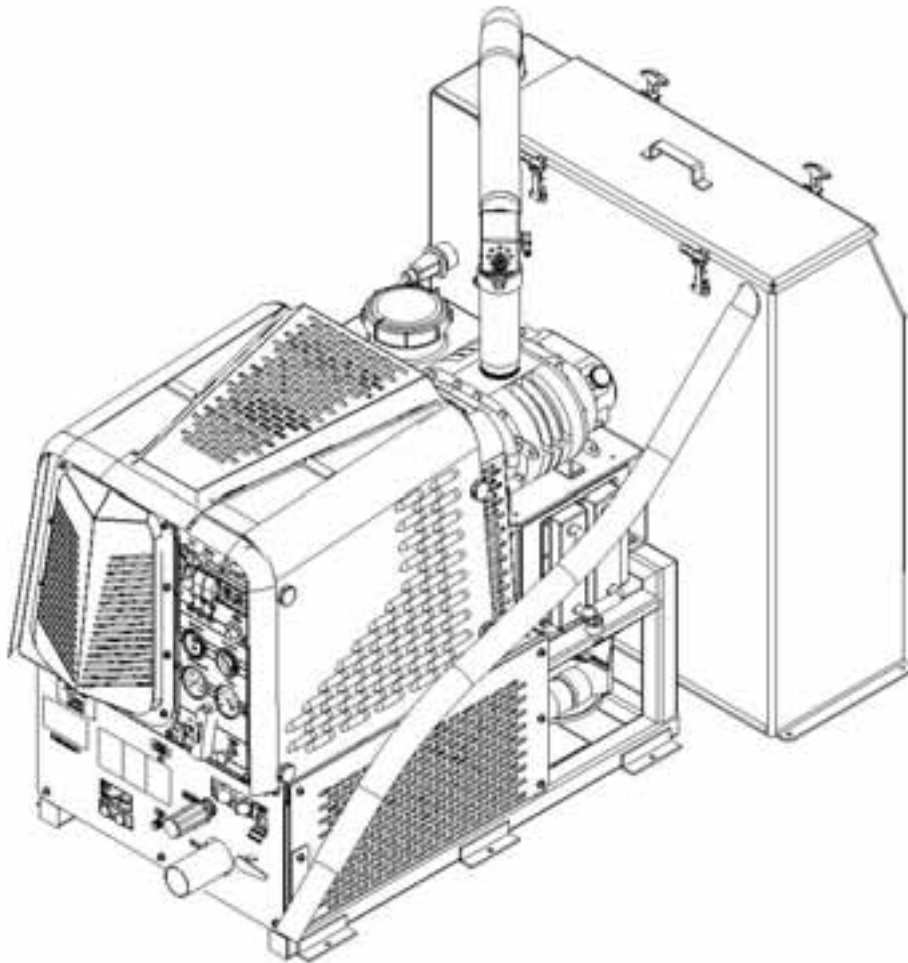


# **BLUELINE CHAMP®**



## **Service and Operation Manual**

**BLUELINE Equipment Co. LLC**

**2604 Liberator Dr., Prescott, AZ 86301 1-928-445-3030**

**Congratulations** on your purchase of the **BLUELINE CHAMP®** truck mount cleaning unit. This instruction/parts manual is a guide for operating and servicing your **BLUELINE** unit.

Proper operation and service are necessary to ensure the outstanding performance of this unit. When properly maintained, your truck mount will have a long and trouble-free life.

The following service methods outlined in this manual are detailed in a manner that operation and servicing may be performed properly and safely. Because service levels vary due to the skill of the mechanic, tools and parts availability, ensure that prior to attempting any repair, you are familiar with this equipment and have the proper tools. Any questions regarding the operation, service, or repair of this unit should be directed to your nearest **BLUELINE** dealer.

The headings **WARNING** and **CAUTION** are utilized to warn you that steps must be taken to prevent personal injury or damage to the equipment. Please make sure that you have read and understand these instructions entirely before proceeding with the operation of this unit.

**THIS UNIT MUST BE INSTALLED BY THE DEALER THAT YOU PURCHASED IT FROM IN ACCORDANCE WITH THE BLUELINE INSTALLATION PROCEDURES.**

PLEASE ENSURE THAT THE WARRANTY CARD IS FILLED OUT BY THE INSTALLATION SERVICE CENTER THAT INSTALLED THIS UNIT AND IS RETURNED TO **BLUELINE EQUIPMENT LLC**.

Record your units serial number here for future reference or if you should need to contact the factory in the future for any reason.

S/N:

This service and operations manual is written specifically for **BLUELINE CHAMP®** Truck Mount Cleaning units manufactured by:

**BLUELINE EQUIPMENT LLC**

2604 Liberator Drive

Prescott, AZ 86301 USA

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# **GENERAL INFORMATION**

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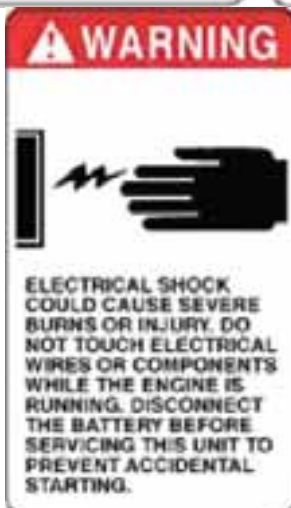
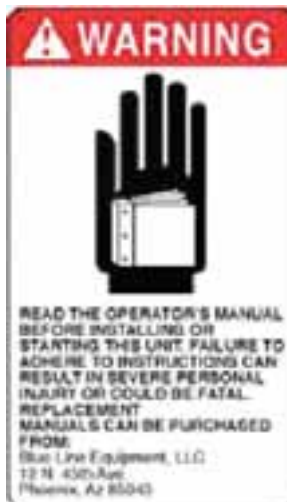
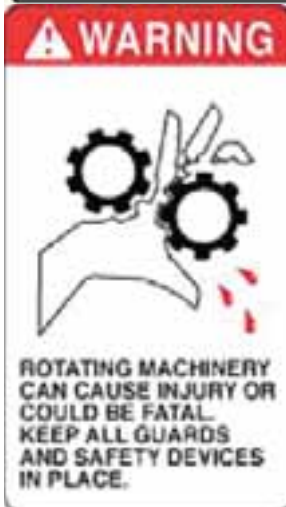
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# 1. SAFETY

## **WARNING For Your Safety!**

The following **WARNING** labels are on your **BLUELINE CHAMP®** console. These labels point out important **WARNINGS and CAUTIONS**, which must be followed at **all** times. Failure to follow warnings could result in personal injury, fatality, to yourself and/or others or property damage. Please follow these instructions carefully! **DO NOT remove these decals.**





### 1. Read the operator's manual before starting this unit.

Failure to adhere to instructions could result in severe personal injury or could be fatal.

### 2. Operate this unit and equipment only in a well-ventilated area.

Exhaust fumes contain carbon monoxide, which is an odorless and deadly poison that can cause severe injury or death. **DO NOT** run this unit in an enclosed area. **DO NOT** operate this unit where the exhaust may enter a building doorway, window, vent or other opening.

### 3. Gasoline is extremely flammable and its vapors can explode if ignited.

Store gasoline only in approved containers, in well-ventilated, unoccupied buildings and away from sparks or flames. Never carry gasoline or any flammable materials in the vehicle. Fumes could accumulate inside of the vehicle and ignite, causing an explosion.

4. This unit must be operated with the vehicle doors open in order to ensure adequate ventilation to the engine.

5. **DO NOT** operate unit if gasoline is spilled. Do not turn ignition switch until the gasoline has been cleaned up. Never use gasoline for cleaning purposes.

6. **DO NOT** place hands, feet, hair, clothing or any body parts near rotating or moving parts. Rotating machinery can cause severe injury or death.

7. **NEVER** operate this unit without belt and safety guards. High speed moving parts, such as belts and pulleys, should be avoided while the unit is running. Severe injury, fatality or damage may result.

8. **NEVER** service this unit while it is running. High speed mechanical parts as well as high temperature components may result in injury or severed limbs.

9. Engine components will be extremely hot from operation. To prevent severe burns, **DO NOT** touch these areas while the unit is running or shortly after the unit is shut off.

10. **DO NOT** touch the exhaust diverter valve or any part of the exhaust system while the system is running or for 20 minutes after the unit is shut off. Severe burns could result.

11. **Water under high pressure at high temperature can cause burns, severe personal injury, or fatality.** Shut down unit, allow to cool down and relieve system of all pressure before removing caps, valves, plugs, fittings, filters or hardware.

12. **NEVER** leave the vehicle engine running while the unit is in operation.

13. **Battery acid contains sulfuric acid.** To prevent acid burns, avoid contact with skin, eyes and clothing. Batteries also produce explosive hydrogen gases while charging. To prevent fire or explosion, charge batteries only in a well ventilated area. Keep sparks, open flames, as well as other sources of ignition away from battery at all times. Remove all jewelry prior to servicing batteries. Keep batteries out of the reach of children.

**Before disconnecting** the negative (-) ground cable, ensure that all switches are in the off position. If on, a spark could occur at the ground connection terminal which could cause an explosion if hydrogen gas or gasoline vapors are present. **ALWAYS** disconnect the negative (-) terminal first.

14. **DO NOT** smoke around the machine. Gas fumes could accumulate and ignite. Battery



## SECTION 1

gases are extremely flammable. This will prevent possible explosions.

15. **DO NOT** damage the vehicle in any way during the installation. When routing fuel lines **DO NOT** configure the hose in any locations where the hose or vehicle could be damaged. Avoid contact with moving parts, areas of high temperature, brake lines, fuel lines, catalytic converters, exhaust pipes, mufflers or sharp objects.

16. **NEVER** cut or splice any of the vehicle fuel lines during fuel line installation. This will result in fuel leaks and potentially dangerous conditions. Use only the provided fuel hose for fuel lines. When going through the vehicle floor with fuel lines, always utilize bulkhead adaptors. This will prevent fuel leaks and ensure that hoses are not punctured by vehicle vibration abrasion.

17. **DO NOT** exceed your vehicles weight limit. The console with waste tank and accessories weighs approximately 890 pounds. Make certain that the vehicle has the correct axle rating. This will prevent unsafe or hazardous driving conditions.

18. High back seats are required for all vehicles that units are to be installed for head and neck protection. Metal partitions between the seats and equipment are strongly recommended.

19. **DO NOT** operate water pump without the water supply attached and on. The water pump and other vital components could be seriously damaged if the pump is operated dry. This unit is equipped with a low pressure shut down switch, which should **NOT** be bypassed.

20. Always keep your vehicle clean and orderly. Wands, tools and accessories must be securely stowed while driving the vehicle.

21. All high-pressure hoses must be rated at 3000 PSI and have a heat rating of 250 degrees F. Thermoplastic hoses do not meet this criteria and should never be used. Severe burns and other injuries could result if hoses do not meet these requirements.

22. Ensure that you have received proper training from the distributor that you purchased the unit from prior to operation.

23. This unit produces high pressure and high temperatures. Improper use could result in serious injury.

24. **DO NOT** modify this unit in any manner. Any modification could result in serious injury or fatality.

25. California Proposition 65 **WARNING:** Engine exhaust from this product contains chemicals known by the State of California to cause cancer, birth defects, or other reproductive harm.



## **SPECIFICATIONS**

Engine Speed	2800 rpm (High Speed No Load) 1400 rpm (Idle No Load)
Water Pump RPM	1485 rpm
Vacuum Pump RPM	3195 rpm
Water Flow Rate	4.2 GPM (maximum)
Water Pump Pressure	1200 PSI (maximum)
Vacuum Relief Valve	13 in. HG
Waste Tank Capacity	70 Gallons at shutoff
Console Weight	640 lbs.
Console Weight (with waste tank & accessories)	890 lbs.

## **TORQUE VALUES**

Engine Hub	720 inch/lbs. 60 ft/lbs.
Vacuum Pump Hub	192 inch/lbs. 16 ft/lbs.

## **JET SIZING**

**BLUELINE** recommends that the total floor tool tip size does not exceed .045". Using larger jet sizes on your **BLUELINE CHAMP®** unit may reduce cleaning temperatures.

**Example:** Four-jet wand uses four 9501 jets. (95 deg. Spray angle w/.01 orifice)  
 $.01 \times 4 = .04$

Upholstery tool jet size: 80015

Stair tool jet size: 9502

## INSTALLATION REQUIREMENTS

Prior to beginning the installation, read the ENTIRE “Installation” section of this manual. Since the **BLUELINE CHAMP®** truck mount unit weighs (with waste tank and accessories) 890 lbs., please adhere to the following recommendations prior to installing the unit.

1. The unit should **NOT** be installed in any motor vehicle of less than ½ ton capacity.



**The console and waste tank with accessories must NOT exceed the vehicles axle weight limit.**

2. If mounting the unit in a trailer, ensure that the trailer is rated for the total weight of the **unit and trailer**. Electric or hydraulic brakes must be provided, and strict compliance with all State and Federal laws must be maintained.
3. If mounting in a trailer, the **BLUELINE CHAMP®** console must be positioned so that it balances properly with respect to the trailer axle. Ten percent (10%) of the units total overall weight (w/o accessories or water) should be on the tongue.
4. The vehicle tires must have a load rating in excess of the combined unit and vehicle weight.
5. **BLUELINE** does not recommend using any type of flooring materials that absorb water. This condition will result in rust and corrosion of the vehicle floor.
6. Insulation under rubber mats should be removed prior to installation of the unit.

## FUEL REQUIREMENTS

Use **unleaded fuel ONLY**. **NEVER** use any gasoline additives. Use only fresh, clean unleaded gasoline intended for normal automotive use. **DO NOT** use high-octane gasoline with this unit.

## ENGINE OIL REQUIREMENTS

The engine is shipped with Castrol Syntec Blend® SAE 10W-30 motor oil. We recommend that you use high quality synthetic oil that meets at least API (American Petroleum Institute) service class SG, SH, SJ or higher.

**NOTE:** the use of less than service class SG, SH or SJ oil or extending oil change intervals longer than recommended can cause engine damage.

USE 10W-30 API SG,SH,SJ OR HIGHER						
°F	-22	-4	14	32	59	104
°C	-30	-20	-10	0	15	40
TEMPERATURE RANGE EXPECTED BEFORE NEXT OIL CHANGE						

## CHEMICAL REQUIREMENTS

The **BLUELINE CHAMP®** truck mount unit’s unique last step chemical injection system can be used with a wide variety of water diluted chemical compounds, either acidic or alkaline, depending on the work to be performed. We recommend using only the highest quality chemistry.

## WATER REQUIREMENTS

Because hard water deposits will damage the plumbing and heat exchange systems on this unit, **BLUELINE** recommends that a high quality water softener be used in areas where the water hardness exceeds 3-1/2 grains. If a water softener is used, it must have a flow capacity of at least five (5) GPM or greater, without any hose constrictions.

The use of a water softening system will reduce maintenance and reduce down time caused by hard water scaling. It will also enhance the performance of cleaning chemicals, which will result in greater efficiency in lower concentrations.

## **2. RECEIVING YOUR TRUCK MOUNT UNIT**

### **DEALER RESPONSIBILITY**

THE **BLUELINE** DEALER THAT YOU PURCHASED THIS TRUCK MOUNT CLEANING UNIT FROM IS RESPONSIBLE FOR THE PROPER INSTALLATION OF THIS MACHINE. THE DEALER IS ALSO RESPONSIBLE FOR THE PROPER INITIAL TRAINING OF YOUR OPERATORS AND MAINTENANCE PERSONNEL.

### **ACCEPTANCE OF SHIPMENT**

Your **BLUELINE CHAMP®** truck mount cleaning unit was thoroughly tested, checked and inspected in its entirety prior to leaving our manufacturing facility. **When receiving your unit, please make the following acceptance check:**

1. The unit should not show any signs of damage. If there is damage, notify the common carrier immediately.
2. Carefully check your equipment and packing list. The standard **BLUELINE CHAMP®** unit should arrive with the following items as well as any optional accessories:

### **EQUIPMENT LISTING**

- A. **BLUELINE CHAMP®** console.
- B. Operation and Service manual
- C. Installation mounting plates and bolt down kit
- D. Hose clamps for vacuum and fuel hoses
- E. Carpet wand
- F. Waste tank with shutoff switch
- G. Waste tank filter and stainless steel strainer basket.
- H. 100 ft. of 1/4 in. high pressure solution hose with quick connects

- I. 100 ft. of 2 in. vacuum hose
- J. 1 vacuum hose connector
- K. 50 ft. water supply hose with quick connect

### **OPTIONAL EQUIPMENT**

- A. Additional lengths of vacuum hose  
Part # 18-003
- B. Additional vacuum hose connectors  
Part # 21-003
- C. Additional high-pressure solution hoses  
Part # 18-000  
(With shutoff valve Part # 18-001)
- D. Automatic waste pump kit  
Part # 68-003
- E. Demand pump system  
Part # 68-002
- F. KIT, FUEL HOOKUP CHEVY 97 & NWR. FI  
Part # 69-003FI
- G. KIT, FUEL HOOKUP CHEVY/DODGE FI  
Part # 69-004FI
- H. KIT, FUEL HOOKUP FORD FI  
Part # 69-005 FI
- I. KIT, FUEL HOOKUP 2003 CHEVY FI  
Part #69-018FI
- J. KIT, 2004 TF ADAPTER CHEVY  
Part # 69-032
- K. KIT, 2004 TF FUEL INJ. CHEVY  
Part # 69-033
- L. ADAPTOR, 2004 FORD FUEL  
Part # 69-041
- M. ADAPTOR, 2004 FUEL INJ. FORD  
Part #69-047

# SECTION 2:

# INSTALLATION

3 INSTALLATION

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### **3. INSTALLATION**



This unit must be bolted to the floor of the vehicle by an authorized BLUELINE DISTRIBUTOR.

#### **LIFTING THE UNIT INTO THE VEHICLE**

The BLUELINE CHAMP® weighs approximately 890 lbs., a forklift is necessary to place the unit into the vehicle. Place the forks into the forklift slots from the front of the unit and make **CERTAIN** that the forks are spread to the maximum width of the unit.

#### **POSITIONING THE UNIT INTO THE VEHICLE**

Vehicles vary in size and openings. Owners have different preferences on where in the vehicle they want their units positioned. BLUELINE strongly recommends a side door installation for the CHAMP®. We **DO NOT** recommend a rear door installation.

1. Ensure that enough space is provided to assure adequate engine ventilation as well as room for service and maintenance.
2. The complete unit with waste tank and accessories **MUST NOT** exceed the vehicle's axle weight limit.
3. **NEVER** position the console closer than 12 inches from the bottom rear of the driver and passenger seats.

### **FASTENING DOWN THE UNIT AND WASTE TANK**



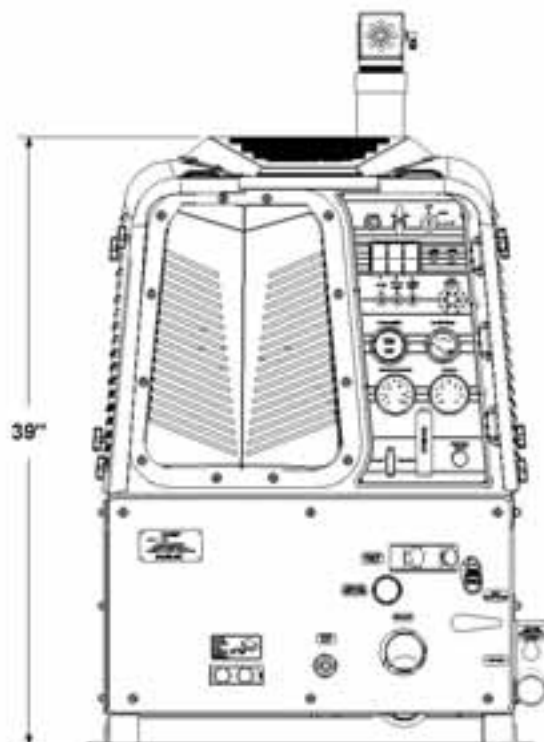
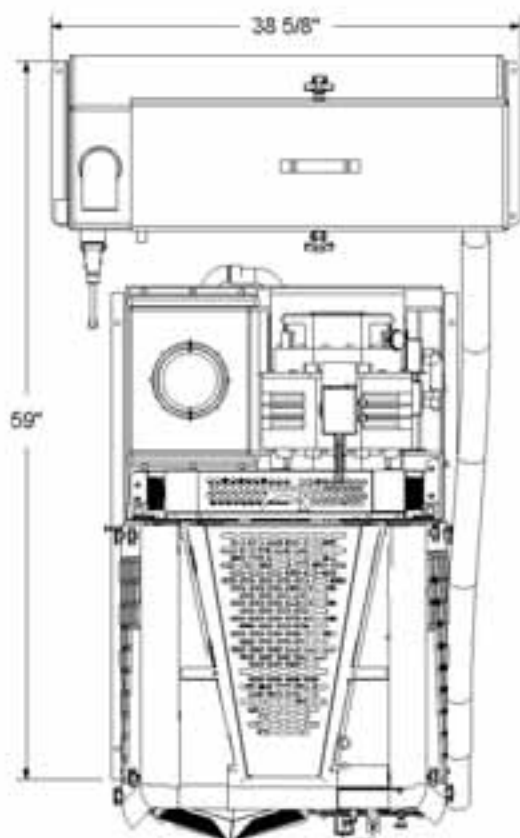
Prior to drilling any holes in the vehicle floor, ensure that while drilling, you will not damage the fuel tank, fuel lines, or any other vital components, which could affect the safety and or operation of the vehicle.

A. The console and waste tank mounting holes will serve as a template. Drill six (6) 13/32 in. diameter holes for the console and six (6) 13/32 in. diameter holes for the waste tank.

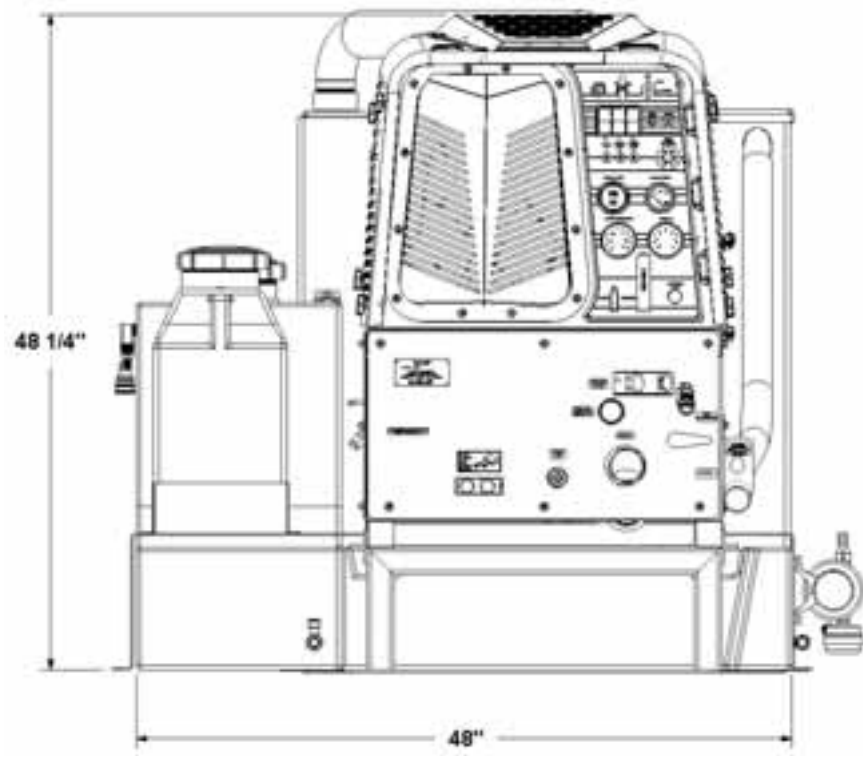
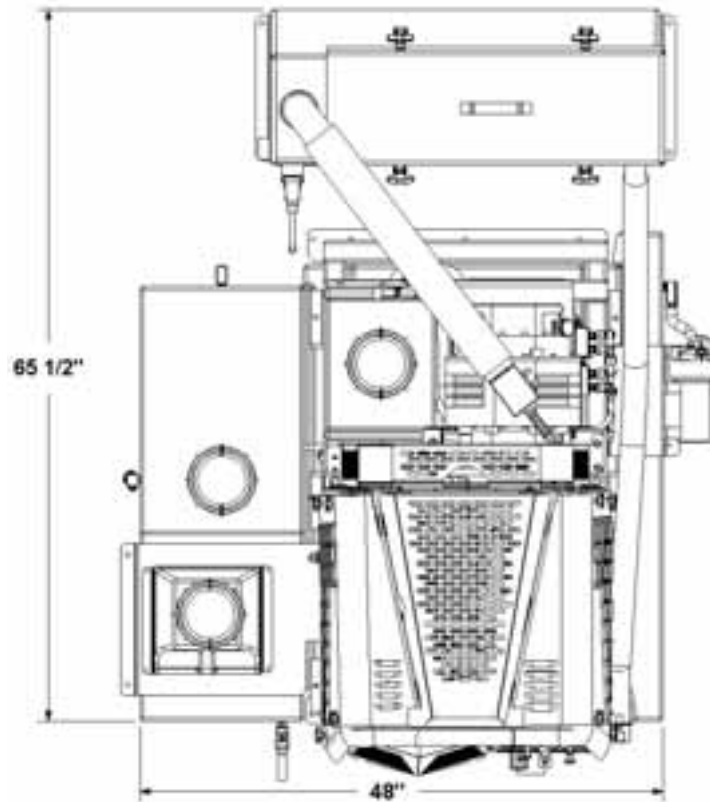
B. Using the provided mounting hardware kit:

1. Insert six (6) 3/8-16 x 2 1/2 in. hex head cap screws with flat washers through the console mounting holes, and six (6) 3/8-16 x 2 1/2 in. hex head cap screws with flat washers through the waste tank mounting holes.
2. Install the provided mounting plates underneath the vehicle floor.
3. Screw the provided 3/8-16 hex head lock nuts on to the mounting bolts and tighten until the console and waste tank are firmly attached to the vehicle floor.

## DIMENSIONAL DIAGRAM REAR MOUNT TANK



## DIMENSIONAL DIAGRAM REAR MOUNT WITH WATER TANK





## INSTALLATION OF FUEL LINES



**READ THESE INSTRUCTIONS IN THEIR ENTIRETY PRIOR TO PROCEEDING.**



**The Vehicle fuel lines should NOT be spliced under ANY circumstances. Severe injury or fatality could result.**

**DO NOT** damage the vehicle in any way during the installation. When routing fuel lines **DO NOT** configure the hoses in any location where the hoses or vehicle could be damaged. Avoid contact with moving parts, areas of high temperature, brake lines, fuel lines, catalytic converters, exhaust pipes, mufflers or sharp objects.

## TRAILER FUEL TANK AND FUEL LINE INSTALLATION

The following are recommendations for trailer installations:

A. Strict compliance with all federal and state laws must be maintained.

B. Use only fuel tanks that are manufactured specifically for gasoline, have proper vented filling caps, and outlet connections that are the same size as the inlet and return connections on the unit.

C. **DO NOT** install fuel tanks inside any type of enclosed trailer or vehicle.



**NEVER** carry gasoline or flammable materials in an enclosed trailer or vehicle.

**NEVER** store any type of flammable material in an enclosed trailer or vehicle.

D. Always mount fuel tanks where they will be protected from any vehicle collision.

E. When installing fuel lines from the fuel tank to the unit, use the proper size fuel line.

## BATTERY CONNECTION



**Explosive gases, Dangerous gases! Batteries contain sulfuric acid. To prevent acid burns, avoid contact with skin, eyes and clothing. Batteries also produce explosive hydrogen gases while charging. To prevent fire or explosion, charge batteries only in a well ventilated area. Keep sparks, open flames, as well as any other sources of ignition away from batteries at all times. Remove all jewelry prior to servicing batteries. Keep batteries out of the reach of children.**

**Before disconnecting the negative (-) ground cable, ensure that all switches are in the OFF position. If ON, a spark could occur at the ground connection terminal, which could cause an explosion if hydrogen gas or gasoline vapors are present. ALWAYS disconnect the negative (-) terminal first.**

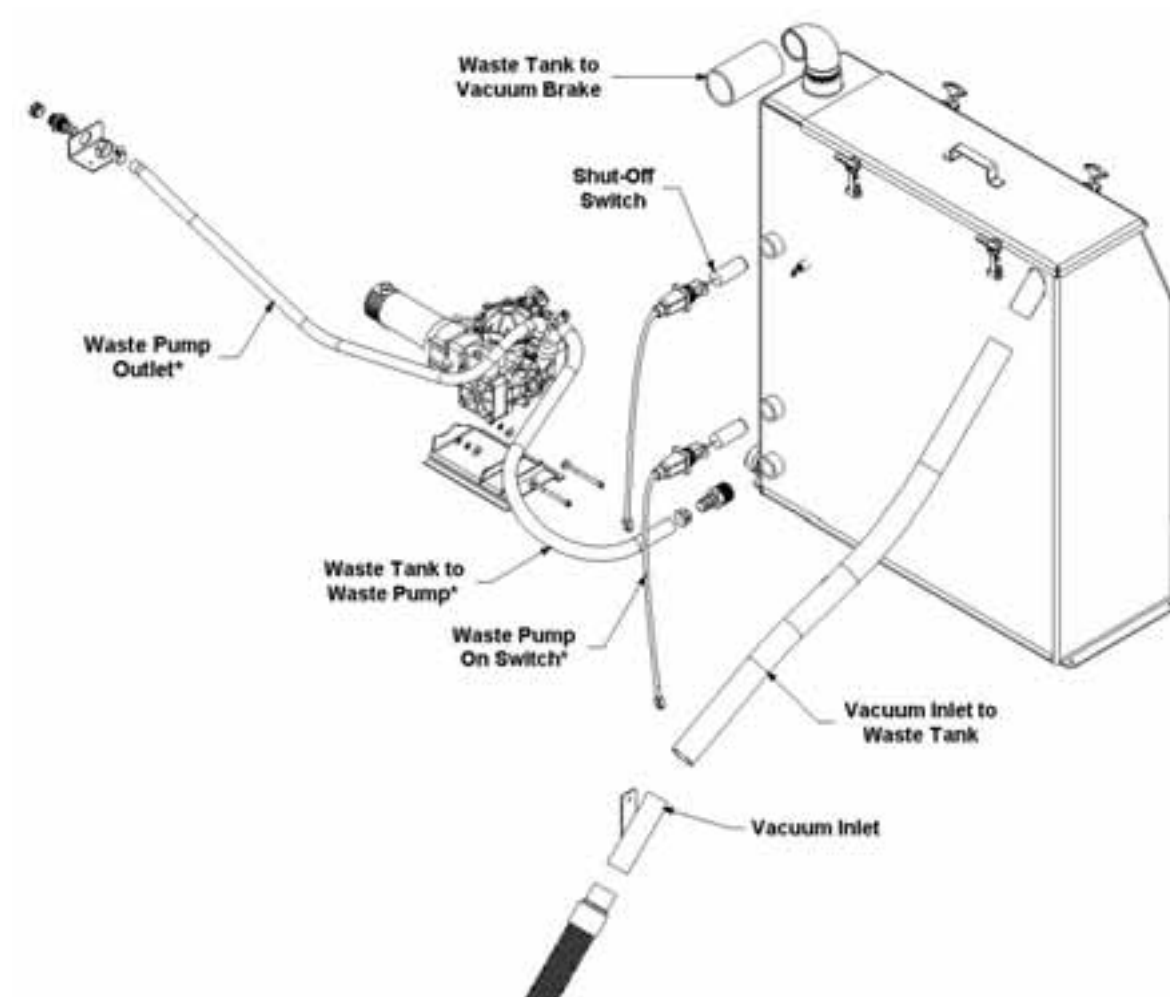
A. Attach the red positive (+) battery cable from the starter solenoid on the console to the positive (+) terminal on the battery and tighten down the nut.

B. Attach the black negative (-) battery cable from the ground on the console to the negative (-) terminal on the battery and tighten down the nut.

## FIRE EXTINGUISHER

**BLUELINE**, and many government agencies, recommend that a fire extinguisher rated for A, B, and C type fires be installed into any commercial vehicle.

## CONSOLE TO WASTE TANK CONNECTION



**\*Shown with optional waste pump out kit #68-003.**

# SECTION 3:

# OPERATION

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## **4. SYSTEMS**

**NOTE: Read and understand this section of the manual entirely before proceeding.**

This portion of the manual divides the unit up into systems and describes how each system works. Prior to proceeding into the operations and maintenance sections of this manual it is recommended that you acquire a basic understanding of how the unit functions.

### **WATER PUMPING SYSTEM**

See figures 3-1 and 5-10. Cold water enters the console through the water inlet connection located on the lower right corner of the right lower front panel. The water then flows to the water box through a float valve, which shuts off the water when the water box is full.

Water then flows through a strainer in the water box to the water pump. The water pump is plumbed to a nitrogen charged accumulator, which helps reduce pressure pulsations. Simultaneously, water is then pumped to the pressure regulator assembly, which provides and maintains the desired pressure setting.

The pressure regulator assembly also includes a high-pressure and a low-pressure shutdown switch. These switches will shut down the unit if the water pressure exceeds 1200 PSI or drops below 50 PSI for more than 5 seconds.

Water then flows from the pressure regulator into the high-pressure heat exchanger, where it is super-heated by the engine exhaust.

The water then flows through the check valve manifold that contains a Y-strainer and a check valve. At this point, the chemical injection takes place.

The hot solution mixture of water and chemicals then flows through the solution outlet manifold to the cleaning tool.

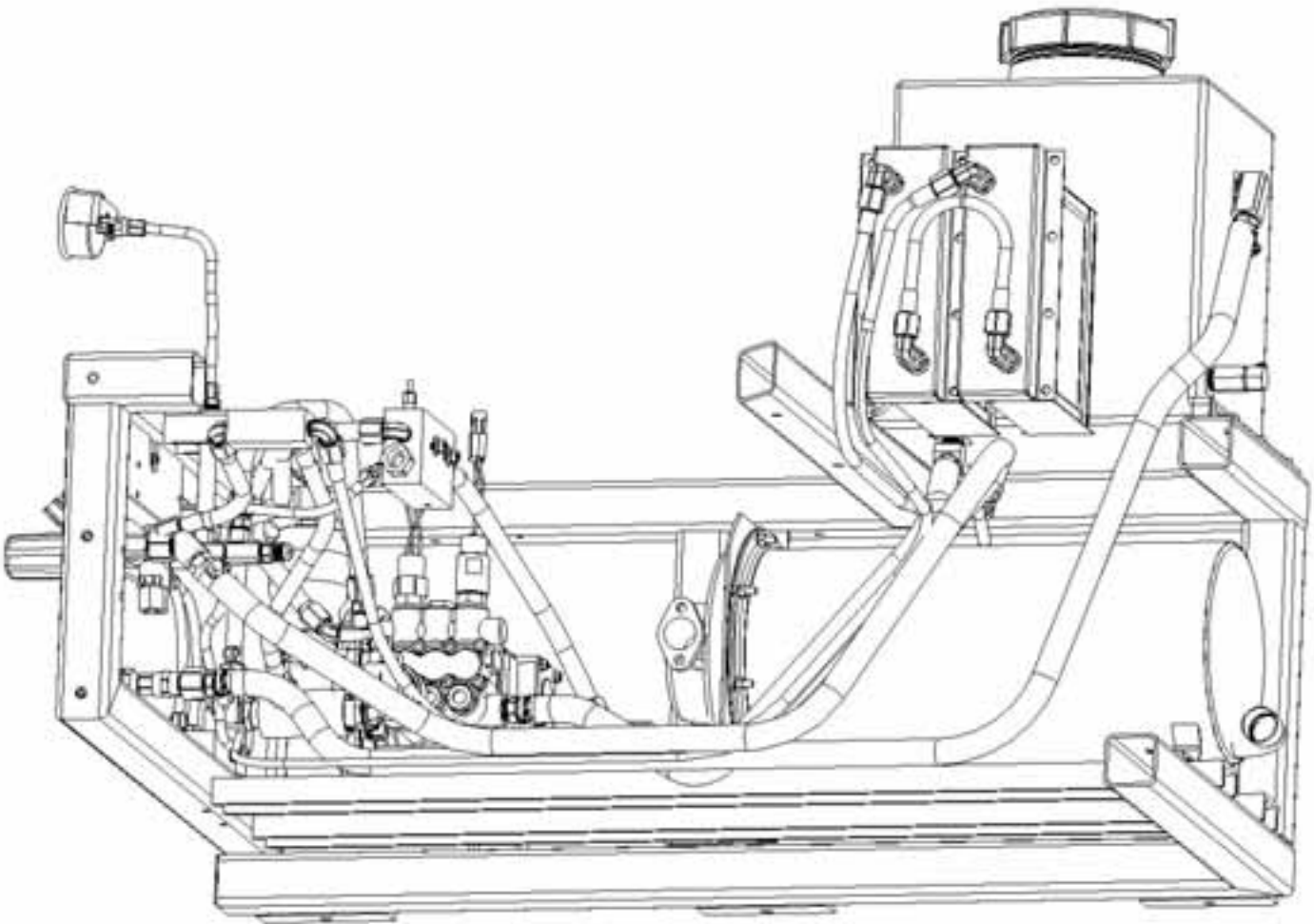
A temperature sensor is located on the engine exhaust heat exchanger outlet. This will shut down the engine if the water temperature exceeds 285 deg. F. If this occurs, see the “**Troubleshooting**” section of this manual to find the cause of overheating prior to restarting your unit.

### **HEAT TRANSFER SYSTEM**

See figures 3-1 and 5-10. Water is heated through a 2 stage heat exchange system that utilizes hot blower exhaust gases and super heated engine exhaust.

Stage one utilizes hot blower exhaust gases through a core containing copper coils. The pressurized water flows through the copper coils and collects heat from the blower exhaust gases. The water then flows to the second heat exchange system.

The second heat exchange system is an engine exhaust vessel containing a stainless steel heating coil. Water flows through the coil and collects heat from the engine exhaust as it leaves the engine.



