# SK2000 Trailer
# Operation Manual

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WWW.THEHOG.COM

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

**CAUTION**

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

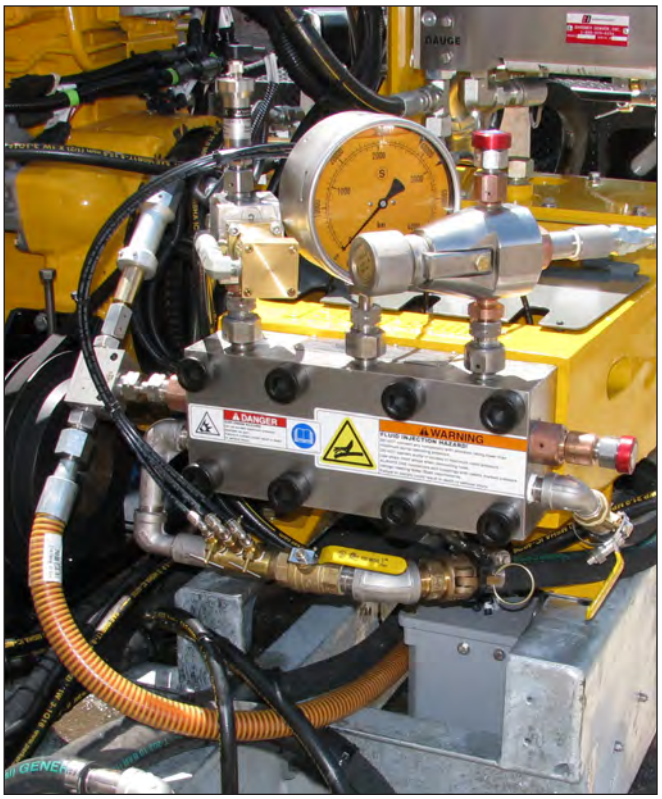
**WARNING**

**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 WATER BLASTING 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 water blasting equipment requires professional training, including safe work practices and procedures. Only professionally trained personnel should be allowed to setup, operate, or maintain high pressure water blasting 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 the nozzle tip exceeds that of a bullet coming out of a gun. Contact with the high pressure blast can result in the loss of a limb or water injection into the bloodstream. If injection occurs in a vulnerable part of the body, death may result.

### Always Read Instructions

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

### Major Component Operation Manuals

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

**REMEMBER - IT IS YOUR RESPONSIBILITY TO ENSURE THAT YOUR EQUIPMENT IS SAFE FOR YOU AND YOUR CREW. ALWAYS EXERCISE GOOD JUDGMENT WHEN INSTALLING OR REPAIRING EQUIPMENT AND WHILE OPERATING WATER BLASTING 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 water blasting head. 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 water blasting 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 water blasting head or other high pressure components, always make sure the high pressure system and trailer engine are shutdown.

### Use Only Products Intended for High Pressure water blasting 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 system replacement parts must have a stated minimum burst rating of 1.5 times the maximum operating pressure. All equipment pressure rating and warning tags should be left intact.

### Product changes

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

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

If you have questions about the equipment on your 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 AN INTERNAL COMBUSTION ENGINE AND FLAMMABLE FUEL. EVERY PRECAUTION HAS BEEN TAKEN BY HOG TECHNOLOGIES TO REDUCE THE RISKS ASSOCIATED WITH POSSIBLE INJURY AND DAMAGE FROM FIRE OR EXPLOSION, BUT YOUR OWN PRECAUTION AND GOOD MAINTENANCE PROCEDURES ARE NECESSARY TO ENSURE THE SAFE OPERATION OF YOUR EQUIPMENT.**

### Store Components Properly

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

### Freezing Conditions

The water and vacuum systems, hoses and the water blasting head should be drained of all water or filled with an antifreeze 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 DUMP VALVE switch.

**⚠ WARNING ⚠**

**INJURIES FROM ULTRA-HIGH PRESSURE SYSTEM WATER BLASTING 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 a spray bar to the Hog Head assembly, engage the high pressure pump at low speed to purge the system. Any dirt or debris in the system can clog nozzle orifices and cause system pressure to spike excessively, causing damage to components.

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

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

### Use Safety Protection
Always use eye protection to protect eyes from projected debris. Use ear protection to protect from noise levels generated from pump, vacuum and water blasting operations.

**WARNING**

**ULTRA-HIGH PRESSURE SYSTEM 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., the trailer, hoses, people, walls, moving vehicles, live lanes of traffic, etc.

### Test System
With the spray bar and high cohesive nozzles installed and the blasting head raised, 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 and shutdown the high pressure system and trailer engine 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 the DUMP VALVE switch two times at operating pressure to check the operation of the blasting head 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 Dumping Pressure
When setting pressure ***ALWAYS*** ensure that the system pressure drops to less than 100 psi (7 bar) immediately when the DUMP VALVE switch turned off. If this does not relieve system pressure immediately to below 100 psi (7 bar), 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, relieve the pressure in the system and shutdown the trailer engine before attempting any repair. Always follow manufacturer's repair instructions.

### Never Blast When Stopped
Always make sure ultra-high pressure system is disengaged before forward or reverse motion is stopped. Damage to road surface will occur if blasting continues when the blasting head is brought to a stop.

**⚠ WARNING ⚠**

**MOST HIGH PRESSURE WATER BLASTING 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 SYSTEM 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 system 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 system hose to a tight radius (less than 30" (.8 m) or pull on a coiled hose. Always make sure the hoses are straight with no coils before pulling on the hose to deploy it.



C. Never pull hard on an ultra-high pressure system 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 an ultra-high pressure system 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 clean water tank must have a large enough diameter and psi strength so that potentially dangerous release pressure is allowed full flow and release pressure is contained safely. Keep hose in good condition.

## *1.5 High Pressure Fitting Safety*
### Fitting Ratings
Use high pressure fittings with a rating of 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 trailer 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.

## *1.7 Trailering Safety*
A. The tow vehicle must be rated for the expected trailer and tongue weight.

B. Check trailer tire air pressure.

C. Make sure the hitch is latched and locked.

D. Connect and test trailer lights.

E. Make sure the safety chains are crossed and connected.

F. Test the trailer brakes for proper operation.

G. Empty the clean water tank and waste water bladder before trailering on the highway when possible to reduce trailer weight.

# DANGER

**AN INJURY CAUSED BY HIGH PRESSURE WATERJETS CAN BE SERIOUS. YOU SHOULD READ THIS WARNING STATEMENT CAREFULLY AND ALWAYS CARY THE MEDICAL INFORMATION CARD WITH YOU.**

- **IN THE EVENT OF ANY WATERJET INJURY:**
- **SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT DELAY.**
- **INFORM THE DOCTOR OF THE CAUSE OF THE INJURY.**
- **SHOW THE DOCTOR THE MEDICAL INFORMATION CARD OR THIS WARNING STATEMENT AND NOTE TO PHYSICIAN BELOW.**
- **TELL THE PHYSICIAN WHAT TYPE OF WATERJET PROJECT WAS BEING PERFORMED AT THE TIME OF THE ACCIDENT AND THE SOURCE OF THE WATER.**

## MEDICAL ALERT

### NOTE TO PHYSICIAN

**This patient may be suffering from a waterjet injury. Evaluation and management should parallel that of a gunshot injury. The external manifestations of the injury cannot be used to predict the extent of internal damage. Initial management should include stabilization and a thorough neurovascular examination. X-rays can be used to asses subcutaneous air and foreign distant from the site of the injury. Injuries to extremities can involve extensive nerve, muscle, vessel damage as well as cause a distal compartment syndrome. Injuries to the torso can involve internal organ damage. Surgical consultation should be obtained. Aggressive irrigation and debridement is recommended. Surgical decompression and exploration may also be necessary. Angiographic studies are recommended preoperatively if arterial injury is suspected. Bandages with a hygroscopic solution ($mgso_4$) and hyperbaric oxygen treatment have been used as adjunctive therapy to decrease pain, edema and subcutaneous emphysema. Unusual infections with uncommon organisms in immunocompetent patients have been seen; the source of the water is important in deciding on initial, empiric antibiotic treatment, and broad-spectrum intravenous antibiotics should be administered. Cultures should be obtained.**



*SK2000 Water Blasting System Mounted On A Trailer Chassis*

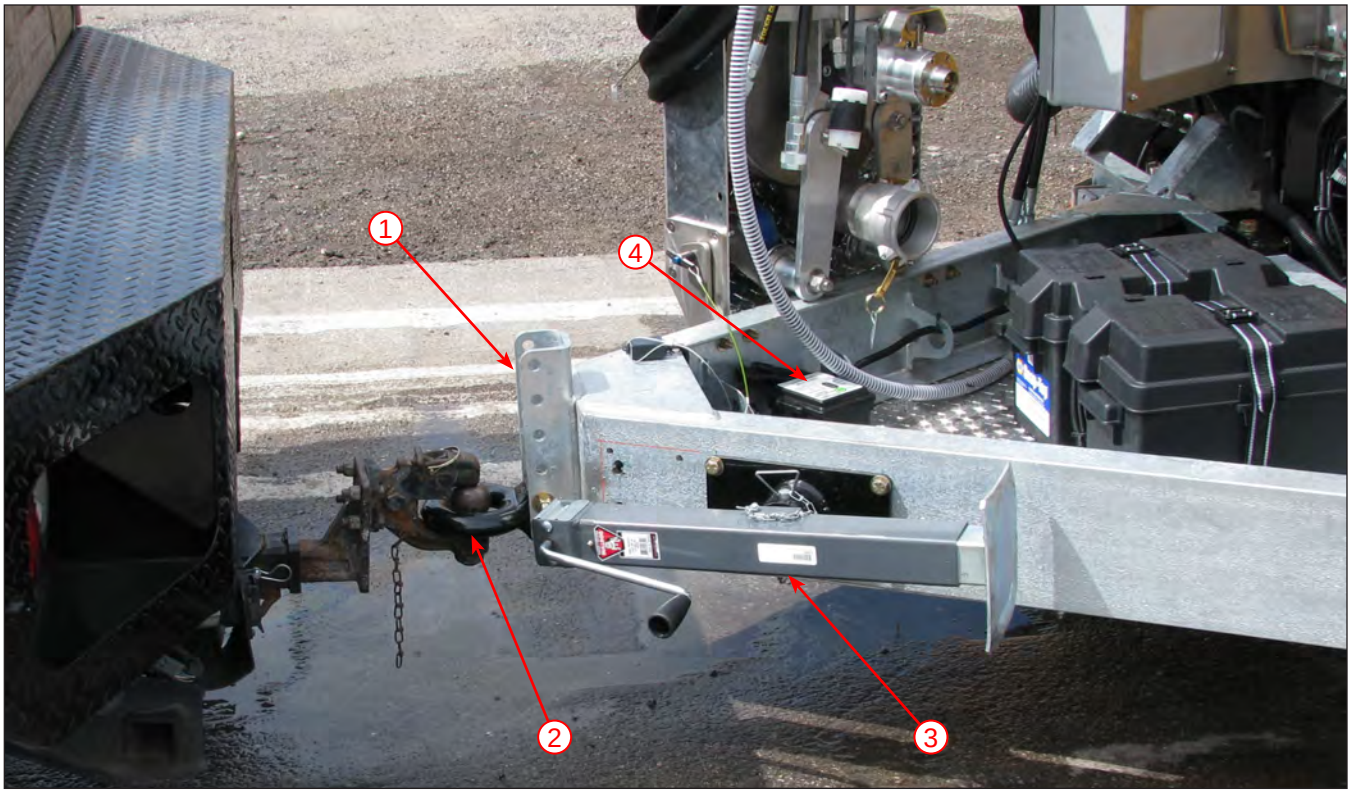
## 2.1 Stripe Hog System Introduction

### Introduction

The SK2000 water blasting system is mounted to the trailer chassis and powered by an onboard diesel engine and a belt driven hydraulic pump. The water blasting system includes an ultra-high pressure water system, vacuum system, water tank with an integrated wastewater bladder, hydraulic system and a DC electrical system.

Most components are controlled by switches in control panels mounted on the front of the trailer. Dumping and other operations are controlled by a removable remote switch panel connected to a plug on the chassis. Quick connect hydraulic hose connectors and a 12 volt DC plug is provided to connect the optional HT1000 Ground Hog, HT2500 Hog Rider or other Hog Tools to the water blasting system.

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




*Trailer Chassis Coupler, Jack & Break-Away System*

1. Pintle Coupler Mount Bracket
2. Pintle Coupler
3. Trailer Jack
4. Trailer Break-Away System & Battery

## 2.2 Trailer Chassis

The waterblasting system is mounted to a heavy duty trailer with a welded galvanized steel frame, tandom torsion axles, pintle style coupler, brakes, lights and a tongue jack.

The trailer weighs 12,000 lbs (5443 kg) with empty fuel and water tanks and 17,000 (7711 kg) to 18,000 lbs (8165 kg)when the tanks are full. Tongue weight is 2,700 (1225 kg) with empty tanks and 3,500 lbs (1588 kg) when they are full. Make sure your vehicle is rated to handle the tongue and gross vehicle weight of the trailer.

### Pintle Hitch

The standard pintle coupler is bolted to a bracket on the front of the trailer. Bolt holes in the bracket allow the coupler to be moved up or down to accommodate a variety of tow vehicle hitch heights.

### Trailer Jack

A swivel mounted jack on the side of the trailer frame raises or lowers the trailer coupler. A pin on the swivel mount is removed to swivel the jack down for use and up for travel. Insert the pin with the jack in the up or down position to secure the jack in the selected position.

### Trailer Lights

All trailers are equipped with side marker and tail lights that are connected to the tow vehicle. Always test the lights to make sure they are operating properly whenever the trailer is connected to the tow vehicle.

### Electric Brakes

Each axle is equipped with electric brakes activated by a brake controller in the cap of the tow vehicle. The controller applies the trailer brakes whenever the tow vehicle brakes are activated. The controller senses the tow vehicle deceleration rate and activates the trailer brakes in proportion to the vehicles braking action.

### Trailer Break-Away System

The system includes a break-away system with a cable tether attached to the tow vehicle and the break-away switch that automatically applies the trailer brakes and stop the trailer if it should accidently disconnect from the tow vehicle while driving. The system includes a separate battery charged by the vehicle that provides electrical power to the brake actuators at each wheel if the trailer disconnects while towing.

A test button and LED status lights show the condition of the battery. You should always press the test button to check the status of the break-away system battery each time the trailer is attached to the tow vehicle.

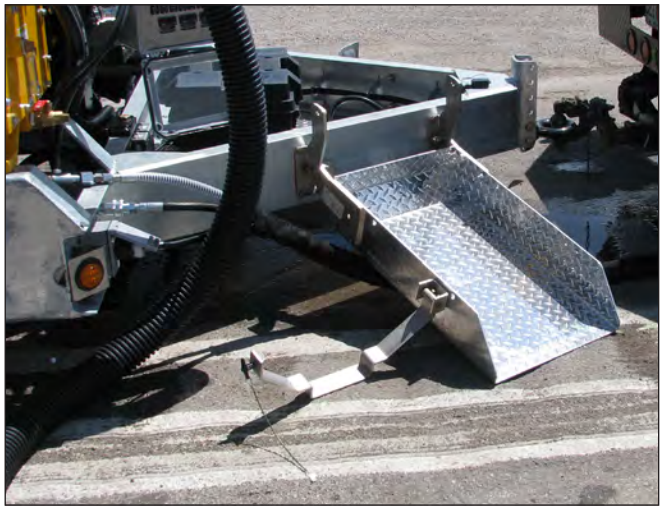

*Trailer Break-Away System & Battery*

## *2.3 Ground Hog Landing Pad*

The Ground Hog is typically stored and transported on a special landing pad on the trailer chassis. The pad is equipped with a ramp and tie down bracket for easy loading and to secure the Ground Hog for transport.

Spring loaded safety pins on each side of the ramp secure it in the stored position. It is lowered for loading and unloading by removing the pins and lowering the ramp until is resting on the pavement. The tie down bracket is hinged and secured with a spring loaded safety pin.

Refer to the Water Blasting Operation section for instructions to load and unload the Ground Hog.

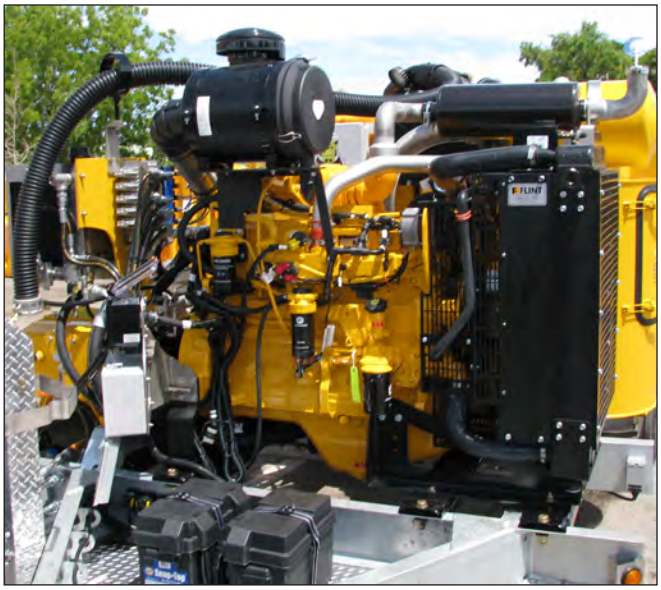


*Ground Hog Landing Pad*

*Ground Hog Secured On Landing Pad*

## 2.4 Trailer Mounted Trailer Engine

The ultra-high pressure system pump is powered by the onboard auxiliary diesel engine. The vacuum system, charge water pump and all other hydraulically powered systems are powered by a hydraulic pump connected to the engine by a pulley and belt drive system. An electronic engine control panel at the front of the trailer provides complete control of the engine. It also monitors critical engine systems and provides warnings and/or automatic shutdown to prevent costly engine repairs in the event a critical engine function fails.



*Typical Trailer Engine*

A tank mounted on the forward trailer chassis provides fuel for the engine. A digital gauge in the engine control panel monitors fuel flow to the engine and total gallons consumed. Some tanks are also equipped with a fuel level gauge. The fuel tank should be filled at the start of each shift.

The engine and water blasting system DC electrical system is equipped with onboard batteries, circuit protection and charging system. Refer to the Electrical System section for additional information on the engine and water blasting electrical system.

*Trailer engine Control Panel*

The ultra-high pressure (UHP) system pump is directly driven by the trailer engine. The pump is mounted to a reduction gear case that reduces the output shaft RPM to between 500-600 RPM, which is the operating range for the pump. A flexible coupler between the engine and pump reduces vibration and reduces the possibility of engine damage from a catastrophic pump failure. The gear case is equipped with a site glass to monitor oil level. Refer to the Scheduled Maintenance section for addition information on the reduction gear case.

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

### Trailer engine Throttle Control

The operator uses the hare/turtle throttle switch on the engine control panel to set the engine speed for the desired water blasting pressure and vacuum. Press and hold the top (hare) of the throttle rocker switch to increase engine speed. Press and hold the bottom (turtle) of the rocker switch to decrease engine speed.

The engine remains at the selected engine speed until it is increased or deceased by the operator using throttle switch. Consequently, when the DUMP VALVE switch is turned off, the engine RPM remains at the preset speed. This allows the water blasting system to develop full pressure immediately when the DUMP VALVE switch is turned on.

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


*Clean Water Tank & Valves*

1. Clean Water Tank Drain Valve
2. Clean Water Tank Fill Valve
3. Clean Water Tank
4. Clean Water Tank Site Tube

## 2.5 Ultra-High Pressure System Water System

Each manufacturer of the high pressure water blasting 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 water blasting 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 DUMP VALVE SWITCH TO ACTIVATE THE ULTRA-HIGH PRESSURE SYSTEM.**

### Clean Water Tank

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

An expandable bladder inside the freshwater tank provides a reservoir for wastewater pumped to the bladder from the debris tank drain system during operation. As the clean water in the tank is consumed, wastewater from the debris drain system is pumped into the bladder which expands into the space created as the clean water is consumed. Refer to the Debris Tank at the end of this section for additional information on the wastewater drain system.

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

Only use potable water (clean enough to drink) to increase the service life of the components in the ultra-high pressure system. Always flush the water source for several minutes prior to filling


*Wastewater Bladder Drain Valve*

the tank to help ensure that no debris enters the system. Additionally, the tank should be flushed frequently with clean, fresh water to prevent the accumulation of debris that may accidently enter the tank.

There is a 3” ball valve on the right side bottom of the tank that allows for quick draining of the tank when flushing is required and complete draining for system winterization. Another 3” valve on the left side provides drainage for the wastewater bladder. A large man-way hatch on the top of the tank provides access to the interior of the tank or wastewater bladder for inspection or to facilitate cleaning.

*Man-Way Hatch On Clean Water Tank*

Remember that the wastewater bladder displaces clean water in the tank as it fills, causing the site gauge to show more water than is actually in the tank. The site gauge is intended to provide

an accurate indication of the water level during filling operations only. It is not a reliable level indicator during operation when the dirty water transfer pump is being used to collect recovered wastewater.

Use actual blasting time during operation with an average pump consumption of 5 gallons (19 liters) per minute to estimate the remaining clean water in the tank. To ensure maximum clean water volume, always completely drain the wastewater bladder before filling the clean water tank.

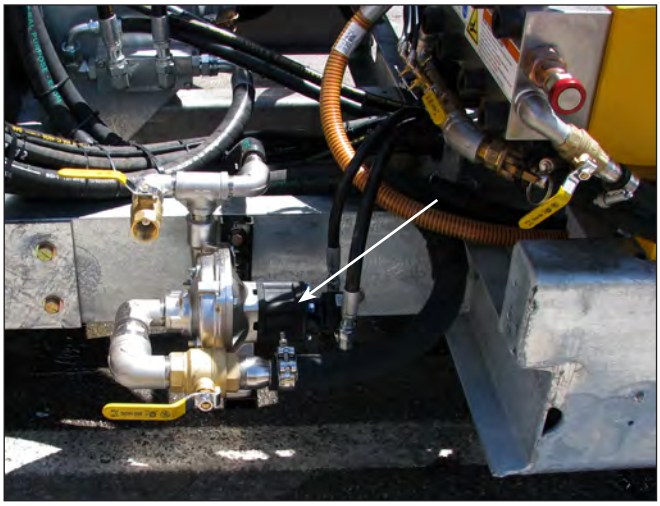
### Charge Water Pump

The charge water pump is a hydraulically powered centrifugal pump that provides a constant supply of water to the ultra-high pressure (UHP) system pump.

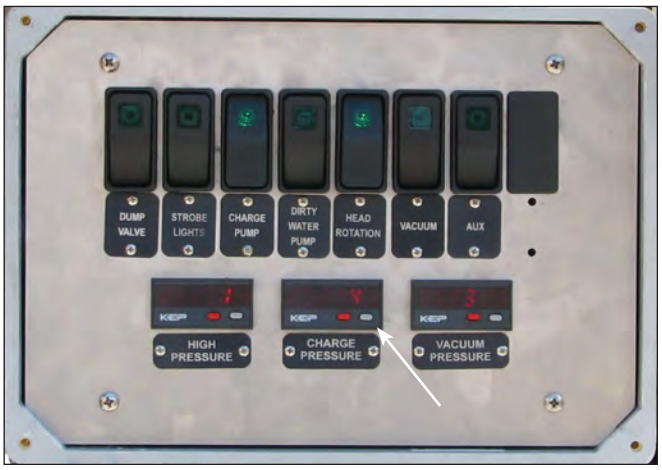
A supply valve located between the clean water tank and the charge water pump controls the flow of water. Always make sure there is at least a half a tank of water and the supply valve is open prior to engaging the charge water pump. If the charge water pump is engaged while this valve is closed or there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

The charge water pump is activated by pressing the CHARGE PUMP switch in the trailer switch panel. (Refer to Startup Procedure in the Operation section of this manual) Once activated, a green light will illuminate to confirm the charge water pump is engaged. A charge pressure gauge in the switch panel 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 60-70 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 whines 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, immediately turn the charge pump OFF. Make sure the supply valve is open, check both filters and/or bleed the air from the system. Operators should be familiar with the normal sound of the pump and stop blasting if the sound changes. Find and correct the problem before water blasting operations resume.



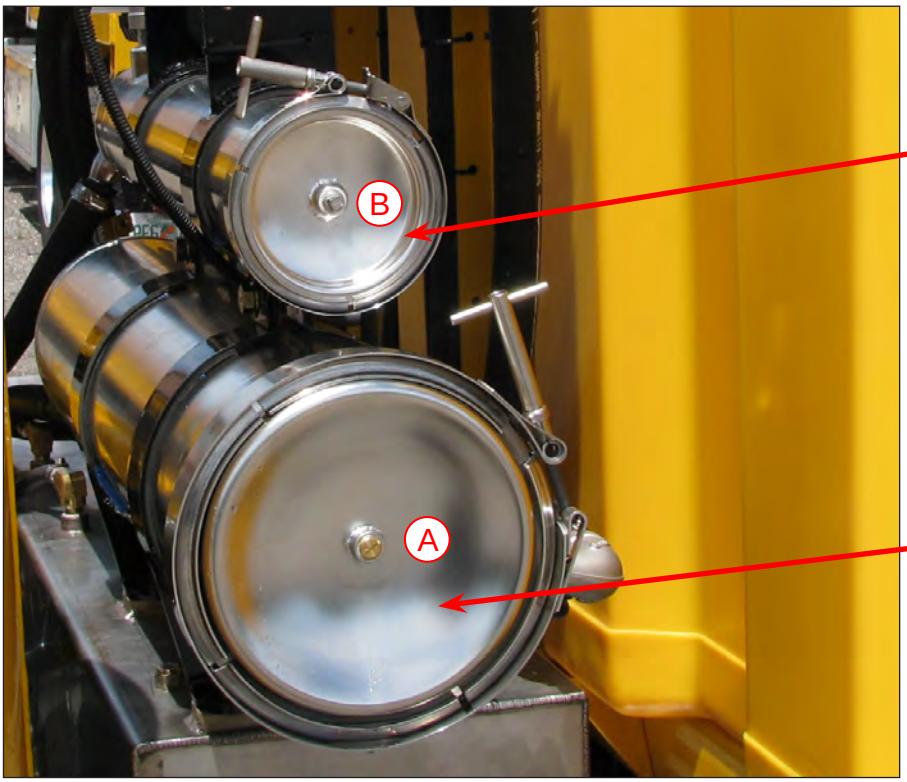
*Charge Pump*

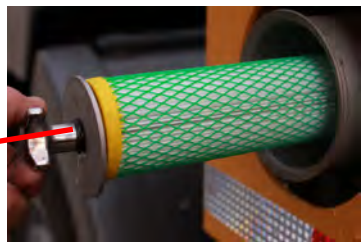



*Digital Charge Water Pressure Gauge In Switch Panel*

**NOTICE:**
**THE UHP PUMP CAN CAVITATE IF THE CHARGE WATER PRESSURE DROPS BELOW 25 PSI (2 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 BAR.)**

**NOTICE:**
**UHP SYSTEMS ARE EQUIPPED WITH A PRESSURE SAFETY SWITCH THAT WILL DEACTIVATE THE DUMP VALVE IF CHARGE WATER PRESSURE DROPS BELOW 30 PSI (2 BAR).**



*Two Stage Filter System*
*A) 10 Micron Filter  B) 1 Micron Filter*

## Filters

A two stage filter system in the supply line from the charge pump to the ultra-high pressure system 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. The second stage is a 1 micron cartridge filter that traps smaller particles.

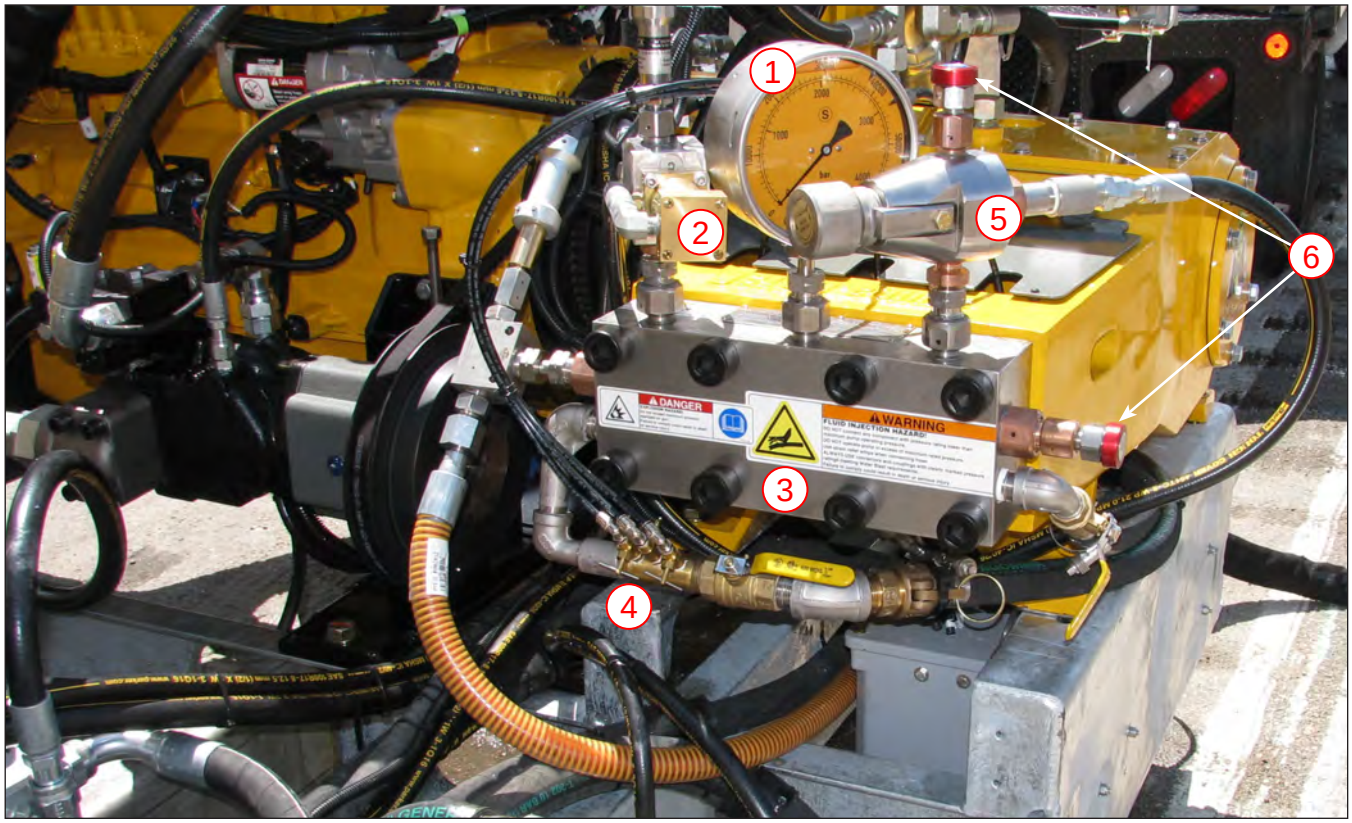
The filters are critical to the proper operation of the ultra-high pressure water system. They should be checked daily and changed when the charge pressure drops to 35 psi (2.4 Bar) (Refer to filter change procedure in Maintenance section of this manual). Dirty charge water filters are the number one reason for low charge water pressure.

**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 trailer engine and UHP pump are shutdown, the CHARGE PUMP switch is off, and the pressure has been bled from the system before removing the filter caps.

Always thoroughly flush the filter canisters and charge water system when the filters are changed and before activating the ultra-high pressure system. A purge valve located on the low pressure (charge water) side of the pump can be opened to purge the system after a filter change or to flush the charge water side of the pump if the system becomes contaminated.




*Ultra-High Pressure System Pump Components*

1. High Pressure Gauge
2. Dump (Diverter) Valve
3. High Pressure Pump Manifold
4. Packing Water & Lubrication Valves
5. Manual Bypass Valve
6. Rupture Disc

**⚠ CAUTION ⚠**

**LOW CHARGE WATER PRESSURE CAN QUICKLY DAMAGE THE UHP PUMP. THE OPERATOR MUST MONITOR THE CHARGE WATER PRESSURE CLOSELY AND IMMEDIATELY SHUTDOWN THE UHP PUMP, WATER BLASTING SYSTEM AND CHARGE WATER PUMP IF LOW CHARGE WATER PRESSURE IS INDICATED.**

**USE THE FOLLOWING PROCEDURE TO SHUTDOWN WATER BLASTING SYSTEM AND CHARGE WATER PUMP:**

- **Press the EMERGENCY STOP button on the engine control panel or turn the key off to shutdown the trailer engine, UHP pump and water blasting system.**
- **Turn the CHARGE PUMP switch off**

## Ultra-High Pressure System Pump

The ultra-high pressure system 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 BAR) to operate properly and prevent cavitation. The operator must monitor the charge water pressure closely and immediately shutdown the water blasting system if the charge water pressure drops below 30 psi (2 BAR) to protect the charge water pump from running dry and protect the UHP pump from damage due to overheating and cavitation.

The UHP pump is powered by the trailer engine thru a direct drive reduction gear on the engine. Since the pump is direct drive, it begins turning as soon as the engine starts. (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 in the switch panel.

**CAUTION**

**THE TRAILER ENGINE MUST BE SHUTDOWN TO DISENGAGE AND STOP THE UHP PUMP FROM ROTATING. IF LOW CHARGE WATER PRESSURE IS INDICATED OR A SERIOUS FAILURE OCCURS IN THE UHP PUMP OR HIGH PRESSURE SYSTEM, USE THE EMERGENCY STOP BUTTON ON THE TRAILER ENGINE CONTROL PANEL TO IMMEDIATELY SHUTDOWN THE UHP PUMP AND WATER BLASTING SYSTEM.**

Maximum operating pressure for the UHP pump of 40,000 psi (2,758 BAR) @ 5 gallons (19 Liters) per minute is usually achieved at or near maximum engine RPM (Typically 2350 RPM). High 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 developing and maintaining proper vacuum for the debris recovery system and less than maximum waterblasting pressure or gallons per minute is desired for the material being removed or the waterblasting tools being used.

The gallons per minute (GPM) produced by the ultra-high pressure system pump is controlled by pump RPM, plunger diameter, length of stroke and number of plungers. Once the ultra-high pressure system 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 system 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 system 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 system water to flow into the 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 Dump 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 inventory to prevent downtime.


*Typical UHP Pump Pressure Gauge*


*Digital High Pressure Gauge*

## Dump Valve (Diverter Valve)

The dump valve is a safety feature that is located on the ultra-high pressure pump manifold and controlled by the DUMP VALVE switch. When activated, high pressure water is diverted to the blasting head. When deactivated, water is diverted from the blasting head to the clean water tank, immediately eliminating high pressure water at the blasting head. The dump 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 DUMP VALVE switch in the cab switch panel. When the DUMP VALVE switch is on, the shutoff cartridge is closed by the hydraulic cylinder forcing all high pressure water to the blasting head. When the DUMP VALVE switch is off, the hydraulic cylinder opens the shutoff cartridge diverting (dumping) high pressure water from the blasting head 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 head immediately.

It the charge water pressure drops below 30 PSI (2 BAR) for any reason, the dump valve will automatically deactivate and divert water back to clean water tank.

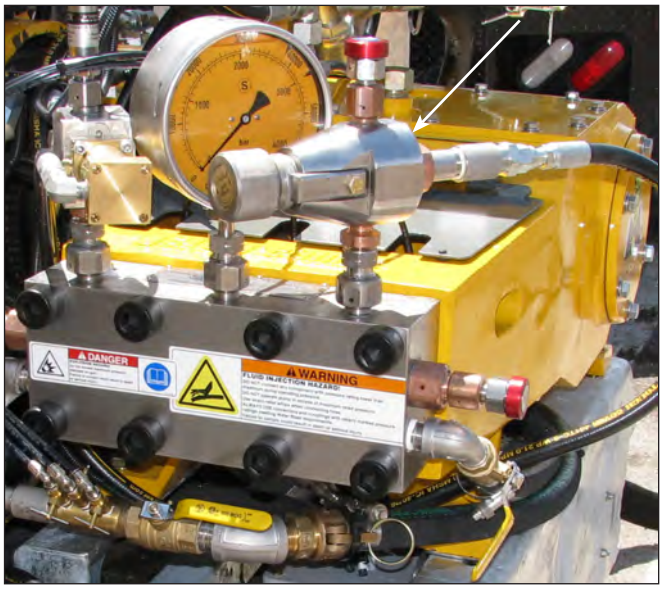
**Notice:**
**If the charge water pump is turned off or fails, the UHP pump must be shutdown immediately by pressing the EMERGENCY STOP button or turning the key off on the trailer engine control.**

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


*Dump (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 head while maintaining optimum engine RPM and torque.




*Manual Bypass Valve*

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 head. 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 head. 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 UHP pump.

When setting initial blasting pressure, always open the manual bypass valve completely, set the engine and UHP pump to maximum operating RPM and turn the DUMP VALVE switch on to 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 head can be turned on or off using the DUMP VALVE switch.

*Manual Bypass Valve & Rupture Disc*

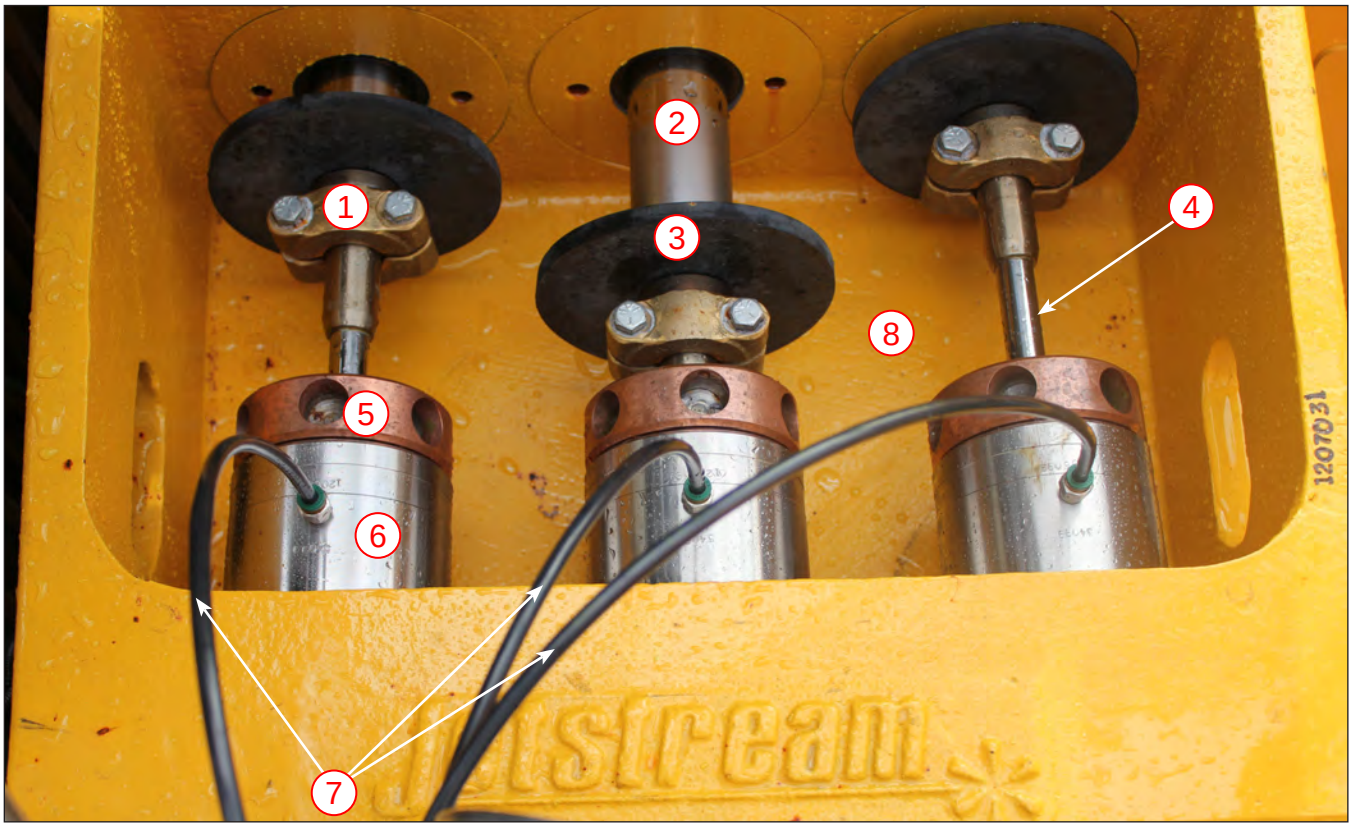
## Rupture Disc (Burst Disc)

There are two rupture discs installed on the high pressure side of the UHP 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 UHP 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 water blasting 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.

