFT, HOG HEAD
10	1	50101-001	DETAIL, HOUSING, THRUST ASSEMBLY, THRU SHAFT, HOG HEAD
11	1	50102-001	DETAIL, COVER, THRUST ASSEMBLY, THRU SHAFT, HOG HEAD
12	1	50103	DETAIL, SHIELD, DIRT, THRU SHAFT, HOG HEAD
13	1	50105-001	DETAIL, TIT, SWIVEL, HOG HEAD 0.0860 BORE
14	1	50106-001	DETAIL, NUT, GLAND, THRU SHAFT, HOG HEAD
15	1	50107-001	DETAIL, NUT, SEAL, GREASE, THRU SHAFT, HOG HEAD
16	1	52052-001	SEAL, SWIVEL
17	1	52100	RING, BACKUP, BRASS
18	2	52101-001	FILTER, DEBRIS, WRECH SLOT, THRU-SHAFT
19	1	52102-001	SEAL, BRASS BUTTON
20	6	60135	SCREW, SHCS, M8 x 1.0 x 20mm, 316 SS
21	1	60146	FITTING, ZERK, GREASE, M8 X 1 MALE, 14.9MM METRIC SS
22	1	60153	SEAL, UPPER, SWIVEL SHAFT
23	1	60158	SEAL 20 X 38 X 5MM
24	1	60159	SEAL 28 X 38 X 7MM
25	1	60160	SEAL 31 X 52 X 7MM
26	1	60161	SEAL 25 X 52 X 8MM
27	1	60266-001	WASHER, BRASS, COMPRESSION, SWIVEL TIT .375in ID x .625in OD. x .025in Thick Rockwell B77
28	1	60950	BEARING, ANGULAR CONTACT BALL, 20x52x15 MED 7300WN SERIES
29	1	60951	BEARING, RADIAL, 20 X 52 X 15, TWO SEALS
30	1	60952	RING, INTERNAL RETAINING, STEEL, 52MM
31	4	67048	HELICAL INSERT, 3/8-16 X 9/16 LONG,18-8 STAINLESS
32	1	68290	PROXIMITY, SWITCH, METALIC - OBJECT W/ MALE PLUG 3 WIRE, 8MM DIA. SS, 1.5MM Range
33	1	70153-001	FABRICATION, WASHER, COUNTER, THRU SHAFT, HOG HEAD
34	1	70837	NUT, JAM, 3/4-16 SS
35	1	71155-001	WRENCH, 3/4 SIZE, THRU SHAFT ASSEMBLY
36	1	72317-001	FABRICATION, GUARD, PROXIMITY SENSOR, THRU-SHAFT
37	1	80044-001	WELMENT, TOOL HOGHEAD, ASSEMBLY, THRU SHAFT
38	2	90000-1333	SCREW, SHCS, 3/8"-16 X 1", SS
39	2	90000-1360	SHCS, 3/8-16 X 1-1/4, SS
40	2	90001-0711	SCREW, SHCS, M12-1.75 X 25MM, SS
41	4	90001-0713	SHCS, M12-1.75 X 35MM, 18-8 SS
42	4	90075-0010	SPLIT LOCK WASHER, M12, 18-8 SS
43	1	90080-0220	SHIM, ROUND, 3/4 X 1-1/4 X .075
44	1	90092-1005	O-Ring AS568A Dash Number 015 (Viton) 9/16" x 11/16" x 1/16 Width
45	1	90092-1007	O-RING, SILICONE, 11/16" ID X 13/16" OD X 1/16"Ø, AS568A DASH NUMBER 017
46	1	90092-1023	O-RING, 2 X 2-1/8 X 1/16 WIDTH, SILICONE (AS568A)
47	1	90095-0281	O-RING, SEAL, DOUBLE, 1-3/4 X 2 X 1/8 WIDTH VITON (AS568A)

HOG TECHNOLOGIES

DRAWN	DG	SIZE	ENGINEERING PART NUMBER:	DESCRIPTION	REV
CHECKED	DG	B	20025-001C	ASSEMBLY, HEAD, THRU, SHAFT, HOG HEAD	H
ENG APPR.	DG	WGT: 20.42 LBS	SCALE: 1:5	SHEET 2 OF 4	

HOG TECHNOLOGIES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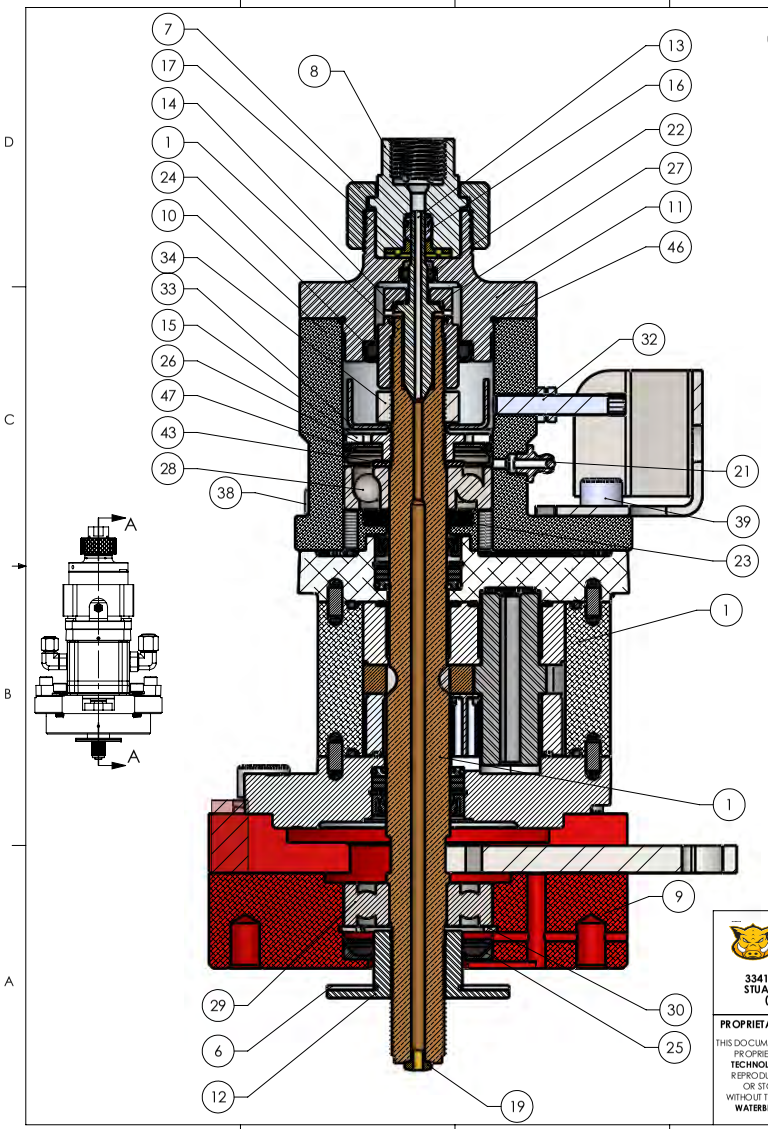
7.00
3.43
Ø3.25
Ø7.00
2.13
3.62
5.65
DRAWN DG
CHECKED DG
ENG APPR. DG
SIZE B
ENGINEERING PART NUMBER: 20025-001C
WGT: 20.42 LBS
SCALE: 1:3
DESCRIPTION ASSEMBLY, HEAD, THRU. SHAFT, HOG HEAD
REV H
SHEET 3 OF 4