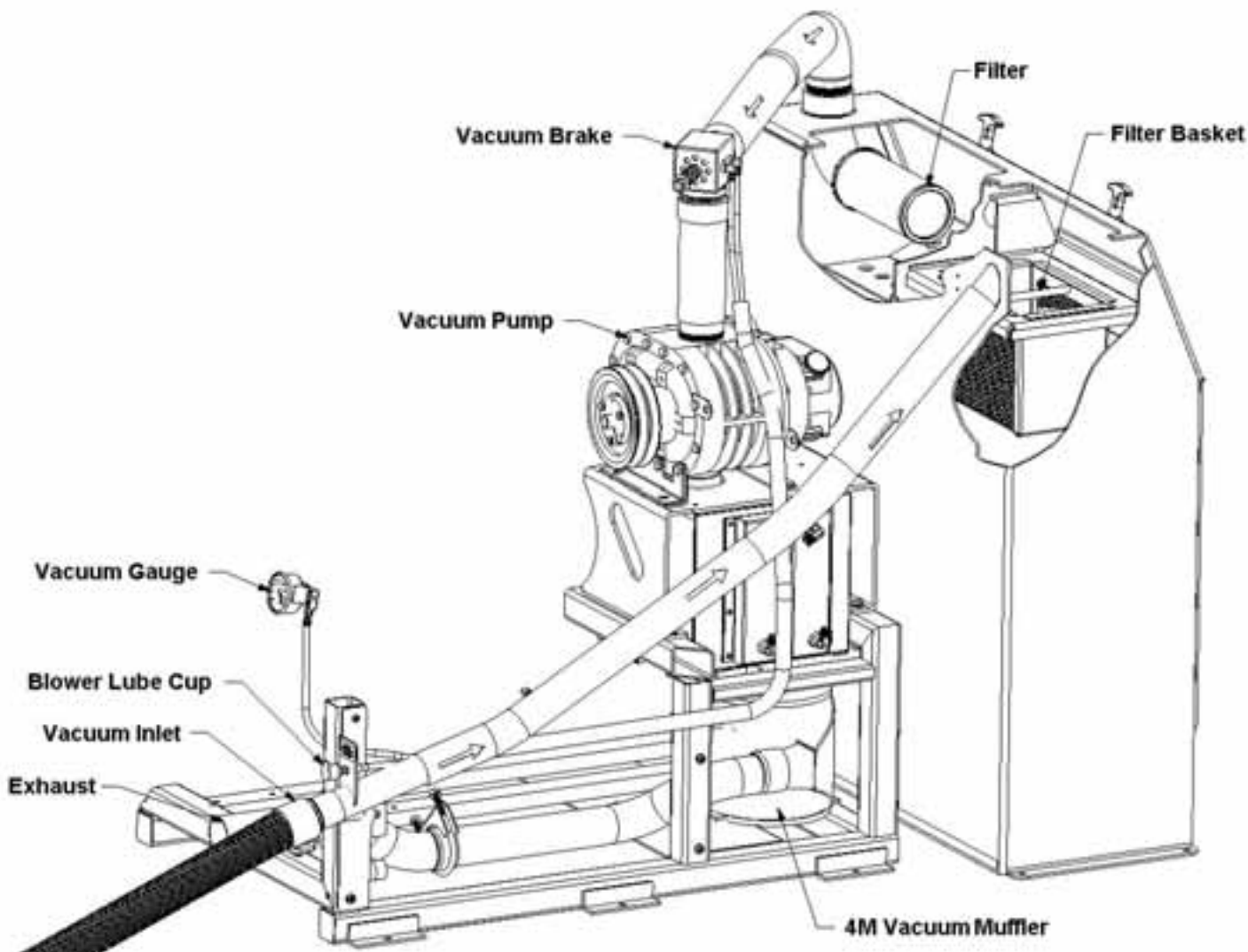
3-1

## VACUUM SYSTEM

See figures 3-2 and 5-20. The vacuum flow is initiated by the vacuum pump, or blower. An air and water mixture is drawn into the vacuum inlet on the front of the console. The mixture flows through a strainer basket in the waste tank. The air exits the waste tank through a 100 mesh filtration system, into the vacuum pump. A vacuum pump relief valve is installed for vacuum pump protection.

The air is discharged from the vacuum pump through a spiral silencer and then through an engine exhaust silencer.

A level shut off sensor is located near the top of the waste tank and will shut down the unit before the tank is at full capacity. This protects the vacuum pump from water damage. **Note:** Waste tank level shut off will not shut the unit off due to high levels of foam. The use of a quality defoamer is recommended.



3-2

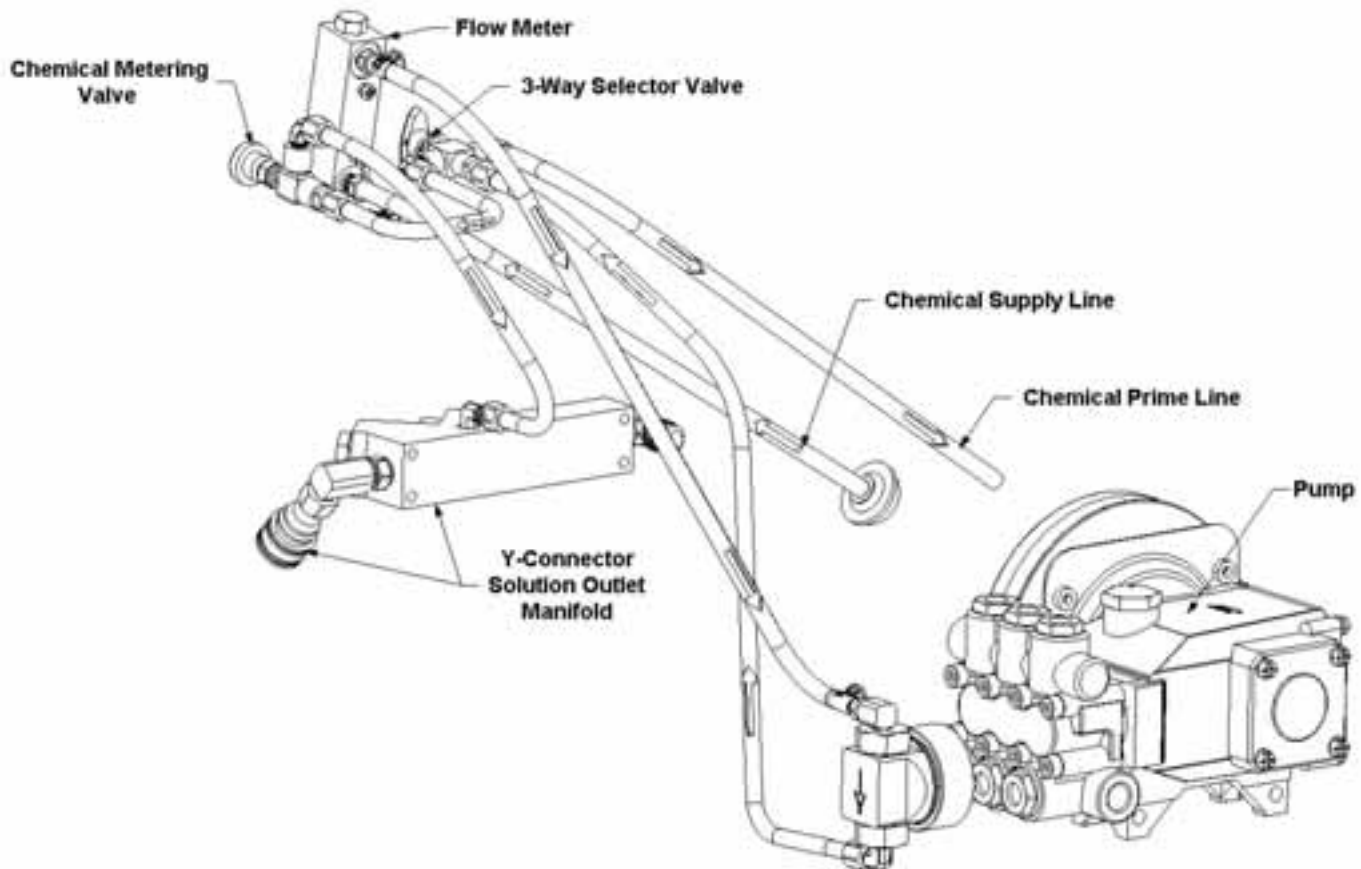


## CHEMICAL PUMPING SYSTEM

See figures 3-3 and 5-25. The chemicals are drawn from the chemical jug through a strainer into the flow meter. The flow meter indicates the rate of chemical flow.

The chemicals then flow through the chemical metering valve to the solution outlet. This valve controls the rate of flow of chemical into the cleaning solution, which is indicated on the flow meter.

The chemicals then flow through the check valve into the stainless steel pulsation chemical pump. Then, the chemical pump injects the chemicals through the check valve to the three way selector valve located on the front panel. This valve may be used to turn the chemical flow **ON**, **OFF**, or to **PRIME** the chemical pump.



3-3



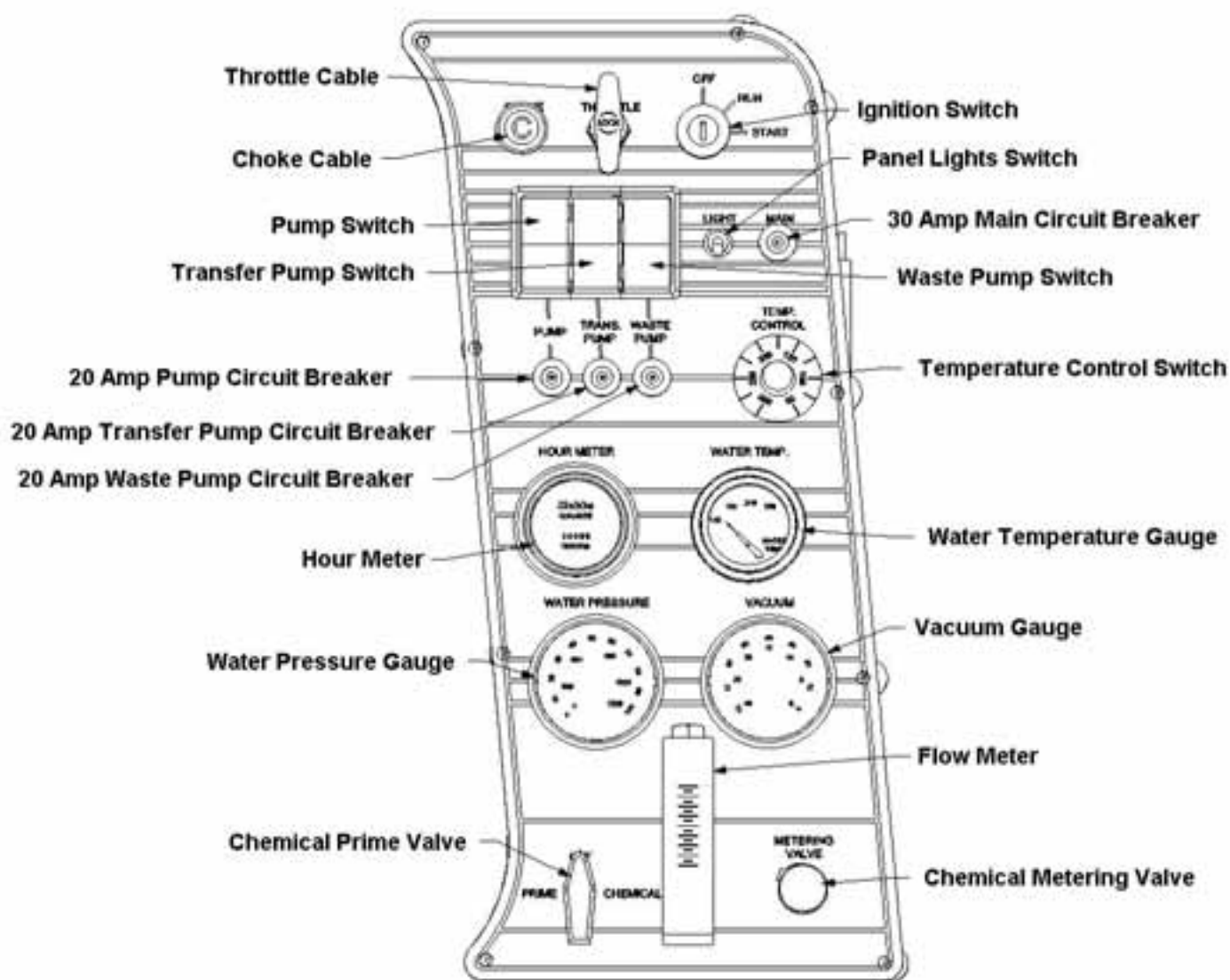
## 5. OPERATION

### PREPARATION

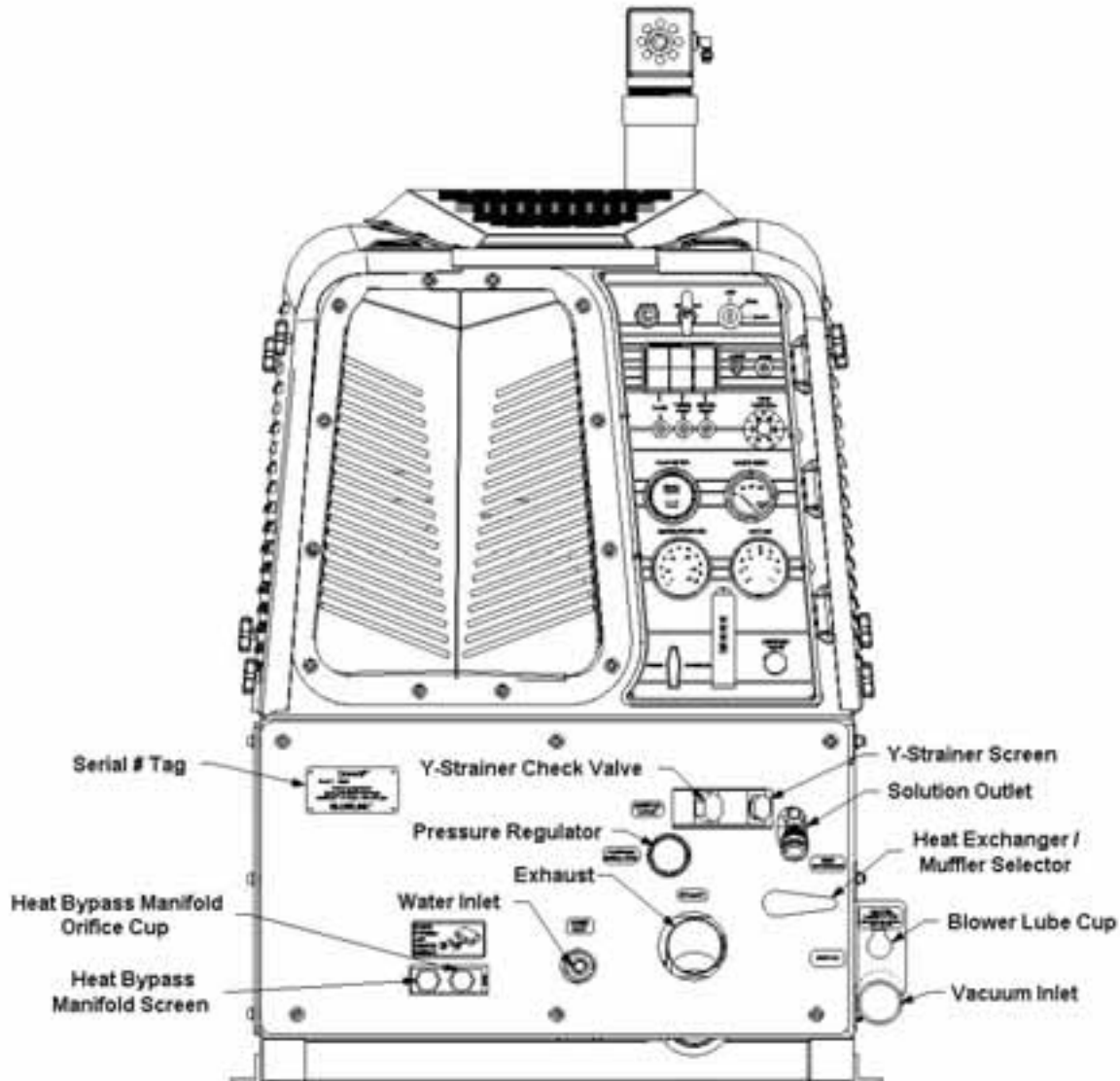
This section of the operator's manual explains how to prepare, start, operate, shut down and maintain your **BLUELINE CHAMP®** mobile cleaning unit. The **BLUELINE CHAMP®** unit is easy to operate. However only trained operator's should proceed.



Operate this unit and equipment only in a well ventilated area. Exhaust fumes contain carbon monoxide, which is an odorless and deadly poison that can cause severe injury or death. **DO NOT** run this unit in an enclosed area. **DO NOT** operate this unit where the exhaust may enter a building doorway, window, vent or any other opening.



3-4



3-5

### ENSURE THERE IS ADEQUATE FUEL

Check the fuel tank to ensure there is adequate fuel to complete the job and transport the vehicle. This unit consumes approximately .95 US gallons of fuel per hour, when unit is run under full load.

### REMOVE TOOLS FROM THE VEHICLE

Remove any tools, accessories or hoses from the vehicle that you will require.

### WATER SUPPLY CONNECTION

**NOTE:** Prior to connecting your water inlet hose to any supply faucet, flush out the faucet until the water is free of any debris. Also, flush out any debris from your water inlet hose.

1. Connect the water supply hose to the water inlet quick connector on the front of the unit. Connect the hose to the faucet.

**NOTE:** Never use a waste pump outlet hose as a water inlet hose. Use only clean hoses for water supply.

2. Turn the water supply faucet on. Water will fill the water box.

### HIGH PRESSURE HOSE

Before starting the unit, connect the high pressure hoses to the solution outlet connection at the front of the unit. Connect the cleaning tool to the opposite end of the pressure hose.



### VACUUM HOSE

Connect the vacuum hose to the vacuum inlet connection at the front of the console. Connect the opposite end of the vacuum hose to the cleaning tool.

### JET SIZING

**BLUELINE** recommends that the total floor tool size does not exceed “.045”. Using larger jet sizes on your **BLUELINE CHAMP®** unit may reduce cleaning temperatures.

**Example:** Four jet wand uses four 9501 jets.  
(95 deg. Spray angle w/01 orifice)  
.01 x 4 = .040

Upholstery tool jet size: 80015.

Stair tool jet size: 9502

## STARTING THE UNIT

The low-pressure switch will automatically shut down the unit if the water pressure in the system drops below 50 PSI, for more than 5 seconds.

The high-pressure switch will automatically shut down the unit if the water pressure in the system exceeds 1200 PSI, for more than 5 seconds, with the water pump in the on position.

1. Set the throttle cable control to the idle position.
2. Pull the choke cable out.
3. Turn the ignition switch to the right intermediate position. Hold the switch in this position for approximately 3 seconds, allowing the fuel pump to pump fuel.
4. Turn the ignition switch to the furthest right position. This will engage the starter and start the engine.
5. After starting the engine, push the choke in.
6. After the engine is running at its idle setting, select the desired speed setting using the throttle control cable.
7. Turn the water pump switch to the **ON** position.

**NOTE:** If the unit does not build water pressure after 5 seconds, check for adequate water supply. See “Loss of Water Pump Pressure in the “**Troubleshooting** section of this manual.

Allow adequate time for the water temperature to warm up before cleaning, approximately 10-15 minutes.

## **PRIMING THE CHEMICAL PUMP**

**NOTE:** BLUELINE recommends that the chemical pump be primed whenever the water pump is on. This eliminates possible pressure fluctuations and water pump pulsations related with running the chemical pump dry.

1. Insert the chemical prime tube and the chemical inlet tube into the chemical jug.

**NOTE:** When inserting the chemical tube into the chemical jug, ensure that it stays fully submerged, as the chemical pump will not function if air is allowed to enter the inlet line.

**DO NOT** operate the chemical pump without the inlet strainer properly installed.

2. Turn the 3-way chemical selector valve located on the control panel to the **PRIME** position. The chemical will then flow from the chemical jug through the chemical prime tube.

If the pump does not prime, then:

A. Place the chemical prime tube into the vacuum hose and seal off the vacuum hose. The vacuum will quickly draw chemical from the chemical jug. After the flow begins, turn the chemical selector valve to **OFF** position, insert the chemical prime tube back into the jug, and turn the chemical selector valve back to the **PRIME** position and continue the procedure.

B. Once chemical flow with no air bubbles has been achieved, turn the chemical selector valve from **PRIME** to **METER**. With the cleaning tool open, check the flow meter and adjust the chemical metering valve until the desired rate of chemical flow is achieved.

## **AUTOMATIC WASTE PUMP**

1. If your unit is equipped with an optional automatic waste pump, connect one end of the 5/8 inch or larger garden hose to the pump-out connection and the other end to an acceptable waste disposal.

2. Turn the pump-out switch located on the front console control panel to the **ON** position. The waste pump will now operate automatically throughout the cleaning period.

**DO NOT** use an outlet hose that is smaller than 5/8 in. I.D.

**NEVER** use a waste pump hose as a water inlet hose.



**NEVER dispose of waste water in a storm drain, water way or on ground areas. Always dispose of waste in accordance with Local, State and Federal laws.**

## **OPERATION**

After you have completed the previous steps, proceed with the cleaning or restoration operation. Place the throttle control cable to the desired cleaning mode for restoration or cleaning. A float shut-off switch is located inside of the waste tank. It will automatically shut down the unit if the tank reaches its full capacity. If this occurs, empty the waste tank before continuing. When doing flood extraction, the water pump should be in the **OFF** position, and the diverter control lever in the muffler position.

### CLEANING

While cleaning, observe the following guidelines:

1. Before cleaning, ensure that the wand nozzles are functioning properly.
  - A. Hold the wand approximately one foot above the surface to be cleaned and open the wand valve. A full even spray should emit from the cleaning nozzles.
  - B. If the nozzles are not showing a full even spray pattern, adjust, clean, or replace the nozzles, if required.
2. Usually, chemical solution is applied during the push stroke of the wand during cleaning, and extraction is done on the pull stroke. For heavily soiled carpets, the wand may be used in a scrubbing action, with chemical solution applied in both push and pull strokes, provided that the final stroke is a pull stroke with no chemical injection.

### UPHOLSTERY CLEANING

1. Upholstery tools have a lower flow rate and smaller orifices. To accommodate the desired cleaning temperature, operate the unit in the **upholstery** mode, by setting the diverter valve in the muffler position and the water pump switch in the on position.
2. Always clean upholstery with a pressure setting below 300 PSI, by using the pressure regulator on the unit.

### STAIR TOOL CLEANING

1. Set the diverter valve to the heat exchange position. Set the **temperature control** to the desired setting. To maintain proper cleaning

temperatures, make certain that the unit has been fully heated up prior to cleaning.

### FLOOD RESTORATION/EXTRACTION



1. Set the throttle control cable on the front control panel to the desired setting. Make certain that the **water pump switch** is in the **OFF** position, and the diverter control lever in the muffler position. Proceed into the extraction process.

### SHUT DOWN AND DAILY MAINTENANCE

1. Flush out the chemical system with fresh water to remove any chemical residue.
2. Remove as much moisture from the vacuum hoses as possible. This will prevent spillage of wastewater in your vehicle when returning hoses.
3. Disconnect the vacuum hose from the front of the console.
4. Push the throttle control cable to the **IDLE** position.
5. Turn the thermostat down to 50 deg. F.
6. Allow the unit to run for at least **2 minutes** or until the water temperature is at or below 180 deg. F. This will also remove any moisture from the vacuum pump.

**NOTE:** If shutting down for the day: Plug the vacuum inlet, and set the throttle control to high speed. Spray WD-40 (or equivalent) into the **blower lubrication cup**, located on the front of the console for **5 seconds**. This will lubricate the vacuum pump. Next, return the



throttle control cable to **IDLE** position, and continue step 4.

7. Turn the ignition switch to the **OFF** position.

8. Turn the water supply faucet off. Loosen the water supply hose at the water supply to bleed off the pressure. Unhook the water supply hose and return it to the vehicle.

9. Activate the valves on all cleaning tools. This will relieve any remaining pressure. Disconnect the cleaning tools and solution hoses and return them to the vehicle.

10. Drain the waste tank, disposing of wastewater in a suitable and proper location.



**NEVER dispose of wastewater in a storm drain, water way or on ground areas. Always dispose of waste in accordance with Local, State, and Federal laws.**

11. Remove the strainer basket from the waste tank. Clean out any debris and re-install.

**NOTE: Damage may occur to the vacuum pump.**

Replacement and maintenance of the filter(s) will prevent rust and corrosion from entering the vacuum pump.

12. Inspect the vacuum inlet filter(s) inside the waste tank **weekly**. Remove and clean the filter(s) if there is any lint or debris present.

**NOTE:** To remove the vacuum inlet filter(s), grip the plastic hexagon section of the filter(s). Gripping the filter(s) by the screen will collapse or destroy the filter(s). Replace the filter(s) after cleaning until hand tight.

**NEVER operate this unit with the filter(s) removed, damaged or improperly installed.**

13. At the end of the work day, rinse out the waste tank with fresh water. A deodorizer may be added to prevent bacterial growth.

14. Clean the vehicle interior, unit, tools, hoses etc., as needed. Inspect **ALL** equipment and accessories for any damage, leaks, wear, etc.

### **FREEZE PROTECTION**



**If the unit is exposed to freezing weather conditions, the water inside of the unit may freeze, resulting in SERIOUS DAMAGE to the unit. The following is recommended to prevent this from occurring during the cold weather season:**

1. Always park the unit in a heated building when not in use.
2. While out in operation, avoid long periods of shut down as the unit generates heat while running. Keep the unit running just prior to leaving for the next job.
3. If a heated building is not available, winterize the unit with anti-freeze.

**It is not possible to winterize units that have auxiliary water tanks. If the unit has an auxiliary water tank(s), it must be stored in a heated building.**

### **WINTERIZING YOUR UNIT WITH ANTI-FREEZE:**

1. Shut off the water supply to the unit and disconnect the water inlet hose from the console.

2. Connect all solution hoses and tools that may have water in them, to the console.

3. Start the unit with the water pump in the **ON** position. Open a tool valve. This will result in the low-pressure switch shutting down the unit when the water box is emptied.

4. Fill the water box with two gallons of 100% glycol based anti-freeze.

5. Start the unit and set the throttle control cable to the **IDLE** position. Turn the water pump switch to the **ON** position. Open a tool valve until anti-freeze comes out of the tool. Repeat this procedure with **ALL** remaining tools and hoses.

6. After the tools and solution hoses have been filled with anti-freeze, disconnect and store them.

**Recover all anti-freeze that comes out of the tools and hoses and store in an approved container. ALWAYS re-use and re-cycle anti-freeze.**

7. Prime the chemical injection system with a 100% glycol based antifreeze. Insert the chemical inlet and prime tube into the anti-freeze container. Turn the chemical valve to **PRIME** until anti-freeze comes out of the prime hose. Turn the chemical valve to the **ON** (chemical) position. Ensure that the flow meter indicates flow. Ensure that all anti-freeze that comes out of the chemical hose goes into an approved container.

After **25 seconds**, turn the chemical valve to the **OFF** position.

8. Turn the temperature control to 50 deg F. Allow the unit to run for at least **3 minutes**. The unit is now winterized.

### **REMOVING ANTI-FREEZE FROM THE UNIT:**

1. Connect the solution hoses to the unit, with a tool attached to the opposite end. Start the unit. Turn the water pump on. Open the tool valve and ensure that the anti-freeze goes into an approved container. Allow the anti-freeze to flow into the container until the low-pressure switch shuts the unit down.

2. Fill the water box with fresh water and repeat step 1.

3. Connect the water inlet hose to the unit and turn the water supply on. Connect all tools and solution hoses that were winterized to the solution outlet connections.

Open all tool valves and drain the anti-freeze into an approved container until the water runs clear and all of the anti-freeze is purged from the hoses and tools.

4. Insert the chemical prime hose into the approved container. Submerge the chemical hose into fresh water. Turn the chemical valve to the **PRIME** position until the water runs clear through the prime hose. Remove the prime hose from the container.

5. Turn the chemical valve to the **ON** (chemical) position. This will allow water to flow to the other side of the system.

After all of the anti-freeze has been removed, the unit is ready to operate.

The anti-freeze in your approved storage container will eventually become diluted with water. When the anti-freeze level drops below 70% of the total mixture, properly dispose of it and start over with fresh 100% anti-freeze.





**DO NOT** drain used anti-freeze on the ground or into storm drains.  
**Dispose of anti-freeze only in an approved location. Observe Local, State and Federal laws when disposing of anti-freeze.**

# **SECTION 4:**

# **SERVICE & MAINTENANCE**

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MAINTENANCE CHART		
Engine	Daily	Check engine oil level.** Fill to proper level.
Vacuum Pump	Daily	Spray WD-40 (or Equivalent) into the lubrication cup for 5 seconds.
Water Pump	Daily	Check water pump oil level.*** Fill to proper level.
Vacuum Inlet Filters	Daily*	Inspect filters, clean and or replace if required.
Strainer Basket	Daily	Empty and clean stainless steel basket.
Vacuum Hoses	Daily	Rinse with fresh water.
Waste Pump-Out (Optional)	Daily*	Inspect and remove any debris or sediment.
Engine	Weekly	Check air cleaner for damaged, dirty, or loose parts.
Engine	Weekly	Inspect air intake and cooling areas. Clean if required.
Vacuum Pump	Weekly*	Check vacuum pump oil level. Fill to proper level. Do not overfill.
Vacuum Inlet Filters	Weekly	Remove filters and clean.
Water Box	Weekly*	Inspect and clean filter. Replace if damaged.
Bypass Manifold	Weekly	Clean and inspect strainer and orifice.
Battery	Weekly*	Check fluid level. Fill with distilled water only. Do not overfill.
Engine	Monthly	Inspect drive belts for wear. Replace as needed.
Water Box	Monthly	Check float valve for proper operation.
Y-Strainer	Monthly*	Clean and remove any debris.****
High Pressure Solution Hoses	25 Hours	Inspect for wear, damage, or impending rupture. Replace if damaged.
Engine	100 Hours	Change engine oil and filter.
Vacuum Pump	100 Hours	Grease bearings with extreme pressure bearing grease.
Pressure Regulator	100 Hours	Lubricate o-rings. Use only o-ring lubricant part # 13-003.
Battery	100 Hours	Clean battery terminals.
Engine	200 Hours	Check spark plugs and clean if necessary.
Engine	200 Hours	Clean engine air filter.
Chemical Metering System	200 Hours	Inspect packing nut on selector and metering valve. Adjust as needed.
Temperature Solenoid	200 Hours*	Clean hard water deposits from solenoid.
Temperature Probe Packing	200 Hours*	Inspect for leaks and tighten if needed. Do not over tighten
Engine	500 Hours	Replace in-line fuel filter.*****
Water Pump	500 Hours	Change crankcase oil.***
Pulleys and Hubs	500 Hours	Check pulley and hub set screws for proper torque.*****
Stainless Steel Accumulator	500 Hours	Check pressure. Recharge and change bladder if needed.*****
Engine	1000 Hours	Replace spark plugs.
Vacuum Pump	1000 Hours	Drain, flush, and replace oil.*****
Chemical Pump	1000 Hours	Change diaphragm and check valves. Inspect disk.
Check Valve	1000 Hours	Check Teflon seat for abnormal wear or debris. Replace as needed.
Engine	2000 Hours	Replace air filter element.

To maximize the operating life and performance, use only recommended oils, filters and greases.

\*Or as often as required.

\*\*Change engine oil and oil filter after **first 50 hours** of operation.

\*\*\*Change water pump crankcase oil after **first 50 hours** of operation

\*\*\*\*Inspect after **first week** of operation, and remove any debris present. Inspect again after **2 to 4 weeks**.

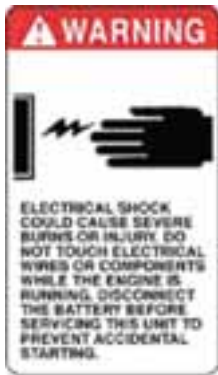
\*\*\*\*\*Check pulley and hub set screws after **first 50 hours** of operation, and again at **100 hours** of operation.

\*\*\*\*\*Or every **6 Months**. Whichever comes first.

\*\*\*\*\*Or **Yearly**. Whichever comes first.

## 6. MAINTENANCE

This section of the operator's manual contains the service and maintenance information for the **BLUELINE CHAMP®** unit. A planned preventative maintenance program will ensure that your **BLUELINE CHAMP®** has optimum performance, long operating life, and a minimum amount of down time.



**DO NOT** attempt to service this unit while it is running. High speed parts as well as high temperature components may result in severe injury, severed limbs, or fatality.

**NOTE:** Refer to the hour meter as a guide for coordinating a maintenance schedule.

## ENGINE

1. Check the engine oil level daily. Ensure that the proper oil level is maintained. **NEVER** overfill.
2. Change the oil after the first **50 hours** of operation, after the “break-in” period. Thereafter, change oil every **100 hours** of operation. **USE ONLY KOHLER BRAND OIL FILTERS. USE OF ANY OTHER TYPE OF OIL FILTER WILL VOID ENGINE WARRANTY.**

**Oil Recommendation.** The engine is shipped with Castrol Syntec Blend® SAE 10W-30 synthetic motor oil. Use only high quality synthetic oil of at least API (American Petroleum Institute) service class SG, SH, SJ or higher.

USE 10W-30 API SG,SH,SJ OR HIGHER					
°F -22	-4	14	32	59	104
°C -30	-20	-10	0	15	40
TEMPERATURE RANGE EXPECTED BEFORE NEXT OIL CHANGE					

**NOTE:** The use of less than service class SG, SH, SJ or higher oil, or extending the oil change intervals longer than recommended can result in engine damage.

3. Check the spark plugs every **200 hours** and clean if necessary. Replace spark plugs every **1000 hours. NEVER** sandblast spark plugs. Spark plugs should be cleaned only by scraping or wire brushing.

4. Clean the engine air filter element every **200 hours**. Replace the element every **2000 hours**.

Replace the in-line fuel filter **yearly**.

**NOTE:** Additional engine service information can be obtained from the provided Kohler Operation and Maintenance manual. If service or repair is required, contact an authorized Kohler Service Center. They will require the serial number of the engine.

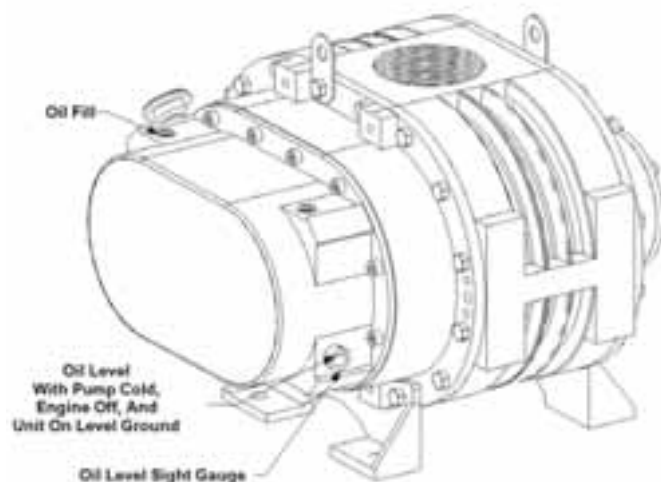
### VACUUM PUMP

**NOTE:** Refer to the provided Vacuum Pump Operation and Service Manual for specific instructions.

**Lubrication:** BLUELINE recommends that you use only AEON PD Synthetic Blower Lubricant in the gear end of the vacuum pump for all operating temperatures. AEON PD is formulated specifically for positive displacement blower service to provide maximum blower protection at any temperature. One filling of AEON PD will last a minimum of twice as long as a premium mineral oil.

**NOTE:** AEON PD (Part # 13-004) is the only oil that BLUELINE puts in the vacuum pump at the factory. Adding petroleum oil to synthetic oil is **NOT** recommended.

1. Check the oil level **weekly** to ensure the proper level. Too little oil will damage and ruin the bearings and gears. Too much oil will result in overheating.



2. A lubrication cup has been provided at the front of the console, to prevent rust from building up inside of the vacuum pump.

Run the unit for at least **2 minutes** to remove any moisture from the vacuum pump. Then, spray WD-40 (or Equivalent) into the lubrication cup for **5 seconds** while the unit is running and the vacuum inlet ports are sealed. This procedure should be done at the end of **every working day**.

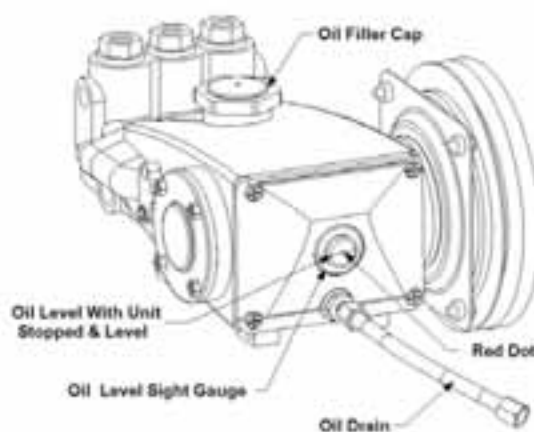
3. Drain, flush and replace the oil every **1000 hours or yearly, whichever comes first**.

The bearings on the pulley end of the vacuum pump require grease lubrication every **100 hours**. Grease the bearings until grease comes out of the vent holes on the vacuum pump. Use extreme pressure bearing grease of the spec: NLGI Grade 2 EP (Part # 13-002).

### WATER PUMP

Refer to the provided Water Pump Operation Manual for specific instructions.

1. Check the crankcase oil level **daily** to ensure the proper level. If the level has dropped, check for the source of leakage and repair.



2. After **50 hours** operation, change the crankcase oil with CAT Pump Crankcase Oil, (Part # 13-000). Change the crankcase oil every **500 hours** thereafter.

## VACUUM INLET FILTERS

1. The vacuum inlet filters in the waste tank should be inspected **daily**, and removed and cleaned **weekly**. The filter(s) will last for a long period of time if this is done.
2. Inspect the vacuum filter(s) inside the waste tank. Remove and clean filter(s) if there is any lint or debris present.



When removing the vacuum inlet filter(s), grip the plastic hexagon section of the filter(s). Grasping filter(s) by the screen will damage or destroy the filter(s).

## DRIVE BELTS, PULLEYS & HUBS

1. Check pulley set screws and hub screws after the first **50 hours** of operation and again at **100 hours**. Re-torque these screws with a torque wrench. Follow the torque values on the following table. Check pulley set screws and hub screws every **500 hours** thereafter.



