X-8, X-9, X-13 SERIES

X-VAC®
HYDRO EXCAVATOR
A Product of Hi-Vac® Corporation

OPERATION
SERVICE
& PARTS

M A N U A L

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SECTION 3 PARTS (Continued)

NOTE: *The descriptions and instructions in this manual cover the standard design of the equipment and any common deviations when possible. This manual does not cover all design details and variations nor does it provide for every possible contingency which may be encountered. When information cannot be found in this manual, contact your nearest AQUATECH Parts and Service Center.*

**When ordering parts always specify unit serial number.*

New Machine Pre-Delivery Inspection Checklist

Machine Model		Dealer Name	
Machine Serial Number		Dealer Location	
Hour Meter Reading		Inspected By	
Inspection Date		Customer Name	

Check each item below. Refer to Owners' Manual for specific information regarding safety, operation, and maintenance of the unit. Indicate in the appropriate space as each item has been performed. If the item is found to be not accetpable, describe each discrepancy in the comments space at the bottom of the form. Immediate action must be taken to correct all discrepancies. The machine is not to be placed into service until all discrepancies have been corrected.

Y=Passed N=Failed C=Corrected NA=Not Applicable	Y	N	C	NA
General				
Operation Manual (paper & electronic) with unit				
Unit conforms with customer specs				
Engine & Chassis				
Engine oil and coolant levels are correct				
Inspect drive lines, tighten bolts if necessary				
Tire pressure is correct				
General condition/appearance of chassis				
Electrical System				
Inspect control panels for loose wires/connectors				
Test throttle control at control panels				
Test wireless remote controls				
Test all lights, strobes, arrow boards, etc.				
Engage PTO into work mode				
Engage water pump				
Engage blower				
Hydraulic System				
Hydraulic oil level is correct				
Check cylinders, hoses, valves for oil leaks				
Boom functions properly				
Rear door opens and closes and door locks function				
Hose reel swings and pays in and out correctly				
Debris tank raises and lowers properly				
PTO oil level is correct				

Return completed form to Hi-Vac Warranty Coordinator - customerservice@hi-vac.com

Y=Passed N=Failed C=Corrected NA=Not Applicable	Y	N	C	NA
Water System				
Install Y-Strainer and cap on suction line				
Fill water tanks and check for any leaks				
Water pump operates correctly				
Water pressure is correct				
Inspect water tanks for damage				
Hose Reel				
Inspect drive chain tension on sewer hose reel				
Inspect hydro-exacavating/wash-down reels				
Test speed control on sewer hose reel pay in/out				
Inspect sewer hose and hydro-exacavation hoses				
Debris Body & Enclosure				
Inspect rear door seal				
Inspect & test enclosure heaters				
Inspect & test water heater				
Vacuum tubes are correct type and sizes				
Decant valve works properly				
Check toolboxes/enclosure for packaged accessories				
Accessories/Other				
All options/accessories are correct				
All options/accessories operate correctly				
Comments				

CUSTOMER TRAINING FORM/DELIVERLY CHECKLIST (Page 1 of 2)

Operator and Service Personnel must be thoroughly instucted of the following:
(Please initial on lines provided)

Power Take off (PTO)

- Maximum operating speed _____
- How to engage and disengage _____
- Drive train service and lubrication _____
- Hydraulic pump location and alignment _____
- PTO oil level _____

Hydraulic system

- Oil level inspection and time interval _____
- Location of filters and service _____
- Manual over-ride operations _____
- Location of flow control valves and explanation of adjustments _____
- Location of hydraulic pressure gauge _____
- Boom system operation _____

Pneumatic system

- Air reservoir regulator, filter and service _____
- Operation of PTO _____

Water system

- Water tank inspection and repair _____
- Drain valves _____
- Water pump drive system _____
- Oil level inspection, time interval _____
- Packing lubrication, time interval _____
- Water “on/off” controls _____
- Pressure relief valve and operation _____
- Return line ball valve setting and service _____
- Handgun operation _____
- Winter recirculation _____
- Cold weather storage _____
- Water pressure operation _____
- Removal of ice from system _____
- Suction line strainer _____
- Water pump service oil level _____

CUSTOMER TRAINING FORM/DELIVERLY CHECKLIST (Page 2 of 2)

Operator and Service Personnel must be thoroughly instucted of the following:
(Please initial on lines provided)

Vacuum system and debris tank

- Debris tank inspection _____
- Door gasket cleaning _____
- Exhauster lubrication oil level _____
- Primary safety cut-off operation, service _____
- Vacuum gauge _____
- Vacuum breaker _____
- Exhauster drive system and controls _____
- Centrifugal scrubber and clean out screen _____
- Rear door operation and controls _____
- Tank tipping operation, controls, lubrication _____
- Tank prop _____
- Hydraulic door locks _____
- With separator open - explain cleaning and un-clogging _____
- With final filter door open - explain final filter cleaning _____
- Water draining system _____
- Cold weather operation _____
- Storage - draining all water from systems _____

Accessories supplied with unit

- Handgun assembly _____

Options

- Water heater _____
- Equipment compartment heater _____
- Antifreeze system _____

THIS INSPECTION WAS PERFORMED BY:

Unit Serial Number:

Signature:

Title:

Date:

INTRODUCTION

MESSAGE TO NEW OWNER

Thank you for purchasing your X-VAC Hydro Excavator unit, the most advanced American-made hydro excavation machine. Our quality of design and manufacture will assure you the greatest return on your equipment investment.

Please consult this owner's manual as the first step to resolving questions you may have about the operation or service of your machine. If you are not able to find the answers, then consult with your selling dealer. Finally, we at the factory will be happy to provide operating or service information that this manual or your dealer are unable to provide.

Our warranty spells out all your rights and expectations with regard to this equipment. Please consult it for a full definition of what is covered.

Thank you again for selecting the equipment preferred by industry professionals throughout the world.

Your new X-VAC Hydro Excavator unit incorporates the very latest in hydro excavation technology. The soil cutting action results from water traveling from the storage tank into the high efficiency water pump and being pumped to the hose reel and nozzle at high pressure and low volume. As a result, the machine will excavate and operate in a far superior manner than previously available.

The vacuum system provided is superior to any other available. It is capable of both wet and dry operation, as well as operation under water.

To achieve maximum results, the operators must become thoroughly familiar with the operation of the machine and completely understand correct nozzle selection and cleaning accessory use.

We are a company that is committed to continually striving to build an even better product. Many ideas for improvements in previous models have come from users in the field.

WARNINGS

X-VAC HYDRO EXCAVATOR MACHINES

X-VAC Hydro Excavator machines are designed to remove material in an underground environment. These systems operate under high pressure conditions with low water flow. Therefore, operators of these systems must be aware of possible hazards. This is not a complete list of all possible hazards, but represents typical hazards and types of hazards. At all times, the operator is responsible for the proper use of the machine.

Operators of X-VAC Hydro Excavator machines should be aware of the following safety warnings:

- Using this machine for purposes other than hydro excavation is not recommended.
- Water hose that is damaged into the braided lining must be repaired or replaced.
- Fittings used on water hose must be of a type and installed in a manner that is approved by the hose manufacturer.
- The handgun is designed to shut off automatically when the actuator handle is released. Never use a forward jet nozzle that will not turn off when released.
- The handgun remains pressurized after use. After shutting off water supply, squeeze actuator handle to relieve pressure before storing or before disconnecting the handgun from hose.
- Never operate the water system with the relief valves removed, or improperly adjusted The main relief valve is set at 3500 psi. Do not operate at pressure readings higher than these unless the manual specifically states that the system has been designed for higher pressures.
- Never walk under raised components such as hydraulically actuated tanks, doors, etc. Whenever these components are raised, props must be used to protect workers who must work under them.
- Never operate the machine in a stationary position without first setting the brakes, and shifting the rear axle out of the drive line. Always use wheel chocks.
- Never move the vehicle with the boom in a raised or otherwise unsecured position.
- Always turn off unit power when moving the vehicle.
- Always check for overhead obstructions before operating boom.

YOUR LIFE COULD DEPEND ON IT!!!

PRINCIPLES OF OPERATION

POSITIVE DISPLACEMENT EXHAUSTER AND WATER PUMP UNITS

This machine is a combination vacuum and high pressure water jetting unit for cleaning sewer drains or catch basins. It also performs other cleaning operations.

The vacuum generator is a rotary lobe, positive displacement exhauster. During operation of the vacuum system, material is picked up at the end of the suction line and pneumatically conveyed through the intake tubes, the boom hose, and through the boom intake valve, to the debris tank. As the material enters the larger area of the debris tank the velocity of the air flow is reduced and the material drops out of the air stream, settling at the bottom of the tank. The spent air flows through the ball check valve, and through a metal screen in the centrifugal scrubber externally located at the front of the body. At this point the filtered air flow enters the exhauster and is expelled through a silencer/muffler to the atmosphere.

A positive displacement triplex plunger water pump provides the water pressure and water flow to the cleaning nozzle which propels itself through the sewer line. When retrieving the nozzle under water pressure, material that has built up in the sewer line is blasted loose and back flushed to the manhole for removal with the vacuum system.

In the water system the water flows from the two water tanks, mounted outboard of the debris tank, through a crossover manifold, through the water pump feed line, through the suction strainer into the suction side of the pump. The pressurized water is then pumped forward to the water control valve and routed, depending on the position of the valve, either to the hose reel for cleaning, or by return lines to the water tank. The vacuum and water system can be used simultaneously when cleaning sewers. This allows conveyance of flushed out materials and water into the debris tank.

This machine is also designed for cleaning catch basins, wet wells, and lift stations where the vacuum operation picks up the material in the manhole while the water pump supplies water to a lance (part no. 238080) for blasting loose packed debris and for wetting dry material. Grapple tongs (part no. 234585) are used to remove long sticks and items that will not fit into the pickup tube.

This machine may also be used for leaf pickups. Position the unit at the curb; rotate the boom and extend it to reach all areas of the tree lawn and sidewalk. The boom is locked in place while picking up leaves to provide maximum operator safety. To aid in the dumping process of compact leaves, it is recommended that a couple hundred gallons of water be added to the bottom of the debris tank prior to vacuuming. Unit must be equipped with the liquid ring option (part no. 380924).

PRINCIPLES OF OPERATION

CONTROLS AND GAUGES

It is important for the operator to fully familiarize him/herself with the location, appearance and function of the various controls and gauges on any new X-Vac Hydroexcavating machine sewer cleaning machine. Please read this section carefully, and refer to it whenever any section of the manual describes a control which you cannot identify.

LOW WATER WARNING AND COLD WEATHER CONDITIONS

Operator should pay special attention to the Low Water Alarm. There is a **"Low Water"** warning light and alarm located on the Operator's Panel, The alarm can be turned off by a toggle switch.

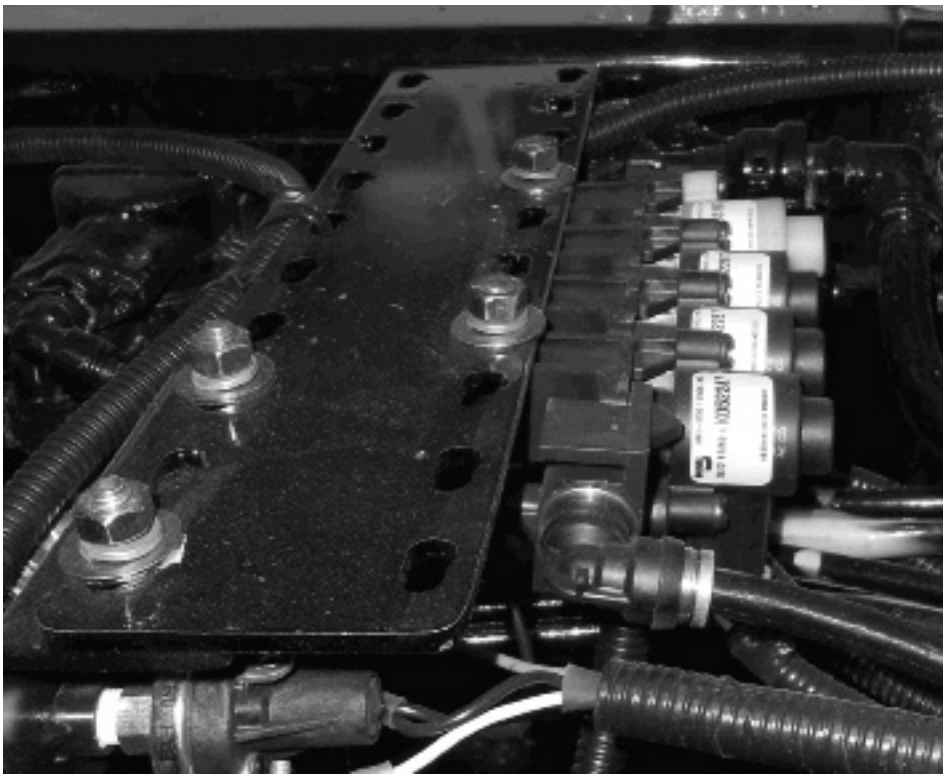
HYDRAULICS

The main split shaft PTO incorporates an additional output for the installation of the hydraulic pump to supply power to all hydraulic functions. This pump is closed coupled to the PTO. Its drive is automatically engaged whenever the PTO switch is activated in order to disengage the main drive to the differential of the vehicle. When the switch is positioned for drive mode, the hydraulic pump drive is disengaged.

DASHBOARD and CONTROL PANEL CONTROLS

Several controls are mounted in the Chassis Cab as well as at the Side Control Panel. These controls allow the operator to engage and disengage the water pump, exhauster, hydraulic system, and a vacuum breaker. The water pump, exhauster, hydraulic system, and vacuum breaker are engaged and disengaged by **Electro-Pneumatic Solenoid Valves**. These solenoids are operated by electric toggle switches. Because each manufacturer will have a different cab layout, even among models of the same manufacturer, locations of controls & switches will vary from unit to unit.

Electro-Pneumatic Solenoid Valves



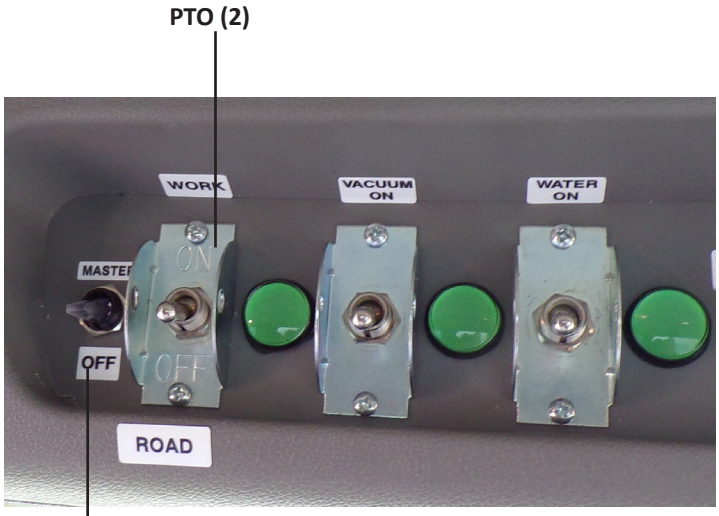
POWER DECK SYSTEMS ENGAGEMENT-SEQUENCE OF OPERATION (ALLISON CONFIGURATION)

1. Start engine and set parking brake.

2. Place transmission in **"Neutral"** position and allow unit to build up with full air pressure.

Note: Because the main split-shaft PTO is actuated by means of electro-pneumatic solenoid valves, there must be at least 90 psi in the air brake system. Check the air pressure gauges on the dashboard to confirm this.

Transmission Control



3. Place **Master Switch (1)** to **"On"** position.

Note: You will not have power to any body controls or functions unless this switch is on.

4. Place **PTO Switch (2)** in **"WORK"** position.

If **PTO Switch (2) "illuminates":**

a) Fully depress brake pedal and press **"D"** on the Transmission Control.
b) Wait until **"4 - 4"** shows on the display.
c) Proceed to **step 5**.

If **PTO Switch (2) "fails to illuminate":**

a) Place **PTO Switch (2)** in **"Off"** position.
b) Fully depress brake pedal and press **"D"** on the Transmission Control.
c) Wait until **"4 - 4"** shows on the display.
d) Place transmission back into neutral.
e) Return to beginning of **step 4**.

Caution! If **PTO Switch (2)** fails to illuminate after a couple of attempts, contact your local dealer for assistance.

POWER DECK SYSTEMS ENGAGEMENT-SEQUENCE OF OPERATION (ALLISON CONFIGURATION)

Caution! Never turn **Master Switch "On"** or **"Off"** unless truck is in neutral.

Caution! The pump systems should never be operated in a gear range greater than indicated on either the dashboard label or the rear operator's panel. Failure to heed this caution may result in severe damage to the water pump or exhauster. Please consult with the factory if the vehicle gear range is not specified.

Caution! When disengaging the unit, perform these steps in reverse. Ensure the transmission is in neutral before turning any switches off.

5. You are now ready to engage the Water Pump and/or Exhauster.

Note: To engage the Water Pump, press the **Water Pump** switch to **"On"** position and wait for indicator light to illuminate. The same procedure is used for the exhauster by pressing the **"Exhauster"** switch to **"On"** position and waiting for indicator light to illuminate. Both power systems can be run simultaneously if desired. To disengage either the Water Pump or Exhauster, press the switch again and wait for indicator light to turn off. The water pump and exhauster can be engaged from the cab or Rear Operator's Control Panel.

POWER DECK SYSTEMS ENGAGEMENT-SEQUENCE OF OPERATION (EATON CONFIGURATION)

1. Start engine and set parking brake.

2. Place transmission in **"Neutral"** position and allow unit to build up with full air pressure.

Note: Because the main split-shaft PTO is actuated by means of electro-pneumatic solenoid valves, there must be at least 90 psi in the air brake system. Check the air pressure gauges on the dashboard to confirm this.

3. Place **Master Switch** to **"WORK"** position.

Note: You will not have power to any body controls or functions unless this switch is on.

4. Place **PTO Switch** in **"On"** position.

If **PTO Switch "illuminates":**

a) Fully depress brake pedal and move stalk shifter to **"D"**.
b) Dash will illuminate with **"D"** and **"AN"** inside a circle.
c) Push **"M"** button on end of stalk shifter.
  1) "AN" will change to flashing **"11"**.
  2) A **"M"** will appear beside the **"D"** on dash.
d) Now press down on fuel pedal for **3 seconds**.
e) **"11"** will stop flashing and become steady on.
f) Transmission should be engaged.

Note: When PTO is operational a green fan symbol will illuminate on dash. This is normal.

If **PTO Switch "fails to illuminate":**

a) Place **PTO Switch** in **"Off"** position.
b) Begin the steps above again.

Caution! If **PTO Switch** fails to illuminate after a couple of attempts, contact your local dealer for assistance.

5. To turn off the PTO.
a) Rotate stalk shift back to neutral.
b) **"11"** will be replaced by a **"N"** in a circle.
c) You can now switch the **PTO Switch** to off.

POWER DECK SYSTEMS ENGAGEMENT-SEQUENCE OF OPERATION (EATON CONFIGURATION)

Caution! Never turn **Master Switch "On"** or **"Off"** unless truck is in neutral.

Caution! The pump systems should never be operated in a gear range greater than indicated on either the dashboard label or the rear operator's panel. Failure to heed this caution may result in severe damage to the water pump or exhauster. Please consult with the factory if the vehicle gear range is not specified.

Caution! When disengaging the unit, perform these steps in reverse. Ensure the transmission is in neutral before turning any switches off.

5. You are now ready to engage the Water Pump and/or Exhauster.

Note: To engage the Water Pump, press the **Water Pump** switch to **"On"** position and wait for indicator light to illuminate. The same procedure is used for the exhauster by pressing the **"Exhauster"** switch to **"On"** position and waiting for indicator light to illuminate. Both power systems can be run simultaneously if desired. To disengage either the Water Pump or Exhauster, press the switch again and wait for indicator light to turn off. The water pump and exhauster can be engaged from the cab or Rear Operator's Control Panel.

SIDE OPERATOR'S STATION

There is an operator's station at the passenger side of the unit to allow the operator to control vaccuuming, pumping, and tank dumping operations. The control panel contains switches for for the various operations and an emergency stop button (not shown). The engine throttle control at this station allows the operator to control engine speed, and therefore hydraulic pressure. Operate engine at 1500 rpm during tank dumping and lock operating functions. Plastic labels at each switch indicate the correct manipulation of the switch for the function it performs. Consult the labeling to be sure you are operating the controls correctly. If the labels become unreadable or are inadvertently removed, consult the information in the electrical section for switch operation.

AIR PURGE PUMP PRIME & COLD WEATHER BLOWOUT SYSTEM
(Page 1 of 2)

AIR PURGE PUMP PRIME

Air Purge Pump Prime Valve#1 (see next page) is provided to assist the purge of air trapped inside the suction section of the water pump. There should be sufficient head pressure from the water in the water tanks to expell any air trapped on the suction side of the pump. Close **Air Purge Pump Prime Valve** (see next page) when a solid water stream runs from the overflow tube.