27 USE ONLY ACCORDING TO ENGINEERING RECOMMENDATIONS

ITEM NO.	20025-001C/QTY.	PART NUMBER	DESCRIPTION
1	1	20026-001	MOTOR, THRU SHAFT, HOG HEAD, ROTATION, CASAPPA
2	1	37037	ADAPT, 90, 8X8, MORB/MORS
3	1	37057	ADAPT, 90, 6X6, MORB/MORS
4	1	37507	CAP, 6, FORS
5	1	37508	CAP, 8, FORS
6	1	50097	SEAL, FELT, GASKET, DIRT .063 THICKNESS
7	1	50098-001	DETAIL, NUT, SWIVEL
8	1	50099-001	DETAIL, ADAPTER, SWIVEL, SEAL
9	1	50100-001	DETAIL, ADAPTER, FLANGE, THRU SHAFT, HOG HEAD
10	1	50101-001	DETAIL, HOUSING, THRUST ASSEMBLY, THRU SHAFT, HOG HEAD
11	1	50102-001	DETAIL, COVER, THRUST ASSEMBLY, THRU SHAFT, HOG HEAD
12	1	50103	DETAIL, SHIELD, DIRT, THRU SHAFT, HOG HEAD
13	1	50105-001	DETAIL, TIT, SWIVEL, HOG HEAD 0.0860 BORE
14	1	50106-001	DETAIL, NUT, GLAND, THRU SHAFT, HOG HEAD
15	1	50107-001	DETAIL, NUT, SEAL, GREASE, THRU SHAFT, HOG HEAD
16	1	52052-001	SEAL, SWIVEL
17	1	52100	RING, BACKUP, BRASS
18	2	52101-001	FILTER, DEBRIS, WRECH SLOT, THRU-SHAFT
19	1	52102-001	SEAL, BRASS BUTTON
20	6	60135	SCREW, SHCS, M8 x 1.0 x 20mm, 316 SS
21	1	60146	FITTING, ZERK, GREASE, M8 X 1 MALE, 14.9MM METRIC SS
22	1	60153	SEAL, UPPER, SWIVEL SHAFT
23	1	60158	SEAL 20 X 38 X 5MM
24	1	60159	SEAL 28 X 38 X 7MM
25	1	60160	SEAL 31 X 52 X 7MM
26	1	60161	SEAL 25 X 52 X 8MM
27	1	60266-001	WASHER, BRASS, COMPRESSION, SWIVEL TIT .375in ID x .625in OD. x .025in Thick Rockwell B77
28	1	60950	BEARING, ANGULAR CONTACT BALL, 20x52x15 MED 7300WN SERIES
29	1	60951	BEARING, RADIAL, 20 X 52 X 15, TWO SEALS
30	1	60952	RING, INTERNAL RETAINING, STEEL, 52MM
31	4	67048	HELICAL INSERT, 3/8-16 X 9/16 LONG,18-8 STAINLESS
32	1	68290	PROXIMITY, SWITCH, METALIC - OBJECT W/ MALE PLUG 3 WIRE, 8MM DIA. SS, 1.5MM Range
33	1	70153-001	FABRICATION, WASHER, COUNTER, THRU SHAFT, HOG HEAD
34	1	70837	NUT, JAM, 3/4-16 SS
35	1	71155-001	WRENCH, 3/4 SIZE, THRU SHAFT ASSEMBLY
36	1	72317-001	FABRICATION, GUARD, PROXIMITY SENSOR, THRU-SHAFT
37	1	80044-001	WELMENT, TOOL HOGHEAD, ASSEMBLY, THRU SHAFT
38	2	90000-1333	SCREW, SHCS, 3/8"-16 X 1", SS
39	2	90000-1360	SHCS, 3/8-16 X 1-1/4, SS
40	2	90001-0711	SCREW, SHCS, M12-1.75 X 25MM, SS
41	4	90001-0713	SHCS, M12-1.75 X 35MM, 18-8 SS
42	4	90075-0010	SPLIT LOCK WASHER, M12, 18-8 SS
43	1	90080-0220	SHIM, ROUND, 3/4 X 1-1/4 X .075
44	1	90092-1005	O-Ring AS568A Dash Number 015 (Viton) 9/16" x 11/16" x 1/16 Width
45	1	90092-1007	O-RING, SILICONE, 11/16" ID X 13/16" OD X 1/16"Ø, AS568A DASH NUMBER 017
46	1	90092-1023	O-RING, 2 X 2-1/8 X 1/16 WIDTH, SILICONE (AS568A)
47	1	90095-0281	O-RING, SEAL, DOUBLE, 1-3/4 X 2 X 1/8 WIDTH VITON (AS568A)

HOG TECHNOLOGIES
3341 S.E. SLATER STREET
STUART, FLORIDA 34997
(772) 223-7393

-	-	
-	-	
-	-	
-	-	
-	-	
N/A	-	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONS ± 1/32
ANG: MACH ± 0°30' BEND ± 2°
DECIMALS .XX ± .01
.XXX ± .005
HOLE Ø .XX ± .005
INTERPRET GEOMETRIC TOLERANCING PER: ASME Y14.5M
MATERIAL N/A
FINISH N/A
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	DG	7/15/2008
CHECKED	DG	-
ENG APPR.	DG	02/26/08
MFG APPR.	-	-
Q.A.	-	-

PERP .003/IN
STRAIGHTNESS .005/IN
FLATNESS .005/IN
THREADS:
EXTERNAL - CLASS 2A
INTERNAL - CLASS 2B
MACHINED SURFACES: 63 U.O.S.