Ensure that when you re-torque the screws, you use a clockwise pattern and continue until the proper torque is achieved.

TORQUE VALUES		
Component	Inch/lbs	Foot/lbs
Engine Hub	720	60
Vacuum Pump Hub	192	16

2. If wear or glazing is discovered, replacement is recommended.

## WATER BOX

1. The float valve should be checked at least **monthly** for proper operation. If overfilling is noted, check the plunger for proper seating. Also, check the float rod for proper adjustment.
2. The filter on the bottom of the inside of the water box is produced out of rubber with a stainless steel screen. This filter should be inspected and cleaned on a **weekly** basis, and replaced, if damaged.

**NOTE:** Prior to removing strainer, vacuum all excess water and debris from water box.

## STRAINER BASKET

The strainer basket located in the waste tank should be emptied and cleaned on a **daily** basis.

## BYPASS MANIFOLD STRAINER AND ORIFICE

The bypass manifold strainer and orifice should be checked and cleaned of any debris **weekly**.

## Y-STRAINER (OUTLET)

Unscrew the screen and inspect the Y-strainer after the first **week** of operation. Remove any debris present. Inspect again after **2** and **4 weeks**. Thereafter, inspect the Y-strainer and screen at least **monthly**. If a frequent build-up of debris is noticed, inspect and clean more frequently.

## CHECK VALVE (OUTLET)

Inspect the check valve when servicing the chemical pump or as needed. Remove the check valve from the Y-strainer assembly and disassemble. Check the Teflon seat for abnormal wear or debris. Replace the Teflon seat if necessary. Improper seating of the check valve



poppet, damaged spring, or o-rings will result in poor operation of the chemical system.

## **CHEMICAL PUMP**

The chemical pump should be rebuilt every **1000 hours**. This involves changing the diaphragm, check valves, and inspecting the disk.

## **CHEMICAL METERING SYSTEM**

Check and inspect the packing nut on the chemical selector and metering valves every **200 hours**. Keeping the valve packings properly adjusted will prevent leaks and add to the overall life of the valves.

## **STAINLESS STEEL ACCUMULATOR**

Sealed 250 pound nitrogen accumulator. Change every 2000 hours or as needed.

## **PRESSURE REGULATOR**

Lubricate the o-rings in the pressure regulator every **100 hours**.  
Use only o-ring lubricant (Part # 13-003).

## **VACUUM HOSES**

To ensure maximum hose life, **BLUELINE** recommends that you wash out the hoses with fresh water **daily**.

## **TEMPERATURE SOLENOID**

Hard water deposits should be removed from the temperature control solenoid every **200 hours**, or as often as required.

## **BATTERY**



**Explosive gases, Dangerous acid!**  
**Batteries contain sulfuric acid. To prevent acid burns, avoid contact with skin, eyes and clothing. Batteries also produce explosive hydrogen gases while charging. To prevent fire or explosion, charge batteries only in a well ventilated area. Keep sparks, open flames, as well as any other sources of ignition away from batteries at all times. Remove all jewelry prior to servicing batteries. Keep batteries out of the reach of children.**

**Before disconnecting the negative (-) ground cable, ensure that all switches are in the OFF position. If ON, a spark could occur at the ground connection terminal, which could cause an explosion if hydrogen gas or gasoline vapors are present. ALWAYS disconnect the negative (-) terminal first.**

1. Check the fluid level in the battery at least **once a week**. If low, fill to the recommended level **ONLY** with distilled water. **DO NOT** overfill the battery. Early failure or poor performance will result due to loss of electrolyte.

2. Keep cables, terminals and external surfaces of the battery clean and dry. A buildup of corrosive acid or grime on the external surfaces could cause the battery to self-discharge.

3. Battery terminals should be cleaned every **100 hours** to prevent corrosion buildup. Wash the cables, terminals and external surfaces with a mild baking soda and water solution. Rinse thoroughly with fresh water. **DO NOT** allow baking soda to enter the battery cells, as this will destroy the electrolyte, resulting in battery failure.

## **HIGH PRESSURE SOLUTION HOSES**

Inspect your high-pressure solution hoses for wear after the first **100 hours**. Thereafter, inspect every **25 hours**. If the hoses show any signs of damage or impending rupture, replace the hoses.



**NEVER attempt to repair high-pressure solution hoses. Repairing high-pressure solution hoses may result in severe burns and serious injury.**

**All high-pressure solution hoses must be rated for 3000 PSI at 250 deg. F. Thermoplastic hoses do not meet this requirement and should not be used. Severe burns and injury may result if the hoses do not meet these requirements.**

## **TEMPERATURE PROBE PACKING**

Check the temperature probe packing for leaks every **200 hours**. Tighten the packing nut fitting just enough to stop any leaks. **DO NOT** over-tighten.

## **7. GENERAL SERVICE ADJUSTMENTS**



**DO NOT attempt to service this unit while it is running. High speed parts as well as high temperature components may result in severe injury, severed limbs, or fatality.**

## **ENGINE SPEED**

1. To adjust the engine RPM, refer to the Kohler Engine Operation and Service Manual for specific instructions.



DO NOT attempt to adjust without a tachometer and NEVER adjust the engine above 2800 RPM.

## **VACUUM RELIEF VALVE**

With the unit running at full RPM, block off the airflow at the vacuum inlet ports and read the vacuum gauge. If adjustment is required, shut the unit down and adjust the locking nut tension on the vacuum relief valve. Re-start the unit and read the vacuum gauge. Repeat this process until the vacuum relief valve opens at 13" Hg.

## **VACUUM PUMP DRIVE BELTS**

The **BLUELINE CHAMP®** unit is equipped with a Belt Tensioning system. This eliminates the need for sliding the vacuum pump for belt adjustment. Periodic checking of the belts and pulley condition is all that is required.

## **WATER PUMP DRIVE BELT**

To tighten the water pump belt:

1. Loosen the four nuts, which hold the water pump base to the frame.
2. Adjust the position of the belt tensioning adjusting bolt until the proper belt tension is achieved. (3/4" deflection in the center of the belts, half way between the pulleys).

## SECTION 4

3. While checking the alignment, tighten the nuts that hold the water pump to the base.

### FLOAT VALVE (WATER BOX)

The float valve should only be adjusted if the water box is overflowing or the water level in the water box is low.

1. If the water box is overflowing, remove and check the float valve for damage, or debris. If the float ball has any water inside of it, it must be replaced.



**IF replacing the float ball, DO NOT over-tighten the float rod, as it can puncture the ball. Ensure that the nuts are tightened on the rod.**

### BYPASS MANIFOLD

The Bypass strainer and orifice should be cleaned **weekly**, using the following guidelines:

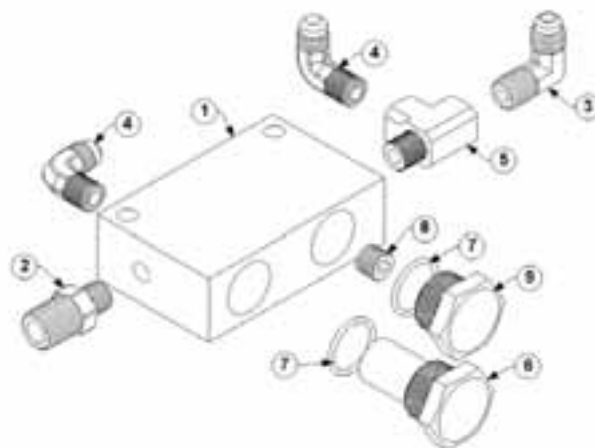
1. Remove the strainer, clean and re-install. **DO NOT** over-tighten.

2. Remove the cap. Remove the orifice, using a 3/16 in. Allen wrench.

3. Re-install the cap and run the unit with the water pump **ON** for at least **20 seconds** to clean out the bypass manifold.

4. Shut the unit down. Remove the cap and re-install the cleaned orifice, using a 3/16 in. Allen wrench. **DO NOT** over-tighten. Tighten orifice just enough to seat. Re-install cap. **DO NOT** over-tighten.

**NOTE:** If strainer is damaged, replace it. If o-rings leak or show wear, replace them.



Item #	Part Number	Qty.	Description
1	66-011	1	MANIFOLD, BYPASS
2	21-056	1	NIP, HEX 1/4 X 1/8 BRASS
3	21-054	1	ELL, 1-8 P X 1-4 T BRASS
4	21-064	2	ELL, 1/4 P X 1/4 T BRASS
5	21-079	1	TEE, PIPE STREET 1/8 BRASS
6	20-015	1	SCREEN, BYPASS MNFLD
7	41-003	2	ORING, .676ID .816OD
8	66-020	1	ORFICE, BYPASS MNFLD. GREEN.
9	66-017	1	CAP, CHECK VLV. BYPASS MNFOLD.

### SOLUTION OUTLET CHECK VALVE

Inspect the check valve whenever performing service on the chemical pump or if flow problems are occurring in the chemical system.

1. Remove the check valve, ensuring that the small o-ring on the seat comes out with it

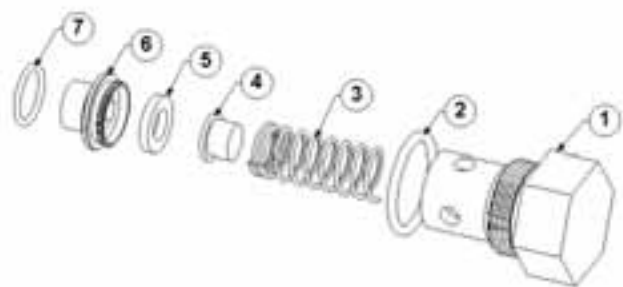
2. Next, remove the seat using a 5/16 in. Allen wrench

3. Check the Teflon seat for wear or debris. Clean and replace the seat if necessary.

## SECTION 4

4. Inspect the poppet and the spring for wear or damage. Clean and replace as necessary.

5. Re-assemble the check valve. Thread the seat by hand until snug. Then tighten with a 5/16 in Allen wrench. **DO NOT** over-tighten.



23-023 MANIFOLD CHECK, VALVE

Item #	Part Number	Qty.	Description
1	27-009	1	CAP, CHECK VALVE ASSY. SS
2	41-007	1	ORING, 7/8 ID X 1-1/16 OD
3	15-004	1	SPRING, CHECK VALVE ASSY.
4	27-010	1	POPPET, CHECK VALVE ASSY
5	27-011	1	SEAT, CHECK VALVE ASSY.
6	27-004	1	INSERT, SEAT-CHK VLV ASSY TM
7	41-008	1	ORING, ½ ID 5/8 OD

**Note:** Improper seating of the check valve seat, poppet, damaged spring or o-rings will result in poor performance of the chemical system.

6. Lubricate the o-rings with o-ring lubricant. (Part # 13-003) and re-install.

## CHEMICAL PUMP

The **BLUELINE CHAMP®** unit features a stainless steel chemical pump. The chemical pump requires only the replacement of the diaphragm and check valves. To replace the diaphragm, unscrew the cover from the body. When replacing the diaphragm, lube the outer edges of the

diaphragm with o-ring lubricant (Part #13-003) and reassemble.

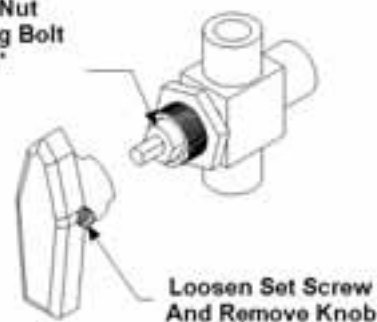
To replace the check valves, remove the check valve caps, replace the check valves and reassemble using new o-rings. **DO NOT** attempt to reuse o-rings after the check valves have been removed.

## PACKING NUT ADJUSTMENT CHEMICAL METERING/SELECTOR VALVES

Inspect the packing nut for proper tension on the chemical metering and chemical selector valves every **200 hours**. When turning the knob, there should be some resistance. If not, slightly tighten the packing nut. **DO NOT** over-tighten. Keeping the packing properly adjusted will eliminate possible leaks and will add to the overall life of the valves.

### Chemical Prime Valve

Adjust The Packing Nut  
By Turning The Packing Bolt  
Clockwise In 1/16"  
Increments.



### Chemical Metering Valve



## PRESSURE REGULATOR

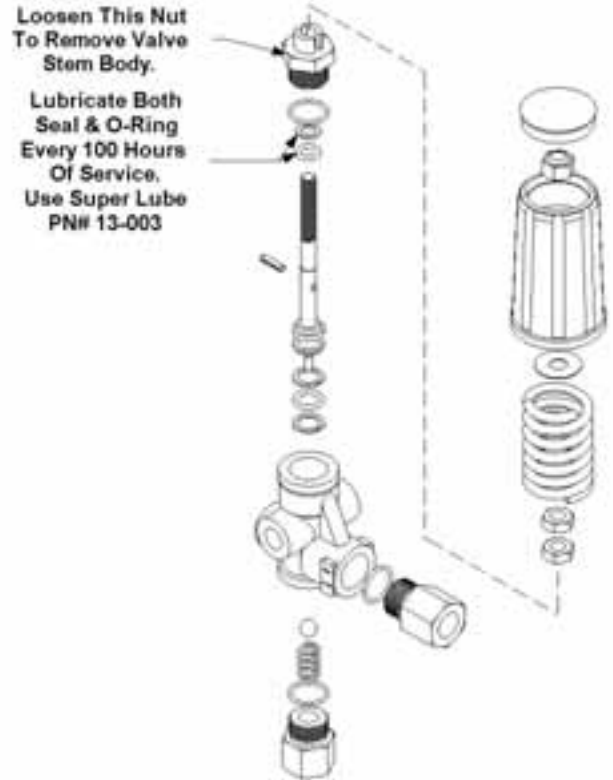
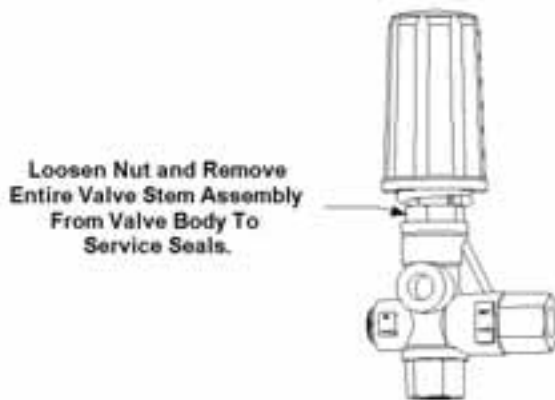
The pressure regulator holds water pressure at a preset point and bypasses this water back to the water box.

To adjust:

1. With the unit running, close the cleaning tool valve. Check the pressure gauge. Open the tool valve. Set the pressure regulator so that the pressure gauge reads 350 PSI with the tool valve open.

With the tool valve open, there should be a normal drop of approximately 100-PSI, in pressure. **If the drop is greater than 100 PSI, it may be necessary to lubricate the pressure regulator o-rings.**

2. To adjust the pressure regulator, turn the adjusting knob (while observing the pressure gauge on the control panel) until you reach the desired pressure.



## TEMPERATURE SOLENOID

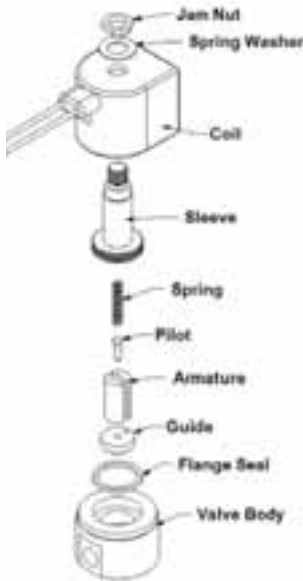
The temperature solenoid could become seized up due to hard water and mineral deposits. Ensure that the core moves freely in the stem. The plunger must also move freely within the guide. To clean, use #0000 steel wool.

Inspect the seat to ensure that it is not distorted. Clean the seat using a 3/64 in. drill bit. **ROTATE THE DRILL BIT WITH YOUR FINGERS ONLY.**

**DO NOT** over-tighten the nut when re-assembling the temperature solenoid. Over-tightening will damage the coil.



## SECTION 4



### TEMPERATURE CAPILLARY & PACKING ASSEMBLY.

#### INSTALLATION:

1. Thread the tapered end of the union fitting into the thermostat manifold and tighten. Use thread sealant.
2. Slide the jam nut over the bulb of the capillary with the threaded end toward the end of the capillary bulb.
3. Insert the bulb through the union fitting and into the thermostat manifold.
4. Put the rubber seal onto the capillary tube with the split facing 90 deg. from the top. (See capillary union detail).
5. Place the four brass disks onto the capillary tube with two of the brass disks on each side of the rubber seal. Face the notch on one brass disk toward the nearest disk to lock the disks together. Next, face the notches on the disks 90 deg. from the split in the rubber seal.

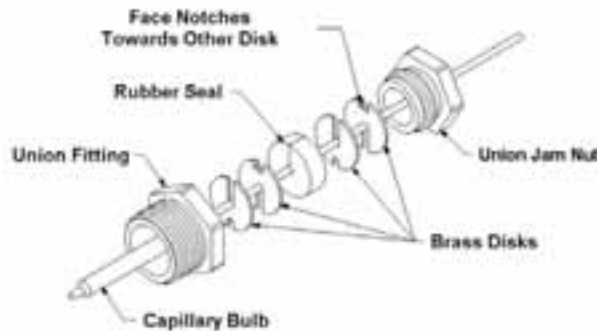
Lubricating the facing sides of the brass disks will help hold them together on the capillary tube during installation.

6. Insert the rubber seal and the brass disks into the union fitting, hand tighten.

7. Place the capillary bulb into the temperature manifold as shown. When positioning the bulb, **do not** allow the bulb to compress against the support fitting.

8. Tighten the jam nut lightly, approximately 1-1/2 turns.

9. Inspect the assembly for leaks and tighten just enough to eliminate any leaks. **DO NOT** over-tighten.



## 8. TROUBLESHOOTING



### WARNING!

**DO NOT attempt to service this unit while it is running. High-speed parts as well as high temperature components may result in severe injury, severed limbs or fatality.**

This section of the operator's manual describes how to look for and repair malfunctions, which may occur.

Accurate troubleshooting is based on a thorough and complete understanding of the **WATER, CHEMICAL, VACUUM, HEAT TRANSFER, SAFETY** and **WIRING** systems featured in this unit.

## SECTION 4

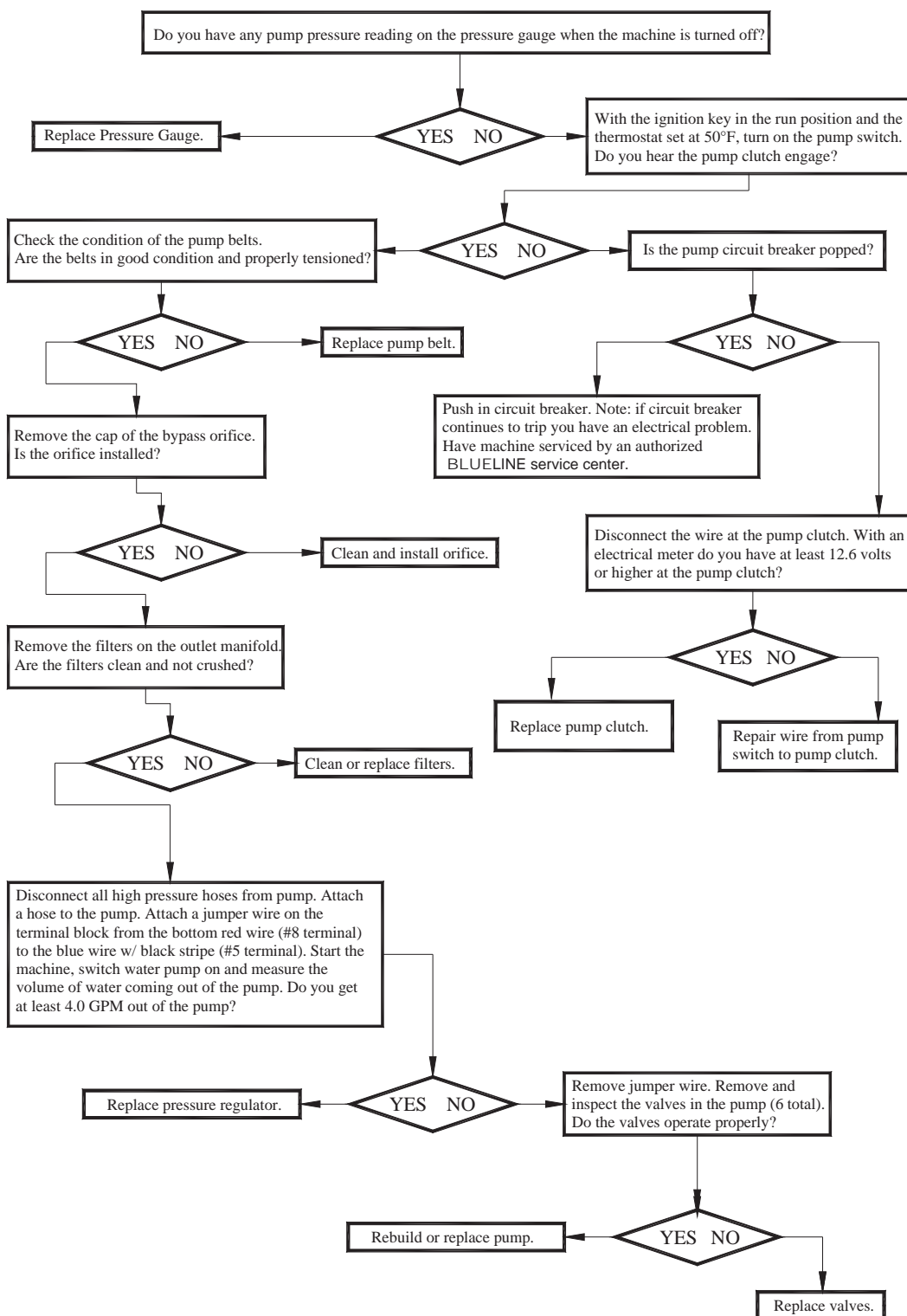
If there are malfunctions occurring on this unit which you do not understand, refer back to the

**OPERATION** section of this manual and review **SYSTEM** or **TROUBLESHOOTING**.



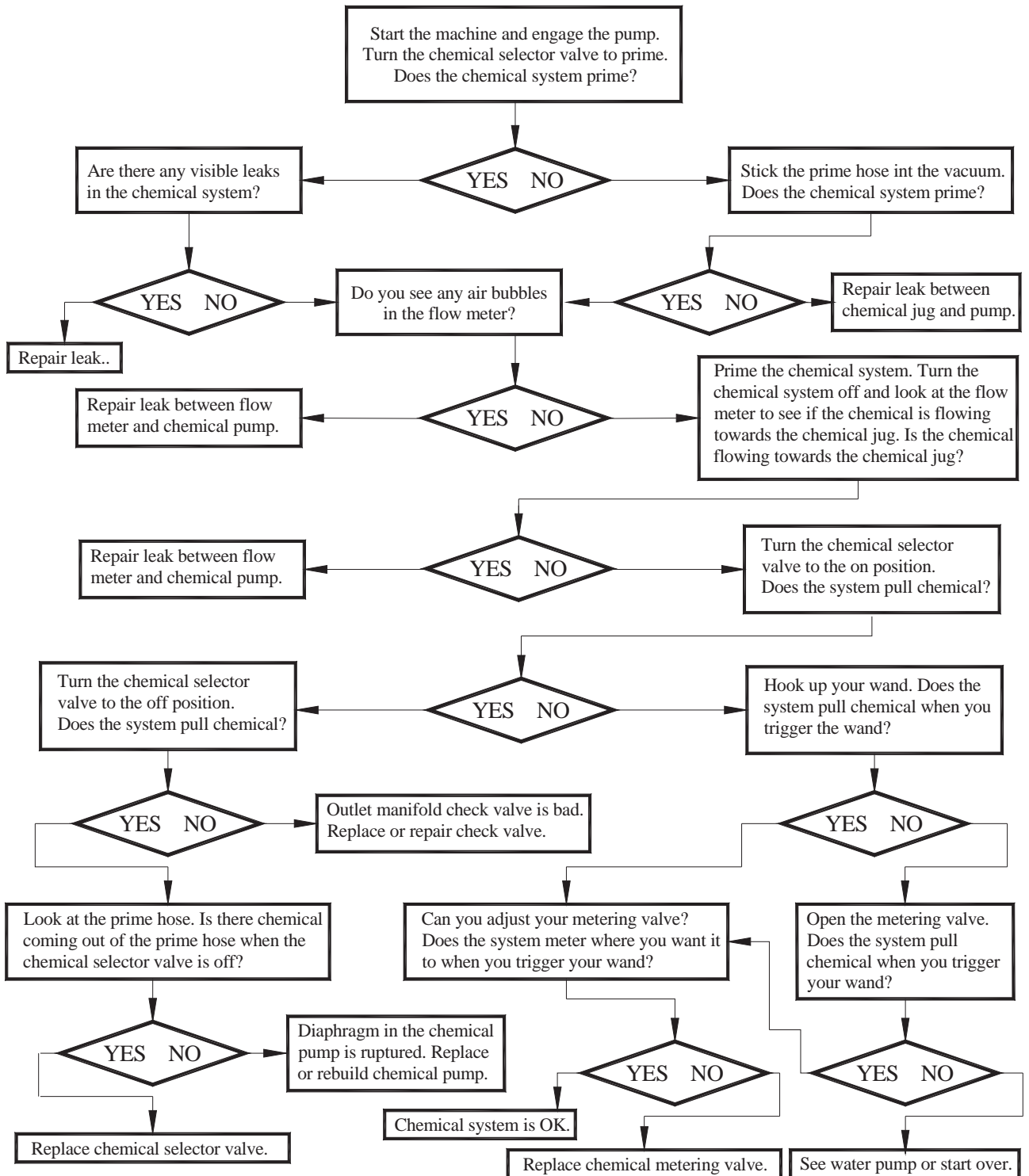
## Water Pump

Note: Make sure the pump has oil, the water box is full of water and the chemical system is turned off.  
 Note: any time you have a pump pressure problem we are actually looking for a pump volume problem.  
**Note: Water may be HOT and UNDER PRESSURE. EXTREME CAUTION SHOULD BE USED!!**



# Chemical System

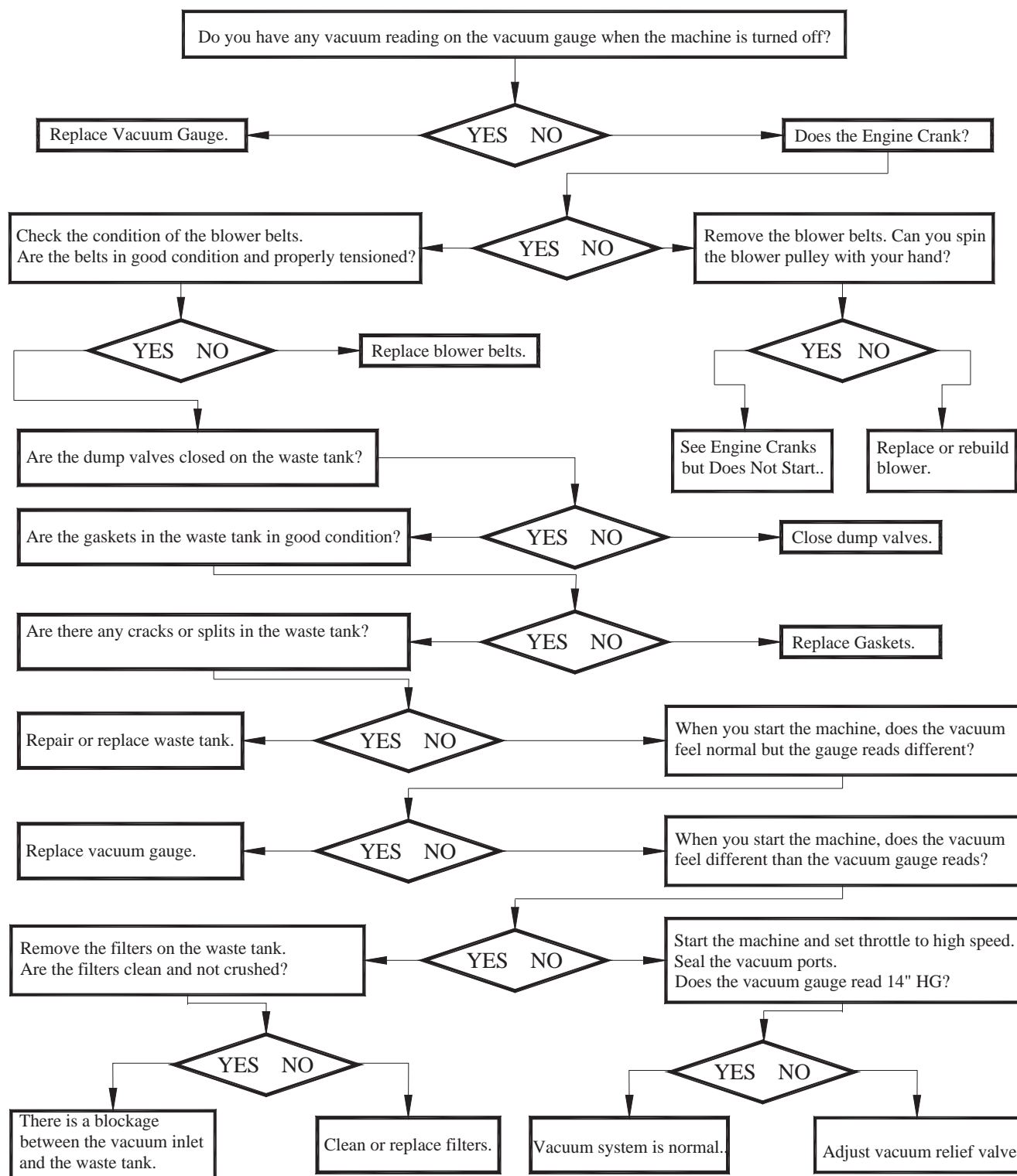
Note: Use a jug with fresh water only to diagnose chemical system.  
 Note: If chemical system works with just fresh water, your problem is with your chemical and not the system.  
 Note: Make sure the water system is working before you proceed.



## Blower/Vacuum

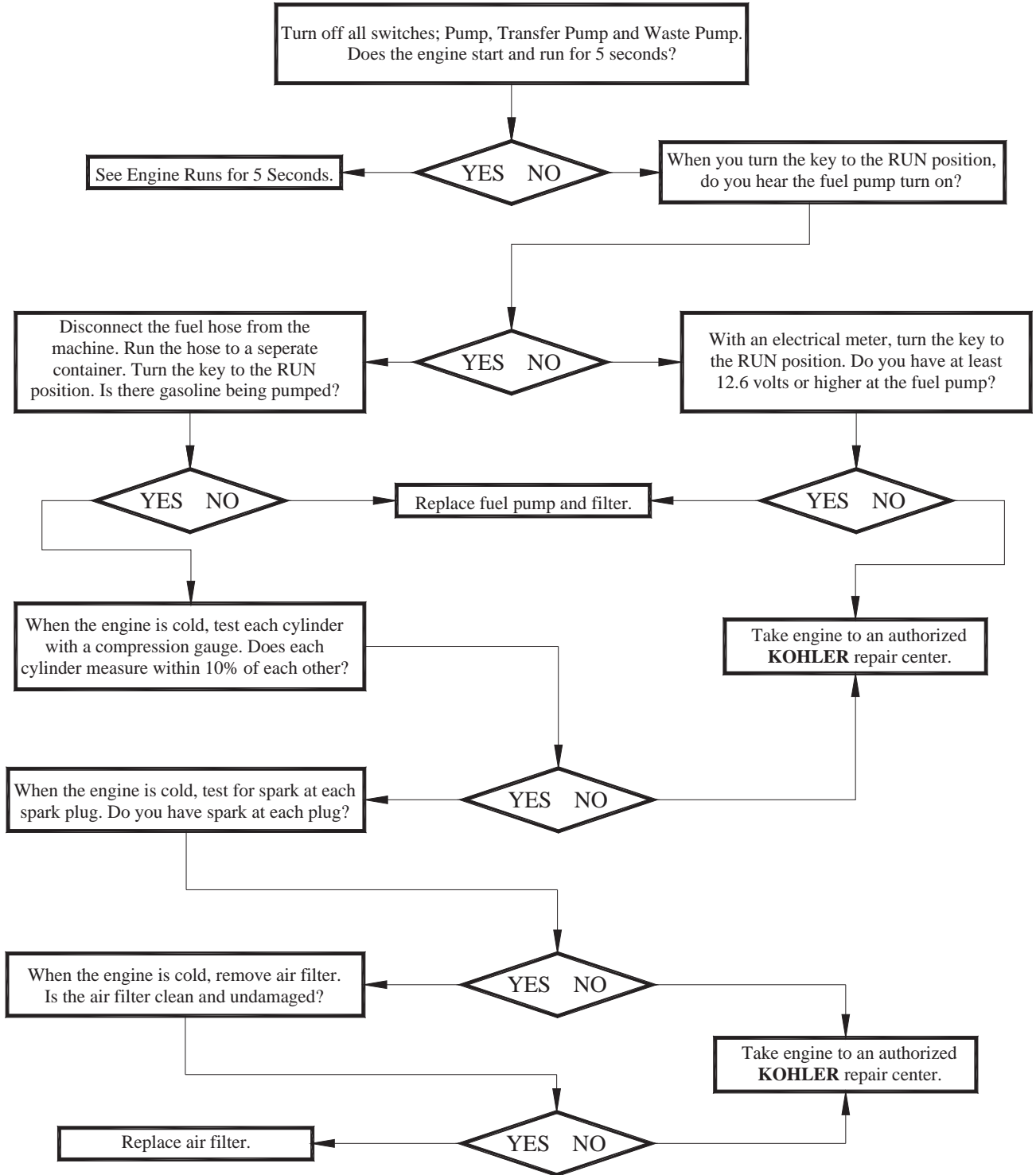
Note: Make sure the blower has oil, the waste tank is empty and their filters are clean.

Note: Anytime you have a Blower/Vacuum problem, you are actually looking for an air volume problem.



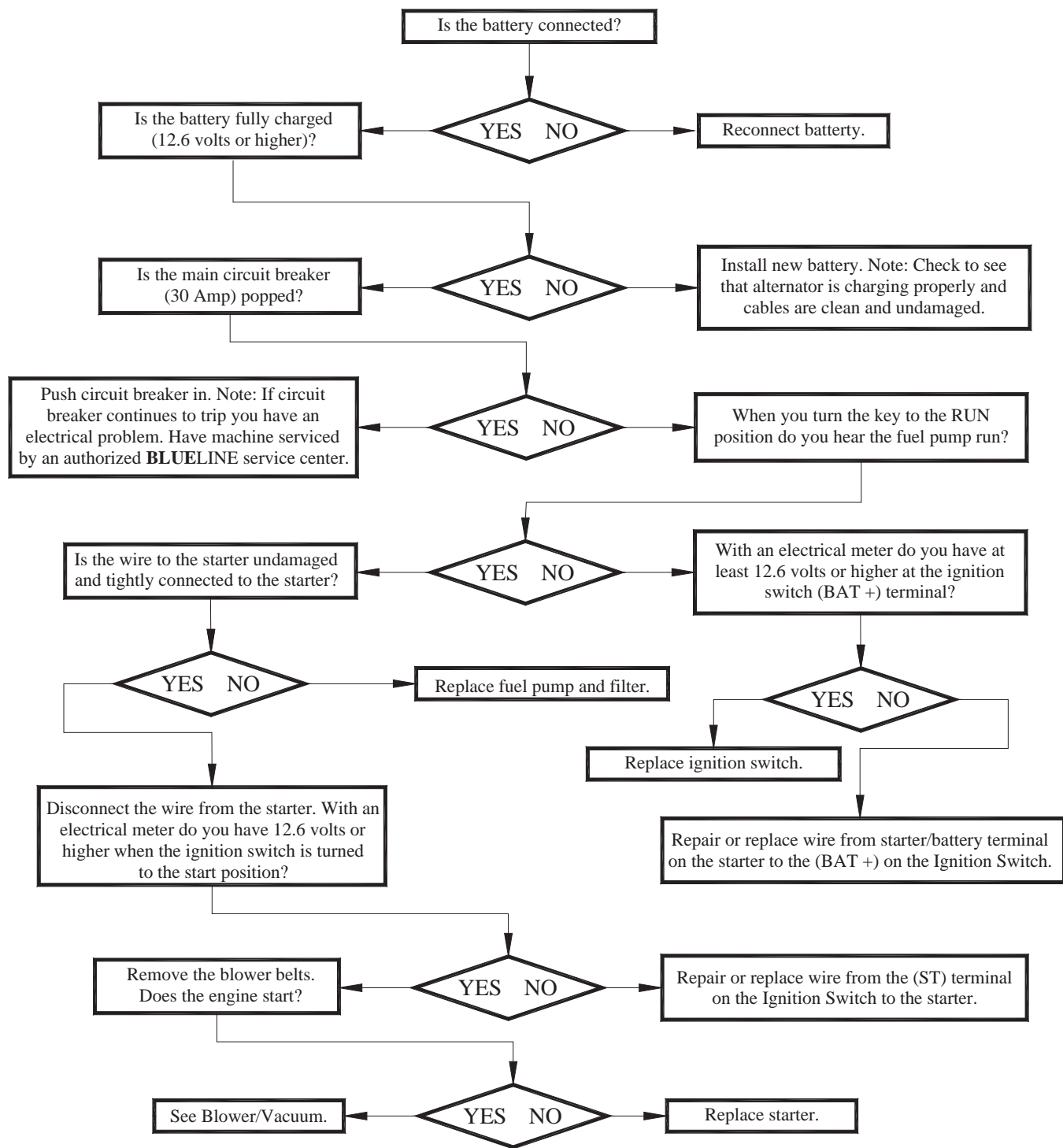
## Engine Will Not Start

Note: Make sure the engine has oil, waste tank is empty, and you have at least a half tank of gasoline.