*UHP Pump Manifold Rupture Disc*




*UHP Pump Bilge & Components*

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

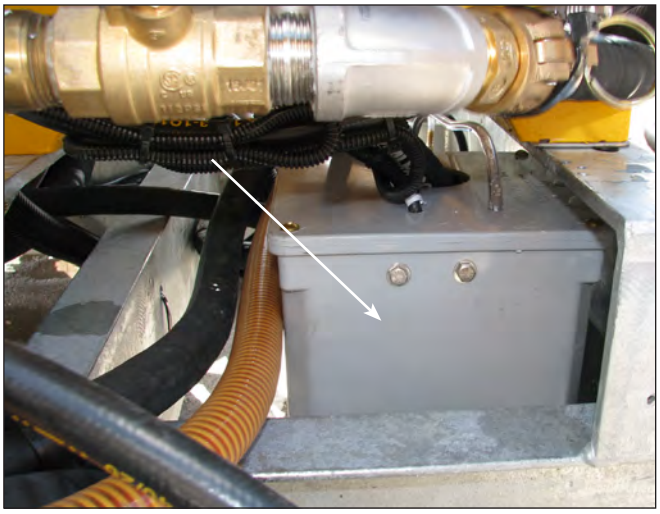
## Packing Lube Water And Bilge Pump

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 small water lines connected to the charge water supply line just below the UHP pump manifold.

A metering valve on each line controls the flow of water to the stuffing box. The flow of water to the stuffing boxes should be checked at the beginning of each shift and periodically during operation. This should be done with the trailer engine running at idle and the charge pump activated. 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 boxes to overheat and crack or damage the packing seals or plungers. If the line metering valves are open too wide, water flow will be excessive, wasting clean water and reducing blasting time. For more information on adjusting the flow of the lubrication and cooling water refer to Jetstream operations manual.


*Charge Water Supply Line & Metering Valves*

Packing lubrication and cooling water is drained from the UHP pump by a bilge pump drain system. The system is completely automatic and activated whenever the main circuit breakers are activated. A fuse in the outside terminal box protects the bilge pump circuit from an overload. Refer to Electrical System section of the manual for additional information on the bilge system fuse location.



*Bilge Pump Sump Box*

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

The sump automatic float switch and inside of the sump box and other internal components 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.

*Typical Bilge 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.

**NOTICE:**
**IT IS IMPORTANT TO INSPECT THE BILGE BOX FREQUENTLY AND REMOVE DEBRIS, OIL OR OTHER CONTAMINANTS THAT MAY CAUSE THE AUTOMATIC FLOAT SWITCH TO MALFUNCTION. USE A WATER BASED GREASE SOLVENT THEN FLUSH THOROUGHLY WITH CLEAN WATER TO REMOVE OIL THAT ACCUMULATES IN THE BILGE BOX.**

## 2.6 Hog Head

The Hog Head (blasting head) assembly on optional Hog Tools or the Hog Rider is powered by the SK2000. A separate operation and maintenance manual for each Hog Tool selected are included with this manual. Refer those manuals for specific operation and maintenance instructions for the tools included with your SK2000 trailer.

The Hog Head is a single blasting head design mounted on the end of the Hog Arm on the Hog Rider or on the base of the Hog Tool. The blasting head is supported by a chassis with castor wheels that support the head at a preset height to prevent the spray bar from contacting the pavement.

A wear brush clamped to the 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 operations. The wear brush is an important safety feature of the blasting head system. It must be installed properly and replaced as necessary.

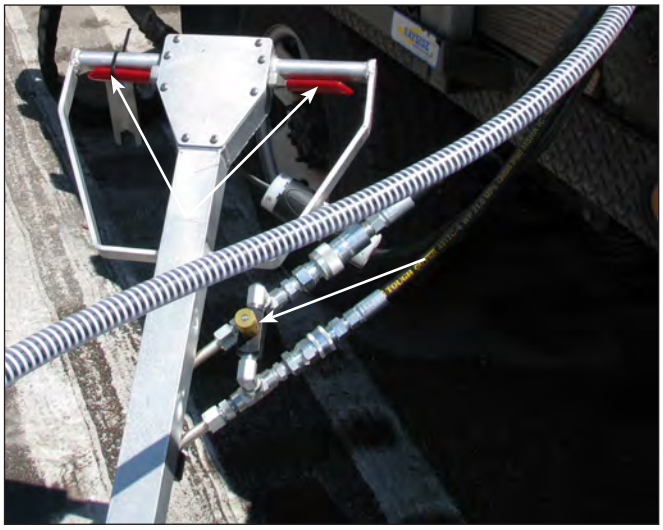
Refer to the Wear Brush in this section and the Routine Maintenance section of this manual for additional information on the wear brush.

**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 spray bar is rotated by a special hydraulic powered “thru-shaft” motor. Spray bar rotation is controlled by the HEAD ROTATION speed dial on the Hog Rider control panel or a control lever and valve on the Hog Tool.

The Hog Head design allows the operator to choose several different length spray bars for specific removal widths. The operator can choose spray bar rotation speeds between 700 and 3000 RPM using HEAD ROTATION speed dial or by an adjustable control valve on the Hog Tool handle.

*Typical Hog Head*



*Typical Hog Tool Control Levers &*
*Adjustable Head Rotation Speed Control Valve*

**CAUTION**

**HEAD ROTATION SPEEDS EXCEEDING 3000 RPM WILL DAMAGE THE BEARINGS AND THRU-SHAFT MOTOR. DAMAGE CAUSED BY EXCESSIVE RPM WILL NOT BE COVERED BY THE HOG TECHNOLOGIES WARRANTY.**

The castor wheel mount assemblies are threaded to provide spray bar/blasting head height adjustment. T-handle adjustment rods attached to each castor wheel assembly or threaded shafts with spacers and locknuts are used to move the wheels up or down. Blasting head height adjustment should be checked before each shift and the wheel castors should be inspected for damage and excessive wear daily. The castors and wheels should be greased daily for maximum life expectancy.

Refer to the Operation and Maintenance sections of this manual and the Hog Tool manuals included with your trailer 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.**

*Hog Tool Control Harness, Hydraulic Hose Quick Disconnect Fittings & High Pressure Hose Connection*

## 2.7 Blasting Tool Connection

### General

When an optional Hog Rider or Hog Tool is connected to the trailer tool connections, the electrical system senses that the tool is connected. The levers and control valves on the tool then control ultra-high pressure water to the blast head and hydraulic fluid flow to the spray bar thru-shaft motor. Ultra-high pressure water, hydraulic power and vacuum are provided by the trailer waterblasting system.

### Control Harness Connection

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

### High Pressure Water Connection

High pressure water is supplied by the UHP hose connected to a special fitting on the trailer above the hydraulic hose quick connect fittings and a fitting at the top of the thru-shaft hydraulic motor. The hose is secured to the thru-shaft motor 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. High pressure water is supplied to the spray bar when activated by the controls on the Hog Tool.

### Hydraulic Connection

Hydraulic hoses with quick disconnect fittings are connected from the tool to the trailer hydraulic system at the tool connection. The hydraulic control lever and speed control valve on the tool provide the operator with full control of the hydraulically activated thru-shaft motor that rotates the spray head.

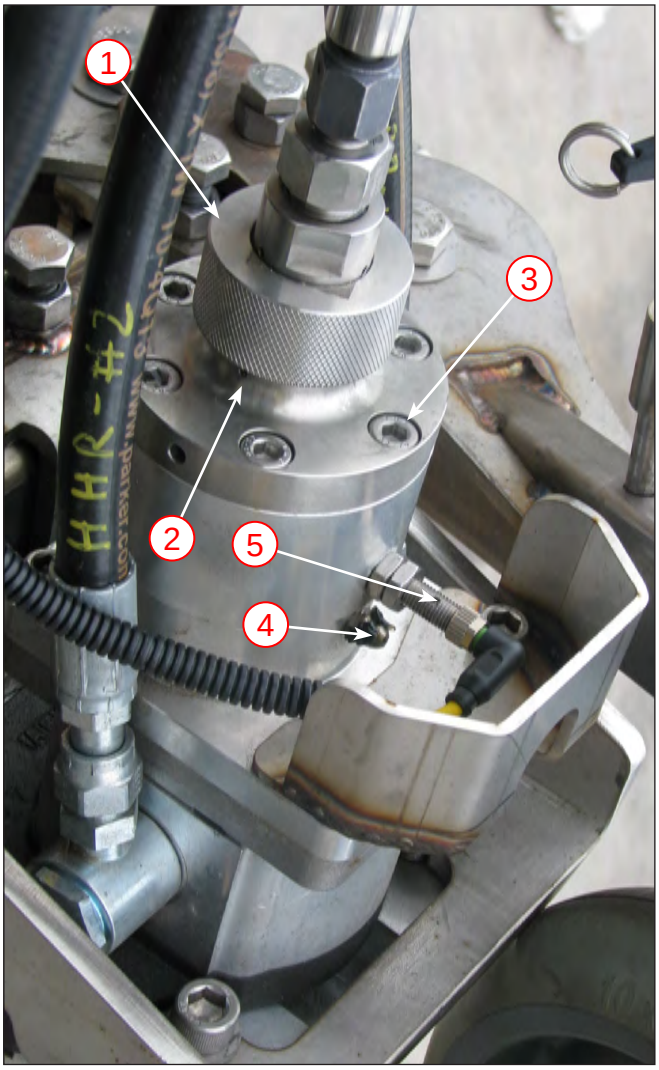
### Vacuum Connection

Most Hog Tools are equipped with blast heads that are designed to be attached directly to the vacuum system. The hose quick disconnect fittings provide vacuum from the trailer vacuum system to the blast head. Once the hose is connected, vacuum is supplied to the tool whenever the waterblasting system is activated.

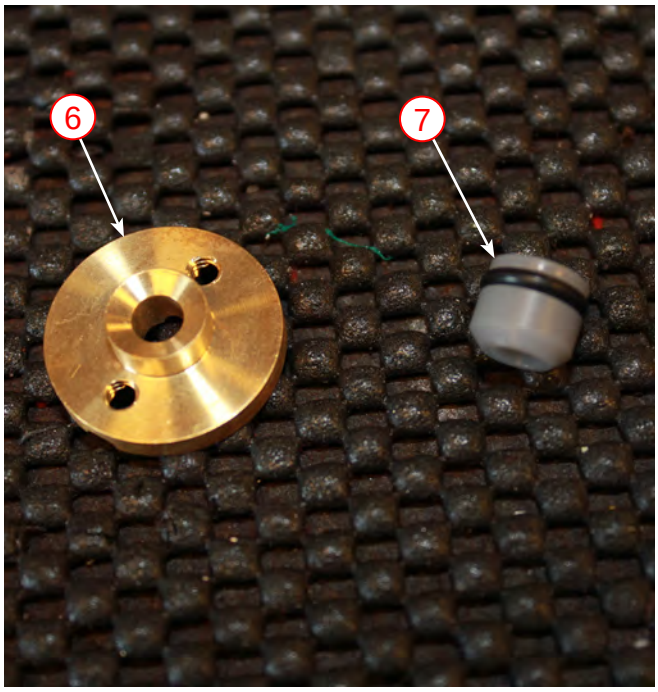
Make sure to protect the hoses from damage and abrasion from dragging on the pavement. This is particularly important when working a long distance from the trailer. In some situations anti-chaffing protection may need to be added to the hoses to protect them in contact areas.

**Notice:**
**The Hog Rider is equipped with onboard hydraulic and electrical systems that are not connected to the trailer water blasting system.**






*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 |

## *2.8 Thru-shaft, Spray Bars & 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 only.*** 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 head with a leaking swivel seal will cause complete failure of the seal, stopping blasting operations.

The RPM of the thru-shaft motor is controlled by the speed dial on the Hog Rider switch console or a control valve on Hog Tools. Hog Riders are equipped with a speed sensor on the thru-shaft motor housing continuously monitors the RPM of the thru-shaft/spray bar and displays the speed on the LED HEAD ROTATION speed gauge on the switch panel. During blasting operations, the operator can monitor the RPM of the 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 Bar

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 6" (15 cm) to 36" (91.5 cm). Aggressive and non-aggressive spray patterns are available for all heads.

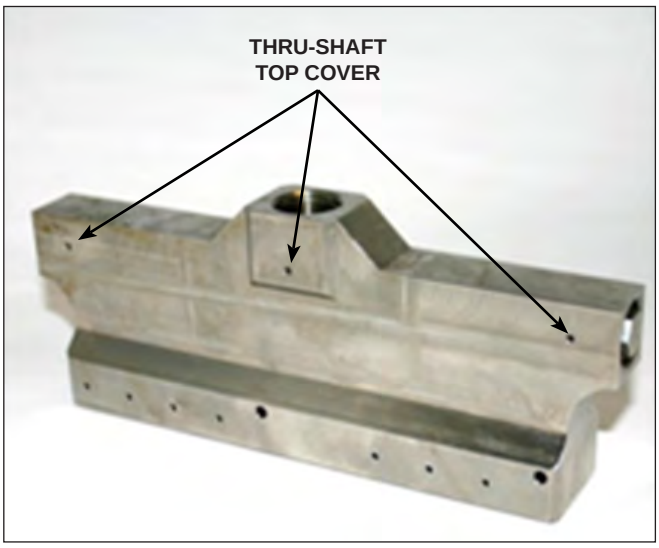
Spray bar selection is determined by requirements of the removal application being performed. The width of the spray bar selected is critical. When removing paint lines, it should be sized to the width of the line whenever possible. In most situations, the spray bar selected should be 2" (5 cm) wider 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:**

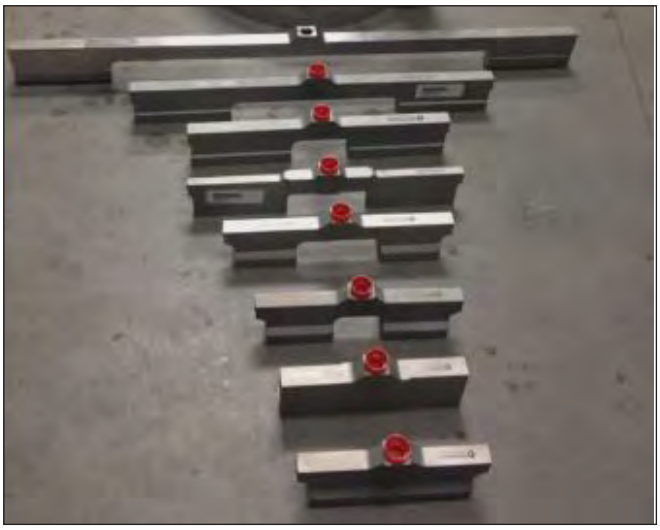
- The size of the line marking, the spray bar should be 2" (5 cm) wider than the marking.
- The type of marking being removed. (Paint, thermal or rubber)
- The thickness of the material being removed.
- The type of road surface. (Concrete or asphalt)
- Profile requirements per job specifications.

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 & Protector*



*Hog Head & Various Spray Bar Sizes*

**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 PROTECTOR. THERE SHOULD NOT BE ANY WATER LEAKING FROM THE 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 ORIFICES AND CAUSE SYSTEM PRESSURE TO SPIKE EXCESSIVELY CAUSING DAMAGE TO COMPONENTS OR RUPTURE DISCS ON THE UHP PUMP TO BURST.**

## Spray Bar Protector

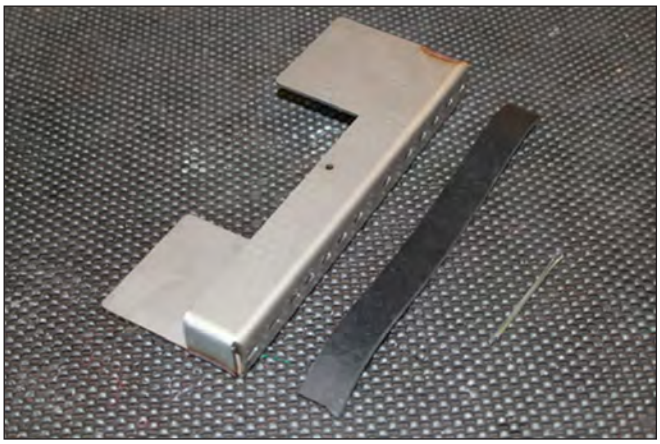
Each spray bar is equipped with a spray bar protector that is held in place with one or two cotter pins. The spray bar protector shields the nozzles and spray bar from damage caused by debris during blasting operations. Never perform ultra-high pressure blasting operations without the spray bar protector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

## Nozzles

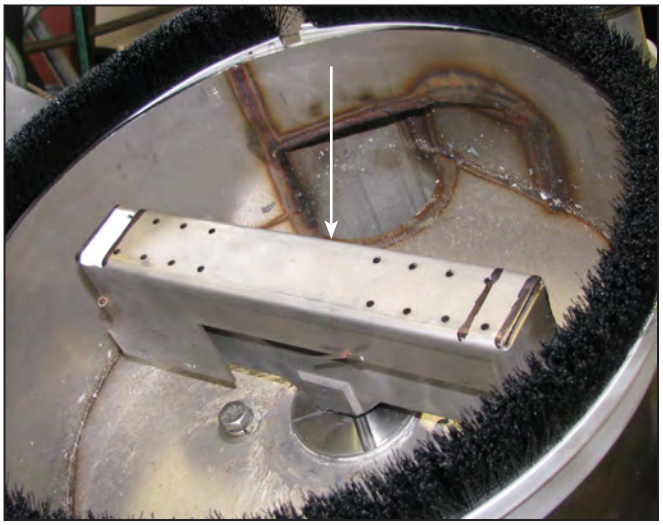
Ultra high pressure is produced by restricting the flow of water at the nozzles on the blasting head. Each nozzle delivers a stream of water at extremely high pressure that is determined by nozzle orifice size and it's Gallon Per Minute (GPM) flow at desired pressure. The performance ranges from least 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 in this section, the nozzle must be replaced.

### Testing and inspecting nozzles:

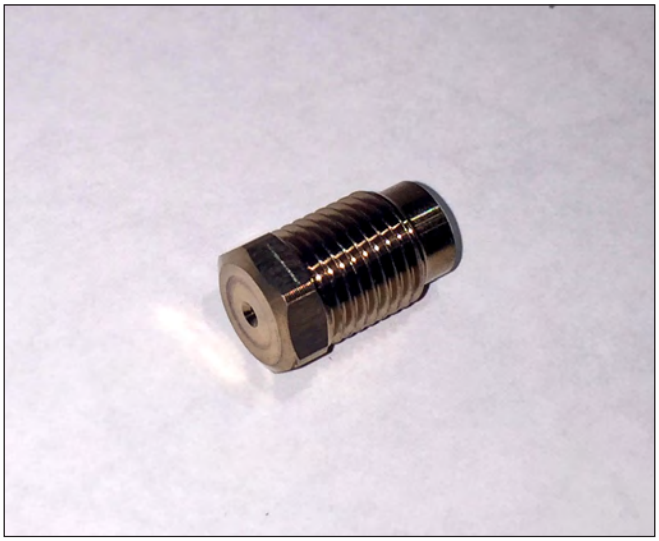
To inspect and test the nozzles, raise the blasting head to the vertical position. Then remove the spray bar protector. The protector will disrupt the spray pattern causing inaccuracies when inspecting or testing nozzle performance.



*Typical Spray Bar Protector & Gasket*

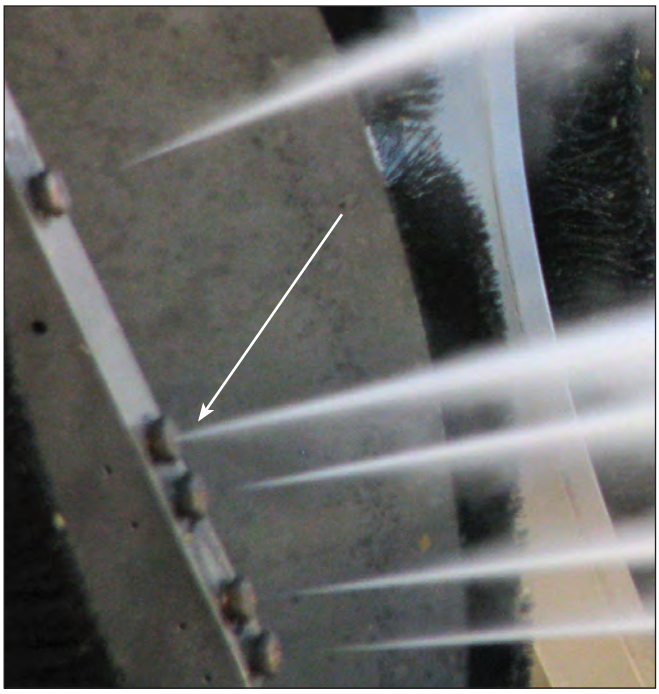


*Blasting Head With Spray Bar Protector Installed*



*Spray Bar Nozzle*

*Good Nozzle Spray Pattern*



*Nozzles Showing Bad Spray Pattern*
*Nozzle Must Be Replaced*

Once the spray bar protector is removed and all personnel are well clear of the blasting head, activate the high pressure system and set the operating pressure to a safe level. Make sure the head rotation control valve/speed dial is set to 0 so the spray bar does not rotate. Staying well clear of the water jets, no closer than 18″, visually inspect the spray pattern of each nozzle. If the spray is tight with a cohesive stream for 1/2-1 1/2 inches (1.3-3.8 cm) 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.

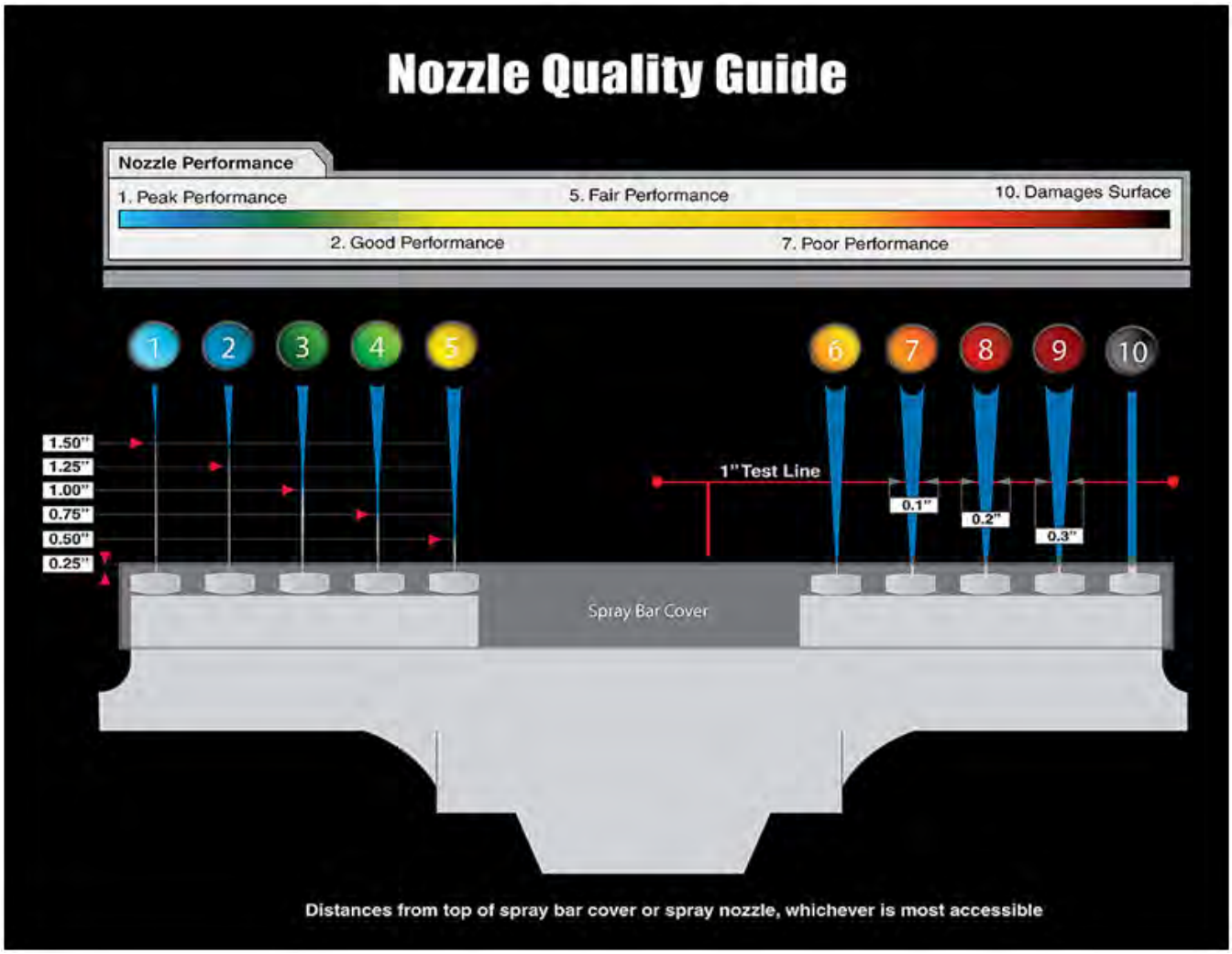
**DANGER**

**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. MAKE SURE THE AREA IS CLEAR OF PEOPLE, HANDS AND FEET BEFORE STARTING THE ENGINE AND ENGAGING THE DUMP VALVE SWITCH TO ACTIVATE 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 a nozzle orifice 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 THE SPRAY BAR PROTECTOR 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. SHUTDOWN THE ENGINE TO RELIEVE ALL WATER AND HYDRAULIC PRESSURE BEFORE MAKING ANY REQUIRED REPAIRS OR ADJUSTMENTS. TO INCREASE THE LIFE EXPECTANCY OF THE SPRAY BARS AND NOZZLES, ALWAYS REMEMBER TO INSTALL THE SPRAY BAR PROTECTORS BEFORE BEGINNING 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 in this section and Spray Bar Configuration Diagrams located in the Operation section 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.

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

- Nozzle is split or damaged
- Nozzle is clogged
- Nozzle water spray is fanned out
- 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 recom-

mend 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 system water blasting system.

### Shroud

The shroud is the heavy duty stainless steel housing attached to the bottom of the thru-shaft motor 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 a variety of spray bar lengths.

### Wear Brush

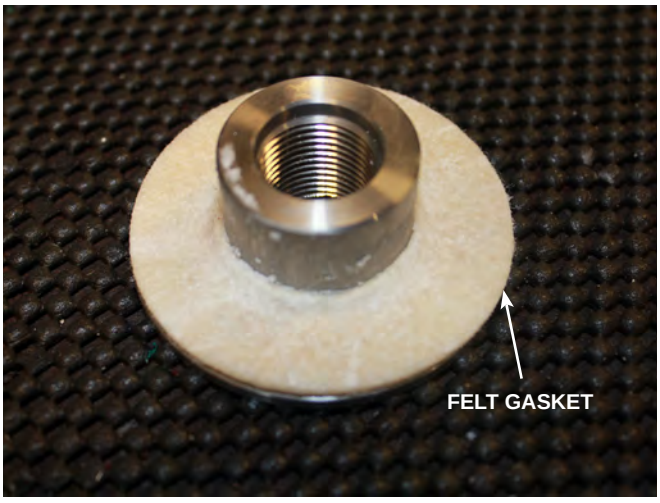
A wear brush clamped to the blasting head shroud provides a partial seal between the blasting head and pavement. The brush regulates vacuum air flow into the shroud and reduces the amount of debris and water exiting the blasting head during water blasting operations. The wear brush is an important safety feature of the blasting head system. It must be installed properly and replaced as necessary. The brush should be installed so the bristles are always making light contact with the pavement.

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

*Blasting Head Shroud & Wear Brush Assembly*

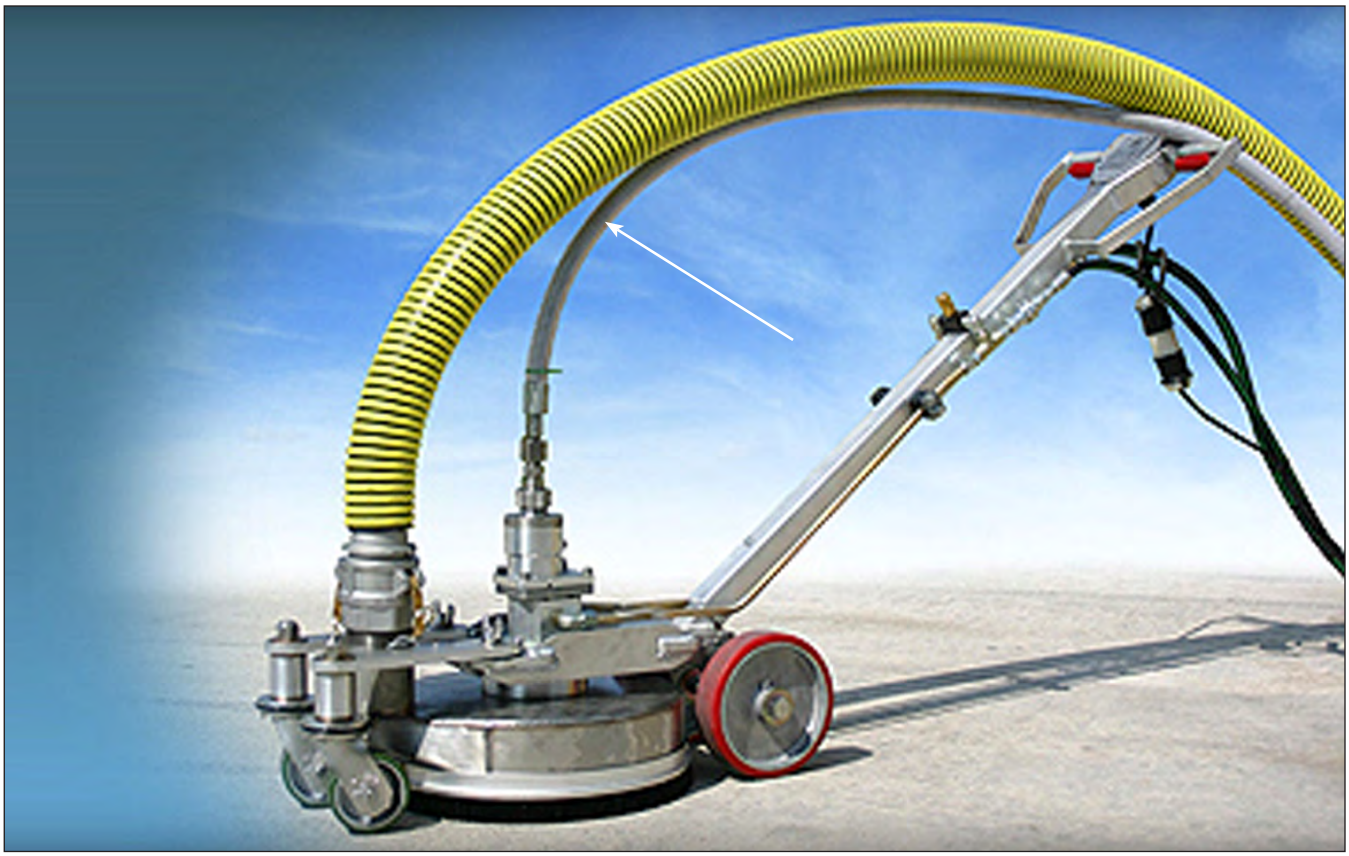
### Dirt Shield

The dirt shield is a threaded stainless steel flat washer that protects the thru-shaft seals and bearings from dirt and debris during blasting operations. It is located between the spray bar and shroud. It includes 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 on replacing the dirt shield).




*Dirt Shield & Felt Gasket*


*Dirt Shield Installed*



*Blasting Head, Thru-Shaft Motor & Ultra High Pressure Hose*

## 2.9 High Pressure Hoses, Connections & Fittings

The ultra-high pressure hoses used in the SK2000 water blasting 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 blasting head. The hose is 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 system 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.

*Ultra-High Pressure Hose & Connection At Trailer*

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 water blasting 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 (7.6 m) 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 WITH THE TRAILER AS SUGGESTED IN THE SPARE PARTS SYSTEM.**

**Retire hose from service if:**

A) Cover is damaged and reinforcing wires are exposed to rust and corrosion.

B) End fitting shows evidence of damage or is leaking.

C) Hose has been kinked or subjected to a radius tighter than its minimum bend radius.

D) Hose has been crushed or stretched.

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

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

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

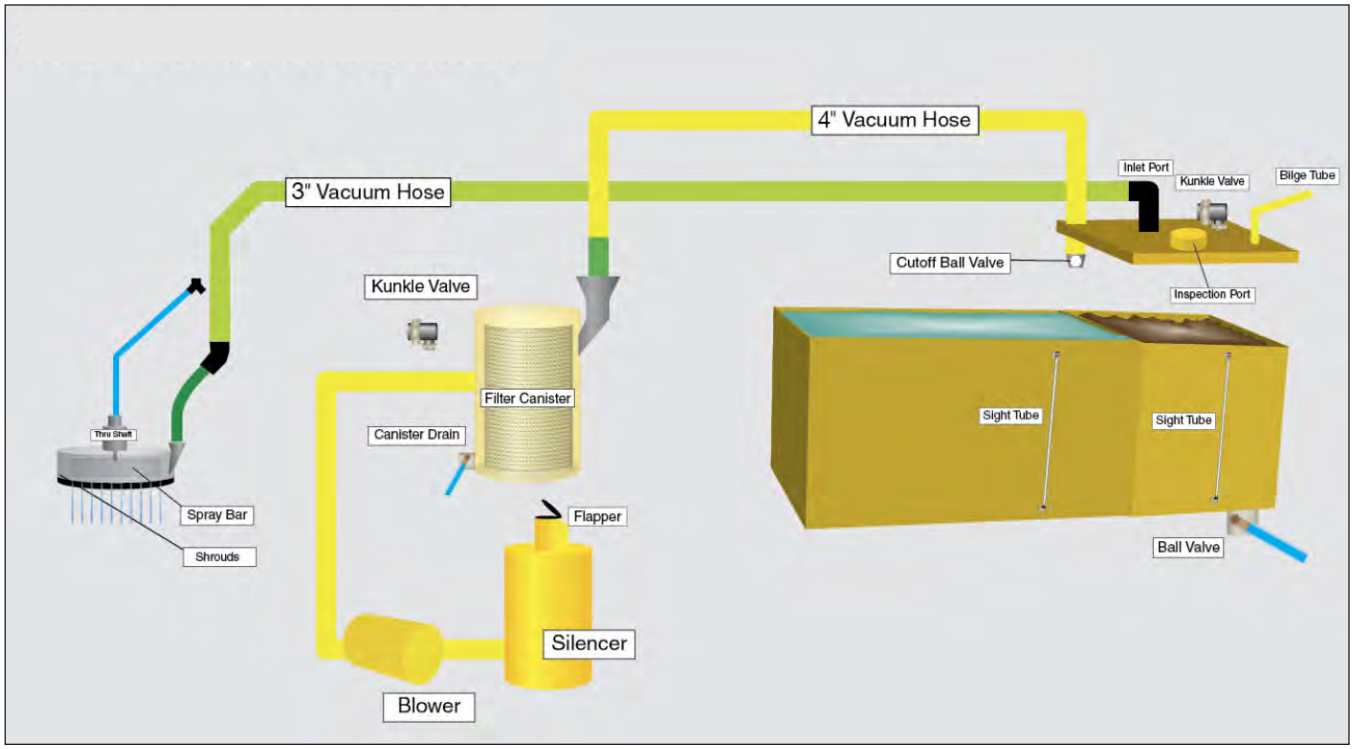
**WARNING**

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






*Debris Recovery System*

## 2.10 Debris Recovery System

### Overview

The vacuum system is powered by the trailer hydraulic system and is activated whenever the engine is running and the VACUUM switch in the control panel is on. The blower creates vacuum in the filter canister, debris tank, vacuum hoses and Hog Head. A filter located in the filter canister protects the blower. Flexible hoses with quick disconnect fittings provide vacuum to the Hog Head shroud.

Vacuum is monitored by a digital gauge in the control panel and an optional gauge on the debris tank. It is adjusted by increasing or decreasing the engine RPM. Thus, maximum vacuum, -7 in Hg (178 mm Hg) is typically achieved at Maximum engine operating RPM. Relief valves (Kunkle valves) on the vacuum filter canister and debris tank will automatically open if excessive vacuum in the system occurs. Always test the valves and all vacuum hose connections at the start of each shift to ensure the valves are operating properly and there are no vacuum leaks in the system.

**WARNING**

**OPERATING THE WATER BLASTING SYSTEM WITH VACUUM IN EXCESS OF -7 IN HG (178 MM HG) WILL DAMAGE THE OIL SEAL IN THE BLOWER GEAR CASE AND SUCK THE OIL OUT OF THE CASE. THIS WILL RESULT IN SEVERE, IRREPARABLE DAMAGE TO THE BLOWER AND SHUTDOWN BLASTING OPERATIONS.**

Blower components have extremely small tolerances and must be protected from the debris. The vacuum filter should be cleaned daily. The canister is equipped with a door in the side that provides easy access to the filter and a means to inspect the canister for excessive debris, water or to remove and clean the filter. There is a manual drain valve or drain plug at the bottom to remove water from the canister as needed. Make sure the vacuum system is shutdown before opening the canister door or attempting to drain the water. Never leave the drain valve or plug fitting open when the vacuum system is operating.

*Ground Hog & Vacuum Hoses*

## Vacuum Hoses

The primary vacuum hose runs from the cutoff ball valve connection on top of the debris tank to the vacuum hose connection on the vacuum filter canister. Another debris suction vacuum hose runs from the debris inlet elbow on the top of the debris tank to the Hog Head. The hoses are equipped with quick connectors at the Hog Head end that allows additional vacuum hoses to be added or for servicing Hog Head vacuum hoses and components. Other quick connectors provide access to other components in the vacuum system.

Consistent and proper vacuum is important to the proper operation of the vacuum system. Debris buildup, kinks, damage or leaks will cause a reduction in vacuum at the blasting head, reducing the efficiency of operation or cause operations to stop completely. Many problems with vacuum hoses are caused by damage or kinks. You should avoid tight bends and maximize the radius of all hose curves to minimize the chance of a kink. It is very important to protect the hoses from contact with sharp objects, abrasive surfaces, foot or wheel traffic and to inspect the hoses daily to ensure there is no damage, signs of chaffing or kinks.

The inside 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 blast head or on top of the debris tank. The life of the hoses in these areas can be extended by rotating the hoses $120^0$ once each week.

Some types of debris will buildup on the inside walls of the hoses to the point where it restricts debris flow in the system and reduces vacuum at the blast head. Debris buildup inside the hoses can be removed by 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.

Damaged vacuum hose can be repaired by cutting out the damaged area and splicing in new hose. Temporary repairs can be made using duct tape.

## Blower And Silencer

The blower is powered by the trailer hydraulic system and activated whenever the engine is running and the BLOWER switch is on.

The blower bearing housing is equipped with two grease fittings that must be lubricated daily to achieve maximum life expectancy. Refer to the Lubrication & General Maintenance section of this manual and the 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 on the silencer keeps water and debris from entering the system and damaging the blower when the unit is shutdown.

Blower components have extremely small tolerances and 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.

**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.**

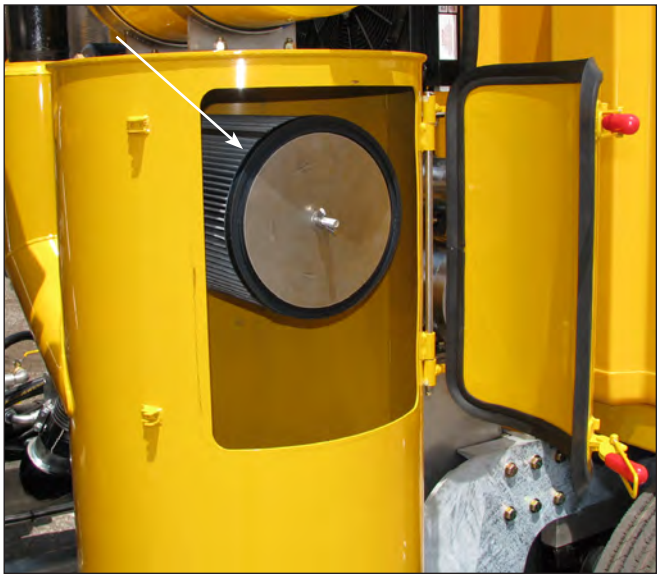

*Filter Canister & Silencer*

## 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 emptied to ensure water does not accumulate to an unsafe level in the 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 or a removable drain plug to remove accumulated water as required. The engine must be at idle and the VACUUM switch turned off before attempting to drain the canister. Once the water has been drained, close the drain valve or insert the plug 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 or the plug is removed.

**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 TURN OFF THE BLOWER SWITCH BEFORE DRAINING THE CANISTER.**

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 the element 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.