TITLE: ASSEMBLY, HEAD, THRU, SHAFT, HOG HEAD

PART NO. 20025-001C

SIZE B | DWG. NO. 20025 | REV H

OLD PART NO. CS1000-TS

SCALE: 2:3 | WGT: 20.42 LBS | SHEET 4 OF 4

5.22 SH8000 Maintenance Matrix

EQUIPMENT	COMPONENT	INTERVALS	LUBRICATION SPECIFICATIONS
Truck Engine	Oil and Filter	Refer to Truck Operating Manual	Refer to Truck Operating Manual
Driveline	Transmission, Drive shafts, Differential	Refer to Truck Operating Manual	Refer to Truck Operating Manual
OMSI	40K Clutch Main Drive Front Section	After 1st 50 Hours Then Every 200 Hours	Castrol TranSynd Full Synthetis ATF or Equivalent
OMSI	40K OMSI Filter	Every Fluid Change	OMSI Filter
OMSI	Rear Main Gearbox	After 1st 50 Hours Then Every 500 Hours or 12 months	75w90 Gear Oil
OMSI	Hydro-Static Planetary Gearbox	After 1st 50 Hours Then Every 500 Hours or 12 months	75w90 Gear Oil
Output Shaft	Shaft Between 40K Clutch And The Combo Skid	Weekly	General Purpose Grease
Pillow Block Bearings	3"Shaft Pillow Block Bearings	Daily (SH8000 only)	General Purpose Grease
Hydraulic System	Hydraulic Fluid Reservoir	500 hours or yearly	Aw68
Hydraulic System	High Pressure Hydraulic Filter	After First 100 hours then every 500 hours	Hydraulic Filter
Hydraulic System	Low Pressure Hydraulic Filter	After First 100 hours then every 500 hours	Hydraulic Filter
Roots Vacuum Blower	Blower Gear Case oil	After First 50 hours and then every 1,000 hours or yearly	ISO VG 320 Roots Oil High Temp - Synthetic
Dresser Roots Blower	Pulley End Bearings (Grease Fittings)	Daily (2 pumps Each Fitting)	Shell GADUS S2 U1000 2 Grease
Howden Roots Vacuum Blower	Pulley End Bearings (Grease Fittings)	Daily (2 pumps Each Fitting)	**Blowers with serial # beginning before 1608A** Shell GADUS S2 U1000 2 Grease **Blowers with serial # beginning with 1608A and later** Royal Purple Synthetic Grease
Tuthill Blower	Pulley End Bearings (Grease Fittings)	Daily (2 pumps Each Fitting)	Tuthill Lithium Complex Grease
Roots Vacuum Blower	Vacuum Filter	Inspect Daily	Clean or Replace
Kunkle Valve	Internal Relief Valve	Cycle several times each week	WD-40 or Equivalent
Jetstream Pump	Uni-valves	Every 100 hours (Lapping Procedure)	NA
Jetstream Pump	Crankcase Oil	After First 100 hours and then every 500 hours	75w90 Gear Oil
Hog Head	Thru-Shaft Motor Bearings	Daily	Mobil Polyrex EM Grease
Hog Head	Thru-Shaft Motor Pre-load Adjustment	Weekly	NA
Hog Arm	Chassis Wheels And Casters	Daily	General Purpose Grease
Hog Arm	Bearings, Hinges and Other Grease fittings	Weekly	General Purpose Grease
General Grease Points	Door Hinges, Debris Tank Tilt Pins, Vacuum Door Hinges, Ball Valves, Latches, ETC	Weekly More Frequently If Required	General Purpose Grease
This chart is a guide only. It should never be to supersede equipment manufacturer's specifications. Please refer to the manufacturer's operation and maintenance manuals for additional information.			