## Engine Does Not Crank

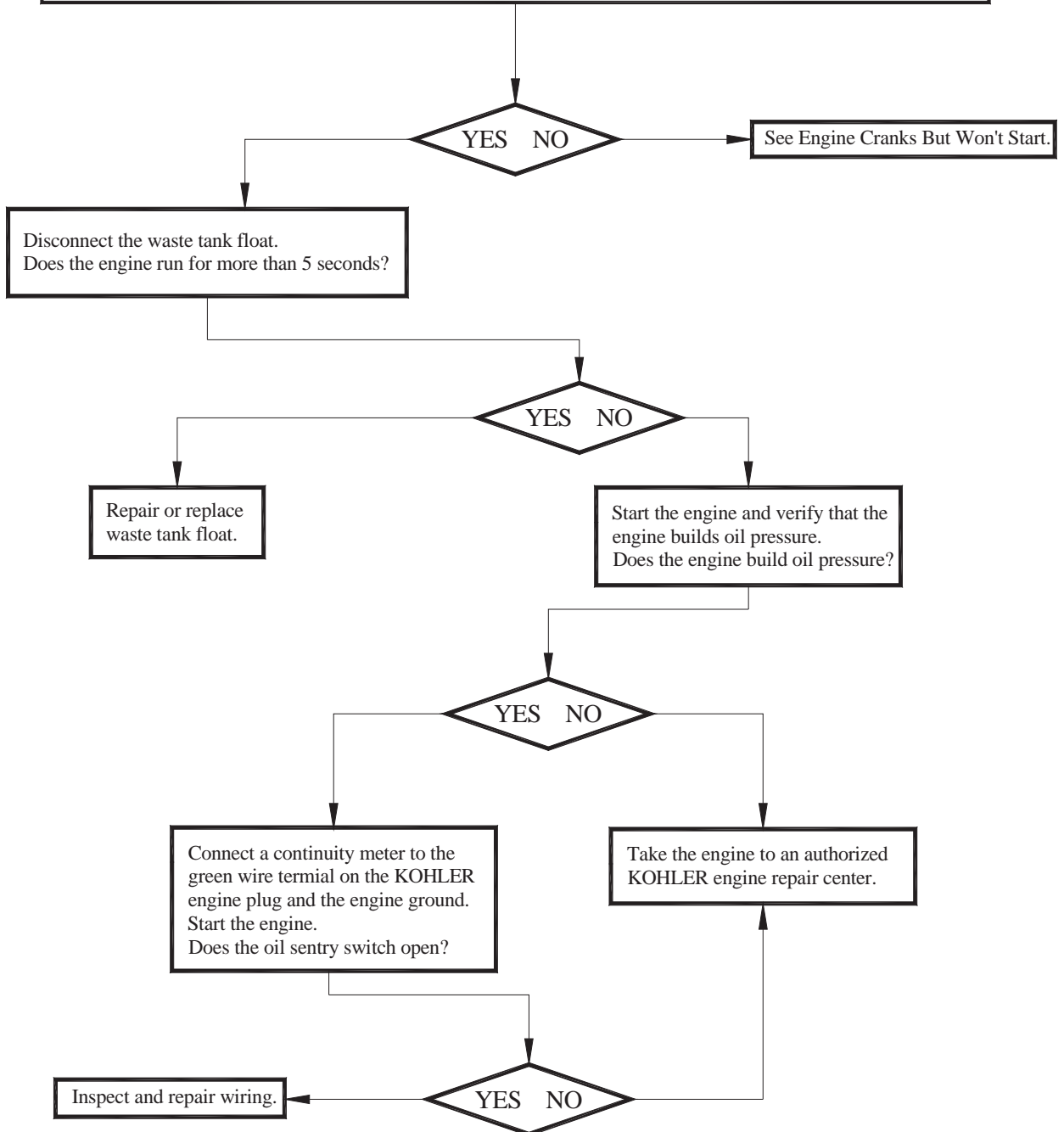
Note: Make sure the engine has oil, waste tank is empty, and you have at least a half tank of gasoline.



## Engine Runs for 5 Seconds

Note: Make sure the engine has oil, waste tank is empty, and you have at least a half tank of gasoline.

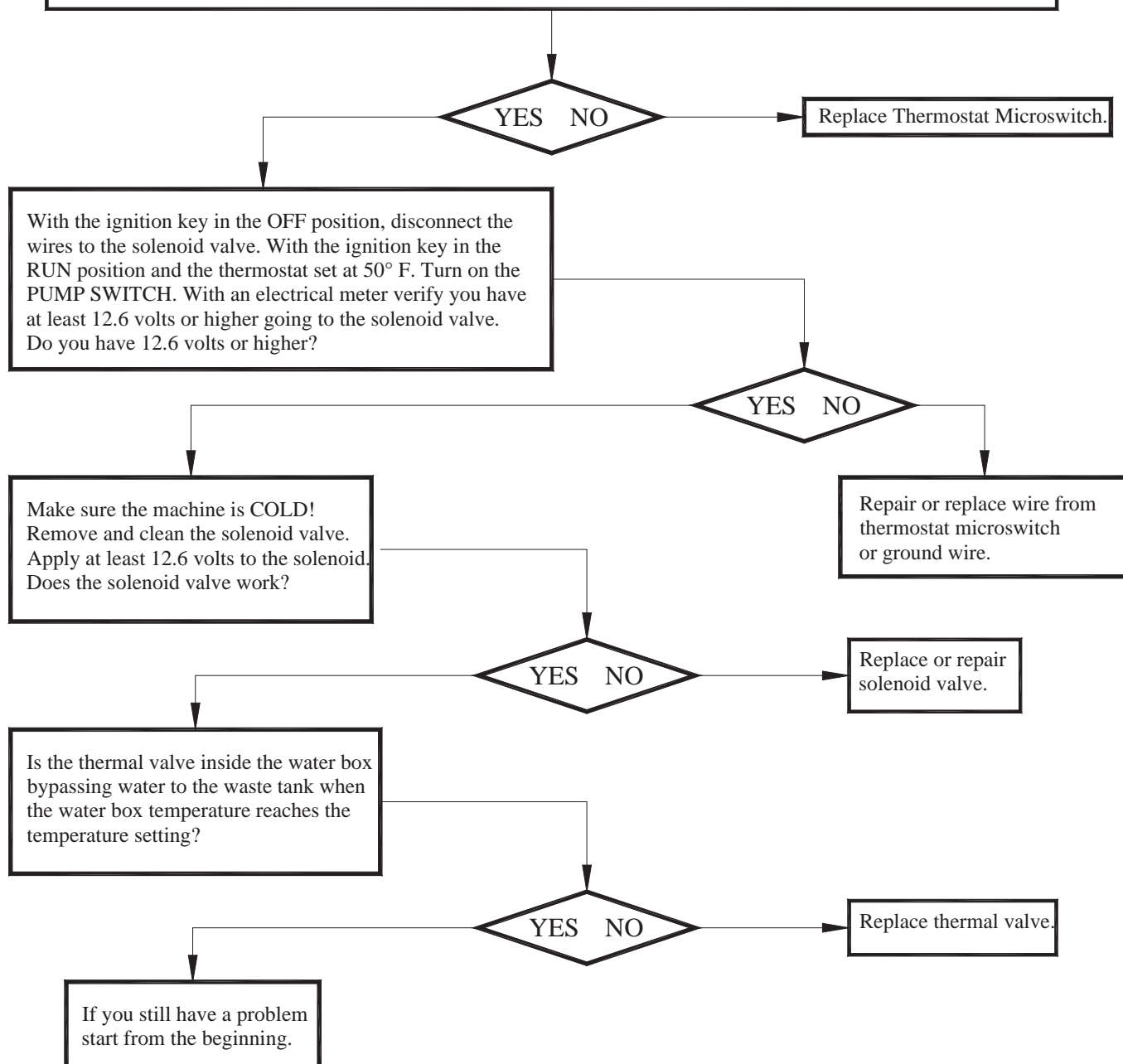
Turn OFF all switches: PUMP SWITCH, TRANSFER PUMP SWITCH and WASTE PUMP SWITCH.  
Does the engine start and run for 5 seconds?



# Heating System

Note: Make sure the Engine and Water Pump System are working Properly.  
 Note: Water may be Hot and under Pressure. EXTREME CAUTION SHOULD BE USED!!!

With the ignition key in the OFF position. Slowly turn the TEMPERATURE CONTROL switch up and down.  
 You will hear the thermostat microswitch click at approximately the temperature that the water in the machine is.  
 Do you hear the Thermostat microswitch click at the approximate temperature that the water in the machine is?





# **SECTION 5:** **SERVICE & MAINTENANCE**

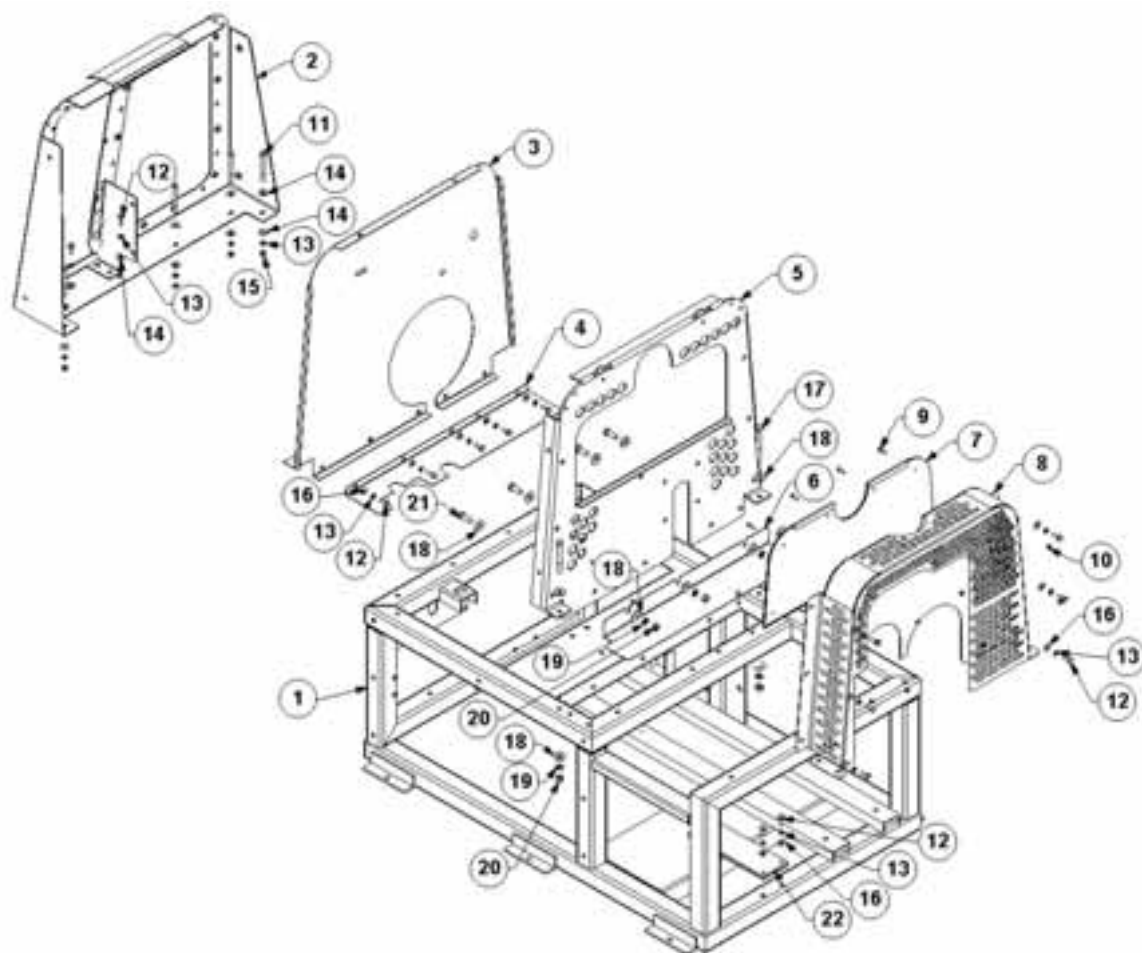
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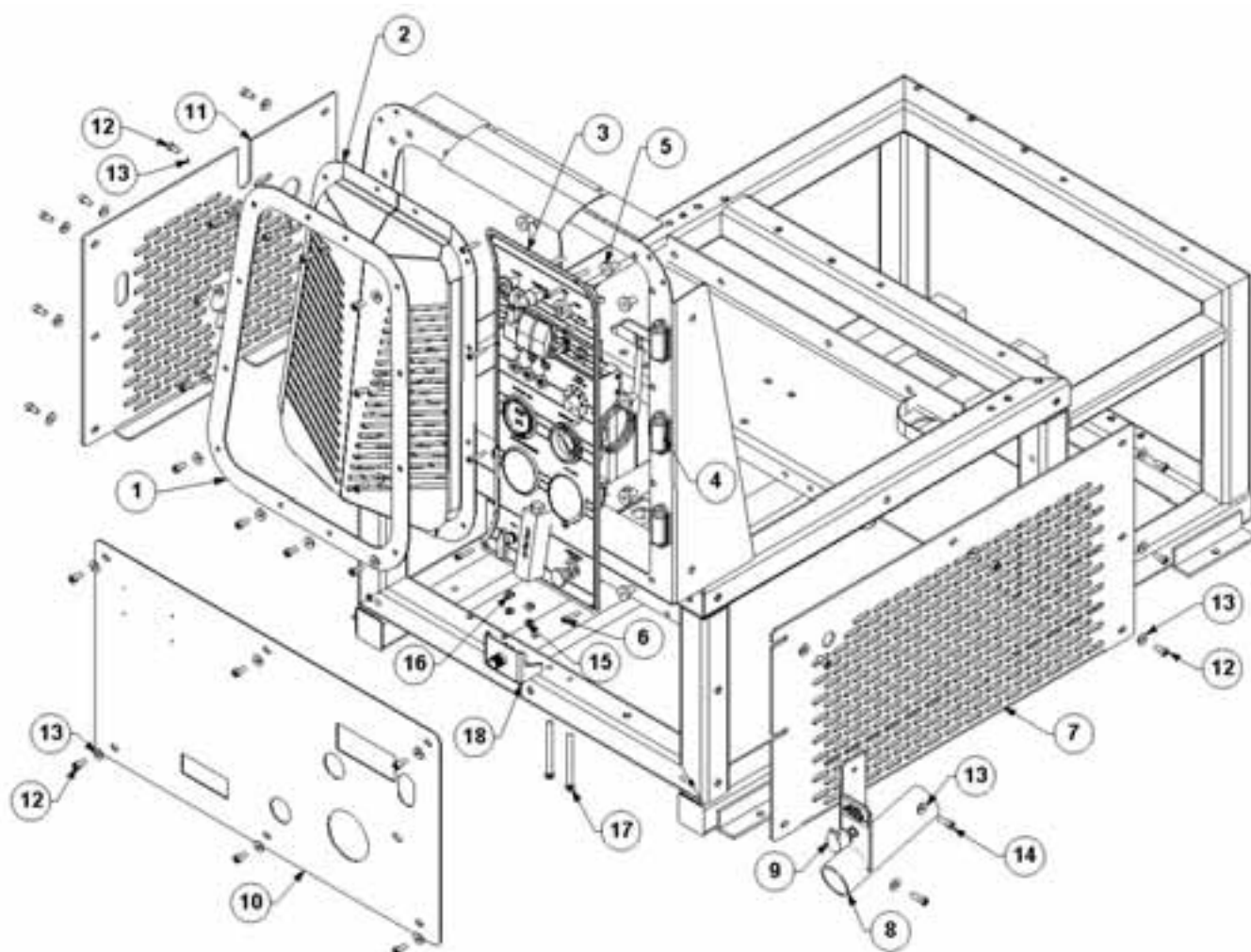
## SECTION 5



5-1

### SHEET METAL FRAME

Item No.	Part Number	Qty	Description
1	61-044	1	BASE, ASSY CHAMP®
2	61-048	1	ASSY, UPR CNTRL PANEL MT CHAMP®
3	58-048	1	SHROUD,ENGINE CHAMP®
4	58-053	1	SHIELD, HEAT LOWER ENGINE
5	61-046	1	ASSY, REAR MOTOR MT. CHAMP®
6	58-049	1	PNL, GUARD LWR BELT
7	68-035	1	ASSY, HEAT SHIELD BELT GUARD
8	61-045	1	ASSY, FIN BELT GUARD CHAMP®
9	10-062	7	SCREW, MACH 10/32 X 5/8PPHZ
10	11-018	7	NUT, 10-32 NYLOK
11	10-028	4	SCREW, MACH 1/4-20 X 2-3/4 HXHD
12	10-032	15	SCREW, MACH 1/4-20 X 3/4 HXHD
13	12-015	19	LKWSR, 1/4 ZINC
14	12-012	11	WASHER, FLAT 1/4 SAE
15	11-004	5	NUT, 1/4-20 ZINC
16	12-011	13	WASHER, FLAT #12 SAE
17	10-057	2	BOLT, TAP 3/8-16 X 3 GR 5
18	12-013	12	WASHER, FLAT 3/8 SAE
19	12-014	6	LKWSR, 3/8 ZINC
20	11-006	6	NUT, 3/8-16 ZINC
21	10-029	4	SCREW, MACH 3/8-16 X 1 HXHD
22	58-035	2	BRKT, COWL SUPPORT CHAMP®

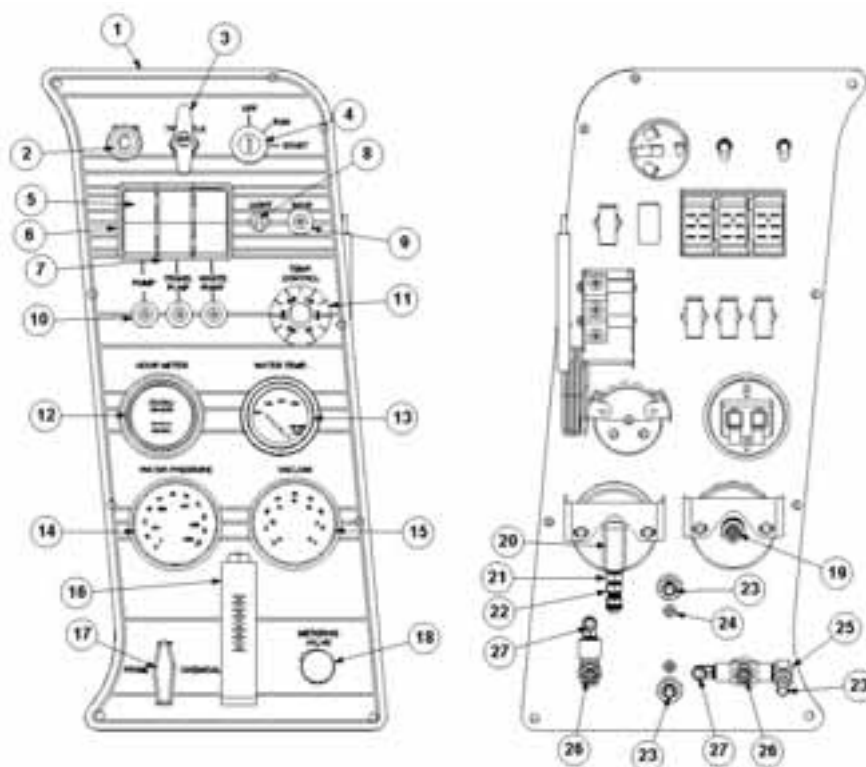


5-2

### FRONT SHEET METAL

Item No.	Part Number	Qty	Description
1	58-024	1	RING, RETAINER GRILL CHAMP®
2	61-078	1	PNL, FIN MAIN GRILL CHAMP®
3	69-021	1	ASSY, CONTROL PANEL CHAMP®
4	30-021	3	LIGHT, UTILITY 12V
5	11-002	9	NUT, WELL G 10-32 .375
6	10-016	9	SCREW, MACHINE 10-32 X 1 SOCHD SS
7	58-029	1	PNL, LOWER RIGHT CHAMP®
8	61-064	1	ASSY, VAC INLET CHAMP®
9	28-000	1	CUP, OILFILL 1/8P
10	58-101	1	PNL, LOWER FRONT CHAMP®
11	58-030	1	PNL, LOWER LEFT CHAMP®
12	10-007	29	SCREW, MACH 1/4-20 X 1/2 SOCHD SS
13	12-011	31	WASHER, FLAT #12 SAE
14	10-021	2	SCREW, MACH 1/4-20 X 3/4 SOCHD SS
15	12-015	2	LKWSR, 1/4 ZINC
16	11-004	2	NUT, 1/4-20 ZINC
17	10-009	2	SCREW, CARRIAGE 1/4-20 X 3-1/2
18	61-134	1	ASSY, BRACKET WATER INLET

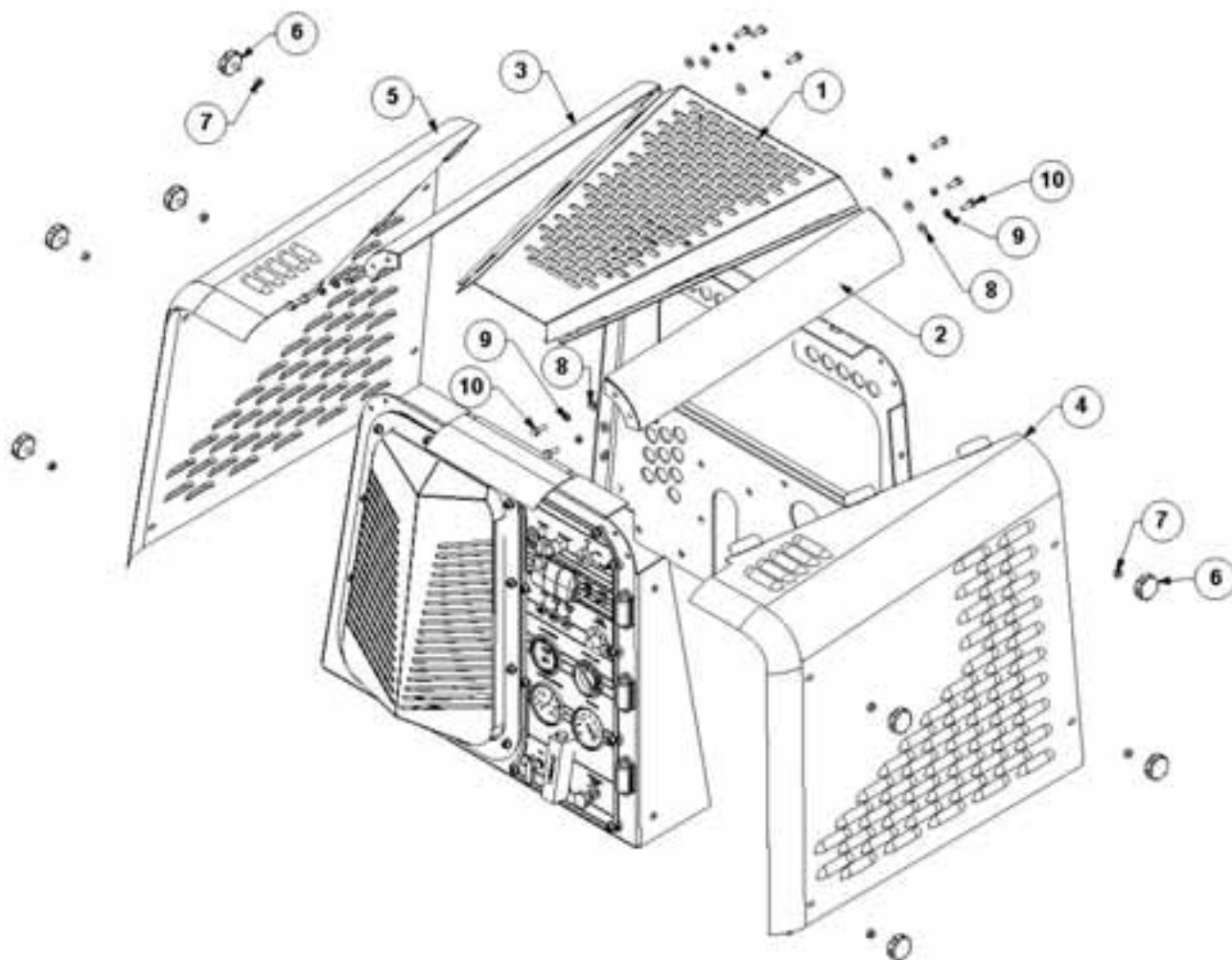
## SECTION 5



5-3

### 69-021 ASSY, CONTROL PANEL CHAMP®

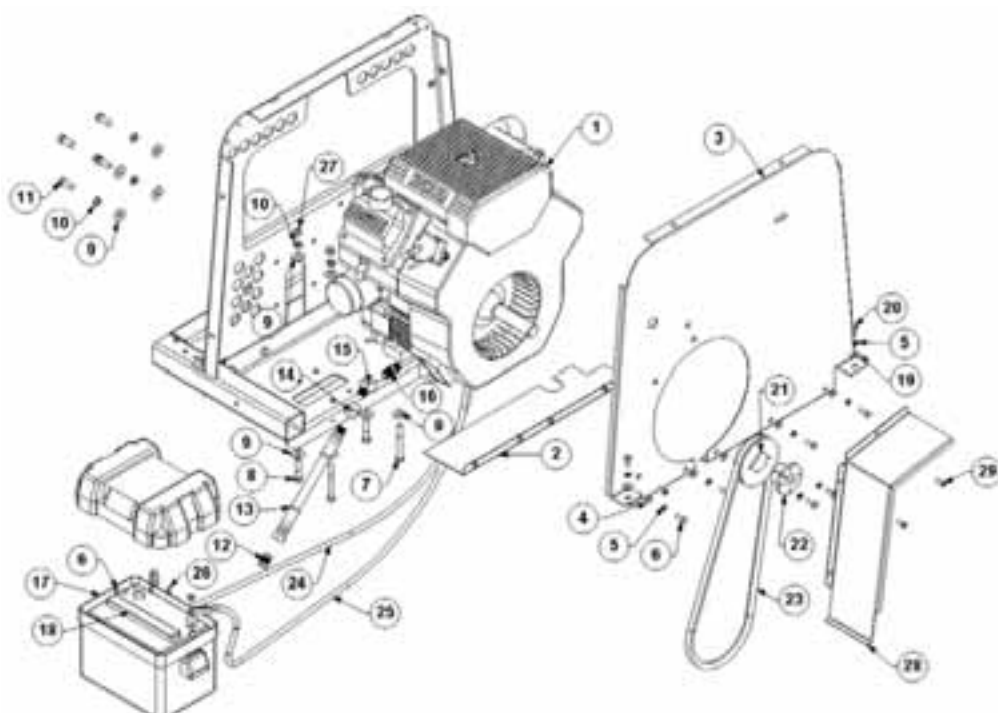
Item No.	Part Number	Qty	Description
1	58-023	1	PNL, CTRL CHAMP®
2	40-001	1	CABLE, CHOKE
3	40-000	1	CABLE, THROTTLE
4	29-007	1	SWITCH, STARTER & KEY 3 POSITION
5	29-012	3	SWITCH, PUMP AND AUX. DISCOVERY
6	31-011	2	PANEL, MTG. END # 44383 WAYTEK
7	31-012	1	PANEL, MTG. MIDDLE # 44384 WAYTEK
8	29-001	1	SWITCH, TOGGLE
9	30-007	1	BREAKER, 30 AMP
10	30-008	3	BREAKER, 20 AMP
11	34-007	1	CONTROL, TEMP 275 DEGREE
12	26-010	1	HOURMETER, HOBBS
13	26-007	1	GAUGE, WTR. TEMP 320 DEG
14	26-005	1	GAUGE, WTR. PRESS 1500 PSI DUAL
15	26-004	1	GAUGE, VAC 30 in. HG DUAL SCALE
16	26-003	1	FLOWMETER, 1/8 P
17	23-027	1	VLV, 3-WAY BALL 1/8 FP SS
18	23-028	1	VLV, MET 1/8 FP (CHEM) RT ANG SS
19	21-004	1	CONN, 1/4 F P X 1/4 T BRASS
20	21-037	1	ELL, 1/4 IN. BRASS
21	21-076	1	BUSHING, 1/4 M X 1/8 F BRASS
22	21-028	1	CONN, 1/8 P X 1/4 POLY
23	21-007	3	FTTG, BRB 1/8 P X 5/16 H BR
24	10-033	2	SCREW, MACH 10-32 X 3/8 PNHD PHILLIP
25	21-038	1	ELL, STREET 1/8 IN. BRASS
26	21-050	2	CONN, 1/4 P X 1/4 T BRASS
27	21-064	2	ELL, 1/4 P X 1/4 T BRASS



5-4  
**HOOD ASSY**

Item No.	Part Number	Qty	Description
1	58-027	1	HOOD, CENTER CHAMP®
2	61-050	1	ASSY, RIGHT HOOD RAIL CHAMP®
3	61-049	1	ASSY, LEFT HOOD RAIL CHAMP®
4	58-025	1	HOOD, RIGHT CHAMP®
5	58-026	1	HOOD, LEFT CHAMP®
6	11-007	8	NUT, THUMB 1/4-20 FKWR. HEAD KNOB
7	11-009	8	NUT, 1/4-20 NYLON
8	12-011	10	WASHER, FLAT #12 SAE
9	12-015	10	LKWSR, 1/4 ZINC
10	10-032	10	SCREW, MACH 1/4-20 X 3/4 HXHD

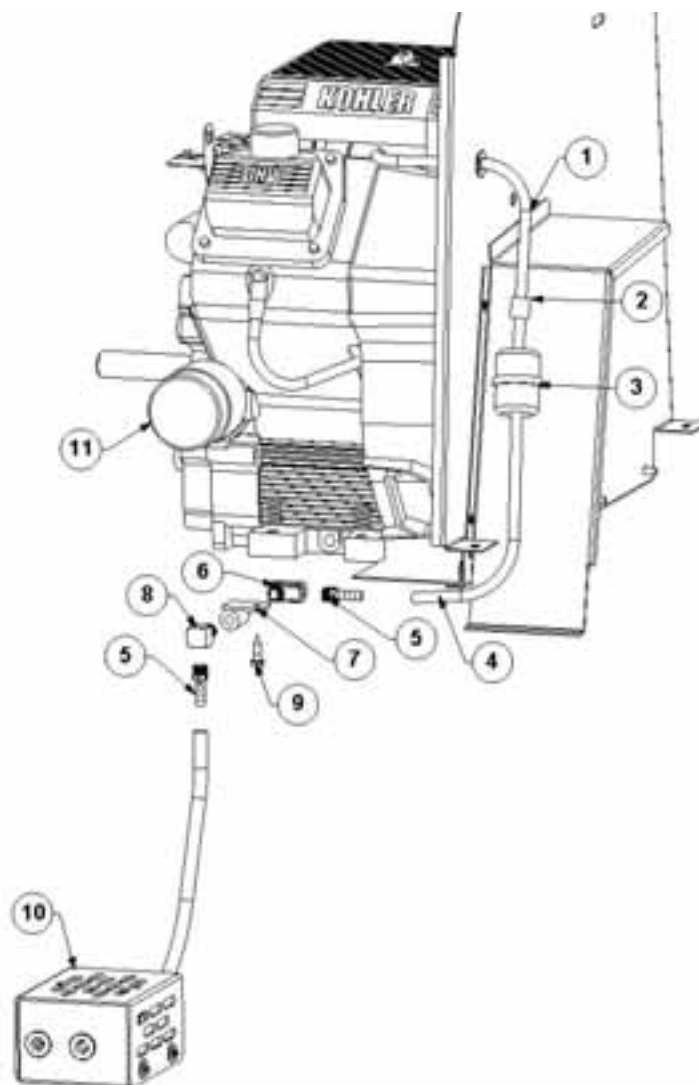




5-5

**ENGINE INSTALLATION**

Item No.	Part Number	Qty	Description
1	45-009	1	ENGINE, KOHLER 20HP CHAMP
2	58-053	1	SHIELD, HEAT LOWER ENGINE
3	58-048	1	SHROUD,ENGINE CHAMP
4	12-011	5	WASHER, FLAT #12 SAE
5	12-015	7	LKWSR, 1/4 ZINC
6	10-032	7	SCREW, MACH 1/4-20 X 3/4 HXHD
7	10-030	2	SCREW, MACH 3/8-16 X 3 HXHD
8	10-055	2	SCREW, MACH 3/8-16 X 1-3/4 HXHD
9	12-013	12	WASHER, FLAT 3/8 SAE
10	12-014	8	LKWSR, 3/8 ZINC
11	10-029	4	SCREW, MACH 3/8-16 X 1 HXHD
12	21-027	1	PLUG, 1/2 T BRASS
13	18-004	1	HOSE, HP 3/8 X 10 IN. OIL DRAIN KOH
14	21-073	1	COUPLING, 3/8 STD BRASS
15	21-043	1	ELL, STREET 3/8 IN. 45 DEG BRASS
16	21-046	1	NIP, 3/8 IN. HEX BRASS
17	40-004	1	BOX, BATTERY HOLDER
18	35-004	1	BATTERY, 12 VOLT LAWN & GARDEN
19	12-012	2	WASHER, FLAT 1/4 SAE
20	10-020	2	SCREW, MACH 1/4-20 X 3/4 HXHD SS
21	38-020	1	PULLEY, AK41H
22	38-021	1	HUB, H-1
23	37-025	1	BELT, AX43 MATCH
24	47-013	1	HARNESS,BATTERY CABLE RED
25	47-014	1	HARNESS,BATTERY CABLE BLK
26	11-001	2	NUT, 1/4-20 SS
27	11-006	4	NUT, 3/8-16 ZINC
28	58-067	1	PNL, BELT GUARD WATER PUMP
29	10-007	3	SCREW, MACH 1/4-20 X 1/2 SOCHD SS



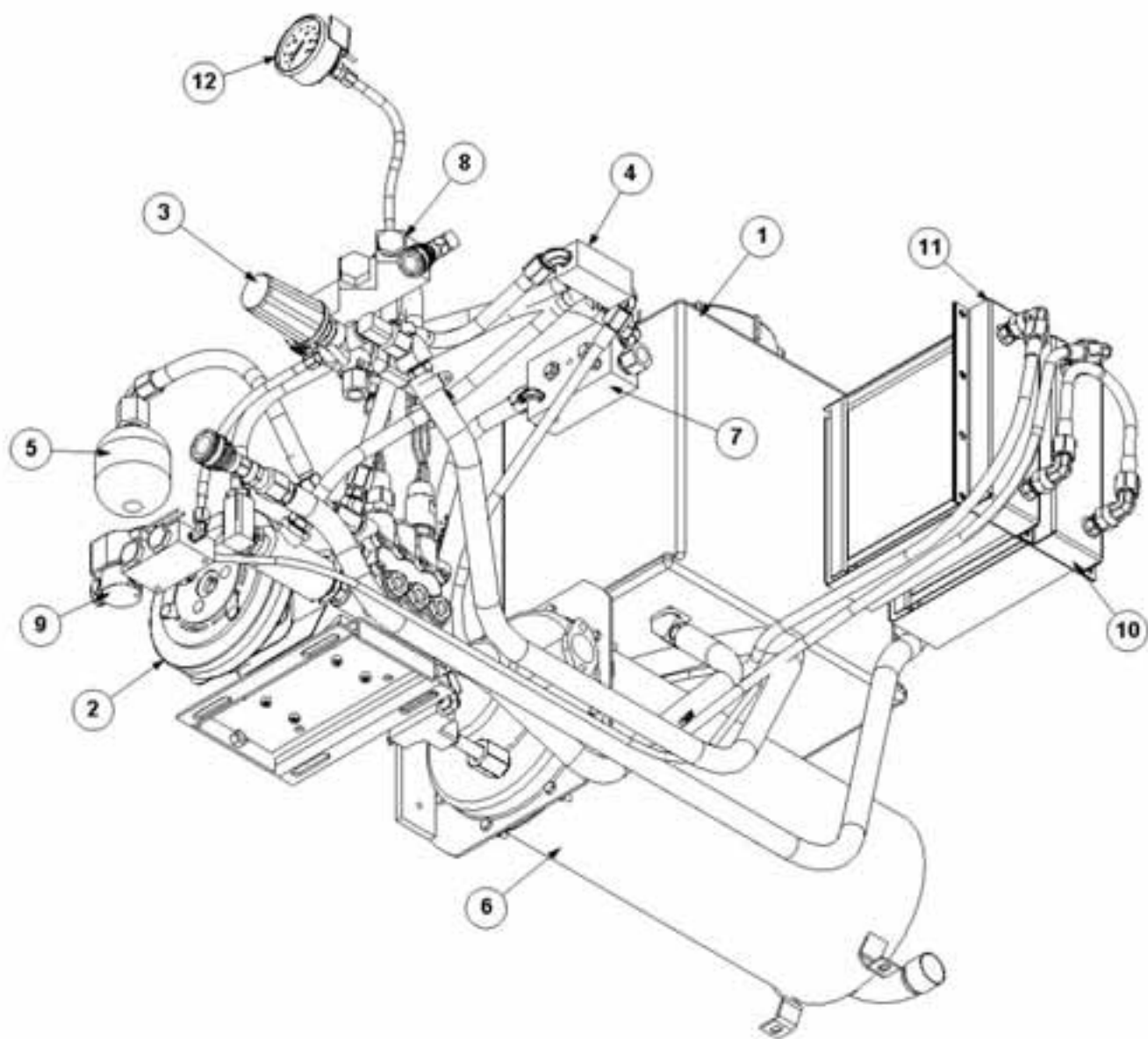
5-6

## ENGINE FUEL/OIL SYSTEM

Item No.	Part Number	Qty	Description
1	16-034	20"	HOSE, FUEL 1/4" 30R7
2	14-005	1	CLAMP, WIRE 1/2 IN X 1/4
3	36-097	1	FILTER, FUEL KUBOTA
4	16-034	9.5"	HOSE, FUEL 1/4" 30R7
5	21-006	2	FTTG, BRB 1/4PX5/16H BR
6	21-039	1	ELL, 1/4 IN LG STREET BRASS
7	61-018	1	BRKT, FIN FUEL RETURN THERMAL
8	21-125	1	ELL, STREET 1/4P 1 3/16L 90 DEG
9	10-035	1	SCREW, SELF TAP 1/4-20 X 1
10	68-030	1	ASSY, FUEL PUMP HOUSING
11	36-019	1	FILTER, OIL KOHLER#1205001