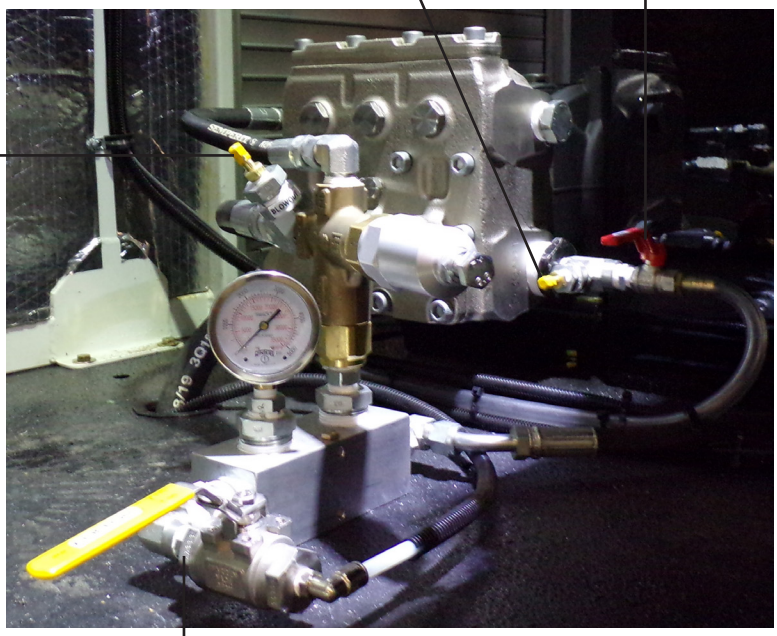
Air Purge Pump Prime "Valve #2" (see next page) is provided to assist the purge of air trapped inside the discharge section of the water pump. Any trapped air acts as a spring cushion for the compressed water and causes the water to "bounce back" against the cushion of air. This can cause a loud knocking noise from the pump area and severe pulsating of the sewer hose. This is called "cavitation". If the air is not expelled, severe damage can occur in the pump. Open the valve to allow air trapped inside the pump to be expelled. Water will also be expelled at the same time. Run the pump at an idle speed for several minutes until all air is expelled, then slowly increase pump speed. As the pump develops greater pressure, the water discharged from the valve will become very intense. When it is clear that all air has been expelled, close the **Air Purge Pump Prime "Valve #2"** (see next page) and increase pump speed. The knocking sound should disappear, and the pulsating of the hose will be very mild. This is normal for a triplex water pump. At this point it is safe to operate the jetting, hydro or handgun operation. This procedure is usually only necessary when all water has been previously purged from the system, the suction line strainer has been removed for cleaning, or the pump has been run out of water.

Note: If you have constant problems with cavitation, it is likely that air is being sucked into the pump somehow, or one or more valve springs have broken. If you experience repeated cavitation, even though the pump has not been run out of water, you should request an inspection of the water system to determine the cause.

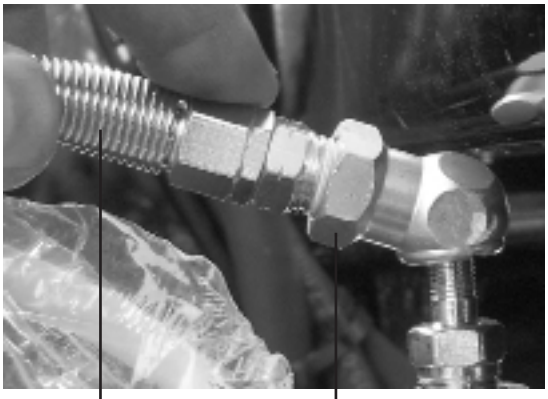
COLD WEATHER BLOWOUT

The **Schrader Air Valve#1** (see next page) located on the suction side water pump, is used to purge the pump and water piping of any trapped water and expel it out through the Hydro-X hose Reel. By connecting the purge coiled hose assembly (see next page) to the **Forced Air Disconnect** (see next page), and the **Schrader Air Valve #1**, air is then introduced at the valve. The **Schrader Air Valve#2** (see next page) located on the discharge side water pump, is used to purge the water piping of any trapped water and return it back to the Water Tank.

AIR PURGE PUMP PRIME & COLD WEATHER BLOWOUT SYSTEM
(Page 2 of 2)



Optional Air Purge System



HYDRO EXCAVATION HANDGUN

1. At the **Hydro-X Hose Reel**, disconnect the Hose from the **Quick Connector** and attach the Hand Gun.
2. Engage the the **Exhauster** and **Water Pump** by pushing up on the switches located on the **Side Operator's Panel**.
3. Pull the trigger on the Hydro Excavation handgun. This will allow air to escape from the Hydro Excavation Hose.
4. Position the boom for debris removal.
5. Use the water from the Hydro Excavation Handgun to break up soil and the vacuum hose tubes to remove the loose soil/debris.
6. When complete, place the boom back into the "Stowed" position, disengage the **Exhauster** and **Water Pump**.
7. Reconnect the **Hydro-X Hose** to the **Quick Connector.**

COLD WEATHER RECIRCULATION OPTION
(with 12V Recirculation Pump)

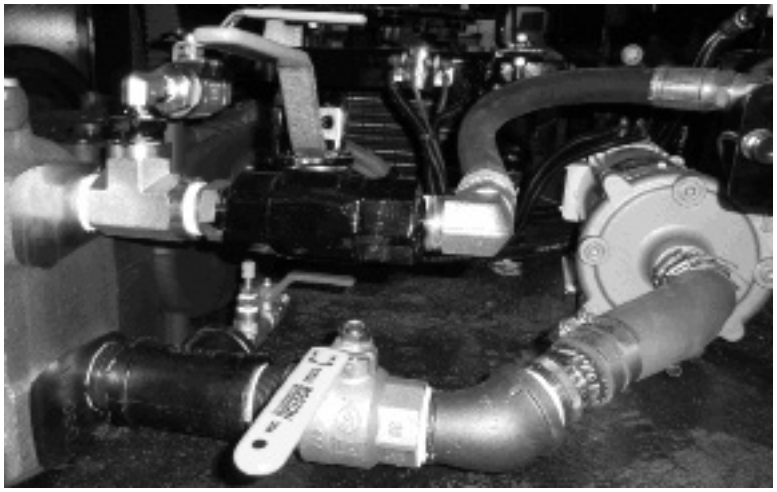
1. Connect the **Hydro-X Hose** from the hose reel to the **Quick Connector**.
2. Assure **Valve #1** and **Valve #2** (located on the water lines between the **Main Water Supply Pump** and **Cold Weather Recirculation Pump**) are **"Open"**.

Important Note: Prime recirculation pump chamber prior to initial start-up by completely filling the pump casing with liquid to be pumped. **Do not run pump dry!**

Hydro-X Hose

Quick Connector

Valve #2 - Return From Cold Weather Recirculation Pump



Main Water Pump

CWR Pump

Valve #1 - Supply To Cold Weather Recirculation Pump

COLD WEATHER RECIRCULATION OPTION (cont.)
(with 12V Recirculation Pump)

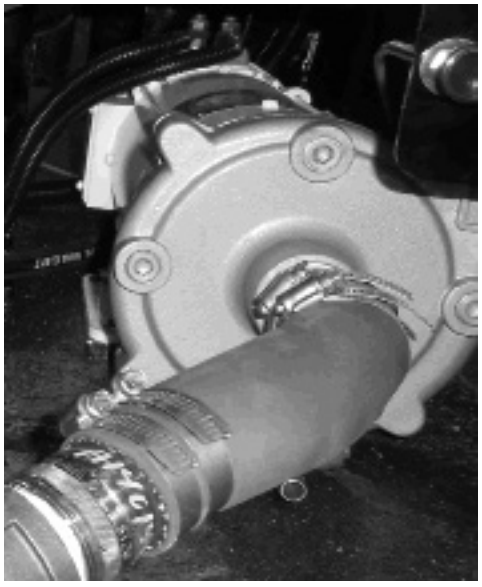
3. Go to the Cab and start the truck.

Important Note: Assure truck is running prior to starting the **Cold Weather Recirculation Pump**. For information on this pump, refer to page 14 of the **"Principles of Operation"** section of this manual.

4. Turn on the **Recirc Pump Switch** to start the Cold Weather Recirculation Pump.
5. The pump will now circulate water throughout the system and back to the tank.

Note: All units supplied with cold weather recirculation are equipped with two low water warning sensors controlled by the **"Summer/Winter"** switch in the cab. In cold weather the switch should be in the **"Winter"** position. This allows more water to remain in the tank to accommodate recirculation. During warmer weather, the switch should be in the "Summer" position, providing more water for jetting operations.

Recirc. Pump Switch



Cold Weather Recirc. Pump

COLD WEATHER RECIRCULATION OPTION
(with 12V Recirculation Pump)

6. When cold weather recirculation is no longer required, turn off the **Recirc Pump Switch** in the Cab to stop the **Cold Weather Recirculation Pump**.
7. Assure **Valve #1** & **Valve #2** (located on the water piping) remain open.
8. Open **Valve #3** (located on the cold weather recirculation pump).
9. Perform **Cold Weather Blowout**.
10. Close **Valve #1, Valve #2**, and **Valve #3** when all of the water has been expelled from the system.

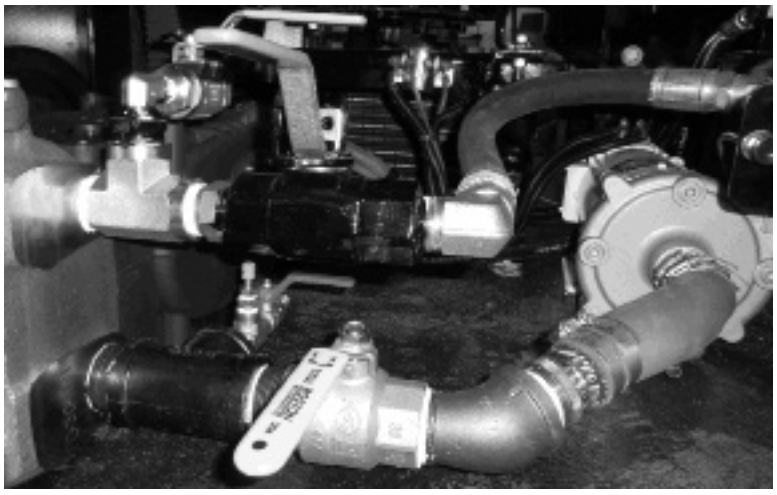
Caution! **Immediately after using the cold weather recircualtion option and every day during cold weather, water must be drained from the recirculation pump as well as the piping between the main water supply pump and the recirculation pump.**

Damage could occur to the recirculation pump if this is not performed.

Recirc. Pump Switch

Valve #3

Valve #2 - Return From Cold Weather Recirculation Pump



Mian Water Pump

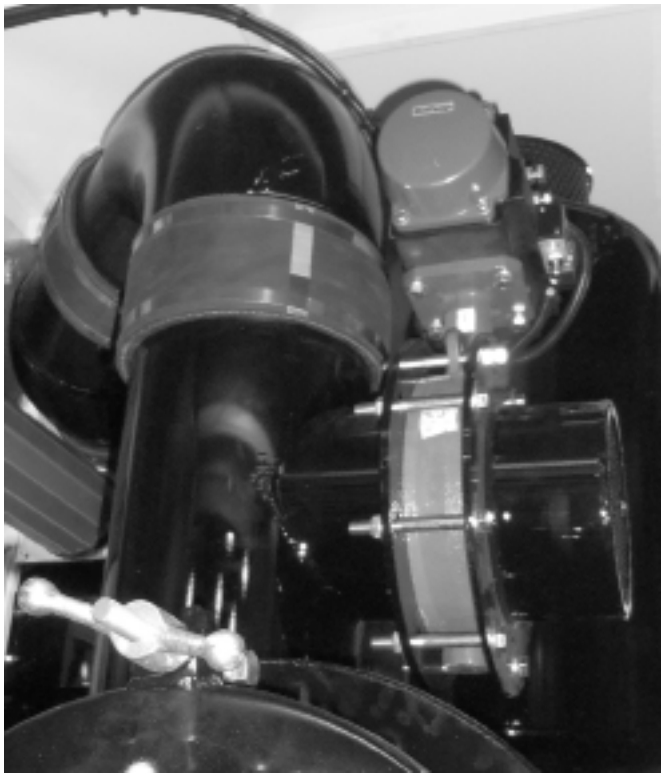
CWR Pump

Valve #1 - Supply To Cold Weather Recirculation Pump

AARCOMM WIRELESS REMOTE

Note: For information on this option, refer to the vendor literature (if included as an option) located in the "Controls" section and on the Digital Copy supplied with this unit.

VACUUM BREAKER



The Vacuum Breaker System utilizes the stored air on the truck chassis to control an air actuated butterfly valve. The butterfly valve opens when the amount of vacuum in the system needs to be reduced.

The vacuum breaker can be controlled from a switch on the Side Opreator's Panel, a rotary switch on the Remote Pendant (if installed), and from the Wireless Remote.

Once the Vacuum Breaker is opened at one location, it must then be closed by the same switch. Example: If the vacuum breaker is opened using the rotary switch on the Remote Pendant, it can only be closed using the same switch on the Remote Pendant.

There is a light on the Side Opreator's Panel to indicate the vacuum breaker has been closed. There is no light indication on the Remote Pendant.

LOW WATER WARNING (LIGHT & ALARM)

On units equipped with the low water warning system, a red light located on the Side Operator's Panel will glow, giving a visual signal to the operator when the water level has been depleted to a pre-determined level.

An alarm, located near the Side Operator's Panel has also been included, giving the operator an audilbe signal when the water level has been depleted to a pre-determined level. This alarm can be turned off by using the toggle switch provide on the Side Operator's Panel.

BOOM UP SAFETY ALARM

This unit has been equipped with a **"Boom Up" Safety Alarm**. The **Limit Switch**, located near the **Boom Cradle**, activates an alarm that alerts the operator in the event the boom has not been returned and seated properly on the **Boom Cradle**.

If the boom is not properly seated, the **"Boom Up" Light** will illuminate and the **"Boom Up" Alarm** will sound when the **Parking Brake** is released.

COMPARTMENT HEATER

The **Compartment Heater** is used to heat the equipment compartment during cold weather operations when the unit is in use. It is connected to the chassis water system by valves mounted on the unit. These valves must be opened to allow the hot engine water to flow to the compartment heater. They should be closed when the heater is no longer used.

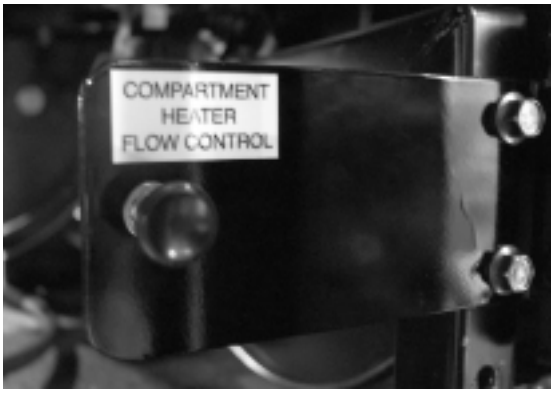
The flow of water to the **Compartment Heater** is controlled by a **Push/Pull Cable** located on the passenger side of the enclosure near the Hydro-X Hose Reel. Pushed all the way in, the flow of hot water is closed off to the heater. Pulled, the hot water is allowed to flow to the heater.

The **Compartment Heater** fan is controlled by a **Thermostat** located near the Water Pump.

There is an "On/Off" switch for the **Compartment Heater** located in the cab.

Compartment Heater

Thermostat



Push/Pull Cable

WEBASTO HEATER (OPTIONAL)

The **Webasto Heater** is used to heat the equipment compartment during cold weather conditions. The air heater operates independently of the engine and is connected to the fuel tank and the electrical system of the vehicle.

Note: For information on this option, refer to the vendor literature (if included as an option) located in the "Body" section and on the Digital Copy supplied with this unit.

WATER HEATER (OPTIONAL)

The diesel fired boiler is used to heat the water during cold weather operation. It is connected into the water system and water always runs through it.

To utilize the boiler:

a) Set **"Thermostat"** to desired temperature.
b) Place the **Switch** to the **"On"** position from unit itself.
b) Engage the Water Pump from the Cab, Control Panel, or Wireless Remote.
c) The boiler will start heating when it senses water flow.

Note: For information on this option, refer to the vendor literature (if included as an option) located in the "Water" section and on the Digital Copy supplied with this unit.

HEAT TAPE/INSULATION/INVERTER (OPTIONAL)

This option consists of the following:

- **Heat Tape** and **Insulation** (not shown) installed on the entire water system to keep system from freezing during cold weather conditions.
- **5000 WATT Power Inverter** (supplied with a remote control) which provides a power source to the Heat Tape.

* Assure **Heat Tape Power Cords** are plugged in and Inverter is turned **"On"** proir to using this option.

* Plug an Extension Cord (not shown) into the **Utility Heat Tape Receptacle** (located on the outside of the enclosure on driver's side of cab) when 120V AC source is used, otherwise 12V DC will be supplied to the Inverter via the truck battery.

* The **Inverter Switch** is an illuminated switch. If switch fails to illuminate, assure **"On/Off" Switch** located on **Inverter** is switched to the **"On"** position.

* The **AC DC Power Inverter** is is supplied with a wireless remote. When using the wireless remote, the **Power Switches** on both the **AC DC Power Inverter** and **Receiver** must be in the **"Off"** position.

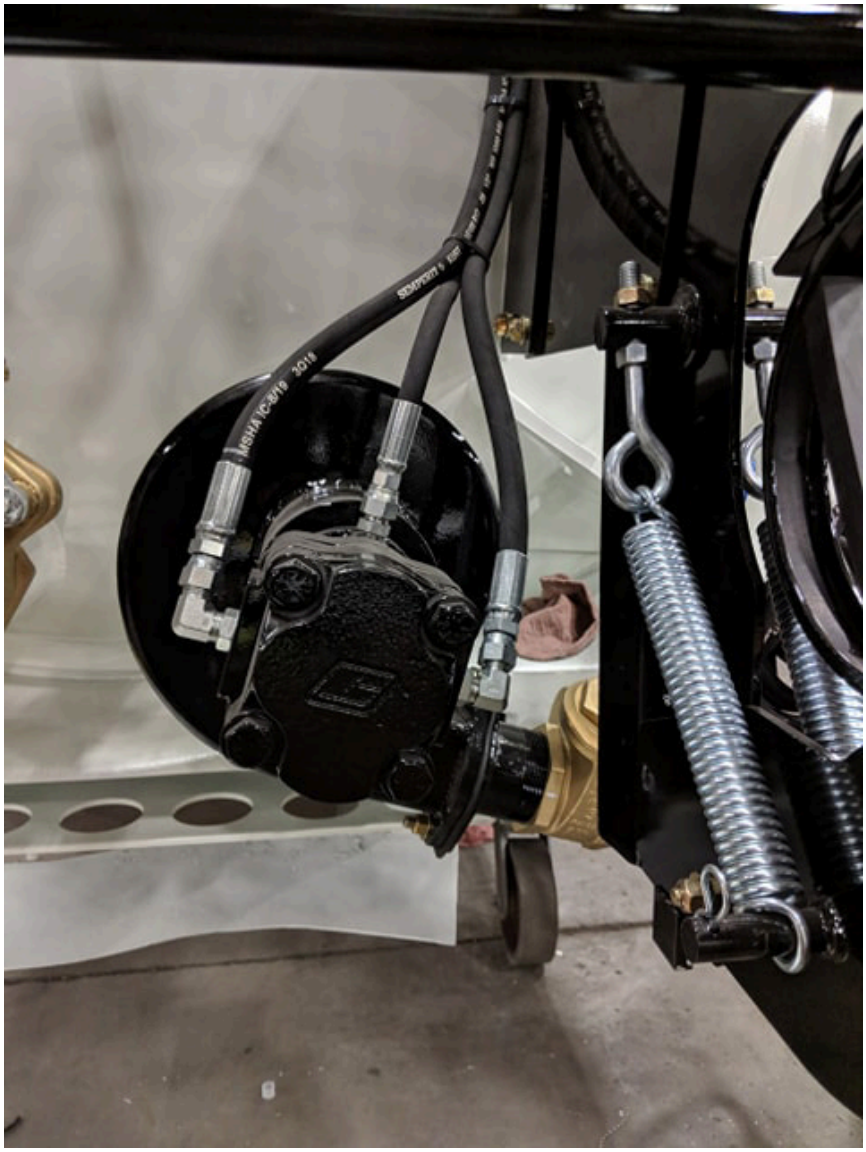
* When heating is no longer required turn **"On/Off" Switch** to the **"Off"** position.

* For operation and maintenance of the Inverter, refer to the Vendor's Manual located in the "Body" section of this Operations Manual.

Utility Heat Tape Receptacle

Inverter

SLUDGE PUMP (OPTIONAL)



To engage the **Sludge Pump:**

1. At the rear of the truck, remove the camlock fitting.
2. Open the valve.
3. Turn the Sludge Pump “On” from the control panel.

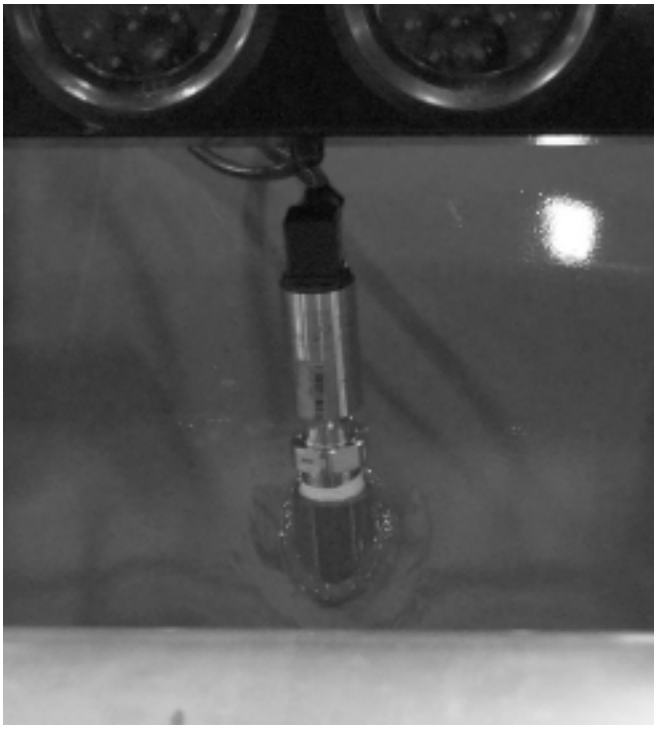
To disengange follow the above steps in reverse

Note **For detailed operating instructions and maintence information, please refer to the manufacturers manual in the HYDRAULIC SYSTEM section or on your included digital copy.**

DEBRIS PROBE (OPTIONAL)

The **Debris Probe** is used to set off an alarm and illuminate a warning light when a predetermined level has been reached in the Debris Tank. When this occurs, the operator can turn off the alarm by using the toggle switch located in the Side Operator's Panel.