*Typical Vacuum Canister Access Door & Filter*

*Typical Vacuum Canister Drain*


Debris Tank & Door

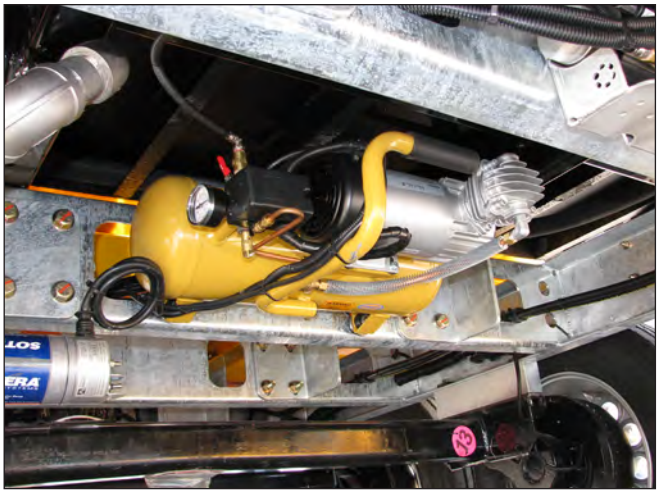
Debris Tank Inflatable Door Seal

## Vacuum / Debris Tank

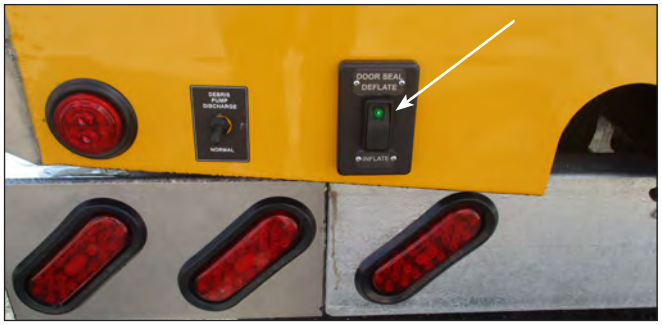
The debris tank is constructed with stainless steel panels. The debris tank door has a manual locking system and watertight inflatable door seal.

The pressurized door seal is supplied compressed air by the onboard air compressor. A solenoid activated pressure valve controlled by the DOOR SEAL rocker switch on the rear of the tank inflates or deflates the door seal. Seal pressure is monitored by a gauge mounted to the rear trailer chassis below the tank. Normal inflated seal pressure is automatically regulated at 20-25 psi (1.4 - 1.7 BAR).

A cutoff ball valve automatically shuts off the vacuum flow if the tank becomes full, protecting the blower system. This valve reduces the possibility of excessive water from damaging the blower. If the cutoff ball valve shuts off the vacuum flow, the vacuum relief valves on the tank and vacuum filter canister will automatically open and reduce the vacuum to near 0 to prevent damage to the vacuum system.



Door Seal Air Compressor




Door Seal Switch

Debris Tank Cutoff Ball

A special filter bag (debris bag) is mounted on sliding retainer rods near the top the stainless steel liner inside the debris tank. The vacuum system creates vacuum in the tank and debris mixed with water from the Hog Head flows directly into the debris bag where solid debris and particles over 100 microns are trapped. The filtered water exits the filter bag and flows into the debris tank where it accumulates until it is drained by the drain valve at the bottom of the tank or pumped out by the dirty water pump out system. The filter system allows for quick draining and easy disposal of filtered waste water while retaining the solids, enabling the operator to regain tank capacity.

*Vacuum Tank Kunkle Valve & Inspection Port*

A site tube on the side of the debris tank indicates the recovered water level and an opening inspection port on top of the debris tank is used to monitor the solid waste level. A ball valve allows for quick draining of the tank.

*Filter Bag Retainer Rod in Debris Tank*

### Filter Bag

The filter bag is biodegradable and designed to slide out of the tank with the debris during dumping. When installing a new bag, make sure to attach the loops at the top of the filter bag to the sliding retainer rods on each side of the tank. The retainer rods hold the bag in position during operation and are designed to automatically slide out with the debris and bag during dumping. The bag will not stay in the proper position during operation and may not release properly during dumping if it is not installed properly.

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

**WARNING**

**AN IMPROPERLY INSTALLED DEBRIS BAG MAY NOT RELEASE PROPERLY DURING DUMPING. THIS CAN CAUSE THE LINER TO SEPARATE FROM THE DEBRIS TANK, DAMAGING THE TANK AND/OR CAUSE SEVERE INJURY TO PERSONNEL. ALWAYS MAKE SURE THE DEBRIS BAG IS INSTALLED PROPERLY AND THAT ALL PERSONNEL STAY WELL CLEAR OF THE TRAILER AND DEBRIS TANK DOOR WHEN DUMPING OPERATIONS ARE UNDERWAY.**

**WARNING**

**NEVER ROCK OR JERK THE DEBRIS TANK UP AND DOWN TO DISLODGE MATERIAL STUCK IN THE DEBRIS TANK. THIS CAN CAUSE THE HYDRAULIC RAMS AND/OR OTHER COMPONENTS TO FAIL WHICH COULD RESULT IN SEVERE INJURY TO PERSONNEL AND DAMAGE TO THE UNIT.**

### Wastewater Transfer Pump

The debris transfer pump circuit is activated by the DIRTY WATER PUMP switch in the control panel. When the circuit is activated, a diaphragm pump on the chassis below the debris tank will transfer wastewater from the tank to the wastewater bladder.

The operator can choose to operate the system in NORMAL mode, which controls the pump automatically or DISCHARGE mode, which allows the operator to override the automatic float switch and manually operate the pump. The transfer pump mode is selected using the DEBRIS PUMP NORMAL/DISCHARGE switch on the rear of the debris tank.

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

When DISCHARGE mode is selected, the automatic float switch is bypassed. The pump will continue to run until the switch is manually returned to the NORMAL position. The discharge flow from the pump must be continuously monitored while operating the system in DISCHARGE mode and the switch set back to NORMAL mode when pumping is complete. To avoid damage to the pump, always return the mode switch to NORMAL as soon the tank is empty and never leave the switch in DISCHARGE mode.

The dirty water pump is a heavy duty, diaphragm pump. It is protected from large debris that could damage the pump by an in-line strainer on the intake side. The strainer canister is equipped with a valve for back flushing and/or draining the canister. The screen should be removed and cleaned periodically or if it becomes clogged. Always make sure the DIRTY WATER PUMP switch is in the OFF position when cleaning or back flushing the strainer. Refer to the Lubrication & General Maintenance section of this manual for instructions on cleaning or back flushing the strainer.


*Wastewater/Dirty Water Transfer Pump & Strainer*


*Debris Pump Switch*

The tank water level and pump out system must be monitored periodically during operation and cleaned as necessary. It is important that the DIRTY WATER PUMP switch is turned on just before the waterblasting system is activated and turned off when waterblasting operations stop.

### Gravity Wastewater Drains

Wastewater can also be drained by gravity by opening the drain valve located on bottom side of the tank. To use the gravity drain system, make sure the DIRTY WATER PUMP and VACUUM switches are off. Open the valve on the passenger side of the tank. Wastewater will continuously flow from the tank while the valve is open. The drain valve system must be monitored periodically during operation and cleaned as necessary.

*Debris Tank Drain Valve & Water Level Sight Gauge*

### Debris Tank Dump System

Solid debris is separated from the wastewater by the 100 micron filter bag and needs to be dumped when the debris tank is near full. A hydraulic ram below the tank tilts the tank for easy dumping. The tank is designed with enough ground clearance to empty into most industrial dumpsters.

The hydraulic ram is controlled by switches in a remote control that plugs into the grey junction box located on the forward side of the trailer. Always make sure the trailer is on level, solid ground before dumping debris. After dumping, use a hose to clean the tank thoroughly with fresh water. Then install a new filter bag.

The debris bag should be checked at the beginning of the shift as part of the pre-start procedure or when you believe it may be reaching its capacity. It should also be checked at the end of each shift. Debris should never be left in the tank for 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.

*Debris Tank Tilted for Dumping*

*Remote Control & Junction Box*


*Trailer Onboard Batteries*


*Main Circuit Breakers*

## 2.11 Electrical System

### 50 Amp Main Circuit Breakers

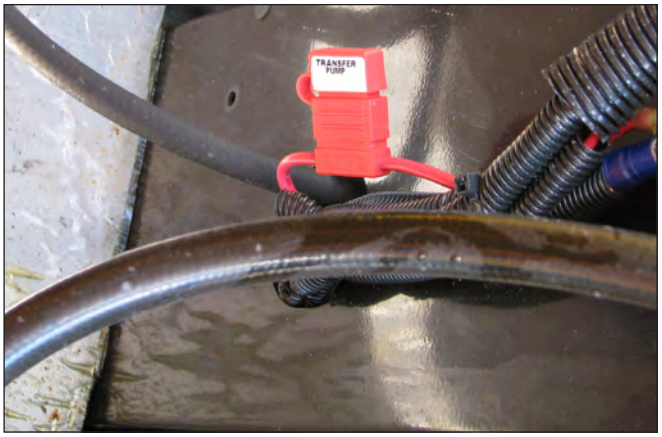
The water blasting electrical system is powered and protected by heavy duty circuit breakers located on the front of the trailer near the batteries. The main breakers are connected directly to batteries and supply electrical power to the fuse panel located in the main terminal box, heat exchanger cooling fans and the air compressor. These breakers must be on to power the water blasting electrical system.

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

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

The main breakers can be used as main disconnect switches by manually moving the yellow levers to the OFF or ON position. Move the levers to the ON position to activate the electrical system. Move the yellow levers to the OFF position to deactivate the electrical system.

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




*Typical In-Line Fuse*


*Outside Terminal Box*

**NOTICE:**
**THE CIRCUITS PROTECTED BY IN-LINE FUSES WILL VARY. IN-LINE FUSE LOCATIONS WILL ALSO VARY, DEPENDING ON THE ACCESSORY CIRCUIT PROTECTED. THE MOST COMMON LOCATIONS FOR IN-LINE FUSES ARE NEAR THE BATTERIES, MAIN CIRCUIT BREAKERS OR IN THE OUTSIDE TERMINAL BOX.**

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 water blasting electrical system.

*Fuses & Relays In Outside Terminal Box*

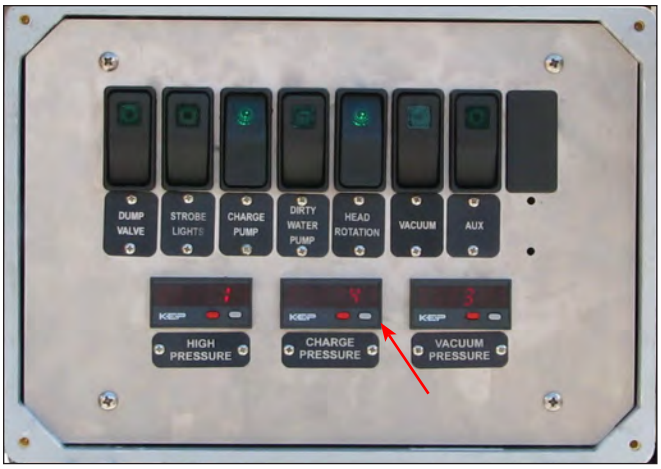
*Typical Fuse Panel In Outside Terminal Box*

## Control Panel Switches and Gauges

All functions and features of the water blasting system are activated by labeled rocker switches on the trailer switch panel. A green LED light in each switch illuminates when the circuit activated by the switch is on.

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

**NOTICE:**
**THE ENGINE MUST BE RUNNING TO ACTIVATE THE HYDRAULIC SYSTEM AND THE HYDRAULIC POWERED ACCESSORIES ACTIVATED BY THE SWITCHES IN THE PANEL.**




*Digital Charge Water Pressure Gauge In Switch Panel*

### Head Rotation On/Off

Activates the solenoid valve that supplies pressurized hydraulic fluid to power the thru-shaft motor that rotates the spray bar. A green LED light in the switch indicates that the thru-shaft motor is engaged. Head rotation speed is controlled by a control valve on the hog tool or speed dial on the Hog Rider.

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

**Dirty Water Pump**
Activates the circuit for the diaphragm transfer pump that pumps wastewater from the debris tank sump to the wastewater bladder. A green LED light in the switch indicates the transfer pump circuit is activated.

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

**Dump Valve**
Controls the UHP dump valve (diverter valve). When the switch is on, the dump valve closes and high water pressure from the UHP pump is directed to the spray bar on the blasting head. When the switch is off, the dump valve opens and the high pressure water is diverted to the clean water tank.

**Strobe Light**
Activates and deactivates the strobe lights above the water and debris tanks.

**AUX**
Reserved for additional electrical equipment on the trailer.

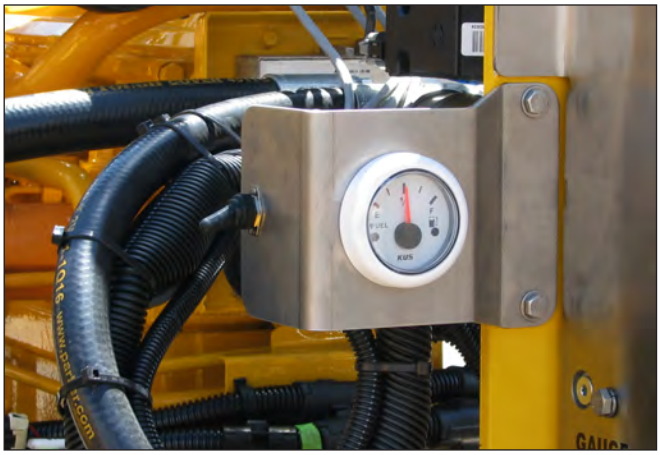
**High Pressure Gauge**
A digital gauge that monitors the Ultra-High water pressure to the blasting head.

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

**Vacuum Pressure Gauge**
A digital gauge that monitors pressure in the vacuum recovery system.

## Chassis Mounted Switches and Gauges
These switches are mounted to the side of the trailer frame, on the rear of the debris tank or near the UHP pump.

## Fuel Gauge
An analog gauge that monitors the fuel level in the fuel tank. It is mounted on the right side of the trailer chassis, above the UHP pump.



*Fuel Gauge & Work Light Switch*


*Debris Pump & Door Seal Switches*

**Work Light**
An ON/OFF toggle switch near the fuel level gauge that activates the work lights above the water blasting system.

**Debris Pump Normal/Discharge**
A two position rocker switch that selects the mode for the transfer pump when the circuit is activated by the DIRTY WATER switch in the panel. Move the switch to the NORMAL position to control the pump automatically with the automatic float switch in the debris tank sump. Move the switch to the DISCHARGE position to bypass the automatic switch and manually activate the pump.

### Door Seal Inflate/Deflate

A three position rocker switch that inflates or deflates the door seal. The center position is OFF. Move the switch to the INFLATE position to pressurize the seal. Move the switch to the DEFLATE position to release the pressure in the seal. A pressure gauge on the chassis below the switch indicates seal pressure. A pressure sensor and solenoid valve in the seal pressure line automatically limit maximum seal pressure to 20-25 psi (1.4 - 1.7 BAR).

### Remote Switch Control

The remote switch control harness plugs into the receptacle on the left side of the trailer chassis. The control allows the operator to control debris tank dumping operations a safe distance from the trailer. UP/DOWN switches in the remote control raise or lower the debris tank for dumping.

Refer to the Operation section of this manual for additional information on dumping debris.

*Typical Remote Control & Switches*

## 2.12 Hydraulic System

### Overview

The hydraulic system is powered by the trailer engine through a pulley and belt drive system. It is equipped with a pump, reservoir/cooling tank and in-line filters. A heat exchanger with thermostatically activated fans cool the hydraulic fluid during operation. Another cooling fan on the Reservoir provides additional cooling. Electric solenoid valves, activated by switches in the control panel and remote control switches, direct hydraulic pressure to the various components. Hydraulic fluid level in the reservoir is monitored by a site gauge on the side of the reservoir.

The system is equipped an in-line filter that protects the system from debris. Pressure gauges on the hydraulic manifold and near the filter alert the operator when a filter is dirty and requires changing.

The hydraulic system powers the Hog Head, UHP system charge water pump, the blower and the cylinder that tilts the debris tank The fluid level should be maintained within the upper level of the sight glass to ensure adequate fluid for operation.

### Hydraulic Circuit and Pump

The hydraulic pump provides high pressure fluid to the hydraulically powered components in waterblasting system. The circuit is equipped with pressure relief valves that prevent excessive pressure in the system. The maximum operation pressure for the hydraulic system is 3000 psi (207 BAR).

### Reservoir

A reservoir tank mounted on the hydraulic tree above the UHP pump 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 bottom of the reservoir cleans the fluid as it flows back into the reservoir.

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


*Hydraulic Fluid Reservoir & Cooling Fan*

*Hydraulic Pump & Drive Belt*

## Hydraulic System Filter

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. A Filter on the low pressure hydraulic circuit removes these contaminates and increases the life of the fluid and hydraulic components.

The low pressure filter is a cartridge type, spin on filter. 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, at intervals specified in the Maintenance Matrix or if it begins to restrict the return flow.


*Hydraulic Fluid Filter*

## Hydraulic Manifold

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

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

*Hydraulic Sectional Valve Manifold*

## Hydraulic Motors

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

*Vacuum Blower Hydraulic Motor*

*Hydraulic Fluid Heat Exchanger & Cooling Fans*

## Hydraulic Actuator

A hydraulic actuator raises or lowers the debris tank. The actuator is equipped with special counterbalance valves that prevent the tank from dropping suddenly if a hose ruptures or a fitting fails.

All hydraulic circuits and actuators 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.


*Debris Tank Hydraulic Actuator*

## *NOTES*



## 3.1 Start Up/Shutdown Introduction

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

Before operating the Stripe Hog, check the fluid levels in the engine and hydraulic system. To make operation as safe and productive as possible, it is important to conduct a thorough pre-operation inspection before operating the machine. You should walk around the unit and visually inspect the Hog Tool blasting head, high pressure hoses, hydraulic hoses, vacuum hoses, and all water blasting 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 trailer equipped with an SK2000 water blasting system. This information is provided as a general guide and overview of the process for educational purposes. The exact procedure for your trailer may be slightly different, depending on the options selected.

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

## 3.2 Pre-Operation Inspection

The Pre-operation Inspection in this section and the Pre-Op Check List in Appendix 3 is provided as a guideline. Additional items should be added to the checklist as determined by company policy, your operating environment, and other factors unique to your situation.

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

**Pre-Operation Inspection Items:**

1. Check tire condition and air pressure.
2. Inspect all hoses for chaffing and signs of wear.
3. Check fuel level and make sure you have enough for the shift.
4. Check the engine and all water blasting system fluid levels.
5. Check all water blasting and vacuum components for oil leaks, loose bolts, and damaged or worn parts.
6. Inspect the Hog Head for loose components and damage.
7. Check vacuum canister for water and the vacuum filter. Drain water or clean filter as required.
8. Inspect clean water tank, hoses and fittings for leaks and damage. Repair if necessary.
9. Check clean water tank level and fill if necessary.
10. Check that the wastewater bladder is empty. Drain if necessary.
11. Make sure debris tank door is closed properly and the inflatable seal pressure is correct.
12. Make sure the correct spray bar and nozzles required for the removal project are installed.
13. Visually inspect spray bars and nozzles for damage and excessive wear.
14. Make sure all lubrication points, vacuum blower motor bearings and Hog Head thru-shaft bearings are greased with the specified lubricants.
15. Check all controls, switches and lights for proper operation.

*Man-Way On Freshwater Tank*

16. Make sure the Mobile Spare Parts and Tool Systems are complete and onboard.
17. Conduct a final walk around and visually check all components. Look for obvious problems that may have been overlooked.

## 3.3 Filling Clean Water Tank

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

**Filling the freshwater tank:**

1. Open the man-way on the top of the fresh water tank and make sure the wastewater bladder is empty, then close and latch the man-way.

**NOTICE:**
**WASTEWATER IN THE BLADDER WILL REDUCE CLEAN WATER TANK CAPACITY. THE WASTEWATER BLADDER MUST BE EMPTY FOR MAXIMUM CLEAN WATER CAPACITY.**

2. If this is the first time using the water source, flush for several minutes prior to filling the tank to help ensure that no debris enters the system.

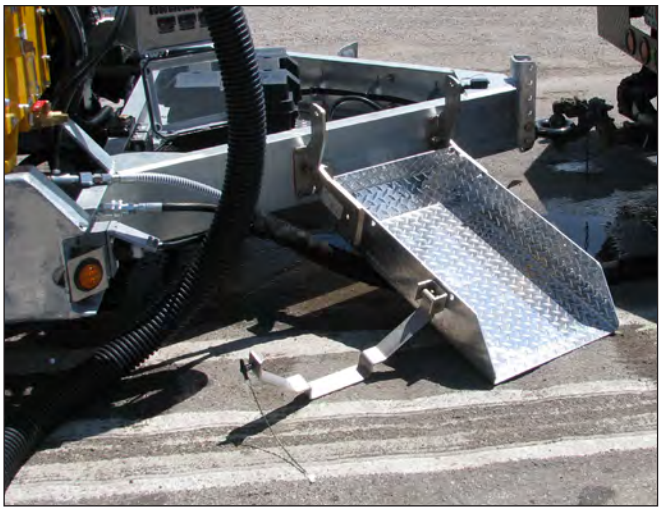
*Clean Water Tank Drain & Fill Valves*

3. Connect the fill hose to the water source and flush hose for several seconds.
4. Open the water tank fill valve and connect the hose to the quick connect fill fitting. Secure the hose to the fitting with the cam-lock levers.
5. Slowly open the source valve to begin filling the tank.
6. Open the ball drain valve on the passenger side of the tank for several seconds to flush out debris that may have accumulated on the bottom of the tank, then close the valve.
7. Monitor the tank sight glass closely during fill operations and close the source valve just before the tank is completely filled.
8. Close the water tank fill valve, release the cam-locks and disconnect the fill hose from the fitting.
9. Remove the fill hose from the water source and drain the hose.
10. Store the hose in a clean, safe location.


*Clean Water Tank Fill Hose Connection Valve & Site Gauge*

**CAUTION**

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



*Ground Hog Landing Pad Lowered To Pavement & Tie Down Strap*

## 3.4 Trailer & Ground Hog Setup

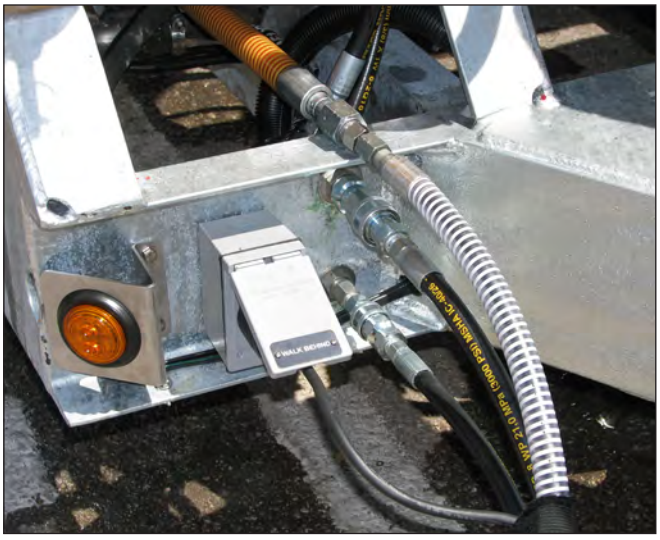
The following procedure is specifically intended for the Ground Hog water blasting tool. Other than unloading the unit from the landing pad, the procedure described in this section will be the same for most other Hog Tools.

**NOTICE:**
**THE HOG RIDER IS EQUIPPED WITH AN ONBOARD ENGINE, HYDRAULIC SYSTEM, DUMP VALVE, ELECTRICAL SYSTEM AND CONTROL PANEL. CONSEQUENTLY, THE SETUP FOR THE RIDER WILL BE DIFFERENT THAN FOR OTHER HOG TOOLS. REFER TO THE HOG RIDER OPERATION MANUAL FOR SETUP INSTRUCTIONS.**

1. Make sure the trailer is maneuvered into position and aligned properly for the Hog Tool at the starting point of the removal job. If the trailer is disconnected from the tow vehicle, make sure the trailer is level and the block the wheels so it can't roll.
2. Hold the Ground Hog so it will not fall and remove the safety pins on each side of the landing pad.
3. Slowly lower the landing pad until it rests firmly on the pavement.
4. Remove the safety pin on the hinged tie down bracket that secures the Ground Hog to the landing pad.

*Ground Hog & Landing Pad Safety Pins*

5. Roll the Ground Hog off the pad and into position at the starting point.
6. Raise the landing pad and secure it with the safety pins.
7. Set the blasting head standoff height as described in the Maintenance section of the manual.



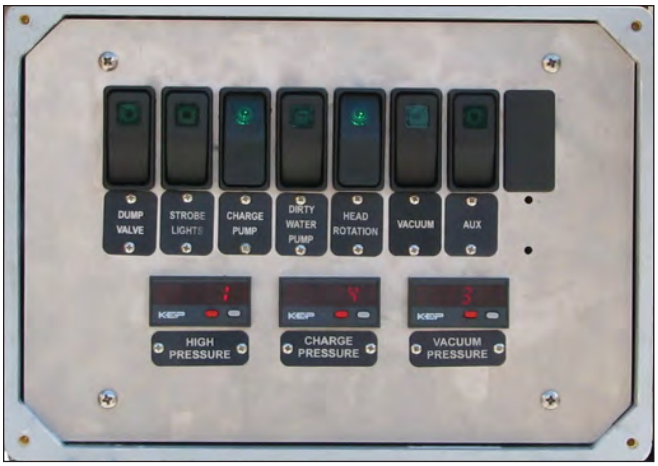
*Trailer UHP Hose & Hydraulic Hose Connections & 12V Control Cord Outlet*

*Ground Hog With All Hoses & 12V Control Cord Connected*

8. Connect the vacuum hose to the trailer and deploy the hose to the Ground Hog. Make sure the hose is laid out so there are no sharp bends that could cause the hose to kink, then connect the hose to the Hog Head.
9. Connect the UHP hose to the fitting on the trailer. Make sure the protective end cap is on the tool end of the hose and deploy the hose to the Ground Hog. Make sure the hose is laid out so there are no sharp bends that could cause the hose to kink.
10. Remove the protective caps on the blasting head and hose connectors, then connect the UHP hose to the swivel shaft connection. Hand tighten the swivel nut.
11. Connect the Hydraulic hoses to the trailer quick disconnect fittings. Make sure the protective end caps are on each hose end and deploy the hoses making sure they are laid out so there are no sharp bends that could cause the hoses to kink.
12. Remove the protective caps and connect the hydraulic hoses to the quick connect fittings on the Ground Hog.

*Trailer Vacuum Hose Connection*

13. Connect the 12V control cord to the trailer outlet. Then deploy the cord and connect it to the plug on the Ground Hog.
14. The water Hog Tool is setup and ready for system startup.




*Trailer Switch Panel & Pressure Gauges*

*Trailer Engine Control Panel & Engine Speed Control Switch*

## 3.5 System Startup Procedure

**Startup procedure/Activating Hydraulics:**

1. Perform the Pre-Op Inspection
2. Turn the main circuit breakers on.
3. Make sure all switches, speed dials and control valves are in the OFF position or set at 0.
4. Make sure the clean water supply valve is open and turn the CHARGE PUMP switch on.
5. Start the engine and allow it to warm up at idle speed.
6. Monitor the charge water pressure gauge. Charge water pressure should rise to 35–70 PSI (2.4- 4.8 BAR) within 10 seconds.

**NOTICE:**
**IF NO CHARGE WATER PRESSURE OR A LOWER PRESSURE IS INDICATED, THERE IS A PROBLEM THAT MUST BE CORRECTED BEFORE OPERATIONS CAN CONTINUE.**

*Clean Water Supply Valve & Charge Water Pump*

7. With the charge pump activated, check the water flow at the UHP pump stuffing boxes. A steady stream of water should be flowing to cool and lubricate the packing. Adjust the metering valves if necessary.

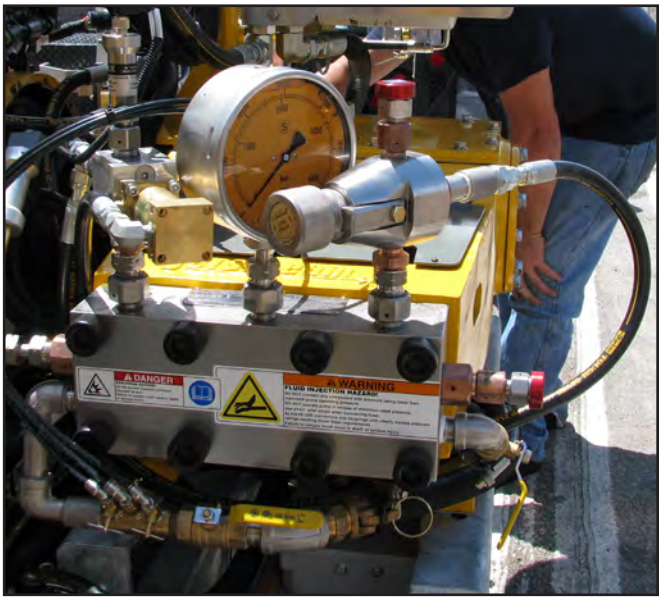
**⚠ CAUTION ⚠**

**THE UHP PUMP IS DIRECTLY DRIVEN BY THE TRAILER ENGINE AND WILL BE DAMAGED IF THE TRAILER ENGINE IS STARTED WITHOUT THE CHARGE PUMP SWITCH ON. ALWAYS MAKE SURE THE CHARGE PUMP SWITCH IS ON BEFORE STARTING THE TRAILER ENGINE.**

8. Monitor the pressure gauges in the hydraulic system to verify proper operation.
9. Raise the blasting head and verify the UHP hose is completely purged with a steady stream of water flowing from the nozzles. Then shutdown the engine.
10. The water blasting system is ready for the pressure setting procedure.

## 3.6 Setting Pressure Procedure

1. Position an operator at the trailer control panels and at the Hog Tool.
2. Make sure the head rotation control valve or speed dial is set to 0.
3. Position the Hog Head so the spray bar and nozzles are visible.
4. Open the by-pass valve approximately 3-5 turns (counterclockwise)
5. Start the engine and set engine speed to 1000 RPM.
6. Make sure all personnel are well clear of the blasting head and turn the DUMP VALVE switch on to send high pressure water to the Hog Tool.
7. Squeeze the UHP control lever on the Hog Tool to send high pressure water to the spray bar. Then use the throttle control switch to slowly increase engine speed to achieve the desired operating RPM.
8. Slowly rotate the by-pass valve clockwise until the desired pressure is achieved.
9. Check the nozzle spray pattern and the spray bar weep holes for leaks.



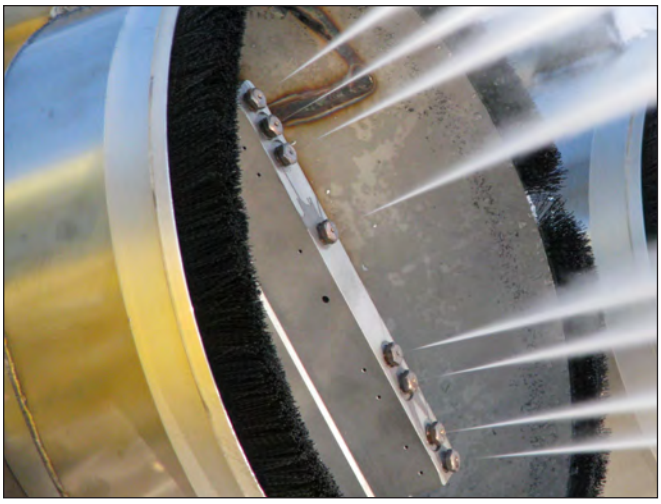

*Bypass Valve*

*Ground Hog Spray Bar Rotation & UHP Control Levers*

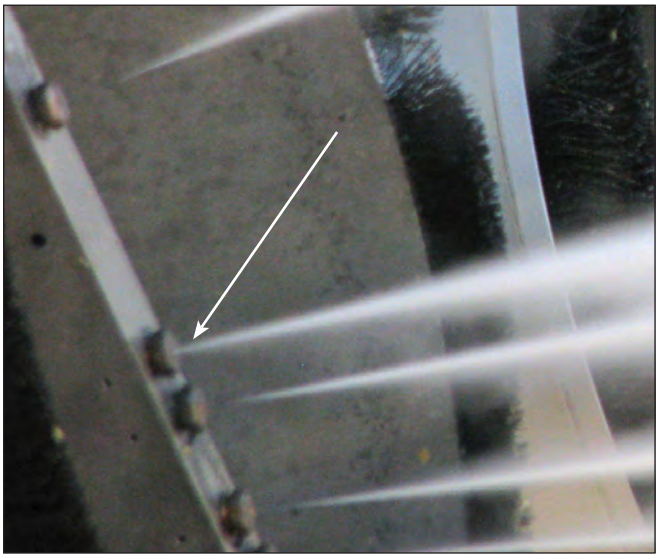
*Ground Hog Spray Bar Rotation Control Valve*


*Switch Panel Digital Gauges*

10. Check all high pressure hose fittings and the Hog Head weep holes for leaks.
11. Turn the HEAD ROTATION switch on. Rotate the speed dial or control valve on the Hog Tool clockwise to test the spray bar rotation, then stop the spray bar.
12. If necessary, adjust engine speed to achieve the desired blasting pressure. Monitor the digital HIGH PRESSURE gauge in the panel to set the pressure. Note the engine RPM for reference.
13. With high pressure set and the spray bar and nozzles working properly, release the UHP control lever and turn the DUMP VALVE switch off.
14. Lower the blasting head to the pavement.
15. The water blasting system and Hog Tool are now ready to begin waterblasting operations.



*Good Nozzle Spray Pattern*



*Nozzles Showing A Nozzle With Bad Spray Pattern*

*Spray Bar Weep Holes*

*Hog Head UHP Hose Connection Weep Holes*

*Ground Hog In Operation*

## 3.7 Blasting Procedure

### Overview

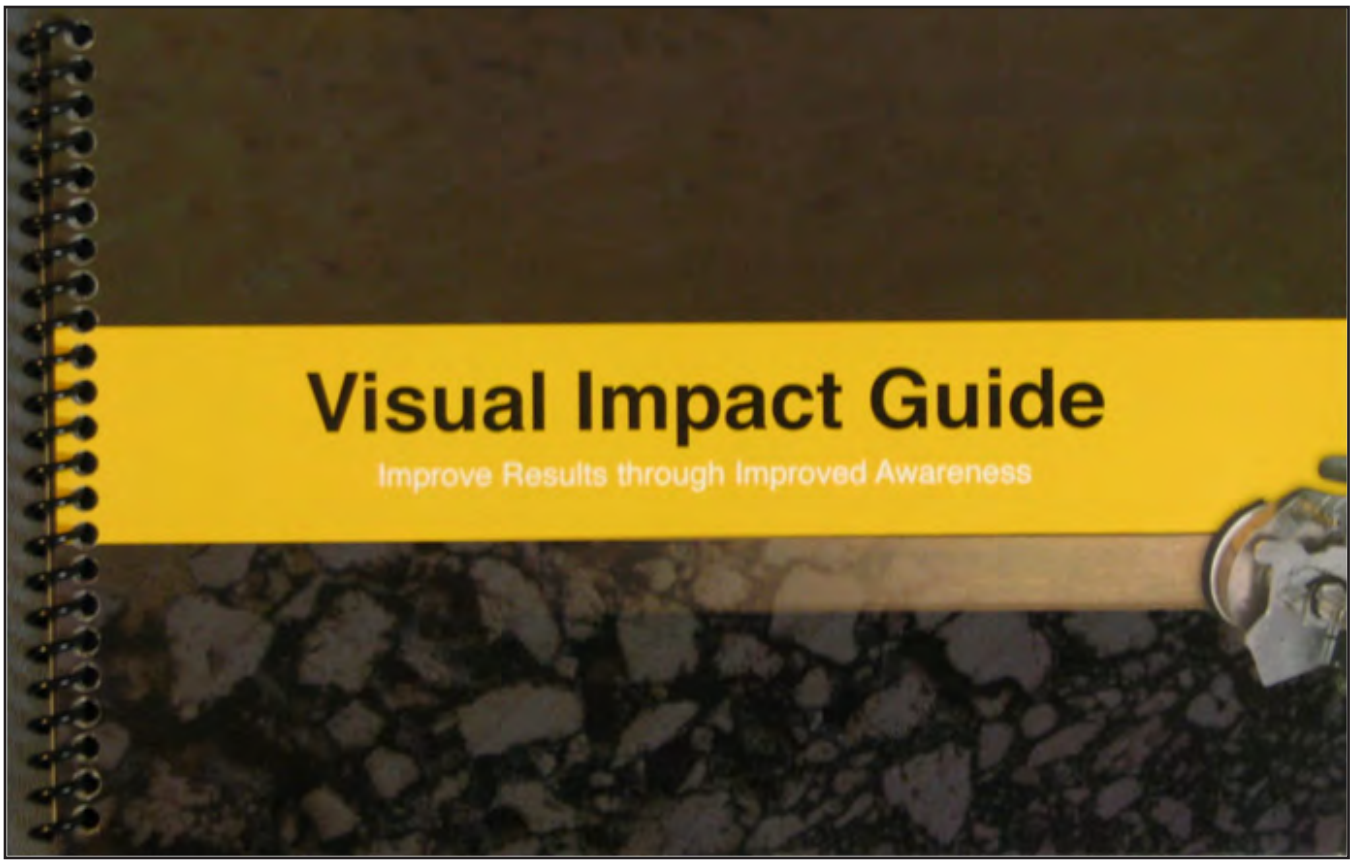
Before you start the job, you should evaluate the pavement and material to be removed. Choose the appropriate spray bar and nozzles best suited for the job. You should also consider the desired or expected profile of the blasted surface in your selection. There are many variables that affect blasting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

Generally, large, high volume (.013 - .015) nozzles are the most aggressive and provide faster results. However, they also provide greater potential for damage and a course profile. Consequently, 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 water blasting, 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**

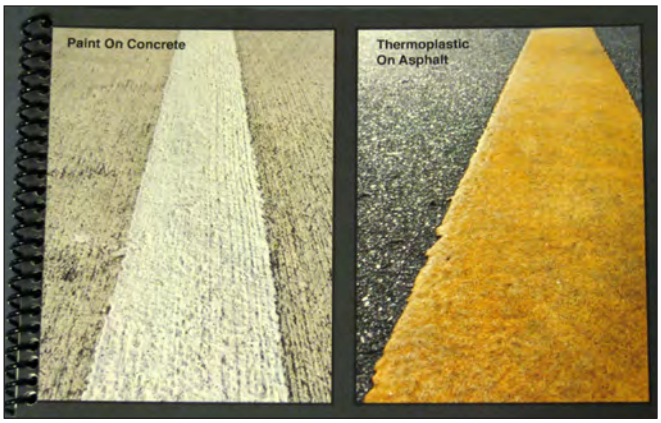
**THE PAVEMENT WILL BE DAMAGED IMMEDIATELY IF HIGH PRESSURE BLASTING IS ACTIVATED WITHOUT THE HOG HEAD MOVING. ALWAYS MAKE SURE TRAILER IS MOVING BEFORE SUPPLYING HIGH PRESSURE TO THE BLAST HEAD.**




*Visual Impact Guide*

**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 a 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 right/left tolerance plus slight over spray to reduce the potential for missed areas and need to re-do sections.
- Pre-clean the work area with a power broom if necessary before blasting.




*Paint On Concrete /Thermoplastic On Asphalt*

## Engaging The Water Blasting System

1. Position an operator on the Hog Tool and position it a short distance before the material to be removed.
2. Set all switches, speed dials or control valves to the OFF position or 0.