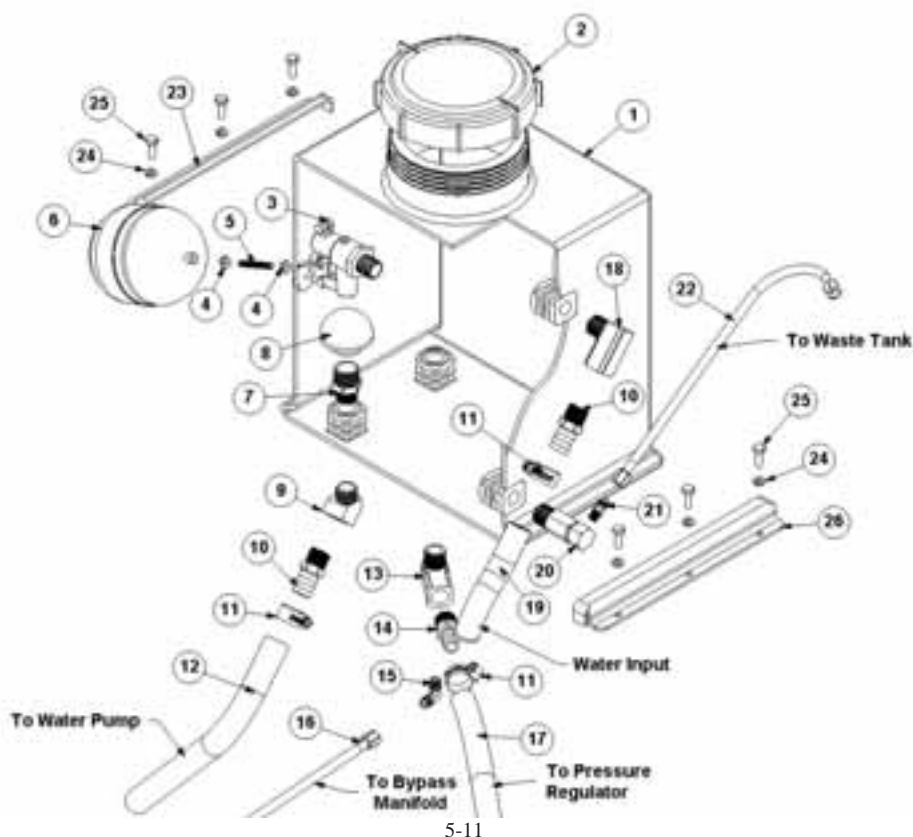
## SECTION 5



5-10

### WATER TRANSFER SYSTEM

Item No.	Part Number	Qty	Description
1		1	Water Box Assembly
2		1	WATER PUMP ASSEMBLY
3		1	CHAMP PRESS REGULATOR ASSY
4		1	VALVE BYPASS MANIFOLD
5		1	CAT ACCUMULATOR
6	69-008	1	ASSY, H.E. THERMAL
7	69-012	1	ASSY, THERMOSTAT MNFLD
8		1	SOLUTION OUTLET ASSEMBLY
9		1	WATER BYPASS MANIFOLD ASSEMBLY
10	63-047	1	ASSY,VAC PRE HEAT W/CVR R CHAMP
11	63-048	1	ASSY,VAC PRE HEAT W/CVR F CHAMP
12	26-005	1	GAUGE, WTR. PRESS1500PSIDUAL

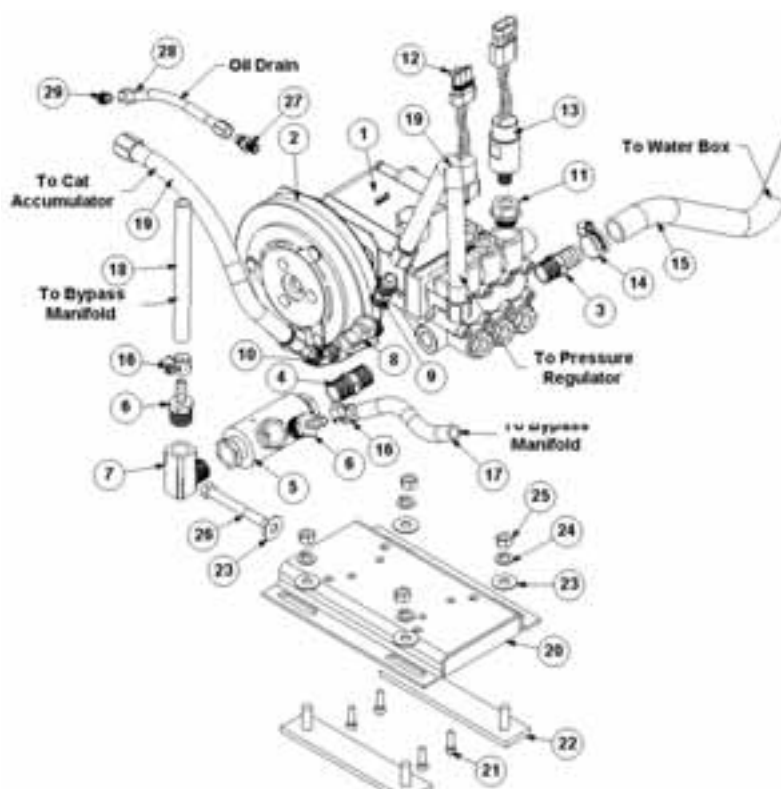


5-11

**WATER BOX ASSEMBLY**

Item No.	Part Number	Qty	Description
1	51-002	1	MOLDING, WATER BOX DISCOVERY
2	21-025	1	CAP, 5 IN. WATER BOX/TANK BLACK
3	23-025	1	VLV, FLOAT WTR BOX THERMALWAVE
4	11-001	2	NUT, SS 1/4-20
5	64-000	1	ROD, FLOAT SS THERMAL WAVE
6	28-001	1	BALL, FLOAT
7	21-072	1	NIP, HEX 3/4 MP 1/2 MP
8	20-001	1	STRAINER, SUCTION END 3/4FP
9	21-044	1	ELL, STREET 1/2 IN. 45 DEG BRASS
10	21-032	2	FTTG, BARB 1/2 P X 3/4 H BRASS
11	14-000	3	CLAMP, HOSE #12
12	17-711	1	HOSE, WATER 3-4 X 24 W-CVR
13	66-089	1	ELL, 1/2 STREET W/ 1/8 PORT
14	21-109	1	FTTG, BARB 1/2 P X 5/8 B BRASS
15	21-054	1	ELL, 1/8 P X 1/4 T BRASS
16	18-095	1	HOSE, 3/16 X 52 1/4"FT X 1/4"FT
17	17-716	1	HOSE, WATER 5/8 X 36 W-CVR
18	21-034	1	ELL, STREET 1/2 BRASS
19	17-715	1	HOSE, 3/4 X 54 IN W-CVR
20	23-033	1	VLV, 165 DEG THERMAL CAT 7145
21	21-001	1	CONN, 1/8 P X 1/4 T BR
22	18-060	1	HOSE, 3/16 X 21 1/4 FT X 1/4 FT
23	58-005	1	BRKT, MTG. WTR BOX HLD DWN LFT
24	12-015	6	LKWSR, 1/4 ZINC
25	10-032	6	SCREW, MACH 1/4-20 X 3/4 HXHD
26	59-008	1	BRKT, MTG WTR BOX HLD DWN RT

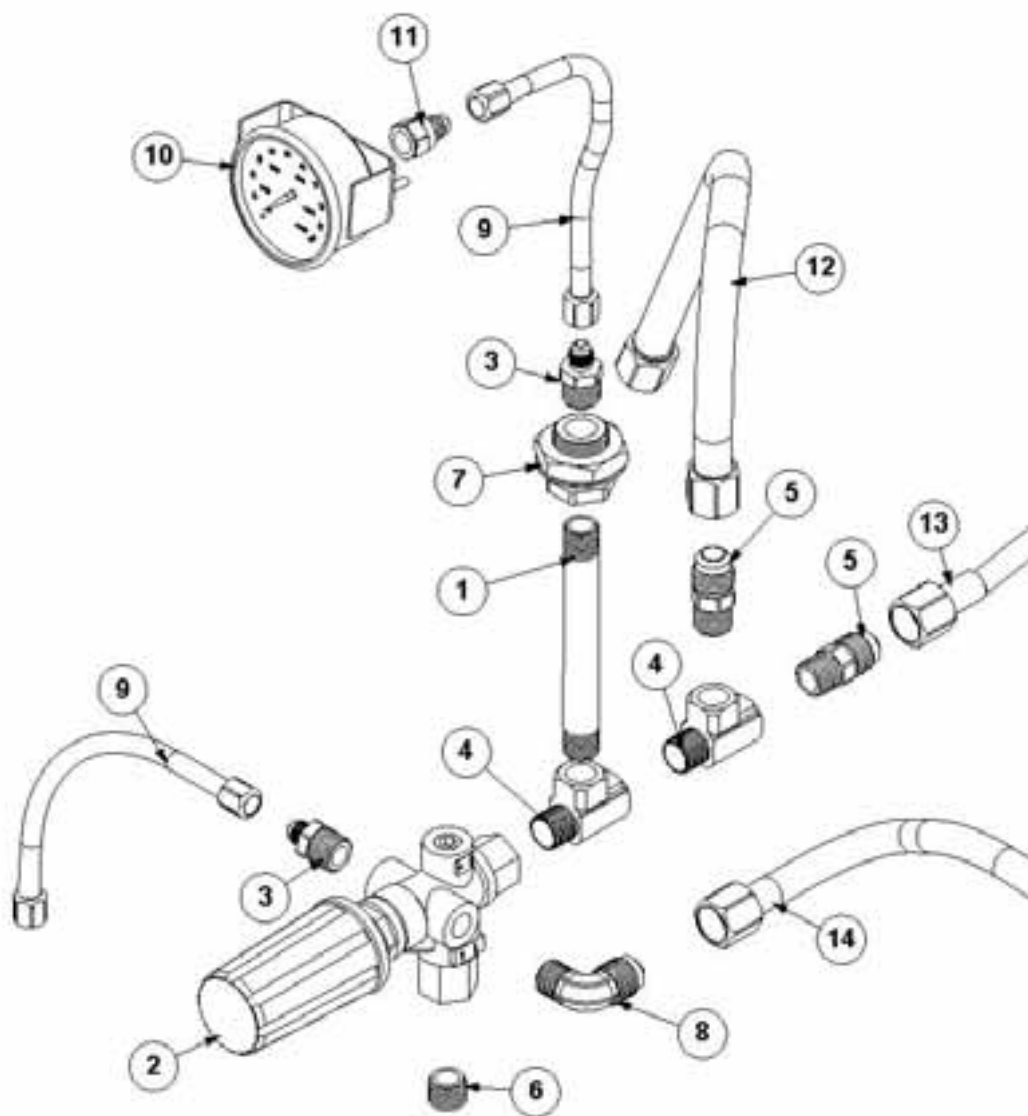
## SECTION 5



5-12

### WATER PUMP ASSEMBLY

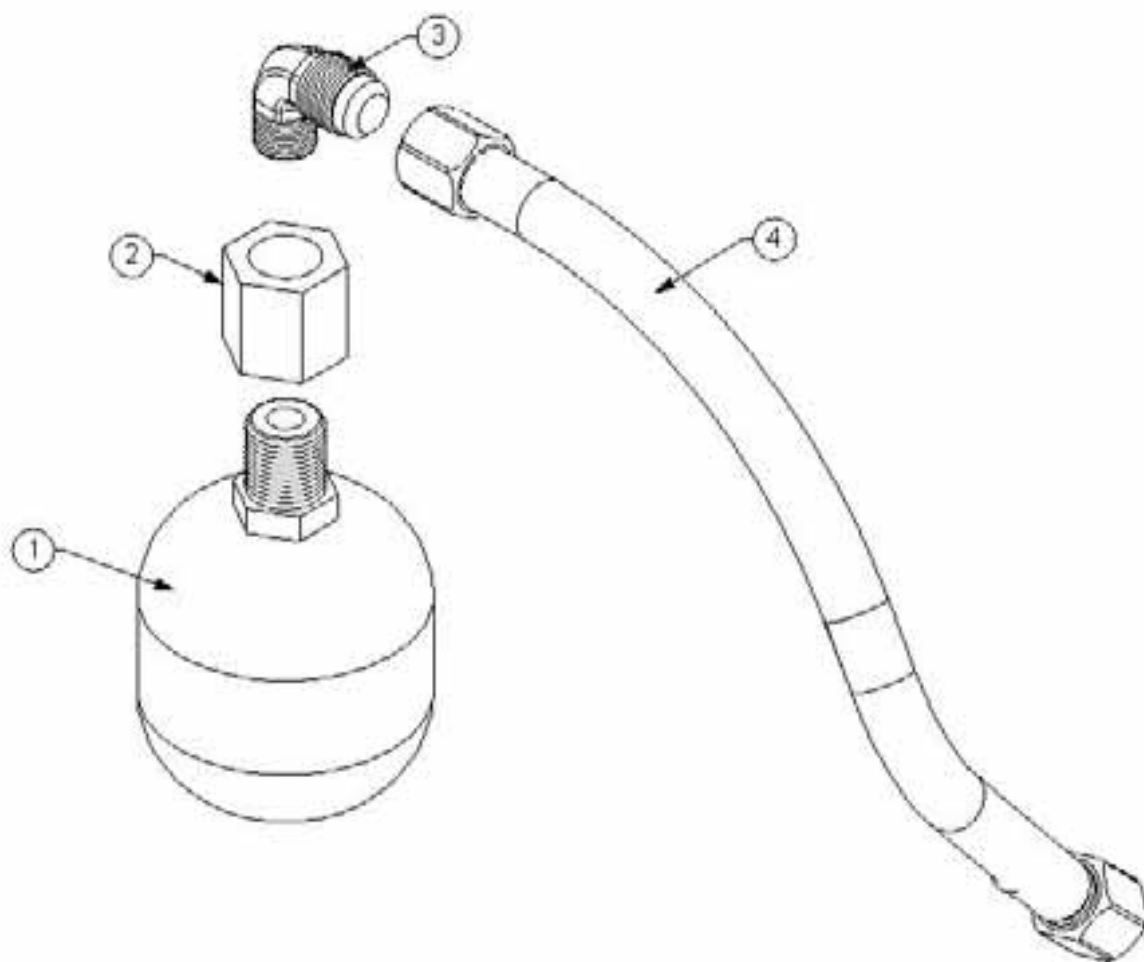
Item No.	Part Number	Qty	Description
1	46-021	1	PUMP, CAT 3CP1120RS.3 HOT&DRY
2	35-001	1	CLUTCH, ELECT CAT3CP 16.5MM
3	21-032	1	FTTG, BARB 1/2 P X 3/4 H BRASS
4	21-047	1	NIP, 1/2 IN. HEX BRASS
5	23-030	1	VLV, BYPASS 1/2 IN 180 DEG BRASS
6	21-101	2	FTTG, BARB 1/2 P X 3/8 B BRASS
7	21-034	1	ELL, STREET 1/2 BRASS
8	21-062	1	TEE, 3/8 F X M X F BRASS
9	21-057	1	CONN, 3/8 P X 1/2 T BRASS
10	21-059	1	ELL, 3/8 P X 1/2 T 45DEG BRASS
11	66-068	2	ADAPTOR, WATER PUMP
12	29-004	1	SWITCH, PRESS (50PSI)
13	29-005	1	SWITCH, PRESS (1000PSI)
14	14-000	1	CLAMP, HOSE #12
15	17-711	1	HOSE, WATER 3-4 X 24 W-CVR
16	14-006	2	CLAMP, HOSE #20
17	16-033	1	HOSE, 3/8 IN 300 PSI INSTA GRIP
18	16-033	1	HOSE, 3/8 IN 300 PSI INSTA GRIP
19	18-054	2	HOSE, 1/2 X 15 1/2FT X 1/2FT W/CVR
20	61-016	1	MT. PUMP CAT 340 HT
21	10-053	4	SCREW,MACH M6-01.0X20 12.9 SOCHD
22	61-028	2	PLT, BOLT CAT PUMP
23	12-013	5	WASHER, FLAT 3/8 SAE
24	12-014	4	LKWSR, 3/8 ZINC
25	11-006	4	NUT, 3/8-16 ZINC
26	10-030	1	SCREW, MACH 3/8-16 X 3 HXHD
27	21-050	1	CONN, 1/4 P X 1/4 T BRASS
28	18-047	1	HOSE, 3/16 X 5 1/4 FT X 1/4 FT
29	21-096	1	PLUG, 1/4 IN T BRASS



5-13

**PRESS REGULATOR ASSEMBLY**

Item No.	Part Number	Qty	Description
1	21-112	1	NIP, SS 3/8 X 5 IN
2	23-021	1	REG, PRESS CAT #7670 VITON
3	21-017	2	CONN, 3/8 P X 1/4 T BR
4	21-062	2	TEE, 3/8 F X M X F BRASS
5	21-057	2	CONN, 3/8 P X 1/2 T BRASS
6	21-146	1	PLUG, 3/8 NPT BRASS
7	21-080	1	FTTG, BULHEAD 3/8 BRASS
8	21-061	1	ELL, 3/8 P X 1/2 T BRASS
9	18-062	2	HOSE, 316 X 10 14FT X 14FT
10	26-005	1	GAUGE, WTR. PRESS1500PSIDUAL
11	21-004	1	CONN, 1/4 F P X 1/4 T BRASS
12	18-054	1	HOSE, 1/2 X 15 1/2FT X 1/2FT W/CVR
13	18-063	1	HOSE, 1/4 X 34 FT X 1/2 FT W/CVR
14	18-033	1	HOSE, 1/2 X 10 1/2 FT X 1/2 FT W/CVR

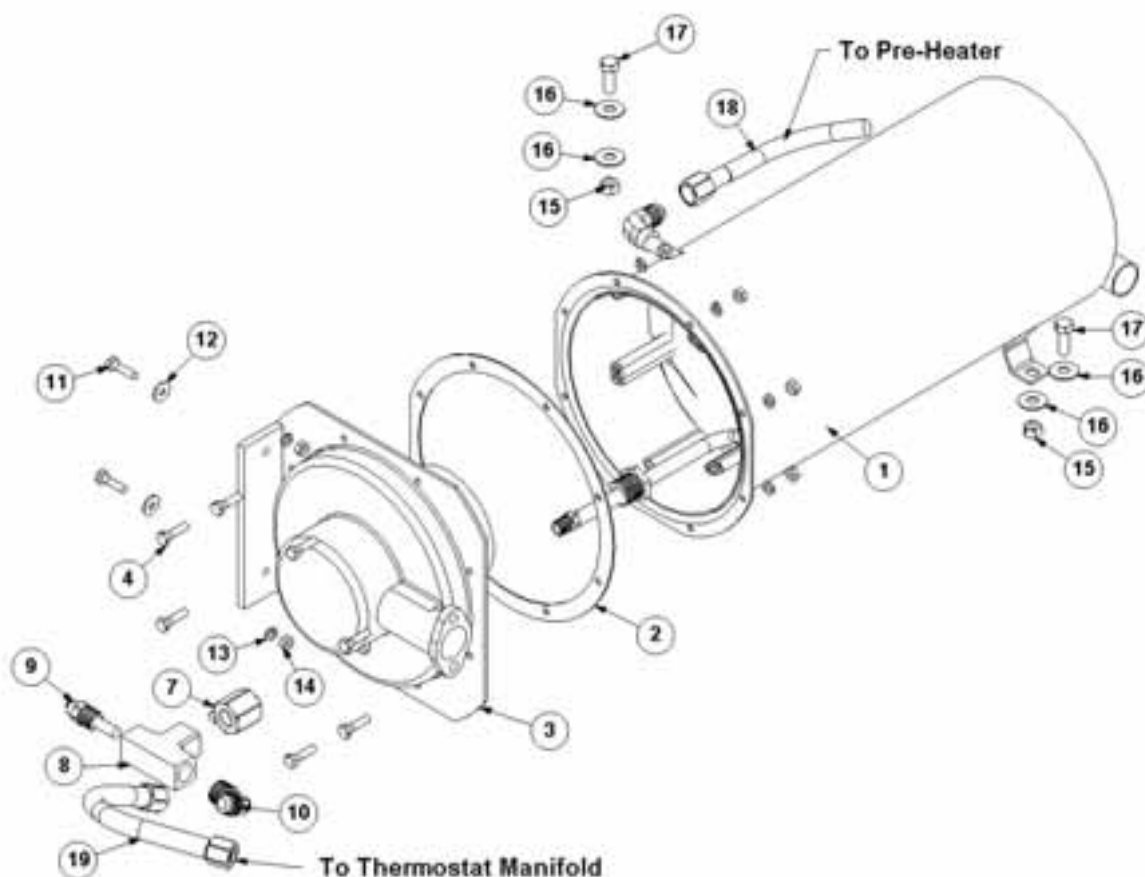


5-14

### CAT ACCUMULATOR

Item No.	Part Number	Qty	Description
1	46-020	1	ACCUMULATOR, CAT 6026
2	66-045	1	COUPLING, DBL END 1-1/8 IN BRASS
3	21-015	1	ELL, 1/2 PX 1/2T BR
4	18-054	1	HOSE, 1/2 X 15 1/2FT X 1/2FT W/CVR

## SECTION 5



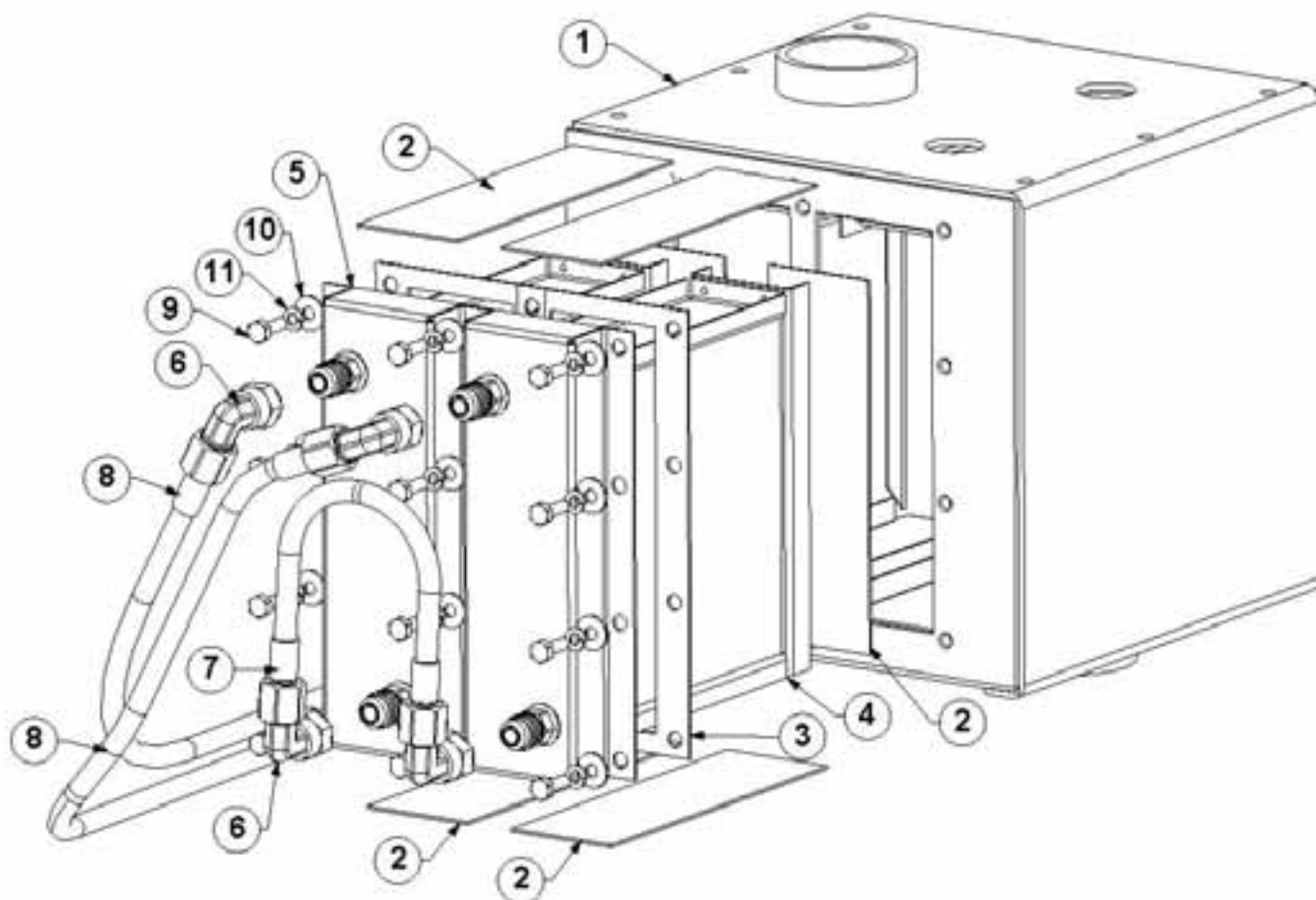
5-15

### HEAT EXCHANGER ASSEMBLY

Item No.	Part Number	Qty	Description
1	63-044	1	COIL & CASING H.E. CHAMP®
2	41-000	1	GASKET, EXH FLG. H.E.
3	63-045	1	CASTING, END H.E. W/CATALYST
4	10-011	8	SCREW, MACH 1/4-20 X 1 SS
5	11-001	8	NUT, 1/4-20 SS
6	12-003	8	LKWSR, 1/4 IN SS
7	66-015	1	NUT, ADAPTOR BUSHING HE
8	66-013	1	FITTING, TEMP SENSOR ADAPTOR
9	34-008	1	SENSOR, TEMP 285DEG NASON
10	21-015	1	ELL, 1/2 P X 1/2 T BRASS
11	10-026	2	SCREW, MACH 1/4-20 X 1 HXHD
12	12-012	2	WASHER, FLAT 1/4 SAE
13	12-015	2	LKWSR, 1/4 ZINC
14	11-004	2	NUT, 1/4-20 ZINC
15	11-006	2	NUT, 3/8-16 ZINC
16	12-013	4	WASHER, FLAT 3/8 SAE
17	10-029	2	SCREW, MACH 3/8-16 X 1 HXHD
18	18-037	1	HOSE, 1/2 X 44 1/2FT X 1/2FT W/CVR
19	18-054	1	HOSE, 1/2 X 15 1/2FT X 1/2FT W/CVR



## SECTION 5

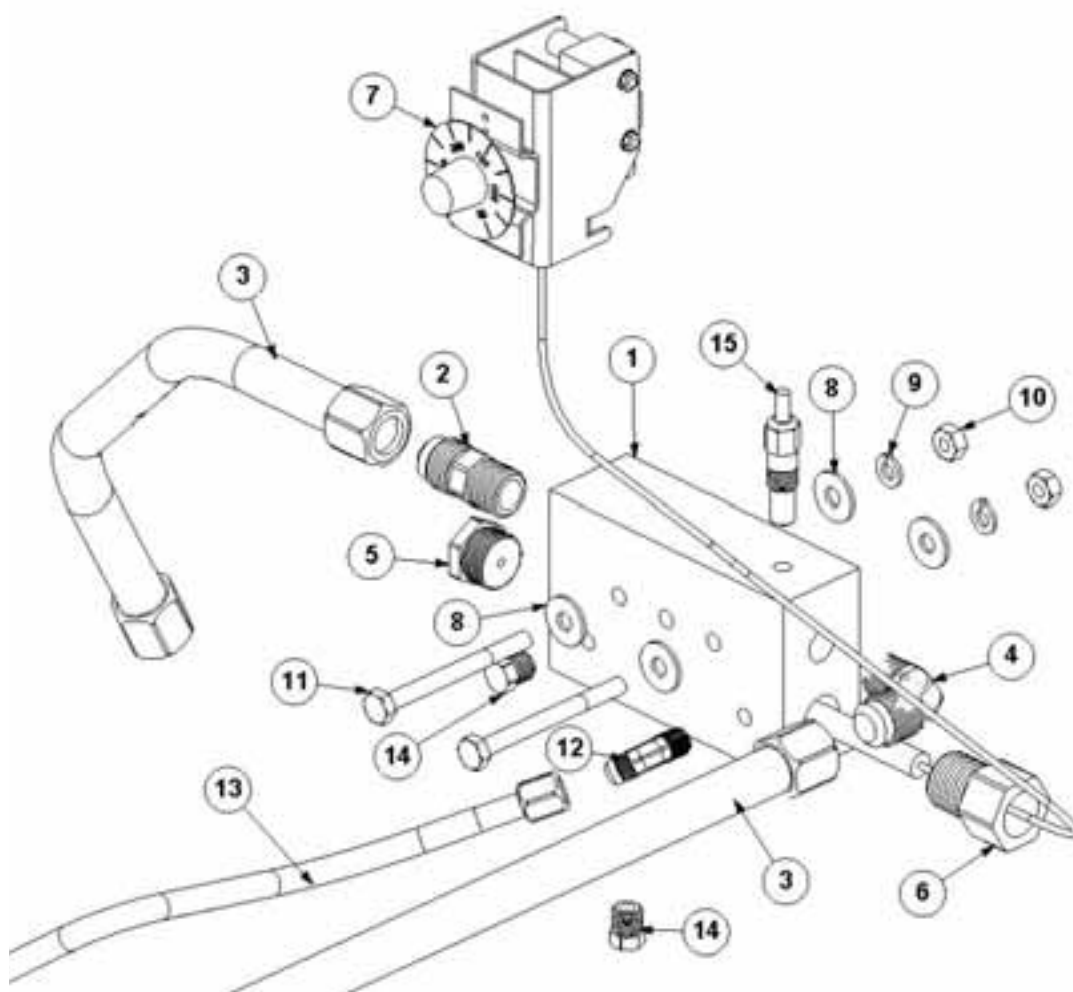


5-16

### CHAMP® PRE-HEATER ASSEMBLY

Item No.	Part Number	Qty	Description
1	61-056	1	ASSY PRE-HEATER CHAMP®
2	41-023	6	GASKET, PREHEATERCORE 2.5" X 8"
3	41-021	2	GASKET, VAC PREHEATER CORE
4	63-047	1	ASSY,VAC PRE HEAT W/CVR R CHAMP
5	63-048	1	ASSY,VAC PRE HEAT W/CVR F CHAMP
6	21-150	4	ELL, 1/2M X 1/2F 90DEG SWIVEL SS
7	18-033	1	HOSE, 1/2 X 10 1/2FT X 1/2FT W/CVR
8	18-037	2	HOSE, 1/2 X 44 1/2FT X 1/2FT W/CVR
9	10-020	12	SCREW, MACH 1/4-20 X 3/4 HXHD SS
10	12-012	12	WASHER, FLAT 1/4 SAE
11	12-015	12	LKWSR, 1/4 ZINC



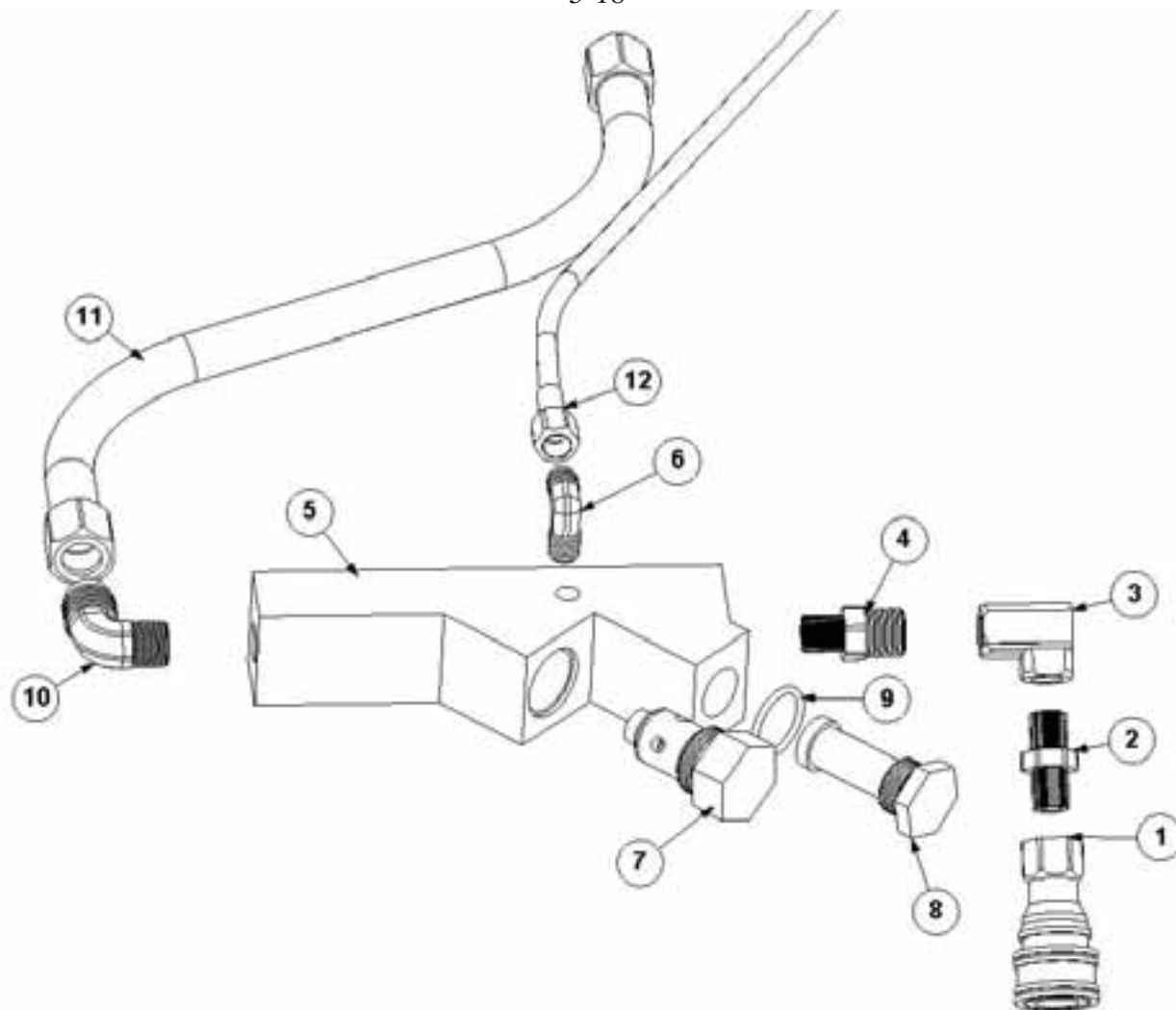


5-17

**THERMOSTAT MANIFOLD ASSEMBLY**

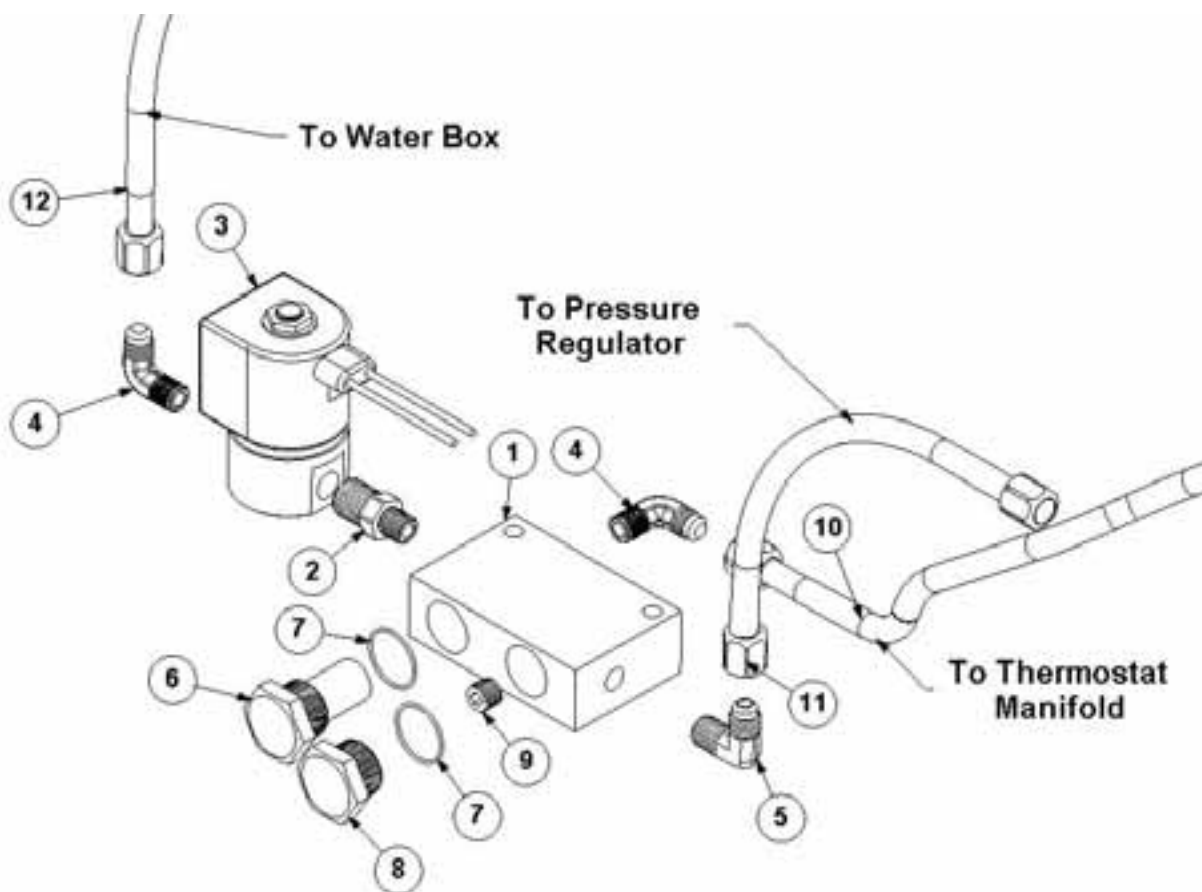
Item No.	Part Number	Qty	Description
1	66-010	1	MANIFOLD, THERMOSTAT
2	21-057	1	CONN, 3/8 P X 1/2 T BRASS
3	18-054	2	HOSE, 1/2 X 15 1/2FT X 1/2FT W/CVR
4	21-061	1	ELL, 3/8 P X 1/2 T BRASS
5	66-037	1	FTTG, TEMP SENSOR SUPPORT
6	21-021	1	UNION, CAPILLARY-THERM 1/2 P
7	34-007	1	CONTROL, TEMP 275 DEGREE
8	12-012	4	WASHER, FLAT 1/4 SAE
9	12-015	2	LKWSR, 1/4 ZINC
10	11-004	2	NUT, 1/4-20 ZINC
11	10-028	2	SCREW, MACH 1/4-20 X 2-3/4 HXHD
12	21-055	1	ELL, 1/8 P X 1/4 T 45DEG BRASS
13	18-060	1	HOSE, 3-16 X 21 1/4 FT X 1/4FT
14	21-048	2	PLUG, 1/8 IN. BRASS
15	34-000	1	SENDER, TEMP 140-320 DEGREE

