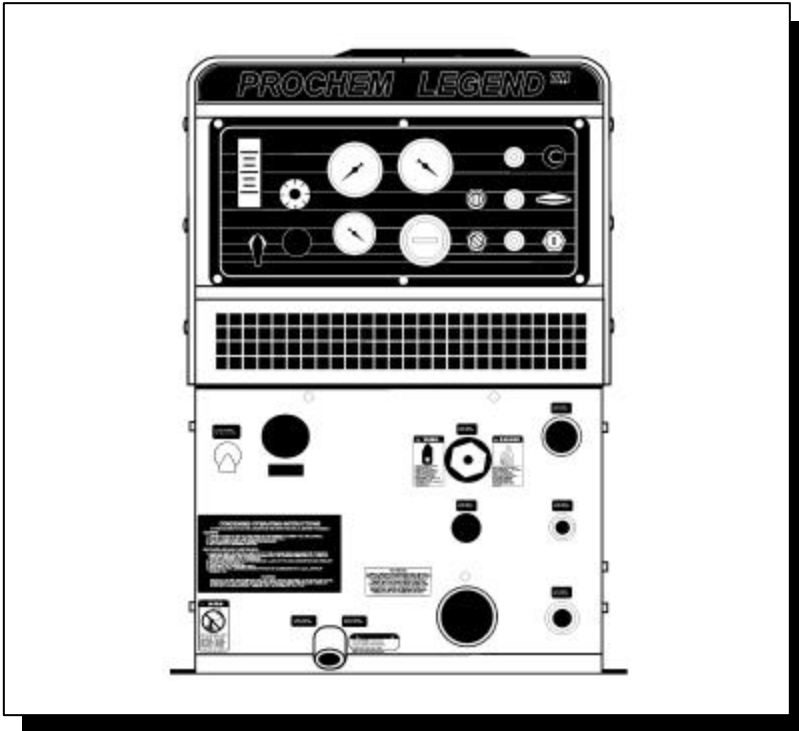


LEGEND SE

MOBILE CLEANING UNIT

Operating Instructions (ENG)



MODELS: LEGEND SE
WITH AUTO HEAT DIVERTER

Read instructions before operating the machine.

MACHINE DATA LOG/OVERVIEW

MODEL _____
DATE OF PURCHASE _____
SERIAL NUMBER _____
SALES REPRESENTATIVE # _____
DEALER NAME _____
OPERATIONS GUIDE NUMBER _____
PUBLISHED _____

YOUR DEALER
Name: _____
Address: _____
Phone Number: _____

Welcome...and congratulations on your purchase of the **LEGEND SE** Mobile Cleaning Unit. This instruction manual is a guide for operating and servicing your PROCHEM unit. **Read this manual completely before installing or operating this unit.**

This unit offers you personal convenience. All of your instrumentation and controls have been positioned to give you easy access for operation and daily maintenance. Proper operation and service are essential to the efficient functioning of this unit. When maintained correctly, this unit will have a long, trouble-free life.

The service methods described in this manual are explained in such a manner that servicing may be performed accurately and safely. Proper service varies with the choice of procedure, the skill of the mechanic, and the tools or parts available. Before attempting any repair, make certain that you are thoroughly familiar with this equipment and are equipped with the proper tools. Any questions pertaining to operating or servicing this unit should be directed to your nearest PROCHEM dealer.

THIS UNIT MUST BE INSTALLED BY THE DEALER FROM WHOM YOU PURCHASED IT IN ACCORDANCE WITH PRESCRIBED PROCHEM INSTALLATION PROCEDURES.

MAKE CERTAIN THAT THE WARRANTY CARD IS FILLED OUT BY THE DISTRIBUTOR FROM WHOM YOU PURCHASED THIS UNIT AND RETURNED TO PROCHEM!

This operation and service manual is written specifically for the PROCHEM Legend SE Mobile Cleaning Unit which is manufactured by:

PROFESSIONAL CHEMICALS CORPORATION
325 SOUTH PRICE ROAD
CHANDLER, AZ 85224

Information in this document is subject to change without notice and does not represent a commitment on the part of Professional Chemicals Corporation.

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HOW TO USE THIS MANUAL

This manual contains the following sections:

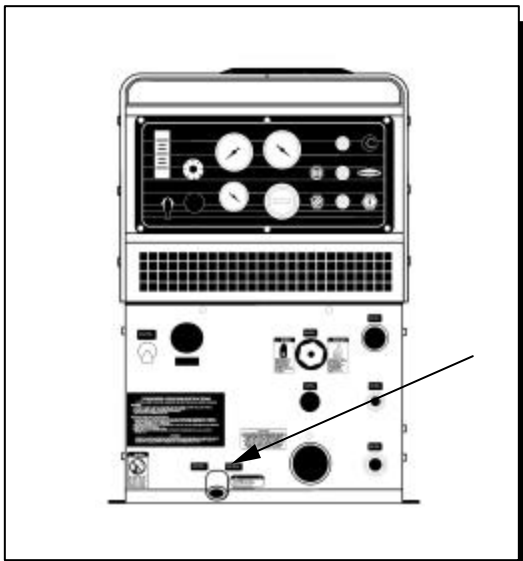
- HOW TO USE THIS MANUAL
- SAFETY
- INSTALLATION REQUIREMENTS
- INSTALLATION
- OPERATIONS
- MAINTENANCE & SERVICE
- PARTS LIST

The HOW TO USE THIS MANUAL section will tell you how to find important information for ordering correct repair parts.

Parts may be ordered from authorized dealers. When placing an order for parts, the machine model and machine serial number are important. Refer to the MACHINE DATA box which is filled out during the installation of your machine. The MACHINE DATA box is located on the inside of the front cover of this manual.

MODEL _____
DATE OF PURCHASE _____
SERIAL NUMBER _____
SALES REPRESENTATIVE # _____
DEALER NAME _____
OPERATIONS GUIDE NUMBER _____
PUBLISHED _____

The model and serial number of your machine is on the lower front as shown.



The SAFETY section contains important information regarding hazard or unsafe practices of the machine. Levels of hazards is identified that could result in product or personal injury, or severe injury resulting in death.

The OPERATIONS section is to familiarize the operator with the operation and function of the machine.

The MAINTENANCE section contains preventive maintenance to keep the machine and its components in good working condition. They are listed in this general order:

- Engine
- Vacuum Pump
- Drive Belts, Pulleys & Hubs
- Chemical Pumps
- Hoses
- Exhaust Heat Exchanger
- General Service Adjustments
- Troubleshooting

The PARTS LIST section contains assembled parts illustrations and corresponding parts list. The parts lists include a number of columns of information:

- **REF** – column refers to the reference number on the parts illustration.
- **PART NO.** – column lists the part number for the part.
- **DESCRIPTION** – column is a brief description of the part.
- **SERIAL NO. FROM** – column indicates the first machine the part number is applicable to. When the machine design has changed, this column will indicate serial number of applicable machine. The main illustration shows the most current design of the machine. The boxed illustrations show older designs. If column has an asterisk (*), call manufacturer for serial number.
- **NOTES** – column for information not noted by the other columns.

NOTE: If a service or option kit is installed on your machine, be sure to keep the KIT INSTRUCTIONS which came with the kit. It contains replacement parts numbers needed for ordering future parts.

IMPORTANT SAFETY INSTRUCTIONS

When using this machine, basic precaution must always be followed, including the following:

READ ALL INSTRUCTIONS BEFORE USING THIS MACHINE.



These symbols mean **WARNING** or **CAUTION**. Failure to follow warnings and cautions could result in fatality, personal injury to yourself and/or others, or property damage. Follow these instructions carefully!



Read the operator's manual before installing or starting this unit. Failure to adhere to instructions could result in severe personal injury or could be fatal.

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 fatality. **DO NOT** run this unit in an enclosed area. **DO NOT** operate this unit where the exhaust may enter any building doorway, window, vent, or opening of any type.

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well-ventilated, unoccupied buildings away from sparks or flames. Never carry any gasoline or flammable material in the vehicle. Fumes may accumulate inside the vehicle and ignite, causing an explosion.

DO NOT store any type of flammable material in the vehicle.

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

DO NOT operate engine if gasoline is spilled. Avoid creating any ignition until the gasoline has been cleaned up. Never use gasoline as a cleaning agent.

DO NOT place hands, feet, hair, or clothing near rotating or moving parts. Avoid any contact with moving parts! Rotating machinery can cause injury or fatality.

Never operate this unit without belt guards. The high speed moving parts, such as belts and pulleys, should be avoided while this unit is running. Severe injury, damage, or fatality may result.

DO NOT service this unit while it is running. The high-speed mechanical parts as well as high temperature components may result in severe injury or severed limbs.

Never touch electrical wires or components while the engine is running. They can be sources of electrical shock.

Engine components can get extremely hot from operation. To prevent severe burns, **DO NOT** touch these areas while the engine is running or immediately after the engine is turned off.

DO NOT touch the exhaust diverter valve or any part of the exhaust system while this unit is running. Severe burns may result.

Before servicing this unit, allow it to "cool down." This will prevent burns from occurring.

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

DO NOT leave the vehicle engine running while operating this unit.

Dangerous Acid, Explosive Gases! Batteries contain sulfuric acid. To prevent acid burns, avoid contact with skin, eyes and clothing. Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.

Before disconnecting the negative (-) ground cable, make sure all switches are OFF. If ON, a spark will occur at the ground cable terminal which could cause an explosion if hydrogen gas or gasoline vapors are present. When disconnecting the battery, **ALWAYS** disconnect the negative (-) terminal FIRST.

DO NOT smoke around the unit. Gas fumes may accumulate and be ignited. The battery is also extremely flammable. This will prevent possible explosions.

DO NOT damage the vehicle in any manner during installation. When routing fuel lines **DO NOT** place the hose in any location where damage may occur to the hose or vehicle. Avoid any contact with moving parts, areas of high temperature, brake lines, fuel lines, muffler, catalytic converter, or sharp objects.

DO NOT cut or splice any of the vehicle fuel lines during fuel line installation. This may result in fuel leaks and potentially dangerous conditions. There is no fuel solenoid shut off on this unit. Use only the provided abrasion resistant fuel hose for fuel lines. When traversing the vehicle floor with fuel lines, always use a bulkhead adapter. This will prevent leakage and ensure that the hose is not punctured by vehicle vibration abrasion.

DO NOT exceed your vehicle's weight limit. The console with waste tank and accessories weighs approximately 886 lbs (976 lbs. if mounted on water tank). Make certain that the vehicle has the correct axle rating. This will prevent unsafe vehicle driving conditions.

We require high-back seats on all vehicles in which units are to be installed for head and neck protection. We recommend using a metal partition between the seats and equipment.

DO NOT operate this unit without the water supply attached and turned on. The water pump and other vital components may be seriously damaged if this unit is permitted to operate dry without water. This unit is equipped with a low pressure shutdown device. **DO NOT** bypass or operate this unit without the low pressure shut-down switch.

Keep your vehicle work area clean. Wands, stair tools, and other accessories must be securely fastened before driving the vehicle.

All high pressure hoses must be rated for 3000 PSI at 250°F. Thermoplastic hoses do not meet these specifications and should not be used. Severe burns and injury may result if the hoses do not meet these requirements.

The winterizing loop hose assembly, Part #10-805380, is for winterizing use only. If used improperly, live steam may escape from this hose, causing it to whip around. Burns or injury may result.

Make certain that you receive complete training by the distributor from whom you purchased this unit.

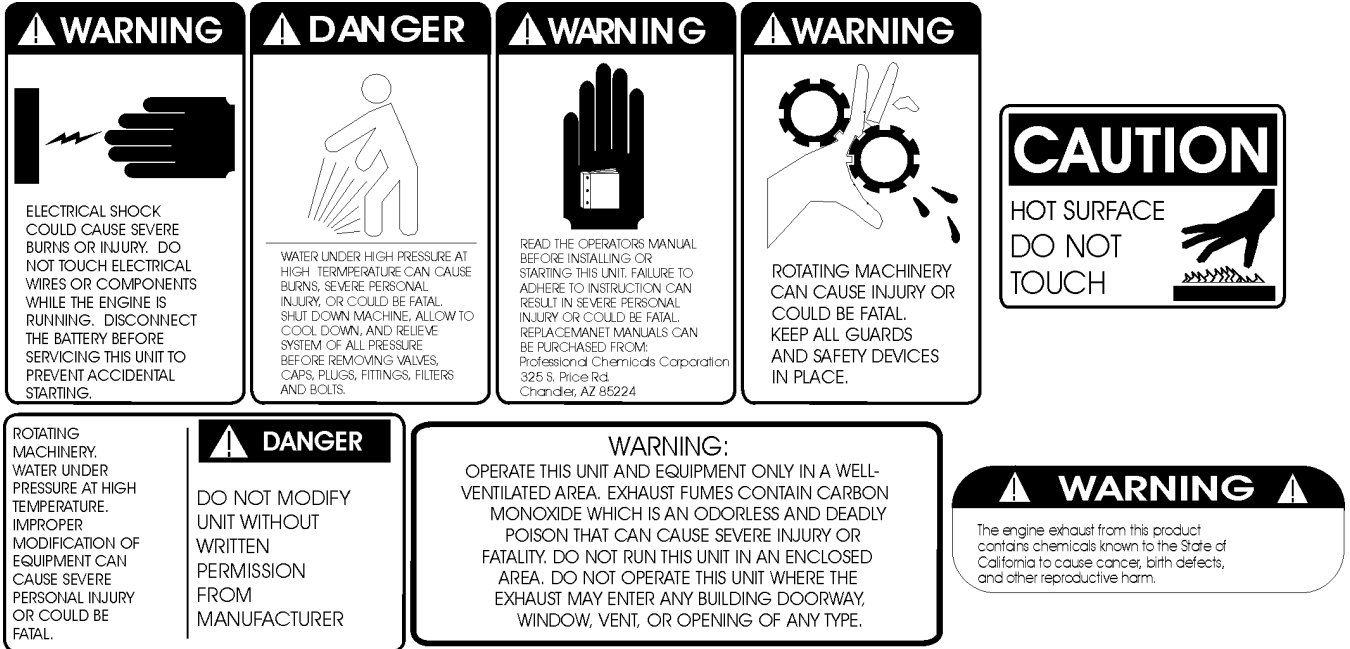
This unit uses high pressure and temperature. Improper or irresponsible use may result in serious injury.