The operator shoud then follow the instructions for **"Dumping The Debris Tank"**, outlined in the **"Principles of Operation"** section of this manual.



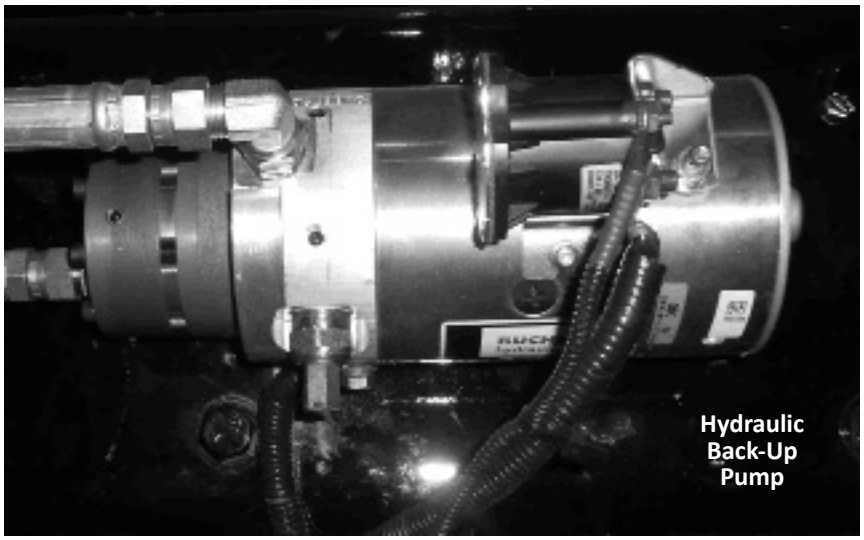
HYDRAULIC BACK-UP SYSTEM (OPTIONAL)

This unit has been equipped with a **Hydraulic Back-Up System**. In the event of a Main Hydraulic Pump failure, this system can be used to complete tasks such as: stowing the boom, raising/lowering the Debris Tank, and locking/unlocking the Debris Tank Door.

To engage the **Hydraulic Back-Up System:**

1. Turn the **"Unit Power" Switch** in the cab to the **"On"** position.
2. Go to the **Operator's Panel** and press & hold **"Up"** on the **"Hydraulic Override"** switch to operate the **"Boom"** functions or press & hold **"Down"** on the **"Hydraulic Override"** switch to operate the **"Rear"** functions.

Caution! **The Hydraulic Pump Motor installed on this system is an intermitent duty motor. It cannnot be run continuously for more than 5 minutes @ 1600psi. After 5 minutes the motor must rest for 4.5 minutes before the system can be restarted. Serious damage to the motor could occur if these steps are not followed.**

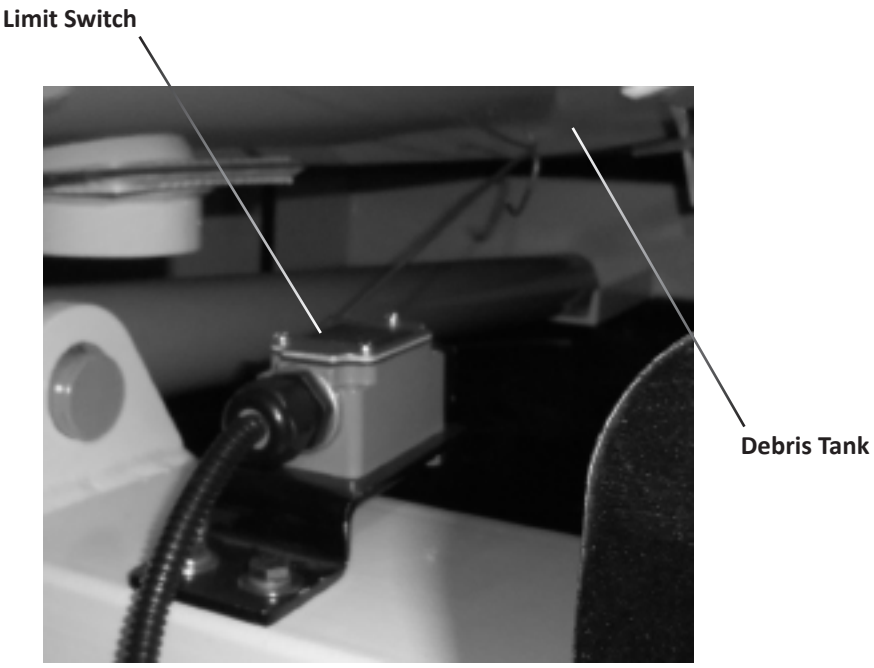


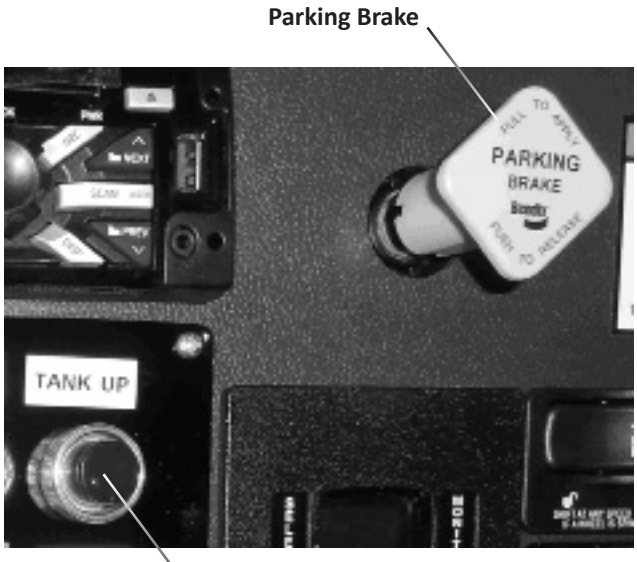
Hydraulic Back-Up Pump

TANK UP SAFETY ALARM (OPTIONAL)

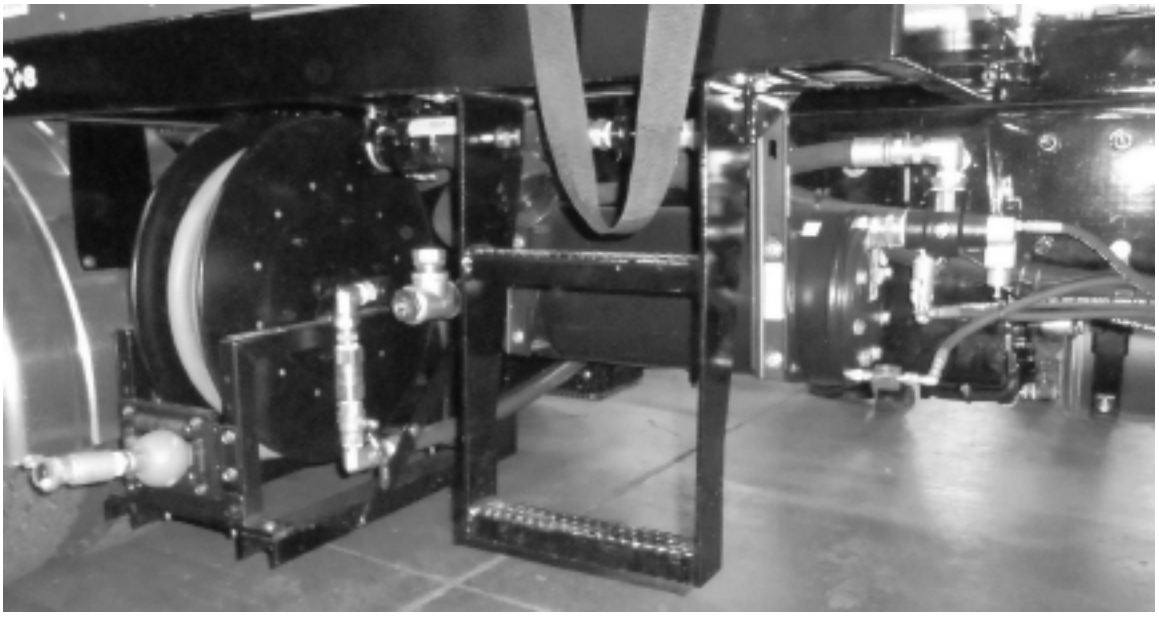
This unit has been equipped with a **"Tank Up" Safety Alarm**. The **Limit Switch**, located under the **Debris Tank**, activates an alarm that alerts the operator in the event the **Debris Tank** has not been returned to its proper position.

If the **Debris Tank** has not been properly lowered, the **"Tank Up" Light** will illuminate and the **"Tank Up" Alarm** will sound when the **Parking Brake** is released.





AIR EXCAVATING (OPTIONAL)



Note: For information on this option, refer to the vendor literature (if included as an option) located in the “Body” section and on the Digital Copy supplied with this unit.

ANTIFREEZE SYSTEM (OPTIONAL)

Procedure:

1. Turn **Valve #1** to **"Glycol"** position. Valve located outside of enclosure and just after **Suction Strainer**.
2. Turn **Valve #2** to **"Glycol"** position. Valve located inside of enclosure.
3. Open **Discharge Valve** on bottom of **Antifreeze Storage Tank**.
4. Engage the Water Pump to circulate fluid and continue running the pump until fluid is seen being returned to the **Antifreeze Storage Tank**.

Note: To return fluid back to the **Antifreeze Storage Tank**, close the **Discharge Valve** on bottom of **Antifreeze Storage Tank** and connect the Purge Coiled Hose Assembly (not shown) between the **Forced Air Disconnect** and the **Schrader Air Valve** located on the Water Pump. Open the **Air Supply Valve** and purge the system until all of the fluid is returned back to the **Antifreeze Storage Tank.**

Valve #1

Suction Strainer

Valve #2

Antifreeze Stroage Tank

Discharge Valve

LATERAL CLEANOUT (OPTIONAL)

AT THE SIDE OPERATOR'S STATION:

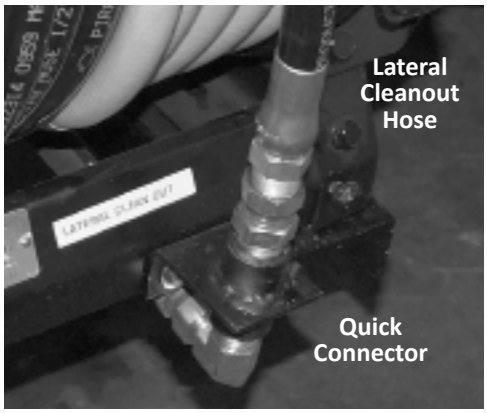
1. Install desired nozzle on the end of Lateral Cleanout Hose.
2. Position the Hose and Nozzle well into the pipe to be cleaned.
3. Assure **3-Way Manual Control Valve** is in the **"Lateral Cleanout"** position.
4. Turn Water Pump **"On"**.

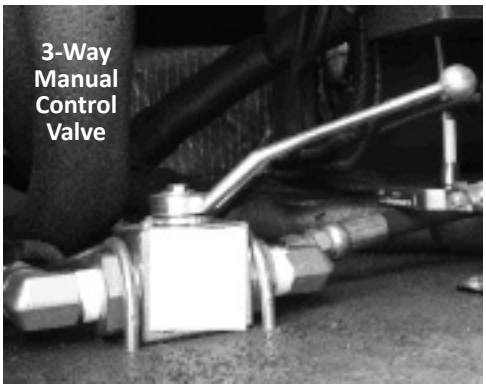
   Note: If desired pressure cannot be achieved, **SLOWLY** increase the engine speed until the pressure reaches desired level.

5. The hose/nozzle combination can now be moved back and forth in the pipe using the **Hydraulic Control Valve**.
6. When finished cleaning, retrieve the hose/nozzle, stopping with at least 3 to 5 ft. of hose remaining in the pipe.

   Caution! **NEVER** completely pull the hose from the pipe when water is flowing through the hose/nozzle.

7. Turn Water Pump **"Off"**.
8. It is now safe to completely remove the hose/nozzle from the pipe.





HOW TO USE YOUR HYDRO EXCAVATOR UNIT

IMPORTANT SAFEGUARDS:

1. When entering any excavation. Follow all state and federal regulations.
2. Use only genuine Hi-Vac hose and repair parts.
3. Use Cold Weather Recirculation in temperatures below 32° F.
4. Check hose and water network for weak, worn or leaking places. Repair or replace if necessary.
5. Check for overhead lines that could come in contact with the boom.

Before proceeding with the following instructions make certain that there is at least 120 psi of air pressure in the chassis air reservoir or damage to the PTO may result.

BEFORE GOING TO THE WORK-SITE:

1. Perform required maintenance as specified in the maintenance schedule.
2. Perform required maintenance on truck chassis as specified in truck chassis manual.
3. Check to see that the boom is secure in the boom rest and the boom pendant control secure in a tool box or in the cab.
4. Check to assure that all tools are secured, and that all cabinet doors are closed and latched.
5. Fill the water tank. Please refer to one or more of the following water level indicators.
    a. The sight tubes located on the rear of the water tanks shows the direct water level in all tanks.
    b. Low water warning light in the cab indicates low water.
6. Inspect and clean water suction line strainer and exhauster final filter.

Before proceeding to drive this vehicle, special attention must be given to assure that the boom is resting properly in the travel position. Also, to avoid damage, be sure that the pendant control is properly wound and placed in a tool box or truck cab.

HYDRO EXCAVATING AT THE WORK-SITE:

1. Position the unit as close to the work location as possible. Set the parking brake and block the wheels.
2. Open the water pump supply valve completely.
3. Disengage the rear axle by shifting the main drive of the tower PTO. The transmission must be in neutral. On units with standard transmissions it is also advisable to depress the clutch pedal to the floor during this operation.
4. Engage water pump. Refer to the dashboard and truck labeling for the correct gear range in which to operate your Hydro Excavator machine. Select the correct gear range and proceed to the side operator's station to operate the unit. Your Hydro Excavator machine must never be run at speeds higher than specified on the dashboard and truck labeling. Running the engine at a higher rpm may be unsafe and result in personal injury and damage. Upon such use, the warranty becomes null and void. If you cannot locate this information, please call your selling dealer, or the Hi-Vac Corporation direct at (740) 374 -2306.
5. At the side operator's station, move throttle control lever up momentarily to increase engine speed, down to decrease. The needle on the tachometer indicates the engine speed.

Cold weather precautions: If the unit is subjected to freezing temperatures, ice will probably form in the hydro excavation hose and must be ejected for proper operation. Leave the hose in its traveling position, the engine at idle speed, and run water through the hose for at least one minute or until all ice is ejected. If pressure starts to rise, the hose is plugged.

VACUUMING AT WORK SITE:

1. Be sure that the unit operator is completely familiar with the wireless remote.
2. Place a sufficient number of intake and/or extension tubes on the boom hose to reach the desired working depth.
3. Engage exhauster. To increase the exhauster speed, increase engine RPM to working speed, not to exceed maximum RPM and gear as noted on the dashboard and truck labeling.
4. Begin vacuuming debris and water. The vacuum tube can be positioned by use of the boom up/down control, and by physically moving the tube around inside the hole to reach all areas where debris has collected.
5. When vacuuming, the intake tube may be positioned just above the water level in the hole allowing a mixture of air, water, and debris to enter. When required, the unit is capable of removing debris from below water level with the intake tube completely submerged.
6. If during the vacuuming process, the debris tank becomes full, the ball check valve will close which is indicated by loss of vacuum at the intake tube. The vacuum breaker will also "whistle." When the debris tank is full, follow the instructions for disengaging the exhauster PTO.

Caution!

To avoid overloading of the truck chassis, the debris tank and the water tanks must never be simultaneously loaded to full capacity. When traveling to the dump site with a fully loaded debris tank, a maximum of 1/4 tank of fresh water should be carried. This is sufficient to wash down the debris tank.

Do not operate the unit for long periods of time when the debris tank is full. It is extremely important to always remove as much water as possible from the debris tank before driving the vehicle. This will help eliminate overloaded conditions.

7. Excess water may be removed from the debris tank by opening the drain valve at the rear of the unit and allow the water to drain. Ensure the exhauster is not engaged.

LEAVING THE WORK SITE:

1. Before leaving the worksite for the dumpsite, assure the boom is in its travel position and properly latched.

2. Proceed to dumpsite.

DUMPING THE DEBRIS TANK:

Caution!

When dumping this vehicle, always seek firm, level terrain on which to park the vehicle when setting up to dump. Never lift the tank when the unit is parked on a grade, or when the underlying ground is soft or unstable. Failure to follow these guidelines may result in a catastrophic accident in which the vehicle may tip over or the tank may shear from its mounting supports.

Do not attempt to raise the tank until the door has been opened to allow the debris to empty. Never drive this vehicle with the tank raised or the tank door opened.

Be sure the area above the vehicle is free of electrical lines or any other obstructions.

1. Position the truck at the dump site, set the parking brake, and block the wheels.

2. Procedure for opening the rear door and raising the tank:

Note: Maximum operating speed for opening the rear door is 1500 RPM.

a. Disengage the rear axles.
b. Rotate the boom to the rear.
c. Your unit is equipped with hydraulic door locks, push and hold the toggle switch marked LOCKS upward to unlock the hydraulic door locks.
d. Raise the door with the toggle switch marked DOOR located on the side control panel. Push the switch up and hold until the door is completely open.
e. Push the switch up and hold to raise the debris tank as needed to allow the debris to completely dump out of the tank.
f. After dumping is complete, pushi the switch and hold down until the tank is completely down on the sub frame.
g. Close the door by pushing the toggle switch marked DOOR. If your unit is equipped with hydraulic door locks, lock the door by pushing the toggle switch marked LOCKS and holding until the locks are completely closed.
h. Next, open the gate valve located at the bottom of the hopper mounted below the cyclone separator. Allow debris to drain. Close the gate valve.
i. Open and clean the exhauster final filter.

Note: Make sure that the door is completely closed prior to closing the hydraulic locks.

CLEANING THE DEBRIS TANK:

Connect the handgun to the quick disconnect at the 1/2" hose reel. Engage the water pump. Increase the engine RPM with the throttle until the water pressure reaches 800 PSI on the pressure gauge. Do not exceed this pressure setting when operating. The handgun should also be used to flush the cyclone and hopper.

HELPFUL HINTS FOR USING YOUR HYDROEXCAVATION UNIT

WATER LEVEL INDICATORS:

It is important to pay attention to the amount of water remaining in the fresh water tanks when using the hose reel. There are two ways of determining the amount of water remaining:

1. The sight level tube located on the water tanks which shows water level in both tanks.
2. Low water warning light on the operators panel.

COLD WEATHER STORAGE:

The following procedure is required to prevent damage to the water pump and water system during cold weather conditions.

1. Open the drain in the water tank cross-over line, under truck chassis, behind the rear axle. Leave the drain cap off until the machine is ready to be used.
2. Drain water from tanks by tipping the tank slightly. Once the water is removed, lower the tank.
3. Remove the suction line filter, gasket and cover.
4. Turn the 3 way ball valve at rear reel water manifold to the "Hose Reel" position.
5. Engage water pump in accordance with normal procedure and run pump approximately 15 seconds.
6. Apply 75 to 100 PSI of air pressure, from an external source, to the air valve on the water pump to force the water from the water pump and hose reel. Do this until a solid stream of water no longer comes out of hose.
7. Tie or wire the sewer cleaning hose end securely to reel and rotate clock-wise as if retrieving the hose from sewer. Make certain the nozzle is removed. Rotate until water no longer comes out.
8. Open valve for handgun and push ball on male quick connect.
9. If equipped with cold weather recirculation option, open the ball valve to drain the water from the return line. Leave this valve open until ready to use again.

Caution! **The implementation of this procedure must be performed immediately after hydro excavating operation or cold weather recirculation operation.**

Caution! **If general circumstances lead to the interruption of the procedure and there is a presumption of ice formation in the system, move to the unit to a heated garage immeadiately, let thaw out, and then proceed with the above steps.**

SERVICE

CUSTOMER SERVICE AND PARTS ORDERS:

Hi-Vac Corporation is committed to customer satisfaction. In addition to our Authorized Dealer network throughout the world, we maintain a full stock of parts and accessories at our factory in Marietta, Ohio. In the event you need parts or service, first call your nearest Authorized Dealer. Their name and number should be shown on the unit information sheet located at the front of this manual.