NOTES

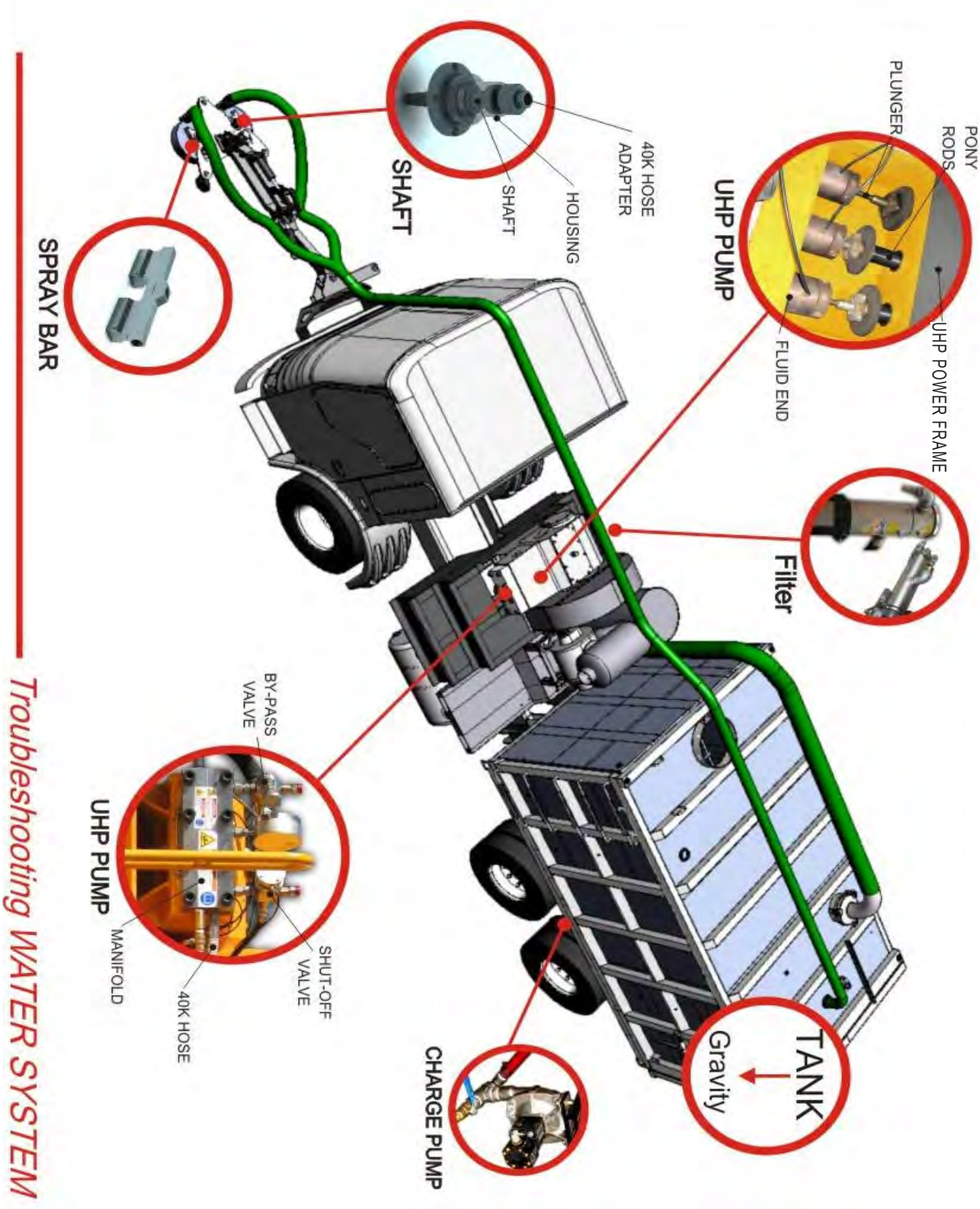
Waterblasting System Troubleshooting

PROBLEM	CAUSE AND SOLUTION
Noises & Vibrations	
Blower system noise.	• Loose blower belts or pump belts. Adjust or replace belts. • Blower or drive belts out of alignment. Align and adjust belts.
Hog Head noise.	• Hog Head rotation extremely high. Turn head rotation dial counterclockwise to reduce head speed.
High pressure pump noise.	• UHP pump pulley out of balance. Balance the pulley.
Hog Arm & Hog Head	
Hog arm won't raise.	• Float mode activated. Disengage float function. • Hydraulics not engaged. Engage PTO 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.	• Hydraulics not engaged. Make sure PTO is engaged 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. • Speed dial control is shut off. Turn the speed dial clockwise. • 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. • Dirt shield is too tight. Remove dirt shield and install new dirt shield only finger tight.
UHP Pump & High Pressure System	
Fluctuation or pulsing of 40k gauge or inlet pressure gauge.	• Valve may be pitted or cracked. Remove valve and check seats for damage - replace or rebuild. • Leaking packing. Determine which is leaking and change, flush and replace. • PTO slipping. Allow PTO to cool and make adjustments to tighten PTO.

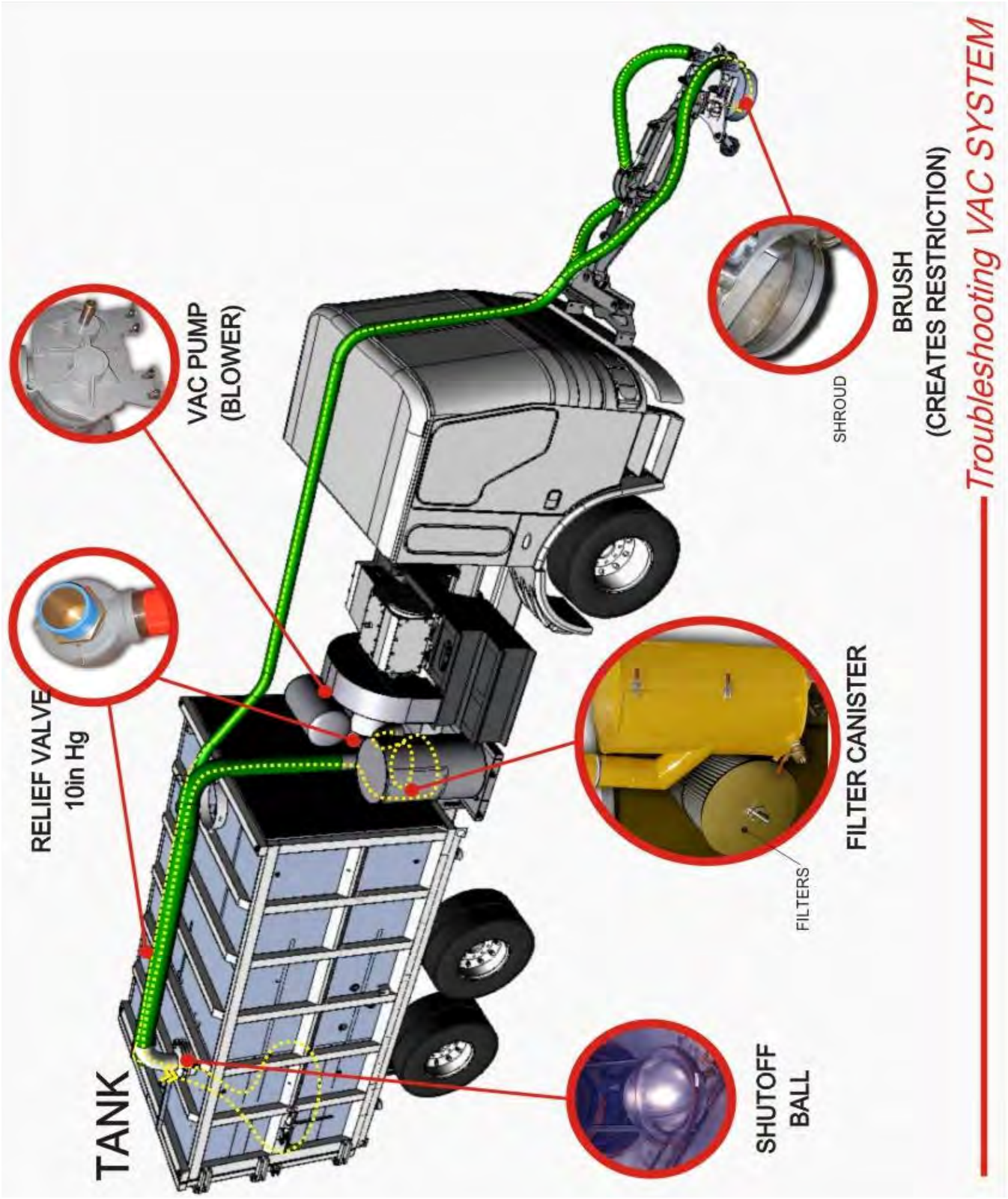
PROBLEM	CAUSE AND SOLUTION
UHP Pump & High Pressure System	
Water Leaks.	• Hose fitting indicator port leaking – fitting loose. Tighten fitting or replace hose and fitting • Fluid end manifold leaking at rectangular hole in manifold block – Stuffing box seal is worn out. Replace stuffing box ring seal. • Fluid end manifold leaking at round hole on top of manifold block – Valve seals worn. Replace valve seal or valve • Weep holes dripping at high pressure hose connection on thru-shaft motor – Loose swivel nut. Hand tighten swivel nut. • Leaking swivel seal. Remove spent seal, check shaft nipple, clean thoroughly and replace with new seal. • Cracked swivel or thru-shaft. Remove shaft assembly and disassemble to inspect shaft and replace if damaged or cracked on nipple end.
Low inlet pressure of 30 PSI or less.	• Dirty Filters. Change filter bag and cartridge. • Low or no inlet water pressure. Fill tank with water. • Empty Water Tank. Fill tank with water. • Clogged impeller on pump. Disassemble pump face and clean impeller or replace with a new impeller. • Cracked water line allowing air to be sucked in. Check and find any leaks and repair. • Low voltage (electric) or hydraulic fluid flow to charge water pump. Be sure batteries on pump or truck are charged or check hydraulic fluid level and flow. • Debris in water line from tank. Flush or replace with new line.
Low outlet pressure.	• Insufficient engine RPM. Raise rpm of engine. • Warn or blown nozzles. Change nozzles. • Oversized nozzles. Refer to chart to correct nozzle pattern. • Leaks – hoses, fittings, nozzles, pump valves or seals. Tighten or replace, check valves for heat indicating internal bypass. • Worn or missing button seal between spray bar and shaft. Replace with new button seal. • Air lock in fluid end. Remove rupture disc assembly or side port fitting, engage pump and run up to high rpm to remove air from the manifold. • Low inlet water pressure. Change dirty water filters - cartridge & bag.