Do not modify this unit in any manner. Improper modification can cause severe personal injury or fatality.

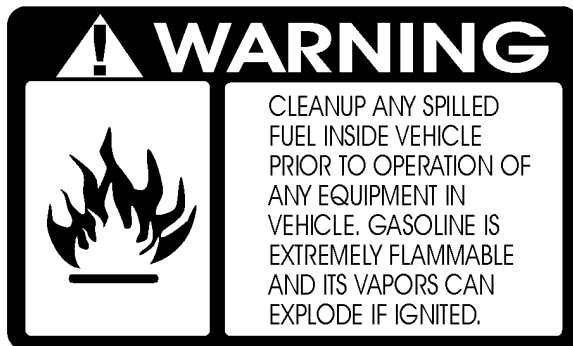
CALIFORNIA PROPOSITION 65 WARNING: Engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

HAZARD INTENSITY LEVEL

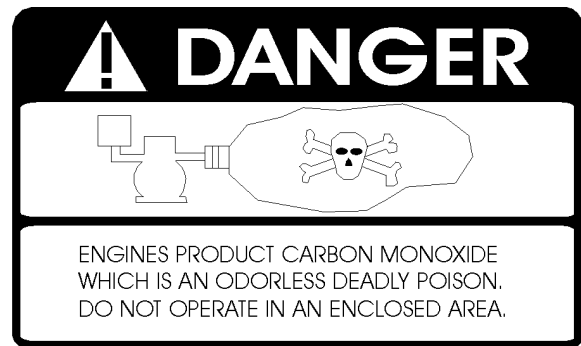
The following **WARNING LABELS** are found on your **LEGEND SE** console. These labels point out important **Warnings** and **Cautions** which should be followed at **all** times. Failure to follow warnings and cautions could result in fatality, personal injury to yourself and/or others, or property damage. Follow these instructions carefully! **DO NOT** remove these labels.



Order Part #48-941212 to get a complete set of decals (safety and instrumentation) for your **LEGEND SE** cleaning unit. The following decals must be placed in a prominent spot on the vehicle that your unit is to be installed in where access is given to operate the unit. See Figure 12 on page 3-17 for suggested locations for these decals.



Decal, Fuel Clean-Up
Part #48-941317



Decal, Carbon Monoxide
Part #48-941316

TECHNICAL SPECIFICATIONS

ITEM	DIMENSION/CAPACITY
Engine speed	2600 rpm (high speed in H.E. position) 1400 rpm (idle speed in Muffler position waster pump OFF.)
Water pump rpm	1395 rpm
Vacuum pump rpm	3195 rpm
Water flow rate	3.5 GPM (maximum)
Water pump pressure	1000 PSI (maximum)
Vacuum relief valve	13" Hg (13" Legend Hg - SE)
Waste tank capacity	70 gallons (60 gallons to shut-off)
Console weight	640 lbs. (730 lbs. If mounted on water tank)
Console weight (with waste tank & accessories)	886 lbs (976 lbs. If waste tank is full) (1467 lbs. If waste tank is full) (1566 lbs. If auxiliary water tank is full)
TORQUE VALUES	
Engine hub	264 inch lbs 22 foot/lbs
Vacuum pump hub	192 inch/lbs 16 foot/lbs

JET SIZING:

Prochem recommends **floor tool** tip sizing not exceed a total of ".045". Using larger jet sizes on your LEGEND SE may reduce cleaning temperatures.

Example: **Tri-jet wand uses three 95015 jets** (95° spray angle w/ 015 orifice).
015 x 3 = 045

Upholstery tool jet size: **80015**
Stair tool jet size: **9502**

DEALER RESPONSIBILITY

The PROCHEM dealer from whom you purchased this mobile cleaning unit is responsible for the correct installation of this machine. The dealer is also responsible for initial training of your operators and maintenance personnel in the proper operation and maintenance of this unit.

ACCEPTANCE OF SHIPMENT

Every part of your Prochem LEGEND SE cleaning unit was carefully checked, tested, and inspected before it left our manufacturing plant. **Upon receiving the unit, make the following acceptance check:**

1. The unit should not show any outward signs of damage. If damaged, notify the common carrier immediately.
2. Check your equipment and packing list. The standard Prochem LEGEND SE cleaning unit should arrive equipped with the following items (unless otherwise specified) and any optional accessories which were ordered:

EQUIPMENT LIST

1. LEGEND SE console.
 2. Operation and service manual with engine, water pump, and vacuum pump manuals.
 3. Installation bolting kit.
 4. Installation mounting plates.
 5. Fittings and hoses for fuel supply installation.
 6. Hose clamps for fuel & vacuum hoses.
 7. External fuel pump installation kit.
 8. Carpet wand.
 9. Waste tank w/float switch.
 10. Waste tank filter and strainer basket.
 11. 100 ft. of 2" vacuum hose.
 12. 1 vacuum hose connector.
 13. 100 ft. of 1/4" high pressure hose with quick connects.
 14. 50 ft. water supply hose with quick connect.
 15. 5 gallon jug and holder.
- ## OPTIONAL EQUIPMENT
15. Winterizing loop hose. Part #10-805380.
 16. Upholstery tool and stair tool.
#78513/78519
#78521
 17. Extra wands.
 18. Hose reel. #65-950393
 19. Extra vacuum hoses. Part #10-805060.
 20. Extra vacuum hose connectors.
Part #12-800078.
 21. Extra high pressure water hoses.
Part #10-805122.
 22. Van storage unit. Part #65-950392.
 23. Dual auxiliary water tanks with demand pump. Part #66-945260.
 24. H.D Automatic waste pump kit. Part #66-945553
 25. Galvanized drip tray. Part #56-501845 (Part #56-501930 if mounted on water tank.)
 26. Water softener. Part #66-945430.

INSTALLATION

Prior to starting the installation, first read the **ENTIRE** "Installation" section of this manual. Since the LEGEND SE cleaning unit (with waste tank and accessories) weighs approximately 886 pounds (976 lbs. if mounted on water tank), consider the following recommendations before installing this unit.

1. The unit should **NOT** be mounted in any motor vehicle of less than **1/2 ton capacity**, or **3/4 ton** if equipped with one or more auxiliary fresh water tanks.



The console with waste tank and accessories must NOT exceed the vehicle's axle weight limit.

2. If mounting in a trailer, make certain that the trailer is rated for the total weight of the **UNIT AND TRAILER**. Electric or hydraulic brakes should be provided, and a strict compliance with any State and Federal vehicle laws must be maintained.
3. The vehicle tires should have a load rating above the combined vehicle and unit weight.
4. We do not recommend using flooring materials that absorb water. This could result in rust and corrosion of the vehicle floor.
5. Padding under rubber floor mats should be removed before installing this unit.
6. We highly recommend using a galvanized drip tray under the console (Part #56-501845, or Part #56-501930 for units mounted on a water tank.)
7. If using a trailer, the LEGEND SE console should be positioned so that it balances properly with respect to the axle. Ten percent (10%) of the overall unit weight (without accessories or water) should be on the tongue.

FUEL REQUIREMENTS

Use unleaded gasoline ONLY. DO NOT use any gasoline additives. We recommend the use of clean, fresh, unleaded gasoline intended for automotive use. High octane gasoline should **NOT** be used with the engine on this unit.

ENGINE OIL REQUIREMENTS

Use high quality detergent oil of at least API (American Petroleum Institute) service class SF or SG. Select the viscosity based on the air temperature at the time of operation as shown in the following table. **NOTE:** Using less than service class SF or SG oil or extending oil change intervals longer than recommended can cause engine damage.

RECOMMENDED SAE VISCOSITY GRADE

	10W-30								
	5W-20, 5W-30								
°F	-20	0	20	32	40	60	80	100	
°C	-30	-20	-10	0	10	20	30	40	
TEMPERATURE RANGE EXPECTED BEFORE NEXT OIL CHANGE									

CHEMICAL REQUIREMENTS

The Prochem LEGEND SE, due to its chemical injection pump design, can be used with a variety of water-diluted chemical compounds (either acidic or alkaline), depending on the job to be done. However, to obtain optimum results with this unit, we recommend using the Prochem line of chemicals. For information on using the cleaning compounds, refer to the Prochem chemical manual.

WATER REQUIREMENTS

Hard water deposits will adversely affect the plumbing and heat exchange systems on this unit. The map below will give you an idea of where areas of high water hardness may occur. However, any water supply obtained from a well is almost always hard water and a water softener will be needed to protect your equipment.

NOTE: Equipment malfunction or component failure caused by hard water scaling is NOT covered under the warranty.

If you are operating this unit in an area where the unit will be using water in which the hardness exceeds 3-1/2 grains, we highly recommend a suitable water softener be installed. If using a water softener, it must have a five (5) GPM (or greater) flow capacity without any hose constrictions.

Using a water softener will reduce maintenance and decrease down time caused by hard water scaling. It will also allow cleaning chemicals to be more effective in lower concentrations.

If you require a water softener, Prochem has a model to meet your needs. Please contact your nearest distributor for information, price, and availability.

Figure 1 HARD WATER MAP



INSTALLATION

WARNING:

All units must be bolted to the floor of the vehicle by a PROCHEM DISTRIBUTOR.

LIFTING THE UNIT ONTO THE VEHICLE

Since the Prochem LEGEND SE console weighs approximately 640 lbs. (730 lbs. if mounted on water tank), we recommend using a fork lift to lift the unit onto the vehicle. Position the forks under the unit from the front and make **CERTAIN** that the forks are spread to the width of the base.

POSITIONING THE UNIT IN THE VEHICLE

Because vehicles vary in size and openings, individuals have their own preference as to where they want their units installed. We strongly recommend a side door installation for the LEGEND SE and **DO NOT** recommend a rear door installation.

1. Enough space should be provided to assure adequate engine ventilation and room for service and maintenance.
2. The unit with waste tank and accessories must **NOT** exceed the vehicle's axle weight limit.
3. **DO NOT** position the console closer than 12" from the bottom of the driver and passenger seats.

NOTE: For individuals who wish to make an engineering layout prior to positioning the unit, refer to Figure 2 for waste tank and console dimensions.