To assure prompt delivery and processing of your parts orders, please have the following information available, when you place your order:

1. Type and serial numbers for the unit and chassis. This information is also located on the Identification Sheet.
2. The part number(s) of the required items, along with the quantity desired.
3. SHIPPING INSTRUCTIONS, whether your parts are to be shipped next day air, second day air, truck, ocean freight, etc. When left unspecified, orders are shipped UPS, or truck freight if necessary due to weight restrictions. We must have your street address: we cannot ship to P.O. Box numbers.
4. When placing orders - FIRST: Contact your nearest Authorized Hi-Vac Dealer. If they are unable to assist you, contact the Parts or Customer Service Departments at Hi-Vac:
   Phone: **740-374-2306**

Every effort is made to ship all in-stock parts on the same day the order is received, when the order is placed before noon, Eastern Time. Orders received after noon are shipped the next business day.

SALES TERMS:

The descriptions and instructions included in this manual cover the standard design of the equipment and any common deviations when possible. This manual does not cover all design details and variations nor does it provide for every possible contingency which may be encountered.

When information cannot be found in this manual, contact your nearest Aquatech, Inc. Parts and Service Center, or phone the Hi-Vac Service Department.

All specifications given have been calculated at sea level. All designs and specifications are subject to change without notice.

No material returns will be accepted unless accompanied by our **Material Return Authorization form**. A restocking charge of 20% applies to all Return Goods. Minimum billing of $100.00 applies to all orders.

CLAIMS PROCEDURE:

Warranty claims against the Company shall be made by the delivering dealer in accordance with the terms set forth in the “Warranty Request Claim” policy statement as set forth at the latest effective date.

All parts are supplied F.O.B. by the factory in Marietta, Ohio. No freight allowances are made. No travel time allowances are made. The purchaser shall agree to these terms by virtue of acceptance of the machine or purchased part.

REPLACEMENT PART WARRANTY:

Parts replaced during the warranty period will be warranted only during the term of the original warranty. No extension of warranty is made by installation of the new part.

Replacement parts purchased after the warranty period will carry a thirty (30) day warranty against defects in material or workmanship, or whatever warranty shall be offered and be enforceable upon the original manufacturer, whichever is longer. Labor costs incurred to replace defective parts are specifically excluded from this warranty.

The purchaser shall be responsible for payment of the replacement part until such time as the original manufacturer shall offer warranty replacement to the Company, at which time credit will be issued to the purchaser. **All such defective parts must be returned to the factory, freight pre-paid, for evaluation and determination of warranty by the original manufacturer.** Requests for return will be made at the discretion of the Company. No part shall have been previously disassembled or tampered with in any way so as to void the manufacturer’s warranty.

The Company’s sole responsibility under these terms shall be the timely return of the defective part to the original manufacturer for warranty consideration, and for such reasonable follow-up action as may be necessary to expedite the claim. The original manufacturer’s decision shall be final and binding on both purchaser and the Company.

LIMITED WARRANTY

Hi-Vac® Corporation (the "Company") hereby warrants to that each new X-VAC® Hydro Excavator (the "Unit") will be free of defects in material and workmanship. This Limited Warranty applies to the original end user and any transferee during the applicable time period, subject to the following terms and conditions:

1. Time Periods:
   - The "Standard Warranty Period" is 12 months from date of delivery to the original end user or 2,000 operating hours, whichever occurs first. Any Unit which has been used as a demonstration unit will, upon sale and delivery to the end user, have the same Limited Warranty as provided for herein.
   - Special Extended Warranties and Extended Time Periods:
     (a) Poly-graphite Tanks Warranty: 10 years against any factory defect in material or workmanship and LIFETIME against leakage from corrosion or rust through.
     (b) Debris Tanks Warranty: 10 years against any factory defect in material and LIFETIME against leaks due to corrosion or rust through.
     (c) Water Pump Warranty: 5 years against water pump failure and/or factory defect in material or workmanship.
     (d) Drive System: 5 years against drive system failure and/or any factory defect in material or workmanship. The Drive System warranty is non-transferrable

2. Exclusive Remedy: The exclusive remedy for any covered warranty claims is that Company shall repair or replace, or in lieu thereof may refund the purchase price, at is sole discretion, such defects of such Unit that the Company's examination discloses to be defective in material or factory workmanship, at Company's sole discretion. Any repairs or replacements are to be made at a location approved by Company (i.e. a selling distributor's location or the Company's facility) to assure the Unit performs according to its published specifications.

3 The Following Limitations Apply:
   (a) This Limited Warranty applies only to the original end user during the applicable warranty time periods.
   (b) Only a Unit which has been subjected to normal use and preventative maintenance per original Manufacturer recommendations contained in the Operator's Manuel delivered with the Unit is covered by this Limited Warranty.
   (c) This Limited Warranty shall not apply to (and the Company shall not be responsible for) any of the following:
      - items or parts of the Unit that are subject to misuse, negligence, accident or improper maintenance by end user.
      - normal maintenance and service adjustments, including, but not limited to engine valve adjustments, fuel, air and hydraulic system cleaning, engine tune-up, clutch inspection and adjustment, etc.
      - standard consumables and preventative maintenance items or normal wear parts such as, but not limited to: oils, fluids, lubricants, hoses, gaskets, fuses, light bulbs, tires, batteries, belts, etc.
      - operation of the Unit in a manner or for a purpose not specifically recommended in writing by the Company.
      - repairs, modifications or alterations without the express written consent of the Company, which in the Company's sole judgment, have adversely affected the Unit's operation, stability, or functionality as originally designed and manufactured by Company.
   (d) The Unit and supporting equipment may incorporate many component parts manufactured by companies other than Manufacturer; including, but not limited to the following: the truck chassis, engines, compressors, water pump, exhauster/vacuum pump, high pressure water hose, hydraulic pumps, motors and valves, batteries, drive belts, power take-off, axels, tires, electrical components and other specialized equipment. This Limited Warranty does not apply to such component parts or sub-systems. For equipment and components mentioned in this section, the end user will address warranty service and support direct with the original manufacturer or nearest authorized servicing distributor for such component parts or sub-systems. While this Limited Warranty does not cover component parts and sub-systems manufactured by third parties, Company shall pass-through to end user any warranties (if any) from such component or sub-system manufacturer to the extent permitted and simply as a matter of customer service shall make good faith efforts to provide any relevant information or reasonable assistance to end user/purchaser related to contacting such third party vendors regarding their warranties.
   (e) Any repair or replacement made to replace any defects in material or workmanship of the Unit is warranted solely for the duration of the unexpired Warranty Period. No extension of warranty is made by installation of the new part.
   (f) Company reserves the right to request the return of failed or defective parts or components to Company's factory origin for evaluation subject to Company's return authorization process and procedure.
   (g) Company will not be responsible or liable for defects, losses, damages or failures caused by end user's (or any third party's) unauthorized alternations, use of non-approved parts, unreasonable use, neglect, abuse, accident, negligent repair or failure to perform proper maintenance.
   (h) It is the responsibility of the end user to report warranty claims in a timely manner. Damages resulting from failure to report such claims promptly are not covered under this warranty.
   (i) The term "LIFETIME" means and applies to the original end user only and covers only the original end user's ownership period.

4. No Other Warranties. There are no other warranties made by company with respect to the Units, expressed or implied, other than the limited warranty as set forth above. This limited warranty supersedes any other warranty, promises or representations previously made or issued by company. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND COMPANY HEREBY EXCLUDES ALL SUCH WARRANTIES WHICH MIGHT OTHERWISE BE IMPLIED BY LAW, ALL OF WHICH ARE HEREBY DISCLAIMED. The Company makes no representation that the Unit has the capacity to perform any functions other than as contained in the Company's written literature, specifications or Owner's Manual accompanying delivery of the Unit. No person, affiliated company or distributor of Company's products, is authorized to alter the terms of this warranty, to give any other warranties or to assume any other liability on behalf of the Company in connection with the sale, servicing or repair of any Unit manufactured by the Company.

5. Design Changes/Product Improvements. The Company reserves the right to make design changes or improvements in its products from time to time without any obligation to change or improve any previously manufactured Units.

6. Limitation of Liability. Company's liability for breach of this Limited Warranty, whether a claim or lawsuit is brought in contract, tort, or strict liability, will be limited exclusively to repair or replacement of defects covered by the terms of this Limited Warranty. Company will not be liable for any direct or indirect, incidental, consequential, special or punitive damages of any kind which may result from defects in its Units, products, services, or from breach of this Limited Warranty, nor will Company be liable for any damages resulting from the end user's loss of use of the Unit and/or its supporting equipment.

GENERAL MAINTENANCE SCHEDULE

(DAILY)

1. Inspect all high pressure water lines and hydro excavation hose for cuts and/or leaks.
2. Inspect all oil lines and connections for cuts and/or leaks.
3. Inspect all valves, linkages, and controls for operation and position.
4. Inspect nozzles for excessive wear or obstructed orifices.
5. Inspect water pump suction line strainer, clean if necessary.
6. Remove and inspect blower filter and clean housing.

(WEEKLY)

1. Inspect water pump and exhauster for loose mounting bolts and proper alignment.
2. Inspect drive train and PTO shafts, universal joints, and bearings.
3. Inspect hydraulic system filter and clean or replace if necessary.

(BI-WEEKLY)

1. Inspect water pump for excessive or abnormal wear. Remove any foreign material, dirt or rust.

(EVERY 6 MONTHS)

1. Inspect the valves and springs in the water pump.
2. Inspect PTO and drive shafts for loose and/or worn belts and bearings.
3. Inspect the exhaust system for leaks or heating problems.

TROUBLESHOOTING COMMON PROBLEMS

The following is a list of possible problems which may be encountered during the life of this machine. Probable causes are listed in this section together with recommended solutions to these problems. If the resolution of these problems or any other problems are not readily apparent, contact your local authorized X-Vac dealer.

CONDITION: LOSS OF WATER PRESSURE	
PROBABLE CAUSES	**REMEDIES**
Worn nozzle orifices.	Replace orifice or nozzle.
Wrong nozzle.	Change to correct nozzle.
Inadequate engine speed.	Adjust throttle cable and consult engine manual. Check for correct gear.
Gate valve in suction line partly closed.	Open valve.
Leaks in the high pressure water system.	Locate and eliminate as required.
Water control valve leakage bypassing or recirculating water back to the water tank.	Clean, or replace seals.
Relief valve leaks or otherwise malfunctions.	Replace. Note: Valves are set at the factory and adjustment by inexperienced people could result in damage to equipment or possible injury to personnel.
Pump starved for water.	Clean suction line and hose of obstructions, replace suction hose if it leaks or is collapsed. Clean suction line strainer. Open gate valve.
Transmission slipping.	Adjust, consult chassis manual, check automatic transmission fluid level.
Gauge is inaccurate.	Replace gauge.
Worn valves or valve components.	Replace components as required.
CONDITION: WATER PRESSURE TOO HIGH	
PROBABLE CAUSES	**REMEDIES**
Clogged nozzle.	Clean jets.
Incorrect nozzle.	Replace with correct nozzle.
Incorrect gear.	Shift to proper gear.
Overspeeding engine.	Reduce speed.
CONDITION: HAMMERING NOISE IN WATER PUMP	
PROBABLE CAUSES	**REMEDIES**
Pump starved for water.	Clean suction line and hose obstructions, replace suction hose if it leaks or is collapsed. Clean suction line strainer. Open gate valve.
Valve stuck open with debris.	Disassemble and remove debris.
Worn valves or seals.	Inspect and replace as required.
Low oil level in water pump.	Check oil level and fill to proper level. If pump has been operating with inadequate lubrication, inspect bearings.
Air in pump.	Bleed off air through blowout valves. Remove nozzle from hose, pump water through until it flows at a smooth steady stream.

TROUBLESHOOTING COMMON PROBLEMS

The following is a list of possible problems which may be encountered during the life of this machine. Probable causes are listed in this section together with recommended solutions to these problems. If the resolution of these problems or any other problems are not readily apparent, contact your local authorized X-Vac dealer.

CONDITION: LOSS OF VACUUM	
PROBABLE CAUSES	**REMEDIES**
Debris tank is full and check ball is closed.	Drain or recycle water in debris tank. Dump debris tank.
Boom turret plugged.	Remove turret and clear blockage.
Vacuum system leak.	Inspect vacuum system for leaks, normally a high pitched sound is heard. Some areas to check first are: Rear door seal, tank closure seal, intake tube O-rings, portal gasket. Check to see that gate valves are closed, such as rear drain, and valves on the recycling system.
Blockage in the intake hose.	Disengage exhauster pump and evacuate the vacuum from the tank. Inspect intake tubes. Remove the primary check valve cover and inspect the ball check. Lower the boom all the way to allow material to drop out through the hose. Pressure discharge through boom hose.
Inadequate engine speed.	Check engine tachometer, adjust throttle cable, consult engine manual. Check for correct gear.
Loose exhauster pump drive belt.	Tighten.
Faulty vacuum reading.	Replace gauge.
Exhauster pump malfunction.	Consult exhauster pump manual.
Sticking vacuum relief valves.	Check to determine if they open at 15” Hg., Clean/lubricate/replace if necessary.

TROUBLESHOOTING COMMON PROBLEMS

The following is a list of possible problems which may be encountered during the life of this machine. Probable causes are listed in this section together with recommended solutions to these problems. If the resolution of these problems or any other problems are not readily apparent, contact your local authorized X-Vac dealer.

ELECTRICAL SYSTEM

IMPORTANT!

Do not attempt to remedy any electrical problems without first examining the schematic wiring diagram and control wiring circuit drawing (see Electrical Section). Check truck chassis battery and cell condition. Use proper instrumentation for current and continuity test results.

(A) Continuity- Use OHM scale recorder or battery powered continuity test light.

(B) Current- The circuit must be opened to obtain current reading with the volt- meter; therefore, it is more convenient to use a 12 VDC test light.

CONDITION	PROBABLE CAUSES	REMEDIES
NO POWER	Ignition/unit power switch not “on”.	Turn ignition/unit power switch “on”.
BOOM VALVE NOT WORKING	Faulty solenoid valve.	Check for voltage at solenoid. Replace.
FUSE BLOWN (#1 TERMINAL BLOCK, #2 AMP REPLACEMENT).	1. Frayed or broken harness wire. 2. Short circuit in solenoid(s) wiring connection. 3. Switch terminal arcing within housing.	1. Repair or replace. 2. Check for pinched or bare wire connections. 3. Secure terminal to post connections on switch.
PTO WON’T RE-ENGAGE DRIVE AXLE.	Switches turned off in wrong sequence.	Unit power must be last switch turned off.
PTO DOES NOT DISENGAGE DRIVE AXLE.	Faulty solenoid valve	Check for voltage at solenoid. Replace
PENDANT BOOM SWITCHES FUNCTION ERRATICALLY.	1. Push button, switch terminals loose or disconnected. 2. Push button switch contacts burned or disconnected. 3. Water in pendant	1. Tighten or reconnect. 2. Replace switch unit. 3. Dry out pendant control and seal leaks.
FLAPPER VALVE INTAKE CYLINDER ON BOOM INOPERATIVE.	1. Pneumatic valve solenoid coil burned out. 2. Valve spool stuck or unsealed. 3. Wiring from valve to control box broken or disconnected.	1. Test and replace if neces-sary. 2. Disassemble, clean, or replace. 3. Repair and replace.

PTO Troubleshooting Guide
OMSI PFT-PC4/3000

Caution! PTO contains moving parts.

PROBLEM	CAUSE	CORRECTION
PTO will not shift to pump mode.	Low air pressure, 100 to 120 is normal operating pressure.	Check for air leaks, check air compressor operation.
	Moisture build-up in the chassis air tanks.	Drain moisture from the system. Add auto drain system.
	Air leak in the system.	Replace leaking hoses, tubing, piping, and fittings.
	Air solenoid valve not shifting.	Check the electrical system and the air system. Red light will illuminate on actuated valve spool.
	Automatic transmissions hold a slight amount of torque on the system, even in neutral.	Move unit forward or backward and attempt shifting again.
	Defective seals in the main input shaft control area.	Contact an authorized service person.
	Detent ball on shifting stem jammed or defective.	Contact an authorized service person.
Water pump will not engage.	Low air pressure, 100 to 120 is normal operating pressure.	Check for air leaks, check air compressor operation.
	Air leak in the system.	Replace leaking hoses, tubing, piping, and fittings.
	Air solenoid valve not shifting.	Check the electrical system and the air system. Test the manual override system on air valves.
	Leaking, defective, worn clutch pack assembly.	Contact an authorized service person.
	Drive line shaft problem, sheared key way, broken belt.	Contact an authorized service person.
Water pump will not stay engaged.	Air leak in the system.	Replace leaking hoses, tubing, piping, and fittings.
	Worn or defective seals in the clutch pack.	Contact an authorized service person.

PTO Troubleshooting Guide
OMSI PFT-PC4/3000

Caution! PTO contains moving parts.

PROBLEM	CAUSE	CORRECTION
Vacuum pump will not engage.	Low air pressure, 100 to 120 is normal operating pressure.	Check for air leaks, check air compressor operation.
	Air leak in the system.	Replace leaking hoses, tubing, piping, and fittings.
	Air solenoid valve not shifting.	Check the electrical system and the air system. Test the manual override system on air valves.
	Leaking, defective, worn clutch pack assembly.	Contact an authorized service person.
	Drive line shaft problem, sheared key way, broken belt.	Contact an authorized service person.
Vacuum pump will not stay engaged.	Air leak in the system.	Replace leaking hoses, tubing, piping, and fittings.
	Worn or defective seals in the clutch pack.	Contact an authorized service person.
Engine stalls when engaging PTO.	Emergency stops engaged or pushed in.	Check emergency stops located in the side and rear system control panels.
	PTO did not disengage from road mode.	Re-shift PTO.
PTO leaking oil out of case breather	PTO is over filled with ATF fluid.	Check fluid level using gauge stick.
	PTO fluid level too high.	Auxiliary hydraulic pump. Check front seal in hydraulic pump, possible
	Air pressure coming out of PTO case.	dumping of fluid into case.
		Seals leaking or defective in the input shaft control housing, item #17. Replace seal, Pos. #10, 11, 14.
PTO leaking oil, shaft seal areas.	Case breather vent is plugged.	Breather vent is set for 7# max. Check ball could be corroded or jammed. Note: You cannot blow 7#s by mouth.
	Cracked, worn or defective seal.	Contact an authorized service person.

PTO Troubleshooting Guide
OMSI PFT-PC4/3000

Caution! PTO contains moving parts.

PROBLEM	CAUSE	CORRECTION
Excessive vibration.	Loose mounting bolts. Worn rubber vibration isolators. Check input/output flange bolts. Check water pump and vacuum pump drive flange bolts. Check water pump and vacuum pump drive belts, drive sprockets, and bearings.	Check & tighten all mounting bolts. Check & replace if needed the four rubber isolators. Check & tighten all mounting bolts. Check & tighten all mounting bolts. Replace frayed, worn belts.
Excessive vibration and drive line chatter at low idle speed.	Check engine programming parameters.	Radiator cooling fan should always be in locked up mode when unit is in PTO enable mode.
PTO overheating.	Fluid level too low. Worn or defective bearing. Worn clutch discs. Clutch packs dragging.	Check and add fluid to recommended level. Contact an authorized service person. Contact an authorized service person. Defective vacuum pump or water pump solenoids.

Alloy Cap Screws 1018 ft. lbs.

CAP SCREW DIAMETER	YIELD STRENGTH PSI MIN.	RECOMMENDED TORQUE	
		UNC	UNF
¼	58000	11	13
5/16	58000	21	23
3/8	58000	38	40
7/16	58000	55	60
½	58000	85	95
9/16	55000	125	140
5/18	55000	175	210
¾	55000	300	330
7/8	55000	450	490
1	50000	680	715
1-1/8	50000	885	990
1-1/4	40000	1255	1380
1-3/8	40000	1635	1875
1-1/2	40000	2180	2430

Heat Treated 1038 Hexagon Head Cap Screws, SAE Grade 5 ft. lbs.

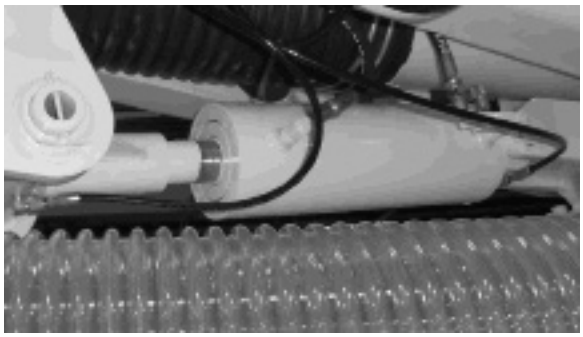
CAP SCREW DIAMETER	YIELD STRENGTH PSI MIN.	TENSILE STRENGTH PSI MIN.	RECOMMENDED TORQUE	
			UNC	UNF
¼	**90000**	**120000**	**11**	**13**
5/16	**90000**	**120000**	**21**	**23**
3/8	**90000**	**120000**	**38**	**40**
7/16	**90000**	**120000**	**55**	**60**
½	**90000**	**120000**	**85**	**95**
9/16	**90000**	**120000**	**125**	**140**
5/8	**90000**	**120000**	**175**	**210**
¾	**90000**	**120000**	**300**	**330**
7/8	**81000**	**115000**	**450**	**490**
1	**77000**	**115000**	**680**	**715**
1-1/8	**77000**	**105000**	**885**	**990**
1-1//4	**77000**	**105000**	**1255**	**1380**
1-3/8	**77000**	**105000**	**1635**	**1875**
1-1/2	**77000**	**105000**	**2180**	**2430**

Alloy Hexagon Head Cap Screws, SAE Grade 8 ft. lbs.