3. Turn CHARGE PUMP switch on, then start the engine and allow it run at idle speed.

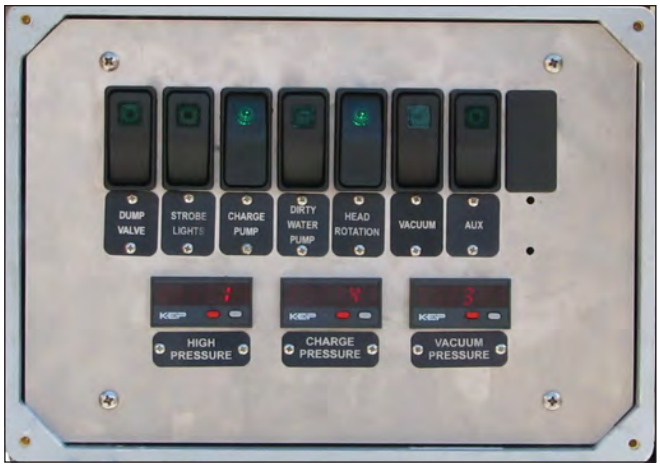
**CAUTION**

**THE UHP PUMP IS DIRECTLY DRIVEN BY THE ENGINE AND WILL BE DAMAGED IF THE ENGINE IS STARTED WITHOUT THE CHARGE PUMP ENGAGED. ALWAYS MAKE SURE THE CHARGE PUMP SWITCH IS ON BEFORE STARTING THE ENGINE.**

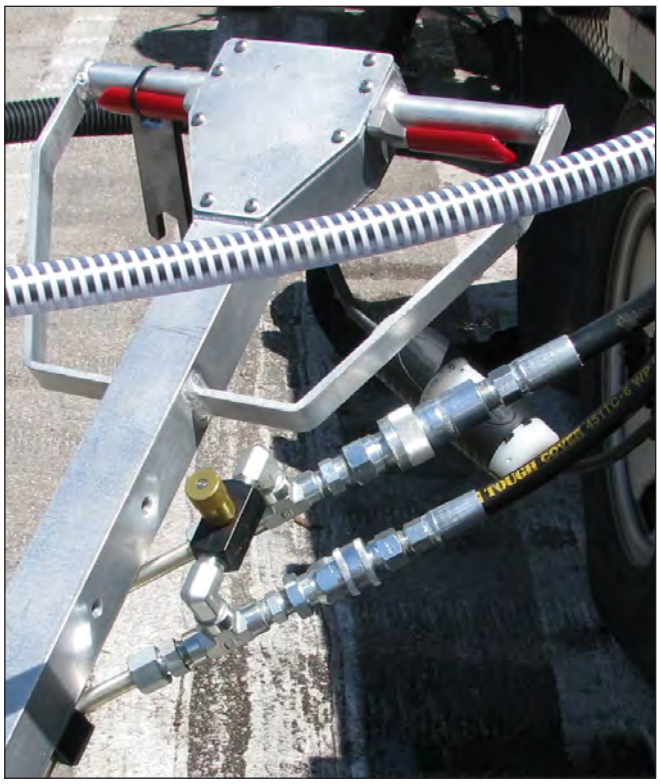
4. Verify charge water pressure.
5. Raise engine speed to the operation RPM and set the pressure (refer to Section 3.6)
6. Turn the VACUUM switch on to activate the vacuum blower.
7. Turn the DIRTY WATER switch on to activate the wastewater transfer pump system. Make sure DEBRIS PUMP switch is set to NORMAL.
8. Make sure the Hog Tool operator is ready, then turn the HEAD ROTATION and DUMP VALVE switches on to enable pressurized hydraulic fluid and high pressure water at the Hog Tool.
9. Use the Hog Tool control lever and valve to activate the Hog Head thru-shaft motor and set head rotation speed to the desired RPM.
10. With the Hog Tool moving at the desired speed, squeeze the high pressure control valve to send high pressure water to the spray bar and begin blasting operations.

***Remember, never activate UHP pressure at the blasting head while the Hog Tool is not moving.***

11. Make sure to keep an operator stationed at the trailer control panel at all times during water blasting operations. The trailer operator must be prepared to immediately respond to commands from Hog Tool operator or shutdown the system in an emergency.




*Trailer Switch Panel & Pressure Gauges*



*Ground Hog Spray Bar Rotation Control Valve & UHP & Spray Bar Rotation Control Levers*

### Water Blasting Operation Do's and Don'ts

**Do's:**

- STOP blasting before stopping the Hog Tool. Blasting with the tool stopped will damage the pavement, spray bar and blast head.
- STOP blasting before changing direction.
- If there is any doubt about the correct spray bar for the job, choose a less aggressive spray bar.
- 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 a blast pressure between 32,000 and 38,000 psi is used.
- Check and clean the vacuum filter frequently to ensure strong vacuum pressure while blasting. A dirty filter 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, wastewater, reduce the power of other nozzles and slow production.
- Avoid running the blast head wheels on rumble strips. Always adjust the Hog Tool castor wheel support arms on the blast head to keep the wheels off the rumble strips.
- Do not blast directly on sealed joints in the pavement. Especially weather stripping on bridges or runways.
- Do not blast over pavement markers/reflectors. Markers can damage the blast head and spray bar and should be removed prior to blasting.
- Do not blast over damaged or uneven pavement that can damage the blast head and spray bar.
- Do not allow the debris bag to become overfilled. Monitor the bag and dump the bag and tank before it is full.
- Do not allow the charge pump to run out of water. Water is a lubricant that cools the charge and UHP 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.
- Do not start the engine when the charge pump is not activated. The charge pump supplies clean water to prime and lubricate the UHP pump.

## 3.8 Routine Shutdown

The shutdown procedure should be followed each time the water blasting system is deactivated and the trailer prepared for dumping or transport.

### Shutdown Procedure:

1. Shutdown high pressure water and spray bar rotation at the Hog Tool.
2. Shutdown high pressure water to the Hog Tool by turning off the DUMP VALVE switch.
3. Shutdown pressurized hydraulic fluid to the Hog Tool by turning the HEAD ROTATION switch off.
4. Reduce trailer engine speed to idle and allow it to run at idle speed for a couple of minutes to cool internal engine components.
5. Allow the vacuum blower to operate for a couple of minutes while the trailer engine is still running to clear waste water from hoses and dry out the vacuum system. Then turn the VACUUM switch off.
6. Turn the DIRTY WATER switch off.
7. Shutdown the engine, then turn the CHARGE PUMP switch off.
8. Activate the Hog Tool head rotation control & UHP levers briefly to clear the hoses of pressure.
9. Disconnect the vacuum hose from the Hog Tool and trailer. Coil and store the hose.
10. Disconnect the hydraulic hoses from the Hog Tool & trailer. Install the protective caps, then coil and store the hydraulic hoses.



11. Disconnect the UHP hose from the Hog Tool and install the protective caps on the hose and blasting head fittings to prevent contamination.
12. Disconnect the UHP hose from the trailer fitting and install the protective caps on the hose and trailer fittings to prevent contamination. Then coil and store the hose.
13. Drain waste water from the vacuum canister. Close the valve or install the drain plug when draining is complete.
14. Remove the safety pins on each side of the landing pad, then lower it to the pavement
15. Load the Ground Hog on the landing pad and secure it with the tie down bracket and safety pin.
16. Raise the landing pad and Ground Hog. Then secure the pad in the transport position with the two safety pins.
17. Connect trailer to the trailer and prepare it for highway transport or to dump debris.

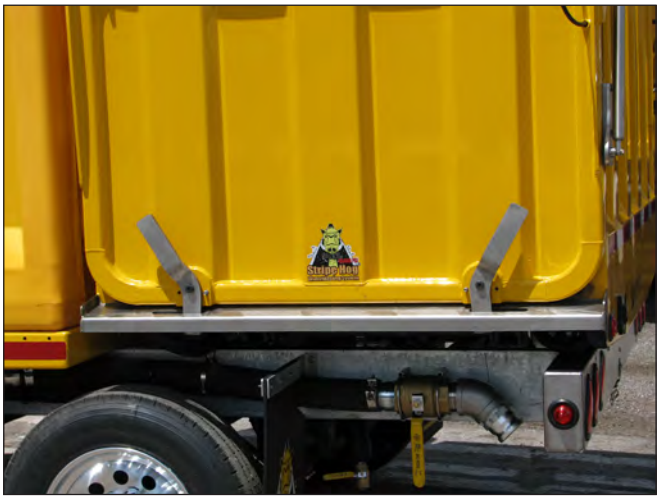
## 3.9 Dumping Debris

Solid debris (larger than 100 microns) is separated from wastewater by the filter bag and needs to be dumped when the bag/debris tank is near full. A hydraulic actuator below the tank lifts the right side, causing the tank to tilt for easy dumping.

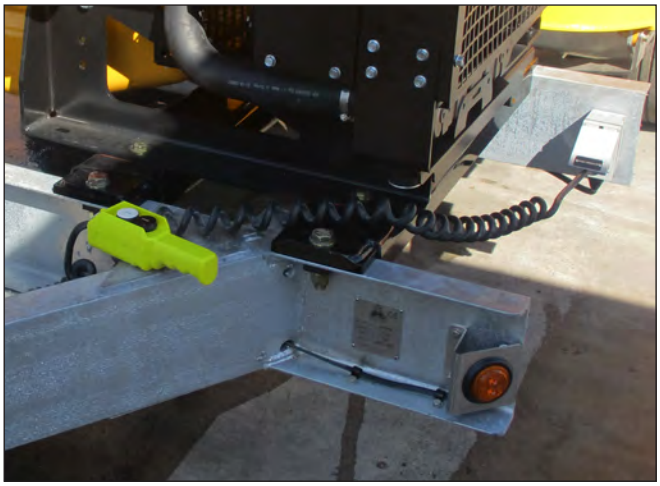
Before dumping debris, be sure you are dumping in an approved dump site and that the trailer is on solid, level ground. Then use the following procedure to dump debris.

1. Turn the CHARGE PUMP switch on and make sure all other switches are off. The start the engine and allow it to run at idle speed.
2. Make sure the VACUUM switch is off, then turn the DIRTY WATER switch on and set the system to DISCHARGE mode or open the gravity drain valve to completely drain the debris tank. Then shutdown the pump system or close the drain valve.
3. Open the drain valve for the wastewater bladder on the passenger side of the trailer and completely drain the bladder. Then close the valve.
4. When draining is complete, 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.


*Debris Tank & Door*



*Debris Tank Door Latches*



*Debris Tank Dump System Remote Control*

5. Open the latches at the bottom of the debris tank door and open the door. It is normal for some water to pour out as the door opens so you should be prepared to step back as the last clamp is removed.

6. Attach the cord for the hydraulic dump system remote control to the receptacle on the left side of the trailer.

7. While you and all other personnel stand well clear of the debris tank, press the white UP button to raise the tank and dump the debris. As the tank raises, the filter bag will slide out with the debris.

8. If the debris and bag does not slide out, use a rod or shovel to break up the debris until it is all removed.

**⚠ CAUTION ⚠**

**NEVER BOUNCE THE HYDRAULIC ACTUATOR TO MAKE THE DEBRIS BAG FALL OUT. THIS JERKING MOVEMENT WILL DAMAGE THE HYDRAULIC ACTUATOR AND POSSIBLY BREAK DEBRIS TANK HINGE PINS OR MOUNT BRACKETS.**

9. When dumping is complete, press the black DOWN button and slowly lower the tank. Monitor all hoses and components as the tank is lowered and be prepared to stop if a hose becomes pinched or a component is misaligned.

10. Use a hose to clean the tank and liner thoroughly with fresh water. Make sure to the clean the automatic float switch for the pump out system and the cutoff ball valve.

11. When the tank is clean install a new filter bag. Check that the bag is installed properly and that the debris pump intake line is not blocked. Also make sure the automatic float switch and cutoff ball valve are free.

12. Then thoroughly clean the door seal, close the door and secure it with the clamps.

13. When the door is closed and latched, use the DOOR SEAL switch to inflate the debris door seal. Maximum seal pressure is 20-25 psi (1.4 - 1.7 BAR).

14. Remove and store the remote switch control.

15. Turn the VACUUM switch on to activate the vacuum system. Then increase engine RPM to achieve maximum vacuum and check the seal area for leaks. If vacuum is leaking around the door, the problem could be that the door didn't close properly, there is debris on the seal, or the seal is damaged. Find and correct the problem before operating the system.

**Note:**
**The system will not be able to develop enough vacuum if the debris tank or filter canister doors are not sealed and closed properly or a drain valve is open.**

16. Shutdown the vacuum system and engine.

17. Turn off all switches and prepare the trailer for transport.

Repair any problems found during dumping operations before returning the trailer to service.



## 3.10 Emergency Shutdown Procedure

**WARNING**

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

**To stop all operations immediately use the following procedure:**

1. Press the Emergency Stop button on the trailer engine control panel (If equipped) or turn the key to off position.
2. This will immediately shutdown the UHP pump (high pressure) and the hydraulic system
3. When the situation permits, return all control panel switches to the “OFF” position and speed dials to the “0” setting for proper restart.

## 3.11 Transporting The Trailer

### General

When selecting a  to tow the SK2000 trailer, make sure that it is capable of towing the weight of the trailer with full fuel and water tanks.  It should also be capable of carrying the trailer tongue weight plus all additional equipment and passengers.

The trailer is designed to carry the load of all factory installed water blasting equipment and full water, debris and fuel tanks. However, we recommend that the water tank and waste water bladder are drained and the debris tank dumped before trailering at highway speeds whenever possible.  This will reduce the load on the trailer and tow vehicle.

Towing the trailer at highway speeds with the water tank 1/4 to half full should be avoided whenever possible.  In some situations, the water in the tank can slosh during transport which can cause the trailer to sway.  If you must tow the trailer with the water tank partiality filled, reduce speed and be prepared for unexpected trailer sway.

### Before Going Out On The Highway:

- Make sure the trailer coupler height is adjusted to match the pintle hitch height so the trailer is level.
- The pintle hitch must latched properly to secure the coupler to the hitch.
- The safety chains must be attached crisscrossing under the coupler to the frame of the tow vehicle.  If the hitch or coupler was to fail, the trailer would follow in a straight line and prevent the trailer tongue from dragging on the road.
- Make sure the trailer emergency brake cable is attached to the tow vehicle frame and breakaway actuator switch. The cable and switch activates the trailer break-way system that automatically applies the trailer brakes if it becomes disconnected from the tow vehicle.
- Make sure the LIGHTS on the trailer function properly.
- Check the brakes.  On a level parking area roll forward and apply the brakes several times at increasing speeds to determine if the brakes on the tow vehicle and trailer are working properly.
- Make sure two vehicle side view mirrors are large enough to provide an unobstructed rear view on both sides of the vehicle.
- Check the tires and wheel bearings.  The tires should in good condition and be inflated to the maximum pressure stated on the tires.  The wheel bearings should be well lubricated and have no excessive play.

**Notice:**
**Make sure your tow vehicle and trailer are in compliance with all state and local laws. Contact your state motor vehicle bureau for laws governing the towing of trailers.**



## 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, make sure the machine is properly shutdown and secured in the service position.

### General Maintenance

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

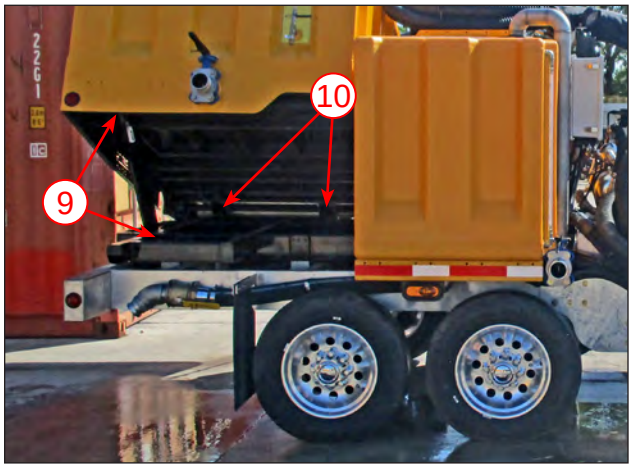
**Use the following procedure to place the machine in the service position:**

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. Park the trailer on a level area and block wheels. If the trailer is disconnected from the tow vehicle, make sure it is level.
3. Apply parking brake.
4. Make sure the trailer engine is shutdown and disable the water blasting system by turning off the main breakers near the trailer engine battery.
5. Follow all Lockout/tagout and additional shutdown procedures established in your company safety guidelines to complete the service position.

**WARNING**

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

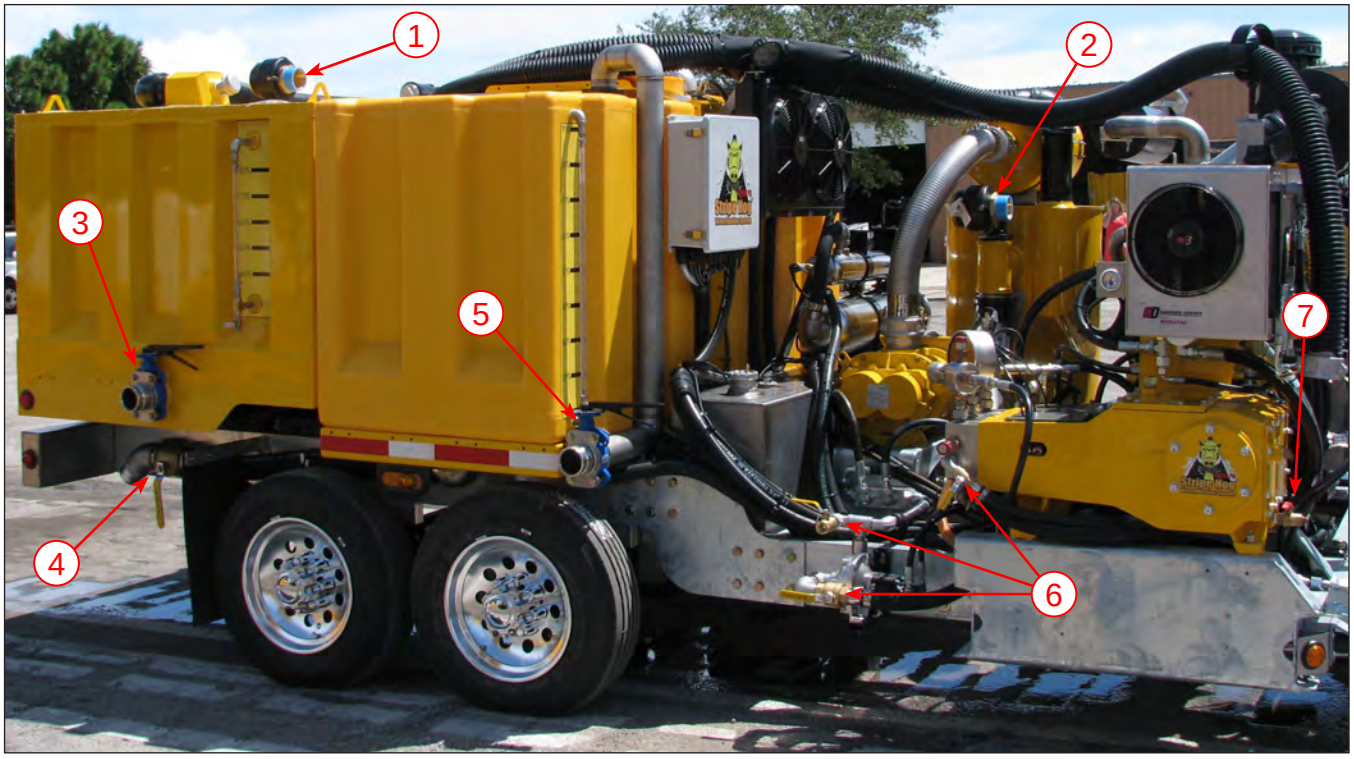
## 4.2 Lubrication & Grease Point Locations

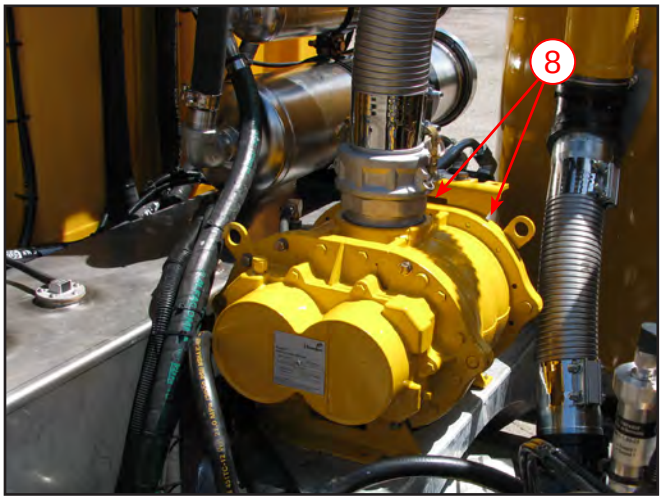



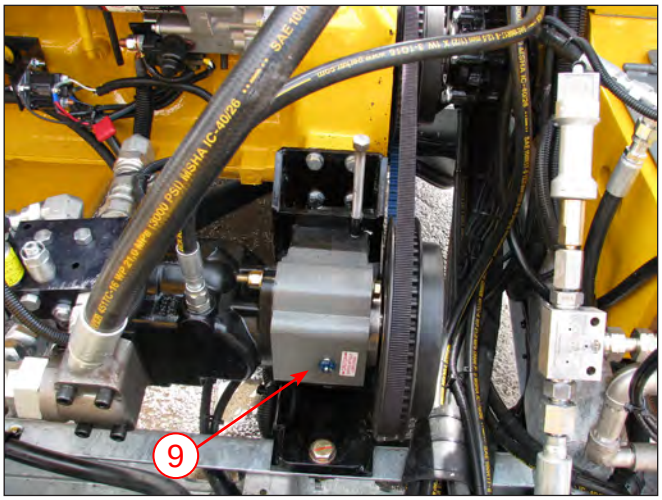

**Stripe Hog Lubrication Chart 1**

| ITEM# | COMPONENT DESCRIPTION | ITEM# | COMPONENT DESCRIPTION |
|---|---|---|---|
| 1. | Vacuum Blower Silencer Exhaust Flap Hinges | 6. | Debris tank Door Hinges |
| 2. | Vacuum Canister Door Latches | 7. | Debris tank Door Latches |
| 3. | Vacuum Canister Door Hinges | 8. | Debris tank Gas Lift Spring Bearings |
| 4. | UHP Water Filter Retainer Ring Clamps | 9. | Debris Tank Tilt Cylinder Bearings |
| 5. | Water Hose Fitting Cam Latches | 10. | Debris Tank Tilt Hinges |

## Lubrication & Grease Point Locations

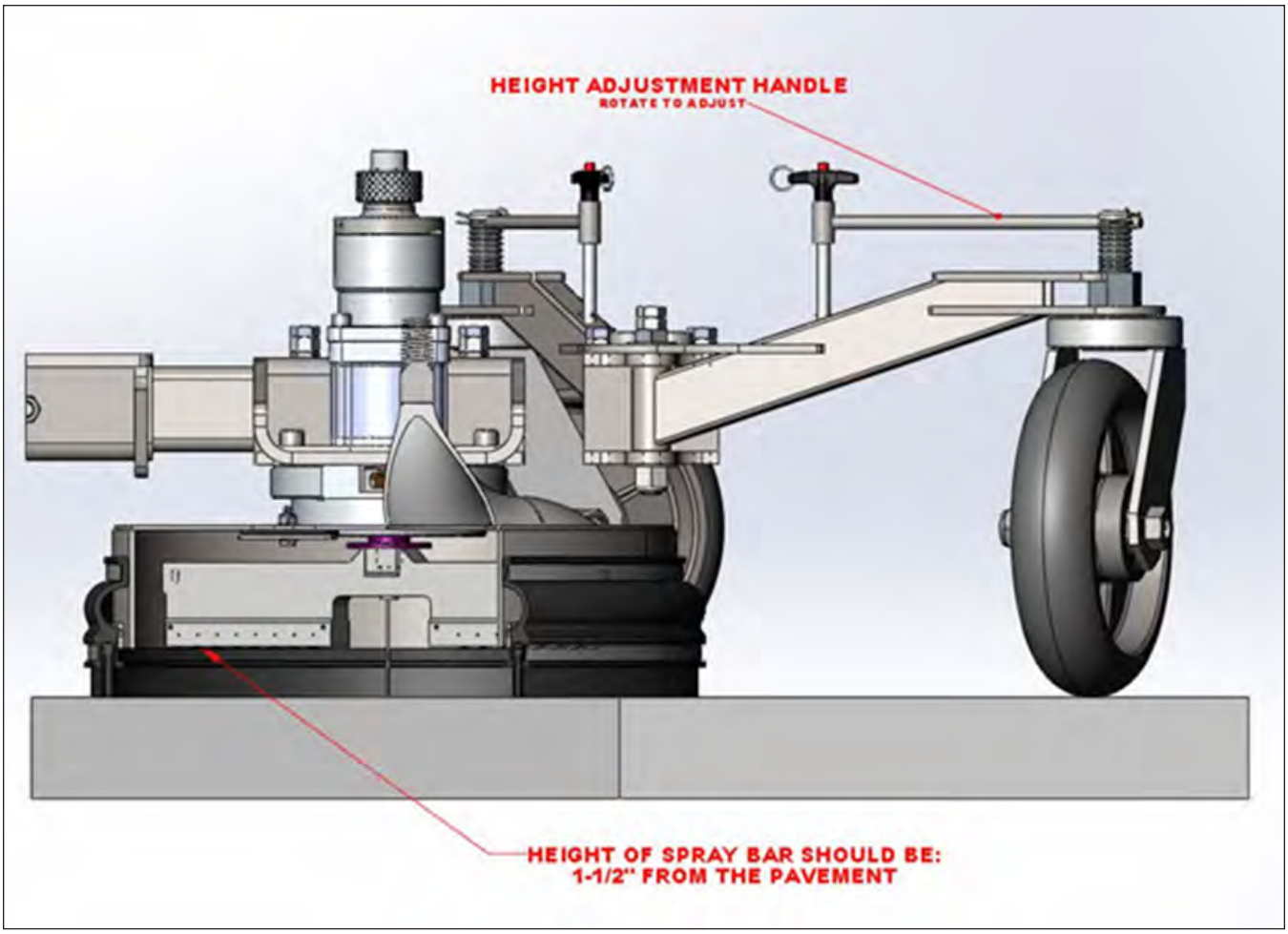



### Stripe Hog Lubrication Chart 2

| ITEM# | COMPONENT DESCRIPTION | ITEM# | COMPONENT DESCRIPTION |
|---|---|---|---|
| 1. | Debris Tank Kunkle Valve | 6. | Charge Water System Valves |
| 2. | Vacuum Canister Kunkle Valve | 7. | UHP Pump Oil Sump Drain Valve |
| 3. | Debris Tank Drain Valve | 8. | Vacuum Blower Bearings |
| 4. | Clean Water Tank Drain Valve | 9. | Hydraulic Pump Drive Pulley Bearing |
| 5. | Clean Water Fill Fitting Valve | | |




*Typical Blasting Head Standoff Adjustment & Standard Setting*
*(Note that the Hog Head shown is for reference purposes only)*

## 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 adjusting the wheels that support the Hog Head.

**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" (3.5 cm) from the spray bar to the pavement; 1.25" (3.2 cm) from the nozzle to the pavement; and .75" (2 cm) from the spray bar protector 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 shroud and spray bar 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 operator who have previously used the Hog Tool in a similar circumstance.



**To set the standoff distance:**

1. Make sure the water blasting system is shut-down.
2. Tilt the Hog Head to the vertical position and support it.
3. Remove the spray bar protector.
4. Place a straight edge across the bottom of the wheels and below the spray bar to simulate the pavement surface. Measure the distance from the straight edge to the spray bar to determine the standoff distance.
5. Adjust` wheels to achieve the desired distance from the straight edge to the spray bar. Remember that 1.5" (3.5 cm) is the standard standoff distance from the spray bar to the pavement. Increase the distance if required to clear road obstacles. Make each wheel is set to the same measurement to keep the blast head level.
6. Cross check the measurement by placing the straight edge across the other wheels. Readjust the wheels as required to level the blast head.
7. Install the spray bar protector and gasket.
8. Lower the Hog Head so the tool is resting on the wheels. Check that the Hog head is level and at the expected distance from the surface.
9. Before starting operations, confirm proper clearance by moving the blast head slowly over a typical obstacle in the pavement on the current job while monitoring the clearance. Make additional adjustments if necessary.
10. 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 tool 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 head to pass over debris.
- Never allow the blast head to pass over equipment or markers that can be damaged by the shroud, spray bar 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 WATER BLASTING SYSTEM AND CHARGE PUMP ARE DISENGAGED, THE CLEAN WATER SUPPLY VALVE IS OFF AND THE PRESSURE HAS BEEN BLED FROM THE SYSTEM BEFORE REMOVING THE FILTER LIDS.**

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

**Replacing the 10 micron filter:**

1. Make sure the water blasting system is shut-down and the trailer 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 water blasting system. Follow the instructions to bleed air from the charge water system in the next section of this chapter.

*10 Micron Filter Canister*

*Typical 10 Micron Bag Style Filter*

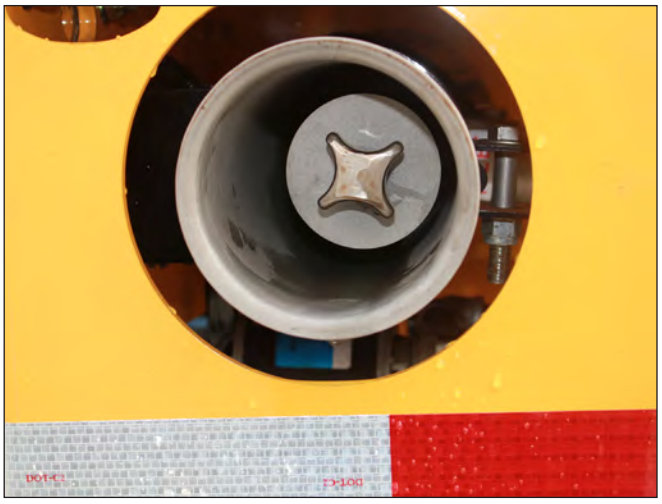
### 1 Micron Cartridge Filter

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

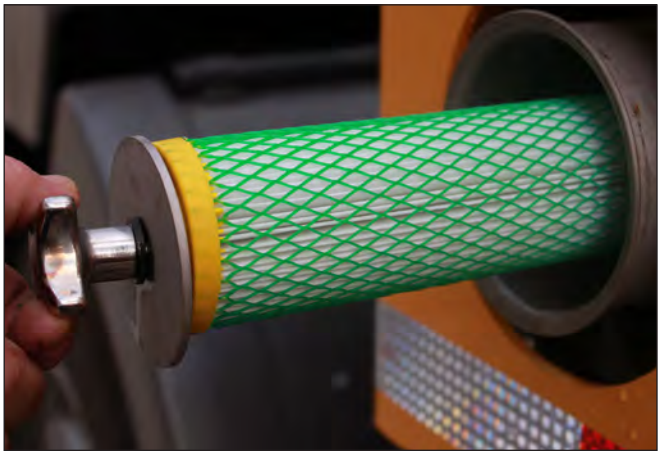
**Replacing the 1 micron filter:**

1. Make sure the water blasting system is shut-down and the trailer is in the service position.
2. Close the clean water supply valve and bleed pressure from the charge water system.

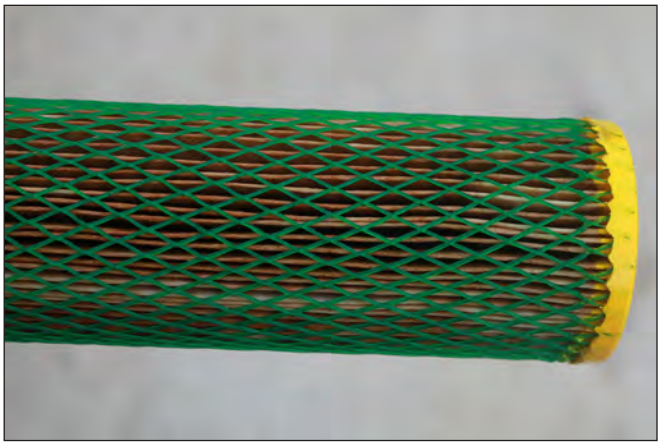
*1 Micron Filter Canister*



*Typical Filter Retainer Hand Bolt*



*Clean Filter Installation*



*Typical Dirty Filter*

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 water blasting 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.

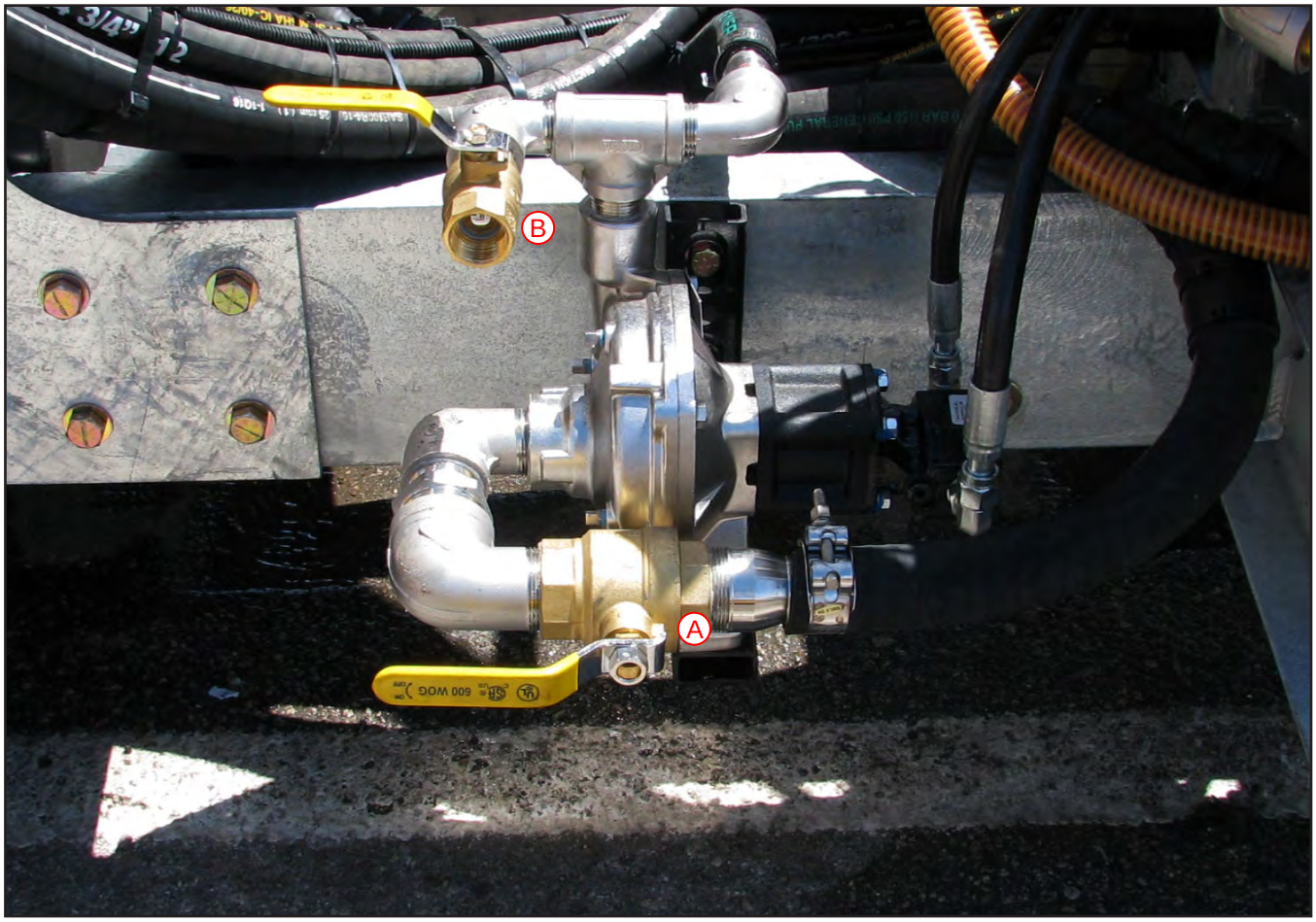
## 4.5 Bleeding Air From Charge Water Pump

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.


*Charge Water Pressure Gauge*

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

1. Make sure the main circuit breakers are on and the clean water supply valve is open.
2. Turn the CHARGE WATER switch on and start the engine. Run the engine at idle speed to activate the hydraulic system.
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 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).




*A) Clean Water Supply Valve / B) Charge Water Pump Discharge Valve*

## 4.6 Wear Brush Replacement

The Hog Tool 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. Shutdown the waterblasting system and place the trailer in the service position.
2. Note the gap between the bottom of the brush and the surface.
3. Loosen the brush clamp on the blast head.
4. Tap the brush down evenly using a dead blow hammer until the bristles are just touching the surface and the gap is eliminated.
5. Make sure the brush bristles are not pressed hard against the pavement. If the brush is set too tight against the surface, it will cause premature wear to the bristles resulting in reduced vacuum air flow and accelerated brush wear.
6. Tighten the clamp and recheck. Readjust if necessary.

*Typical Hog Tool Blasting Head Shroud & Wear Brush Assembly*

## 4.7 Dirt Shield Replacement

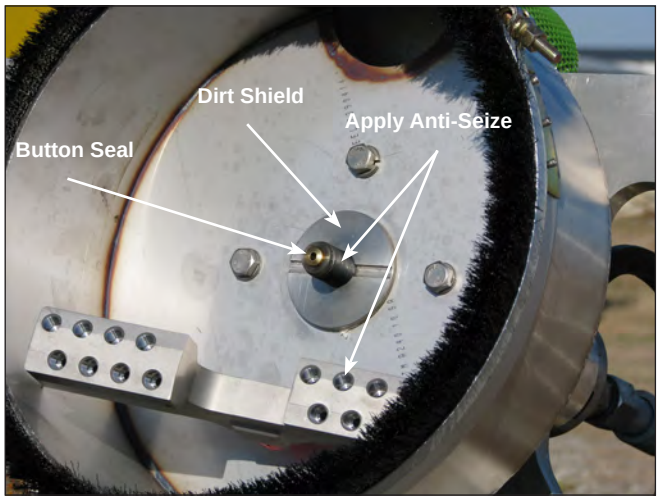
The dirt shield should be inspected daily to ensure it is tightened properly and that the felt seal is in good condition.

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

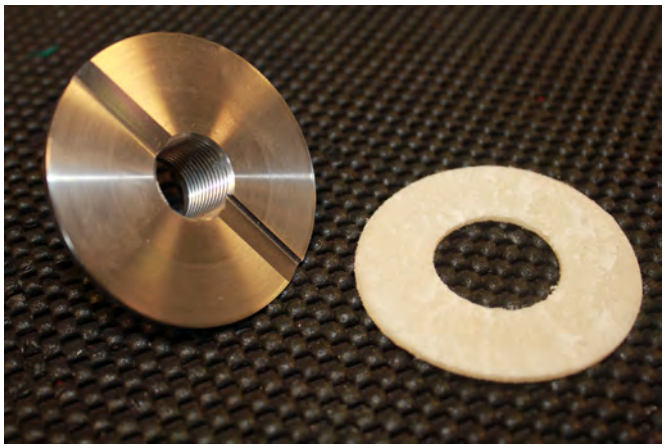
1. Shutdown the waterblasting system and place the trailer in the service position.
2. Tilt the Hog Head and support it in the vertical position.
3. Remove the spray bar protector.
4. Hold the thru-shaft so it won't turn with a 3/4" (19 mm) wrench inserted in the slot at the base of the thru-shaft motor.
5. Turn the spray bar counterclockwise by hand until it is free of the shaft.
6. Remove brass button.
7. Use a stainless steel wire brush to clean the dirt from the thru-shaft threads.
8. While still holding the thru-shaft with the wrench, remove the dirt shield by turning it counterclockwise.
9. Remove the felt seal. Then clean the dirt shield and shroud.
10. Place a new felt seal on the dirt shield and apply a light coating of anti-sieze to the thru-shaft threads.
11. 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.**

12. Activate the charge water system. Purge the blast head at low pressure to remove debris that could clog the nozzles.
13. Deactivate the Hydraulic and charge water systems. Then return the trailer to the service position.



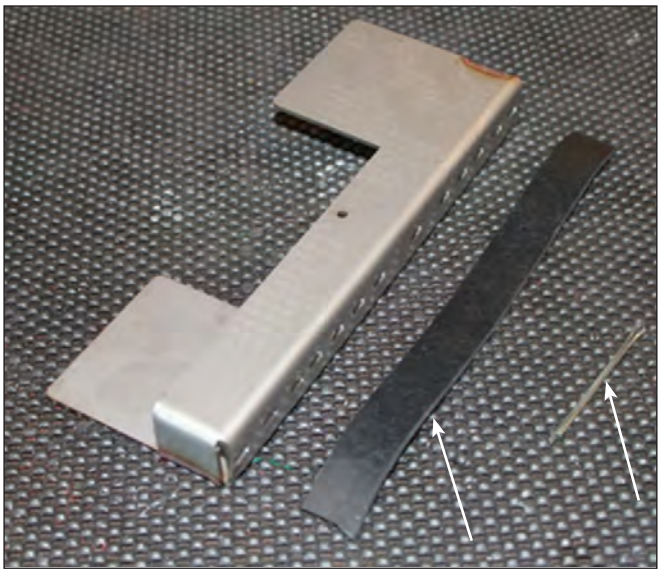

*Typical Dirt Shield Installation*



*Brass Dirt Shield & Felt Seal*

14. Install a new brass button seal, hold the thru-shaft with the wrench and reinstall the spray bar.
15. 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.
16. Install the spray bar protector and gasket.
17. Rotate the Hog Head to the horizontal position.

*Typical Blasting Head With Spray Bar Protector Installed*



*Spray Bar Protector, Cotter Pin & Gasket*

## 4.8 Nozzle Installation

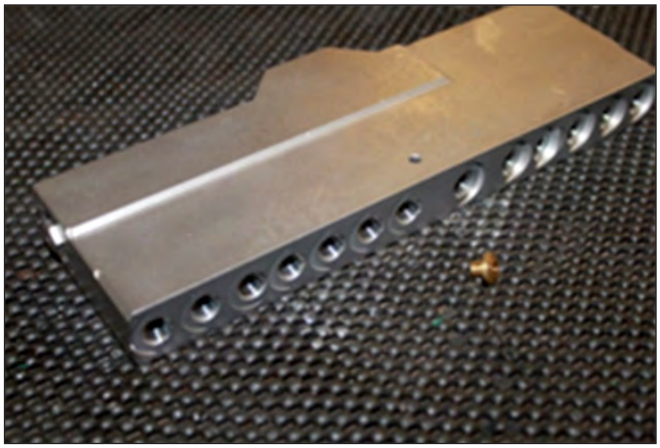
The condition of the nozzles is critical to removal performance and maintaining a tight, cohesive stream as water is forced through the nozzles. Maximum productivity and 98% removal without damage requires all nozzles to be in excellent condition.