PROBLEM	CAUSE AND SOLUTION
UHP Pump & High Pressure System	
Low outlet pressure.	• Low or no inlet water pressure. Check to see that water charge pump is on and valve to charge pump is open. • PTO slipping. Allow PTO to cool and make adjustments to tighten PTO. • Leaking packing. Determine which is leaking and change, flush and replace. • Leaking or cracked valves. Check face of manifold for heat to find leaking valve and replace or rebuild. • Shut-off (Dump Valve) cartridge leaking. Remove return hose and check cartridge, if leaking remove diffuser tube and replace cartridge. • By-pass valve cartridge leaking. Remove diffuser tube and replace cartridge. • Leaking swivel seal. Remove spent seal, check shaft nipple, clean thoroughly and replace with new seal. • Cracked swivel shaft. Remove shaft assembly and disassemble to inspect shaft and replace if damaged or cracked on nipple end.
Vacuum System	
Vacuum loss or failure.	• Engine and/or blower not running. Make sure engine is running and vacuum system is activated. • Vacuum blower RPM not high enough. Adjust RPM higher. • Vacuum filter dirty and clogged. Rinse with hose or replace if too badly clogged. • Worn or improperly adjusted shroud wear brush. Adjust or replace brush. • Broken vacuum hose or fitting. Inspect hoses & fittings and replace any parts damaged. • Vacuum line plugged with debris. Remove clogged hose, flush to remove blockage or replace with new hose if necessary. • Slipping vacuum belt. Tighten belt or replace if worn or damaged. • Debris tank door leaking. Make sure door is completely closed and latched. Check for proper seal inflation pressure. Open door and clean seal and contact area if necessary. • Debris tank dump valves open. Clear valves of any debris and close. If a valve still leaks, it may be necessary to replace the valve. • Relief valve stuck open. Lubricate plate & stem make sure it is free.

PROBLEM	CAUSE AND SOLUTION
Vacuum System	
Vacuum loss or failure.	• Vacuum filter canister door seal leaking. Replace seal to eliminate vacuum leak. • Vacuum filter canister dump valve leaking or open. Clean valve of any debris; if it is still leaking, it may be necessary to replace worn valve.
Relief valves open and whistling.	• Relief valve on top of debris tank open. Indicates a blockage in vacuum hose between the tank and the Hog Head. Locate and remove blockage. • Relief valve on vacuum filter canister open. Indicates (A) clogged vacuum filters or (B) high water/debris level lifting shut-off ball in debris tank. Clean or replace vacuum filters. Clean canister tank bottom or empty water from debris tank and dump debris. Clean shut off ball to prevent sticking in closed position. Replace debris bag, clean door seal and close.



Troubleshooting WATER SYSTEM


Troubleshooting VAC SYSTEM
BRUSH
(CREATES RESTRICTION)
SHROUD
VAC PUMP
(BLOWER)
RELIEF VALVE
10in Hg
FILTER CANISTER
FILTERS
TANK
SHUTOFF
BALL

Mobile Tool System

Rubber Hammer
#2 or #4 Hammer
2 Grease Guns with hose
Brass Wire Brush (Big and Small)
Putty Knife/Scraper
12" or 15" Pipe Wrench
Torque Wrench (50 foot lbs.) 3/8" Drive
Feeler Gauges
60-96 Piece Socket Set
Utility Knife (3 pieces)
Tool Box
6 Piece Screw Driver Set
Open End Wrench Set - 1/4"-7/8"
Needle Nose Pliers
Snap Ring Pliers
15" Crescent Wrench (adjustable)
12" Crescent Wrench (adjustable)
12" Channel Lock Pliers
Triangle Metal File (Small)
Pick Set (Dental Pick Type)
Allen Wrench Set (Standard and Metric)
Metric set must include 7mm allen
Deep Socket for Thru-Shaft - 1 1/8"
Deep Socket for Thru-Shaft - 15/16"
Brake Parts Cleaner (3 cans)
Scotch Bright Scratch Pads (Red)
Open End Wrench - 15/16"
Converter 3/8" to 1/2" for Torque Wr.
The mobile tool system has been designed as a complete system of tools required for the Stripe Hog. To reduce unnecessary downtime always ensure your mobile tool system is complete during the Pre-Operational checklist

Mobile Spare Parts System

Ultra High Pressure Pump Spare Parts Organizer Box
Hog Head Spare Parts Organizer Box
Vacuum Recovery System Spare Parts

With each truck we manufacture, Waterblasting Technologies provides a spare parts system. This spare parts system consists of (2) organizer boxes including labels as well as the suggested quantity to keep in the boxes for each component.

To ensure you have what you need when you need it a physical inventory of the spare parts system should be completed at a minimum of once a week. Keeping the spare parts system fully stocked at all times will reduce unnecessary downtime and expedited freight costs.

For further information on your specific spare parts system or to request additional labels or components please contact customer support at (001) (772) 223-7393 or visit StripeHogSupport.com

Daily Report

Date _____/_____/_____

Job Name or Number:	Employee Name:
Total Pump Hours:	Total length of removal:

Removal Type:	If Paint How many layers:

Consumable Used and Quantity:

Nozzles:	Swivel seals:
Brass Backups:	Debri Bags:
Cartridge Filters:	Bag Filters:
Packings:	Brushes:
Spray Bar Protectors:	

Job Summary:

*****Please make a concerted effort to only run the pump while blasting as these start and stop times will directly impact the overall production rates and skew the data*****

Pre-Op Checklist

Check Marks indicate the item is without issue, safe and ready for work

Tires
- ☐ Tire Pressure - Front
- ☐ Tire Pressure - Rear

Lighting Systems
- ☐ Brake
- ☐ Turn Signals
- ☐ Parking
- ☐ 4-Ways
- ☐ Strobe and Work Lights
- ☐ Reverse
- ☐ Headlight: High-Beams
- ☐ Headlight: Low-Beams