BOLTING DOWN THE UNIT AND WASTE TANK

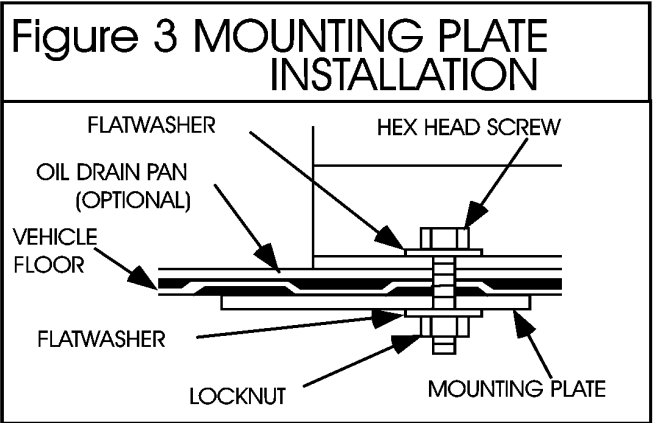
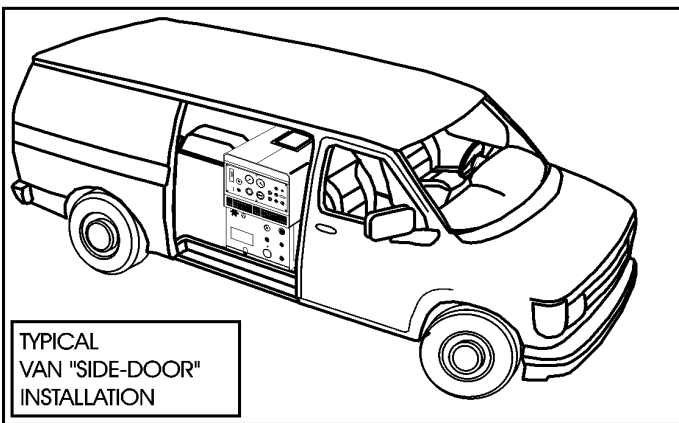
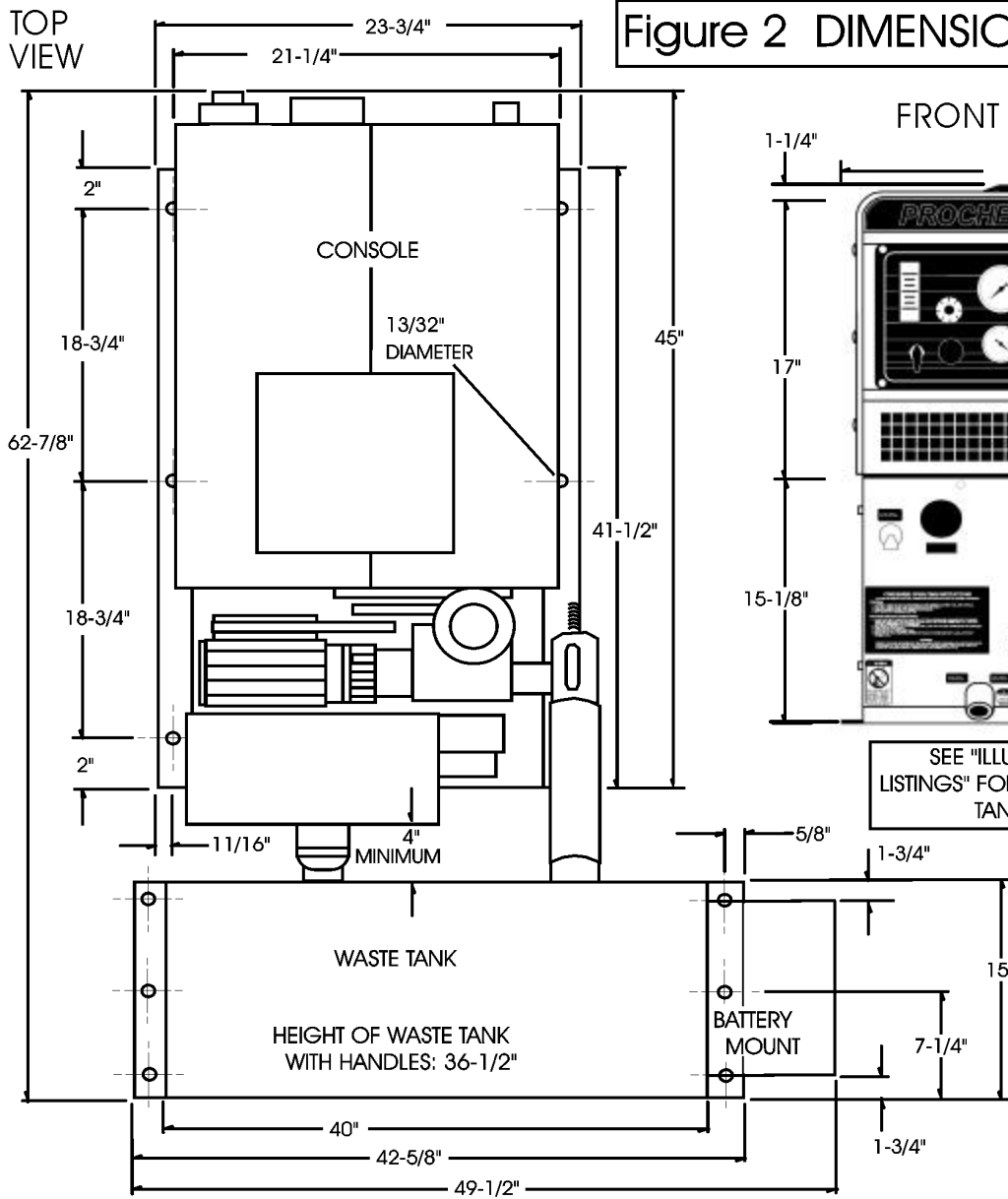
NOTE: When positioning the waste tank with respect to the console, hook up the vacuum hoses to the waste tank. This will ensure that the waste tank is positioned correctly. Once the unit and waste tank are positioned in the vehicle in the desired location, you may proceed.

CAUTION:

Before drilling any mounting holes in the vehicle floor, make certain that when drilling, you will not do any damage to the fuel tank, fuel lines, or any vital component which might affect the operation or safety of the vehicle.

1. Using the console and waste tank mounting holes as a template, drill six 13/32" diameter holes for mounting the console and six more 13/32" diameter holes for mounting the waste tank.
2. Using the installation hardware kit:
 - a) Insert six 3/8-16 x 2" hex head cap screws with flat washers through the mounting holes in the Prochem LEGEND SE console, and six 3/8-16 x 2" hex head cap screws with flat washers through the mounting holes in the waste tank.
 - b) Install the mounting plates underneath the vehicle floor.
 - c) Screw the 3/8-16 hex head locknuts on the mounting screws and tighten them until the console and the waste tank are firmly secured to the vehicle floor.

TOP VIEW



INSTALLATION

WASTE TANK TO CONSOLE CONNECTION

NOTE: Before connecting any hoses to the waste tanks, make certain the hose clamps are on each hose.

1. See Figure 11. Connect the 12" long section of 2" I.D. internal vac hose to the 2" dia. vac inlet tube on the console and the 2" dia. inlet tube on the waste tank. Tighten the hose clamps.
2. Connect the 25" long section of 2-7/8" I.D. internal vac hose to the 2-7/8" dia. vac outlet tube on the waste tank and to the vacuum pump relief valve on the console. It may be necessary to cut this hose to fit. Tighten the hose clamps.
3. Connect the 2" I.D. waste removal hose to the 2" dia. tube at the bottom of the waste tank. Tighten the hose clamps.
4. Connect the 5/16" I.D. water box hose to the barb fitting (pointed downward) on the waste tank, which is mounted on the outside of the waste tank. Tighten the hose clamps.
5. Connect the console engine shut-off cord to the waste tank level sensor cord.

BATTERY CONNECTION

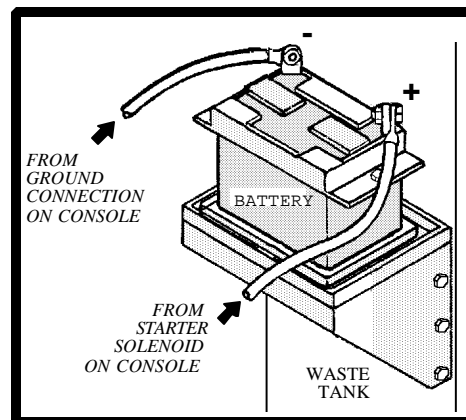


Dangerous Acid, Explosive Gases!
Batteries contain sulfuric acid. To prevent acid burns, avoid contact with skin, eyes, and clothing. Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well-ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.

Before disconnecting the negative (-) ground cable, make sure all switches are OFF. If ON, a spark will occur at the ground cable terminal which could cause an explosion if hydrogen gas or gasoline vapors are present. When disconnecting the battery, ALWAYS disconnect the negative (-) terminal FIRST.

1. Attach the red positive (+) battery cable from the console starter solenoid to the positive (+) terminal on the battery and tighten the holding nut.
2. Next, attach the black negative (-) battery cable from the console ground to the negative (-) terminal on the battery and tighten the holding nut.

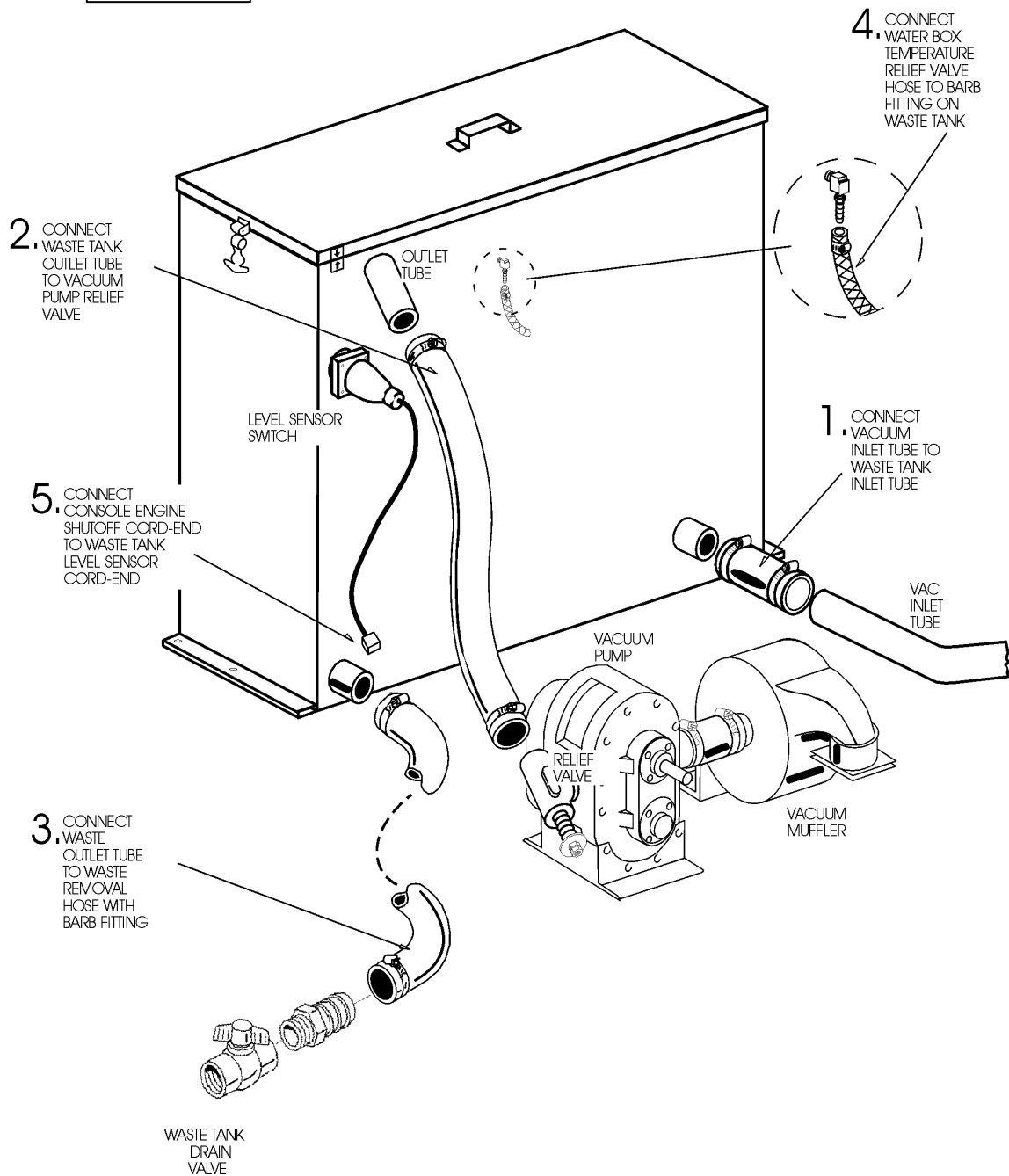
BATTERY HOOK-UP



FIRE EXTINGUISHER

We recommend that a fire extinguisher, preferably rated for A, B, & C type fires, be installed inside the vehicle.

FIGURE 11



SPECIAL INSTRUCTIONS:

1. Cut hoses to fit, if necessary.
2. When cutting hoses, make certain that the cutting blade is facing away from you hands, fingers, or any other part of your body to avoid injury.
3. Do not install hoses with excessive bends or kinks.
4. Place clamps on hoses before installing.
5. Tighten all hose clamps firmly.

INSTALLATION

AUXILIARY WATER TANK CONNECTION

Your cleaning unit may be equipped with an auxiliary water tank mounted underneath the console. If so, you will need to install the demand pump assembly. (See "Illustrated Parts Listings" for demand pump dimensions.)

The demand pump should be situated in a location where it is easily accessible. We have provided hoses which are long enough to reach their connections on the console and auxiliary water tank.

Figure 12 illustrates how the demand pump works with the auxiliary water tank and how it connects to the console.

1. Connect the 3/4" I.D. water hose coming from the in-line strainer on the demand pump to the barb fitting at the bottom rear, right side of the water tank. Trim the hose for the best fit. Tighten the hose clamps.