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 number 1-4 quality range as indicated on the Nozzle Quality Guide, the nozzle must be replaced.

**Nozzle Replacement Procedure:**

1. Make sure the waterblasting system is shut-down with the trailer in the service position.
2. Remove the spray bar protector cotter pin and the spray bar protector.
3. Remove worn or damaged nozzles.
4. Reactivate the trailer and the waterblasting system by following the steps in the Start Up Procedure.
5. Turn the charge pump on and start the engine.
6. With the engine running at idle speed, flush debris from the spray bar with low charge pressure water.
7. Once the spray bar is flushed, deactivate the waterblasting system and return the trailer to the service position.

8. Apply a light coat of anti-seize to the threads on the new nozzles.
9. Install the nozzles 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 to 10 ft lbs.
11. Reactivate the trailer and the waterblasting system by following the steps in the Start Up Procedure.
12. Follow the steps in the Setting Pressure Procedure to pressure test the spray bar and nozzles.
13. Confirm at least a 1 inch, needle tight, water jet is coming from each nozzle.
14. When the pressure test is complete, deactivate the waterblasting system and return the trailer to the service position.
15. Replace the spray bar protective cover and gasket.



*Typical Spray Bar & Nozzle*

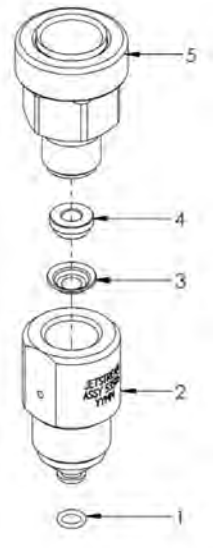
*Nozzle Pressure Test - All Nozzles Good*

**Replacing the rupture disc:**
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. Make sure the waterblasting system is shutdown with the trailer in the service position.
2. 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.
3. Remove the hold down ring from the base (Item 4 in drawing below) and set it in a clean, safe location.
4. Remove the blown rupture disc.
5. Insert a new rupture disc into the base assembly. Be sure it is the same pressure rating as the one being replaced.
6. Place the hold down ring on top of the rupture disc.
7. Install the rupture disc cap assembly on the base and tighten to specification.

*Typical Rupture Disc Rating*

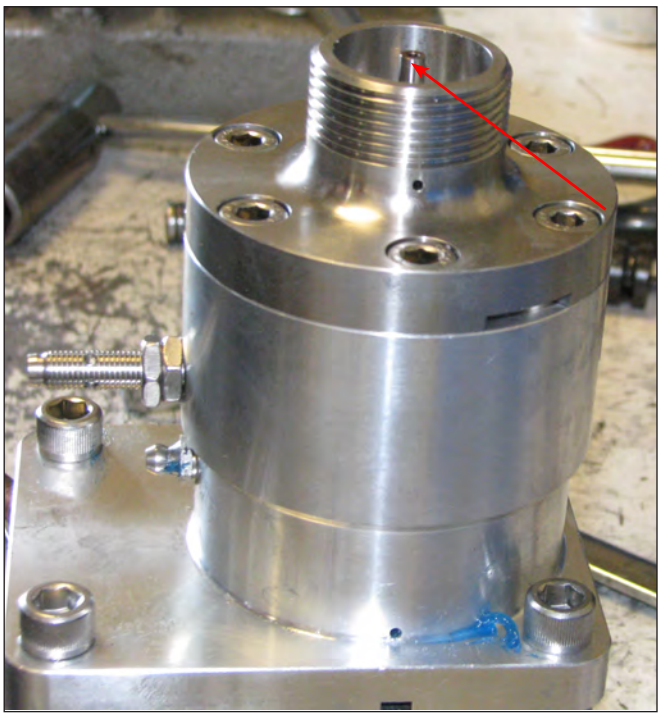



| # | DESCRIPTION |
|---|---|
| 1 | O-ring |
| 2 | Base 40K Male Port 9/16” High Pressure Male |
| 3 | Rupture Disc |
| 4 | Hold Down Ring |
| 5 | Cap |

*Rupture Disc & Holder Assembly*

*Typical Rupture Disc On Manual By-Pass Valve*

*Thru-Shaft Cover Housing & Swivel Nut*



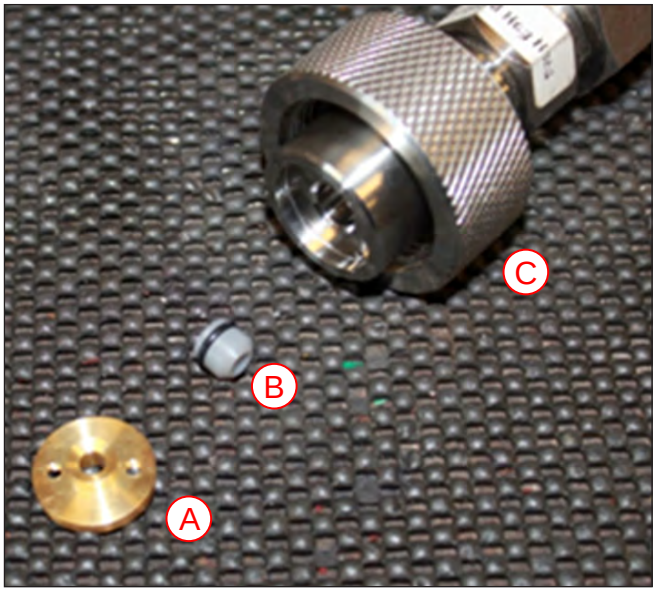
*Swivel Tit In Thru-shaft Cover Housing*

## 4.9 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 water blasting system is shut-down and the trailer 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.




*Swivel Seal Assembly*

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

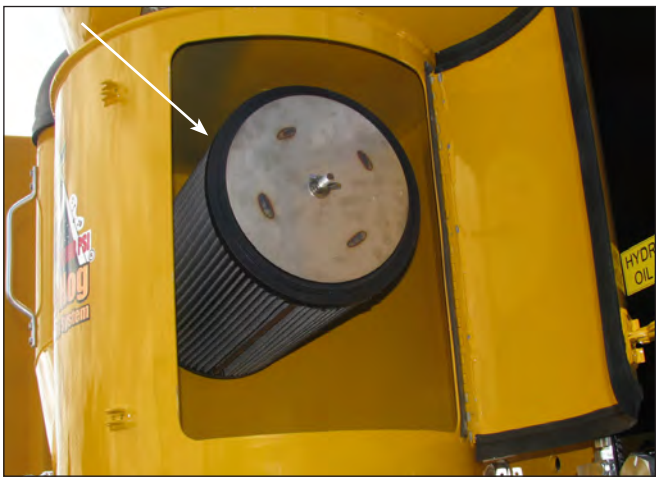
5. Once the brass back-up ring is removed, inspect the swivel seal seat and the edges of the seat in the back-up ring closely. If there is any sign of wear or damage, replace the brass back-up ring. It is recommended that the back-up ring be replaced every 3rd or 4th swivel seal replacement.
6. Insert 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.**

## 4.10 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 drain valve or a drain plug at the bottom of the filter canister to remove excess water as needed.



*Typical Vacuum Canister Access Door & Filter*

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.

*Typical Vacuum Canister Drain*

**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 trailer is in the service position.
2. Open the filter access door and drain accumulated water from the canister. Close the valve or insert the plug 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.

*Typical Pleated Vacuum Filter*

## 5.1 Scheduled Maintenance Introduction

Most components of the water blasting 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 water blasting 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 SK2000 water blasting 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, UHP pump 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 water blasting system have specific stated service intervals. Other components that support primary equipment require periodic inspection and routine maintenance. Many of those items are mentioned in this section.

### Access Door Hinges And Latches.

**Monthly/200 Hours:**

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

## Vacuum Separator Wiper Blades

**Weekly/50 Hours**

- Activate the drum and vacuum system. Monitor the operation of the drum and make sure the wiper blades are in good condition and sealing properly.
- Inspect the drum and blades for damage and excessive wear.

**Monthly/200 Hours**

- Replace the wiper blades and test for proper operation.

## Debris tank Transfer Pump And Automatic Switch

**Weekly/50 Hours:**

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

**Monthly/200 Hours:**

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



## 5.3 Trailer Engine & Reduction Gear

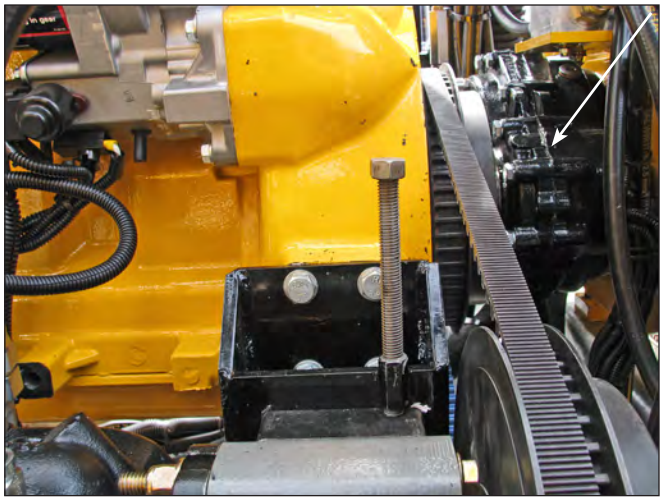
Proper trailer engine maintenance is essential to the proper performance and reliability of the water blasting system. You should perform all recommended maintenance according to the manufacturer's recommendations. Maintenance schedules and procedures are outlined in the engine owner's manual. They should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

The UHP pump is driven by the trailer engine through a direct drive reduction gear and coupler. The reduction gear unit is lubricated by 80w90 gear oil. Oil is added through a removable plug in the housing and oil level is monitored by a sight glass on the side.

*Typical Trailer Engine*

### Daily inspection and Maintenance

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


*UHP Pump Reduction Gear*

### 300 Hour Maintenance

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

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

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


*UHP Pump Reduction Gear Sight Glass*

### 500 Hour Maintenance

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

- Change the reduction gear oil

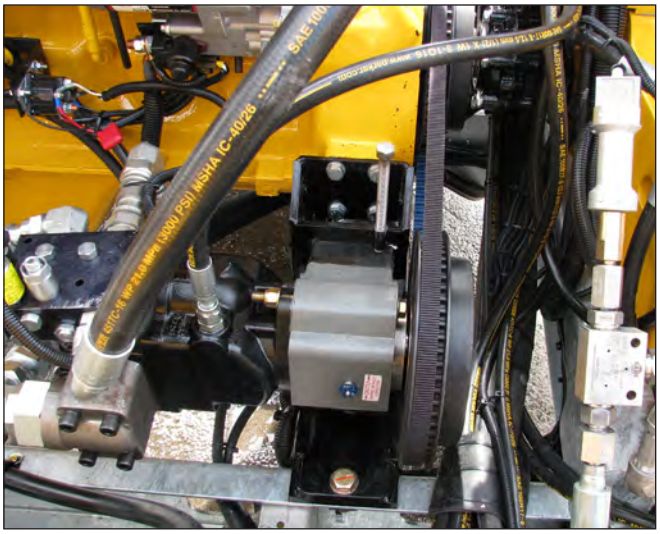
Refer to the reduction gear operation manual for additional maintenance information and instructions for changing the gear oil.

## 5.4 Hydraulic System Drive Belt

The primary drive belt that connects the engine to hydraulic pump is a special carbon fiber industrial belt designed for high horsepower applications.

The ribbed drive belt is matched to grooved pulleys and has very little stretch. Therefore, the belt typically doesn't need to be adjusted often and proper belt tension is extremely important. The belt is strong enough to cause severe damage to bearings, shafts and other components if it is set too tight. Additionally, if a belt is too loose, it can ride on top of the grooves in the pulleys and become too tight.

Make sure you follow the instructions and set the tension to proper specifications when adjusting the drive belts. Never overtighten them.



*Typical Hydraulic Pump Drive Pulley & Grease Fitting*

**⚠ WARNING ⚠**

**AN OVERTIGHTENED DRIVE BELT CAN CAUSE SEVERE DAMAGE TO PULLEYS, SHAFTS AND BEARINGS. ALWAYS MAKE SURE THE BELT IS PROPERLY ALIGNED AND SET TO THE MANUFACTURES SPECIFICATIONS WHEN IT REQUIRES ADJUSTMENT. NEVER OVERTIGHTEN THE BELT.**

### Drive Belt Inspection and Maintenance

**Daily:**

- The belt must be inspected before each shift for damage, tension and alignment.
- Check and grease drive pulley bearings.

**Monthly/200 Maintenance:**

- Check drive belt tension, pulleys and belt alignment. Adjust or replace as required.

### Checking Belt Tension

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 highly recommended.

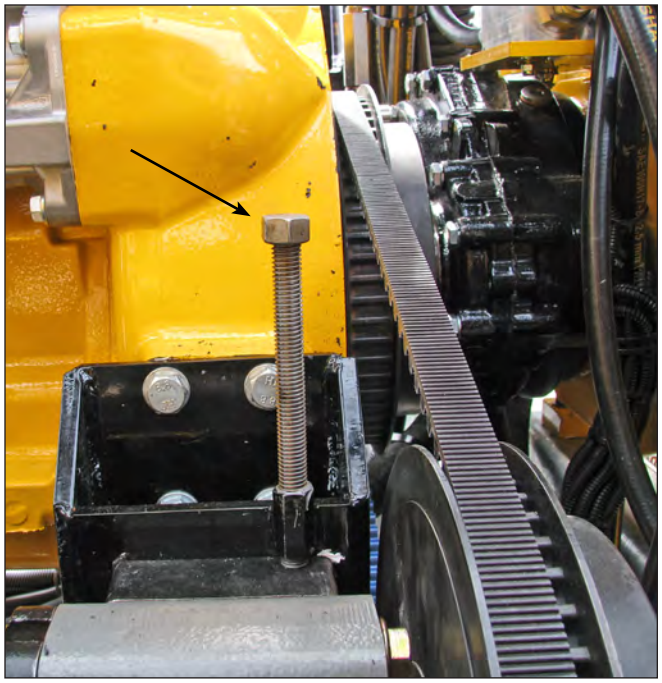

*Typical Gates Sonic Tension Meter*

#### Sonic Tension Meter Method

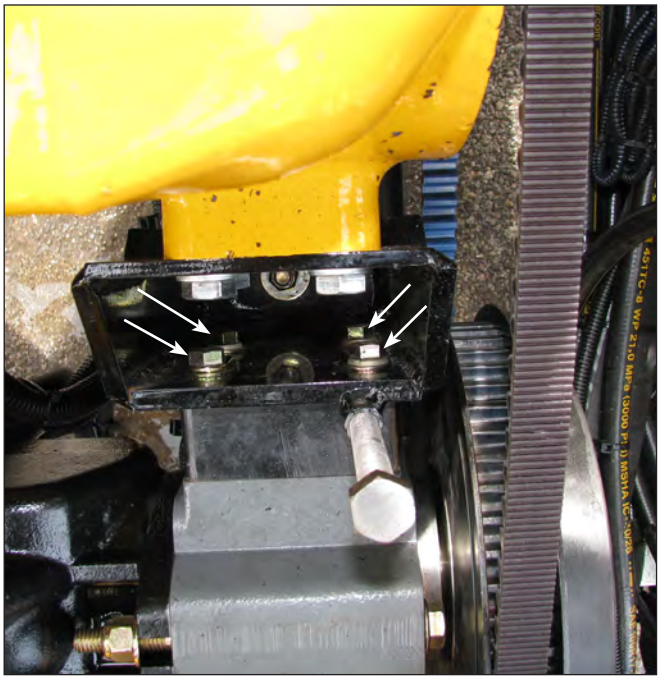
The Sonic Tension Meter detects the vibration frequency in the belt span and converts that measurement into the actual static tension in the belt.

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 and hold 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, the belt should be tightened. If it is higher than the maximum recommended frequency the belt should be loosened.



*Drive Pulley Adjusting Bolt*



*Mounting Plate Bolts*

**Note:**
**The procedure in this example is for the Gates Sonic Tension Meter shown. Sonic meters from different manufacturers or sonic tension meter APPS available for some smart phones will require procedures unique those meters or APPS.**

## Belt Tension Frequency Specifications

**New Belt Tension Frequency** = **-** Hz

**Used Belt Tension Frequency = **-** Hz**
(More than 20 hours of operation)

Refer to the belt manufacturer's manual for additional maintenance information on the drive belt.

## Drive Belt Adjustment Procedures

The hydraulic pump and drive pulley is on a adjustable mount. A threaded adjusting bolt is used to move the pump and pulley up or down to adjust drive belt tension.

Make sure the waterblasting system is shutdown and the trailer is in the service position. Then use the following procedure to adjust the belt.

1. Loosen the four bolts in the slotted holes on the mounting plate just enough to allow the plate to move. Make sure not to loosen them too much.
2. Rotate the adjusting bolt to move the pulley and pump to set the belt to the proper tension. Use a spring scale tester or sonic tension meter to achieve proper tension.
4. Tighten the bolts in the slotted holes when proper belt tension is achieved.

**Important:**
**Tighten the mount bolts in the slotted holes and recheck the belt tension and alignment. Readjust as necessary to achieve correct belt tension and/or alignment.**

5. Make sure the CHARGE PUMP switch is on and follow the System Startup Procedure to start the engine at idle speed.

**NOTICE:**
**THE HYDRAULIC PUMP DRIVE BELT IS DIRECTLY DRIVEN BY THE ENGINE AND IS DRIVING THE HYDRAULIC PUMP WHENEVER THE ENGINE IS RUNNING.**

6. Run the engine at idle speed for 30 seconds, then shutdown the engine and return the trailer to the service position.
7. Recheck belt tension and make sure the belt is riding on both pulleys properly. If necessary, repeat steps 1-4 to set to set proper tension and alignment.

8. Tighten the mounting bolts securely.

**Note:**
**Apply grease or anti-seize to the threads of the adjusting bolt each time the belt is adjusted to help prevent corrosion and ensure the adjusting bolt will turn when adjustment is required.**

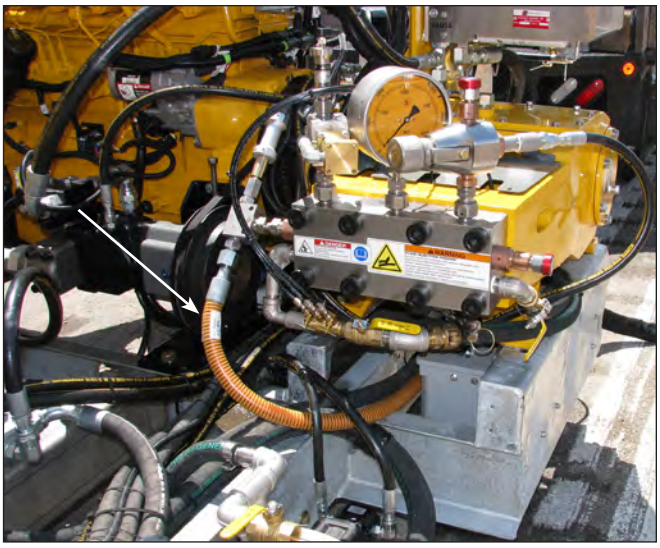
## 5.5 High Pressure Hose Installation

The ultra-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 on the trailer:**

1. Make sure the water blasting system is shutdown with the trailer 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.



*Trailer UHP Water Hose*

*Hog Tool 12V Cable, UHP Hose & Hydraulic Hose Connectors*

8. Follow the steps in the System Start Up Procedure to activate the charge water system and purge the UHP hose at low pressure to remove debris that could have entered the system while changing the hose.
9. Shutdown the water blasting system and return the trailer to the service position.
10. Install the protective cap on the trailer UHP hose fitting to prevent contamination.

**NOTICE:**
**HOG TOOL CABLES AND HIGH PRESSURE HOSES MUST BE PROTECTED WITH ANTI-CHAFFING.**

## 5.6 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.

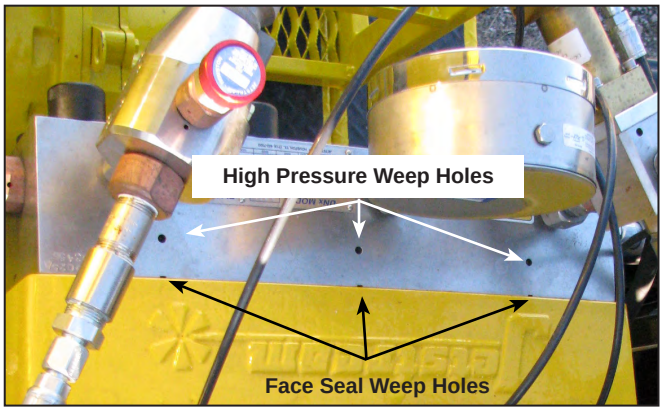
### Daily Inspection and Maintenance

- Check the crankcase lubricating oil level.

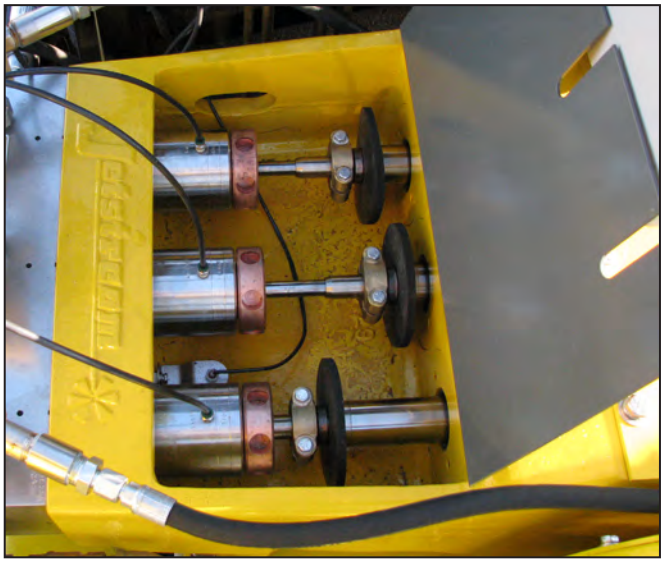
**NOTICE:**
**THE PROCEDURE FOR CHECKING THE CRANKCASE OIL LEVEL IS DIFFERENT FOR WHEN THE PUMP HAS NOT BEEN OPERATING FOR 5 OR MORE HOURS AND WHILE THE PUMP IS IN OPERATION. REFER TO UHP PUMP CRANKCASE OIL LEVEL CHECK PROCEDURE IN THIS SECTION FOR THE CORRECT PROCEDURES FOR CHECKING THE CRANKCASE OIL.**

- 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 beginning water blasting operations.
- Test the dump valve for proper operation daily. Never operate the system if the dump valve is not working properly.


*UHP Pump & Packing Cooling/Lube Metering Valves*




*Typical UHP Pump Weep Holes*



*Typical 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 Univalves. Refer to High Pressure Pump Univalve 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.

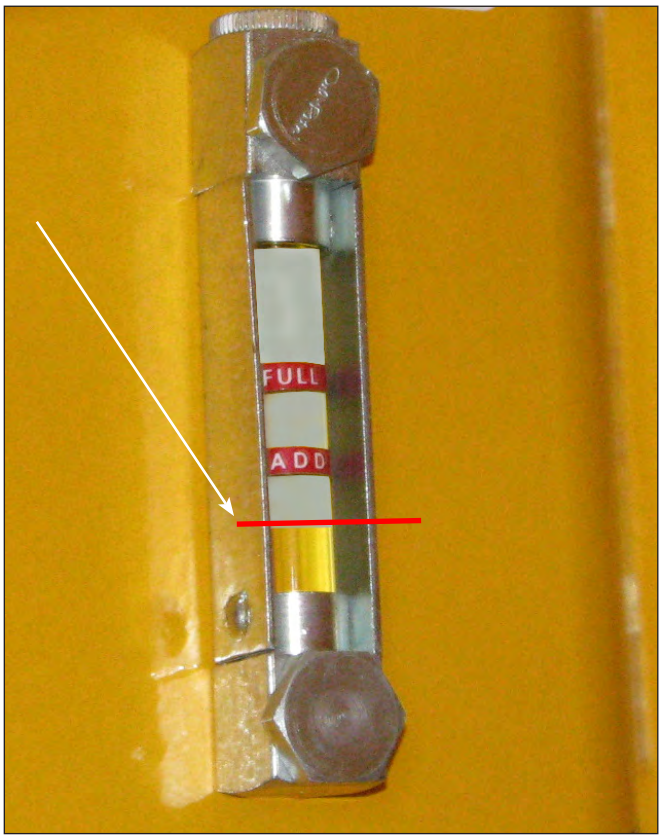
- Check and tighten all mounting bolts and hardware.
- Check and tighten plunger coupling bolts.
- Inspect and lubricate the dump valve to keep it operating properly.
- Inspect and lubricate the manual by-pass valve to keep it operating properly.

## 500 Hour Maintenance

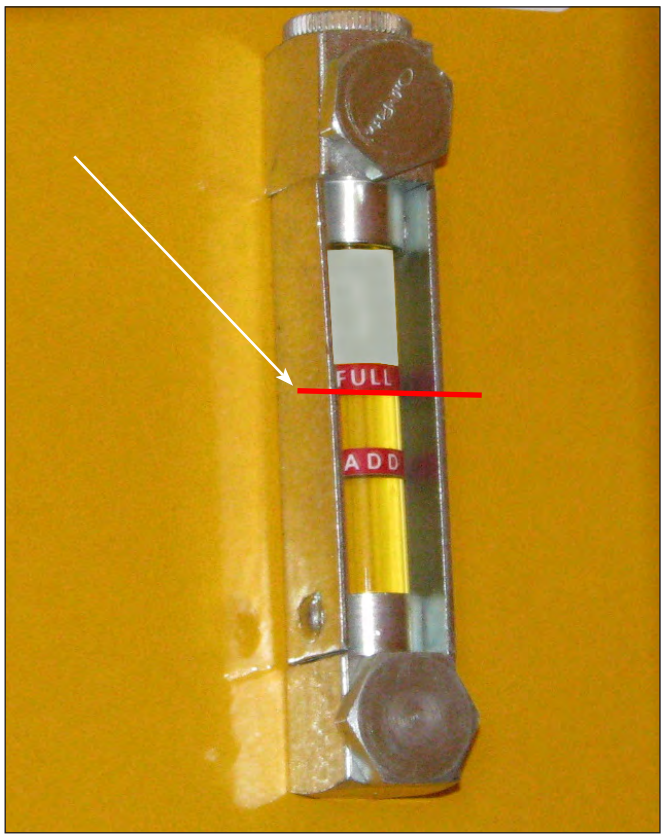
Perform all daily, 100 and 200 hour maintenance along with the items outlined in this section.

- Change UHP pump crankcase lubricating oil.






*Crankcase Oil Level - Pump Running*




*Crankcase Oil Level - Pump Shutdown 5 To 8 Hours*

## 5.7 Checking UHP Pump Oil Level & Changing Crankcase Oil

### Checking Oil Level

Jetstream UHP 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 trailer 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 activate the charge pump and start the engine 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.

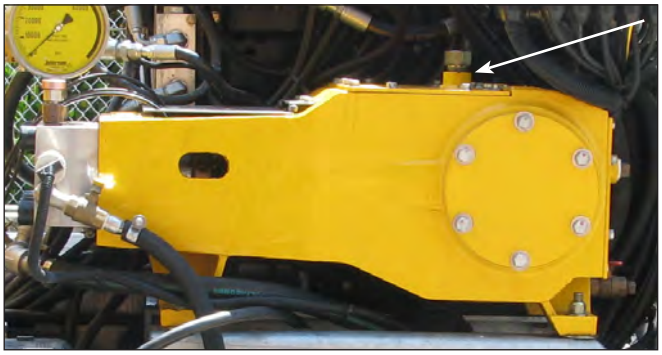
It is best to add oil using the back plate fill port when possible. The oil will be added directly to the main oil sump and the level will register immediately on the sight gauge. When the breather port at the top of sump is used, oil is added to the upper sump and it can take several hours for the oil to drain to the main sump and the correct oil level to 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 5 gallons (19 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 water blasting system is shut-down with the trailer in the service position.
2. Remove the safety plug at the oil drain valve fitting.
3. Attach a drain hose to the valve fitting and route the hose to a suitable waste oil container capable of handling at least 6 gallons (23 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 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, this reduces 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 several hours for the oil to drain 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 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.

## 5.8 High Pressure Pump Univalve Service

The Univalve 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.

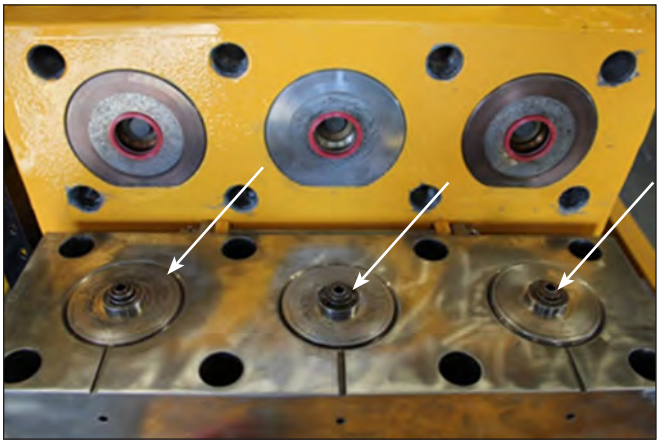
**NOTICE:**
**ALWAYS CHECK FOR WATER DRIPPING FROM THE UHP PUMP WEEP HOLES DURING HIGH PRESSURE TEST. WATER DRIPPING FROM THE SQUARE HOLES INDICATES THE FACE SEALS ARE LEAKING. WATER LEAKING FROM THE ROUND HOLES INDICATES THE HIGH PRESSURE VALVE SEALS ARE LEAKING.**

**Removing Univalves:**

1. Make sure the water blasting system is shut-down with the trailer 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 Univalve. 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 Univalves:**

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



Univalves 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 Univalve 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 Univalve 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 Univalve 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 Univalve cartridge (A) in one hand and the suction valve (B) in the other. Figure 1.

**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*

5. Push the two parts together.
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.

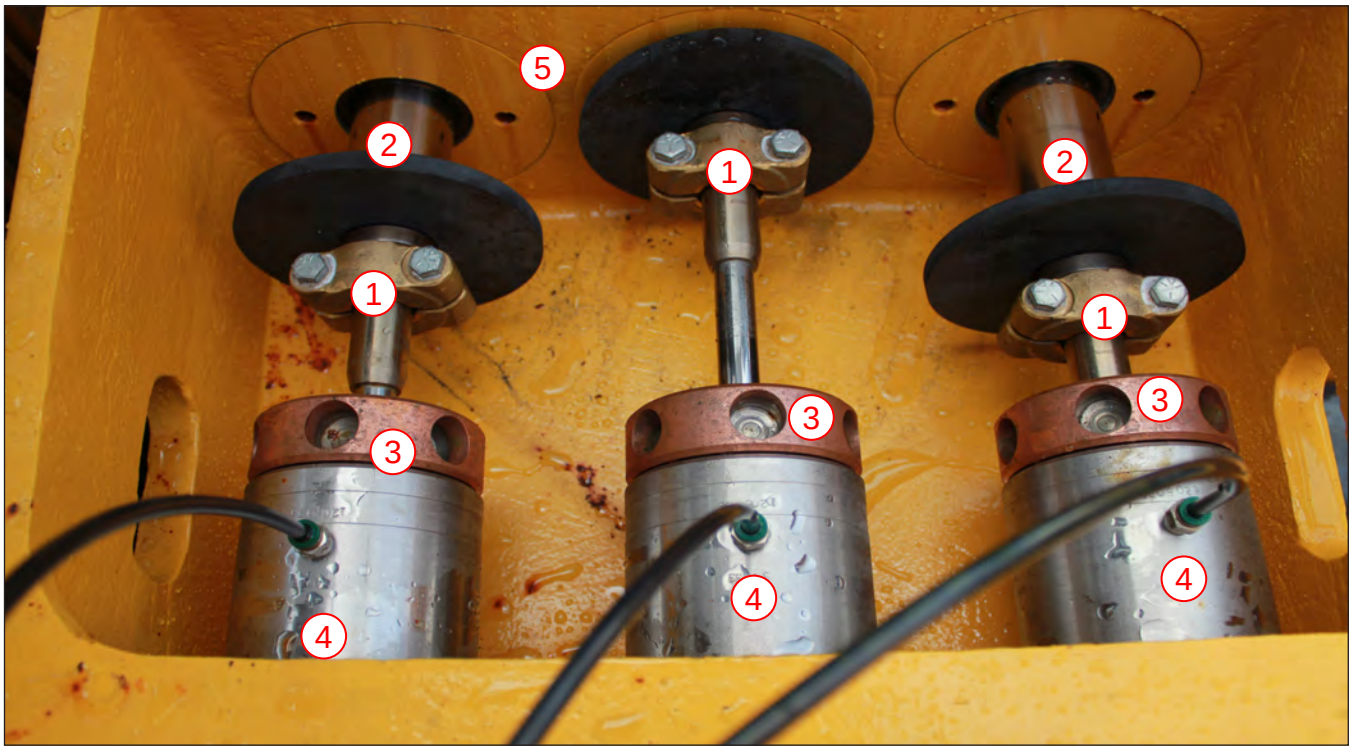

*Figure 4: A. Univalve Body - B. Suction Valve Valve Cartridge Rotated 90⁰ Clockwise*

12. Remove the suction valve and clean both pieces thoroughly with brake cleaner. Be sure to thoroughly clean the holes in the Univalve 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)**

13. 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
14. 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.
15. Alternate grit sizes every 3 or 4 cycles until lapping is complete. The final cycle should always be completed with 600 grit compound.
16. Follow the same procedure for the discharge valve on the other side of the Univalve cartridge.
17. Reassemble the Univalve with new O-rings and seals.
18. Lubricate the O-rings and seals with the grease provided in Mobile Spare Parts System box # 2.
19. Reinstall the Univalve cartridges into the manifold.

**NOTICE:**
**NEVER USE DRY COMPOUND WHEN LAPPING UNIVALVES. KEEP 3 FULLY LAPPED UNIVALVES 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

## 5.9 High Pressure Pump Stuffing Box Packing Replacement

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

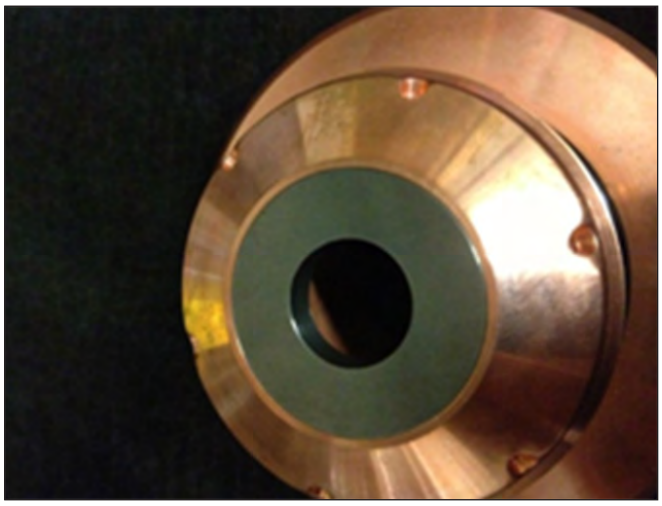
### Typical Packing Replacement

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. Shutdown the trailer engine and UHP pump, charge water pump and the water blasting system. Then place the trailer in the service position.
3. Rotate the high pressure pump 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 Hog Technologies tool system. Insert the round end of 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.

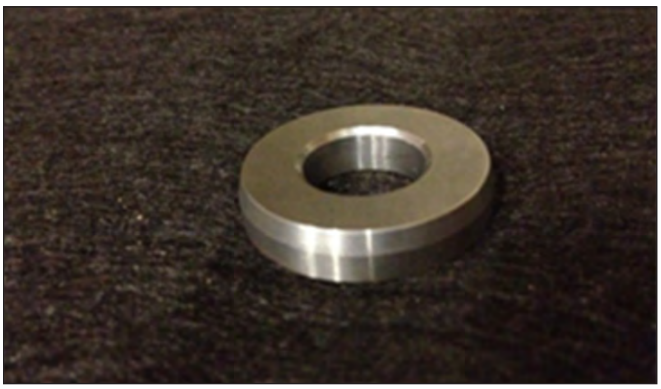
*Stuffing Box, Glandnut, Packing & Plunger*



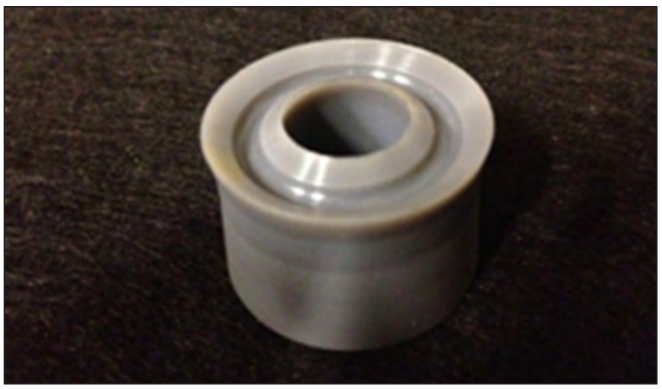
*Guide Bushing or Carbide Ring*

8. Check the carbide guide bushing for nicks, cracks, breaks or excessive wear. Replace if necessary.
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 clock-wise direction to tighten.

*Plunger*



*Carbide Ring*



*Packing*

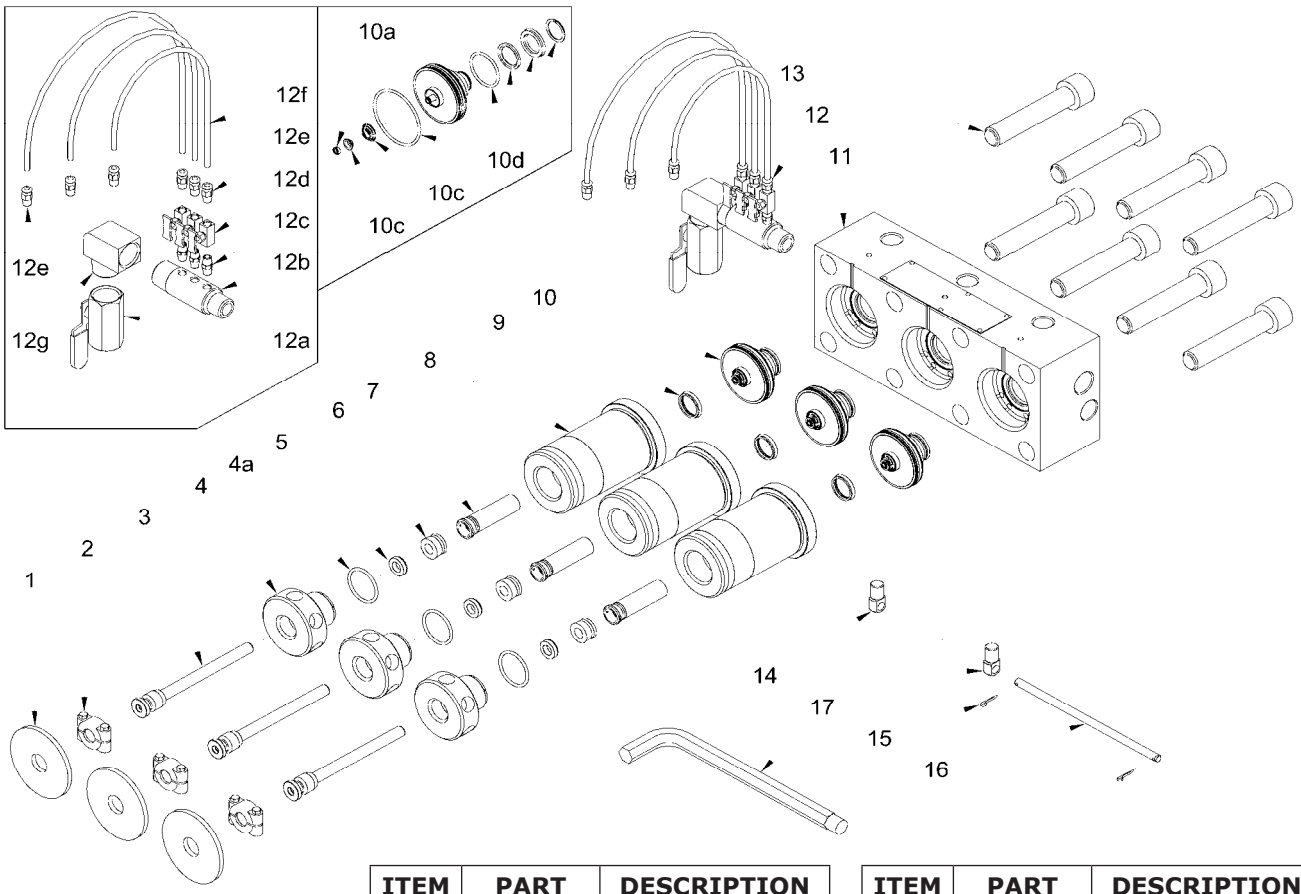
15. Slide the plunger back against the pony rod. Reinstall the plunger coupling to the plunger and pony rod. Make sure both halves of the plunger coupler face the same way.
16. Tighten the coupler bolts evenly to specifications.
17. Activate the trailer engine.
18. Turn on the charge water pump and verify that the lubrication water is flowing normally. Use the metering valves to adjust water flow to the packing if necessary.
19. Verify proper operation.