Operational Testing
- ☐ All switches and controls work
- ☐ Engage/Disengage Gearbox
- ☐ Charge Pump_____PSI
- ☐ 40K Clutch
- ☐ Spray Bar Rotation
- ☐ UHP Pump _____PSI at pressure test
- ☐ Hydrostatic Drive working correctly
- ☐ Run Arm (Up/Down/Left/Right)
- ☐ Water filters - Not below 30 PSI
- ☐ Water lube for packings

Tank System
- ☐ Fresh Water tank seals not leaking
- ☐ Fittings, Sight tubes
- ☐ Rear door seal clean
- ☐ Check vac hoses for leaks or loose bolts
- ☐ Check for leaks in Exchanger Systems
- ☐ Debris bag in place - Debris level ok
- ☐ Water on board is clean not milky

Electrical
- ☐ Check console switches and switch lights
- ☐ Check back up beeper
- ☐ Check Engage and Disengage lights
- ☐ Check low oil light (on/off)
- ☐ Check digital gauges (if applicable)
- ☐ Inspect Electrical Box

Spray Bars
- ☐ Nozzles Grade 4 or better
- ☐ Spray Bar covers in place
- ☐ Dirt Shield

Mobile Spare Parts and Tool System
- ☐ Mobile Spare Parts system complete
- ☐ Mobile Tool System complete

General
- ☐ Cab is Clean and swept out
- ☐ Stripe Hog Decals
- ☐ Wipers
- ☐ Horn
- ☐ Filling Hose and wrench
- ☐ Accident/Incident decals
- ☐ All wires, brake lines & hydraulic lines tied up & secure
- ☐ All components are neat and organized
- ☐ How's my blasting decal present on truck
- ☐ Complete tool box per inventory sheet

Fluid Levels
- ☐ Engine Oil 15W-40
- ☐ Automatic Transmission Oil
- ☐ Radiator 50/50 Mix
- ☐ Coolant Level
- ☐ Gearbox: Rear Lobe 80W-90
- ☐ Gearbox: Hydrostatic Drive 80W-90
- ☐ Gearbox: 40K Clutch TranSynd by Castrol
- ☐ Hydraulic Oil Level AW68(Low,Med or Topped Off)
- ☐ Jetstream Oil 80W-90
- ☐ Check for OMSI leaking oil

Belts
- ☐ UHP Pump - Check for tension and alignment
- ☐ Blower - Check for tension and alignment

Grease Points
- ☐ Thru Shafts
- ☐ Pillow block Bearings (Combo skid)
- ☐ Vacuum blower

Note any actions taken to correct an issue or comments concerning the condition of equipment

Nozzle Configuration Chart

SPRAY BAR NOZZLE CONFIGURATION CHART

Hog Technologies

SPRAY BAR NOZZLE CONFIGURATION CHARTS FOR ALL STRIPE HOG MODELS

High Cohesive Nozzle Flow Chart - FLOW - GPM @ Pressure Indicated					
Orifice	**20KPSI**	**26KPSI**	**30KPSI**	**36KPSI**	**40KPSI**
Dia./ins	(1379 Bar)	(1723 Bar)	(2068 Bar)	(2482 Bar)	(2758 Bar)
0.005	0.08	0.09	0.09	0.10	0.11
0.006	0.11	0.12	0.13	0.15	0.15
0.007	0.15	0.17	0. 18	0. 20	0. 21
0.008	0.19	0.22	0. 24	0. 26	0. 28
0.009	0.25	0.28	0. 30	0. 33	0. 35
0.010	0.30	0.35	0. 37	0. 41	0. 43
0.011	0.37	0.42	0. 45	0. 49	0. 52
0.012	0.44	0.50	0. 54	0. 59	0. 62
0.013	0.51	0.59	0. 63	0. 69	0. 73
0.014	0.60	0.68	0. 73	0. 80	0. 84
0.015	0.68	0.78	0. 84	0. 92	0. 97

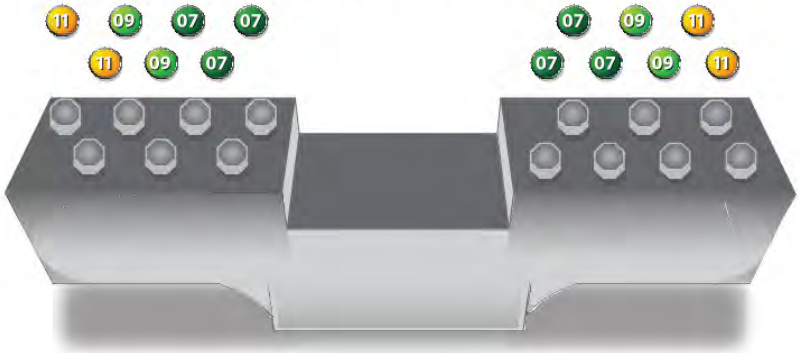
The GPM in each setup is calculated per spray bar.

Spray Bar Configuration Charts

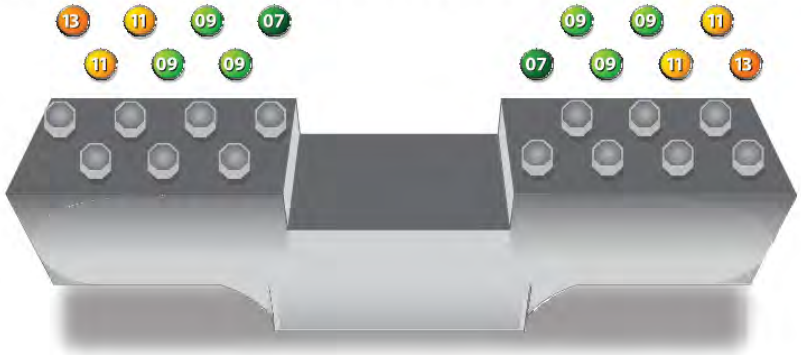
SPRAY BAR NOZZLE CONFIGURATION CHART

(These configurations are to be used as a general guide for flat line marking removal which may need to be altered to suit your situation.)

6", 14 Nozzle Spray Bar – 4" lines – Least Aggressive 4.48 GPM @ 36K PSI / 4.74 GPM @ 40K PSI



6", 14 Nozzle Spray Bar – 4" lines – Most Aggressive 5.72 GPM @ 36K PSI / 6.06 GPM @ 40K PSI



SPRAY BAR NOZZLE CONFIGURATION CHART

(These configurations are to be used as a general guide for flat line marking removal which may need to be altered to suit your situation.)