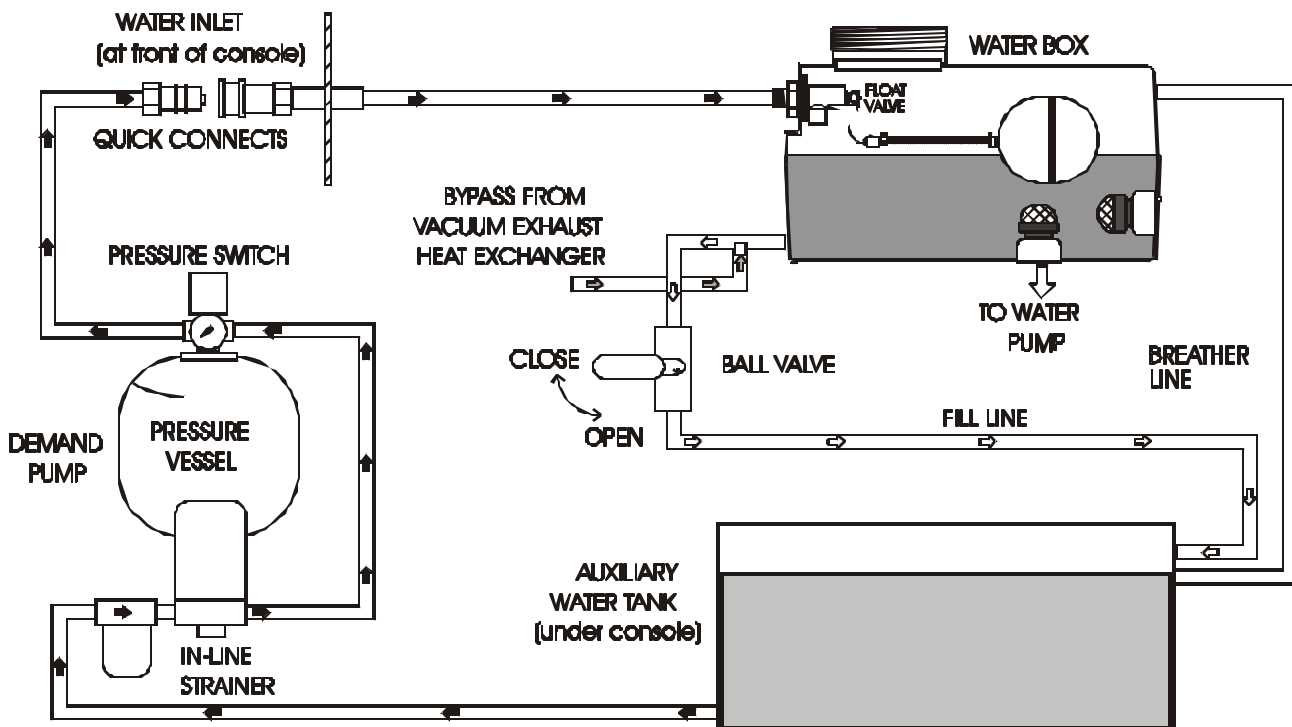
2. Connect the demand pump cord to the 2-pole connector on the console (located on the left side of the console near the vacuum pump.)

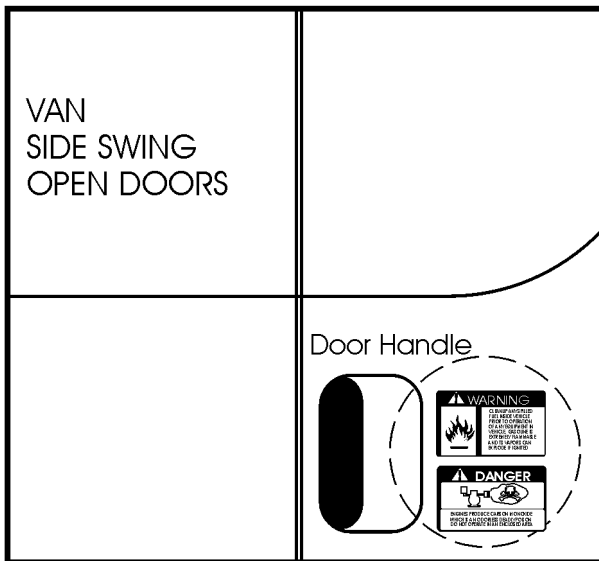
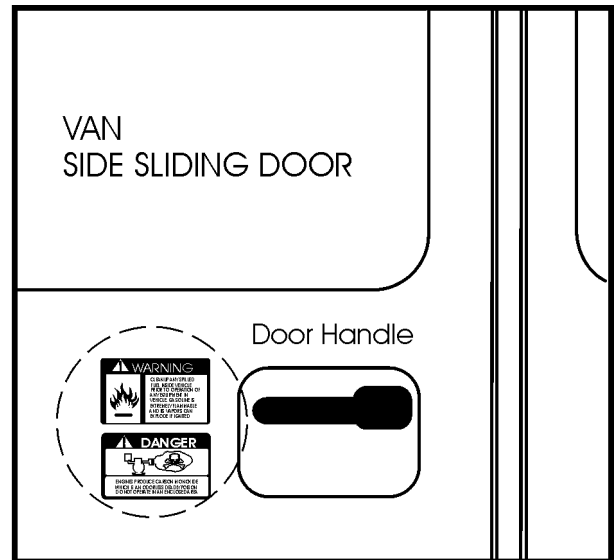
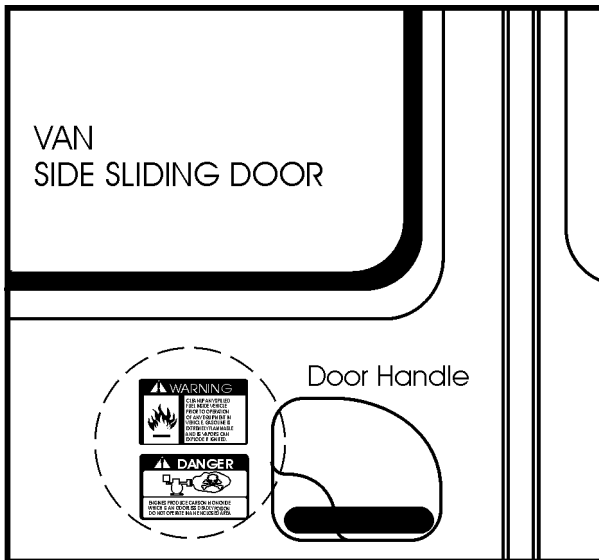
⚠ CAUTION:

When using the auxiliary water tank as your water source, be sure you have enough water in the tank to complete the job.

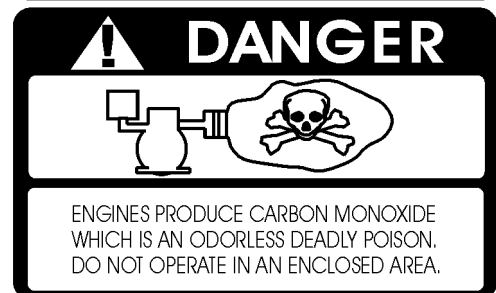
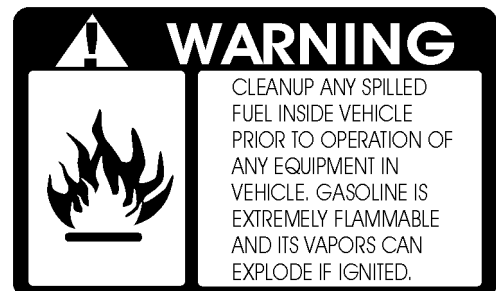
1. Connect the hose from the demand pump to the water inlet at the front of the console.
2. Turn the demand pump toggle switch "ON."
3. See "Operation" section in this manual for instructions on filling the auxiliary water tank.

FIGURE 12





Decal, Fuel Clean-up
Part# 48-941317



Decal, Carbon Monoxide
Part# 48-941316

The decals should be placed in a prominent spot on the vehicle where access is given to operate the unit. The illustrations above suggest the location and placement of the decals.

When placing the decals, be sure the area is clean of any dirt and possible wax build-up. Place the decal by starting at on edge and smoothing he decal over to the other edge. This will help eliminate air bubbles and allow the decal to adhere better. After a time the decals may become damaged or worn. If they become unreadable, they should be replace.

OPERATION

This chapter of the operator's manual divides the unit up into systems and explains how each system works. Before proceeding into the operation and maintenance sections of this manual, we recommend acquiring a basic knowledge of how this unit functions. Read the next section of this manual carefully and completely.

WATER PUMPING SYSTEM

See Figures 14 and 15. Cold water enters the console through the water inlet connection located on the lower front panel. The water flows to the water box through a float valve, which shuts off water flow when the water box is full.

Water then flows from the water box, through a strainer, into the water pump where it is pressurized. This pressurized water is pumped to the pressure regulator manifold where the pressure regulator provides and maintains the desired pressure setting.

The pressure regulator manifold includes a nitrogen charged accumulator which helps reduce pressure pulsation's. In addition, the manifold also contains a low-pressure switch and a high-pressure switch. These switches will shut the unit down if the water pressure drops below 50 PSI or exceeds 1200 PSI.

If the tool valve is closed, water flows from the pressure regulator through the vacuum exhaust radiator-type heat exchanger, where heat is transferred from the vacuum pump exhaust to the water.

The heated water then returns to the water box. If the temperature in the water box exceeds 180°F, a temperature relief valve will open and bleed a small amount of hot water into the waste tank, allowing cool water to flow into the water box.

When the tool valve is open, water flow is from the pressure regulator to the engine exhaust heat exchanger, where the water is super-heated by engine exhaust.

A bypass manifold, located next to the water box, constantly bleeds a small amount of hot water from the engine exhaust heat exchanger outlet to the water box.

Next, the hot water flows through the check valve manifold which contains a check valve and Y-strainer. This is where chemical injection occurs.

The hot solution then flows through the solution outlet manifold to the cleaning tool.

Temperature is adjusted primarily using the thermostatic temperature control. This control opens a solenoid valve if the water exceeds the temperature setting. When open, this valve allows hot water to be drawn into the waste tank. The temperature sensor for this control is located in the thermostat manifold en route to the solution outlet.

In addition, a heat bypass valve on the lower front panel lowers the solution temperature manually with a knob adjustment. When open, this valve allows hot water to be drawn into the waste tank.

An additional temperature sensor on the engine exhaust heat exchanger outlet will shut down the engine if the water temperature exceeds 285°F. If this occurs, consult the "Trouble-shooting" section of this manual to determine the cause of overheating before restarting your unit.

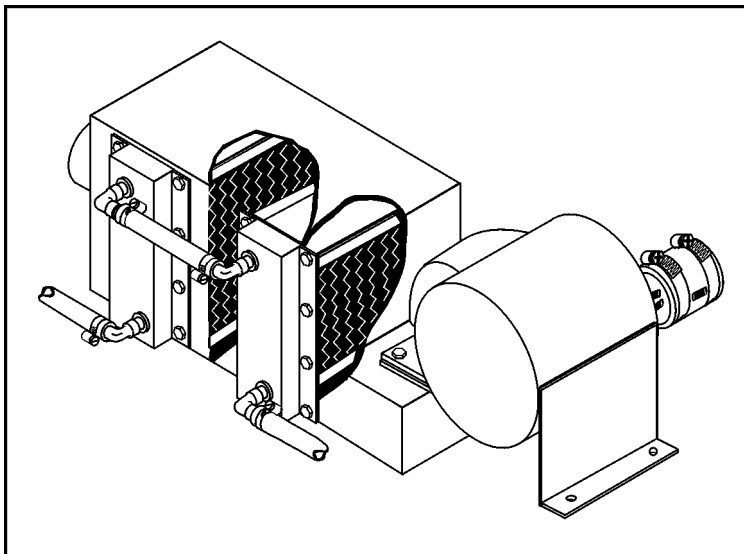
HEAT TRANSFER SYSTEM

See Figures 14 and 15. Water is heated through a two stage heat exchange system which uses vacuum pump exhaust and engine exhaust.

Stage one utilizes vacuum exhaust heat blowing over a radiator-type heat exchanger prior to discharging the exhaust into the atmosphere. When the tool valve is closed, the water bypasses from the pressure regulator manifold back to the water box through the vacuum exhaust heat exchanger. The water is heated as it flows through this heat exchanger.

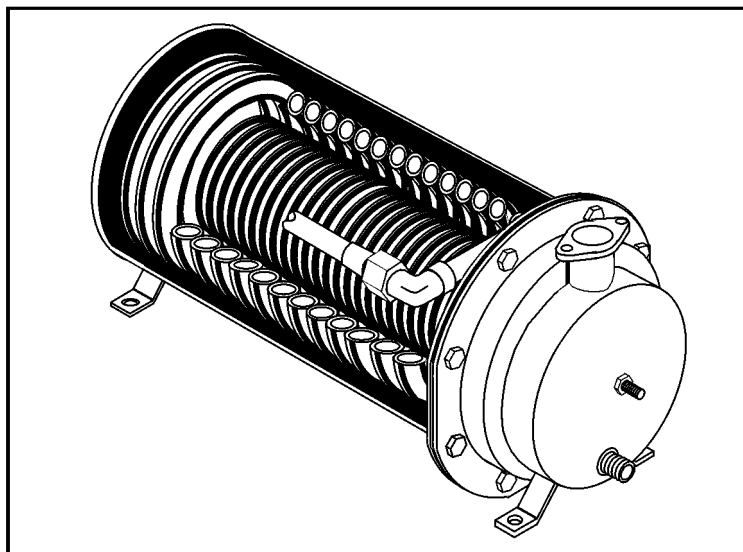
When the tool valve is open, the water flows from the pressure regulator manifold and through the stage two engine exhaust heat exchanger system where it is super-heated by extremely hot engine exhaust.