5-18



### SOLUTION OUTLET ASSEMBLY

Item No.	Part Number	Qty	Description
1	25-001	1	DSC, 1/4X1/4FP BR
2	21-026	1	NIP, 1/4 HEX BR
3	21-037	1	ELL, 1/4 IN. BRASS
4	21-052	1	NIP, 3/8 X 1/4 HEX BRASS
5	66-012	1	MANIFOLD, CHECK VALVE (YSTRAIN)
6	21-054	1	ELL, 1/8 P X 1/4 T BRASS
7	23-023	1	VLV, CHECK, CHECK VLV MANIFOLD
8	20-018	1	SCREEN, CHECK VALVE MANIFOLD
9	41-007	1	ORING, 7/8 ID 1-1/16 OD
10	21-061	1	ELL, 3/8 P X 1/2 T BRASS
11	18-054	1	HOSE, 1/2 X 15 1/2FT X 1/2FT W/CVR
12	18-030	1	HOSE, 3/16 X 14-3/4 1/4FT X 1/4FT

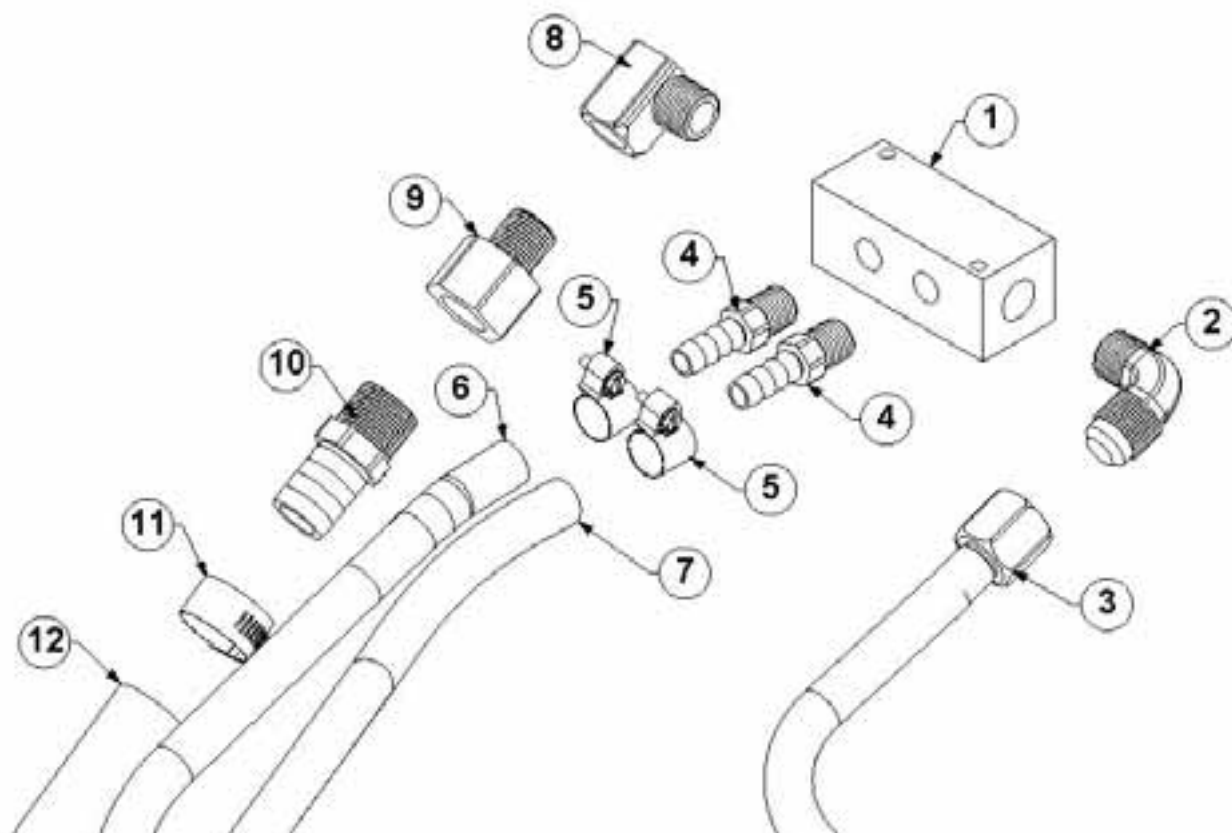


5-19

### WATER BYPASS MANIFOLD ASSEMBLY

Item No.	Part Number	Qty	Description
1	66-011	1	MANIFOLD, BYPASS
2	21-056	1	NIP, HEX 1/4 X 1/8 BRASS
3	23-014	1	VLV, SOLEN 1-4FPX 1-4FP
4	21-064	2	ELL, 1/4 P X 1/4 T BRASS
5	21-054	1	21-054 1/8 JIC x 1/8 NPT 90 Deg Ell
6	20-015	1	SCREEN, BYPASS MNFLD
7	41-003	2	ORING, .676ID .816OD
8	66-017	1	CAP, CHECK VLV. BYPASS MNFOLD.
9	66-020	1	ORFICE, BYPASS MNFLD. GREEN
10	18-060	1	HOSE, 3-16 X 21 14 FT X 14FT
11	18-062	1	HOSE 3/16 x 10 1/4FT x 1/4FT
12	18-095	1	HOSE, 3/16 X 52 1/4"FT X 1/4"FT

## SECTION 5

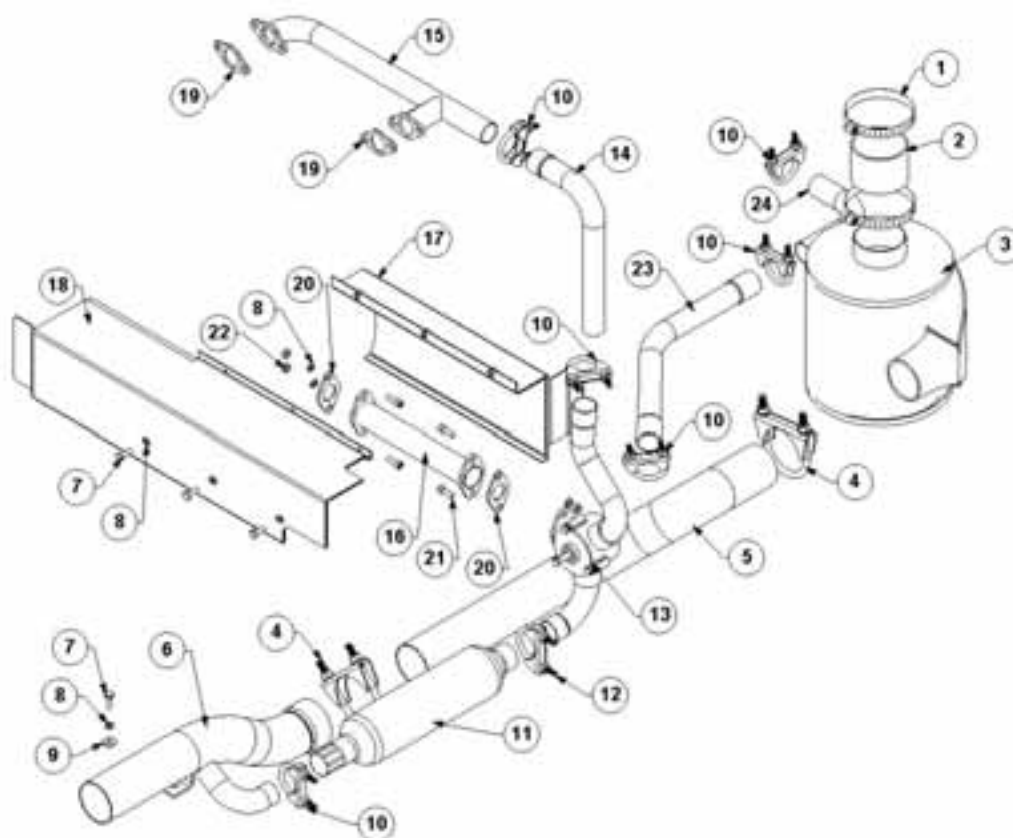


5-

### VALVE BYPASS MANIFOLD

Item No.	Part Number	Qty	Description
1	66-076	1	MANIFOLD, BYPASS VALVE
2	21-061	1	ELL, 3/8 P X 1/2 T BRASS
3	18-033	1	HOSE, 1/2 X 10 1/2 FT X 1/2 FT W/CVR
4	21-123	2	FTTG,BRB 1/4 PX 3/8 H BR
5	14-012	2	CLAMP, HOSE # 8
6	16-033	1	HOSE, 3/8 IN 300 PSI INSTA GRIP
7	16-033	1	HOSE, 3/8 IN 300 PSI INSTA GRIP
8	21-040	1	ELL, STREET 3/8 IN. BRASS
9	21-035	1	CONN, 3/8 M X 1/2 FP
10	21-109	1	FTTG, BARB 1/2 IN NPT X 5/8 H
11	14-000	1	CLAMP, HOSE #12
12	17-714	1	HOSE,WATER 5/8IN X 46" W/CVR

## SECTION 5

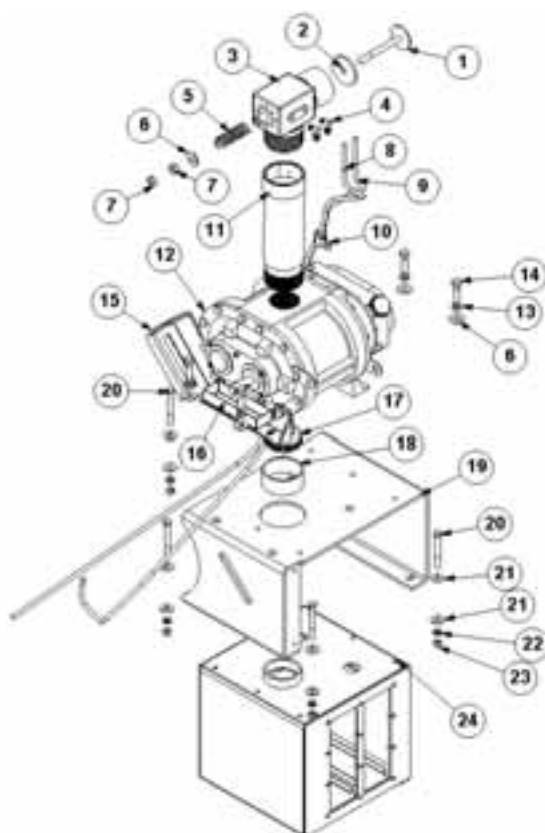


5-20

### VACUUM-EXHAUST SYSTEM

Item No.	Part Number	Qty	Description
1	14-024	2	CLAMP, HOSE #48 SS (42-90mm)
2	16-011	1	HOSE, INT VAC 2-7/8 IN 50 FT BULK
3	63-018	1	MUFFLER, VACUUM 3L,4M
4	14-025	2	CLAMP, MUFFLER 2 1/2
5	61-079	1	ASSY, EXHAUST CHAMP
6	61-082	1	ASSY, EXH. TUBE FRT CHAMP
7	10-032	4	SCREW, MACH 1/4-20 X 3/4 HXHD
8	12-015	8	LKWSR, 1/4 ZINC
9	12-012	1	WASHER, FLAT 1/4 SAE
10	14-001	6	CLAMP, MUFFLER 1-1/4 IN.
11	63-020	1	MUFFLER, ENGINE EXHAUST CHAMP
12	14-027	1	CLAMP, MUFFLER 1-1/2 IN.
13	61-055	1	ASSY DIVERTER VALVE BODY CHAMP
14	63-042	1	TUBE, EXHAUST EXT KOHLER
15	63-040	1	EXHAUST, KOHLER PIPE
16	63-043	1	TUBE, DVTR TO HE EXT CHAMP
17	58-074	1	ASSY, HEAT SHIELD REAR
18	58-075	1	ASSY, HEAT SHIELD FRONT
19	36-024	2	GASKET, EXHT KOHLER#2404102-S
20	36-016	2	GASKET,EXHAUST ONAN#154-2747
21	10-021	4	SCREW, MACH 1/4-20 X 3/4 SOCHD SS
22	11-004	4	NUT, 1/4-20 ZINC
23	63-017	1	TUBE, EXHAUST 45 DEG THERMAL
24	63-002	1	TUBE, HE TO EXHAUST

## SECTION 5

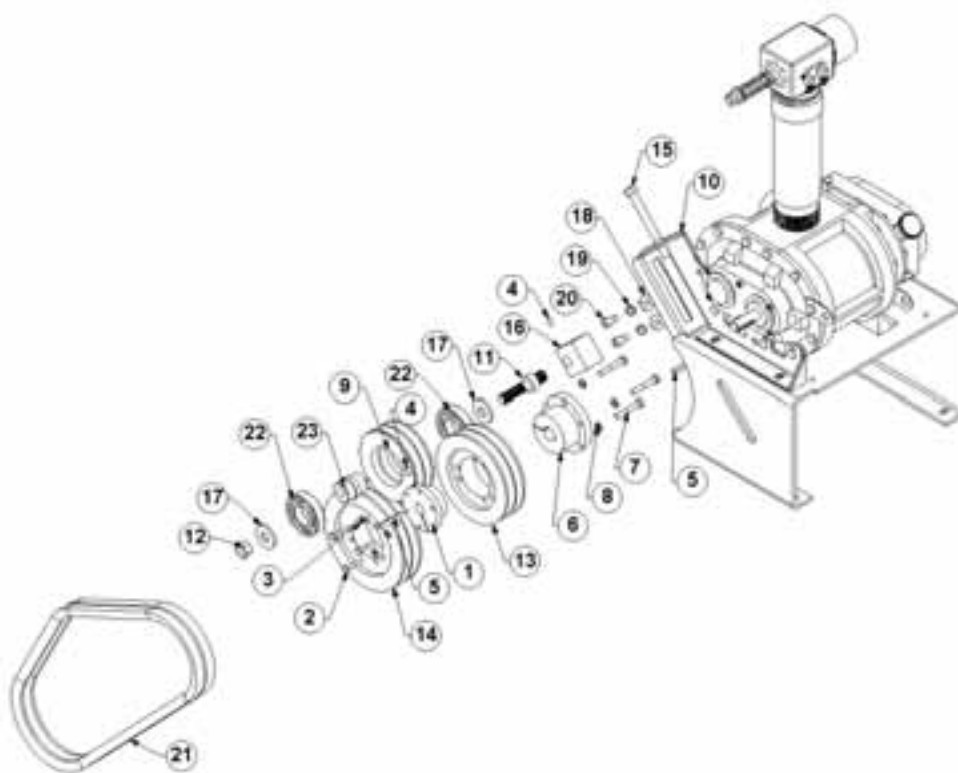


5-21

### VACUUM PUMP ASSY

Item No.	Part Number	Qty	Description
1	61-077	1	STEM, VACUUM RELIEF VLV 3L/4M
2	41-010	1	DIAPHRAGM, VAC RELIEF VLV 3L, 4M
3	66-000	1	VAC BRAKE, MACHINED 3L, 4M
4	21-011	2	ELL, 1/8 P X 1/4 POLY BR
5	15-002	1	SPRING, VAC RELIEF VALVE
6	12-021	5	WASHER, FLAT 7/16 ZINC
7	11-012	2	NUT, 7/16-14 ZINC
8	16-017	1	TUBING, IMPOLENE 250FT.
9	16-017	1	TUBING, IMPOLENE 250FT.
10	14-004	1	CLAMP, WIRE 5/8 IN X 3/8
11*	61-076	1	ASSY, ADAPTOR VAC STANDPIPE
12	46-008	1	VACUUM PUMP 4 M-L
13	12-020	4	LKWSR, 7/16 ZINC
14	10-039	4	SCREW, MACH 7/16-14 X 1-1/2 HXHD
15	61-142	1	ASSY, MOUNT BLWR TENSN CHAMP
16	59-240	1	TRAP, GREASE BLOWER 3L,4M
17	66-058	1	NIPPLE, 2 1-2 X 7-8 STEEL
18	16-011	1	HOSE, INT VAC 2-7/8 IN 50 FT BULK
19	61-047	1	ASSY, BLOWER MOUNT 4M CHAMP
20	10-030	4	SCREW, MACH 3/8-16 X 3 HXHD
21	12-013	8	WASHER, FLAT 3/8 SAE
22	12-014	4	LKWSR, 3/8 ZINC
23	11-006	4	NUT, 3/8-16 ZINC
24	61-056	1	ASSY PRE-HEATER CHAMP

\*61-153 with sub-mount water tank



5-22

### IDLER PULLEY ASSEMBLY

Item No.	Part Number	Qty	Description
1	38-016	1	HUB, B 3/4
2	OEM	3	1/4-20 x 1-3/8 HEX HEAD
3	12-015	3	LKWSR, 1/4 ZINC
4	10-084	2	SCREW, SET 1/4-20 X 1/2
5	64-005	2	KEYSTOCK, 1/4 SQUARE X 2 IN
6	38-019	1	HUB, SK-1 1/8
7	10-037	3	SCREW, MACH 5/16-18 X 2 HXHD
8	12-016	3	LKWSR, 5/16 ZINC
9	66-082	1	PULLEY, TENSIONER 5.0 2G
10	61-142	1	ASSY, MOUNT BLWR TENSN CHAMP
11	66-084	1	SHAFT, TENSIONER CHAMP
12	11-016	1	NUT, HEX 5/8-11
13	38-027	1	PULLEY, 5V630SK 2G
14	38-028	1	PULLEY, 5V710SK 2G
15	61-140	1	BOLT, BELT ADJUSTMENT CHAMP
16	66-081	1	TENSIONER, ADJUSTMENT BLOCK
17	58-107	2	SPACER, .190 X .688 X 1.625
18	12-013	2	WASHER, FLAT 3/8 SAE
19	12-014	2	LKWSR, 3/8 ZINC
20	10-029	2	SCREW, MACH 3/8-16 X 1 HXHD
21	37-040	2	BELT, 5VX500
22	39-018	2	BEARING, 35MM X 72MM X 17MM
23	66-080	1	SHAFT, BEARING SUPPORT

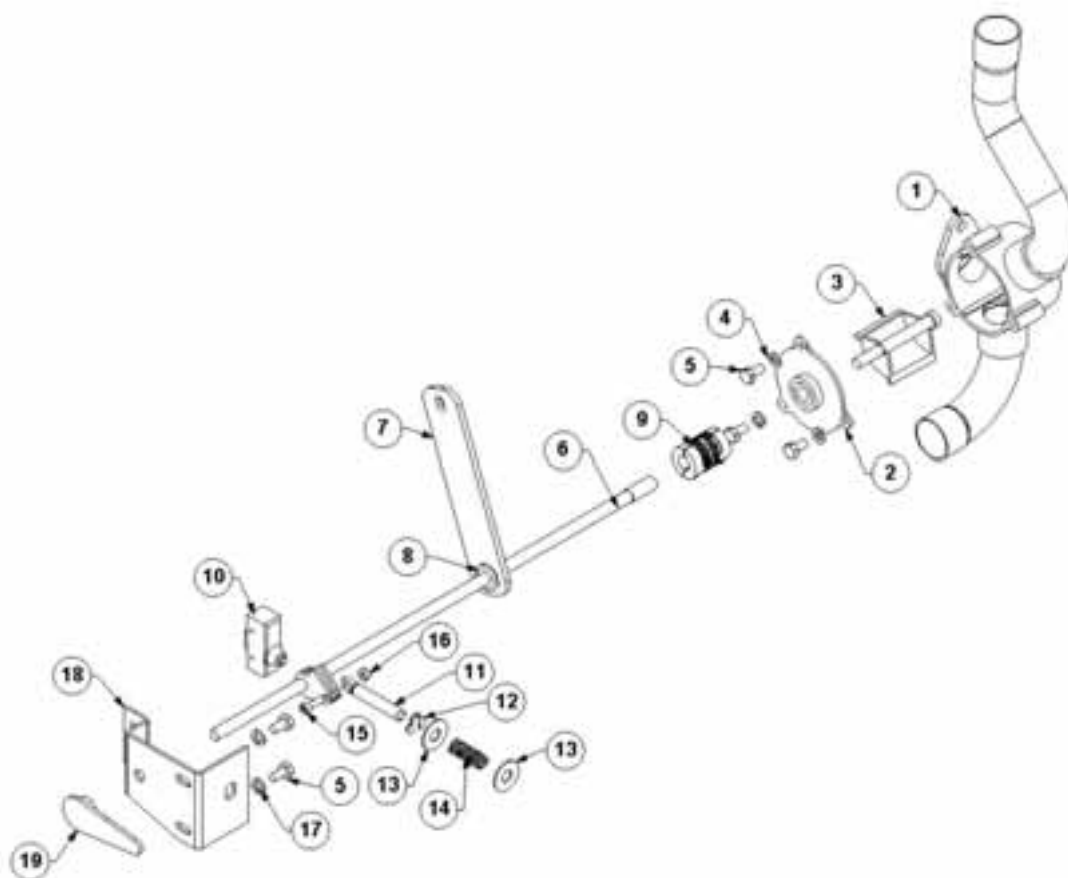
(17) \*58-105 SPACER, .062 X .688 X 1.625

(17) \*58-106 SPACER, .125 X .688 X 1.625

(17) \*58-107 SPACER, .190 X .688 X 1.625



## SECTION 5

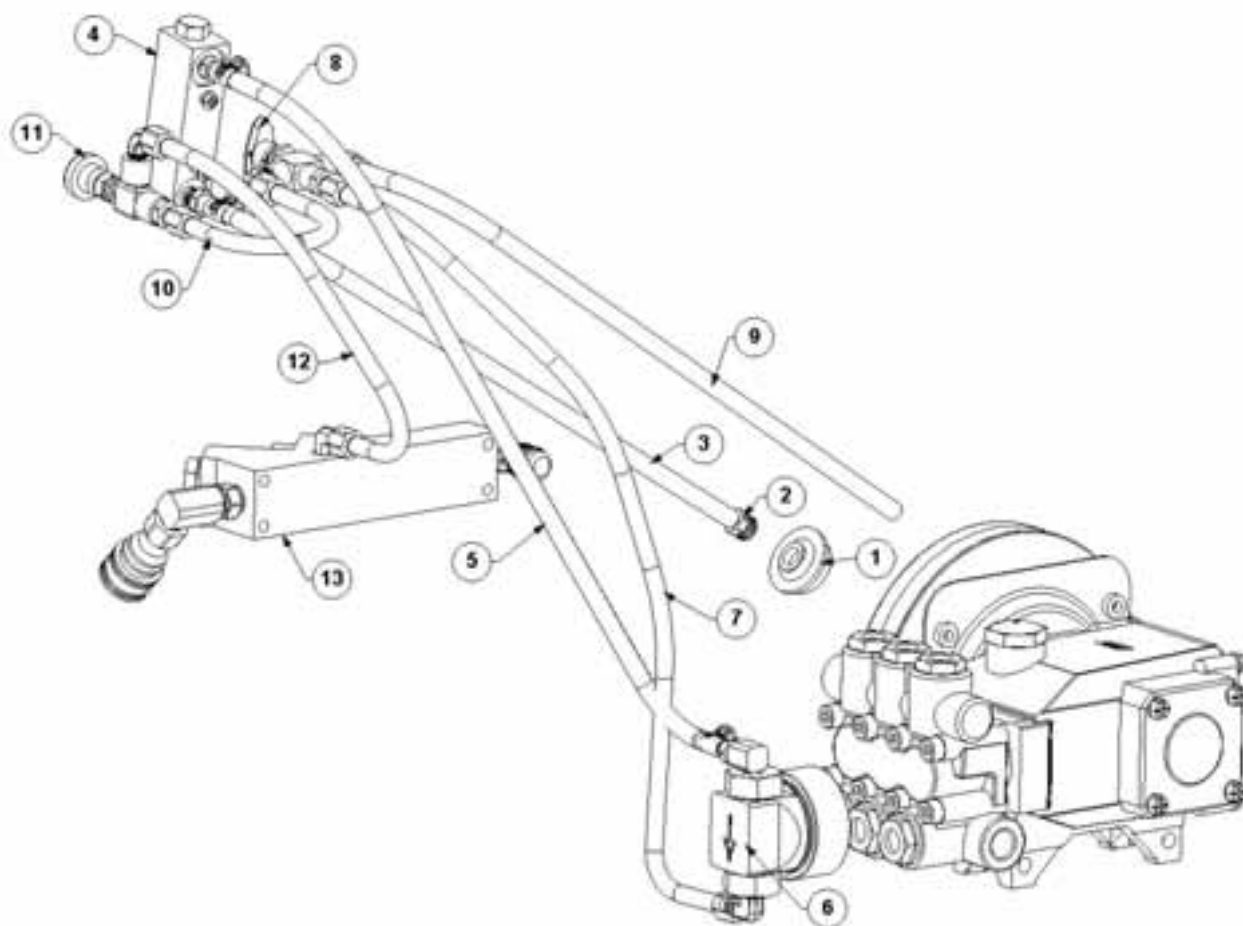


5-23

### DIVERTER VALVE ASSEMBLY

Item No.	Part Number	Qty	Description
1	61-055	1	ASSY DIVERTER VALVE BODY CHAMP
2	51-006	1	CASTING, CVR. DIVERTER VALVE
3	51-007	1	CASTING, ACTUATOR DIVERTER VALVE
4	12-003	3	LKWSR, 1/4 IN SS
5	10-006	5	SCREW, MACH 1/4-20 X 1/2 HEXHD
6	61-136	1	ASSY, DVTR SHAFT W/ 7/16" ADPTR
7	58-113	1	BRKT, DIVERTER ROD SUPPORT
8	41-034	1	GROMMET, DIVERTER SILICON
9	39-016	1	39-016 COUPLING, FLEX D-BORE
10	34-006	1	MICROSWITCH, SAGER#BA-2RB-A2
11	66-044	1	ROD, SPRG GUIDE 3/8SS CHAMP
12	39-007	1	RING,RETAINING 3/8 SHAFT .331 GROOVE
13	12-013	2	WASHER, FLAT 3/8 SAE
14	15-006	1	SPRING, DIVERTER/HOSE REEL
15	10-016	1	SCREW, MACHINE 10-32 X 1 SOCHD SS
16	11-018	1	NUT, 10-32 NYLOK
17	12-015	2	LKWSR, 1/4 ZINC
18	58-028	1	BRACKET, DIVERTER SHAFT MOUNT
19	40-007	1	HANDLE. HE/MUFFLER CHAMP

## SECTION 5

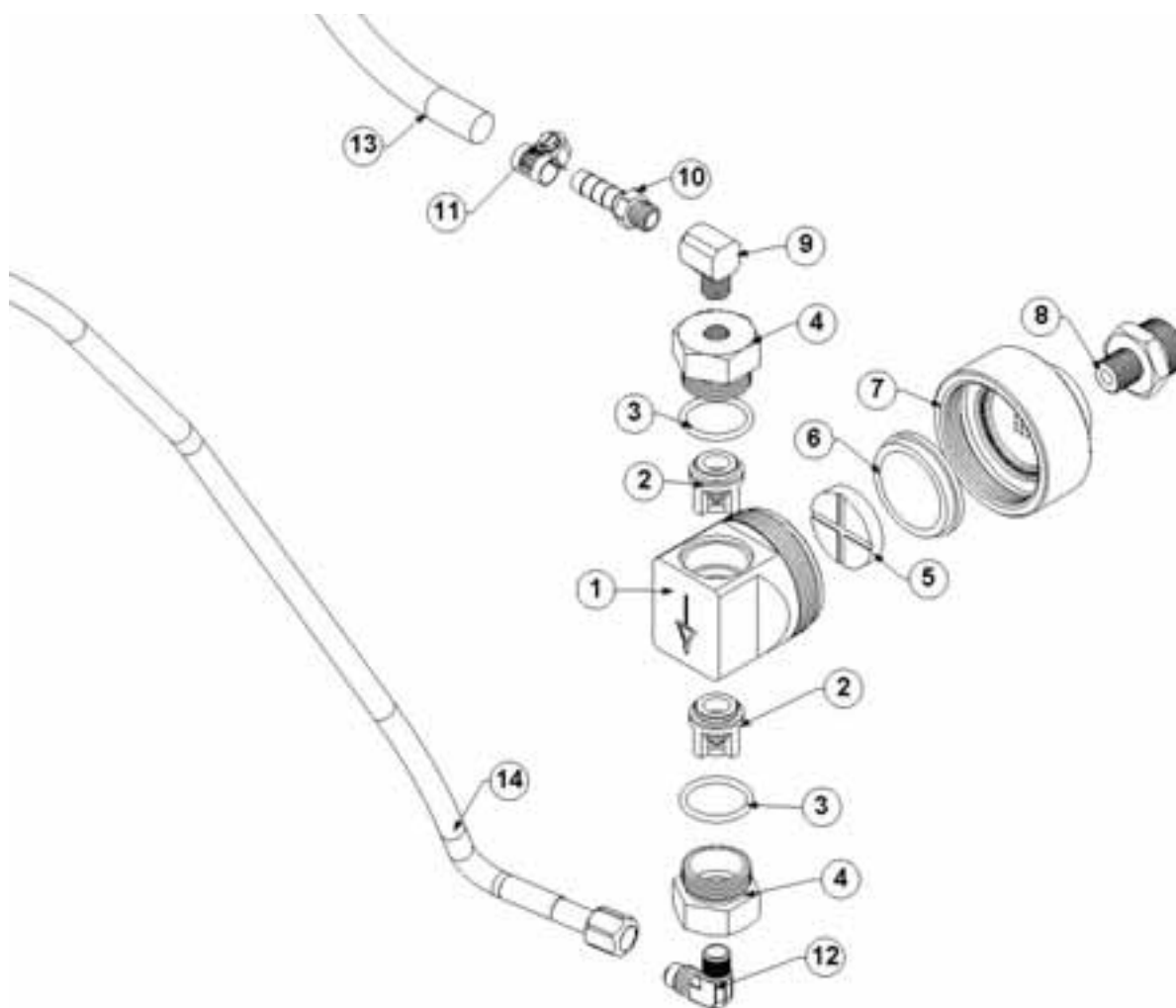


5-25

### CHEMICAL PUMPING SYSTEM

Item No.	Part Number	Qty	Description
1	20-002	1	STRAINER, SUCTION END 1/8FP
2	21-006	1	FTTG, BRB 1/4PX5//16H BR
3	16-006	60"	HOSE, BRAIDED 5/16 IN. 300FT BULK
4	26-003	1	FLOWMETER, 1/8P
5	16-006	22"	HOSE, BRAIDED 5/16 IN. 300FT BULK.
6	46-012	1	PUMP, CHEMICAL STAINLESS STEEL
7	18-061	1	HOSE, 3/16 X 10 1/4FT X 1/4FT
8	23-027	1	VLV, 3-WAY BALL 1/8 FP SS
9	16-006	60"	HOSE, BRAIDED 5/16 IN. 300FT BULK.
10	18-030	1	HOSE, 3/16 X 14-3/4 1/4FT X 1/4FT
11	23-028	1	VLV, MET 1/8FP (CHEM) RT ANG SS
12	18-062	1	HOSE, 3/16 X 10 1/4FT X 1/4FT
13		1	Y-STRAINER ASSEMBLY

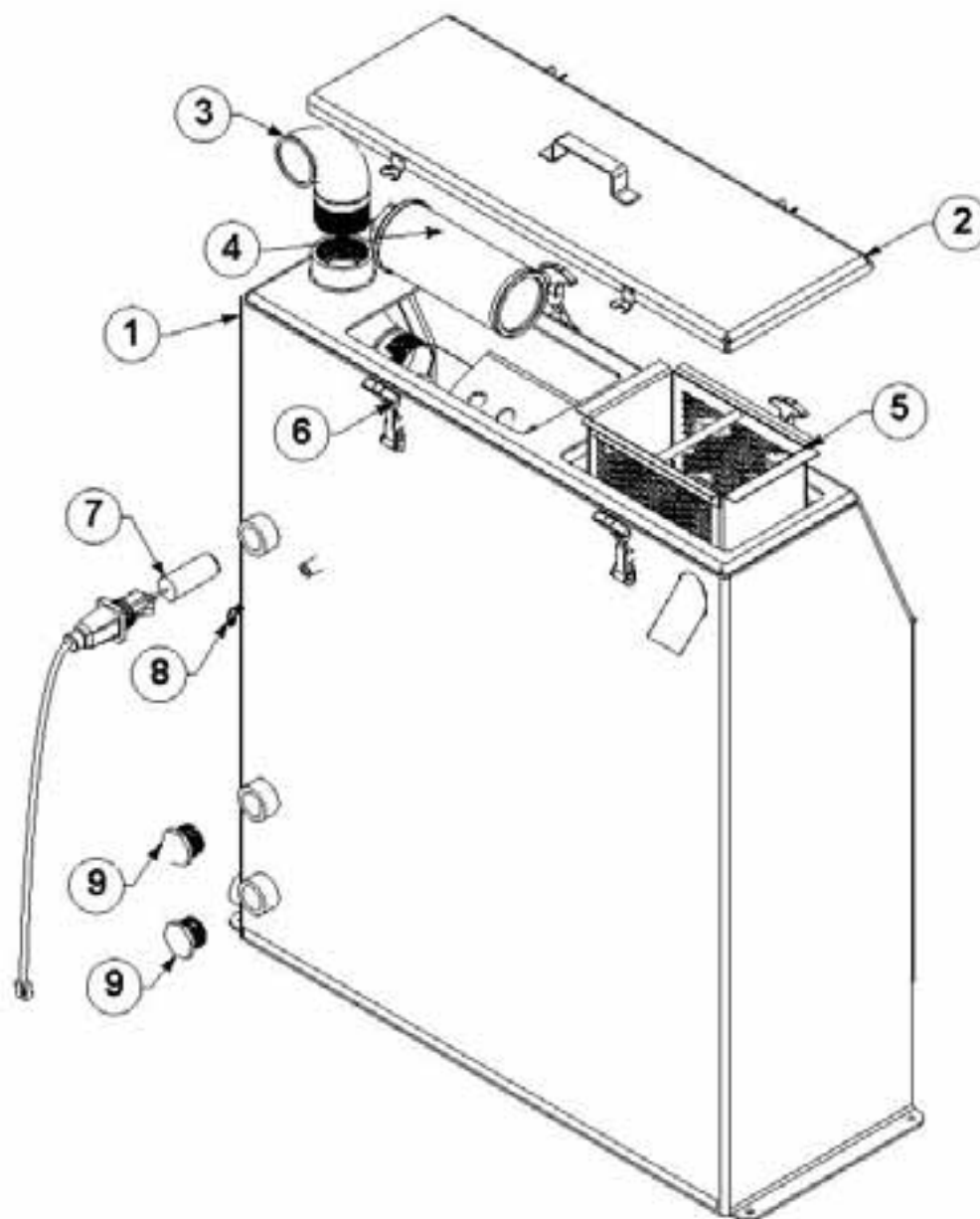
## SECTION 5



5-26

### CHEMICAL PUMP, STAINLESS STEEL

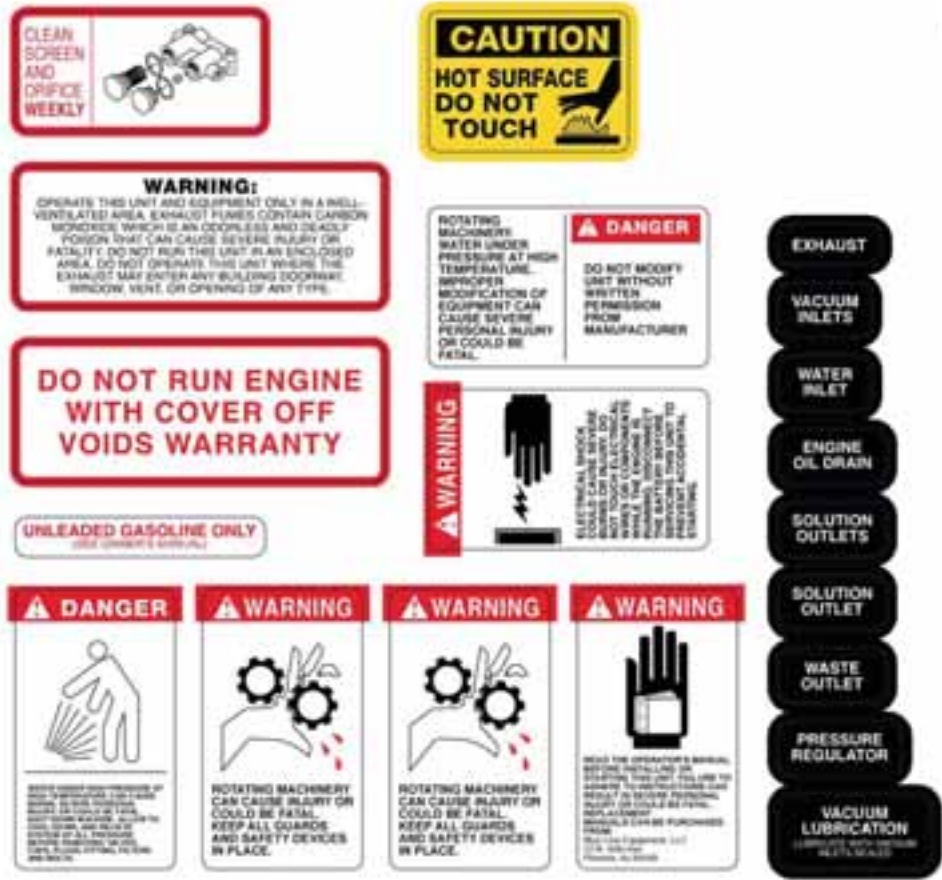
Item No.	Part Number	Qty	Description
1	66-008	1	BODY, CHEMICAL PUMP STAINLESS
2	36-004	2	VLV, CHECK HYPRO
3	41-007	2	O-RING, 7/8 ID, 1-1/16 OD
4	66-006	2	CAP, CHECK VALVE CHEM PUMP SS
5	36-003	1	DISC, CHEM PUMP
6	36-000	1	DIAPHRAGM, CHEM PUMP
7	66-007	1	COVER, CHEM PUMP STAINLESS
8	66-002	1	ADAPTOR, CHEMICAL PUMP
9	21-038	1	ELL, STREET 1/8 IN BRASS
10	21-007	1	FTTG, BRB 1/8P x 5/16H BR
11	14-007	1	CLAMP, HOSE # 4
12	21-066	1	ELL, 1/8P x 1/4T SS
13	16-006	22"	HOSE, BRAIDED 5/16 IN. 300FT BULK.
14	18-061	1	HOSE, 3/16 X 10 1/4FT X 1/4FT