## 5.10 Ultra-High Pressure Pump Assembly

### UNx™ 3040 Fluid End

Replacement Parts




| Fluid End Assembly | |
|---|---|
| **Part Number** | **Plunger Size** |
| K55636 | #5 |

| ITEM | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | K26624 | Deflector[1] |
| 2 | K51738 | Plunger Coupling |
| 3 | K55647 | #5 Plunger |
| 4 | K55644 | Gland Nut |
| 4a | K25567 | O-Ring[2] |
| 5 | K70299 | Bushing |
| 6 | K70300 | Packing |
| 7 | K55648 | Sleeve |
| 8 | K55642 | Stuffing Box |
| 9 | K70302 | Stuffing Box Seal |
| 10 | K55631 | Uni-Valve |
| 10a | K55635 | Keeper (Pair) |
| 10b | K55637 | Spring Retainer |
| 10c | K70301 | Spring |
| 10d | K55658 | Seal Kit |

| ITEM | PART NUMBER | DESCRIPTION |
|---|---|---|
| 11 | K55632 | Manifold |
| 12 | K55883 | Lube Harness |
| 12a | K27914 | Ball Valve |
| 12b | K53798 | Lube Manifold |
| 12c | K26466 | Nipple |
| 12d | K27476 | Needle Valve |
| 12e | K27733 | Tubing Adapter |
| 12f | K27741 | Tubing |
| 12g | K26255 | Elbow |
| 13 | K26463 | Manifold Bolt |
| 14 | K51660 | Trunnion |
| 15 | K26469 | Cotter Pin |
| 16 | K51667 | Trunnion Rod |
| 17 | K50065 | Pump Wrench |

1 Power end component included in drawing for convenience. Not included with new fluid ends.
2 O-Rings also included with gland nut.

## 5.11 Dump Valve Assembly

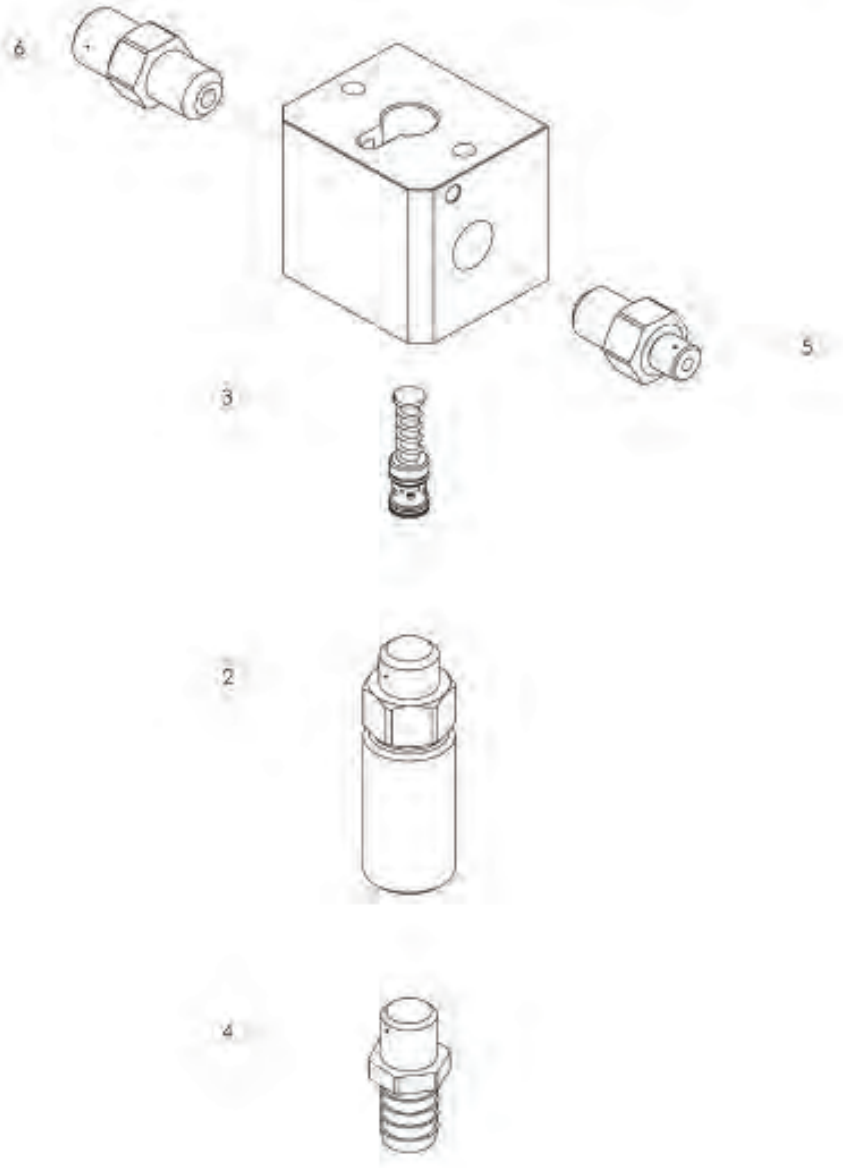
The dump valve should be inspected and lubricated every 200 hours to keep it operating properly. Replace components as required.

### Dump Valve Repair

(Hydraulically operated)

1. Remove diffuser tube (2) with cartridge (3).
2. Remove cartridge (3) from slotted end and replace with a new cartridge (3).
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 | FIT916HPX5mm | HOSE FITTING |
| 6 | 1 | FIT916HPX7B | HOSE FITTING |

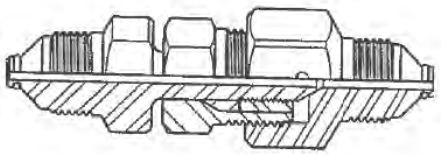


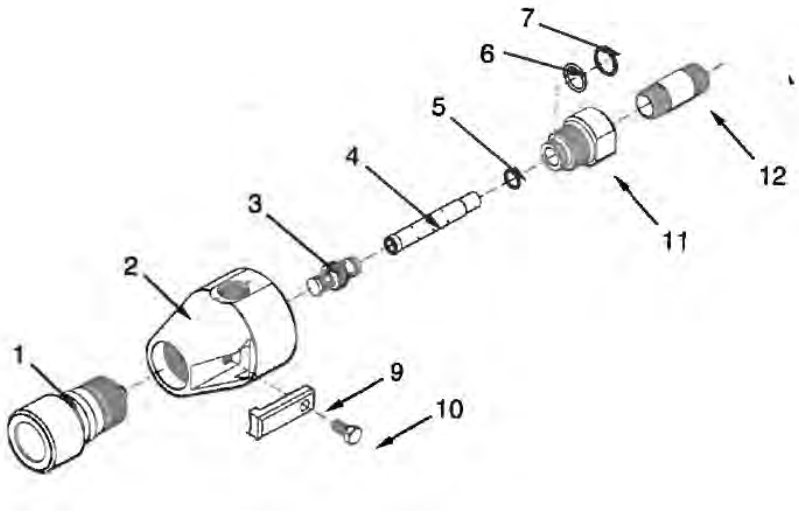
## 5.12 Manual Bypass Valve

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) |

## 5.13 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.

### 500 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:**
**If the blower on your trailer is equipped with a crankcase drain valve, make sure to install the safety plug in the 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.

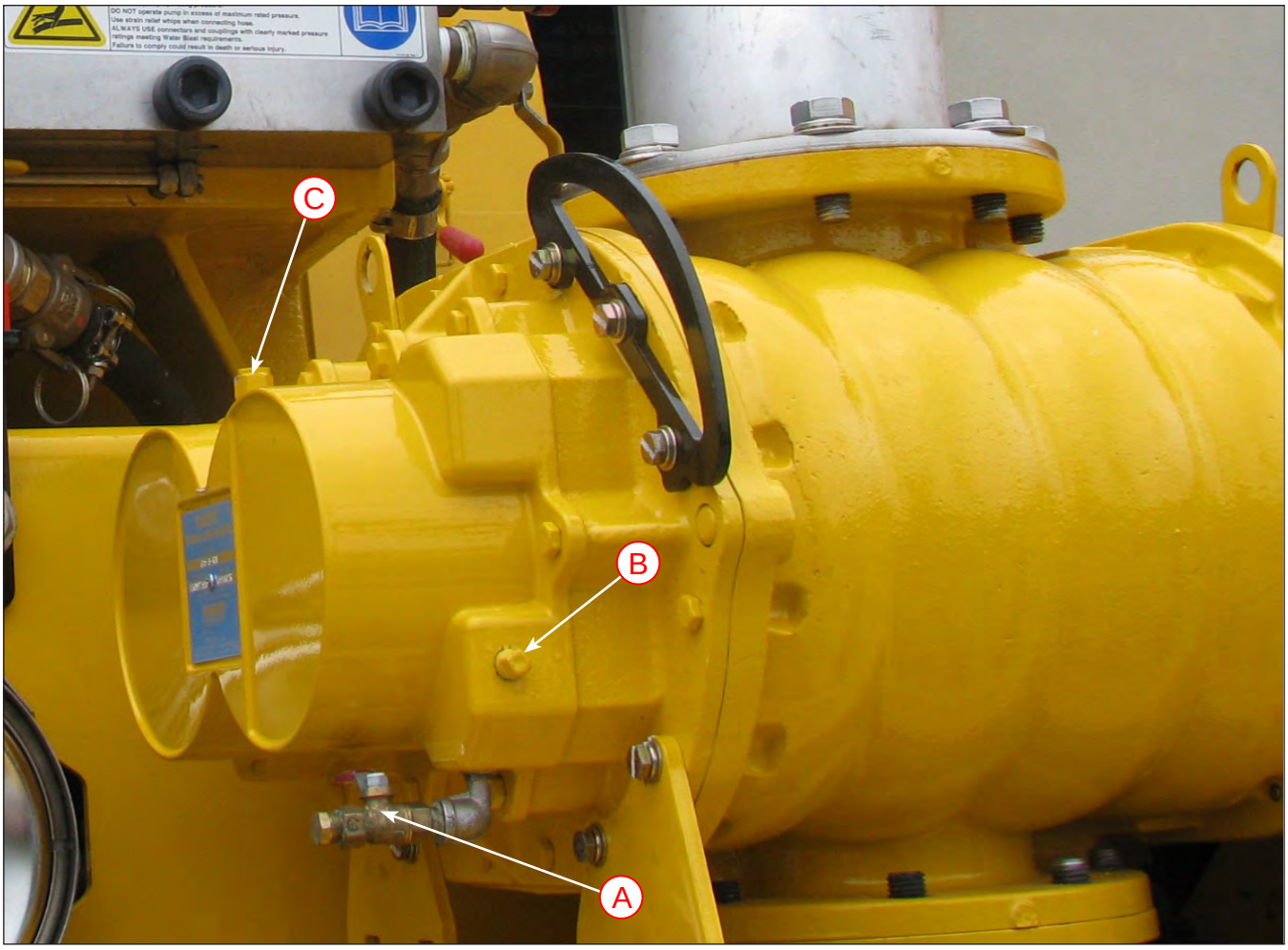
- Inspect and tighten all mounting bolts, hose clamps and hardware.
- Lubricate canister drain valve (if equipped). Make sure to open and close all ball valves at least once every 200 hours to keep them free and operating properly.
- Inspect, clean and lubricate the vacuum relief valves to keep them 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*

## 5.14 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 water blasting system is shut-down with the trailer 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

*Vacuum Blower Drain Valve & Safety Plug*

**Draining the gear case:**

1. Make sure the water blasting system is shut-down with the trailer 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 section of the manual 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.

## 5.15 Vacuum Hose Replacement & Rotation Procedure

Debris buildup, kinks, clogs or leaks in the system will cause a reduction in airflow at the blasting head, 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 head and where the debris hose rises above the trailer cab.

The life of the hoses in these areas can be extended by rotating the hoses $120^0$ every 50 hours. Vacuum hoses should be inspected daily and replaced as needed.

Make sure the water blasting system is shutdown with the trailer 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*

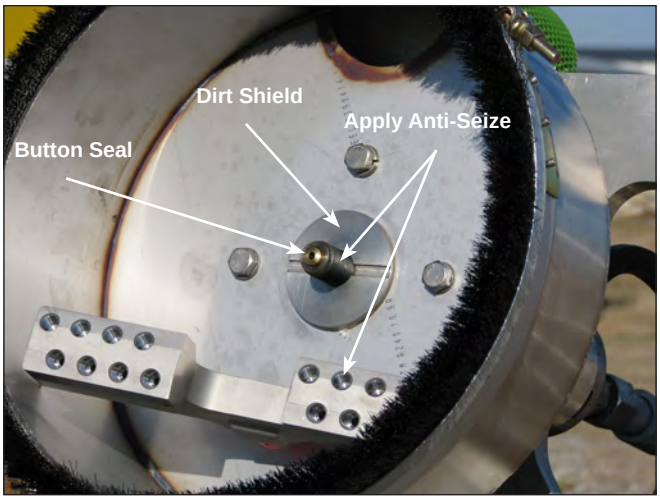
### Vacuum Hose Replacement

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*



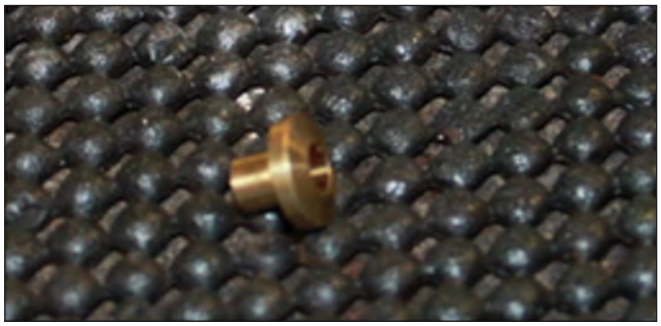

*Spray Bar & Dirt Shield Components*

## 5.16 Shroud Installation

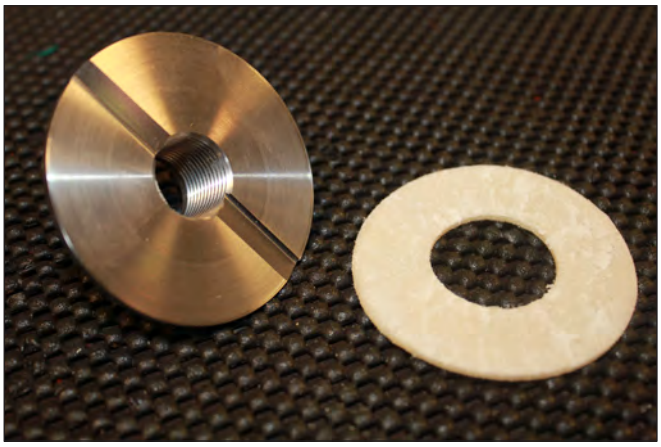
If the shroud becomes damaged, it must be replaced following the steps outlined in this section.

**Removing the shroud:**

1. Make sure the water blasting system is shut-down with the trailer in the service position.
2. Remove the vacuum hose from the shroud.
3. Remove the spray bar protector.
4. 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.
5. Turn the spray bar counterclockwise by hand until it is free of the shaft.
6. Remove brass button.
7. Use a stainless steel wire brush to clean the dirt from the thru-shaft threads.
8. While still holding the thru-shaft with the wrench, remove the dirt shield by turning it counterclockwise.
9. Remove felt seal. Then clean the dirt shield and shroud.
10. Loosen and remove the bolts holding the shroud in place.
11. Remove the shroud from the blast head.



*Typical Spray Bar Button Seal*



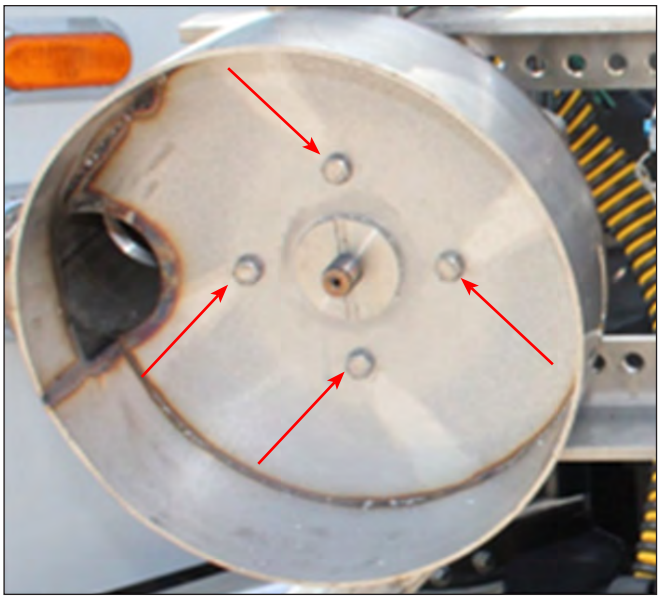
*Dirt Shield & Felt Seal*

**Installing a new shroud:**

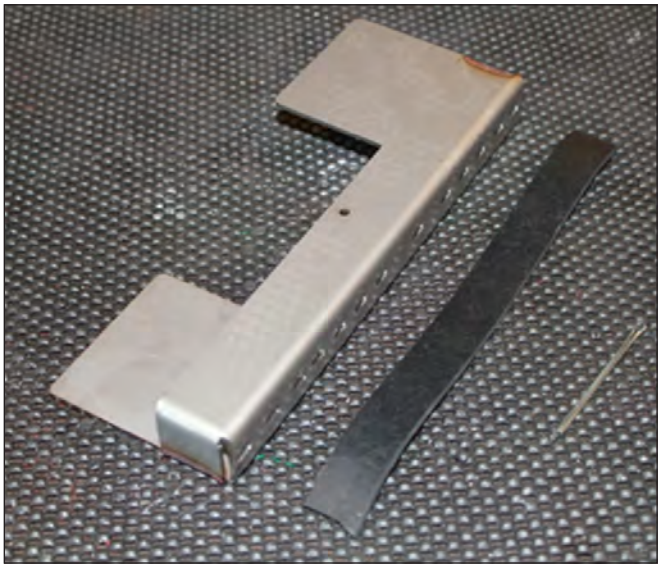
1. Clean the bottom of the thru-shaft motor housing of dirt and debris.
2. Place the new shroud on the housing and align the bolt holes. Insert the shroud bolts and tighten finger tight.
3. Clean the dirt shield and install a new felt seal.
4. Apply anti-seize to the thru-shaft threads and hold the thru-shaft 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.

**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 water blasting system and return the trailer 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.
14. If the wear brush on the damaged shroud is in good condition, install the existing brush on the new shroud. If it is damaged, install a new wear brush.



*Shroud Mounting Bolts*



*Spray Bar Protector, Cotter Pin & Gasket*

## 5.17 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 the hydraulic component manufacture's recommendations. Hog Technologies recommends changing the fluid at least once every 600 hours.

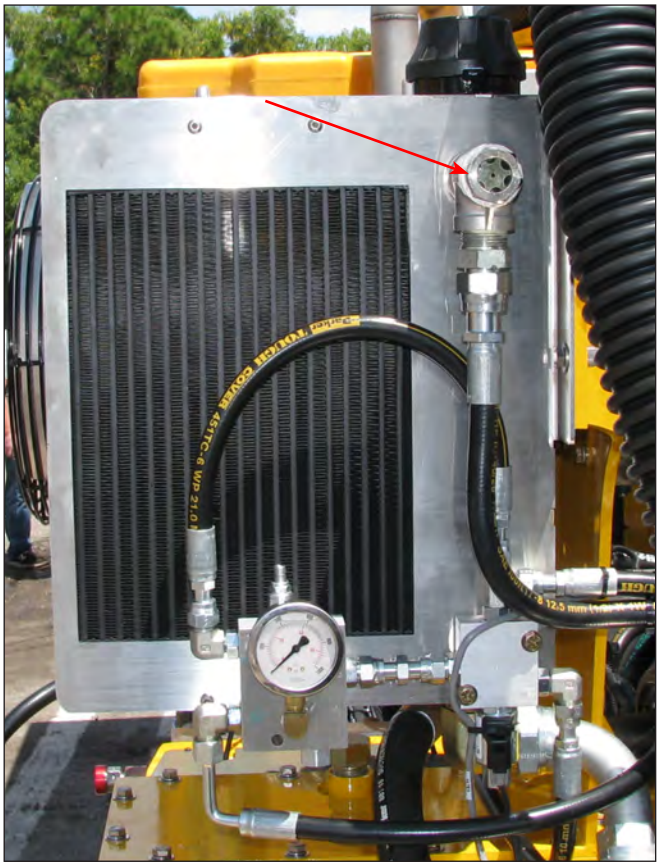
### Daily Inspection and Maintenance

- 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.
- Monitor heat exchanger cooling fan operation and make sure the fans are activating when necessary, sound normal and pull a strong flow of air through the coolers.

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

*Hydraulic Fluid Reservoir/Cooler*


*Hydraulic Fluid Heat Exchanger & Cooling Fans*



*Hydraulic Reservoir Fluid Level Sight Glass*

### 200 Hour Inspection and Maintenance

- Change the filter in the return line. The filter removes any debris that may enter the system and should be changed every 200 hours or more frequently if necessary.
- Inspect heat exchanger cooling fins and clean as necessary. The heat exchangers are critical in maintaining acceptable fluid temperature in the hydraulic system and must be kept clean to maintain efficiency.

### 600 Hour Inspection and Maintenance

- Drain hydraulic fluid and flush reservoir tank.

## 5.18 Changing Hydraulic Fluid & Flushing Tank

The reservoir tank and integrated fluid cooler must be drained and flushed at regular intervals as recommended by manufacturer. Only qualified service technicians should drain and flush the system or replace hydraulic fluid filters. Refer to the manufacturer's operating and service manuals for instructions to drain and flush the hydraulic tank and cooler.

**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 WATER BLASTING SYSTEM IS SHUTDOWN WITH THE TRAILER IN THE SERVICE POSITION AND ON LEVEL GROUND.**
- **MAKE SURE THE HYDRAULIC SYSTEM IS NOT PRESSURIZED AND THE FLUID IS COOL.**
- **MAKE SURE THE HYDRAULIC TANK, FILTERS AND ALL RELATED COMPONENTS ARE THOROUGHLY CLEANED BEFORE SERVICING TO PREVENT CONTAMINATION.**
- **MAKE SURE ALL PARTS ARE CLEAN BEFORE FINAL ASSEMBLY.**


*Hydraulic Filter*

## 5.19 Replacing Hydraulic Filter

A spin on filter in the return line removes contaminates from the hydraulic fluid as it is returned to the tank. The filter should be changed every 200 hours, whenever the hydraulic fluid is changed or when the system is serviced. Use the following procedure to replace the filter.

1. Use a filter wrench and rotate the filter counterclockwise to remove it.
2. Lubricate the seal on the new filter with hydraulic fluid.
3. Install the filter and hand tighten.
4. Inspect the filter for leaks when the hydraulic system is activated.

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

*Clean Water Tank Drain & Fill Valves*

## 5.20 Winterization & Storage Procedures

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

### Vacuum and UHP System Shutdown and Winterizing

Water freezing in vacuum system components can cause serious damage to the blower, silencer, filter canister, drain valves and other vacuum system components. Water freezing in UHP components can cause serious damage to pumps, filter canister, valves and other UHP system components.

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

Completely draining the UHP and vacuum systems is difficult and time consuming. Consequently, circulating antifreeze through the system is the preferred method to winterize the water blasting system.

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

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

**⚠ CAUTION ⚠**

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

**Use the following procedure to shutdown and winterize the water blasting system:**

1. Shutdown high pressure water to the blast head by turning off the DUMP VALVE switch.
2. Turn the HEAD ROTATION switch off.
3. Reduce the engine speed to idle.
4. Allow the vacuum blower to operate for a couple of minutes to clear waste water from hoses and dry out the vacuum system.
5. Turn the DIRTY WATER switch off.
6. Follow the Shutdown Procedure to shutdown the waterblasting system and place the trailer in the service position.
7. Drain all water from the clean water tank, wastewater bladder and debris tank.
8. Open the clean water fill valve and allow all water to drain from the fill pipe.
9. 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 valve and allow all water to completely drain from the tank and valves.
10. UHP water system hoses, the vacuum filter canister and all blasting head components should be drained of all water.

*Wastewater Bladder Drain Valve*

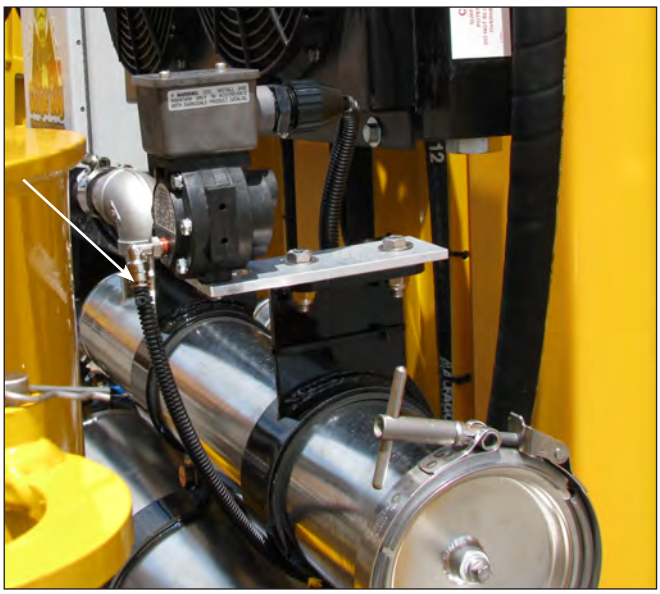

*Filter Canister Drain Plug*


*Debris Tank Drain Valve*

11. Remove the spray bar and store it.
12. Open the bleeder valve at the charge water pump and allow hoses to completely drain. With the valve still open, activate the pump briefly to pump out any remaining water, then close the valve.
13. Remove the dirty water pump strainer and run the pump briefly to drain the pump hoses, then clean and reinstall the strainer.
14. Open the man-way hatch and pour 20 gallons of 50/50 antifreeze mixture into the clean water tank.
15. Activate the trailer and waterblasting system following the steps in the Startup Procedure.
16. Make sure the CHARGE PUMP switch is on and start the engine. With the engine at idle, turn on the DUMP VALVE switch until antifreeze flows from the thru-shaft in the blasting head for 20 or 30 seconds. Then turn off the DUMP VALVE switch.
17. Shutdown the engine and waterblasting system.
18. Disconnect the pressure hose running from the 1 micron filter to the charge pressure safety switch at the switch fitting.
19. Turn the CHARGE PUMP switch on and start the engine. Run the engine at idle speed until antifreeze flows from the hose fitting for several seconds.

*Charge Pump Bleeder Valve*


*Dirty Water Pump Strainer*



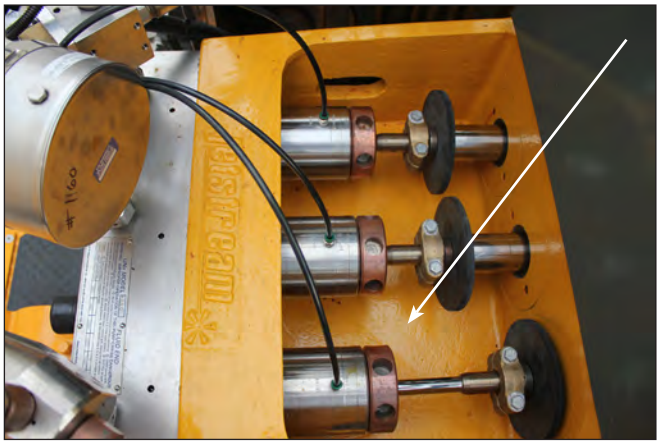
*Charge Pressure Safety Switch Hose Fitting*

*Clean Water Tank & Wastewater Bladder Access*

20. Follow the Shutdown Procedure to shutdown the waterblasting system and place the trailer in the service position. Then reconnect the safety switch hose.

**NOTICE:**
**THE CHARGE PRESSURE SAFETY SWITCH DEACTIVATES THE DUMP VALVE WHEN CHARGE PRESSURE DROPS BELOW 30 PSI (2 BAR) TO ALERT THE OPERATOR AND PROTECT THE UHP PUMP. IF WATER FREEZES IN THE PRESSURE SWITCH HOSE, IT WILL SENSE LOW CHARGE PRESSURE AND PREVENT THE DUMP VALVE FROM ACTIVATING.**

21. Pour 2 gallons 50/50 antifreeze mixture 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 antifreeze flows from the bilge pump hose fitting in the wastewater bladder for several seconds.
22. Thoroughly clean the vacuum filter canister and the filter.
23. Pour 10 gallons of 50/50 antifreeze mixture into the wastewater bladder. Open the wastewater bladder drain valve until antifreeze flows from the valve. Then close the valve.
24. Make sure the debris tank is lowered to the full down position. Close the door and inflate the seal.
25. Open the inspection port and pour 10 gallons of 50/50 antifreeze mixture into the debris tank. Activate the wastewater transfer pump until antifreeze flows from the hose fitting in the wastewater bladder for 20 or 30 seconds. Then turn off the pump.
26. Open the debris tank gravity drain valve until antifreeze flows from the valve. Then close the valve.
27. When winterizing the UHP pump, refer to pump manufacturer's procedures for additional instructions for operating and maintaining UHP pumps and equipment in freezing climates.
28. Follow all other instructions in the Routine Shutdown Procedure.



*UHP Pump Stuffing Box Sump*

*Typical Bilge Pump*

*Vacuum Canister & Filter*

**Reactivating a trailer winterized with antifreeze:**

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

1. Position a container below the clean water tank drain valve and drain the antifreeze into the container.
1. Close the drain valve and add clean fresh water to the water tank.
2. Activate the trailer and waterblasting system following the steps in the Startup Procedure.
3. Position the blasting head over a container to collect the antifreeze.
4. Make sure the CHARGE PUMP switch is on and start the engine. With the engine at idle, activate the DUMP VALVE switch and allow clean water to flow and push all the antifreeze out the blasting head into a container.
5. Once the water flows clear, shutdown the waterblasting system and return the trailer to the service position.
6. Install the spray bar.
7. At this point you're ready to continue with complete startup procedure. (Refer to the System Startup Procedure)

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

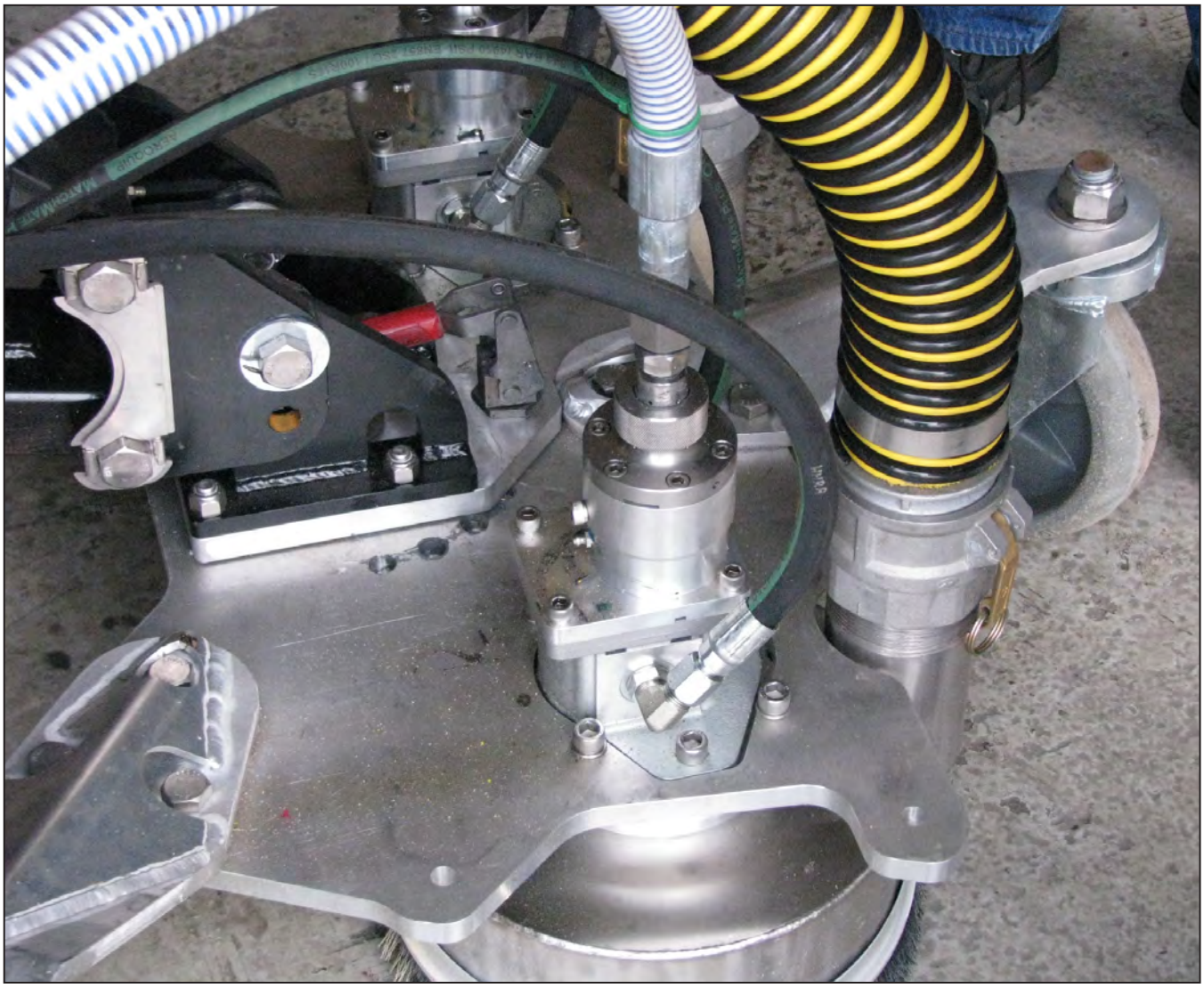
**REMEMBER THAT THE ANTIFREEZE WILL BE SLIGHTLY DILUTED EACH TIME THE SYSTEM IS WINTERIZED, WHICH WILL CAUSE THE FREEZE PROTECTION TEMPERATURE TO RISE. THE AMOUNT OF DILUTION WILL VARY, DEPENDING ON THE VOLUME OF FRESHWATER IN THE SYSTEM AT THE TIME OF WINTERIZATION.**

## CAUTION

**TO AVOID SERIOUS DAMAGE TO WATER BLASTING HYDRAULIC COMPONENTS WHEN OPERATING IN FREEZING TEMPERATURES OR TEMPERATURES BELOW 60 DEGREES FAHRENHEIT (16$^0$ CELSIUS), IT IS NECESSARY TO OPERATE THE HYDRAULIC SYSTEM AND OTHER WATER BLASTING COMPONENTS INCLUDING THE BLOWER AND HIGH PRESSURE PUMP, WITH THE ENGINE AT IDLE, UNTIL THE HYDRAULIC FLUID REACHES A TEMPERATURE OF 60 DEGREES FAHRENHEIT (16 DEGREES CELSIUS) OR ABOVE.**



## 5.21 Thru-Shaft Motor Bearing Pre-Load



The bearing preload setting in the thru-shaft hydraulic motor that spins the spray head is critical to the proper operation of the thru-shaft motor. The bearings are carefully preset at the factory. Then, each motor is run for several hours to break-in the bearings and components. When break-in is complete, the bearing preload is reset and the motors are tested again with pressure applied. This normally ensures trouble free operation of the thru-shaft motors and they don't require further adjustment.

Even though every effort is made at the factory to ensure the through shaft motors are properly broken-in and will provide trouble free operation, there are situations where the bearing preload will need to be reset after the Hog Head has been operating in the field for a period of time. Setting the bearing preload is not difficult and will not take much time. The following instructions will guide you through the bearing preload process and provide the information you need to do the job properly and in the shortest possible time.

The instructions provide information on the tools and materials you will need as well as the step by step process. You can save time by reading the instructions completely before beginning and making sure you have all the tools and supplies you will need readily available.

If you have any questions or require assistance, please don't hesitate to contact Hog Technologies Customer Service at 772-223-7393.

# 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) Open End Wrench

1 - 15/16” (24 mm) Box 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

## *Supplies*

- Anti-Seize
- Grease Gun and Mobile Poly Rex EM Grease
- Rags or Paper Towels
- 9396K21 O-ring (Supplied in Spare Parts Kit)

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

**WARNING**

**INJURIES FROM ULTRA-HIGH PRESSURE SYSTEM 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.**



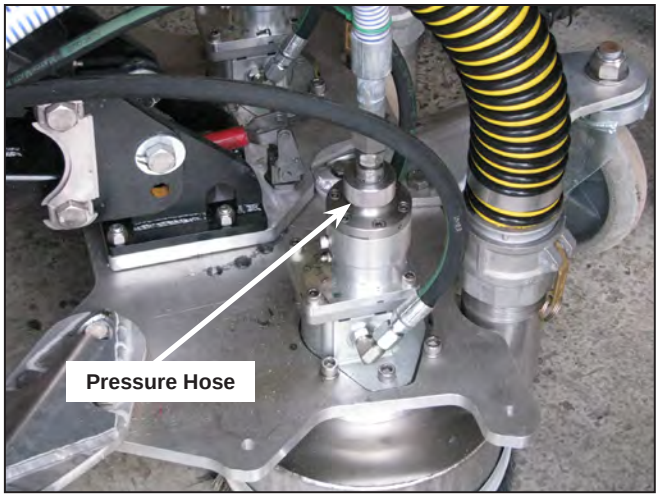



*Figure 1: High pressure hose on top of the thru-shaft motor*

*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.

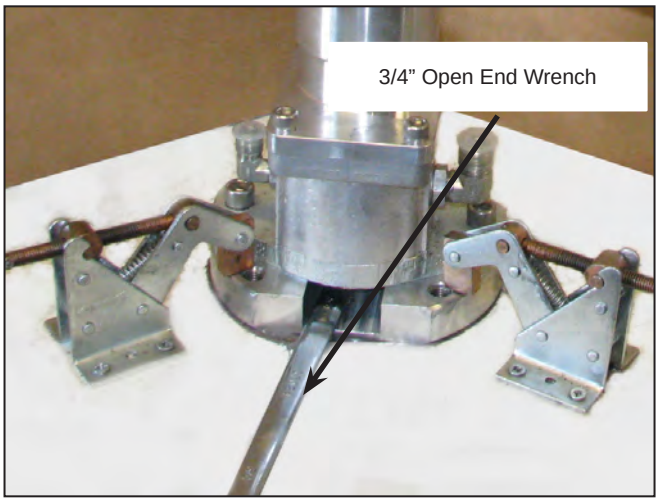



*Figure 3: Thru-shaft motor on work bench showing position of slot and 3/4" open end wrench.*

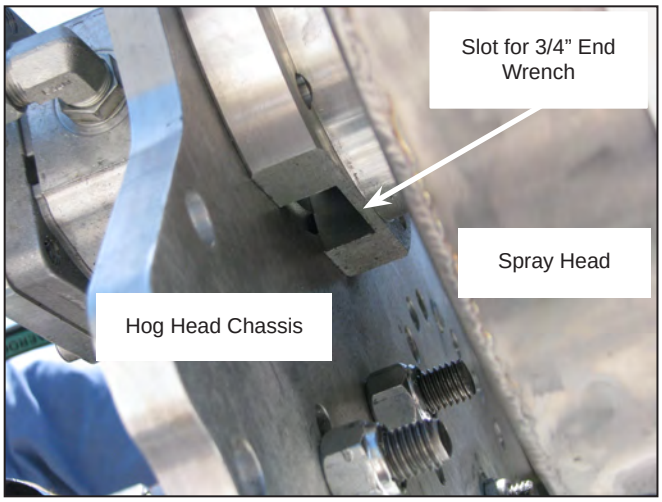



*Figure 4: Location of slot in thru-shaft motor mounted on hog head for 3/4" open end wrench.*

## *Step 2*

### Insert Wrench to Hold Thru-Shaft

Insert the 3/4" (19 mm) 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.