The engine exhaust heat exchanger is an engine exhaust chamber containing a stainless steel heating coil and catalytic converter. Water flows through the coil and is heated by the engine exhaust as it leaves the engine. The catalytic converter, combined with the injection of air pumped into the exhaust manifold, re-burns the exhaust waste gases. This results in super-heated water flowing through the solution outlet to the cleaning tool.



**VACUUM EXHAUST
HEAT EXCHANGER**

**CATALYTIC
ENGINE EXHAUST
HEAT EXCHANGER**



OPERATION

FIGURE 14

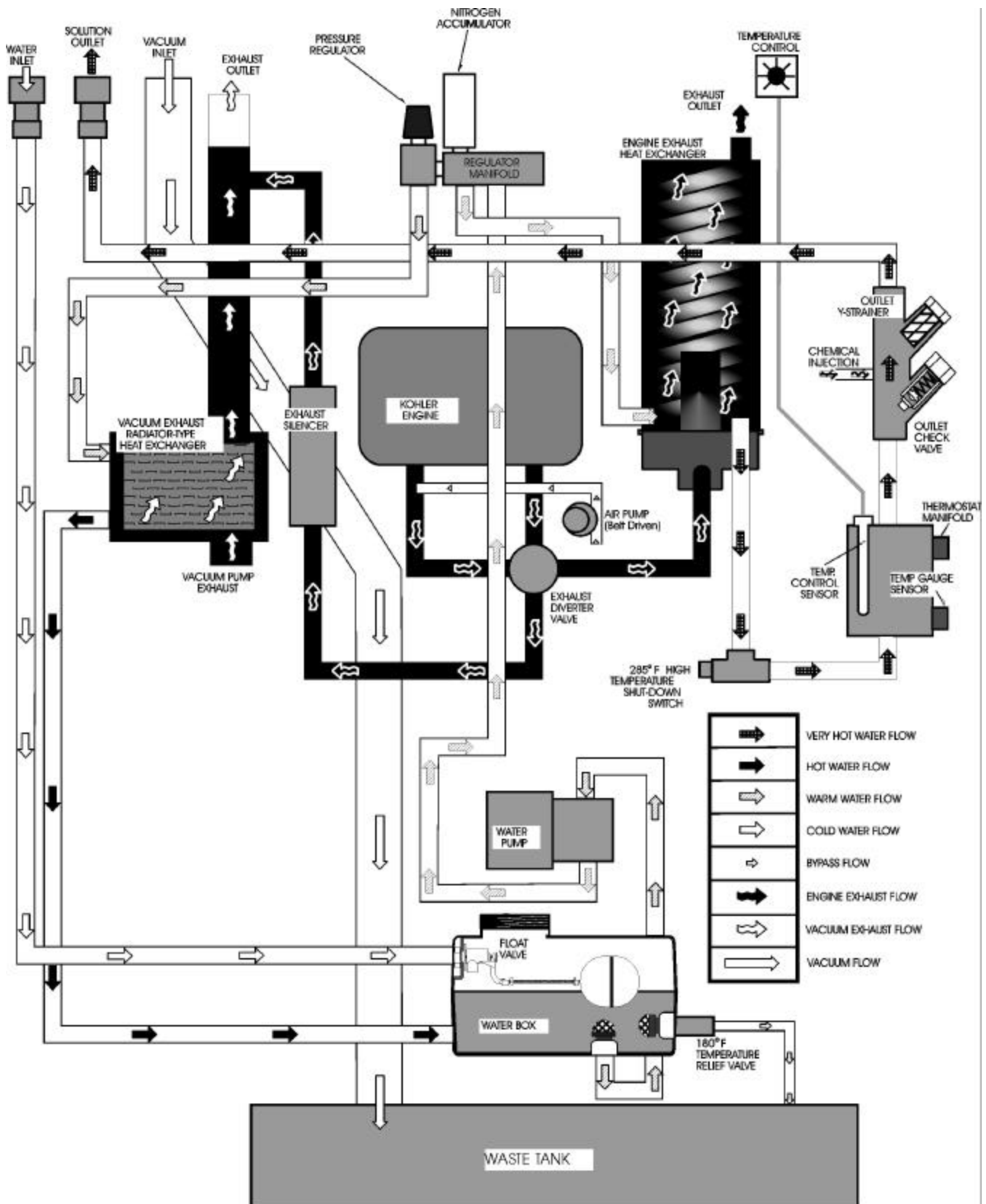
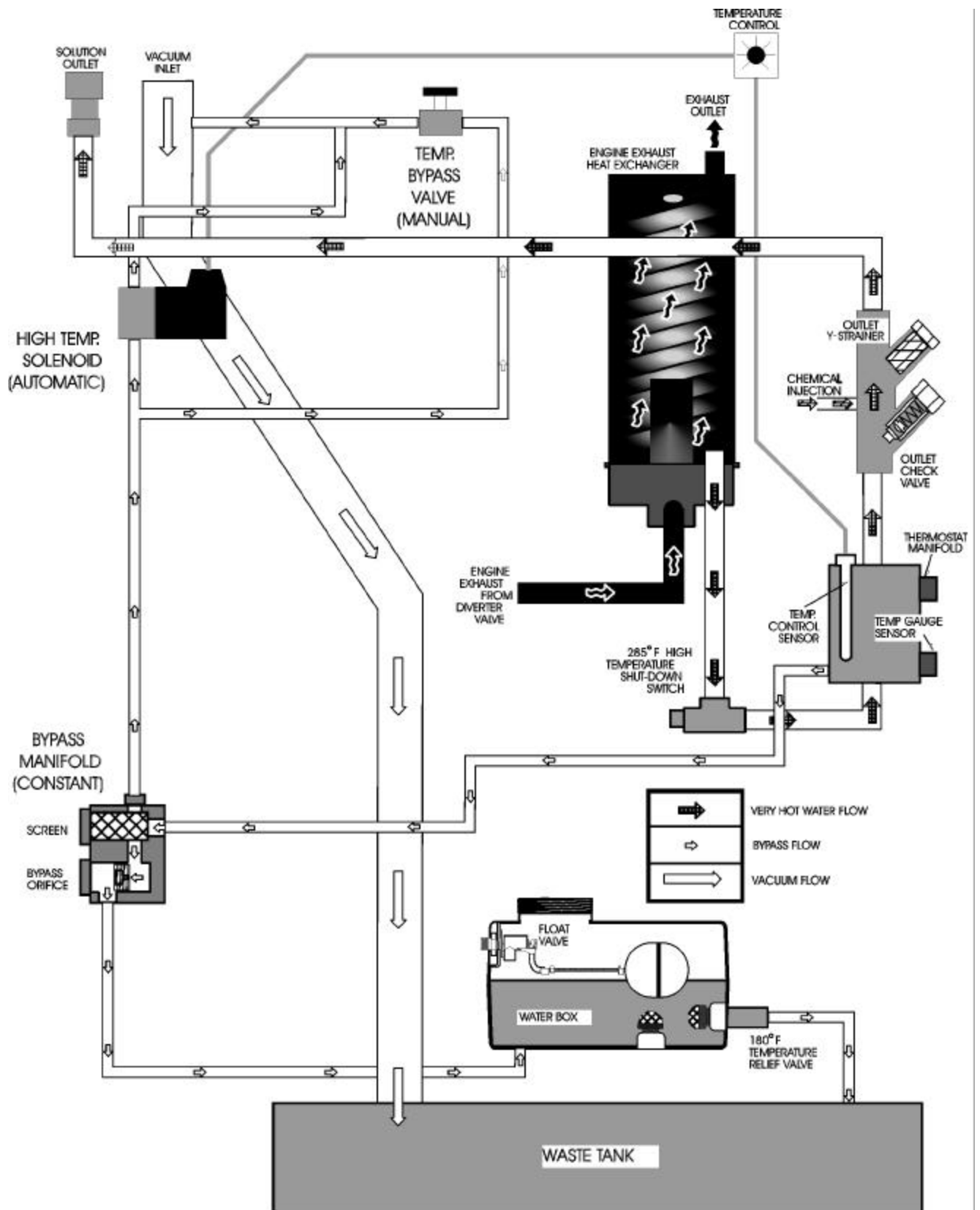


FIGURE 15



OPERATION

VACUUM SYSTEM

An exhaust diverter valve is located on the engine exhaust system. This directs the exhaust either to the heat exchanger for high temperature cleaning or to the exhaust muffler for low temperature cleaning or extraction, such as for flood restoration.

When the diverter valve is in the MUFFLER position, a relay automatically shuts off the water pump. An override switch on the control panel will enable you to turn the water pump ON, for low temperature cleaning.

See Figure 16. Vacuum flow is initiated by the vacuum pump, with air and water being drawn into the vacuum inlet at the front of the con-sole.

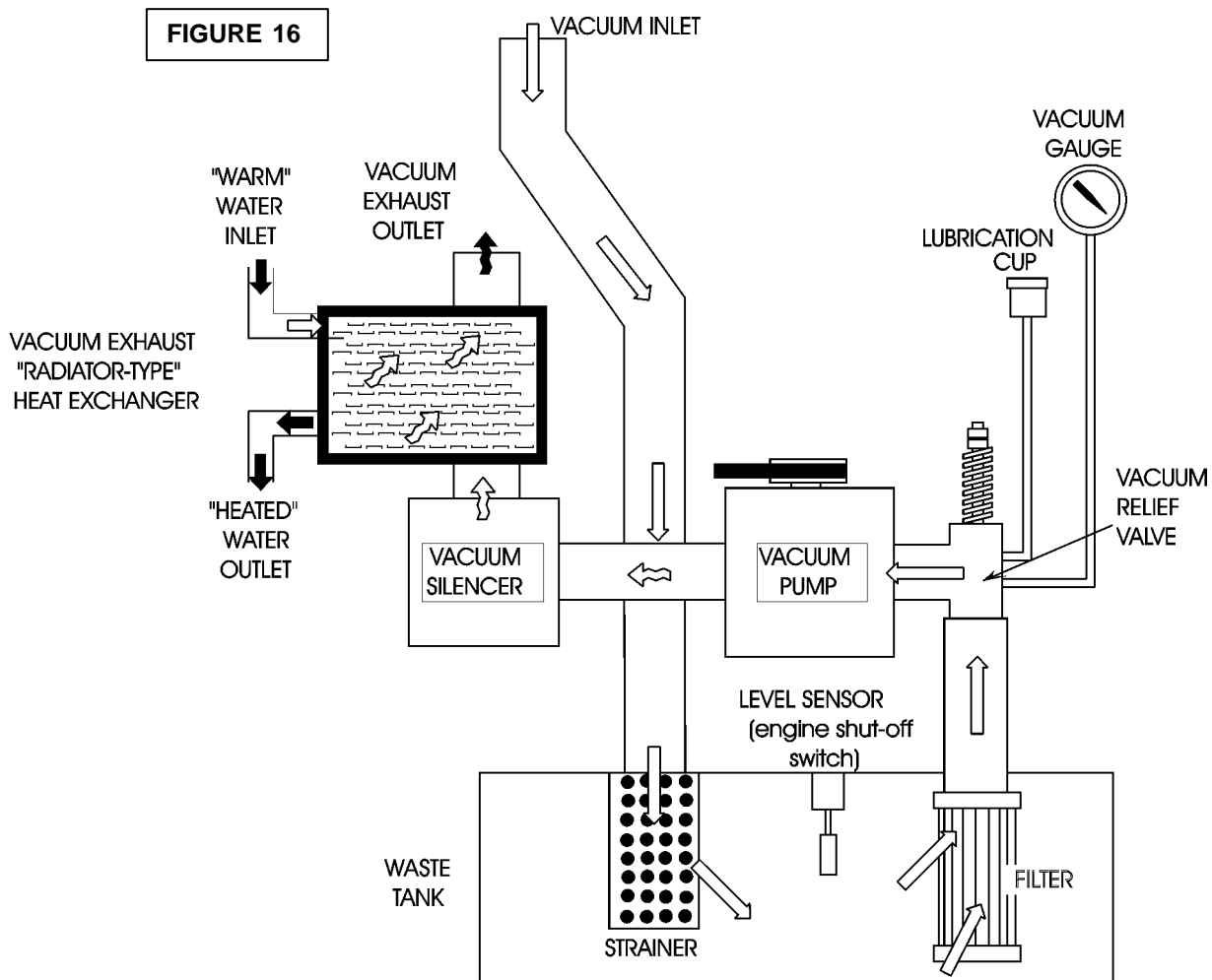
The mixture then flows through a strainer basket into the waste tank. Air exits the waste tank through a 100-mesh filter, and then flows into the vacuum pump. A vacuum pump relief valve has been provided for vacuum pump protection.

The air is discharged from the vacuum pump through the stage one heat exchanger where the heated vacuum exhaust blows across a radiator-type heat exchanger before discharging into the atmosphere.

A level sensor switch located near the top of the waste tank will shut the unit down before the waste tank reaches its full capacity. This protects the vacuum pump from water damage.

⚠ CAUTION:

Use of a DEFOAMER will help prevent damage to the unit by a build-up of foam in the waste tank, which may be caused by some chemicals (foam build-up will not activate float switches).