5-27

**68-029 ASSY, WASTE TANK CHAMP®**

Item No.	Part Number	Qty	Description
1	61-062	1	ASSY, WASTE TANK CHAMP®
2	61-061	1	ASSY, WST TANK LID CHAMP®
3	61-068	1	ELBOW, WASTE TANK CHAMP®
4	20-009	1	STRAINER, WST TNK 2-1/2 IN. 100 M.
5	61-002	1	BASKET, STRAINER WASTE TANK
6	40-003	4	LATCH, PRE-FILTER BOX
7	69-000	1	WIRING , LEVEL SENSOR SHUTOFF
8	21-051	1	ELL, 1/4 P X 1/4 T 45 DEG BRASS
9	21-097	2	PLUG, 1-1/4 IN PVC



44-000 DECAL SHEET, WARNING & CONTROLS

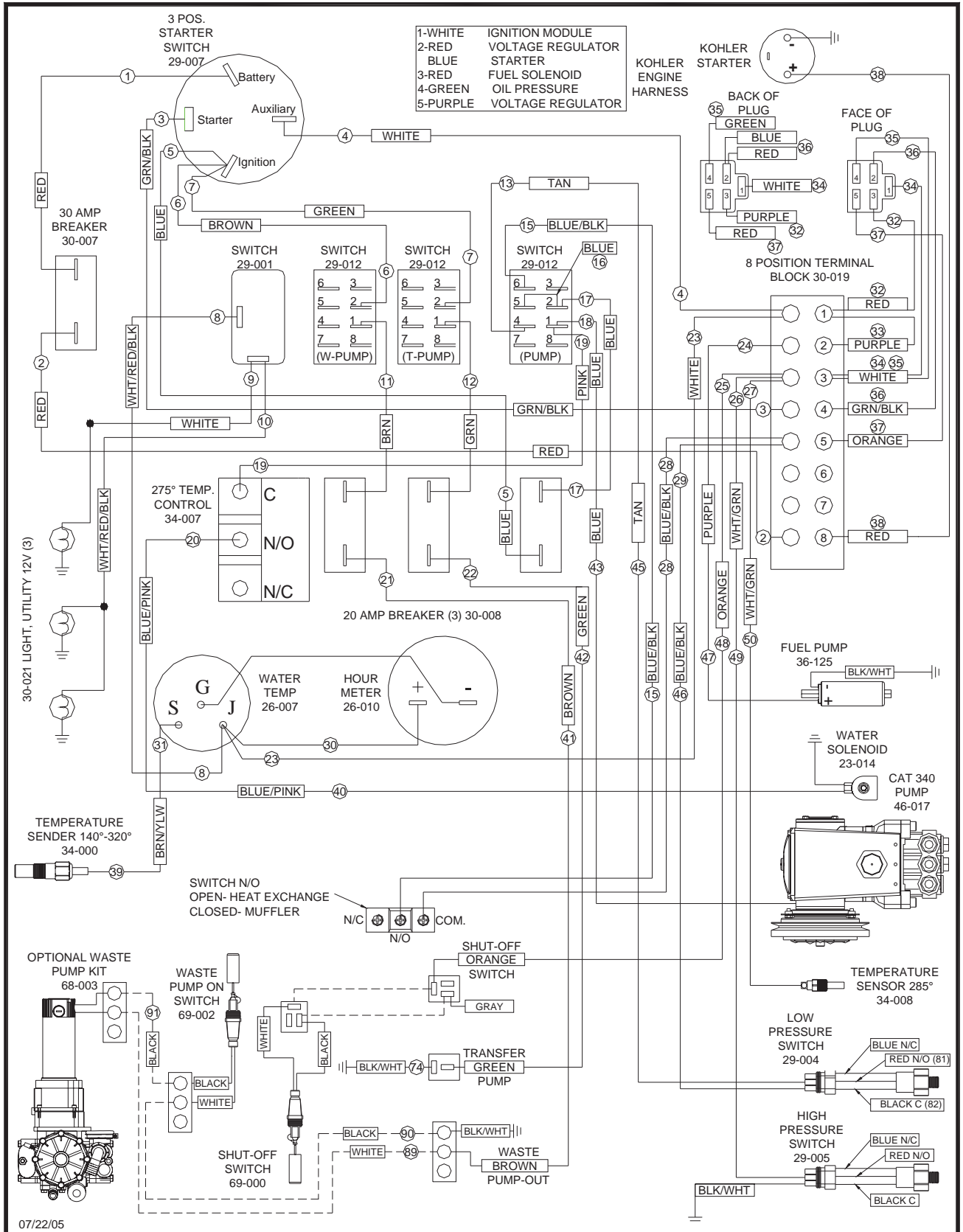


44-005 DECAL, HEAT EXCH-MUFFLER



44-007 DECAL, CHAMP®

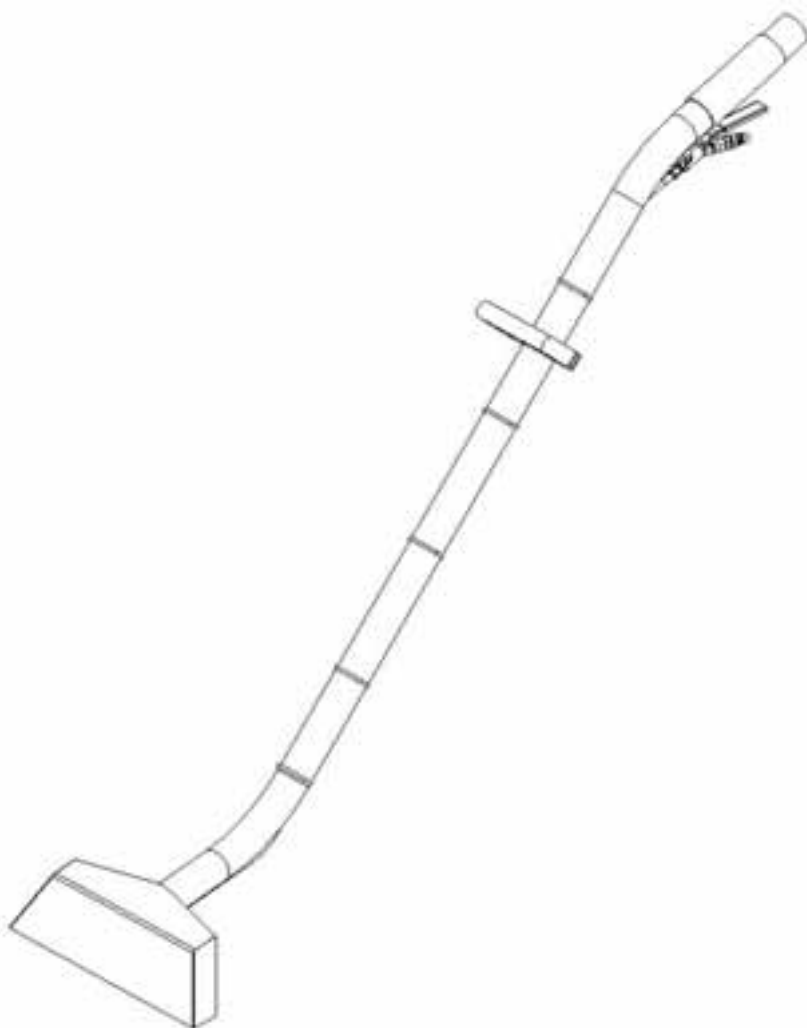
## ELECTRICAL DIAGRAM



Serial #73 &amp; Higher

5-30

## SECTION 5



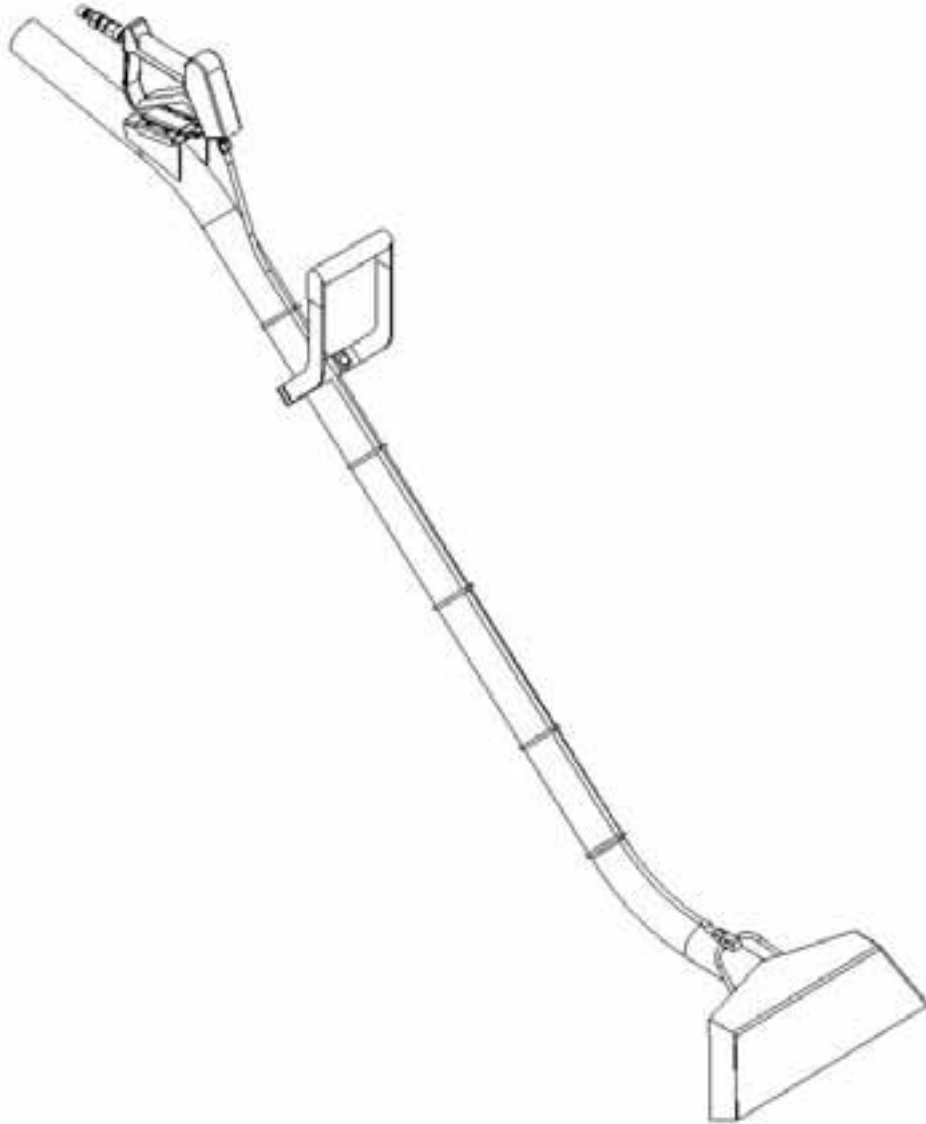
5-30

### 67-002 WAND, LOW PROFILE 12 IN. WIDE

Item No.	Part Number	Qty	Description
1	67-001W	1	WAND, LOW PROFILE 2 IN
2	*25-000	1	DSC, 1/4M X 1/4FP BR
3	*27-013	1	VLV, WAND CMP
4	21-001	1	CONN, 1/8 P X 1/4 T BR
5	21-050	1	CONN, 1/4 P X 1/4 T BRASS
6	18-021	1	HOSE, 3/16 X 51 1/4FT X 1/4FT
7	*24-000	4	TIP, SPRAY 95015X1/8P SST

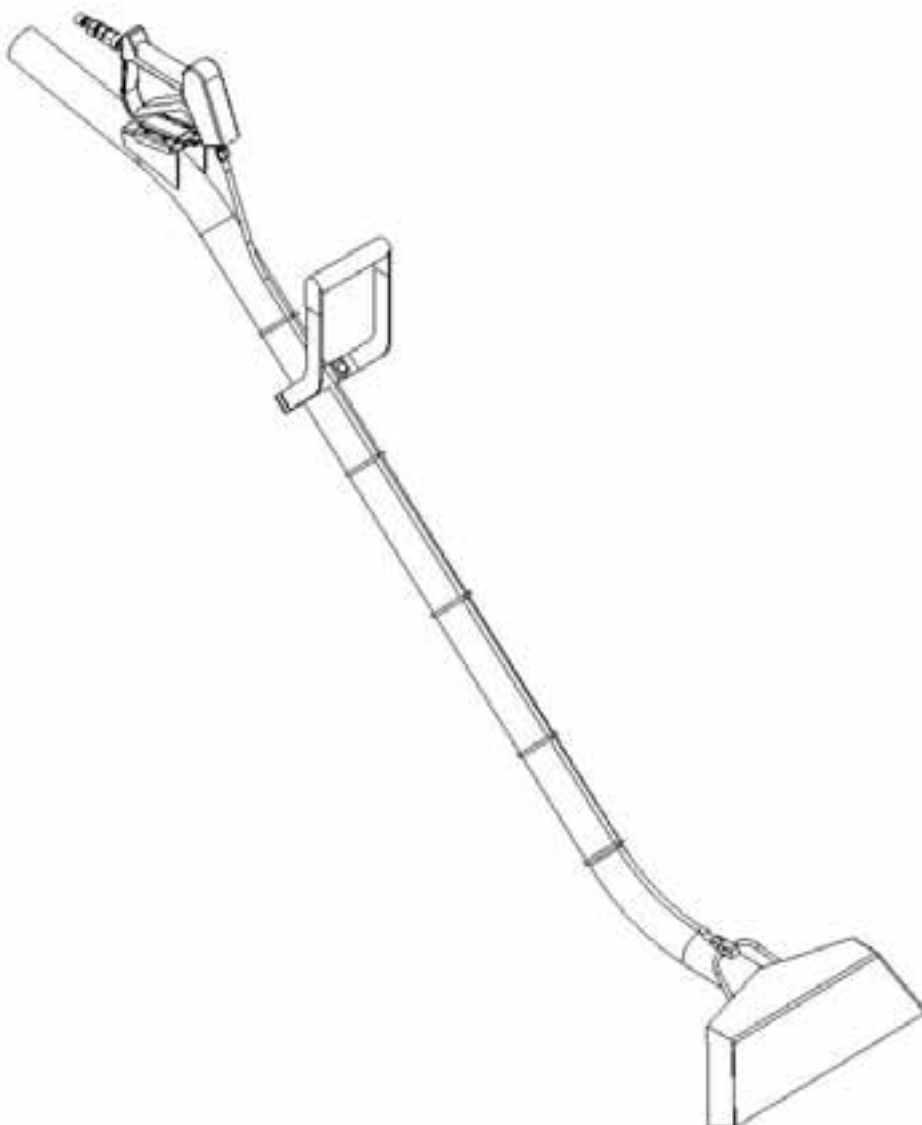


## **10. ACCESSORIES**



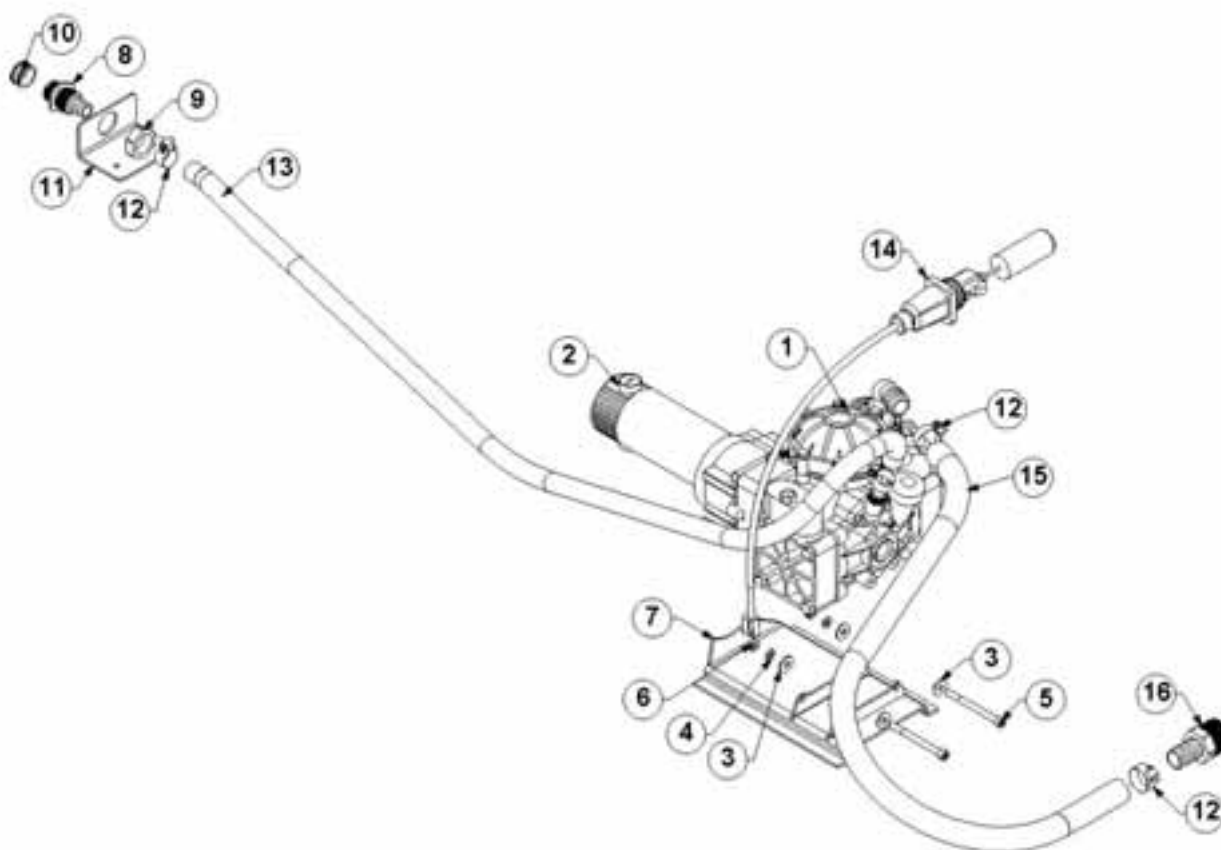
**67-003 WAND, ERGO W/PISTOL GRIP 14"**

Item No.	Part Number	Qty	Description
1	67-003	1	WAND,ERGONOMIC W /SPRAYER
2	25-000	1	DSC, 1/4M X 1/4FP BR
3	23-035	1	VLV,SPRAYER HYPRO 3381-0032
4	21-050	1	CONN, 1/4 P X 1/4 T BRASS
5	18-021	1	HOSE, 3/16 X 51 1/4FT X 1/4FT
6	24-000	4	TIP, SPRAY 95015X1/8P SST
7	40-009	1	HANDLE, ERGO WAND COATED



### WAND, ERGONOMIC 11 IN. WIDE

Item No.	Part Number	Qty	Description
1	67-005	1	WAND, ERGONOMIC 11 IN. WIDE
2	25-000	1	DSC, 1/4M X 1/4FP BR
3	23-035	1	VLV, SPRAYER HYPRO 3381-0032
4	21-050	1	CONN, 1/4 P X 1/4 T BRASS
5	18-021	1	HOSE, 3/16 X 51 1/4FT X 1/4FT
6	24-000	4	TIP, SPRAY 95015X1/8P SST
7	40-009	1	HANDLE, ERGO WAND COATED

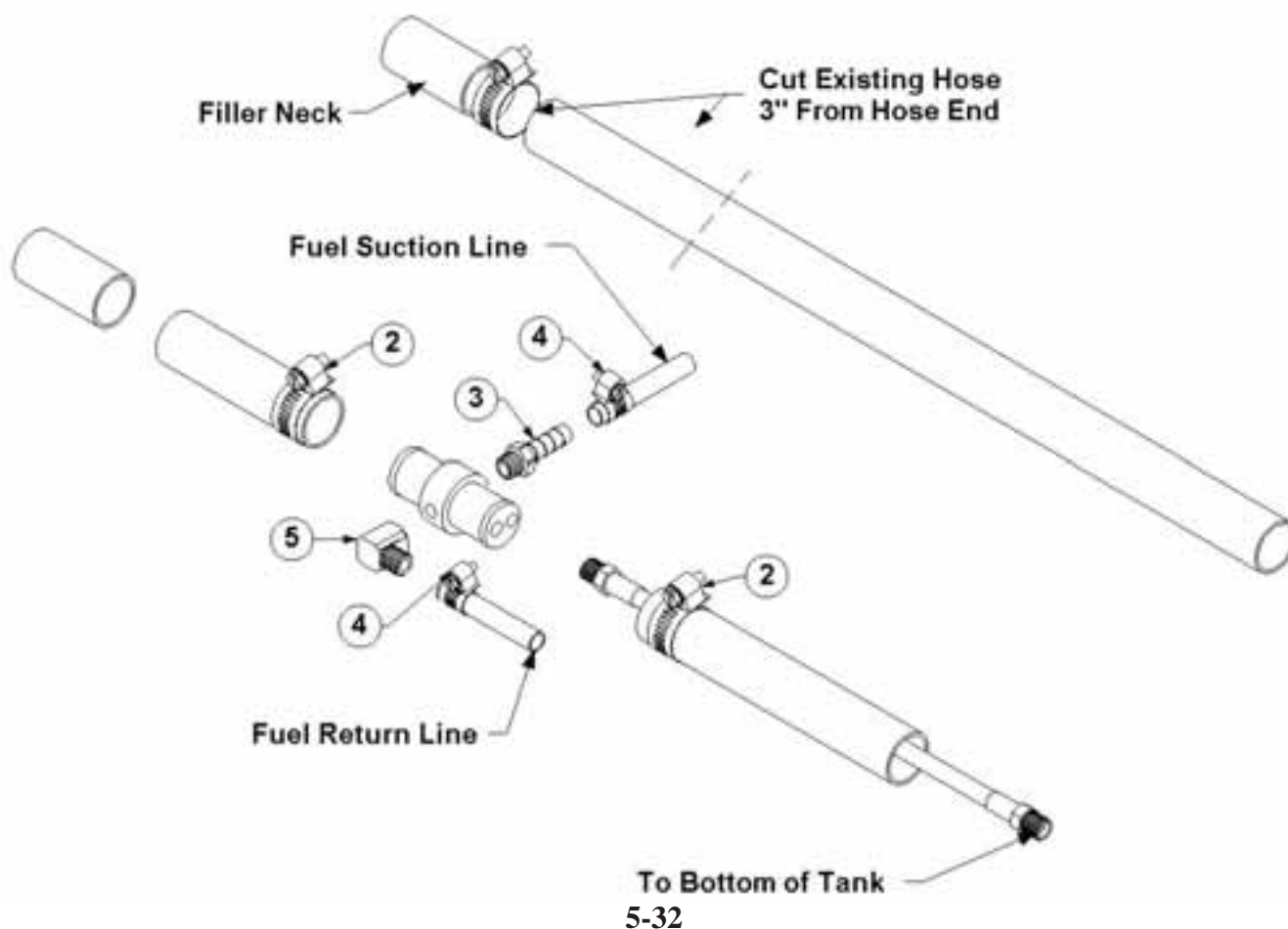


5-31

**68-003 KIT, WASTE PUMP EXTERNAL**

Item No.	Part Number	Qty	Description
1	46-016	1	PUMP, DIAPHRAGM, PUMP OUT
2	45-008	1	MOTOR, GEAR BISON PUMPOUT
3	12-017	4	WASHER, FLAT 5/16 SAE
4	12-016	2	LKWSR, 5/16 ZINC
5	10-040	2	SCREW, MACH 5/16-18 X 3-1/2 SOCHD
6	11-005	2	NUT, 5/16-18 ZINC
7	61-003	1	MOUNT, EXTERNAL PUMPOUT
8	66-022	1	ADAPTOR, HOSE WASTE PUMP
9	66-023	1	NUT, ADPTR. HOSE WASTE PUMP
10	21-071	1	CAP, GARDEN HOSE 3/4 BRASS
11	58-006	1	BRKT, HOSE CONN WASTE PUMP
12	14-006	4	CLAMP, HOSE #20
13	16-004	72"	HOSE, WTR. 3/4 IN HRZ. 500FT BULK
14	69-000	1	WIRING , LEVEL SENSOR SHUTOFF
15	16-018	24"	HOSE, WTR. 1 IN HRZ. 100FT BULK
16	21-036	1	FTTG, BRB 1-1/4 P X 1 IN. BARB

## 1992 (or later) FORD FUEL LINE INSTALLATION

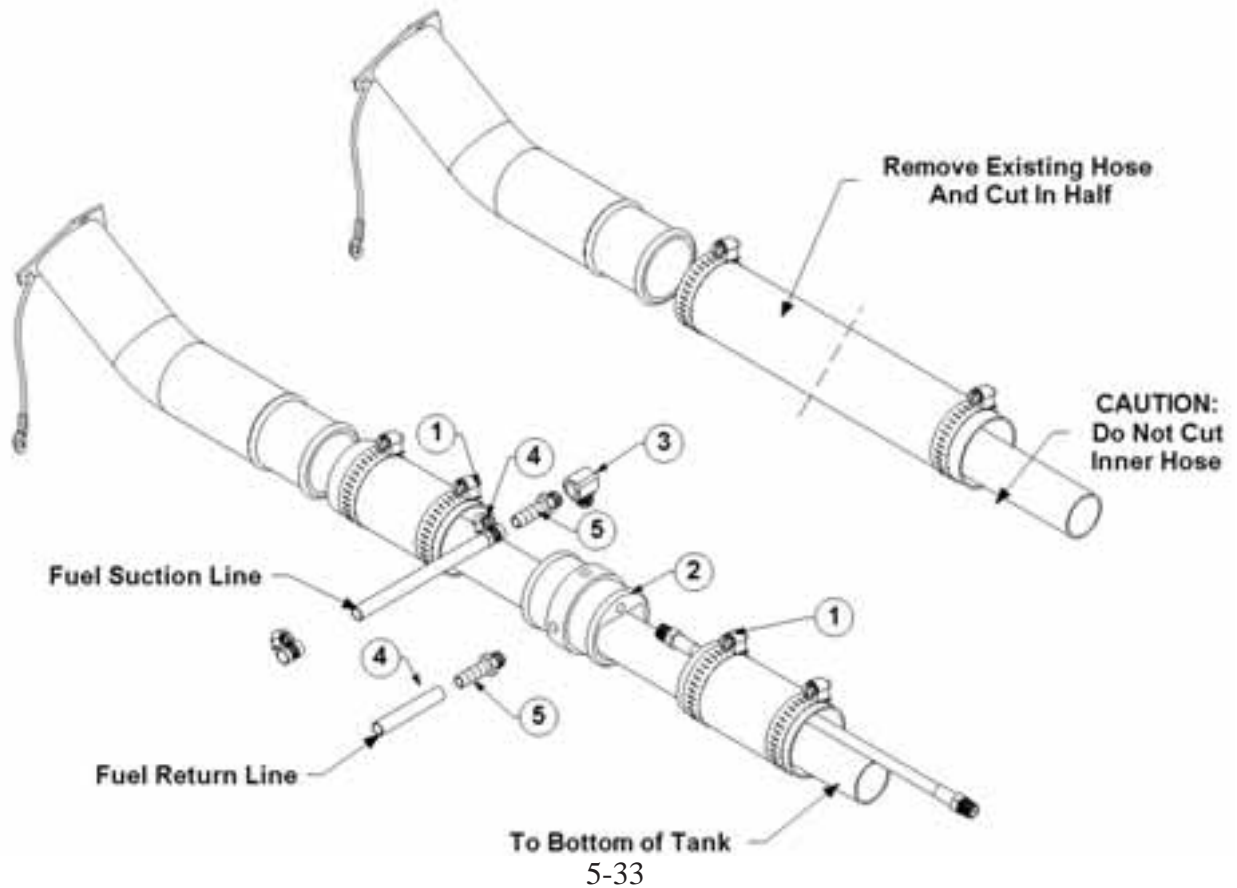


5-32

### 69-005FI KIT, FUEL HOOKUP FORD FI

Item No.	Part Number	Qty	Description
1	66-031	1	ADAPTOR, FUEL FILLER NECK FORD
2	14-000	2	CLAMP, HOSE #12
3	18-028	1	HOSE, 3/16 X 25 1/8P X 1/8P NO CVR
4	21-086	2	FTTG, BULKHEAD 1/4 IN. BRASS
5	21-006	4	FTTG, BRB 1/4PX5//16H BR
6	21-039	2	ELL, 1/4 IN LG STREET BRASS
7	14-011	6	CLAMP, HOSE FUEL #6
8	21-038	1	ELL, STREET 1/8 IN. BRASS
9	21-007	2	FTTG, BRB 1/8 P X 5/16 H BR

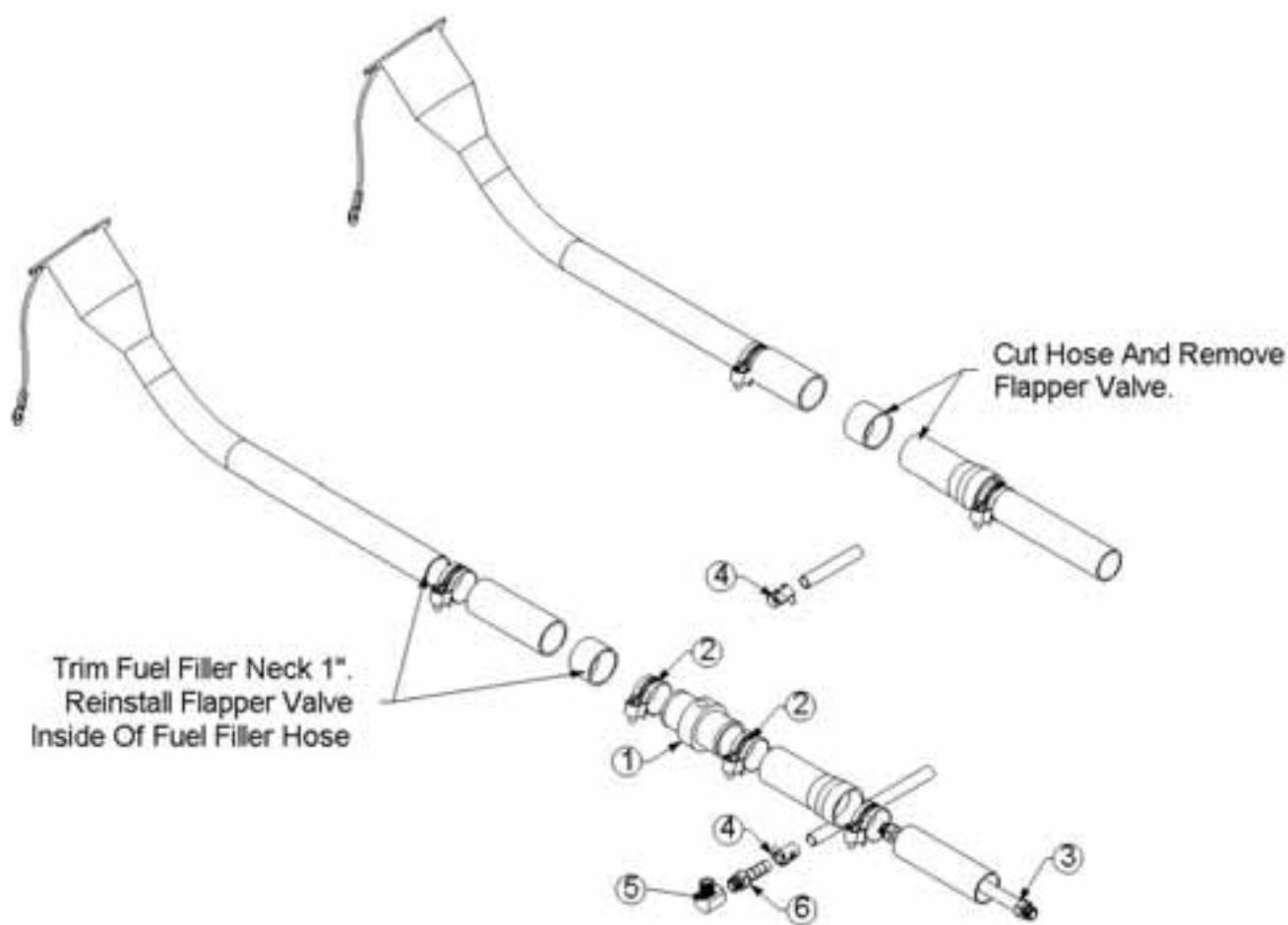
# CHEVY AND GMC FULL SIZE VAN FUEL LINE INSTALLATION



## 69-003FI KIT, FUEL HOOKUP 97 & NWR. FI

Item No.	Part Number	Qty	Description
1	14-010	2	CLAMP, HOSE #32
2	66-030	1	ADAPTOR, FUEL FILLER NECK CHEVY
3	21-116	1	ELL, 1/8FP 90 DEG BRONZE
4	14-011	6	CLAMP, HOSE FUEL #6
5	21-007	2	FTTG,BRB 1/8 PX 5/16 H BR
6	18-027	2	HOSE, 3/16 X 5 1/8P X 1/8P NO CVR
7	21-006	4	FTTG, BRB 1/4P X 5/16 H BR
8	21-039	2	ELL, 1/4 IN LG STREET BRASS
9	21-038	1	ELL, STREET 1/8 IN. BRASS
10	21-086	2	FTTG, BULKHEAD 1/4 IN. BRASS

## 2003 CHEVY AND GMC FULL SIZE VAN FUEL LINE INSTALLATION

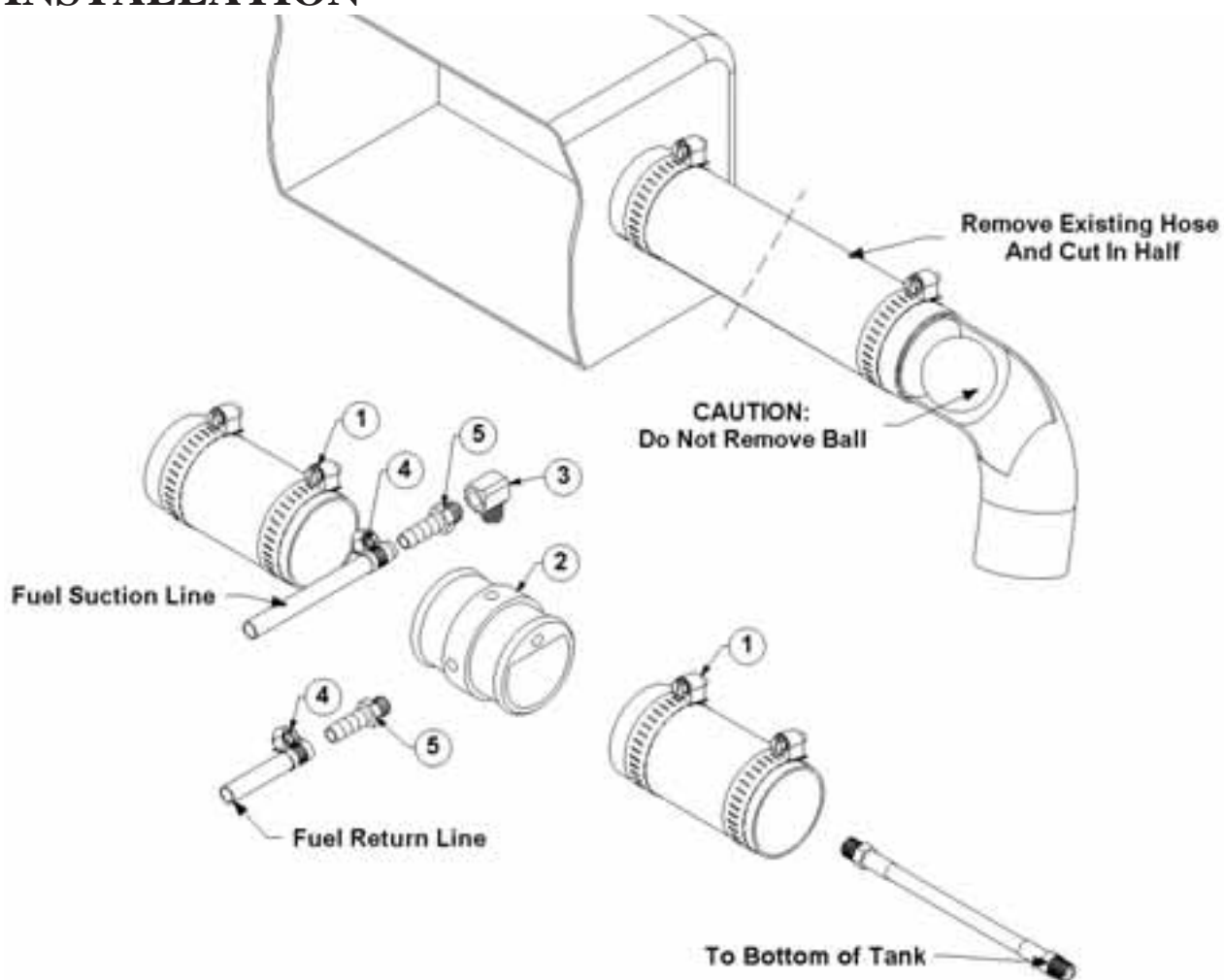


5-34

### 69-018FI KIT, FUEL HOOKUP 2003 CHEVY FI

Item No.	Part Number	Qty	Description
1	66-034	1	ADAPTOR, FUEL FLR CHVY 2003
2	14-006	2	CLAMP, HOSE #20
3	18-028	1	HOSE, 3/16 X 25 1/8P X 1/8P NO CVR
4	14-011	6	CLAMP, HOSE FUEL #6
5	21-038	1	ELL, STREET 1/8 IN. BRASS
6	21-007	2	FTTG,BRB 1/8 PX 5/16 H BR
7	21-039	2	ELL, 1/4 IN LG STREET BRASS
8	21-006	4	FTTG, BRB 1/4PX5//16H BR
9	21-086	2	FTTG, BULKHEAD 1/4 IN. BRASS