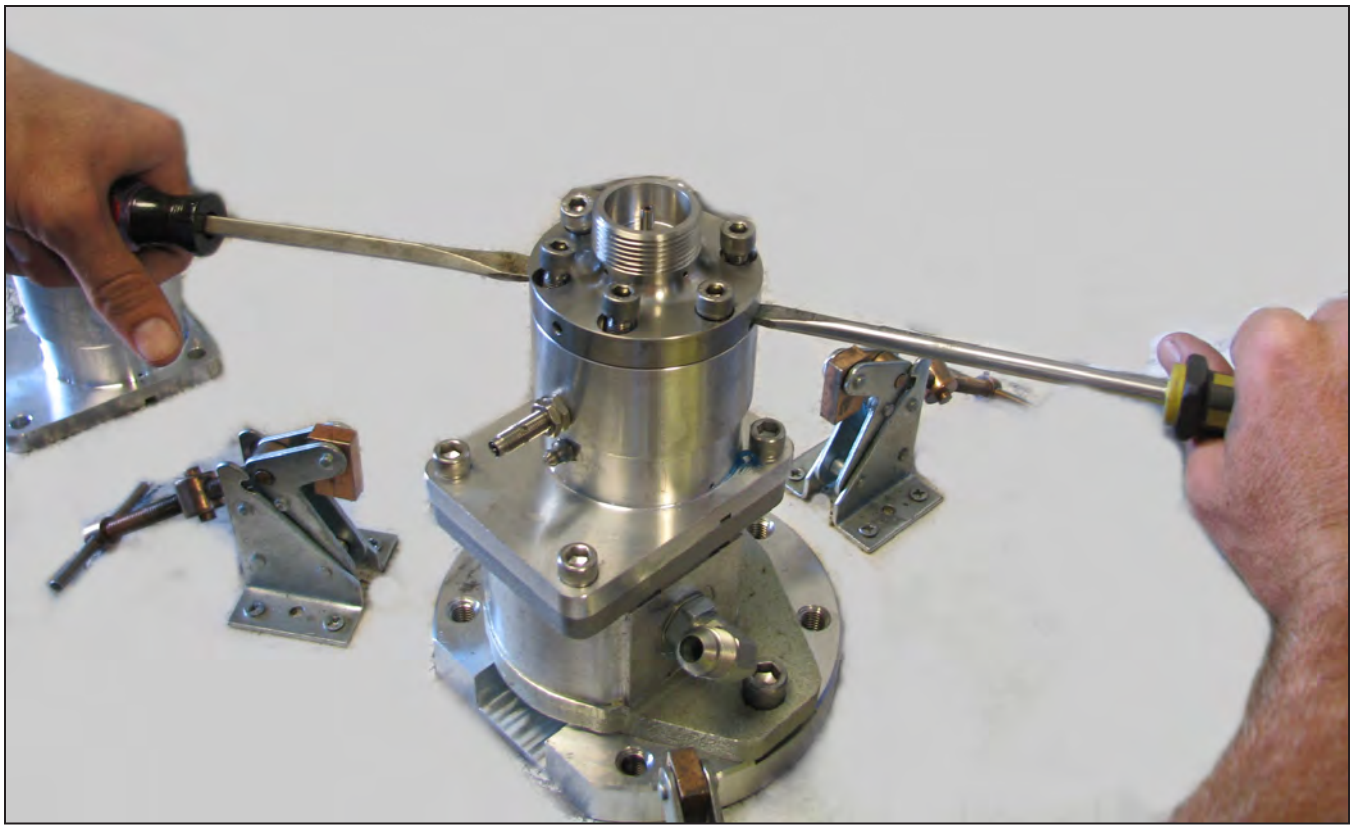


*Figure 5: Use two medium flat head screwdrivers to remove the thrust housing cap. Note that the bolts are loose and left in place to prevent thrust housing cap from falling and being damaged during removal.*

## *Step 3*

### Remove Thrust Housing Cap

Use a 6 mm Allen wrench 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.

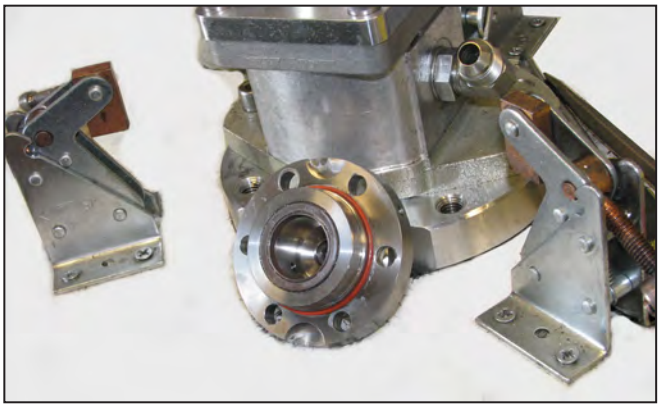


*Figure 6: Thrust housing cap removed. Note the O-ring seal and the slots for the screwdrivers. Make sure the cap and O-ring is in good condition and clean.*

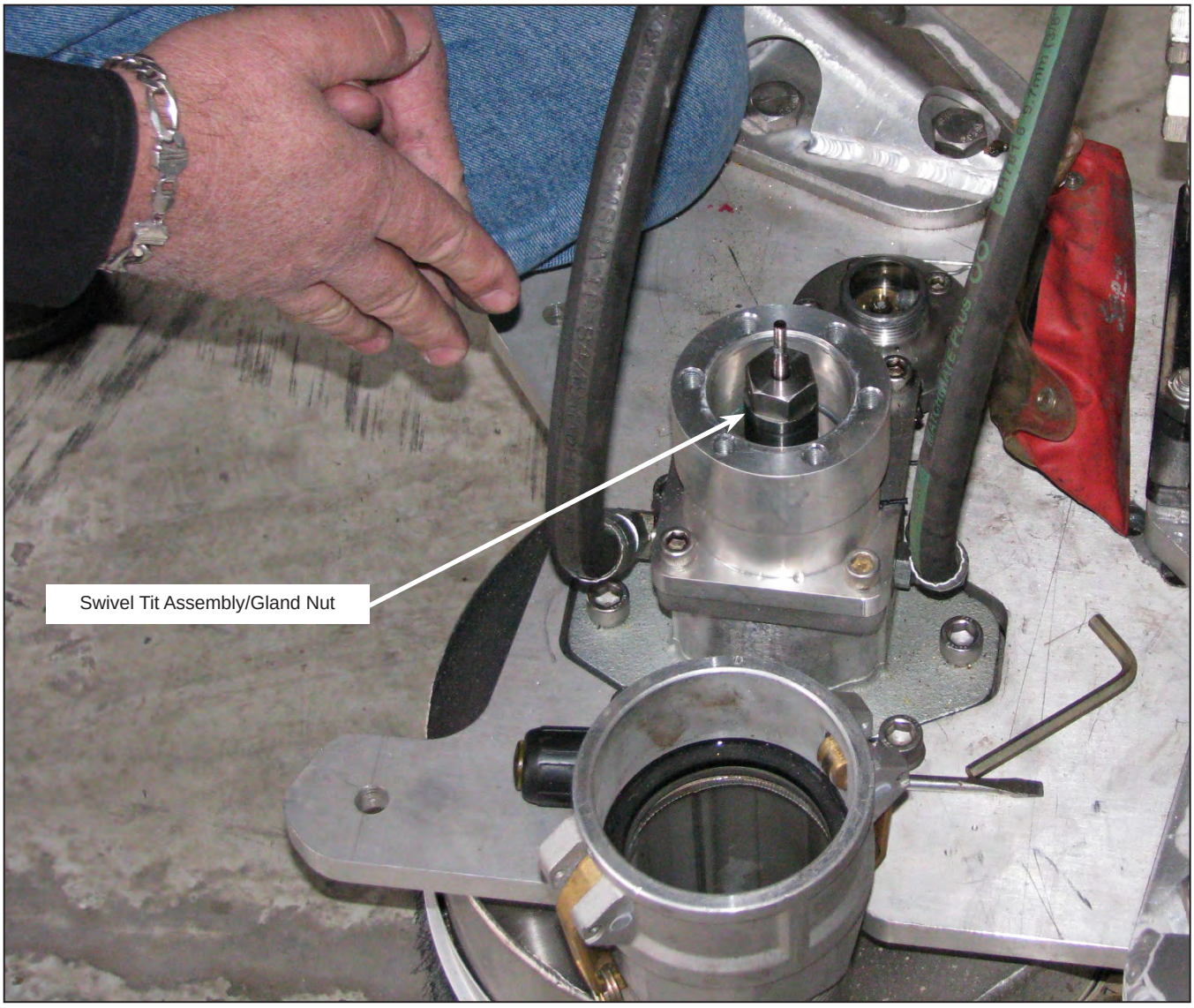



*Figure 7: Swivel Tit assembly/gland nut to be removed by turning counterclockwise with a 15/16" deep well socket or box end wrench.*

## *Step 4*

### Remove Swivel Tit Assembly/Gland Nut

While holding the thru-shaft with the 3/4" (19 mm) open end wrench through the slot in the motor base, use a 15/16 (24 mm) deep well socket or box end wrench to remove the swivel tit assembly/gland nut by turning it counterclockwise. Inspect the gland nut for wear, damage or worn O-ring inside. Replace the O-ring if it shows signs of wear or is damaged. Check the swivel tit assembly for wear and damage, then set it in a safe, clean location. Figure 7 and 8.

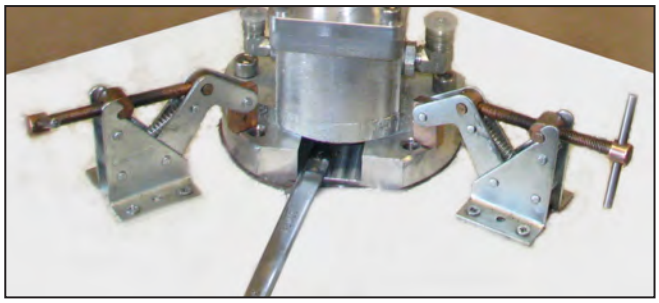


*Figure 8: 3/4" (19 mm) open end wrench holding thru-shaft and preventing it from turning while removing swivel tit assembly/gland nut.*

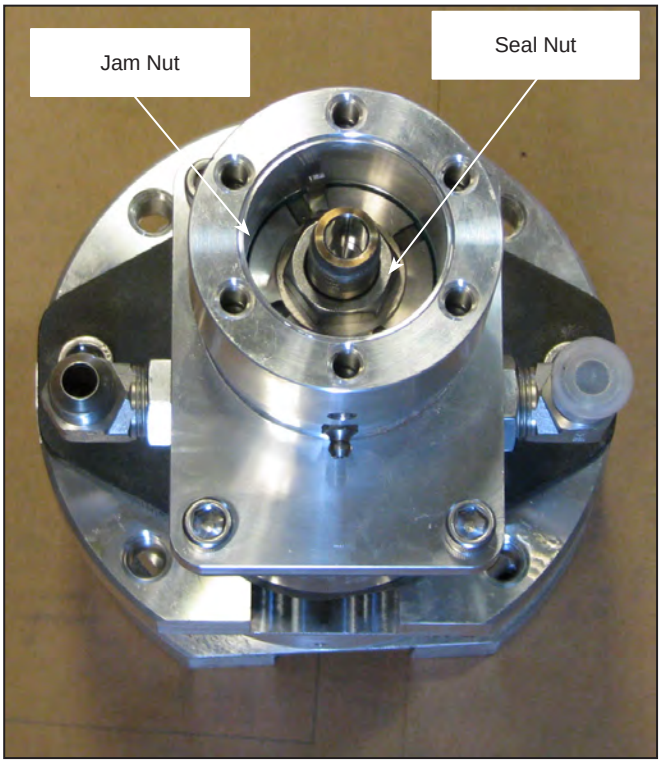



*Figure 9: Jam nut and seal nut. Make sure to loosen Jam nut 4 full turns first.*

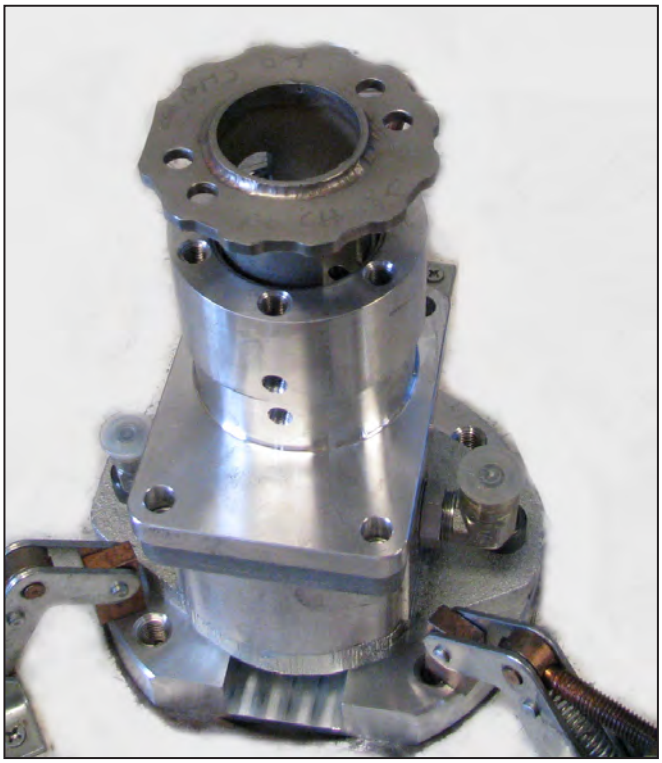


*Figure 10: Use spanner (weldment tool) to turn seal nut.*

## *Step 5*

### Loosen Jam Nut and Set the Bearing Preload

While holding the thru-shaft with the 3/4" (19 mm) open end wrench through the slot in the motor base, use a 1 1/8" (28 mm) deep well socket to loosen the jam nut by turning it counterclockwise. Loosen the jam nut 4 full turns and stop. Figure 8 and 9.

While holding the thru-shaft with 3/4" (19 mm) open end wrench, use the spanner (weldment) tool to loosen the seal nut 2 full turns. Then put a rag on the spanner tool for padding and tighten the seal nut as tight as you can by hand to set the bearing. Figure 8 and 10.

Once the bearing is set, loosen the seal nut 2 full turns.

Hold the thru-shaft firmly with the 3/4" (19 mm) open end wrench and use the spanner tool to hand tighten the seal nut until it is snug. ***Do not overtighten!! Do not allow the 3/4" wrench to move at all!!*** Figure 8 and 10.

***Continue to hold the thru-shaft firmly with 3/4" open end wrench so it doesn't move at all*** and set the bearing preload by carefully loosening the spanner tool and seal nut 1/4 turn ($90^0$). Then thread 2 - 3/8" thrust housing cap bolts through the holes in the spanner socket and into the threaded holes in the thrust housing to hold the spanner tool in that position. Figure 11.

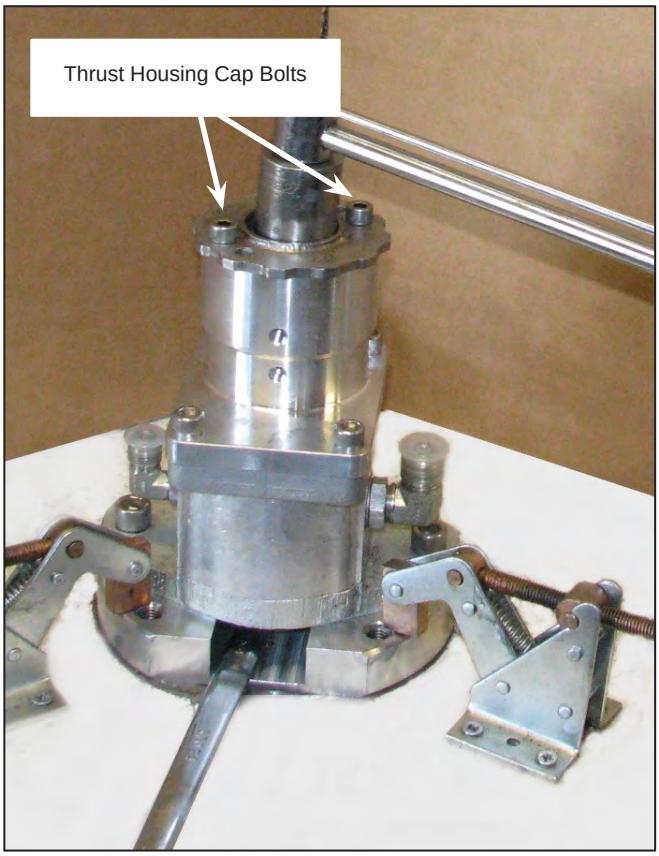



*Figure 11: Spanner tool secured with thrust housing cap bolts.*

# WARNING

**WHEN LOOSENING THE SPANNER TOOL AND SWIVEL NUT 1/4 TURN 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" (19 MM) 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 WHILE SETTING THE BEARING PRELOAD, YOU MUST REPEAT STEP 5 TO ENSURE PROPER BEARING PRELOAD.**

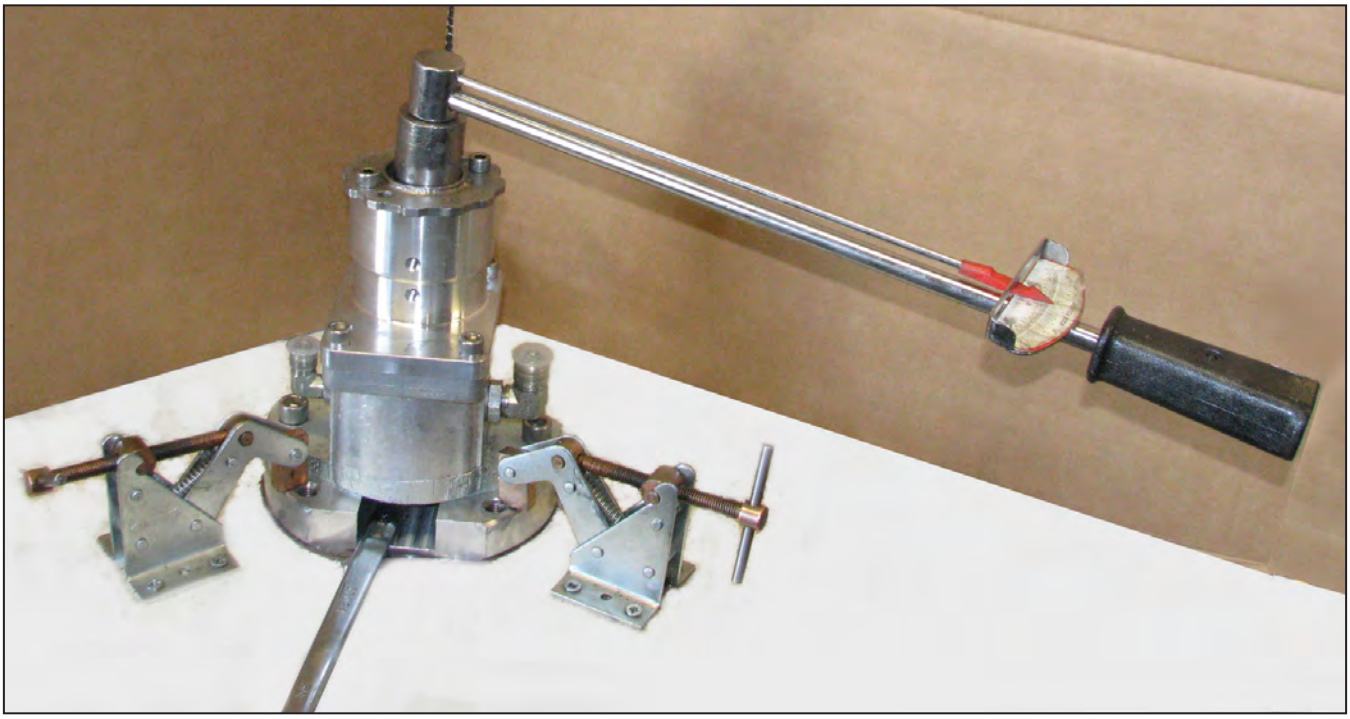


*Figure 12: Thrust housing cap bolts securing the spanner tool are snug and a torque wrench and 1 1/8" deep well socket is used to tighten the jam nut to 50 Ft lbs.*

## *Step 6A*

### 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" (19 mm) 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" (28 mm) 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" (19 mm) 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.

## *Step 6B*

Make sure both the counter washer tabs have .010" clearance between each of them and the speed sensor. To adjust the sensor, loosen both nuts on the sensor and turn the sensor with your fingers to the correct depth, then tighten both nuts. Recheck the washer tab clearance to ensure they both have .010" clearance.

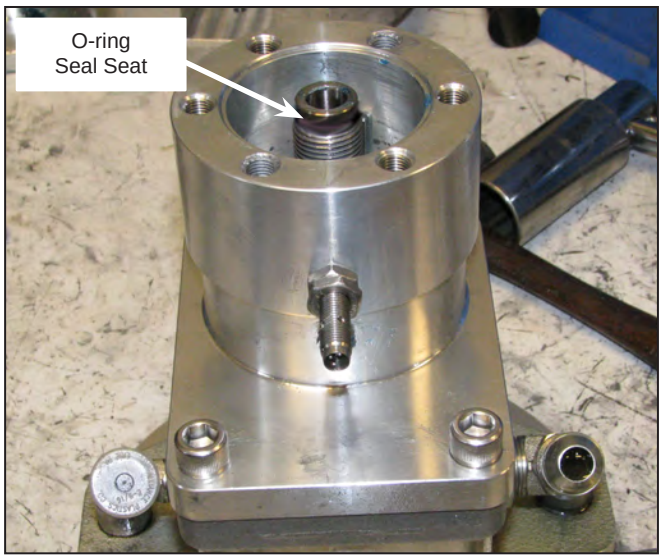



*Figure 13: O-ring seal seat at the top of the thru-shaft greased and the threads below the seal coated with anti-seize.*

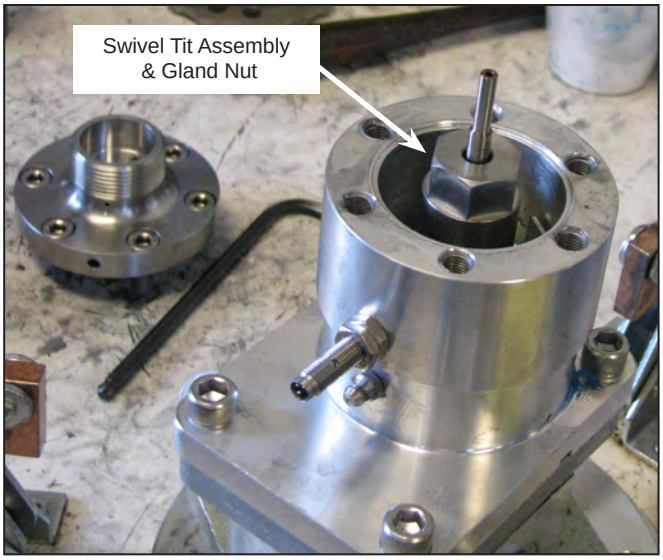



*Figure 14: Swivel tit assembly/gland nut installed on the thru-shaft and torqued to 50 Ft lbs.*

## *Step 7*

### Install the Swivel Tit Assembly/Gland Nut.

Inspect the O-ring seal inside the gland nut, near the top, and make sure it is not damaged. Replace the O-ring if it shows any signs of nicks, cuts, deterioration or wear. 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 from galling and seizing. ***If anti-seize is not used and the threads seize, the thru-shaft will be permanently damaged and the thru-shaft motor will have to be disassembled and rebuilt!!***

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

## *Step 8*

### 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.

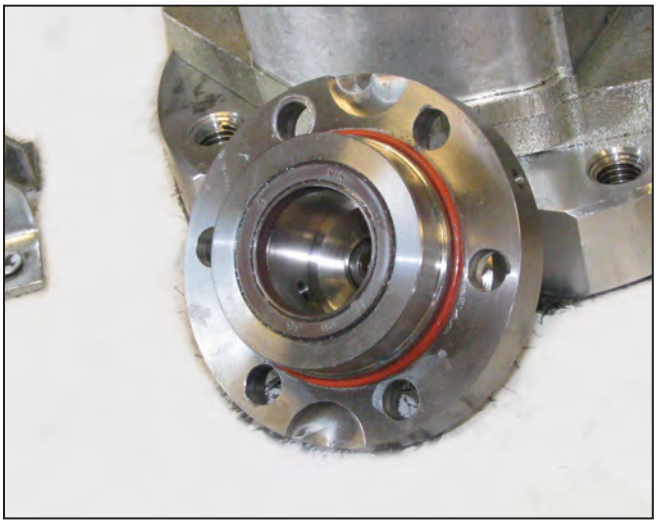


*Figure 15: Inspect and grease the O-ring seal on the thrust housing cap.*

## Step 8 (Cont)

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.

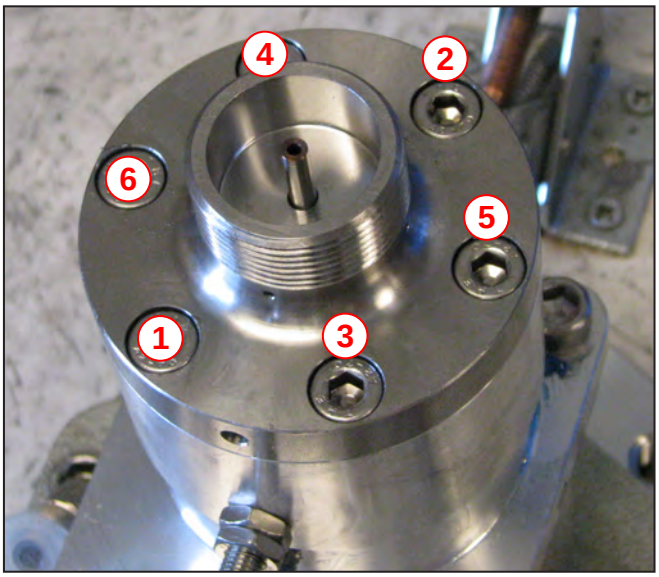



*Figure 16: Apply anti-seize to the thrust housing bolts and tighten them in a crisscross pattern to snug using a 6 mm Allen wrench.*


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

## Step 9

### 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, flush the hose with low pressure and install the high pressure water hose. Hand tighten the swivel nut on the pressure hose.

Flush the thru-shaft using low pressure, then apply anti-seize to the threads on the shaft and on the spray bar. Install the dirt shield, button seal and spray bar on the thru-shaft.

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

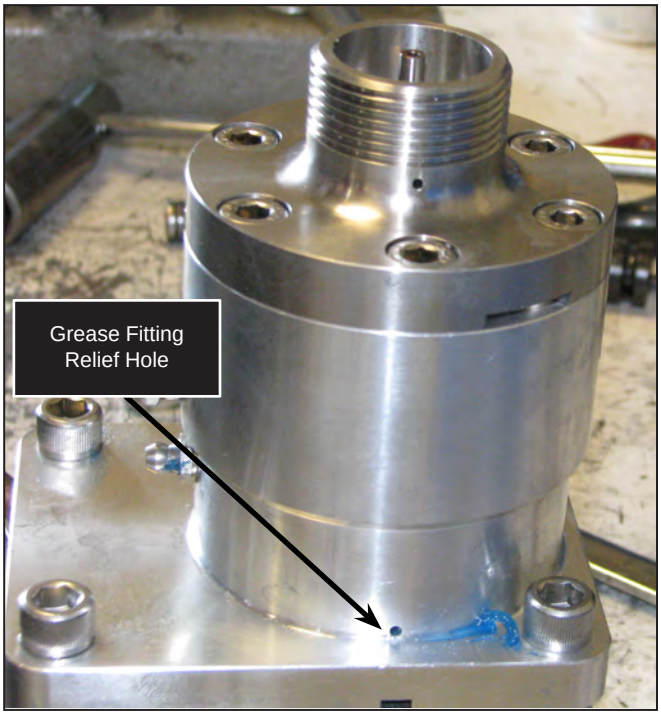



*Figure 18: Thru-shaft bearing grease fitting and grease relief holes in thrust housing base.*

## Step 10

### 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 hole in the thrust housing cap for water leakage. If water is dripping from the hole, the swivel tit will need to be changed. If no water is dripping from the weep hole and the spray bar is still rotating at maximum RPM, your unit is ready to be put back into service. Figure 21.

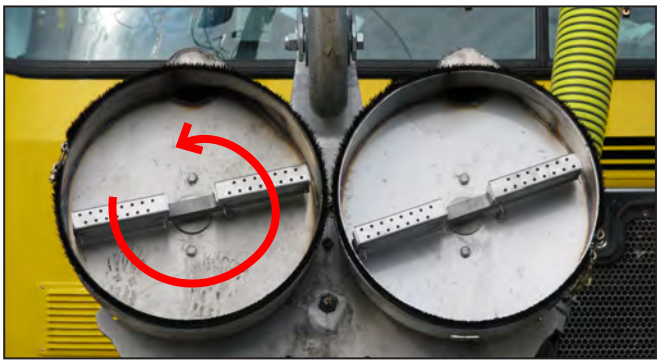


*Figure 19: Counterclockwise spray head rotation. Operate 1st 15 minutes at maximum rpm with no water pressure.*

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

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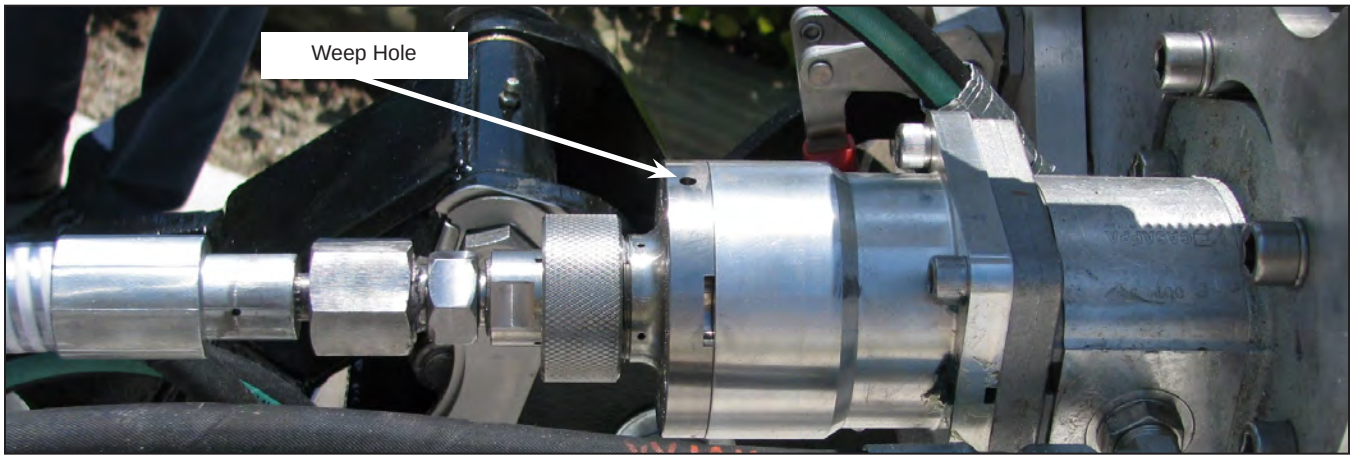
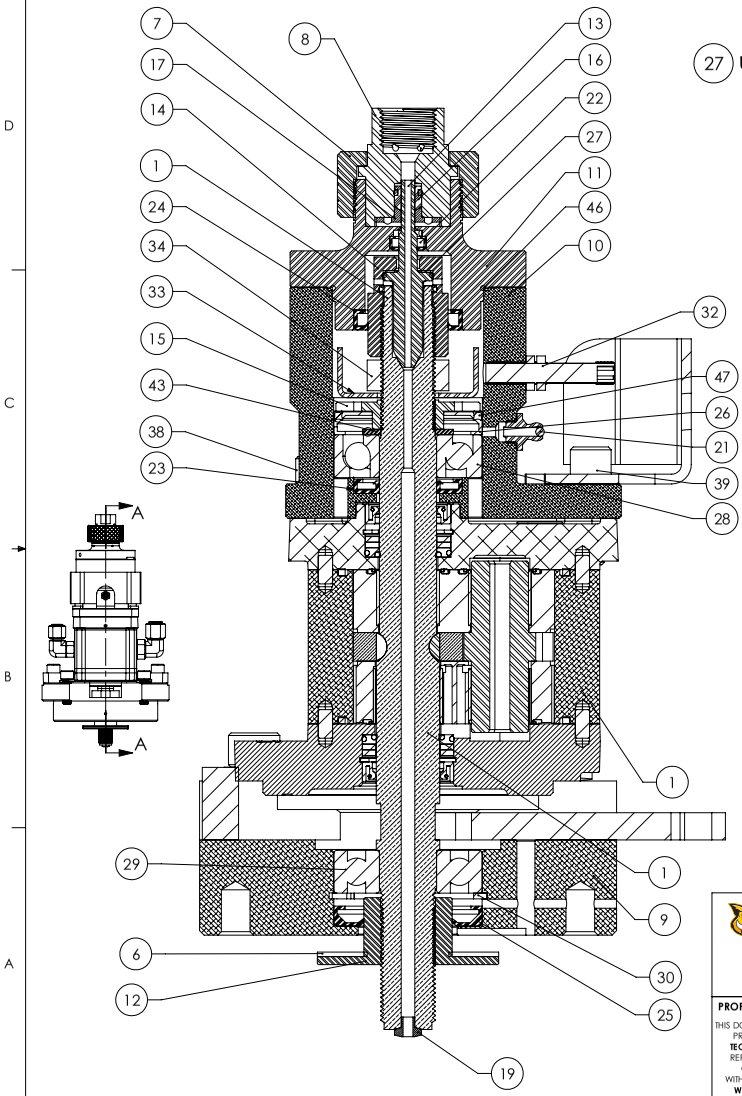



*Figure 21: Check for water dripping from weep holes just below the high pressure water hose connection.*




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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| NEXT ASSY | USED ON |
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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

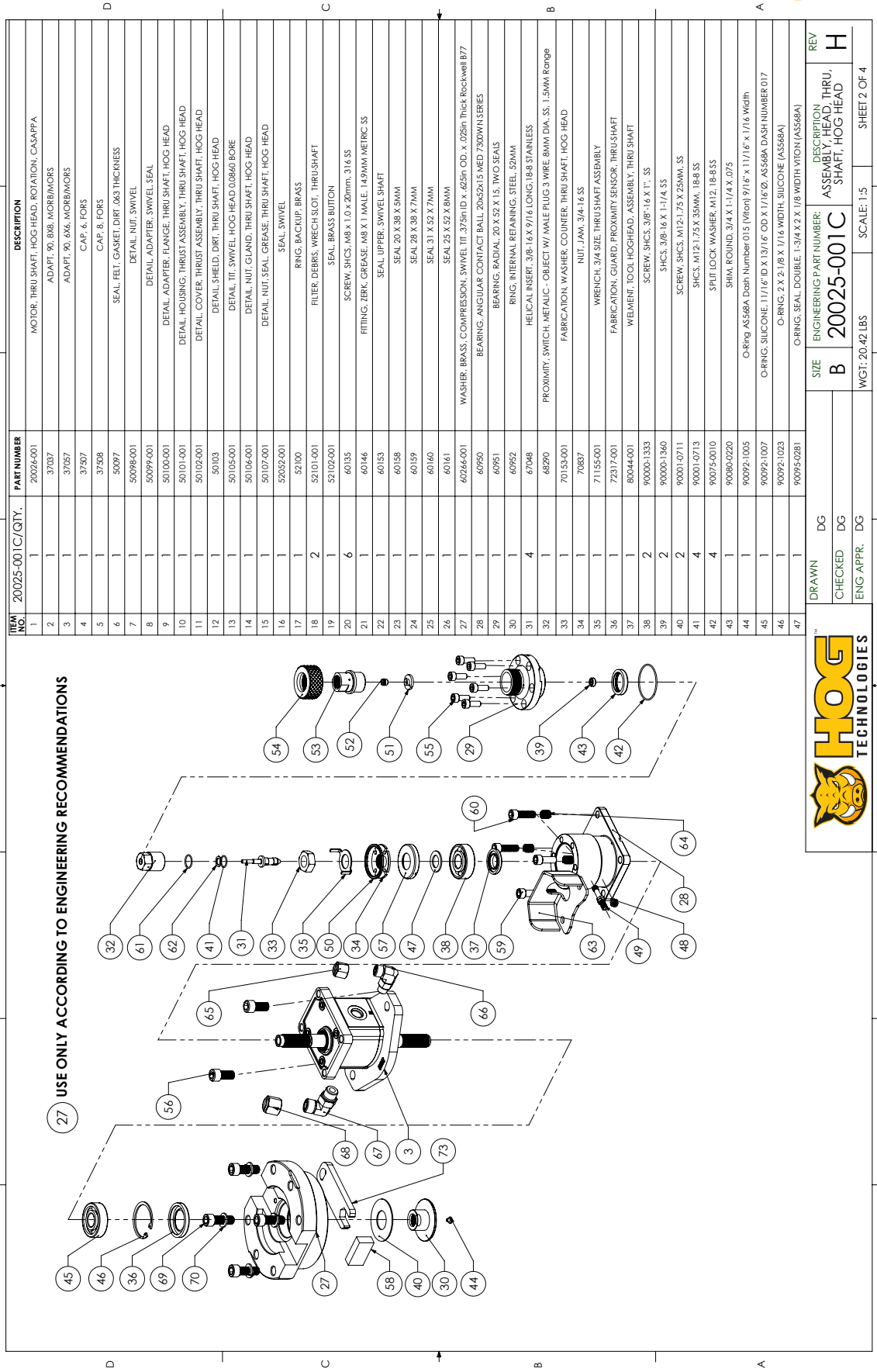
TITLE: ASSEMBLY, HEAD, THRU, SHAFT, HOG HEAD