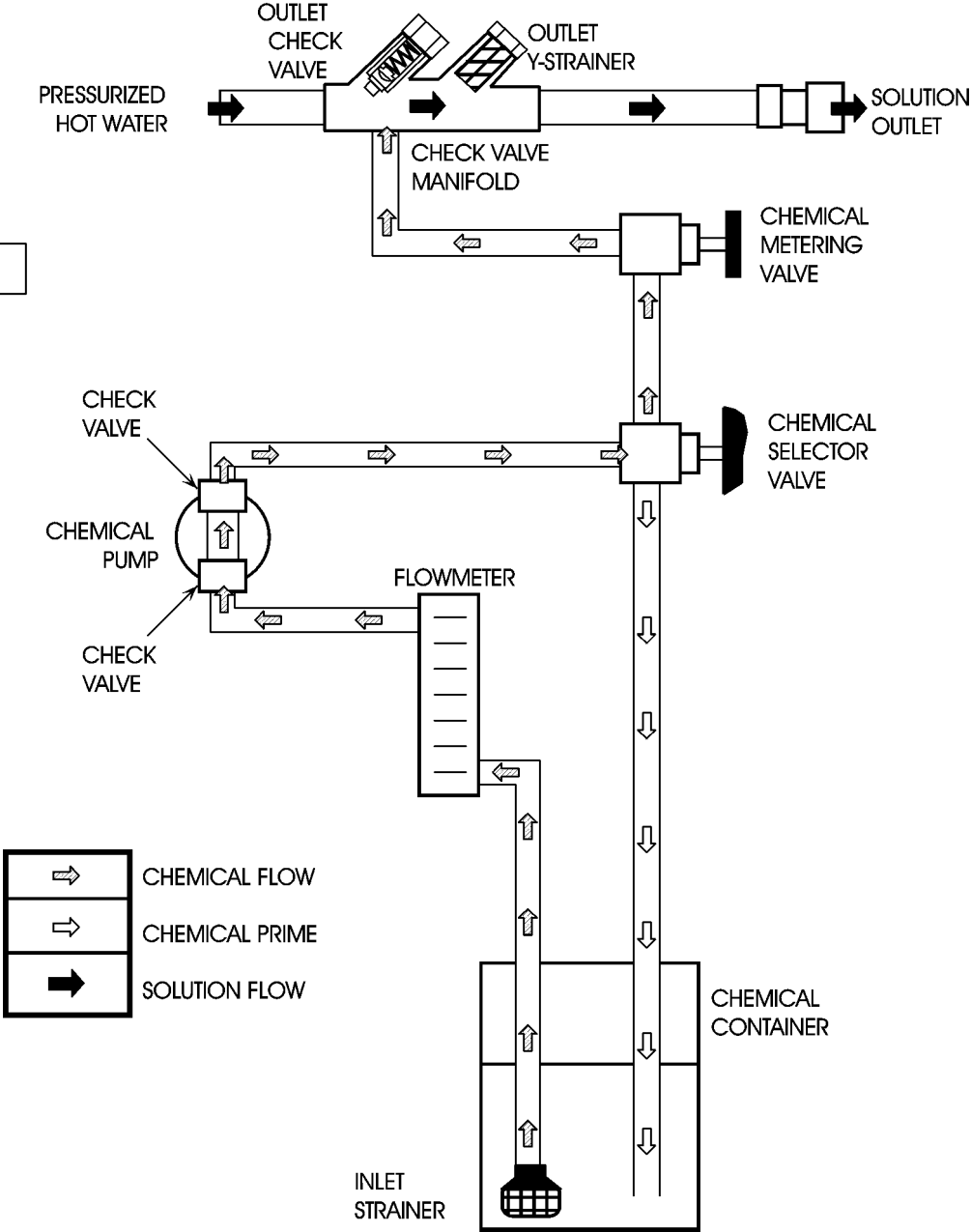
CHEMICAL PUMPING SYSTEM

See Figure 17. The chemical is drawn from the chemical container through a strainer into the flow meter. The flow meter indicates the rate of chemical flow.

The chemical then flows through a check valve into a pulse-powered chemical pump. Next, the chemical pump injects the chemical through a check valve to the 3-way selector valve on the control panel. This valve may turn the chemical flow ON, OFF, or PRIME the chemical pump.

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

FIGURE 17



OPERATION

WARNING:

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 fatality. DO NOT operate this unit where the exhaust may enter any building doorway, window, vent, or opening of any type.

CHECK FOR ADEQUATE FUEL

Check the fuel tank to be certain there is adequate fuel to complete the job. This unit uses approximately .95 to 1.25 gallons of fuel per hour, depending on the speed setting.

REMOVE TOOLS FROM VEHICLE

Remove any **tools** or **hoses** from the van which you will require.

WATER SUPPLY CONNECTION

NOTE: Before connecting your water hose to the supply faucet, flush out the faucet until the water is free of any debris. Flush out any debris which may be in your water inlet hose.

1. Connect the **water supply hose** to the **water inlet** quick-connect at the front of the unit. Connect the hose to the water supply faucet.

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

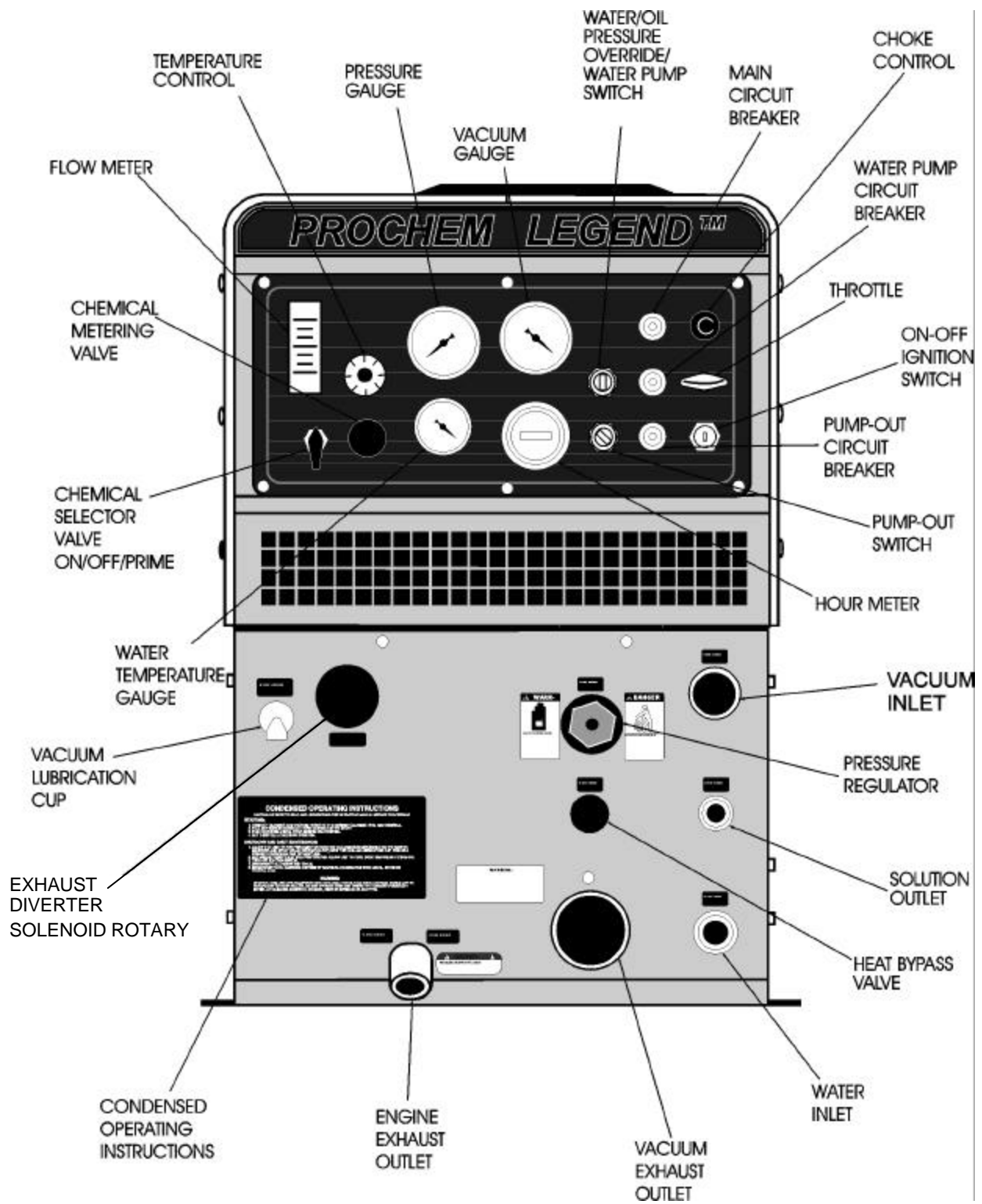
2. Turn the **water supply faucet** on. The water will fill the **water box**.

FILLING AUXILIARY WATER TANK

1. Your cleaning unit may be equipped with an auxiliary water tank mounted underneath the console. To fill the auxiliary water tank, open the **ball valve** on the water box by turning the handle on the valve to the vertical position.
2. Connect the **water supply hose** to the **water inlet** quick-connect at the front of the unit. Connect the hose to the water supply faucet.
3. Turn the **water supply faucet** on. The water will flow through the water box and fill the **auxiliary water tank**.
4. When the auxiliary water tank is full, close the **ball valve** on the water box by turning the handle on the valve to the horizontal position. Disconnect the **water supply hose** from the unit and plug the hose from the **demand pump** into the water inlet quick-connect at the front of the unit.
5. Turn ON the **toggle switch** at the front of the **demand pump**.

NOTE: Make sure you turn on the demand pump before you start the unit.

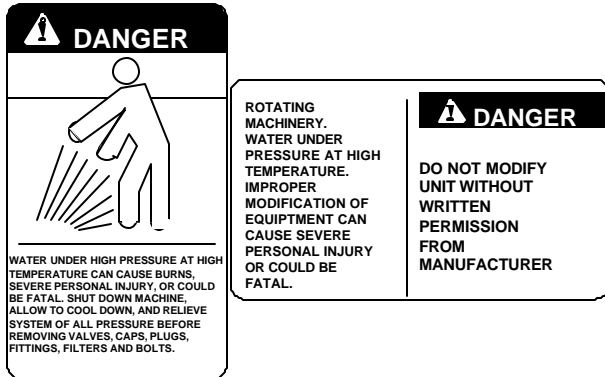
FIGURE 18



OPERATION

HIGH PRESSURE HOSE

Before starting the unit, connect the **pressure hose** to the **solution outlet connection** at the front of the unit. Connect the **cleaning tool** to the **pressure hose**.



VACUUM HOSE

Connect the **vacuum hose** to the **vacuum inlet** connection at the front of the unit. Connect the other end of the **vacuum hose** to the **cleaning tool**.

STARTING THE UNIT

1. For carpet and upholstery cleaning set the **temperature control** on the control panel to the desired cleaning temperature. The thermostatic temperature control will allow you to increase or decrease the solution temperature automatically. Simply turn the **control knob** to the desired temperature setting.
2. For flood extraction operations set **temperature control to 50°**. This temperature setting energizes the rotary solenoid to hold the **Exhaust Diverter** in muffer position.

3. Close the **heat bypass valve** by turning the knob clockwise. **DO NOT** over-tighten.

The **heat bypass valve** allows you to decrease the solution temperature manually. Opening the valve (counter-clockwise) decreases the temperature by allowing hot water to bypass to the waste tank.

Before proceeding, be certain that the control panel indicators are at the following settings:

Engine – IDLE (Throttle Control In)
Engine Choke – PULL OUT

NOTE: It will not be necessary to pull the choke out if the engine is already warmed up.

4. Turn the **ignition switch** to the **START** position while holding the **water pump switch** to the left (override position). The engine will start. For cleaning operation turn pump switch clockwise to on position. For flood extraction operations leave switch in off or straight up position.

NOTE: If your unit fails to build water pressure after 15 seconds, check for adequate water supply. If necessary, see “Loss of Water Pump Pressure” in the “Troubleshooting” section of this manual.

5. After starting the engine, push the **choke** in. After the engine has warmed up, pull the **throttle** all the way out and lock it in the full throttle position.

Allow adequate time for the unit to warm up before beginning the cleaning operation, approximately 5-15 minutes.

PRIMING THE CHEMICAL PUMP

NOTE: Prochem recommends that the chemical pump be primed whenever the water pump is ON. This will eliminate possible pressure fluctuations and water pump pulsation's related to a dry chemical pump.

1. Place the **chemical inlet tube** and the **chemical prime tube** into the chemical container.

NOTE: *When placing the chemical inlet tube into the chemical container, make certain that it stays fully submerged since 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 **chemical selector valve** on the control panel to the PRIME position. The chemical will then flow from the chemical container through the chemical prime tube.