8" Least Aggressive Set Up 4.70 GPM @ 36K / 4.98 GPM @ 40K PSI

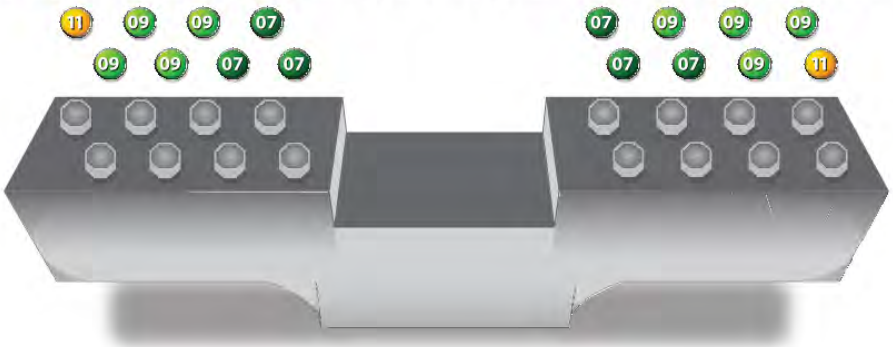
8" Medium Aggressive Set Up 5.41GPM @ 36K /5.74 GPM @ 40K PSI

8" Most Aggressive Set Up 5.59 GPM @ 36K / 5.92 GPM @ 40K PSI

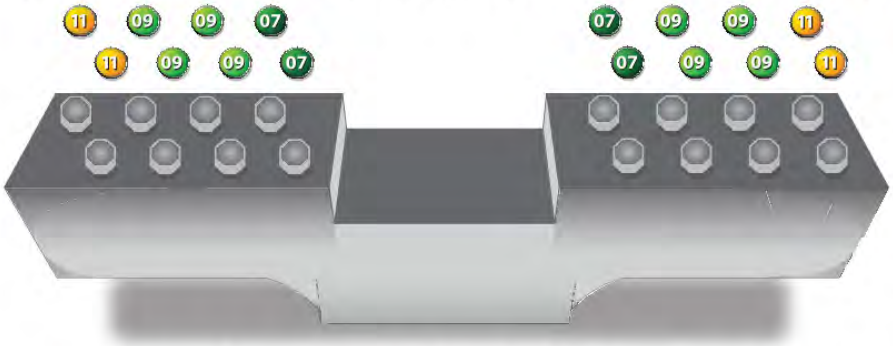
SPRAY BAR NOZZLE CONFIGURATION CHART

(These configurations are to be used as a general guide for flat line marking removal which may need to be altered to suit your situation.)

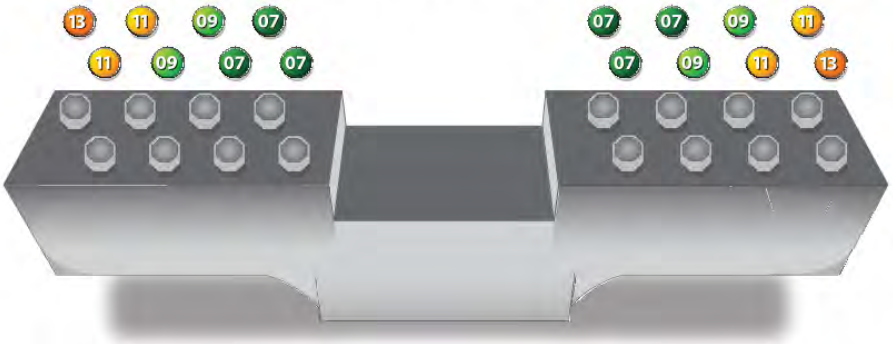
8” & 10”, 16 Nozzle – Least Aggressive set-up 4.82 GPM @ 36K PSI / 5.1 GPM @ 40K PSI



8” & 10”, 16 Nozzle - Medium Aggressive set-up 5.4 GPM @ 36K PSI / 5.72 GPM @ 40K PSI



8”, & 10”, 16 Nozzle - Most Aggressive set-up 5.86 GPM @ 36K PSI / 6.2 GPM @ 40K PSI



SPRAY BAR NOZZLE CONFIGURATION CHART

(These configurations are to be used as a general guide for flat line marking removal which may need to be altered to suit your situation.)

14" Least Aggressive set-up 4.81 GPM @ 36K PSI / 5.09 GPM @ 40K PSI

14" Medium Aggressive set-up 5.46 GPM @ 36K PSI / 5.78 GPM @ 40K PSI

14" Most Aggressive set-up 5.66 GPM @ 36K PSI / 5.98 GPM @ 40K PSI

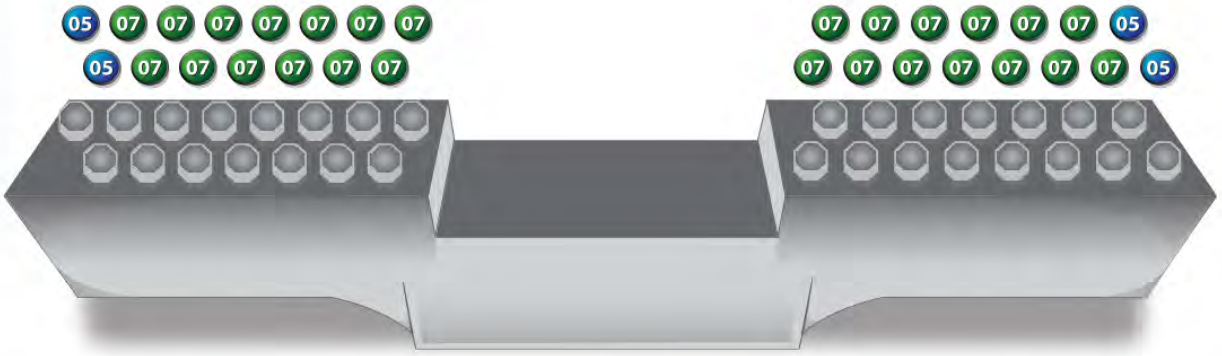
SPRAY BAR NOZZLE CONFIGURATION CHART

(These configurations are to be used as a general guide for rubber removal and/or curing compound removal which may need to be altered to suit your situation.)