PART NO. 20025-001C

| SIZE | DWG. NO. | REV |
|---|---|---|
| B | 20025 | H |

OLD PART NO. CS1000-TS

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



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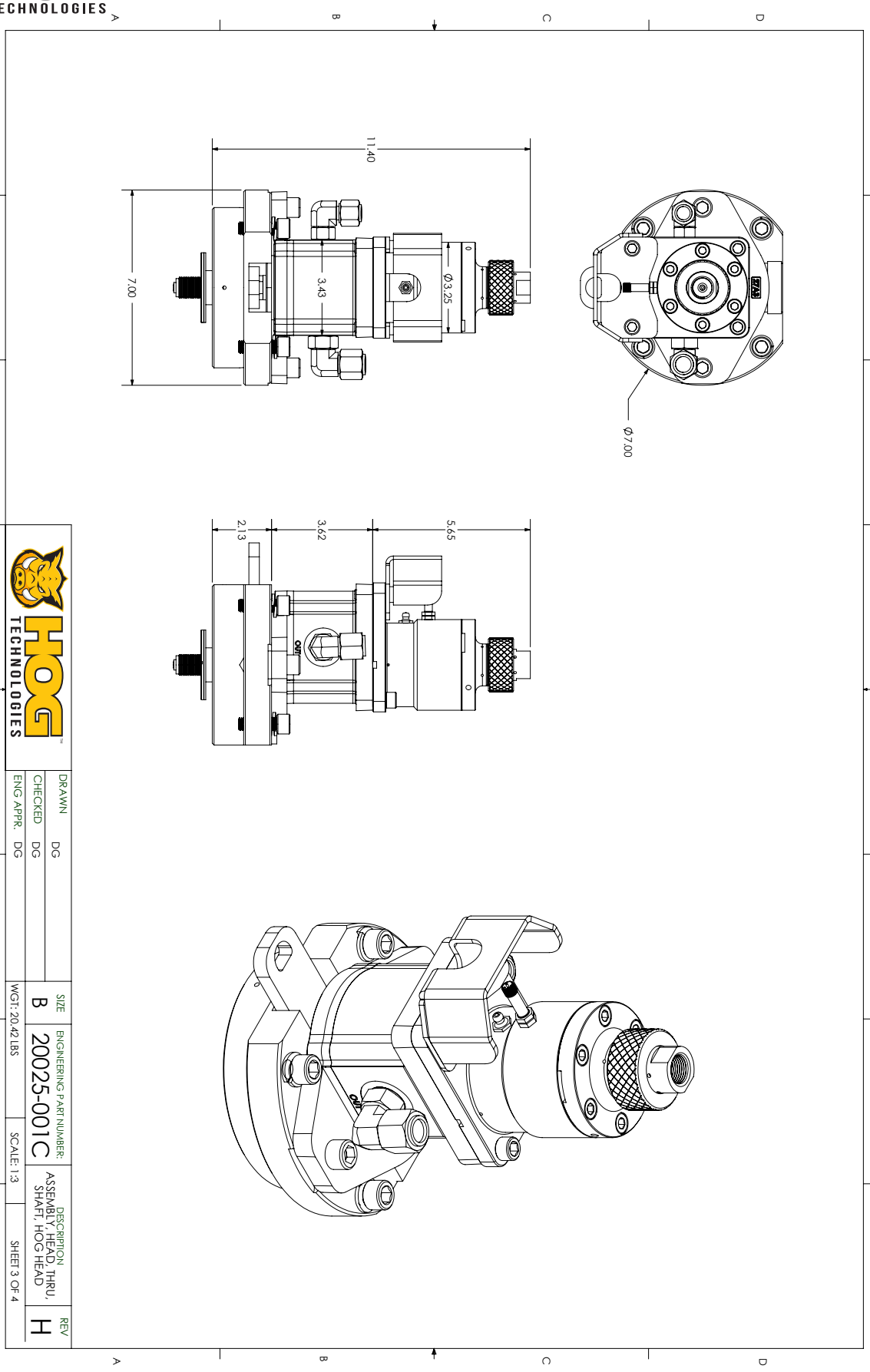
| 4 | 1 | 37307 | CAP, 6, FORS |
| 5 | 1 | 37308 | CAP, 8, FORS |
| 6 | 1 | 50097 | SEAL, FELT, GASKET, DIRT .063 THICKNESS |
| 7 | 1 | 50098-001 | DETAIL, NUT, SWIVEL |
| 8 | 1 | 50099-001 | DETAIL, ADAPTER, SWIVEL SEAL |
| 9 | 1 | 50100-001 | DETAIL, ADAPTER, FLANGE, THRU SHAFT, HOG HEAD |
| 10 | 1 | 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 | 60264-001 | 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) |

| | | |
|---|---|---|
| DRAWN | DG | |
| CHECKED | DG | |
| ENG APPR. | DG | |

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

HOG TECHNOLOGIES

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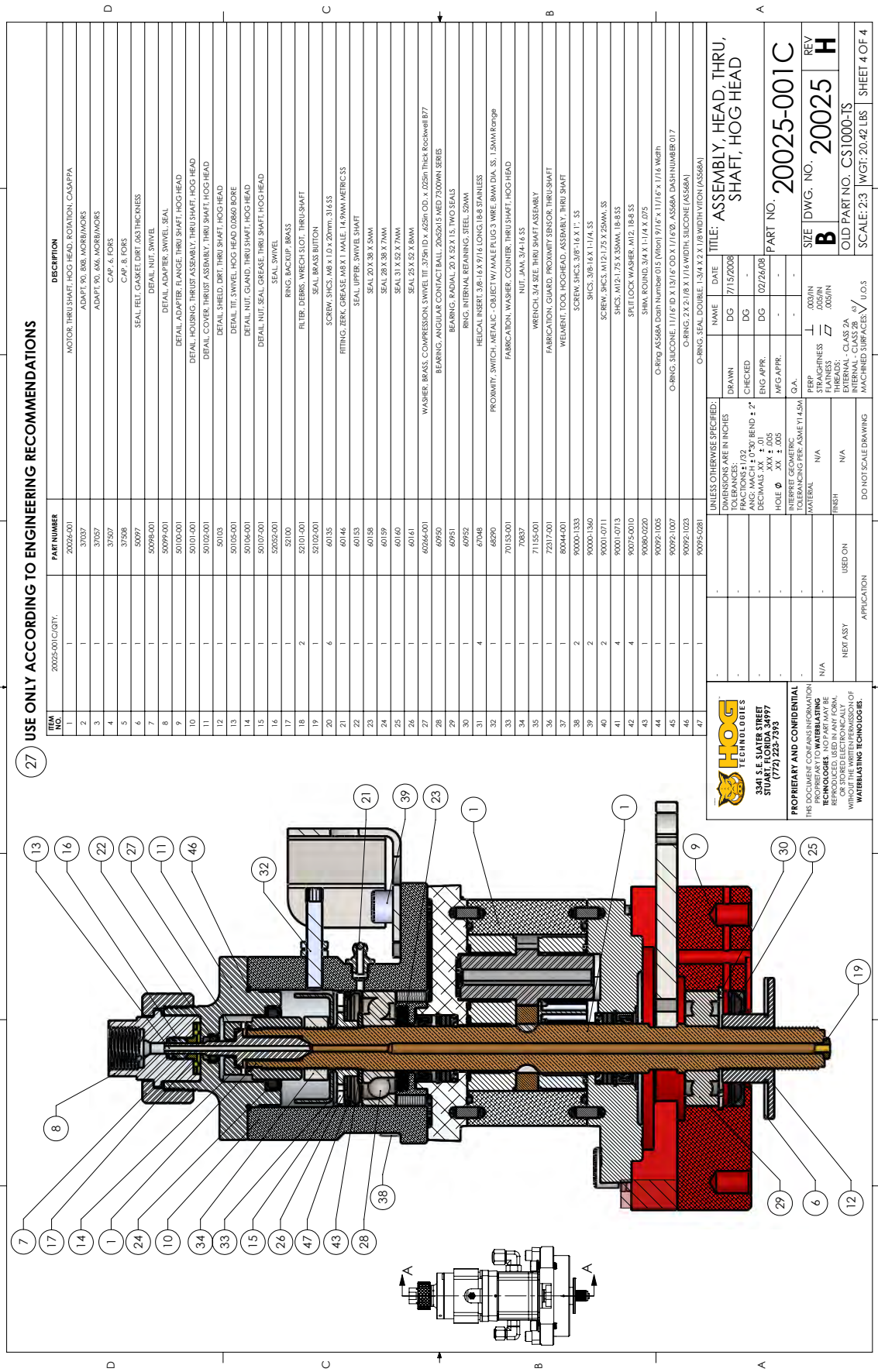
7.00
3.43
Ø3.25
Ø7.00
2.13
3.62
5.65
HOG TECHNOLOGIES
DRAWN DG
CHECKED DG
ENG APPR. DG
SIZE B
ENGINEERING PART NUMBER: 20025-001C
WGT: 20.42 LBS
SCALE: 1:3
DESCRIPTION ASSEMBLY, HEAD, THRU, SHAFT, HOG HEAD
REV H
SHEET 3 OF 4


USE ONLY ACCORDING TO ENGINEERING RECOMMENDATIONS
20025-001C/QTY.
ITEM NO.
PART NUMBER
DESCRIPTION
1 20026-001 MOTOR, THRU SHAFT, HOG HEAD, ROTATION, CASAPPA
2 37037 ADAPT, 90, 8X8, MORB/MORS
3 37057 ADAPT, 90, 6X6, MORB/MORS
4 37507 CAP, 6, FORS
5 37508 CAP, 8, FORS
6 50097 SEAL, FELT, GASKET, DIRT, .063 THICKNESS
7 50098-001 DETAIL, NUT, SWIVEL
8 50099-001 DETAIL, ADAPTER, SWIVEL, SEAL
9 50100-001 DETAIL, ADAPTER, FLANGE, THRU SHAFT, HOG HEAD
10 50101-001 DETAIL, HOUSING, THRUST ASSEMBLY, THRU SHAFT, HOG HEAD
11 50102-001 DETAIL, COVER, THRUST ASSEMBLY, THRU SHAFT, HOG HEAD
12 50103 DETAIL, SHIELD, DIRT, THRU SHAFT, HOG HEAD
13 50105-001 DETAIL, TIT, SWIVEL, HOG HEAD, 0.0860 BORE
14 50106-001 DETAIL, NUT, GLAND, THRU SHAFT, HOG HEAD
15 50107-001 DETAIL, NUT, SEAL GREASE, THRU SHAFT, HOG HEAD
16 52052-001 SEAL, SWIVEL
17 52100 RING, BACKUP, BRASS
18 52101-001 FILTER, DEBRIS, WRECH SLOT, THRU-SHAFT
19 52102-001 SEAL, BRASS BUTTON
20 6 60135 SCREW, SHCS, M8 X 1.0 X 20mm, 316 SS
21 60146 FITTING, ZERK, GREASE, M8 X 1 MALE, 14.29MM METRIC SS
22 60153 SEAL, UPPER, SWIVEL SHAFT
23 60158 SEAL, 20 X 38 X 5MM
24 60159 SEAL, 28 X 38 X 7MM
25 60160 SEAL, 31 X 52 X 7MM
26 60161 SEAL, 25 X 52 X 8MM
27 60266-001 WASHER, BRASS, COMPRESSION, SWIVEL TIT .375in I.D x .625in O.D. x .025in Thick Rockwell B77
28 60950 BEARING, ANGULAR CONTACT BALL, 20x52x15, MED 7320WN, SERIES
29 60951 BEARING, RADIAL, 20 X 52 X 15, TWO SEALS
30 60952 RING, INTERNAL RETAINING, STEEL, 52MM
31 67048 HELICAL INSERT, 3/8-16 X 9/16 LONG, 18-8 STAINLESS
32 68290 PROXIMITY, SWITCH, METALIC - OBJECT W/ MALE PLUG 3 WIRE, 8MM DIA, SS, 1.5MM Range
33 70153-001 FABRICATION, WASHER, COUNTER, THRU SHAFT, HOG HEAD
34 70837 NUT, JAM, 3/4-16 SS
35 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
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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) 223-7303
PROPRIETARY AND CONFIDENTIAL
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO WATERBLASTING TECHNOLOGIES. NO PART MAY BE REPRODUCED, USED IN ANY FORM, OR STORED IN RETRIEVAL SYSTEM WITHOUT THE WRITTEN PERMISSION OF WATERBLASTING TECHNOLOGIES.
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
NEXT ASSY USED ON
APPLICATION
DO NOT SCALE DRAWING
NAME DATE
DRAWN DG 7/15/2008
CHECKED DG -
ENG APPR. DG 02/26/08
MFG APPR. - -
Q.A. - -
FERP .003/IN
PERPENDICULARITY .005/IN
FLATNESS
THREADS:
EXTERNAL - CLASS 2A
INTERNAL - CLASS 2B
MACHINED SURFACES √ 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 SK2000 Maintenance Matrix

| EQUIPMENT | COMPONENT | INTERVALS | LUBRICANT SPECIFICATIONS |
|---|---|---|---|
| Drive Line | Drive Shafts | At Each Chassis Service | Mobil PolyRex EM Grease |
| Trailer engine | Oil and Filter | Refer To trailer Operating Manual | Refer To Engine Operating Manual |
| Trailer engine | Fuel Filters | Refer To trailer Operating Manual | Refer To Engine Operating Manual |
| UHP Pump Reduction Gear | Gear Case Oil | Every 500 Hours | High Grade Non Detergent 80w90 Gear Oil |
| Hydraulic System | Hydraulic Fluid Filter | Every 200 Hours or As Required | Refer to Hydraulic Reservoir Operating Manual |
| Hydraulic System | Hydraulic Fluid Reservoir | Every 600 Hours or Once Per Year/Which Ever Comes 1st | Aw68 |
| Vacuum Blower | Blower Gear Case Oil | After 1st 50 Hours Then Every 500 Hours | ISO VG 320 Roots Oil High Temp – Synthetic |
| Roots Vacuum Blower | Drive End Bearings ***(Grease Fittings)*** | Daily ***(4 Pumps Each Fitting)*** | Shell Gadus S2 U10002 Grease ***No Substitutes*** |
| Jetstream Pump | Univalves | Every 100 Hours ***Lap Univalves Seats*** | NA |
| Jetstream Pump | Crankcase Oil | After 1st 100 Hours Then Every 500 Hours | High Grade Non Detergent 80w90 Gear Oil |
| General Grease Points | Hydraulic Ram Pivots – Door Hinges –Debris Tank Tilt Pins – ETC. | Weekly More Frequently If Required | Mobil PolyRex EM Grease |
| Unit General Lubrication Points | Vacuum Door Hinges – Safety Pins - Ball Valves – Latches – Etc. | Weekly More Frequently If Required | General Purpose Oil |
| | | | |
| **OPTIONAL EQUIPMENT** | | | |
| Ground Hog | Swivel Shaft or Thru-Shaft Motor Bearings | Daily | Mobil PolyRex EM Grease ***No Substitutes*** |
| Ground Hog | Chassis Wheels and Casters | Daily | General Multi Purpose Grease |
| | | | |

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

# NOTES



## Water Blasting System Troubleshooting

| PROBLEM | CAUSE AND SOLUTION |
|---|---|
| ***Noises & Vibrations*** | |
| **Blower system noise.** | • Blower impellers are clogged with paint and debris. Disassemble and clean blower. Rebuild or replace if necessary.<br>• Blower muffler is clogged. Clean muffler.<br>• Blower mount bolts are loose. Tighten Bolts.<br>• Loose blower hydraulic drive motor coupler. Tighten or replace drive motor coupler.<br>• Hydraulic drive motor is worn. Replace drive motor. |
| **Hog Head noise.** | • Hog Head rotation extremely high. Reduce head speed.<br>• Spray bar is hitting shroud (1). Shroud is bent or damaged. Repair or replace shroud.<br>• Spray bar is hitting shroud (2). Thru-shaft motor bearings are loose causing spray bar to hit shroud. Repair thru-shaft motor. |
| **High pressure pump noise.** | • UHP pump coupler is loose. Tighten or replace drive motor coupler.<br>• Reduction drive gear case is low on oil. Add oil to gear case.<br>• There is an internal problem with the pump. Repair the pump. |
| ***Hog Head*** | |
| **Spray bar doesn't spin or spins slowly.** | • Hydraulics not engaged. Make sure trailer engine is running to activate hydraulic system.<br>• Debris packed around thru-shaft or spray bar. Clean thru-shaft or spray bar.<br>• Hog Head shroud is concave and not convex. Repair or replace shroud.<br>• Speed dial control or control valve is shut off. Turn speed dial or control valve clockwise.<br>• 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.<br>• Dirt shield is too tight. Loosen dirt shield and tighten finger tight.<br>• Dirt shield seal is worn or damaged. Remove dirt shield and install new seal. Tighten finger tight. |

| PROBLEM | CAUSE AND SOLUTION |
|---|---|
| ***UHP Pump & High Pressure System*** | |
| **High pressure and / or charge pressure gauges fluctuating or pulsing.** | • Engine speed is too low and hydraulic system is not turning the charge pump at proper RPM. Raise engine speed to operating RPM.<br>• Univalve may be pitted or cracked. Remove valve and check seats for damage. Replace or rebuild.<br>• One or more UHP pump stuffing box seals are leaking. Replace leaking seal. |
| **Water dripping from high pressure hose connection weep holes.** | • Hose fitting loose or damaged. Tighten fitting or replace hose and fittings. |
| **Water dripping from fluid end manifold rectangular weep hole in manifold block.** | • Face seal is worn or damaged. Replace seal. |
| **Water dripping from fluid end manifold round weep hole on the top of the manifold block.** | • Univalve seals worn or damaged. Replace seals or valves. |
| **Water dripping from weep hole on thru-shaft motor high pressure hose connection.** | • Swivel nut is loose. Hand tighten swivel nut.<br>• Swivel seal is worn or damaged. Remove and replace worn or damaged seal.<br>• Cracked swivel or thru-shaft. Remove and inspect shaft assembly. Replace damaged or cracked components. |
| **Low charge water pressure. (30 PSI/2 BAR or less).** | • Engine speed is too low and hydraulic system is not turning the charge pump at proper RPM. Raise engine speed to operating RPM.<br>• Charge water pump is not activated or supply valve is closed. Open supply valve or activate charge water pump.<br>• Dirty clean water filters. Change filter bag and cartridge.<br>• Clean water tank is empty. Fill tank with water.<br>• Clogged impeller on pump. Disassemble pump and clean or replace impeller.<br>• There is an air leak in the suction hose. Find and repair leak.<br>• Debris in water hose from tank. Flush or replace intake water hose. |
| **Dump valve will not activate** | • Charge water pressure is below 30 PSI (2 BAR) and the charge pressure safety switch is preventing Dump vale operation. Find and correct the cause of low charge pressure. Refer to low charge water pressure.<br>• The charge pressure safety switch is defective. Replace safety switch.<br>• Water in the pressure hose between the charge water safety switch and 1 micron filter has frozen. Thaw frozen water in hose. (Cold weather operation only) |



| PROBLEM | CAUSE AND SOLUTION |
|---|---|
| **Low blasting pressure at nozzles.** | • Engine speed is too low. Raise engine speed.<br>• Worn or blown nozzles. Change nozzles.<br>• Nozzles are leaking. Tighten or replace nozzles.<br>• Oversized nozzles. Refer to chart to correct nozzle pattern.<br>• Water leaks in UHP hoses, fittings. Tighten loose fittings or replace defective hoses and damaged fittings.<br>• UHP pump valves or seals damaged or worn. Check valves for heat indicating internal bypass. Service or replace valves as required<br>• Worn or missing button seal between spray bar and shaft. Replace button seal.<br>• Air lock in fluid end manifold. Remove rupture disc assembly or the side port fitting, start engine and advance engine speed to maximum operating RPM to bleed system and remove air lock.<br>• Low charge water pressure. Refer to low charge water pressure problems.<br>• One or more UHP pump stuffing box seals are leaking. Replace leaking seal or seals.<br>• Dump valve cartridge leaking. Repair or replace leaking cartridge.<br>• By-pass valve cartridge leaking. Remove diffuser tube and replace cartridge.<br>• Swivel seal is worn or damaged. Replace damaged swivel seal. |

| PROBLEM | CAUSE AND SOLUTION |
|---|---|
| ***Vacuum System*** | |
| **Low vacuum pressure.** | • Engine speed is too low and hydraulic system is not turning the vacuum blower at proper RPM. Raise engine speed to operating RPM.<br>• Vacuum filter canister door seal leaking. Clean or replace lid seal.<br>• Vacuum canister or debris tank relief valve leaking or stuck open. Clean or replace leaking valve.<br>• Vacuum filter is clogged. Clean or replace vacuum filter. |
| ***Vacuum System*** | |
| **Vacuum loss or failure.** | • Worn or damaged shroud wear brush. Replace wear brush.<br>• A vacuum hose is worn through or damaged. Replace worn or damaged vacuum hose.<br>• Vacuum hose plugged with debris. Hit hose with dead blow hammer to breakup debris. Replace hose if necessary. |
| **Vacuum system relief valve sticks open.** | • Debris in relief valve is causing it to stick. Clean and lubricate relief valve. Replace valve if necessary.<br>• Vacuum filter is clogged. Clean or replace vacuum filter.<br>• Vacuum hose is clogged. Clear clogged hose. Replace hose if necessary.<br>• Vacuum hose kinked. Replace kinked hose. |



## 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 CHECK LIST

### Mobile Spare Parts & Tool System

- ☐ Mobile Spare Parts System Complete
- ☐ Mobile Tool System Complete

### Trailer Running Gear & Chassis

- ☐ Tire Condition & Pressure
- ☐ Brake Lights
- ☐ Turn Signals
- ☐ Running Lights
- ☐ Strobe and Work Lights
- ☐ Brake System Brake-Away Cable Connected
- ☐ Brake System Brake-Away Status LED Green
- ☐ Electric Brakes Tested & Working

### Electrical & Accessories

- ☐ Engine Control Panel Activated
- ☐ Console Switches Operating
- ☐ Waterblasting Master Breakers Activated
- ☐ Digital Gauges Operating
- ☐ Inspect Electrical Box

### Grease Points

- ☐ Thru Shaft Motor Bearings
- ☐ Vacuum blower Bearings
- ☐ Hydraulic Pump Drive Pulley Bearing

### Fluid Levels

- ☐ Engine Oil
- ☐ Radiator & Coolant Level
- ☐ UHP Pump Reduction Gear Oil
- ☐ Hydraulic Fluid Level
- ☐ Jetstream Pump Oil
- ☐ Fuel Tank Level OK
- ☐ Water filters Clean

### Water Blasting System

- ☐ Clean Water Tank Full & Not Leaking
- ☐ Fittings, Sight Tubes
- ☐ Wastewater Bladder Empty
- ☐ Check Vac Hoses Not Damaged
- ☐ Debris Bag In Place - Debris Level OK
- ☐ Transfer Pump Strainer Clean
- ☐ Vacuum Filter Clean
- ☐ Vacuum Canister Drained
- ☐ Vacuum Canister Door Closed & Latched
- ☐ Debris Tank Door Closed & Latched
- ☐ Debris Tank Door Seal Inflated To Proper PSI
- ☐ Debris Tank Inspection Port Closed & Latched

### Hog Head & Spray Bar

- ☐ No Loose Components Or Damage
- ☐ Standoff Height Set
- ☐ Wear Brush Height Set
- ☐ Spray Bar & Nozzles Correct
- ☐ Dirt Shield OK

### Water Blasting System Operation Test

- ☐ Charge Pump Engaged
- ☐ Engine Operation & Controls Normal
- ☐ Control Panel Switches Activated & Operating
- ☐ Charge Pump PSI OK
- ☐ UHP Pump Packing Cooling Water Flow Set & Normal
- ☐ Bilge Pump System Operating
- ☐ Vacuum System Operating
- ☐ Vacuum pressure Normal
- ☐ Dirty Water Transfer System Operating
- ☐ Dump Valve Operation
- ☐ Spray Bar Rotation
- ☐ UHP Pump PSI Set
- ☐ UHP Pump Weep Holes - No Leaks
- ☐ Nozzles Grade 4 Or Better
- ☐ Spray Bar & UHP Pressure Hose Weep Holes - No Leaks
- ☐ Spray Bar Cover In Place



*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 |

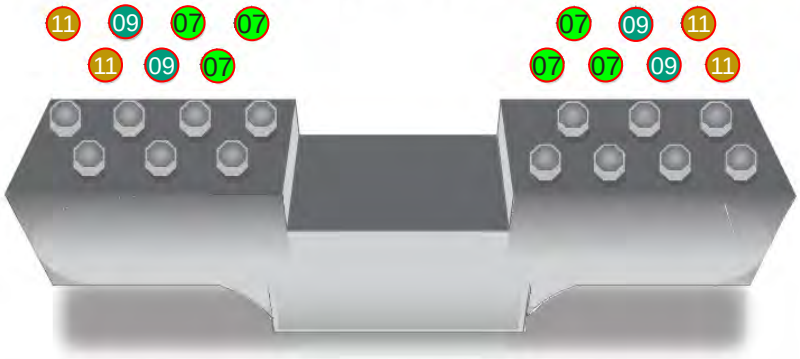
The GPM in each setup is calculated per spray bar.

## Spray BAR Configuration Charts

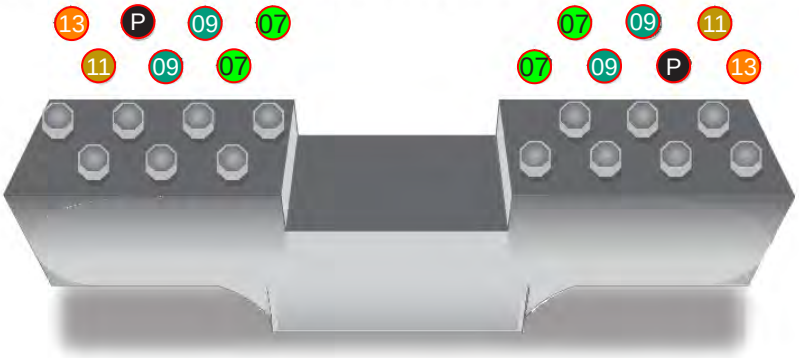
### SPRAY BAR NOZZLE CONFIGURATION CHART

(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.)

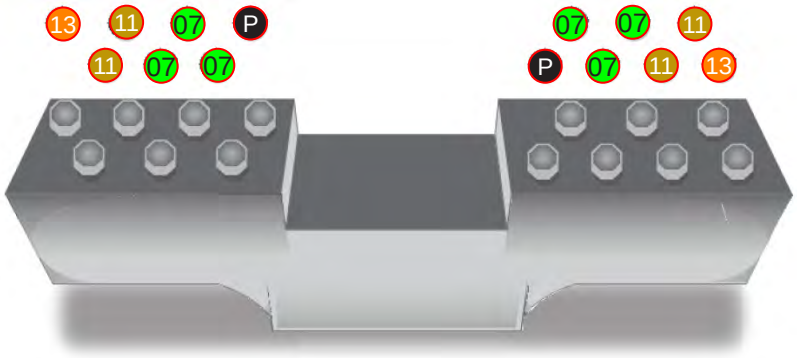
6”, 14 Nozzle Spray Bar – 4” lines – Least Aggressive 4.48 GPM @ 36K PSI / 4.74 GPM @ 40K PSI




6”, 14 Nozzle Spray Bar - 4” lines - Medium Aggressive 4.48 GPM @ 36K PSI / 4.74 GPM @ 40K PSI



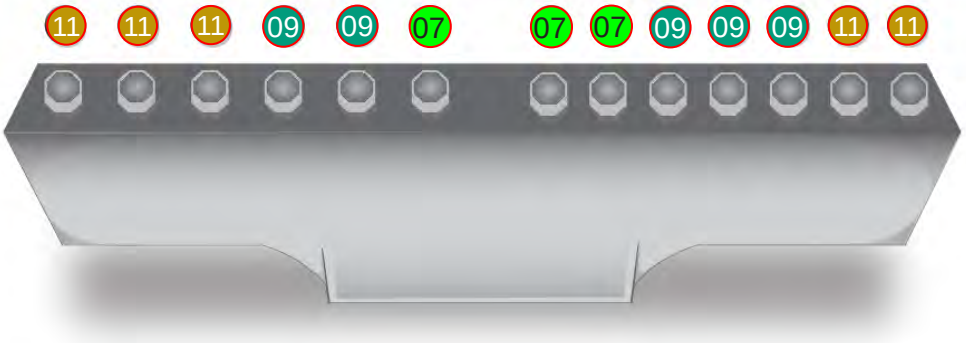

6”, 14 Nozzle Spray Bar - 4” lines - Most Aggressive 4.54 GPM @ 36K PSI / 4.8 GPM @ 40K PSI



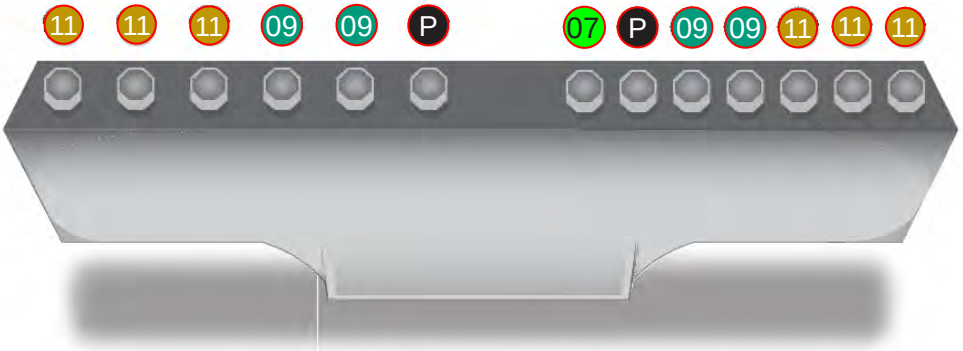
# SPRAY BAR NOZZLE CONFIGURATION CHART

(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.)

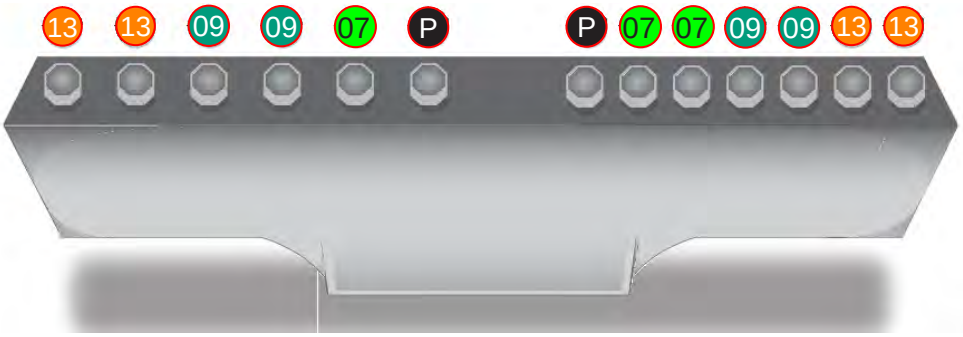
8” Least Aggressive Set Up 4.70 GPM @ 36K / 4.98 GPM @ 40K PSI




8” Medium Aggressive Set Up 4.46 GPM @ 36K / 4.73 GPM @ 40K PSI



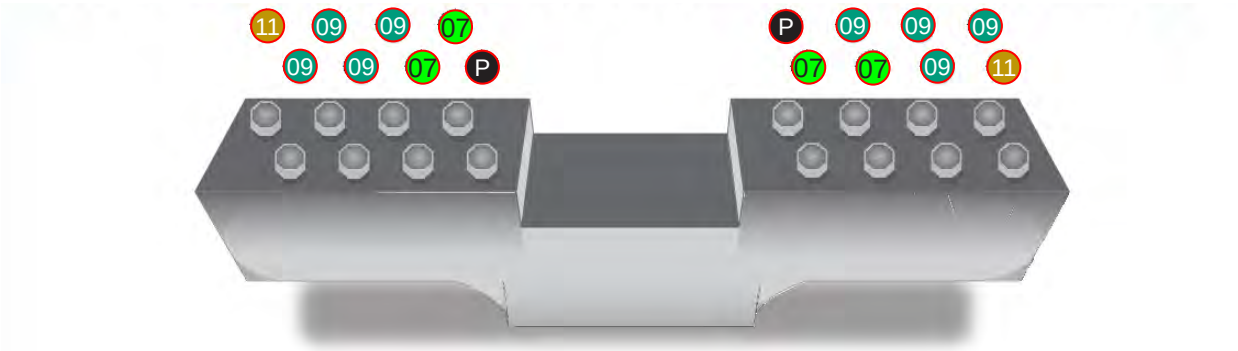

8” Most Aggressive Set Up 4.68 GPM @ 36K / 4.95 GPM @ 40K PSI



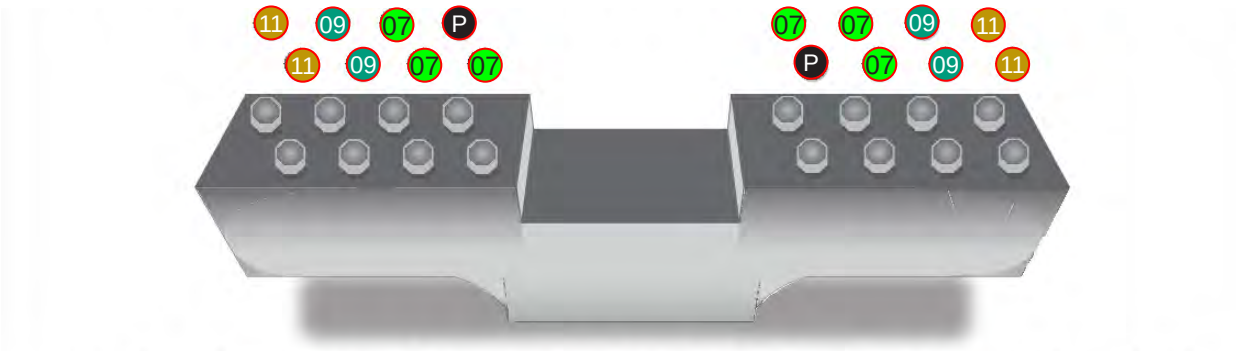
# SPRAY BAR NOZZLE CONFIGURATION CHART

(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.)

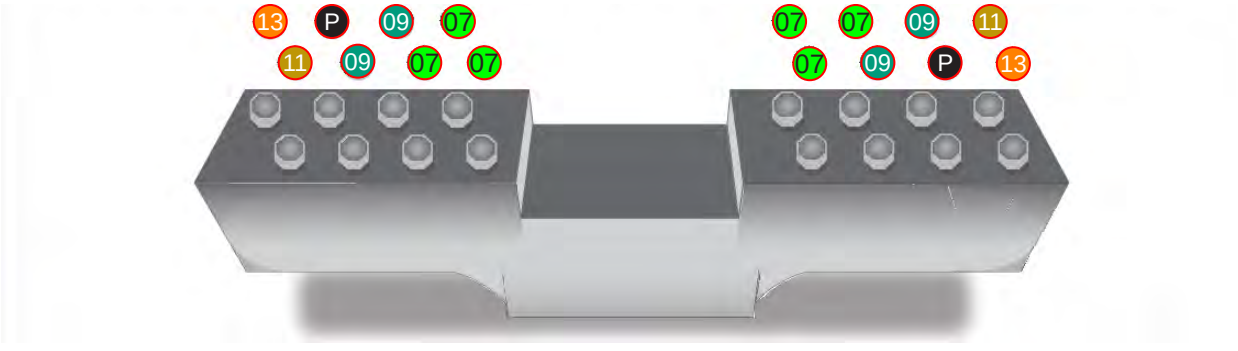
8” & 10”, 16 Nozzle - Least Aggressive Set Up 4.42 GPM @ 36K PSI / 4.68 GPM @ 40K PSI



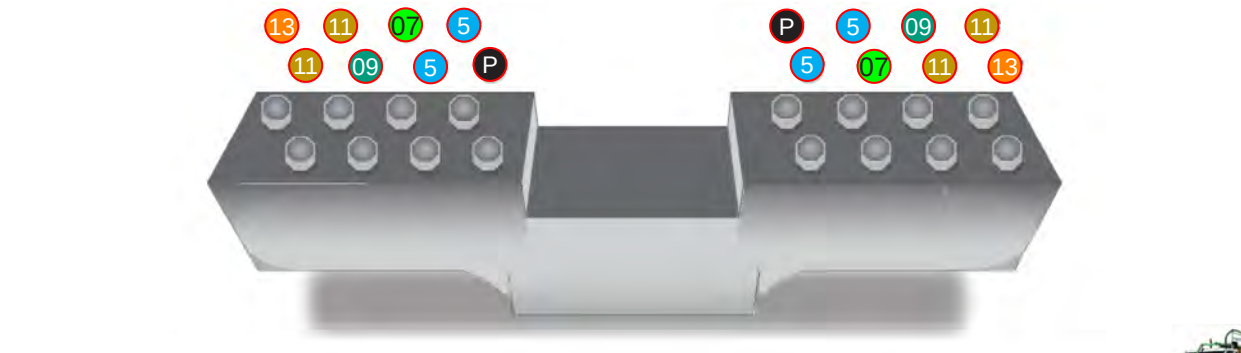

8” & 10”, 16 Nozzle - Medium Aggressive Set Up 4.48 GPM @ 36K PSI / 4.74 GPM @ 40K PSI




8” & 10”, 16 Nozzle - Most Aggressive Set Up 4.88 GPM @ 36K PSI / 5.16 GPM @ 40K PSI



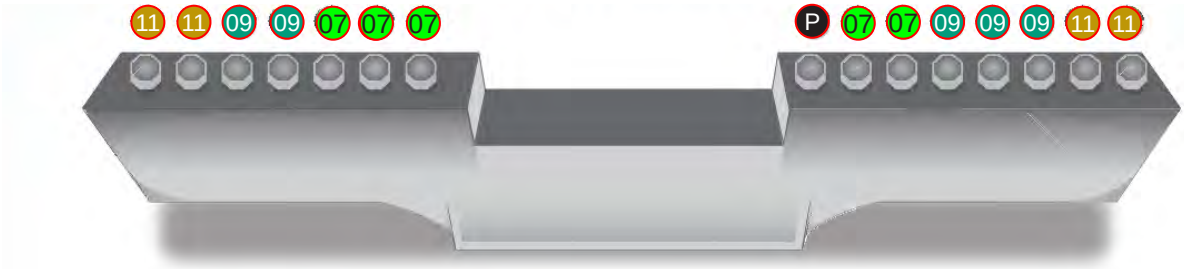

8” & 10”, 16 Nozzle - Most Aggressive Set Up 4.80 GPM @ 36K PSI / 5.10 GPM @ 40K PSI



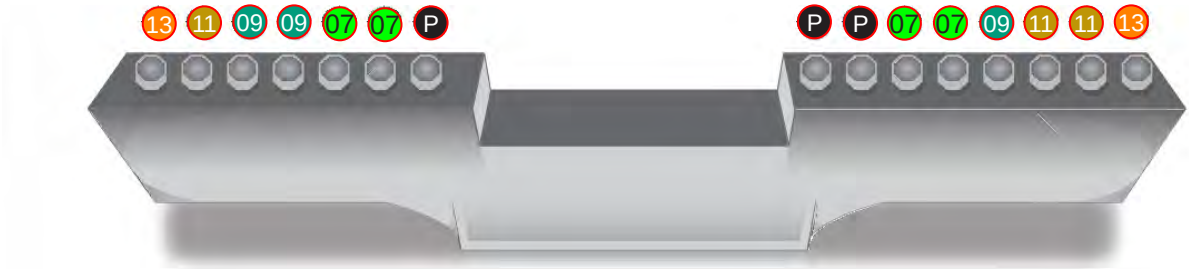
# SPRAY BAR NOZZLE CONFIGURATION CHART

(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.)

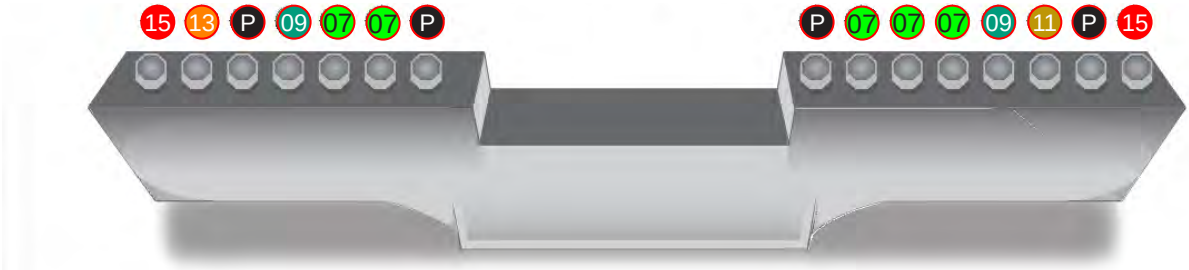
14", Least Aggressive Set Up 4.61 GPM @ 36K PSI / 4.88 GPM @ 40K PSI




14", Medium Aggressive Set Up 4.64 GPM @ 36K PSI / 4.91 GPM @ 40K PSI




14", Most Aggressive Set Up 4.68 GPM @ 36K PSI / 4.94 GPM @ 40K PSI



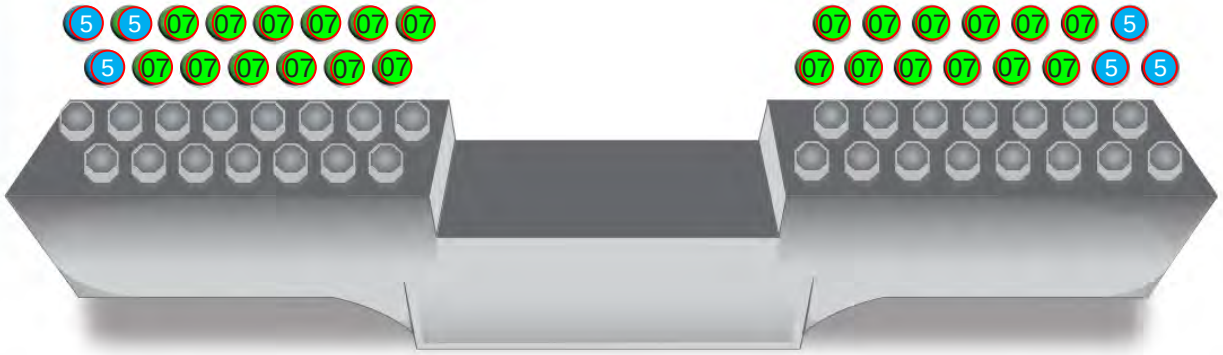
# SPRAY BAR NOZZLE CONFIGURATION CHART

(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.)

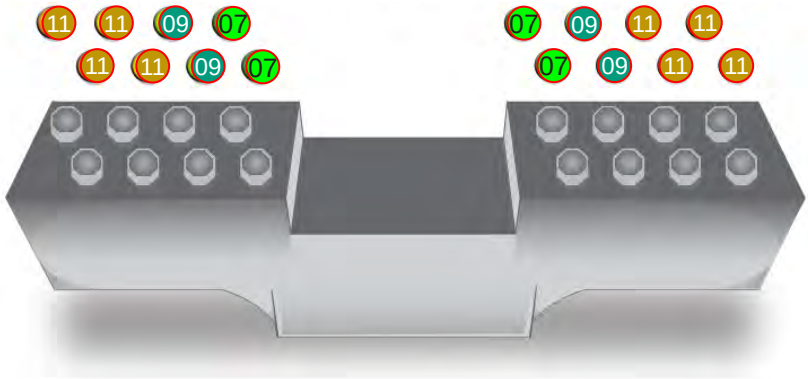
## Hog Technologies

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 - Set Up - 25K - 35K 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 |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
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| | | | |

**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



## Water Blasting 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.

**Wear 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 water blasting 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 trailer 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.

**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 trailer 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.

**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.

**Head Rotation Control Valve** - 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 -7 psi

**Hog Head Assembly** – Attaches to the Hog Tool - Includes the 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.

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

**Man-Way –** 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.

**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 Safety Switch –** Controls the head rotation hydraulic coils. If the charge water pressure drops below 30 psi the pressure switch will stop the heads from spinning.

**PSI –** Pounds per square inch, a unit of pressure.



**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 trailer 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.

**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.

**Univalve –** Separates the high and low pressure water in the ultra-high pressure system 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.

## NOTES



## 24 / 7 CUSTOMER SERVICE

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

Customer Service can also assist you with part orders.

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

## PARTS

All replacement parts are available directly through Hog Technologies.

Get the parts you need when you need them.

Next day delivery is available in most locations.

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

**CUSTOMER SERVICE HOT LINE - 772-223-7393**
**www.hogtechnologies.com**
**www.stripehogsupport.com**

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

## WARNING

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

## Stripe Hog Support Web Site


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www.thehog.com

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