If the chemical does not flow, then:

- a. Put the **chemical prime tube** into the **vacuum inlet** on the unit and seal off the vacuum inlet. The vacuum will quickly pull chemical from the chemical container. When the chemical starts to flow, turn the **chemical selector valve** to OFF, place the **chemical prime tube** back into the container, and turn the **chemical selector valve** back to PRIME to continue the procedure.
- b. Once continuous chemical flow without air bubbles has been achieved, turn the **chemical selector valve** from PRIME to METER. With the **cleaning tool** open, observe the **flow meter** and adjust the **chemical metering valve** until the desired rate of chemical flow is obtained (the **chemical metering valve** is located on the control panel below the temperature control.)

WASTE PUMP

1. If your unit is equipped with an **automatic waste pump**, connect one end of a garden hose to the **pump-out connection** on the console and the other end to an **appropriate waste disposal**.

2. Turn the **pump-out switch** on the control panel to the ON position. The waste pump will operate automatically throughout the cleaning operation.

We recommend that you use a 3/4" I.D. water hose as a waste pump outlet hose. **DO NOT** use a hose smaller than 5/8" I.D.

NEVER use your automatic waste pump outlet hose as a water inlet hose.



NEVER dispose of waste in storm drains, water ways, or on ground areas. Always dispose of waste in accordance with Local, State, and Federal laws.

OPERATION

Once you have completed steps 1 through 10, proceed with the cleaning operation. Your unit should be in the full throttle position when cleaning or extracting. A **float switch** located inside the waste tank will automatically shut down the unit when it reaches its full capacity. When this occurs, empty the waste tank before continuing.

EXHAUST DIVERTER VALVE

The automatic **exhaust diverter valve** directs exhaust through either:

- a. The high temperature heat exchanger or through the muffler. This is fully automatic and is controlled through the temperature setting dial for cleaning operations.
- b. Set temperature control to desired temperature or for flood extraction set to 50°.

OPERATION

CLEANING

Observe the following guidelines, while cleaning:

1. Before proceeding make sure the nozzles are functioning properly.
 - a) To check, hold the wand about one foot above the surface to be cleaned and open the wand valve. A full spray should be observed from the cleaning nozzles.
 - b) If the nozzles are not showing a full spray pattern, adjust nozzles for proper pattern, clean, or replace nozzles, if required.
2. Normally, chemical is applied on the push stroke of the wand when cleaning, and vacuuming is done on the pull stroke. For heavily soiled carpets the wand may be used in a scrubbing manner, applying chemical in both push and pull strokes. Always finish up an area with a vacuum pull stroke.
3. When cleaning, keep the working opening (mouth) flat on the surface being cleaned. Keep the wand moving when the valve is open.
4. The unit will automatically shut-down when the waste tank is full. This will prevent water being drawn into the vacuum pump. If shut-down occurs, empty the waste tank before proceeding.

WARNING:

NEVER dispose of waste in storm drains, waterways, or onto the ground. Always dispose of waste in accordance with Local, State, and Federal laws.

UPHOLSTERY CLEANING

Upholstery Tool, Part #78513

1. Set temperature as desired and slow down engine speed to minimize excess heat.
2. Slow engine speed down to minimize excess heat.
3. Use one (1) "80015" spray tip in the tool.
4. Pressure adjustment below 300 PSI should be made at the tool itself, by using the adjusting knob located on the valve.

STAIR TOOL CLEANING

Stair Tool, Long, Part #78519

Stair Tool, Short, Part #78521

1. Set temperature as desired and slow down engine speed to minimize excess heat.
2. Slow engine speed down to minimize excess heat.
3. Use one (1) "9502" spray tip in your stair tool.

OPERATION

FLOOD RESTORATION



Set the temperature control on the control panel to 50°.

SHUTDOWN AND DAILY MAINTENANCE

1. Run fresh water through the **chemical injection system** to flush out chemicals.
2. We recommend removing as much moisture from your **vacuum hoses** as is reasonable. This will prevent spillage of solution in your vehicle when replacing hoses.
3. Position the **throttle control** to about 3/4 of the way out, but no less than 1/2 of the way out.
4. Disconnect the **vacuum hoses** from the unit.
5. Set temperature dial to 50°, and allow the unit to cool down to 180°F or less.
6. Push the **throttle** all the way in to idle and allow the unit to run for **1 minute** in order to remove all moisture from the **vacuum pump**.

NOTE: If finishing for the day: Pull the throttle all the way out, plug the vacuum inlet and spray WD-40 (or equivalent) into the vacuum lubrication cup (located at front of console) for 5 seconds. This will lubricate the vacuum pump. Pull the throttle back to idle and continue to step #7.

7. Turn the **ignition switch** to the OFF position.
8. Turn the **water supply faucet** off. Bleed the pressure out of the **water supply hose** by loosening the hose at the water supply. Unhook the **water supply hose** and store in vehicle.

9. Relieve pressure from the **cleaning tools and pressure hoses** by activating the valve on the tools. Disconnect the **tools and pressure hoses** from the unit and store all items.

10. Drain the **waste tank** and dispose of waste in a proper manner.



NEVER dispose of waste in storm drains, water ways, 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 accumulated debris, and re-install. Inspect the **vacuum inlet filter** inside the **waste tank**. If there is any lint or debris, remove and clean filter.

NOTE: When removing the vacuum inlet filter, grip the plastic hexagonal section of filter. Grasping filter by the screen may collapse or ruin the filter. Re-install the filter hand-tight. NEVER operate this unit with this filter removed, damaged or improperly installed.

NOTE: When replacing this filter, we recommend using the stainless steel Prochem filter, Part #14-806518, only.

12. At the end of your work day, rinse out the waste tank with fresh water. DUO Deodorizer may be added to the waste tank to inhibit the growth of bacteria.
13. Clean the unit, tools, hoses, van interior, etc., as needed. Inspect ALL equipment for any damage, wear, leaks, etc.

OPERATION

FREEZING PROTECTION

⚠ CAUTION:

If the unit is exposed to freezing weather the water in the unit may freeze, causing **SERIOUS DAMAGE** to the unit. To avoid this, the following is recommended during the cold weather season:

When the unit is not in use, always park it in a heated building.

While in operation, avoid long shutdowns as the unit provides heat while running. Shut it down just prior to leaving for the next job.

If a heated building is not available, we recommend that you winterize the unit with anti-freeze. At present, it is only possible to winterize units which do not have an auxiliary water tank. Units with auxiliary water tanks must be stored in a heated building when not in use.

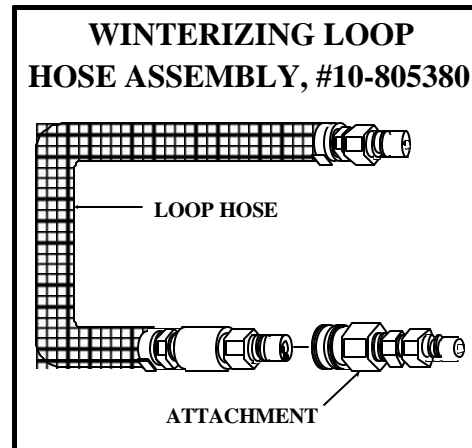
ADDING ANTI-FREEZE TO YOUR UNIT:

1. Shut off the water supply. Disconnect the **water inlet hose** from the front of your console.
2. Connect all **high pressure hoses and tools** that may have water in them.
3. Fill the water box with approximately two gallons of 100% glycol base anti-freeze.
4. Start the unit, turn water pump off and open the tool valve pressure drops and water stops flowing.
5. Turn the **water pressure override switch** to the override position and start the unit. Turn the **water pump switch ON**.
6. Open the tool valve until anti-freeze begins to come out of the tool. Recover **ALL** anti-freeze that comes out of the tools into an approved container. We strongly recommend that you recycle and re-use the anti-freeze.

Repeat this procedure with all the remaining tools. After all tools and pressure hoses have been filled with anti-freeze, disconnect and store them.

Close the heat bypass valve by turning the knob all the way clockwise.

7. Turn the **water pump switch OFF**. Attach the **winterizing loop hose** with attachment, Part #10-805380, to the solution outlet connection and the water inlet connection. Turn the **water pump switch ON**.



Allow the unit to run for approximately 3 minutes with the winterizing loop hose attached.

8. Prime the **chemical system** with a 50/50 anti-freeze/water mix. Insert the chemical inlet and prime tubes into the anti-freeze container. Turn the **chemical valve** to PRIME until antifreeze begins to flow out of the prime hose. Now turn the **chemical valve** to the ON (CHEMICAL) position, making certain that the flow meter indicates flow. Make certain that all anti-freeze drains out of the chemical hose into an approved container.

After 20 seconds, turn the **chemical valve** to the OFF position.
9. Open the **heat bypass valve** by turning the knob counter-clockwise. After 10 seconds, close the **heat bypass valve**.

Hold switch in override position for 10 seconds.
10. After completing these procedures, shut the unit down. The unit is now "winterized".

REMOVING ANTI-FREEZE FROM THE UNIT

1. Connect one end of the **winterizing loop hose** to the solution outlet connection. Place the other end of the loop hose, without the attachment, into an approved container.
2. Start the unit. Allow the anti-freeze to flow into the container until flow stops.
3. Fill the water box with fresh water and repeat step #2.
4. Connect the **water inlet hose** to the water inlet connection on the console. Turn the water supply on.
5. Connect all **solution hoses and any tools** which require purging of anti-freeze to the solution outlet connection.
6. Open the tool valves and drain the anti-freeze into an approved container until the flow is clear and all anti-freeze is purged from the tools and hoses.

7. Place the chemical prime hose into the approved container. Submerge the chemical inlet hose in water. Turn the **chemical valve** to the PRIME position until clear water comes through the prime hose, and then remove the prime hose from the container.

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

Once all of the anti-freeze is removed, the unit is ready to use.

Eventually, the anti-freeze in your storage container will become diluted with water. If the anti-freeze level drops below 50% of the total, dispose of it and start with fresh 100% anti-freeze.

WARNING:

When disposing of used anti-freeze, observe local laws and regulations. Where permitted, we recommend disposal in sanitary sewer systems. Do not drain onto the ground or into storm drainage systems.

MAINTENANCE

SERVICE SCHEDULE

Engine	Daily	Check engine oil level. *** Fill to proper level
Vacuum Pump	Daily	Spray WD-40 in lubrication cup at front of console for 5 sec.
Water Pump	Daily	Check oil level. ** Fill to proper level
Vacuum Inlet Filter (In Waste Tank)	Daily	Clean filter, inspect, replace if damaged
Vacuum Hoses	Daily	Wash out with clean water
Automatic Waste Pump	Daily	Inspect and remove any debris or sediment
Vacuum pump	Weekly*	Check oil level. Fill to proper level
Engine	Weekly	Examine air intake and cooling areas. Clean, if required.
Engine	Weekly	Check air cleaner for dirty, damaged, or loose parts.
Water pump inlet filter (In water box)	Weekly*	Check for debris and clean
Battery	Weekly*	Check for proper fluid level. Fill with distilled water only
Bypass manifold orifice & strainer	Weekly*	Inspect and remove any debris or blockage
Solution outlet Y-Strainer	Monthly*	Inspect and remove any debris or blockage
High pressure hoses	25 hrs	Inspect for damage or impending damage
Engine	25 hrs	Service pre-cleaner element.
Pressure regulator	50 hrs	Lubricate stem and o-ring
Engine	100 hrs	Change engine oil***
Engine	100 hrs	Service air cleaner elements
Battery	100 hrs*	Clean battery terminals
Engine	100 hrs	Remove cooling shrouds and clean areas
Engine	100 hrs	Check condition & re-set gap on spark plugs
Engine	200 hrs	Change oil filter***
Heat bypass and chemical valves	200 hrs*	Inspect and/or adjust packing nuts
Engine	200 hrs	Check radiator hoses and clamp tightness
Temperature solenoid	200 hrs*	Remove any hard water deposits
Vacuum exhaust heat exchanger	200 hrs	Inspect core and remove debris
Water pump	500 hrs	Change oil**
Vacuum pump	250 hrs	Lubricate bearing on pulley end with grease
Pulley set screws & hub cap screws	500 hrs	Check for proper torque valves. Re-torque, if required****
Drive pulley	500 hrs	Inspect, clean and check for pulley groove wear****
Drive pulley	500 hrs	Check pulley alignment****
Drive belts	500 hrs	Inspect and clean****
Drive belts	500 hrs	Check belt tension****
Chemical pump & check valves	1000 hrs	Replace diaphragm and check valves
Check valve (solution outlet)	1000 hrs	Inspect, clean, and repair, if needed
Vacuum pump	yearly	Drain, flush, and replace oil *****
Vacuum inlet filter (in waster tank)	Yearly*	Replace
Nitrogen accumulator	Yearly*	Check and have re-charged with nitrogen, if required
Engine	Yearly*	Replace in-line fuel filter on engine
Engine	Yearly*	Replace air cleaner element

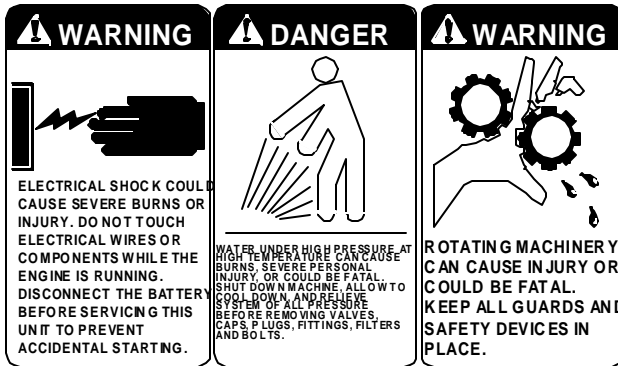
* Or as often as required

** Change water pump crankcase oil after the first 50 hours

***Change engine crankcase oil and filter after the first 50 hours

****Perform drive belt, pulley and hub maintenance after the first 25 hours of operation, and then again at 100 hours

*****If using AEON PD synthetic lubricant, 4500 hours or every 2 years, whichever comes first



WARNING:

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

NOTE: Use the hour meter as a guide for coordinating the maintenance schedule.