CAP SCREW DIAMETER	YIELD STRENGTH PSI MIN.	TENSILE STRENGTH PSI MIN.	RECOMMENDED TORQUE	
			UNC	UNF
¼	**130000**	**150000**	**12**	**15**
5/16	**130000**	**150000**	**25**	**30**
3/8	**130000**	**150000**	**50**	**60**
7/16	**130000**	**150000**	**85**	**95**
½	**130000**	**150000**	**125**	**140**
9/16	**130000**	**150000**	**175**	**195**
5/8	**130000**	**150000**	**245**	**270**
¾	**130000**	**150000**	**425**	**460**
7/8	**130000**	**150000**	**660**	**700**
1	**130000**	**150000**	**990**	**1050**
1-1/8	**130000**	**150000**	**1470**	**1655**
1-1//4	**130000**	**150000**	**2100**	**2310**
1-3/8	**130000**	**150000**	**2750**	**3110**
1-1/2	**130000**	**150000**	**3640**	**4100**

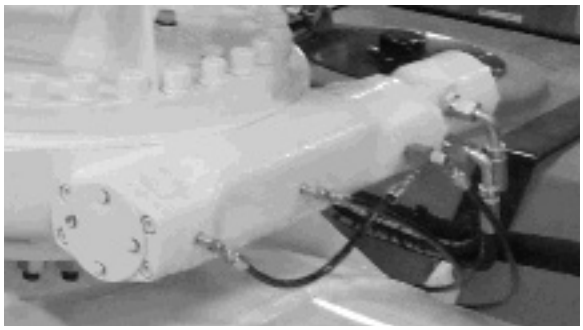
X-VAC (w/SLEW DRIVE) LUBRICATION POINTS

Note: For item descriptions and lubrication intervals, refer to the "**X-Vac Standard Unit Lubrication Points Intervals**" located within the "**Service**" section of this manual.

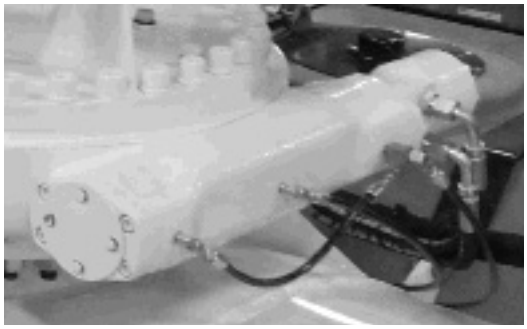


1&2 - BOOM LIFT CYLINDER

3-4 - BOOM PIVOT

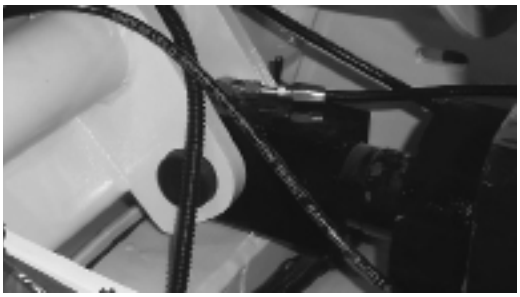


5- SCREW WORM



6 - SCREW BEARINGS

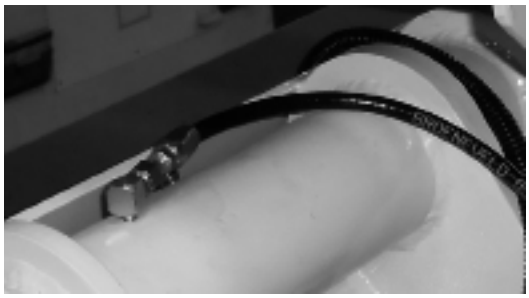
7&8 - BOOM TUBE EXTENSIONS



9 - REAR DOOR CYLINDER

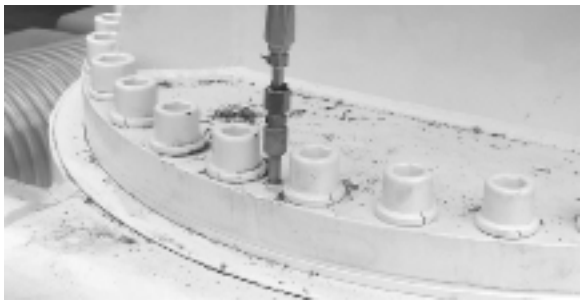
X-VAC (w/SLEW DRIVE) LUBRICATION POINTS

Note: For item descriptions and lubrication intervals, refer to the "**X-Vac Standard Unit Lubrication Points Intervals**" located within the "**Service**" section of this manual.

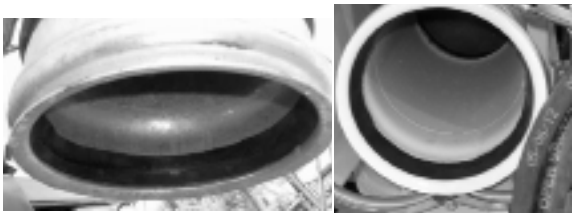


10&11 - REAR DOOR PIVOT

12 - REAR DOOR BLOCK

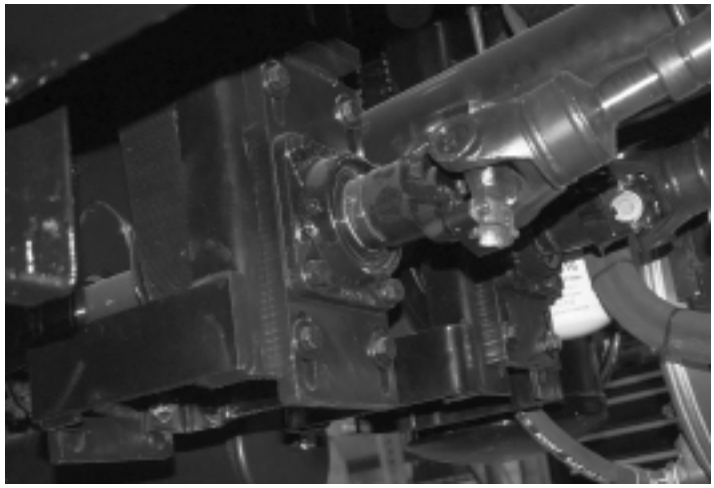


13 - SLEW RING



14 - VACUUM TUBE O-RINGS

15- TIPPING CYLINDER PINS

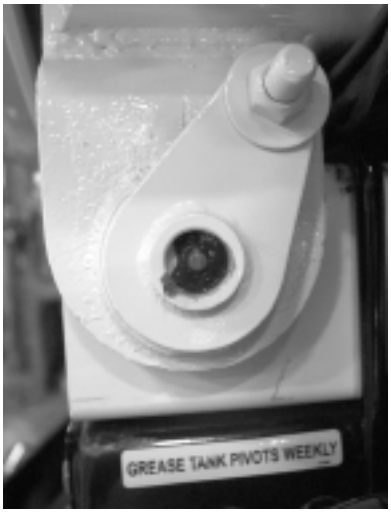


16 - VACUUM & WATER PUMP DRIVE LEG BEARINGS
17 - VACUUM & WATER PUMP JACK SHAFTS

X-VAC (w/SLEW DRIVE) LUBRICATION POINTS

Note: For item descriptions and lubrication intervals, refer to the "**X-Vac Standard Unit Lubrication Points Intervals**" located within the "**Service**" section of this manual.

18 - HOSE REEL SWIVEL



19 - DEBRIS TANK PIVOT PINS

20 - REAR DOOR LOCK WEDGE

X-SERIES UNIT (with SLEW DRIVE) LUBRICATION POINTS INTERVALS						
Item #	Item Description	# Points	Inspect	Interval	Qty.	Lubricant
1&2	BOOM LIFT CYLINDER	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
3&4	BOOM PIVOT	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
5	SCREW WORM	1	REFER TO SLEW DRIVE MANUAL LOCATED IN THE "BODY" SECTION OF THIS OPERATIONS MANUAL			
6	SCREW BEARINGS	2	REFER TO SLEW DRIVE MANUAL LOCATED IN THE "BODY" SECTION OF THIS OPERATIONS MANUAL			
7&8	BOOM EXTENSION	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
9	REAR DOOR CYLINDER	1	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
10&11	REAR DOOR PIVOT	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
12	REAR DOOR BLOCK	1	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
13	SLEW RING	1	REFER TO SLEW DRIVE MANUAL LOCATED IN THE "BODY" SECTION OF THIS OPERATIONS MANUAL			
14	VACUUM TUBE O-RINGS (AQUATECH STYLE TUBE)	1	MONTHLY	WEEKLY	COAT LIGHTLY	LITHIUM #2 SHORT FIBER
15	TIPPING CYLINDER PINS	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
16	VACUUM & WATER PUMP DRIVE LEG BEARINGS	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
17	VACUUM & WATER PUMP JACK SHAFTS	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
18	HOSE REEL SWIVEL	1	CHECK MANUFACTURER'S RECOMMENDATION. MANUAL LOCATED IN "WATER" SECTION OF THIS MANUAL.			
19	DEBRIS TANK PIVOT PINS	2	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER
20	REAR DOOR LOCK WEDGES	4	MONTHLY	100 HOURS	1-2 SHOTS	LITHIUM #2 SHORT FIBER

REMOTE PLUMB GREASE FITTING KIT (OPTIONAL)
PART #A381531-1

REFER TO SCHEMATIC (IF OPTION INCLUDED) ON NEXT PAGE FOR LOCATIONS AND TO CHART ON PREVIOUS PAGE FOR INTERVALS.

X-VAC® HYDRO EXCAVATOR
A Product of Hi-Vac® Corporation

X-VAC (X-8) STANDARD UNIT WATER PUMP, EXHAUSTER, PTO, and HYDRAULIC SYSTEM LUBRICATION INTERVALS

HI-VAC® CORPORATION

LUBRICATION CHART

Revised3/1/2019

ITEM	CAPACITY	OIL RECOMMENDATION	AMBIENT TEMP.	INTERVAL
Aquatech Water Pump Gear Reduction Boxes **	2.5 Quarts	SAE 90 EP		
Aquatech "Fab" Water Pump model 012 **	no record	SAE 60 EP	Winter	1000 hrs
		SAE 90 EP	Summer	
Cummins A1700 37hp	5 Quarts	SAE 5W-30 - API Spec CH4 & up….. SAE 10W30 - API Spec CH4 & up….. SAE 15W40 - API Spec CH4 & up…..	Below 20°F -25°F to 20°F Above -10°F	500 hrs or 6 mo. ¤
Cummins A2300 50hp	7.5 Quarts			
Cummins B3.3 65hp & 85hp	8 qts. (9 w/turbo)			
Cummins B3.9 116hp & 125hp	?			
Cummins B5.9 160hp	?			
Gaso 3364 Series Water Pumps **	2 Gallons	ISO VG100 EP3 Non-Corrosive	Below 32°F (0°C)	2000 hrs
		ISO VG220 EP5 Non-Corrosive	Above 32°F (0°C)	or 6 mo. ¤
General PN3 Regulating Valve	15.2 Ounces	ISO VG46	All	
General PN4 Regulating Valve	8.5 Ounces			
General HF Series Water Pumps - Crankcase	2.13 Quarts	ISO VG220 R&O	32° to 113°F	1000 hrs or 12 mo. ¤
General MH Series Water Pumps - Crankcase	14.8 Quarts			
General MK Series Water Pumps - Crankcase	14.25 Quarts			
General MWR Series Water Pumps - Crankcase	9.5 Qaurts			
General KL Series Water Pumps - Crankcase	3.75 Quarts			500 hrs or 12 mo. ¤
General MS Series Water Pumps - Crankcase	10.57 Quarts			
General MS Series Water Pumps - Packings	1 squirt each zerk	A111370 (3oz. tube) Grease A111372 (12oz. tube)	All	500 hrs or 12 mo. ¤
General EZ Series Water Pumps – Crankcase	14 oz.	ISO VG100 (SAE30 ND)		
Giant Water Pumps – GP & LP Series	see manual	80W90		
Giant Water Pumps – P200, P300 & P400 series	see manual	20W50 Synthetic (Giant p/n 01153)		
Hibon Blower model SIAV840 (vertical gears)	.52 Gal. Drive End .45 Gal. Non D. E.	Mobil SHC-630 (ISO VG220 Synthetic)	Winter & Summer	12 mo.
Hibon Blower model SIAV8702 (vertical gears)	.79 Gal. Drive End .59 Gal. Non D. E.			
Hibon Blower model TS56MV18	.5 Gal. Drive End 1.11 Gal. Gear End			
Hibon Blower models VTB810H & VTB820H (vert.)	1.23 pt. ea. end			
Hi-Vac Bag Shaker Motor Gear Reducer	8 oz.	Mobil SHC-634 (ISO 460 PAG)	-10°F to 120°F	Top Off
Hydraulic System (for all product lines)	see manual	AW46 (Formerly AW68 *)	All	
MD Pneumatic Blower **	see manual	ISO VG220 EP5		
Myers C Series Pumps **	2 Quarts	SAE 30 Gear Oil	All	300 hrs
Myers D Series Pumps **	see manual	Mobilgear 630 (ISO VG220 EP5)	All	300 hrs
OMSI Direct/Mechanical Driven Units	see manual	SAE 80W90 (Moderate Duty Cycle) SAE 75W90 GL-5EP (Heavy/Severe)	All	1000 hrs
OMSI PC4-3000 PowerClutch™ Driven Units	8 Quarts	Mobil Delvac No.1	All	500 hrs
Robuschi Blower **	see manual	ISO VG220 EP5		
Roots 624 Blower (vertical gears)	32 oz. Drive End 64 oz. Gear End	ISO 100 (AGMA 3EP)……..	Below 0°F (-18°C)	500 hrs
Roots 624 Blower (horizontal gears)	64 oz. Drive End 96 oz. Gear End	ISO 150 (AGMA 4EP)……. ISO 220 (AGMA 5EP)……..	0° to 32°F (-18° to 0°C) 32° to 90°F (0° to 32°C)	
Roots 824 Blower (vertical gears)	8 oz. Drive End 2 pt. Gear End	ISO 320 (AGMA 6EP)……..	Above 90°F (32°C)	
		Note: synthetic has been recommended since 2005		
Sutorbilt Blower	see manual	ISO VG220 EP5	0°C to 90°C	
Uraca KD716GS Water Pump	see manual	SAE 75W90 GL5 Synthetic	Above 80°C use Full Synthetic	12 Mo.
Uraca P3-45 Water Pump	see manual	ISO VG220 EP5 or SAE 85W90		
Uraca MSSV Safety & Unloading Valve	.5 L	ISO VG46	All	Keep Full
Uraca MSUV Safety & Unloading Valve	.51 L	ISO VG5		

* Was changed in 2009 to accommodate the use of the Pall filters. ** Used pre Hi-Vac ¤ Whichever occurs first

(VG) Viscosity Grade: a commercial rating of industrial lubricants. The grade numbers are approximately equal to the kinematic viscosity of the lubricant in centistokes. A table is provided showing the range of viscosities acceptable for each grade under the current standard of the International Organization for Standardization (ISO).

BOOM HOSE

BOOM HOSE MAINTENANCE AND CARE:

1. Excessive end pull or twisting can damage or weaken end construction.
2. Never drag large hoses. Dollies or a sling should be used during transfer.
3. Inspect hose regularly. Alight tap of a hammer will detect weak or soft areas badly worn from the inside.
4. Rotation of the hose distributes wear and maximizes service life. Different coloured axial paint strips at 90° or 180° near the hose ends will assist maintenance crew.

Note: The space of time elapsing between each rotation of the hose varies individually between different applications, depending on such factors as the type of material, flow rate, quantity of material handeled, etc. By measuring the wear in the hose on a number of occassions at identical intervaks, wear intensity can be determined and suitable times for rotation can be planned.

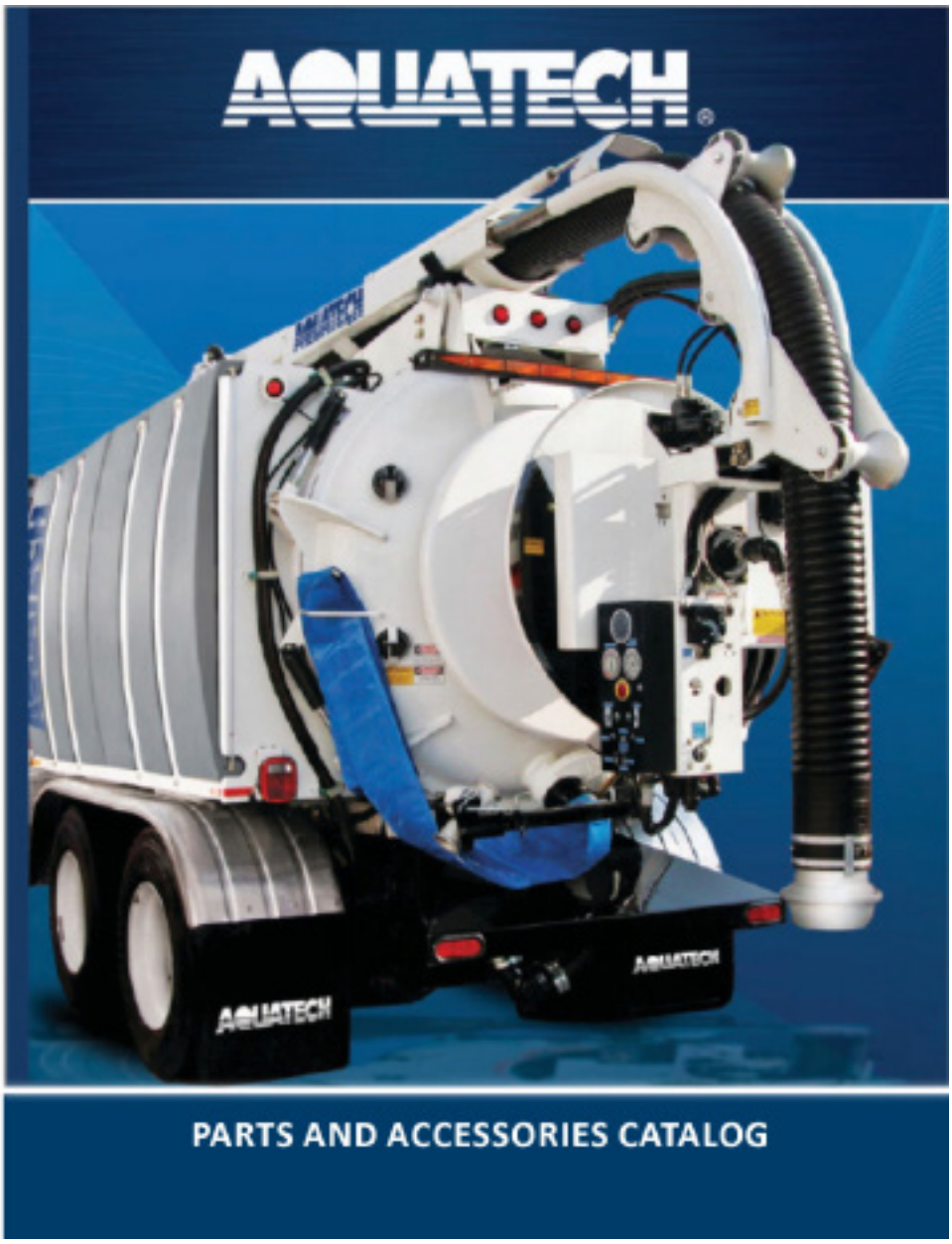
	FILTER	BREAK-IN FILTER CHANGE	1st YEAR	CHANGE INTERVAL AFTER THE FIRST YEAR	A381152-B10-S-KIT (Even Anniversary Kit)	A381152-B10-P-KIT (Odd Anniversary Kit)
	A110516 Hydraulic Spin-On	After the first 50 Hours	✓	Every Year (Even & Odd Anniversary)	✓	✓
	A110000-3 Hydraulic Reservoir	After the first 50 Hours	✓	Every Year (Even & Odd Anniversary)	✓	✓
	A383754-E Pall HP Element (to March 2018)	After the first 50 Hours	✓	Every Year (Even & Odd Anniversary) or when the change indicator light stays solidly on, whichever would occur first. NOTE: the light will flicker occasionally during normal operation.	✓	✓
	121005071 A Parker HP Element (Mar 2018 on)				Not available in a kit at this time.	
	A383767 Last Chance Hydraulic		✓	Every 2 Years (Odd Anniversary)		✓
	A383736-E Pneumatic Oil Separator		✓	Every 2 Years (Odd Anniversary)		✓
	A383737-E Pneumatic Water Separator		✓	Every 2 Years (Odd Anniversary)		✓

HYDRAUILC FILTER ASSEMBLY
PART #121004987

REPLACEMENT HYDRAUILC FILTER
PART # 121004989

THE HYDRAULIC FILTER ASSEMBLY ABOVE WAS INSTALLED ON THIS UNIT.

FILTER REPLACEMENT SCHEDULE			
ITEM DETAIL	**INSPECT**	**SCHEDULE**	**PART No.**
BLOWER INLET FILTER CARTRIDGE	**CHECK DAILY OR EACH TIME UNIT IS DUMPED**	**CLEAN AND REINSTALL, REPLACE IF DAMAGED**	**A383165-M849**



Catalog provided on Digital Copy.