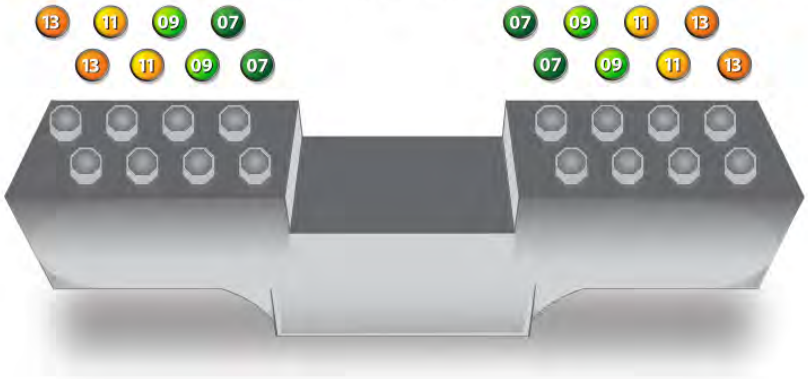
Hog Technologies

SPRAY BAR NOZZLE CONFIGURATION CHARTS FOR ALL STRIPE HOG MODELS

14", 22" & 36", 30 Nozzle -Rubber Removal and/or Curing Compound Removal – 30K to 33K PSI



8" & 10", 16 Nozzle Curing Compound Removal set-up - 25,000 - 35,000 PSI



Nozzle Calculation Sheet

36K Nozzle Calculation Sheet

Size	GPM	Quantity	Total GPM

Total Accumulative GPM

40K Nozzle Calculation Sheet

Size	GPM	Quantity	Total GPM

Total Accumulative GPM

Remember to multiply the total by two if you have a two head system. The total should not exceed 11.8 gpm. If it does, you will not achieve pressure.

Remember that the total available gpm varies by 12% for individual machines.

NOTES

Waterblasting Terms

1 Micron Cartridge Filter - Traps smaller particles that may come from the clean water tank and pass through the charge pump.

10 Micron Bag Filter – Traps larger particles that may come from the clean water tank and pass through the charge pump.

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 – 5 days of on-site training to operate and maintain the stripe hog unit.

Bilge Box – box beneath the ultra-high pressure manifold that contains the sump to collect lubrication and cooling water from the UHP pump.

Bilge Pump – Pumps or removes the water from the bilge box to the debris tank.

Blast 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 blast head and the road surface to reduce the amount of debris and water exiting during waterblasting operations.

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

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

Manual Bypass Valve – Located on the ultra-high pressure pump and used to manually adjust pressure.

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

Castor Plate – Supports the hog head and prevents the spray bar from touching the ground.

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 UHP pump.

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

Charge Pump – Centrifugal pump that supplies water to the ultra-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 Level Sensor – Sensor that reads the level of water in the clean water tank and indicates the information on the PLC.

Clean Water Tank – Modular tanks located on the rear of the chassis used to store the clean water supply for the UHP system.

Cutoff Ball Valve – Located inside the debris tank as a safety feature to stop the flow of vacuum if the tank becomes full.

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

Dirt Shield – Threaded flat washer that protects the lower radial bearing of the thru-shaft from dirt and debris.

Diverter Valve – Safety feature on the ultra-high pressure pump that recirculates water to the blast head or back to the clean water tank.

Double blast head design – Allows two heads to be mounted on the hog arm and operate simultaneously

Felt Gasket – Attaches to the dirt shield to protect the shroud from damage while the spray bar is rotating.

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

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

Forward Tank – Tank on the truck chassis reserved for the clean water tank.

GPM – Gallons per minute of water produced by the ultra-high pressure pump.

Head Rotation Speed Dial – Controls the speed of the blast heads when operating in manual mode.

Hg – Symbol that indicates inches mercury. Used to measure vacuum air flow. Maximum vacuum is -7psi

Hog Arm – 5-axis arm that raises, lowers and moves the blast heads 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.

Holding Tank – Area below the debris tank that catches the recovered water that drains from the 100 micron debris bag.

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

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

Joystick Console – Console in the cab of the truck that houses the joystick, start/stop button, head rotation speed dial, truck speed dial, and digital high pressure and charge pressure gauges, float and forward rocker switches.

Kunkle Valves – Vacuum safety relief valve that opens when there is excessive vacuum.

Manhole – Opening on the top of each clean water tank that provides access to the interior of the tank. This should always remain locked.

Manual Bypass Valve – Manual adjustment valve that releases small amounts of water back to the clean water tank to adjust pressure

Manual High Pressure Gauge – Manual gauge on the UHP pump that displays the operating pressure of the pump.

Metering Valve – Controls the flow of cooling and lubrication water to the stuffing box.

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

PLC – Programmable logic controller located in the cab of the truck and displays digital information on the waterblasting system.

Poly Chain Carbon Drive Belt - A high tensile strength belt designed for high horsepower industrial applications. Used to drive the UHP pump and blower.

Potable Water – Clean water that is suitable for drinking.

Pressure Switch 1/2 – Controls the head rotation hydraulic coils. If the charge water pressure drops below 30 psi the pressure switch will stop the heads from spinning.

Pressure switch 18/30 – Controls the OMSI 40K clutch. If the charge water pressure drops below 30 PSI, this pressure switch will disengage the clutch.

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 tank used to hold the 100 micron debris bag.

RPM – Revolutions per minute. The revolutions of the engine crankshaft, pump or motor each minute.

Rupture Disc – Pressure relief device to protect equipment from over pressurization.

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

Shutoff Cartridge – Component of the diverter valve that shuts off the flow of water.

Silencer – Muffles the sound of the airflow being pulled through the vacuum blower.

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

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

Spray Bar Protector – Cover for the spray bar that shields the nozzles and spray bar from damage caused by debris during blasting operations.

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

Stripe Hog – Ultra high pressure water blasting equipment manufactured by Hog Technologies to remove paint and rubber from road surfaces.

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

Swivel Nut – Locks the ultra-high pressure hose onto the thru-shaft.

Swivel Seal – Utilized to create the ultra-high pressure seal required for the ultra-high pressure hose connection.

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 5-axis hog arm as a safety feature to prevent the hog arm from drifting downward while the truck is in Drive Mode.

Thru-Shaft – Hydraulic thru-shaft motor that connects and rotates the spray bar on the hog head assembly.

Two Stage Filter System – Process of the water passing through 2 filters prior to reaching the ultra-high pressure pump to reduce debris in the system.

Two Way "Y" Connector – Splitter that allows the use of two vacuum hoses from one source.

Ultra High Pressure Hose – Hose rated at 40,000 psi that connects to the thru-shaft and the ultra-high pressure pump.

Ultra High Pressure Pump (UHP Pump) – Piston type positive displacement pump that supplies ultra high water pressure to the spray bars.

UNI-VALVE – Separates the high and low pressure water in the ultra high pressure pump.

Vacuum Filter – Filter cartridge inside the vacuum filter canister that traps debris in the vacuum air flow before it enters into the blower.

Vacuum Hose – 4" hose connects to the shroud at the blast head to transport airflow to the debris tank. 6" hose draws airflow from the debris tank to the filter canister.

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.

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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

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Get the parts you need when you need them.

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

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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

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.

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(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!

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