## 1997 (OR LATER) DODGE FULL SIZE VAN FUEL LINE INSTALLATION

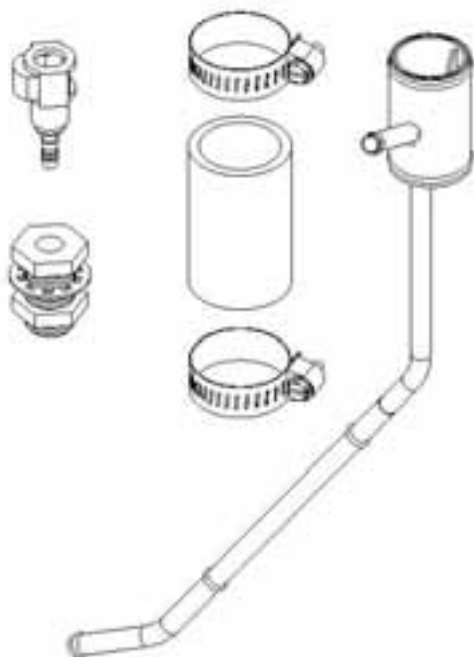


5-35

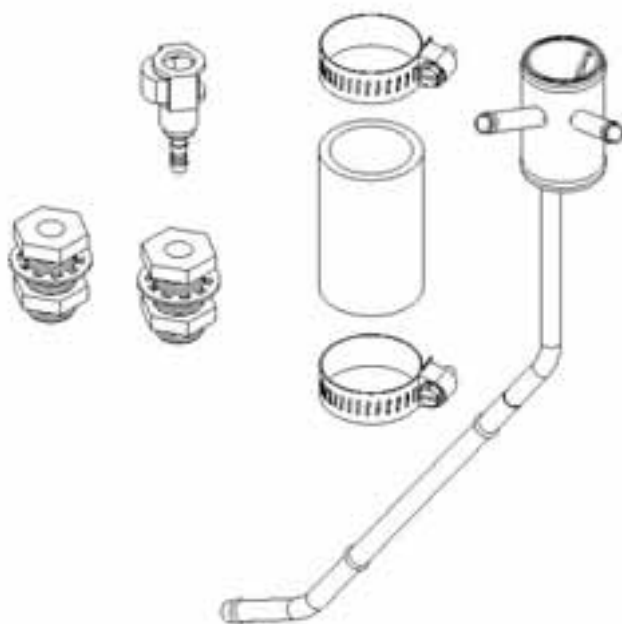
### 69-004FI KIT, FUEL HOOKUP CHEVY/DODGE FI

Item No.	Part Number	Qty	Description
1	14-010	2	#32 Hose Clamp (40/63mm)
2	66-030	1	ADAPTOR, FUEL FILLER NECK
3	21-038	1	ELL, STREET 1/8 IN. BRASS
4	14-011	6	CLAMP, HOSE FUEL #6
5	21-007	2	FTTG,BRB 1/8 PX 5/16 H BR
6	18-028	1	HOSE, 3/16 X 25 1/8P X 1/8P NO CVR
7	21-086	2	FTTG, BULKHEAD 1/4 IN. BRASS
8	21-006	4	1/4 M NPT x 5/16 Hose Barb
9	21-039	2	ELL, 1/4 IN LG STREET BRASS

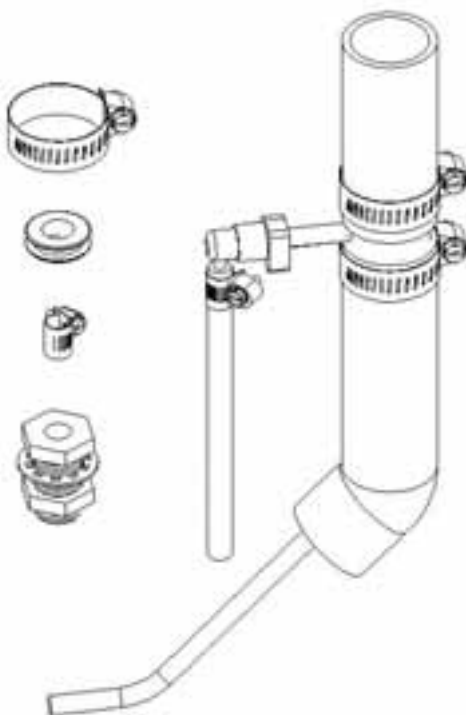




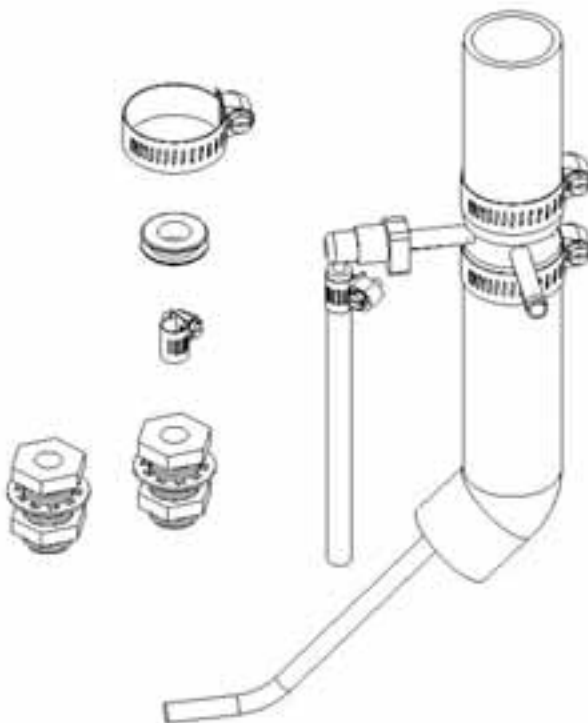
**69-032 KIT, 2004 TF ADAPTOR CHEVY**



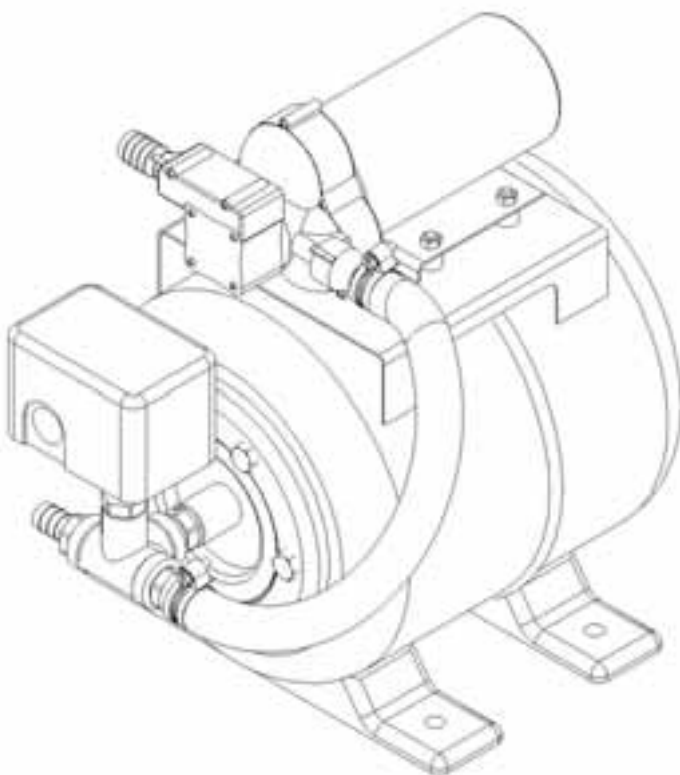
**69-032 KIT, 2004 TF ADAPTOR CHEVY**



**69-041 ADAPTOR, 2003 FORD FUEL**

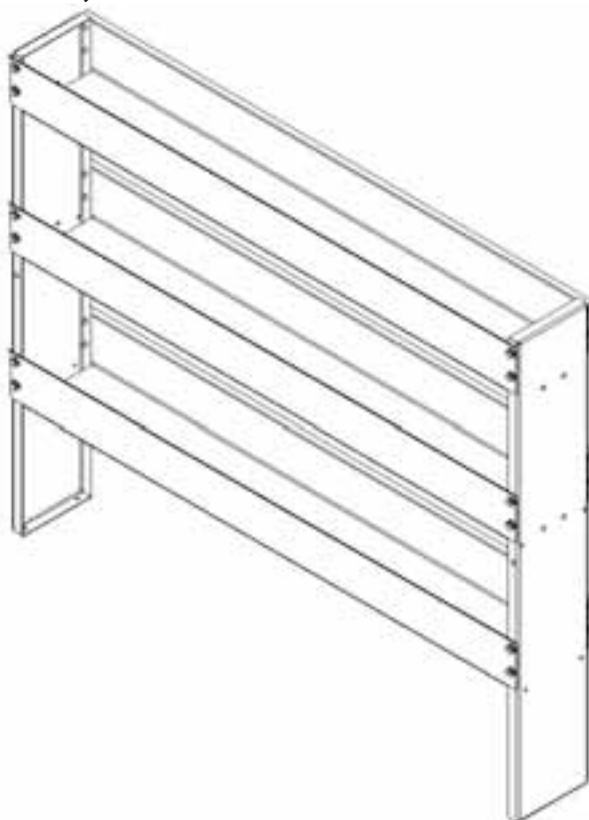


**69-047 ADAPTOR, 2003 FUEL INJ. FORD**



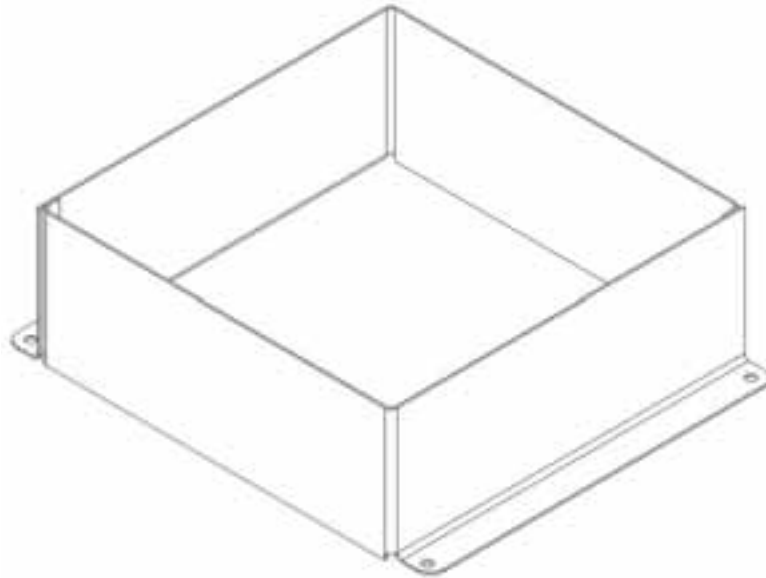
5-36

**68-002 KIT, DEMAND PUMP W/PLUMBING SS**



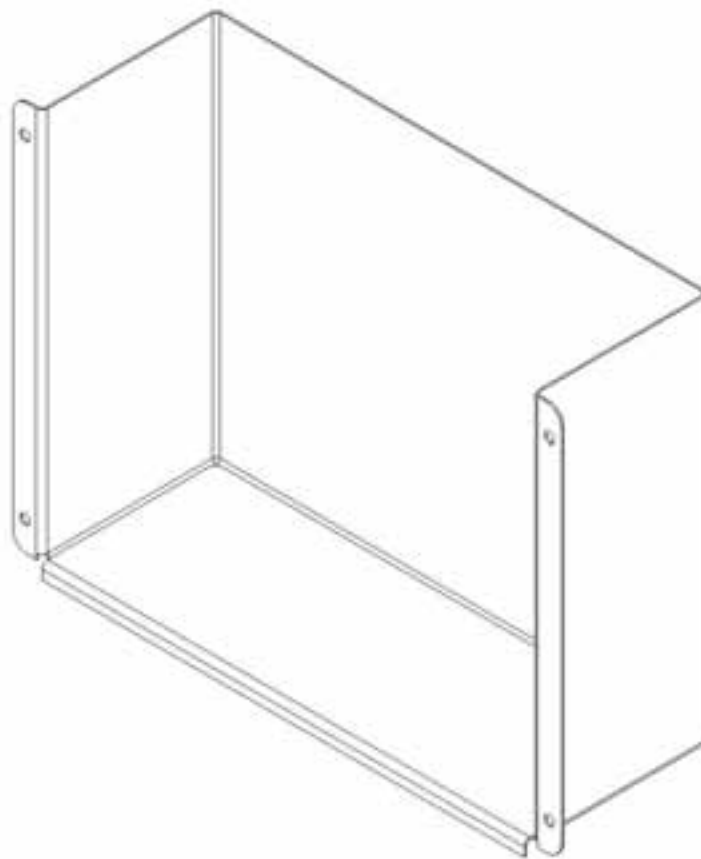
5-37

**68-013 ASSY, VAN STORAGE UNIT SS**



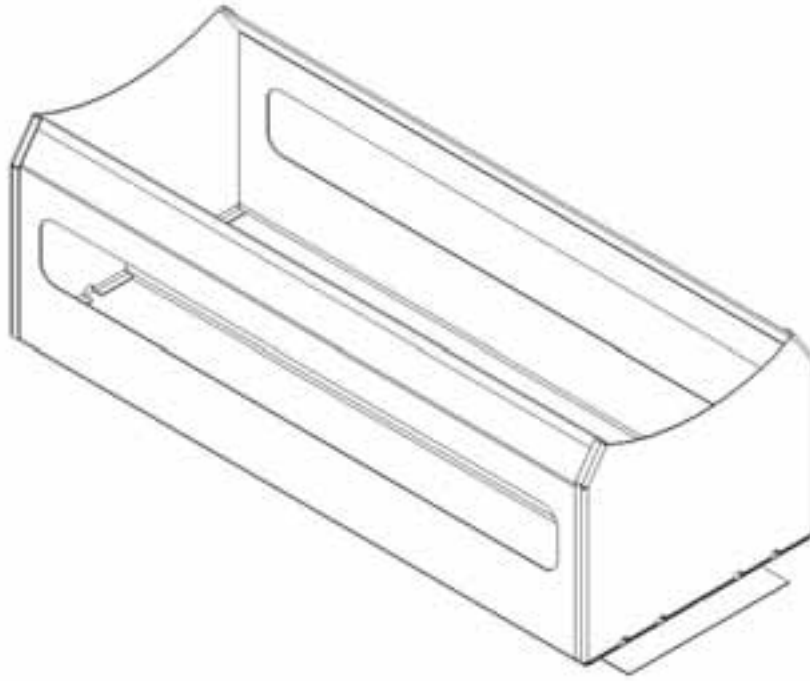
5-38

**68-014 ASSY, SINGLE 5 GAL JUG HOLDER**



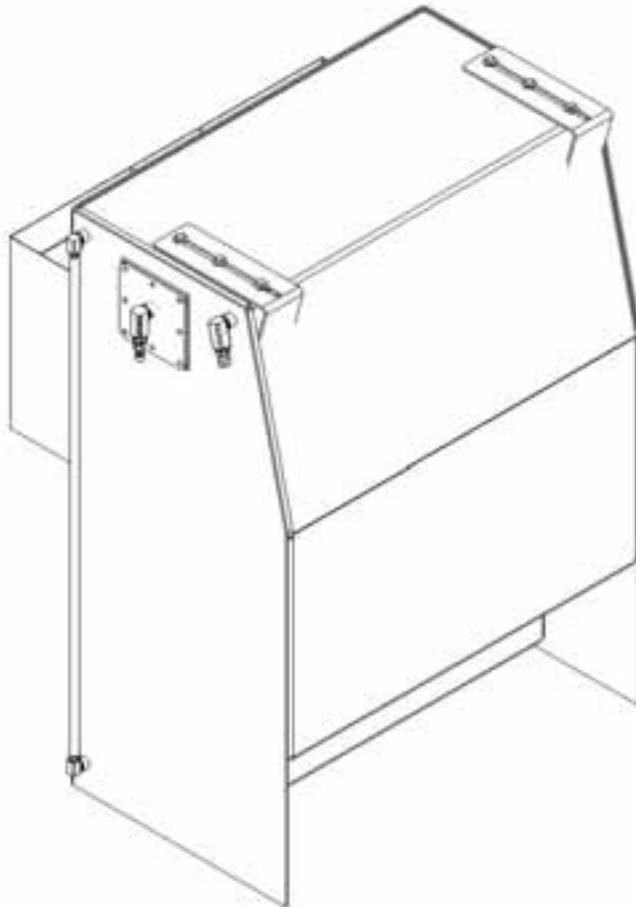
5-39

**68-015 ASSY, FURN BLOCK HOLDER SS**



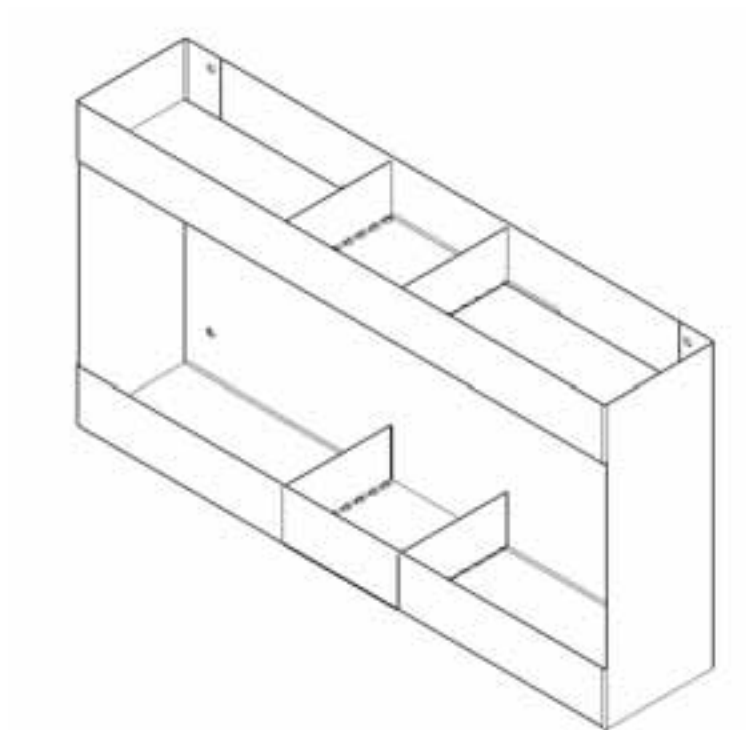
5-40

**68-016 RACK, DOUBLE CHEMICAL**



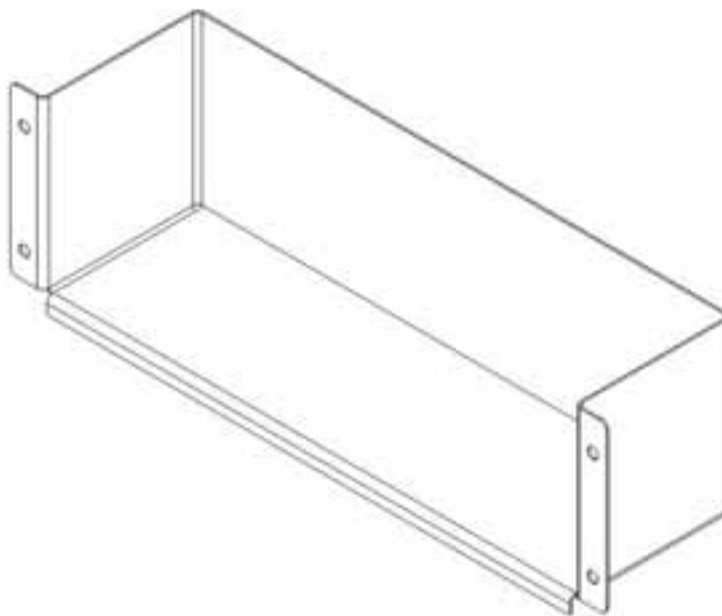
5-41

**68-017 ASSY, FIN 120 GAL WTR TNK**



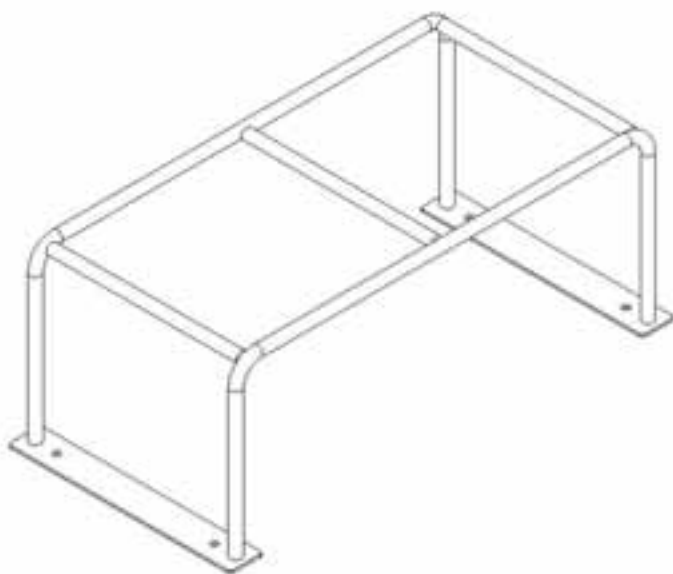
5-42

**68-018 ASSY, 10 GAL CHEM RACK S.S.**



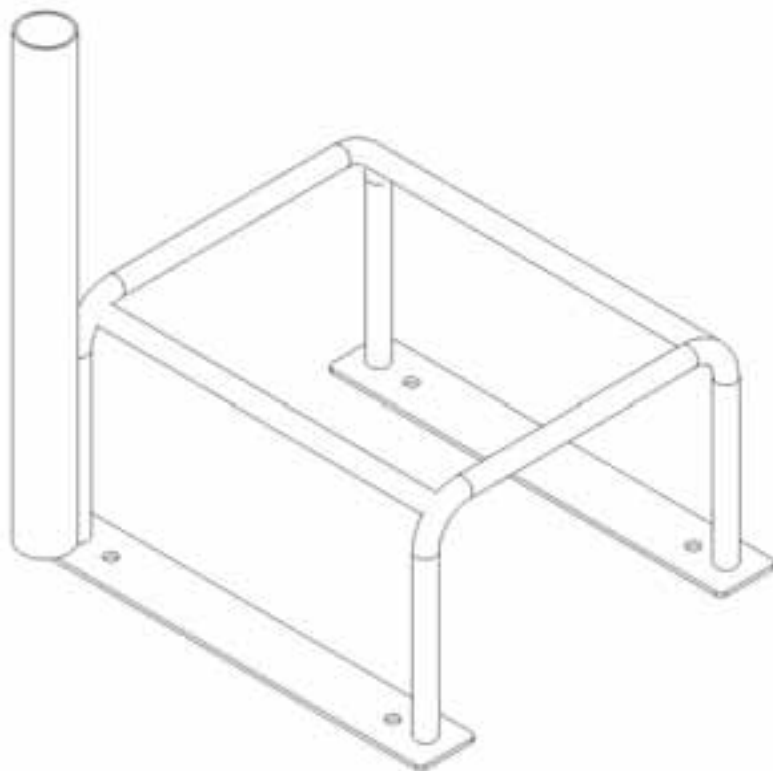
5-43

**68-019 SPRAY BOTTLE HOLDER SS**



5-44

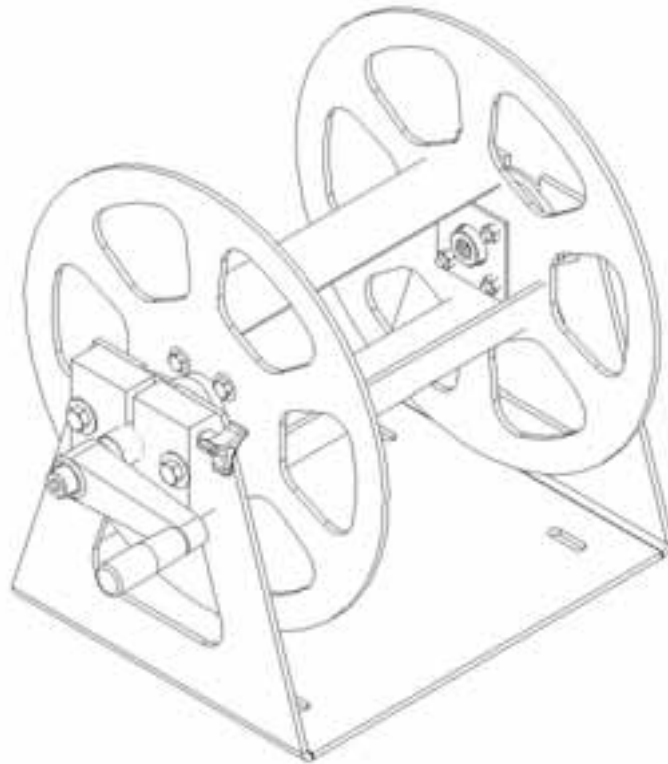
**68-022 ASSY, DBL PMP UP SPRAY RK, SS**



5-45

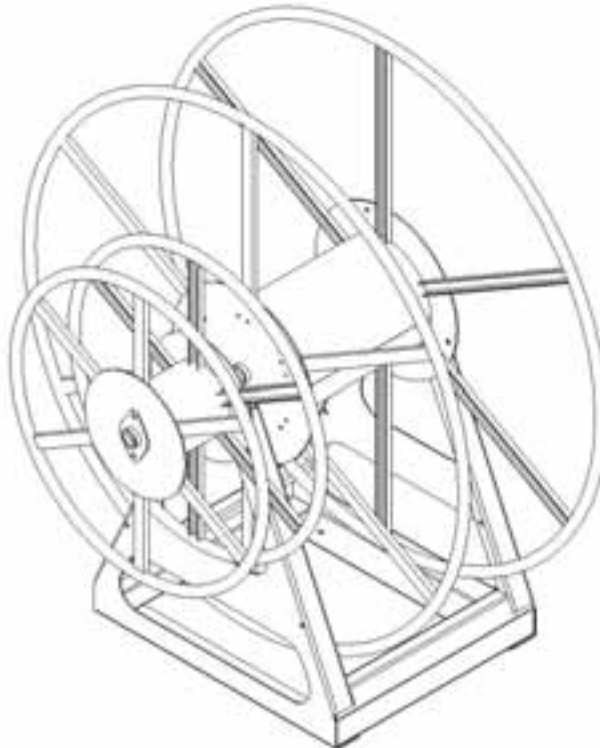
**68-024 ASSY, SNG PMP UP SPRAY RK, SS**





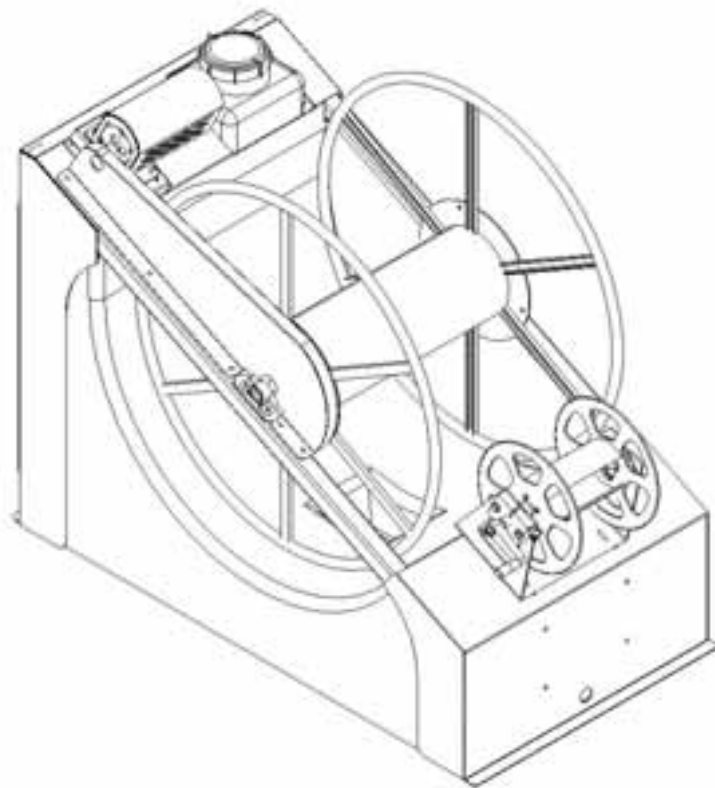
5-46

**68-023 ASSY, REEL HP SOLUTION**



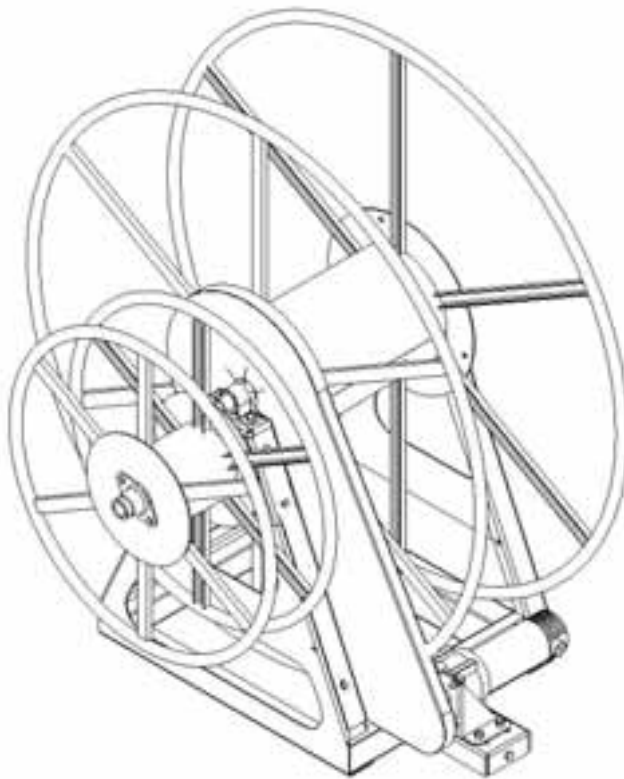
5-47

**68-025 ASSY, HOSE REEL HIGH PROFILE**



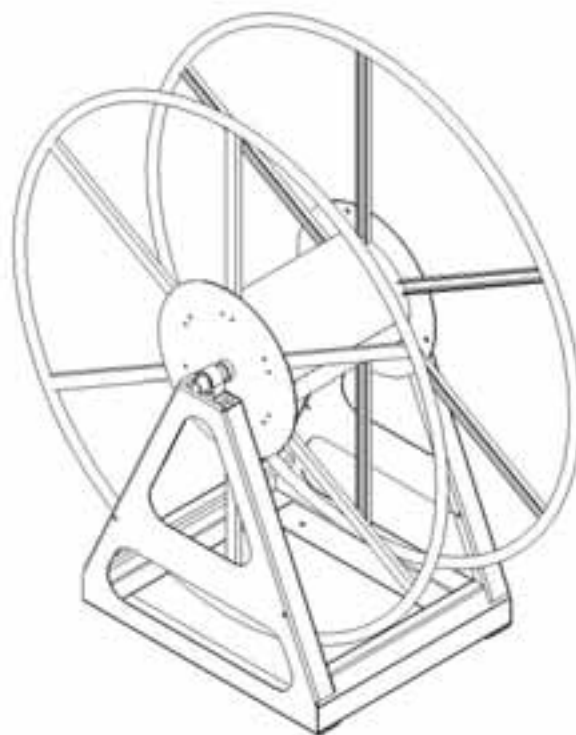
5-48

**68-032 ASSY, H-REEL MOTORIZED W-H2O TNK**

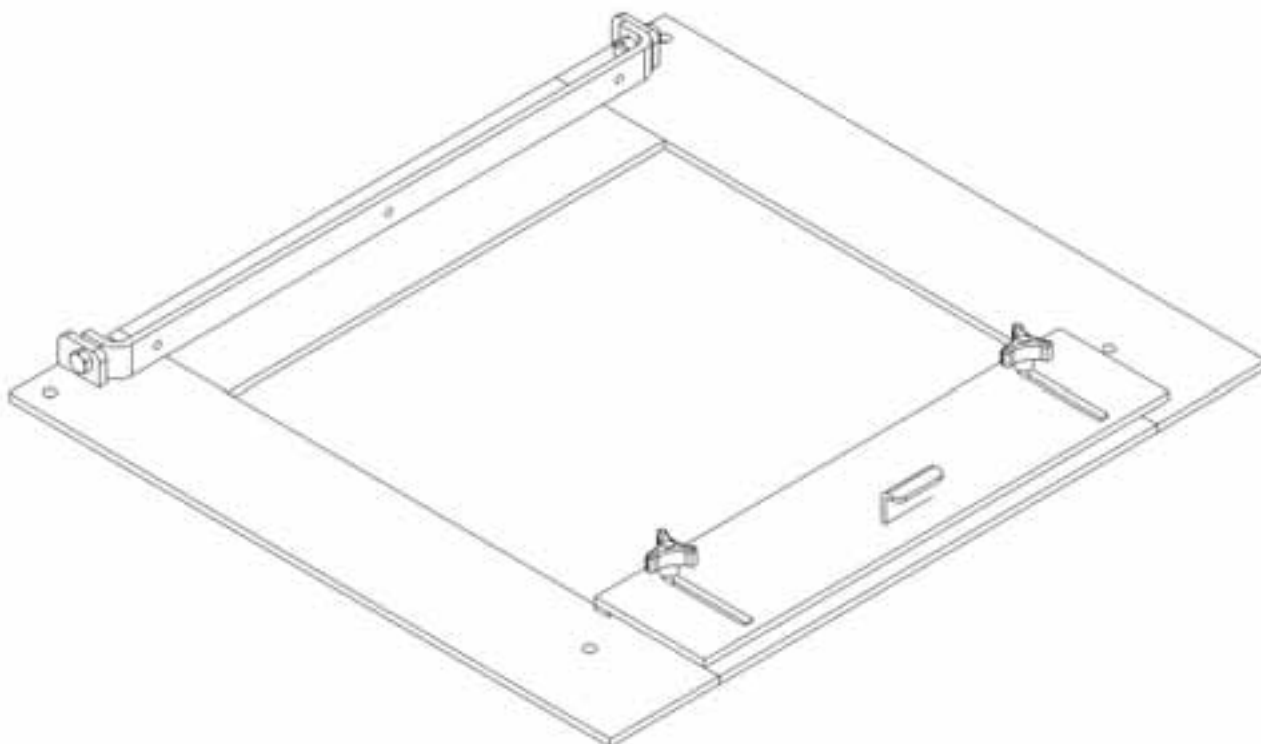


5-49

**68-033 ASSY, HOSE REEL H. PROFILE W-MTR**

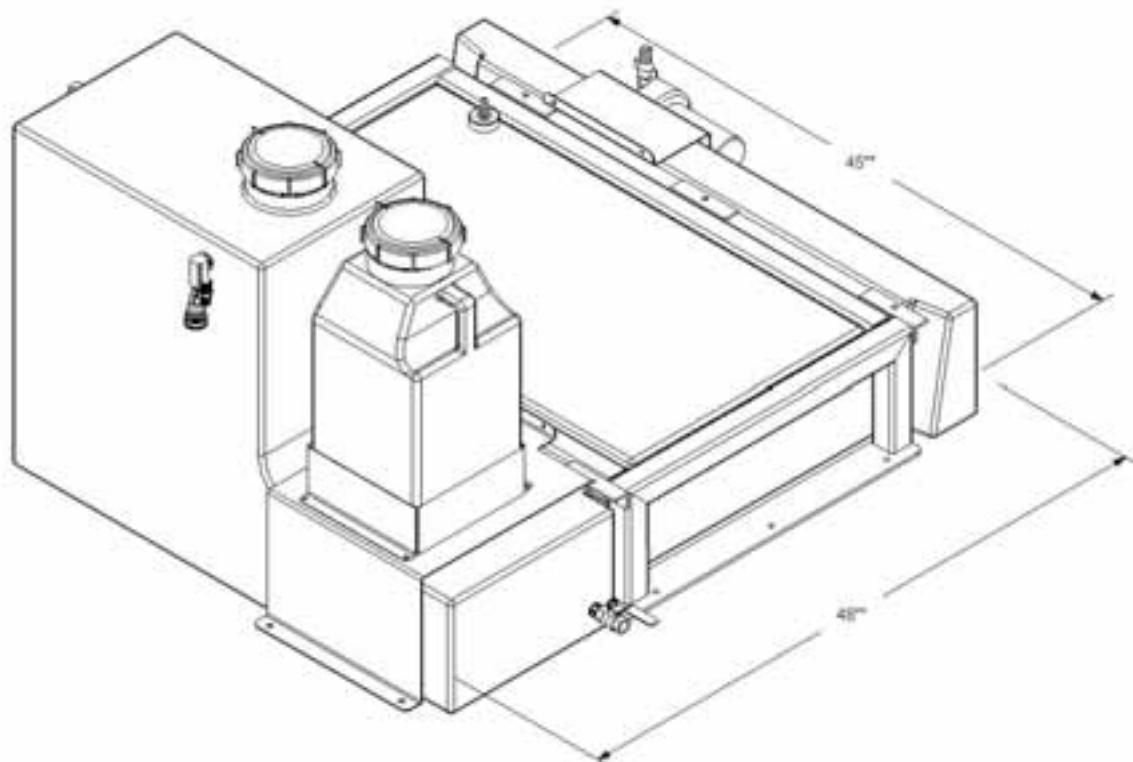


**68-037 ASSY, HOSE REEL VAC ONLY**

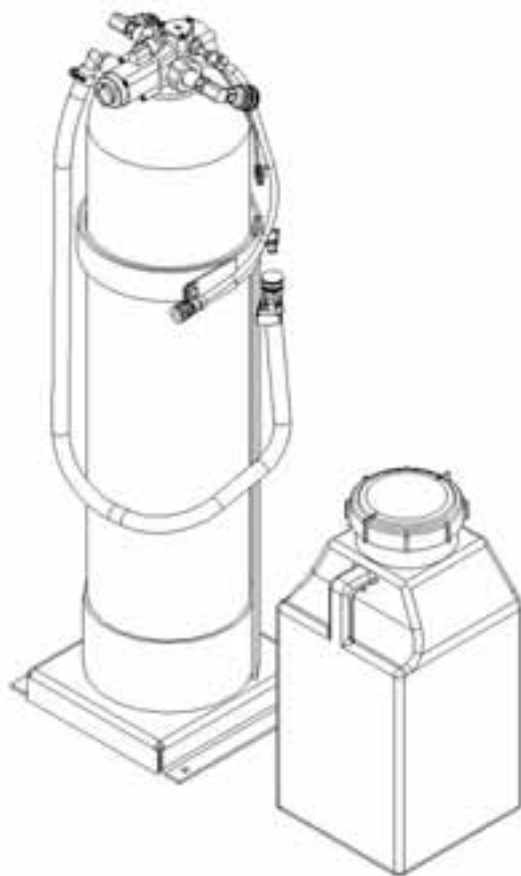


**68-043 ASSY, HOSE REEL LAY DOWN KIT**

**SECTION 5**



**68-059 KIT, SUB MOUNT WATER TANK**



**68-045 ASSY, WATER SOFTENER**