SIDE OPERATOR'S PANEL

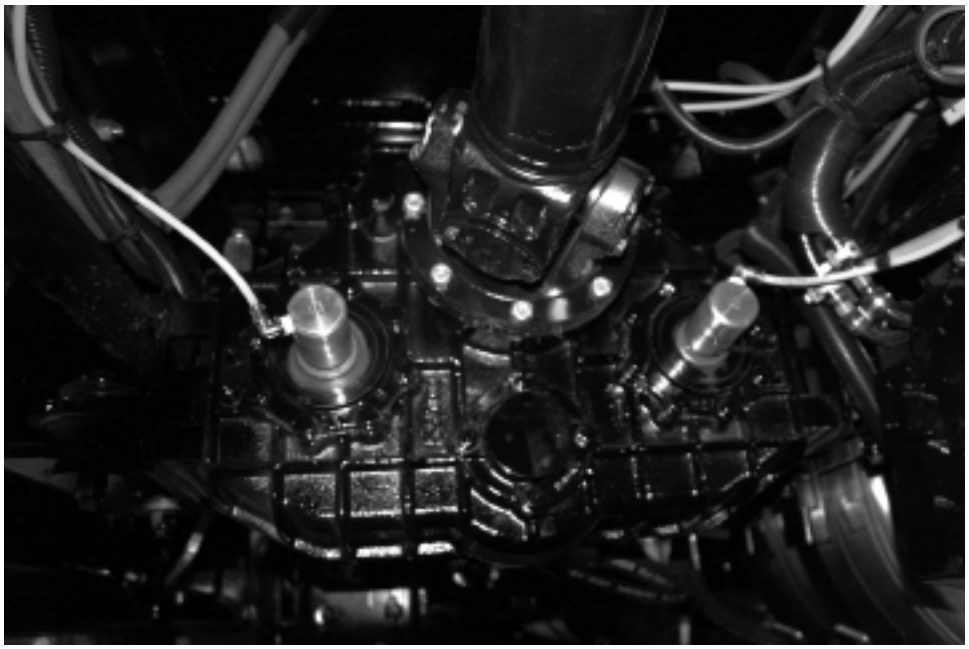
For electrical components on or in panel, refer to your included electrical schematic(s).

AARCOMM WIRELESS REMOTE
PART # 121001268

X-VAC® HYDRO EXCAVATOR
A Product of Hi-Vac® Corporation

POWER TAKE OFF

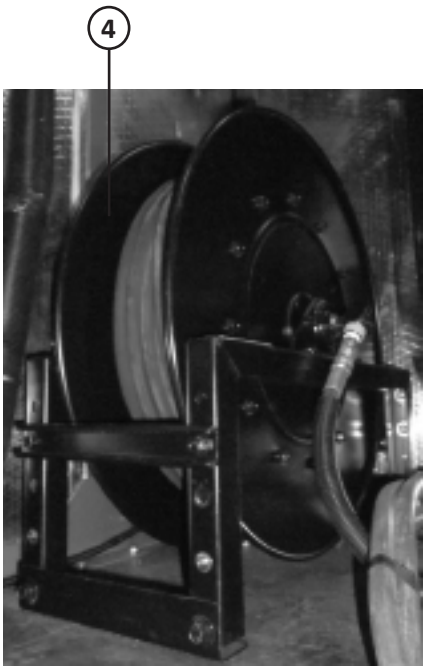
For 616 DVJ, 721 use PART # A164134-1
For 827 DVJ use PART # 121003728

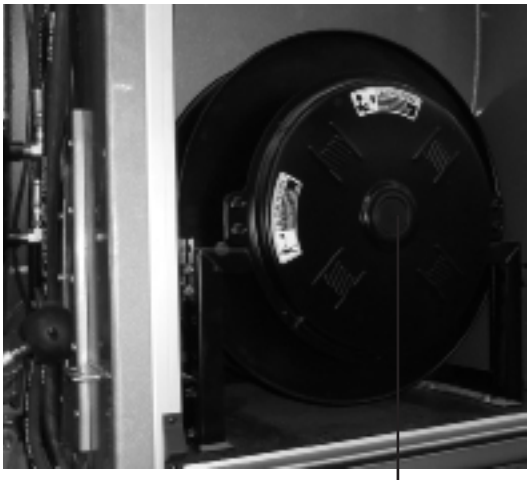


Water System

For water system components not specifically listed in the following section, refer to your included water system schematic(s).

WATER PUMP AREA





***Second Hose Reel located in rear locker optional.**

ITEM	PART #	DESCRIPTION	QTY
1	121002350	PUMP, WATER, 25 GPM	1
2	A131787	GAUGE,PRESSURE,0-5K PSI,BOTTOM CONNECT	1
3	121001627	UNLOADER VALVE-29GPM,3KSI	1
*4	A383075	HOSE REEL-SPRING REWIND,100’	2

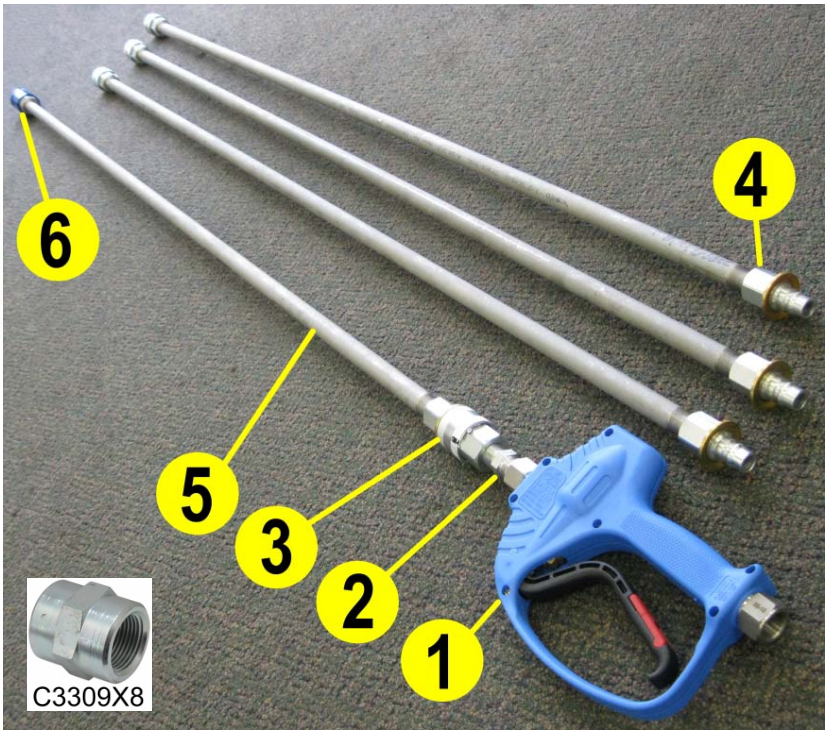
WATER HEATER (OPTIONAL)
PART # A381599-2

PART # A381599-2

PART # 300000600

VERTICAL HYDRO-EXCAVATION GUN & LANCES

Ergonomic vertical design minimizes arm fatigue – ideal for hydro-excavation. Gun has ½"FNPT inlet and outlet fittings.



ITEM	DESCRIPTION	PART NO.
1	Vertical Spray Gun – 32 GPM Max, 4000 PSI Max, 320°F Max	A255080
2	½"NPT Nipple (used to attach male & female couplers to gun)	A131830
3	½" Female Coupler with ½"FNPT threads	A383062
4	½" Male Coupler with ½"FNPT threads	A383063
5	½" NPT X 36" 304SS Lance	A255099
	½" NPT X 48" 304SS Lance	A255100
	½" NPT X 60" 304SS Lance	A255101
	½" NPT X 72" 304SS Lance	A255102
inset	½"NPT Coupler (use to join lances together if male & female couplers are not desired)	C3309X8

Spray Nozzle Options…

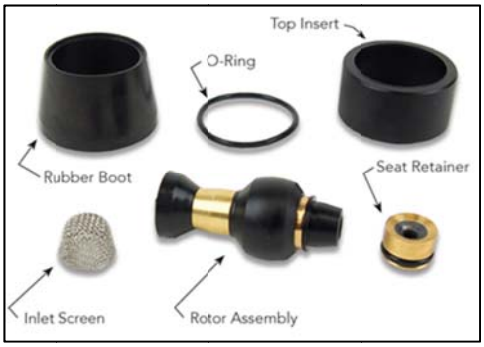
6	Adapter, ¼"FNPT X ½"FNPT for installing following tips	A255103
	Spray Tip, ¼"MNPT, #30 Orifice - Solid Stream Pattern	A249490
	Spray Tip, ¼"MNPT, #30 Orifice - 15° Delta Pattern	A249489-2
	Spray Tip, ¼"MNPT, #30 Orifice - 50° Delta Pattern	A249489-1
	Spray Tip, ¼"MNPT, #30 Orifice - 95° Delta Pattern	A249489

See separate flyers for other optional nozzle attachments.

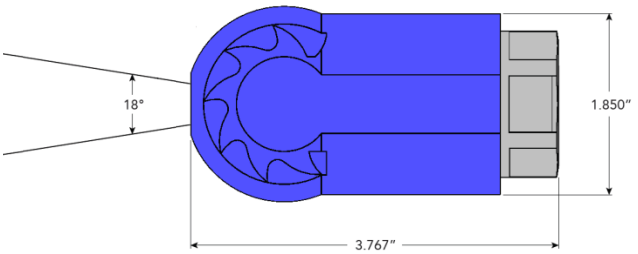
ROTATING HYDRO-EXCAVATION NOZZLE

SPECIFICATIONS

- Minimum Inlet Pressure: 1000 PSI (69 bar)
- Maximum Inlet Pressure: 3200 PSI (220 Bar)
- Maximum Water Temperature: 180°F (82°C)
- Housing Material: Stainless Steel
- Coating Material: Urethane
- Nozzle Tip Material: Tungsten Carbide
- Inlet Connection Thread: ½" FNPT



REPAIR KIT



DIMENSIONS

NOZZLE SIZE	NOZZLE PART NUMBER	REPAIR KIT PART NUMBER	FLOW RATE		
			@ 2000 PSI	@ 2500 PSI	@ 3000 PSI
3.0	A255200-3	A255200-3-RK	2.1 GPM	2.4 GPM	2.6 GPM
4.0	A255200-4	A255200-4-RK	2.8 GPM	3.2 GPM	3.5 GPM
5.0	A255200-5	A255200-5-RK	3.5 GPM	4.0 GPM	4.3 GPM
6.0	A255200-6	A255200-6-RK	4.2 GPM	4.7 GPM	5.2 GPM
8.0	A255200-8	A255200-8-RK	5.7 GPM	6.3 GPM	6.9 GPM
10.0	A255200-10	A255200-10-RK	7.1 GPM	7.9 GPM	8.7 GPM
12.0	A255200-12	A255200-12-RK	8.5 GPM	9.5 GPM	10.4 GPM

LINEAR HYDRO-EXCAVATION NOZZLE

SPECIFICATIONS:

- Maximum Inlet Pressure: 3200 PSI (220 Bar)
- Maximum Water Temperature: 180°F (82°C)
- Housing Material: Stainless Steel
- Coating Material: Urethane
- Nozzle Tip Material: Tungsten Carbide
- Nozzle Dimensions: 3.376”L x 3.390”W
- 1/2” NPT Inlet with 30 Mesh Screen
- Four 1/8” NPT Nozzle Pill Ports

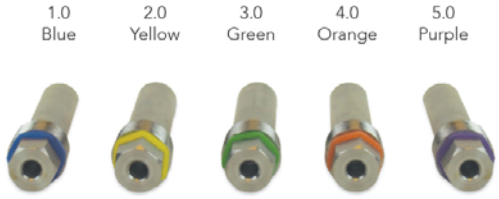
NOZZLE KITS

PART NUMBER	DESCRIPTION	NOZZLE FLOW RATE		
		@ 2000 PSI	@ 2500 PSI	@ 3000 PSI
A255201-7.2	A255201 Body with four A255201-2 Nozzle Pills	5.7 GPM	6.3 GPM	6.9 GPM
A255201-8.9	A255201 Body with two A255201-2 and two A255201-3 Nozzle Pills	7.1 GPM	7.9 GPM	8.7 GPM
A255201-12.5	A255201 Body with two A255201-3 and two A255201-4 Nozzle Pills	9.9 GPM	11.1 GPM	12.1 GPM

OR ASSEMBLE YOUR OWN CONFIGURATION

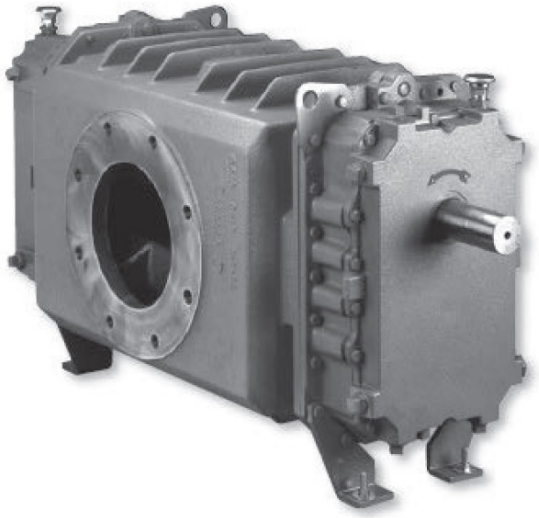
Start with the A255201 body and then select 4 nozzle pills or plugs. Total flow equals the sum of the flows of the individual nozzle pills.

PART NUMBER	DESCRIPTION	COLOR	PILL FLOW RATE		
			@ 2000 PSI	@ 2500 PSI	@ 3000 PSI
A255201-1	1.0 Nozzle Pill, 1/8”NPT	Blue	.7 GPM	.8 GPM	.9 GPM
A255201-2	2.0 Nozzle Pill, 1/8”NPT	Yellow	1.4 GPM	1.6 GPM	1.7 GPM
A255201-3	3.0 Nozzle Pill, 1/8”NPT	Green	2.1 GPM	2.4 GPM	2.6 GPM
A255201-4	4.0 Nozzle Pill, 1/8”NPT	Orange	2.8 GPM	3.2 GPM	3.5 GPM
A255201-5	5.0 Nozzle Pill, 1/8”NPT	Purple	3.5 GPM	4.0 GPM	4.3 GPM
A255201-PLUG	SST Plug	-	0	0	0

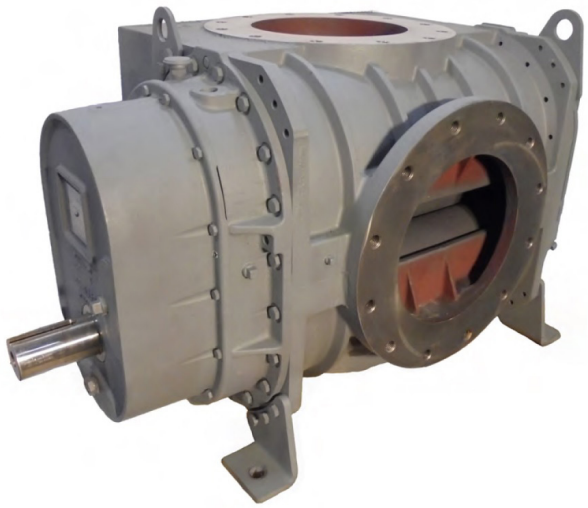


BLOWERS

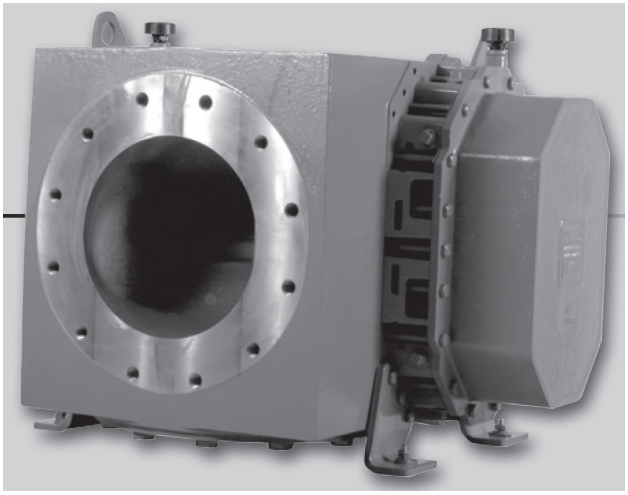
616-DVJ BLOWER



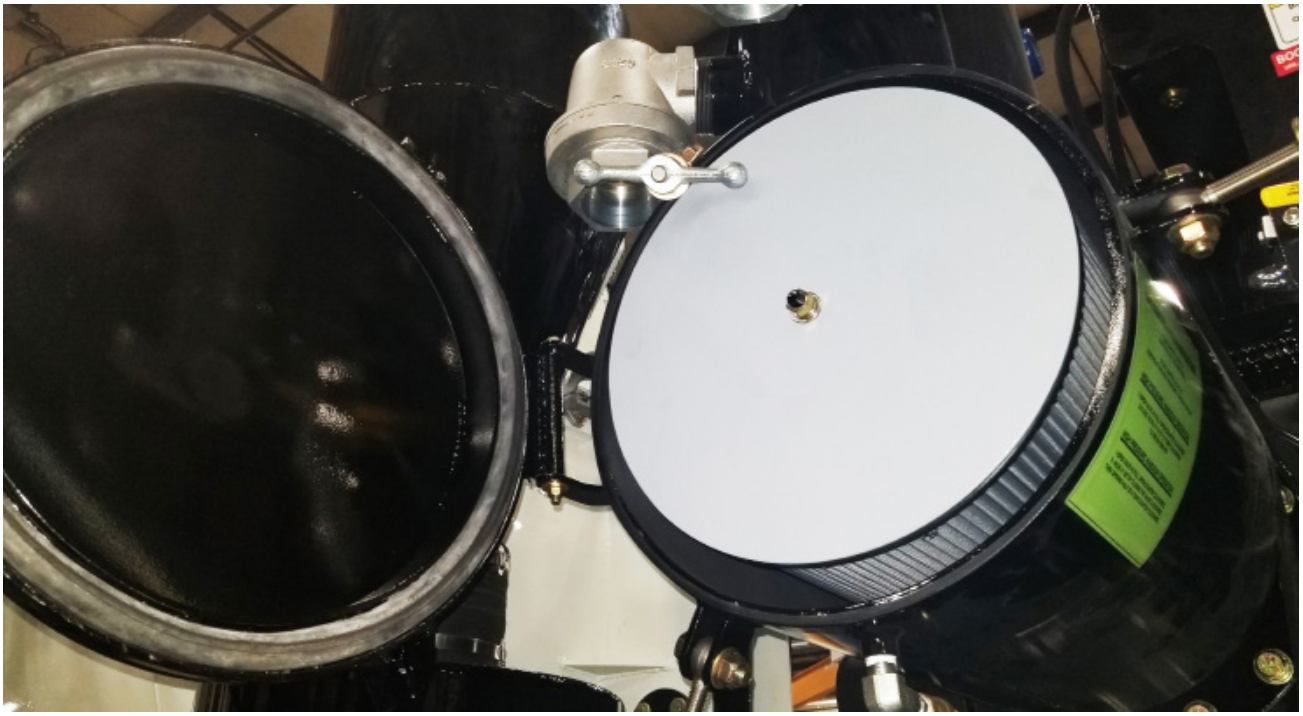
827-DVJ BLOWER



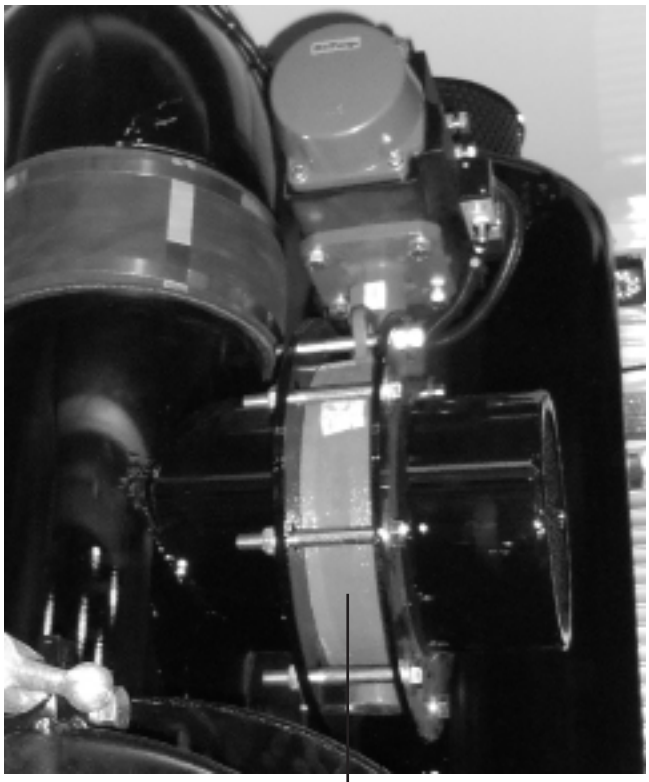
700 SERIES BLOWER



FILTER CARTRIDGE
A383165-M849



VACUUM BREAKER,8”
PART # A301015



ITEM	PART #	DESCRIPTION	QTY
1	U4307-0013	VALVE,BUTTERFLY,8”12V	1

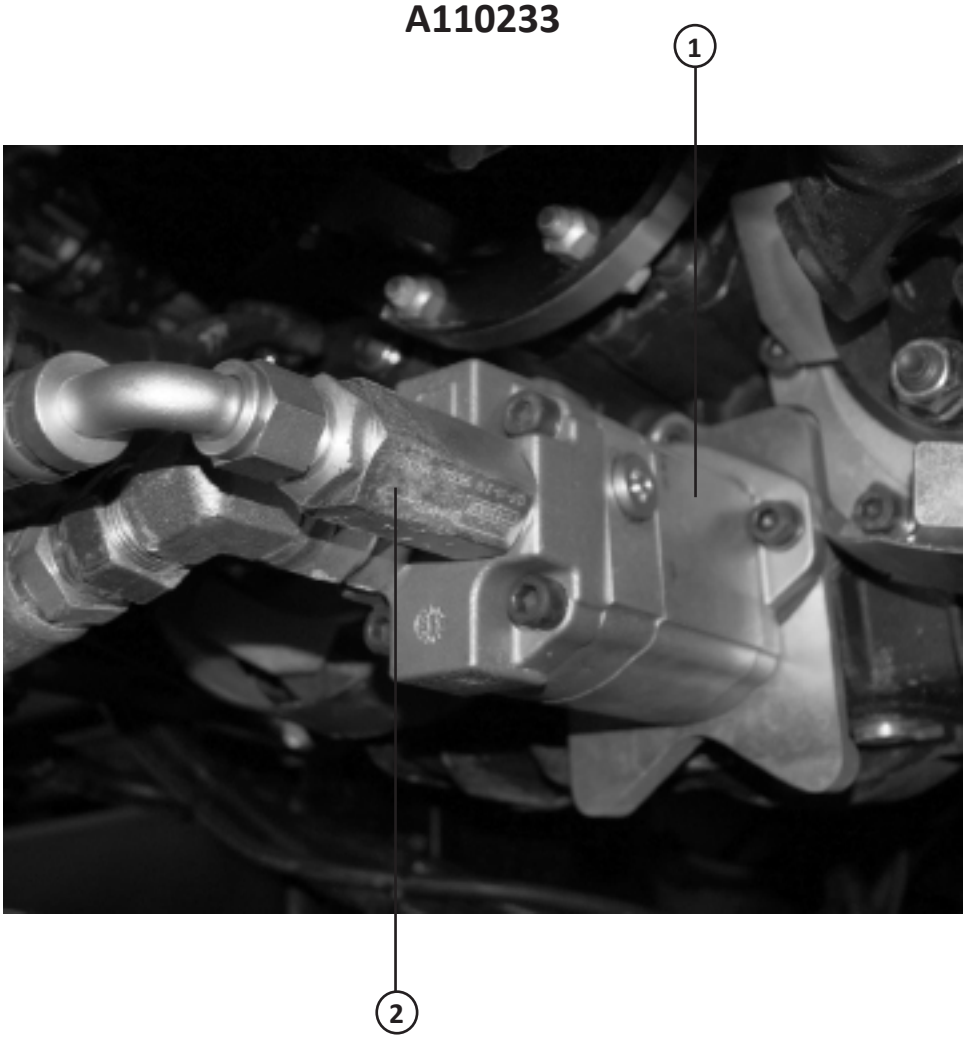
HYDRAULIC FILTERS

PART #	DESCRIPTION	QTY
A110516	FILTER,HYD. SPIN-ON,F/A110515,25 MICRON	1
121005071	FILTER ELEMENT,HYD.,PARKER	1

HYDRAULIC PUMP & CHECK VALVE

Verify Unit Number with the Service Department prior to ordering a replacement pump. Unit will have one of the following:

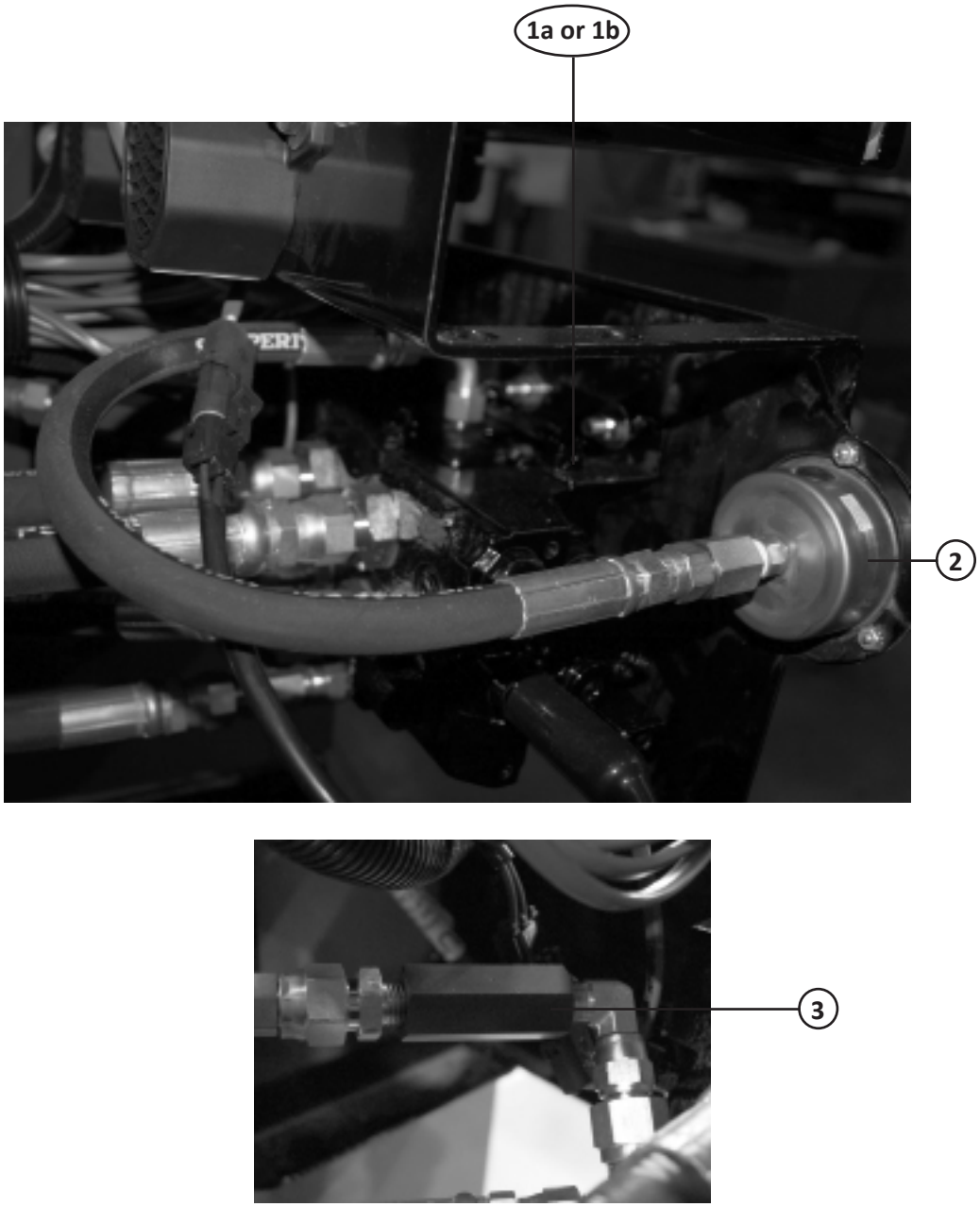
121005624
121005839
A110233



ITEM	PART #	DESCRIPTION	QTY
1	A110233	TPUMP, HYDRAULIC -1.01 CU IN	1
2	121005022	VALVE,CHECK-HYDRAULIC	1

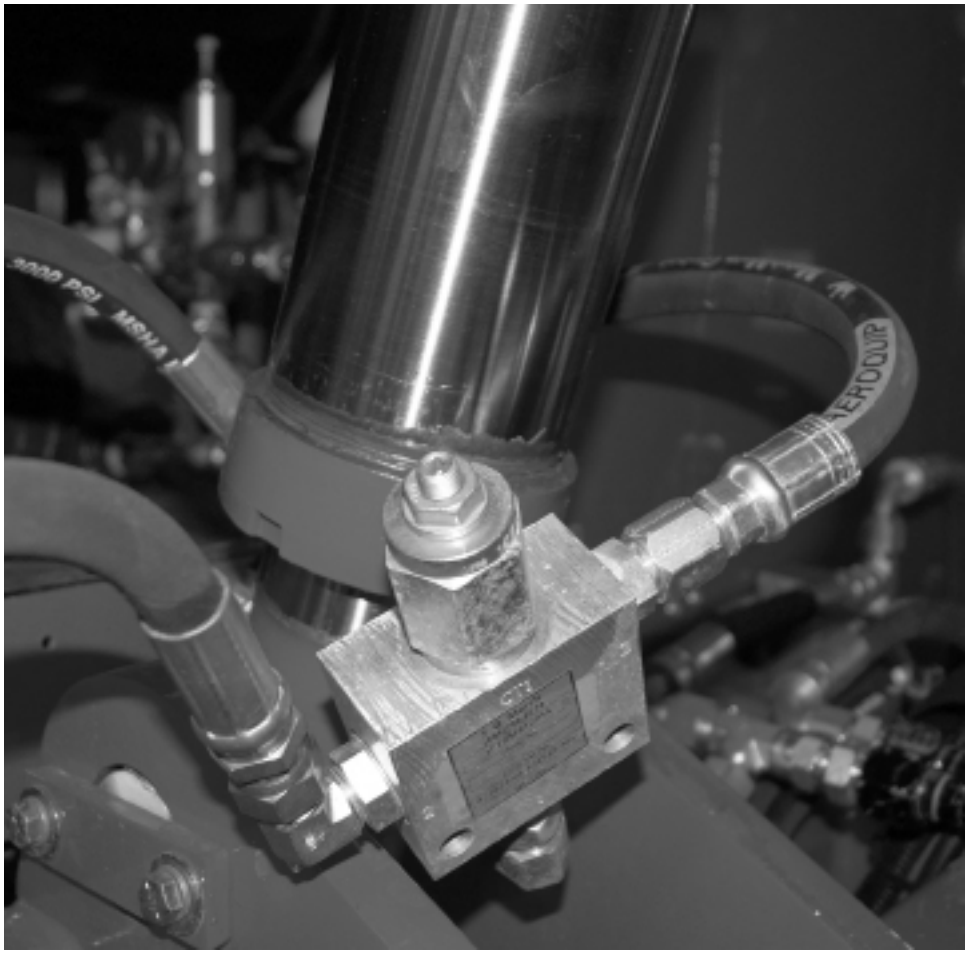
VALVE,RELIEF-CHECK
PART # A383266

CONTROL VALVE, GAUGE & CHECK VALVE



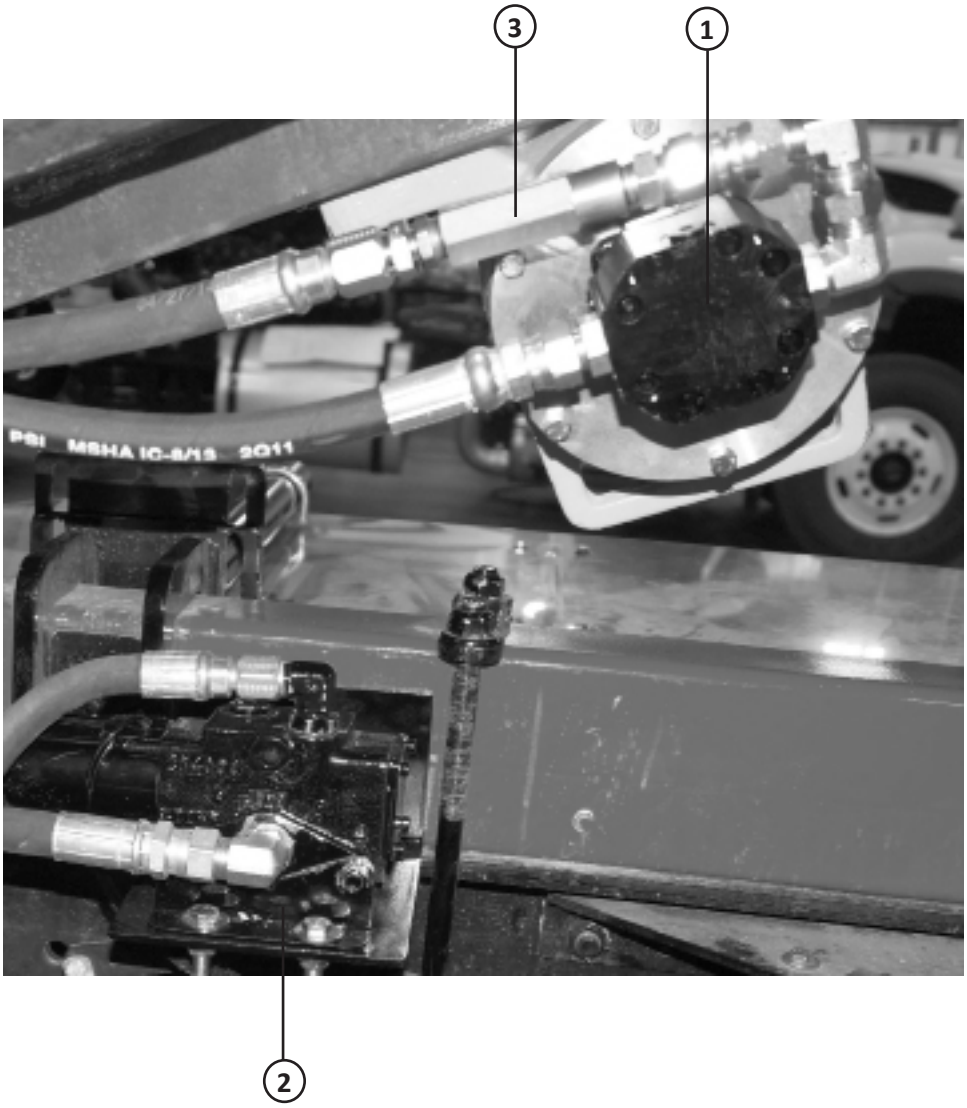
ITEM	PART #	DESCRIPTION	QTY
1a	A380886	VALVE,CONTROL-12V DC	1
1b	A380886 - 24	VALVE,CONTROL-24V DC	1
2	A131788	GAUGE,PRESSURE,0 TO 5000 PS	1
3	A110304	VALVE,CHECK,VELOCITY	1

TIPPING CYLINDER & RETROFIT KIT



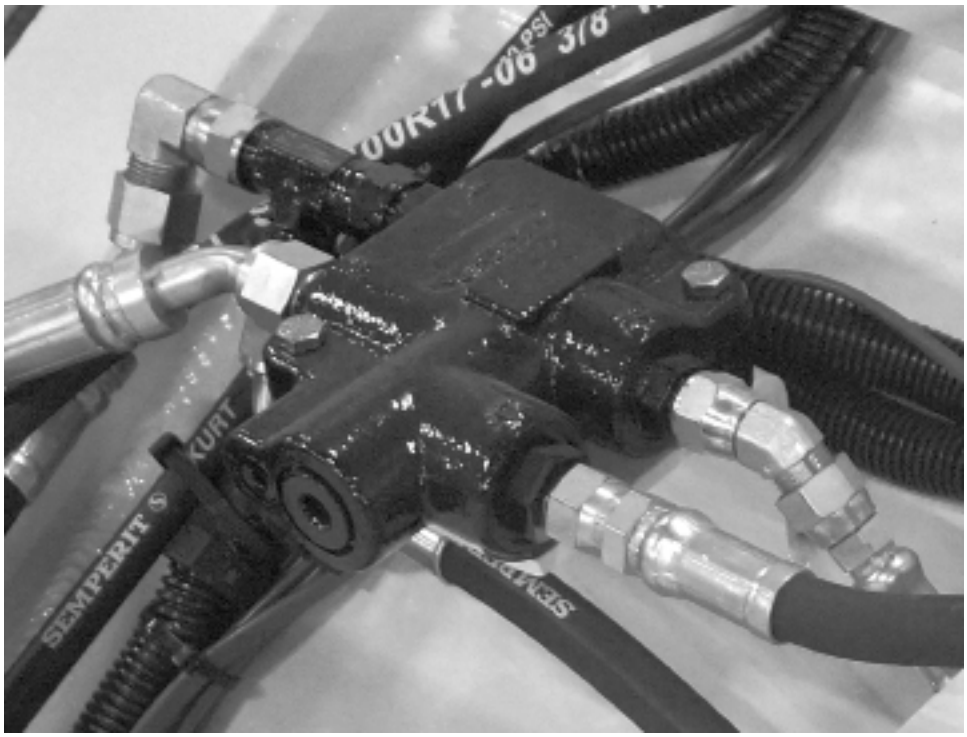
PART #	DESCRIPTION	QTY
A110107	CYLINDER X-9, X-13	1
A110102	CYLINDER X-8	1
A381188	ASSEMBLY, RETROFIT, X-8 ONLY	1

CONTROL VALVE, FLOW RESTRICTOR & VIBRATOR OPTION

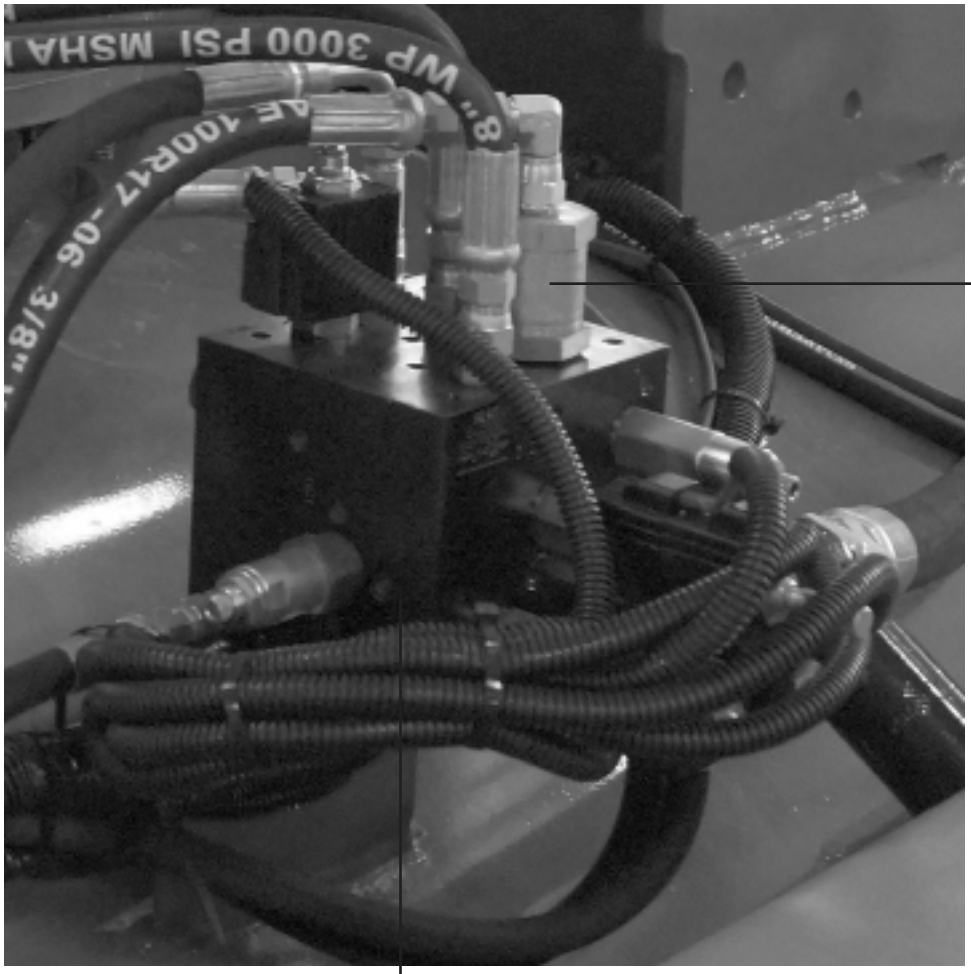


ITEM	PART #	DESCRIPTION	QTY
1	U3917-0007	VIBRATOR,HYDRAULIC	1
2	A380886	VALVE,CONTROL,12VDC	1
3	A380112	FLOW RESTRICTOR,2.8 GPM	1

VALVE,FLOW CONTROL-PRIORITY,3GPM
PART # A110292-3

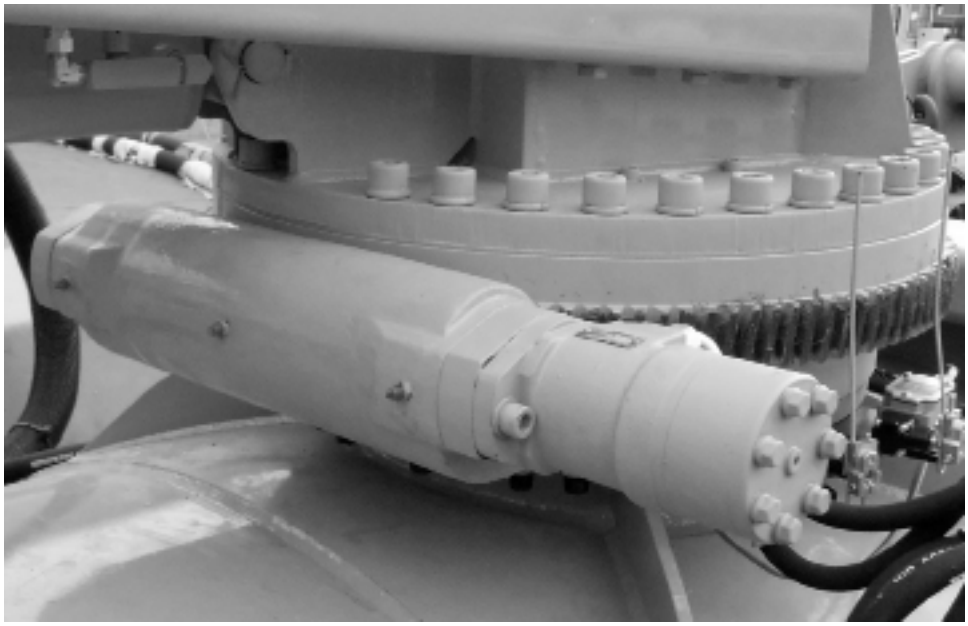


VALVE ASSEMBLY,BOOM CONTROL,4-SPOOL
12v PART # A249270
24v PART # A249270-24

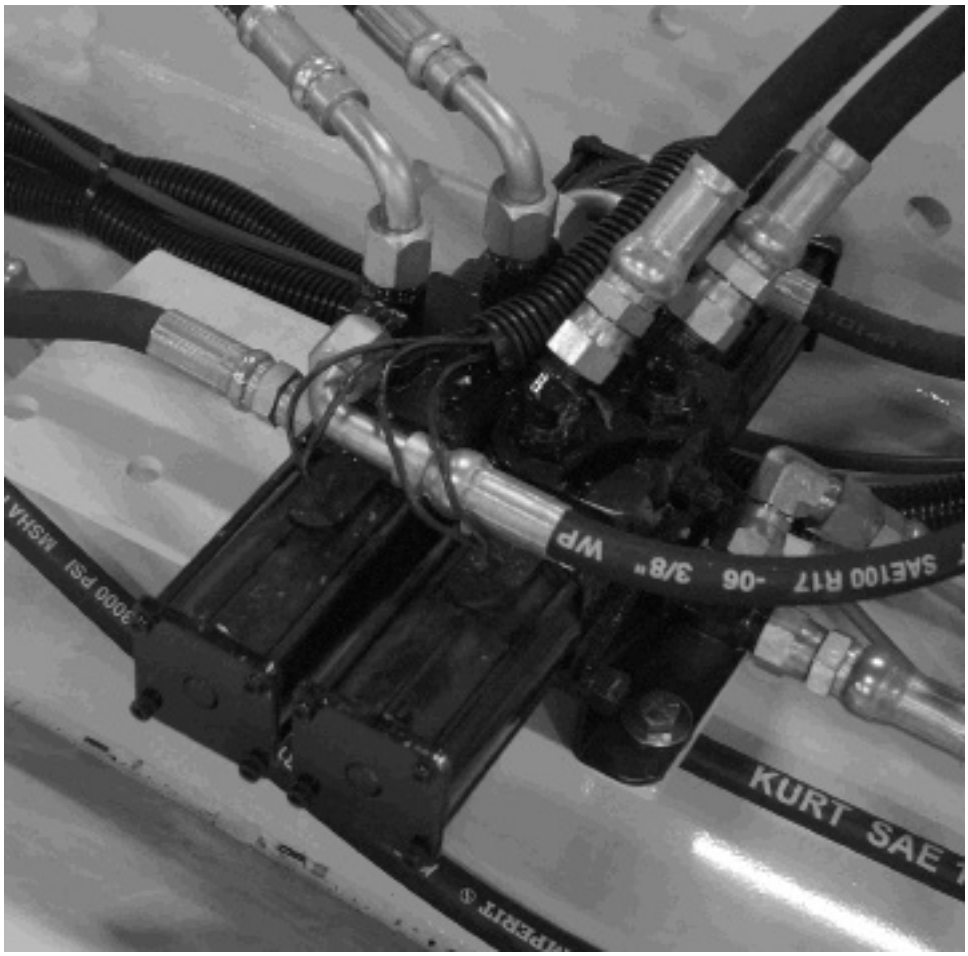


ITEM	PART #	DESCRIPTION	QTY
1	A383767	FILTER,LAST CHANCE,CARTRIDGE	1
2a	A249270	INTEGRATED VALVE ASSY W/MANUAL OVERRIDE	1
2b	A249270-24	INTEGRATED VALVE ASSY W/MANUAL OVERRIDE - 24v	1

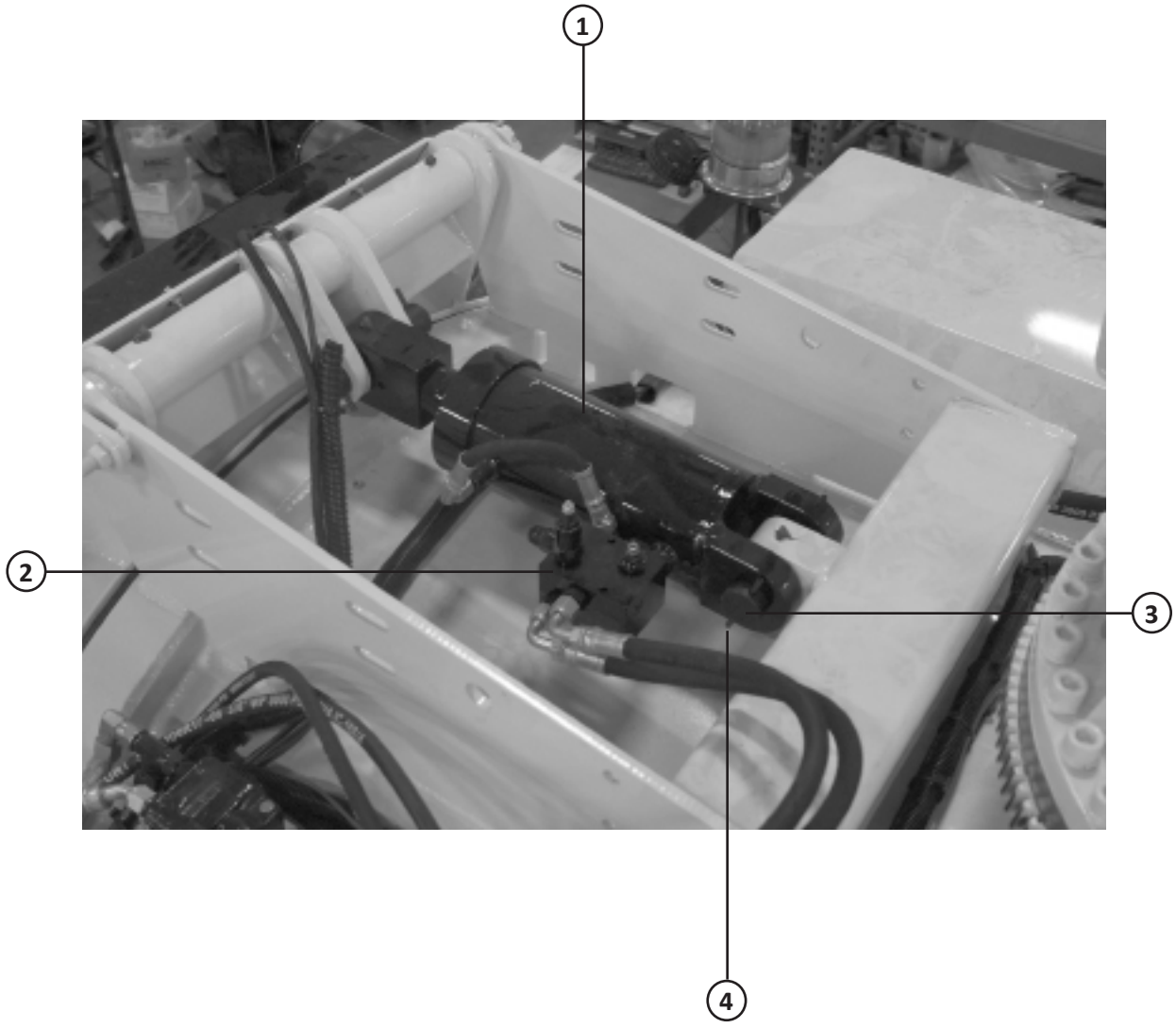
MOTOR,HYDRAULIC-SLEW MASTER
PART #121005097



VALVE,HYD,2 SPOOL,MD06,DOOR & LOCKS
12v PART #A110503-1
24v PART #30002144



CYLINDER,HYDRAULIC,DOOR ASSEMBLY
PART # A110015-2-RJ

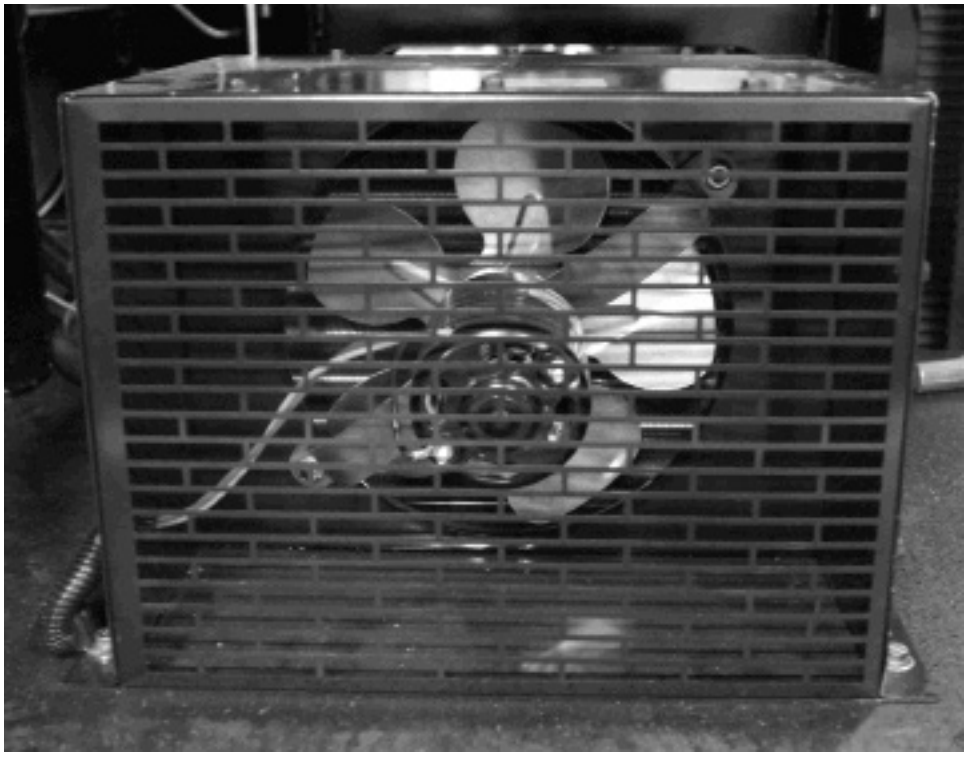


ITEM	PART #	DESCRIPTION	QTY
1	A110015-1-RJ	CYLINDER, HYDRAULIC, TANK DOOR, 5” X 6.75’	1
2	A110019	VALVE, CHECK/RELIEF, INTEGRATED ASSEMBLY	1
3	A246183	PIN, PIVOT, REAR DOOR CYLINDER	2
4	08-0020	PIN,SPRING,1/4” DIA X 3-1/2”LG,PLN STL	4

CYLINDER & WEDGE ASSY,UPPER & LOWER DOOR
PART # A246523-P

GROUND CABLE OPTION,50'REEL
PART #OPTION 240

COMPARTMENT HEATER
PART #A381247

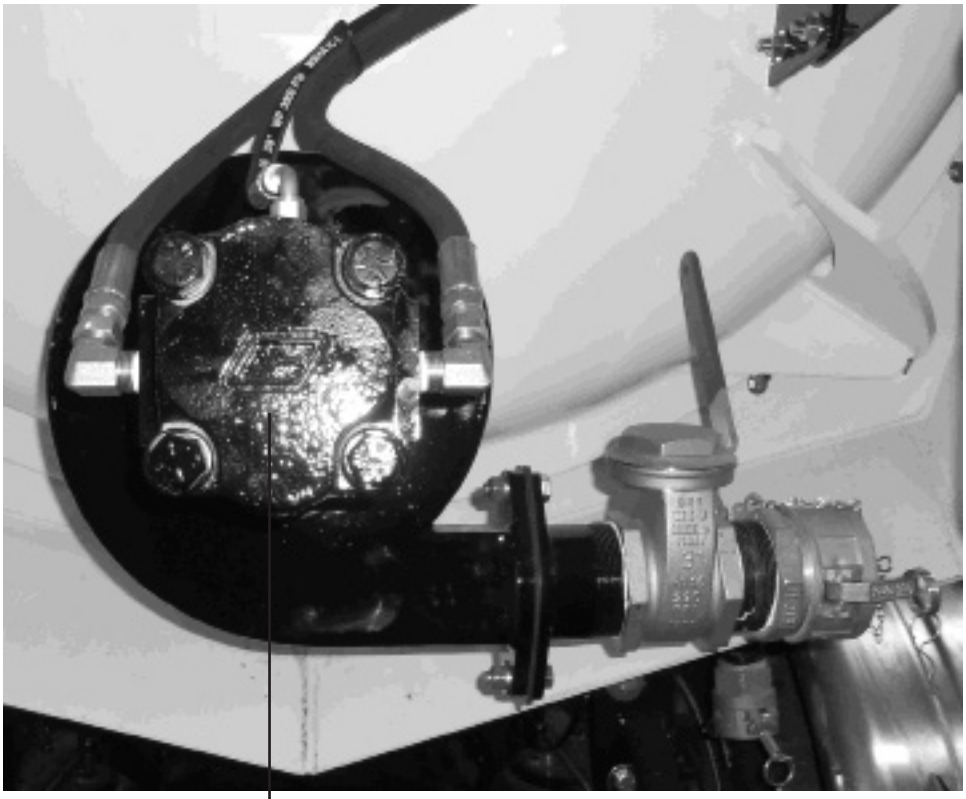


SCALE,ONBOARD
(OPTIONAL)

Note: For information on this option, refer to the vendor literature (if included as an option) located in the "Body" section and on the Digital Copy supplied with this unit.

PUMP-OFF SLUDGE, 12V (OPTIONAL)

12v PART #A381339-3
24v PART #300002140



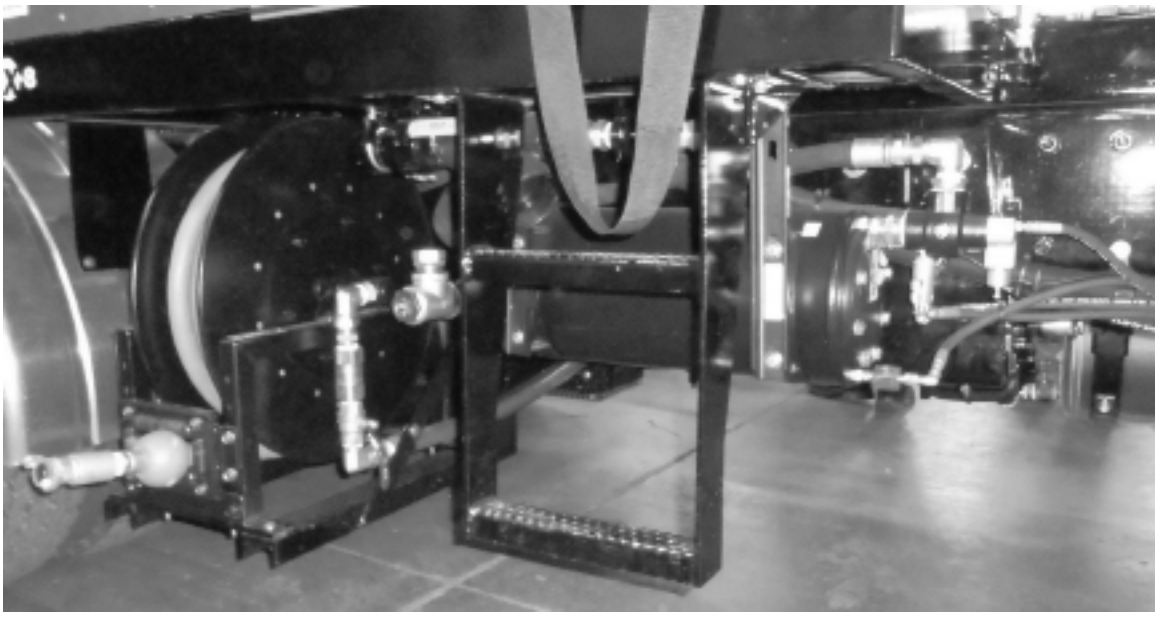
A249056

Note: For information on this option, refer to the vendor literature (if included as an option) located in the "Body" section and on the Digital Copy supplied with this unit.

INVERTER, 12VDC TO 110VAC (OPTIONAL)
PART #A383747

Note: For information on this option, refer to the vendor literature (if included as an option) located in the "Body" section and on the Digital Copy supplied with this unit.

AIR EXCAVATING (OPTIONAL)



Note: For information on this option, refer to the vendor literature (if included as an option) located in the "Body" section and on the Digital Copy supplied with this unit.

POLYTANK INSTALLATION INSTRUCTIONS
(New Style)

1. Place left rear and right rear water tanks onto tank frame assembly.

2. Attach hoses and suction tee weldment.

3. Place left front and right front water tanks onto tank frame assembly.

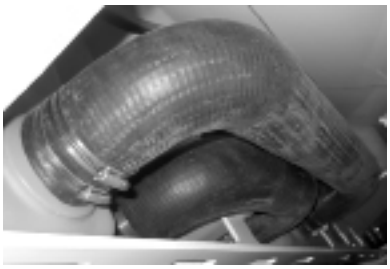
4. Attach short and long inter connect hoses between front and rear tanks.

5. Attach caps on front water tanks.

6. Install retaining straps.

Note: For a detailed listing of parts, refer to drawing A385300_T.

Hoses and Suction Tee Weldment



Front and Rear Water Tank Inter Connect Hoses

Front Water Tank Caps

POLYTANK REPAIR

General Informafion

Repairs to polyethylene tanks can be performed easily with a miniInurn of training. Repair technicians must exercise prudent caution against melting completely through the poly material, but extreme caution is generally not necessary. What this means is that the technician must realize that dire consequences are possible but not likely if he/she is reasonably carel.

Typical repairs will involve repair of two basic types of damage: blernishes to the surface, and cracks or holes through the material. A different repair approach will be appropriate for each type of damage.

Blemish Repairs

Blemishes to the surface of the poly tank can usually be repaired by first cleaning the area to remove any grease, oil or dirt. Then apply heat using an electric heat gun. Such guns, in the range of 1000 to 1300 watts allow the application of heat in controllable amounts to avoid quick burn through which is possible with a flame such as from a propane torch. Aquatech does not recommend the use of a torch to repair poly tanks.

Using the heat gun, and varying the distance of the gun from the surface of the material, work the heat

in a circular motion around the blemished area until the surface begins to become shiny. At this point the technician should become Vely careful as the poly material is beginning to liquefy and will begin to flow. By allowing just enough flow to fill any surrounding blemishes, and using a smooth metal obj ect such as a spoon or spatula, the material can be manipulated and be made smooth. In cases where the material may have been heavily gouged, and some material has been lost, the use of a stick of polyethylene material melted into the affected area can help fill it, then the tool can restore the smooth surface.

Cracks and Holes

When a crack or hole has developed in the polyethylene material another approach is advisable. Cleaning the affected area is very important. It may be necessary to scrape away some of the material if it is badly contaminated with grease, oil or dirt. The repair is best done when it can be approached from both sides, although there are cases where this will clearly be impossible.

Using an electric soldering gun with a wide, flat tip suitable for working with plastics, dip the hot tip into granulated polyethylene (provided by Aquatech) and work small amounts into the crack or hole. Repeat as many times as necessary to build the affected area up to the surrounding surface. Repeat the procedure on the opposite side if possible.

Use a smooth metal tool such as a spoon or spatula to work the material to conform with the surrounding surface. A heat gun may used as a final step to completely smooth the area, but is not required.

Areas repaired with either technique will have all the qualities and properties of strength and stability as the original area. Repaired sections can be put into service immediately upon cooling.

Recommended Tools

Tools recommended are a heat gun, 1000-1300 watts. Several manufacturers offer such a gun in the price range of US$60.00 to US$ 150.00. Some manufacturers include Master, Weller and Ideal. These heat guns are also excellent tools for thin wall shrink tubing and special solder/shrink electrical terminals. A soldering gun capable of accepting altemate tips is also recommended. Such soldering guns can be purchased at electronic supply houses such as Radio Shack, or at common retail outlets such as Sears. Weller is a respected manufacturer of good soldering tools. Forming tools which are metal and smooth can be made from common items such as kitchen utensils, or purchased from body shop suppliers. Since many different applications are possible, experience is the best judge of which particular tool to obtain.

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POLY TANK REPAIR ITEMS

The following products are available for repairing cracks and holes in our polyethylene water tanks.

ILLUSTRATION	HI-VAC NO.	DESCRIPTION
	A385008	Black Epoxy Adhesive (includes two mixer tips)
	A385009	Automix Applicator Gun
	A385010	Mixer Tip = Bag of 6 (order only if extras are required)
	A385011	Patching Screen
	A385012	Aerosol Gray Primer (for hiding black adhesive on gray tanks)
Picture not available	APOLY-001	Gray Polyethylene Patching Material (for used with soldering iron and heat gun)

Hi-Vac Corp. • 117 Industry Road • Marietta, Ohio 45750 • Tel. 740-374-2306 • Cust. Svc. Fax 740-374-3299

Door Gasket

Adhesive 121002892

Directions for Use

1. Rough entire sealing surface on debris tank & gasket that is being installed with a scotch-brite general purpose pad or 80 grit sandpaper using.
2. Thoroughly clean surfaces to be bonded. Wiping with 3M™ General Purpose Adhesive Cleaner (P.N.08984) will aid in removing oil and dirt.
3. Apply a thin uniform coat of adhesive on each surface but do not close the bond.
4. Allow adhesive to dry until tacky but will not transfer to your knuckle when touched (maximum dry time about 4 minutes).
5. Assemble materials with sufficient pressure to ensure contact.
6. Greater initial strength may be obtained by reactivation. To reactivate, coat both surfaces with adhesive and allow to dry tack free.
7. Lightly coat surface with a thin coat of adhesive or lightly wipe with 3M™ General Purpose Adhesive Cleaner (P.N. 08984*).