ENGINE

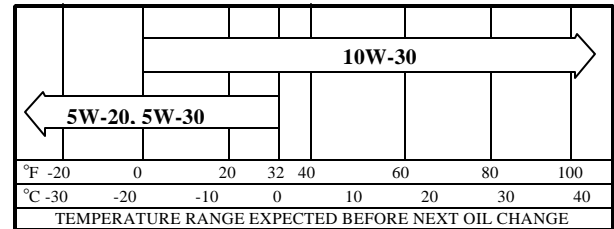
Major repairs should **NOT** be attempted without a thorough knowledge of all components of the engine. Therefore, we strongly recommend having service or repairs performed by an authorized engine dealer.

General maintenance, filter changes, oil changes, etc., should be performed as recommended by the Kohler Engine Operation and Maintenance Manual. Use the engine manual as a detailed guide for all matters concerning the engine. The following is a condensed version of maintenance procedures:

1. Check the engine oil level **daily**, when in use. Make certain that proper oil level is maintained. **NEVER** overfill. Use high quality detergent oil of at least API (American Petroleum Institute) service class SF or SG. Select the viscosity based on the air temperature at the time of operation as shown in the following table.

NOTE: Using less than service class SF or SG oil or extending oil change intervals longer than recommended can cause engine damage.

RECOMMENDED SAE VISCOSITY GRADE



2. It is important that the engine break-in oil is changed after the **first five hours** of operation. Afterwards, change the engine oil **every 100 hours**.
3. Examine air intake and cooling areas **weekly**. Clean if required.
4. Check the air cleaner **weekly** for dirty, damaged, or loose parts.
5. Service the pre-cleaner element **every 100 hours**.
6. Service the air cleaner element every **100 hours**.
7. Check the condition of the spark plugs and spark plug gap **every 100 hours**.
8. Remove the cooling shrouds and clean the cooling areas **every 100 hours**.
9. Change the oil filter **every 200 hours**.

NOTE: Perform these maintenance operations more frequently under extremely dirty or dusty conditions.

MAINTENANCE

VACUUM PUMP

Refer to the Vacuum Pump Operation and Service Manual for specific instructions.

Lubrication: We recommend that you use AEON PD Synthetic Blower Lubricant in the gear end of the vacuum pump for all operating temperatures. AEON PD is formulated especially for positive displacement blower service to provide maximum blower protection at any temperature. One filling of AEON PD will last a minimum of 2 times longer than a premium mineral oil.

NOTE: AEON PD (Part # 05-008039) is the oil which Prochem puts in the vacuum pump at the factory. Topping off or adding petroleum oil to synthetic oil is NOT recommended.

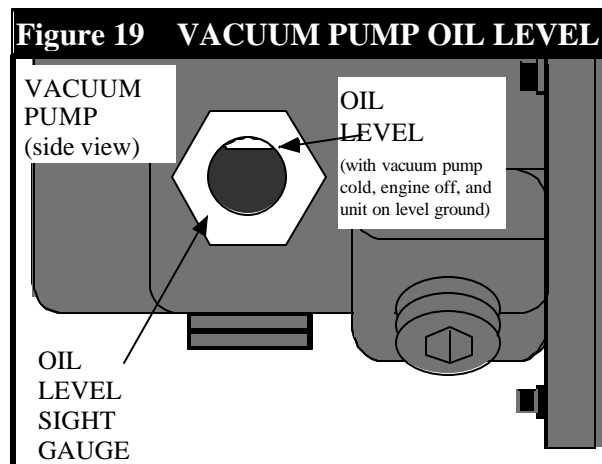
If not using AEON PD synthetic blower lubricant, use oils with rust and oxidation inhibitors, anti-foam additives and the viscosity's listed on the chart on this page.

1. Check the oil level **weekly** to assure the proper level. **PROPER LEVEL** cannot be overemphasized. Too little oil will ruin bearings and gears. Too much oil will cause overheating. Use Figure 19 as a guide when adding oil.
2. To prevent rust from building up inside the vacuum pump (if moisture exists) we have provided a lubrication cup on the front of the unit.

VACUUM PUMP LUBRICANT

BLOWER DISCHARGE TEMPERATURE	OIL GRADE U.S.A.	OIL VISCOSITY, CENTISTOKES @ 40°C
-40° TO 32°F (-40° TO 0°C)	SAE 10W	45
32° TO 100°F (0° TO 38°C)	SAE 20	100
100° TO 275°F (38° TO 135°C)	SAE 40	200
OVER 275°F (135°C)	SAE 50	250
* In applications with extreme variations in ambient temperature a 20W-50W multiple viscosity oil is recommended.		
FOR GREASE LUBRICATED BEARINGS Service every 500 hours or operation		
Blower Discharge Temperature	Type Grease	
-40° to 275°F (-40° TO 120°C)	Non-corrosive bearing grease	

First run the unit at least **1 minute** to remove any moisture from the vacuum pump. Next, fill the lubrication cup with WD-40, or a similar lubricant, for **5 seconds** while the unit is running and the vacuum inlet is sealed. Do this at the end of **each working day**.



3. Drain, flush and replace oil **every 1500 hours or yearly, whichever comes first**. Change oil more frequently if inspection so indicates. With AEON PD synthetic lubricant, perform the oil change maintenance **every 4500 hours or every 2 years, whichever comes first**.
4. The bearings on the pulley end of the vacuum pump requires grease lubrication **every 500 hours**. Pack the bearings until grease comes out of the vent holes. Use extreme pressure bearing grease of the specification NLGI Grade 2 EP.

WATER PUMP

Refer to the Water Pump Operation and Service Manual for specific instructions.

1. Check the crankcase oil level **daily** to assure the proper level. Use Figure 20 as a guide when checking the oil level. If the level has dropped, check for the source of leakage and repair.

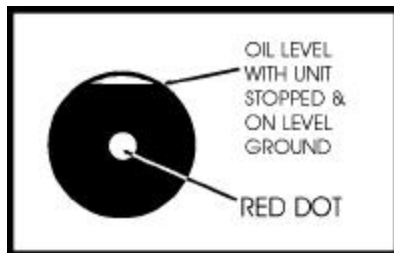


FIGURE 20

2. Change the crankcase oil with Cat Pump Crankcase Oil, Part #05-008016, after the **first 50 hours** of operation. Drain and refill the crankcase oil with Cat Pump Crankcase Oil **every 500 hours** thereafter.
3. Other Cat approved oil equivalents are: Mobil DTE 16, Amoco Rykow 68, and Shell Tellus T68.

VACUUM INLET FILTER (IN WASTE TANK)

1. The vacuum filter in the waste tank should be removed and cleaned **daily**. If this is done, the filter will last for a long period of time.
2. Inspect the vacuum inlet filter inside the waste tank. If there is any lint or debris, remove and clean filter. Re-install the filter **hand-tight**. Replace this filter **yearly**.

⚠ CAUTION:

When removing the vacuum inlet filter, grip the plastic hexagonal section of filter. Grasping filter by the screen may collapse or ruin the filter.

NOTE: When replacing this filter, we recommend using only a stainless steel Prochem filter, Part #14-806518.

DRIVE BELTS, PULLEYS, & HUBS

1. Check pulley set screws and/or hub cap screws after the **first 25 hours** and then again at **100 hours**. Re-torque these screws with a torque wrench, using the values on the chart on the next page. Check pulley set screws and/or hub cap screws **every 500 hours** thereafter.

⚠ CAUTION:

Make certain that when you re-torque these screws, that you use a clockwise pattern and continue until proper torque is achieved.

TORQUE VALUES		
COMPONENT	INCH/LBS	FOOT/LBS
Engine hub	720	60
Vacuum pump hub	192	16

2. Check for pulley groove wear, clean belts and pulley grooves, check for worn belts, proper belt tension, and pulley alignment after the **first 25 hours** and then again at **100 hours**. Check for belt ride in the groove. In multiple groove drives, belt ride should be uniform, not more than 1/16" above or below top of pulley groove.

Check groove wear area for wear. Side wall of groove should be straight, not dished out. Bottom of groove should show no signs of belt contact.

Inspect belts for contaminants, such as oil or grease. Wipe belts clean with detergent and water. Inspect pulley grooves for buildup of such material and remove, if necessary.

Check wear surfaces of belt for excessive wear. If they have a slick, glazed look, belts are slipping. Check belt tension. Never replace one belt in a used set, as used belts will elongate. Replace entire set if replacement is necessary.

Place a straight-edge across the top of belt. There should be no more than 1/2" deflection in the center of the belt, halfway between the pulleys. If there is too much slack, tighten belt, making sure that it stays properly aligned.

See the "General Service Adjustments" section in this manual for details.

Check alignment with straight-edge, string, or machinist level. Correct alignment to as near perfect as possible.

MAINTENANCE

FLOAT VALVE (WATER BOX)

Check the float valve at least once a month for proper operation. If overfilling is a problem, check the plunger for a proper seat. Replace tip on plunger if needed or damaged. Water level in the water box should be about 5-1/2" to 6".

For the procedure, see the "General Service Adjustments" section in this manual for details.

INLET FILTER (TO WATER PUMP)

The filter inside and on the bottom of the water box is rubber with a stainless steel screen. This should be inspected and cleaned on a **weekly** basis. Replace, if damaged.

NOTE: Vacuum all excess water and debris from water box prior to removing strainer.

WASTE TANK STRAINER BASKET

The strainer basket located inside the waste tank should be removed and cleaned whenever it is full of debris. This should be done on at least a **daily** basis.

BYPASS MANIFOLD (STRAINER AND JET BLOCK)

Check the strainer and the jet **weekly**. Remove any debris or blockage.

For the procedure, see the "General Service Adjustments" section in this manual for details.

Y-STRAINER (OUTLET)

Inspect the Y-strainer **after the first week** of running the unit by unscrewing the screen and removing any accumulated debris. Inspect the strainer again at **2** and **4 weeks**.

The Y-strainer should then be inspected **every month**. However, if the Y-strainer has a frequent build-up of debris it should be inspected and cleaned more often.

CHECK VALVE (OUTLET)

Inspect the check valve when rebuilding the chemical pump or as needed. Remove and disassemble the check valve. Check the Teflon seat for debris or abnormal wear. Clean or replace seat if needed.

NOTE: Improper seating of the check valve poppet, damaged spring, or o-rings will cause poor operation of the chemical system.

For the procedure, see the "General Service Adjustments" section in this manual for details.

CHEMICAL PUMP

Rebuild the chemical pump **every 1000 hours**. This involves changing the diaphragm and check valves.

For the procedure, see the "General Service Adjustments" section in this manual for details.

CHEMICAL AND HEAT BYPASS VALVES

Examine the packing nut on the chemical selector valve, heat bypass valve, and chemical metering valve **every 200 hours**. Keeping these valve packings properly adjusted will eliminate possible leakage from the valve stems and add to overall valve life.

For the procedure, see the "General Service Adjustments" section in this manual for details.

PRESSURE REGULATOR

Lubricate the o-rings **every 100 hours**. Use o-ring lubricant Part #05-008035.

For the procedure, see the "General Service Adjustments" section in this manual for details.

VACUUM HOSES

To assure maximum hose life, we recommend that the hoses be washed out with clean water at the end of **each working day**.

CATALYTIC AIR PUMP

Check and/or replace the air pump every **1500 hours**. When replacing, it will also be necessary to replace the air pump pulley.

TEMPERATURE SOLENOID

Remove hard water deposits from the temperature solenoid every **200 hours** or as often as required.

For the procedure, see the "General Service Adjustments" section in this manual.

BATTERY



Dangerous Acid, Explosive Gases!
Batteries contain sulfuric acid. To prevent acid burns, avoid contact with skin, eyes and clothing. Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times.

Keep batteries out of the reach of children. Remove all jewelry when servicing batteries. Before disconnecting the negative (-) ground cable, make sure all switches are OFF. If ON, a spark will occur at the ground cable terminal which could cause an explosion if hydrogen gas or gasoline vapors are present. When disconnecting the battery, ALWAYS disconnect the negative (-) terminal FIRST.

1. Check the fluid level in the battery **every 25 hours** or **once a week**. If low, fill to the recommended level with **distilled water ONLY**.

NOTE: DO NOT overfill the battery. Poor performance or early failure due to loss of electrolyte will result.

2. Keep the cables, terminals, and external surfaces of the battery clean. A buildup of corrosive acid or grime on the external surfaces can cause the battery to self-discharge. Self-discharge occurs rapidly when moisture is present.

The battery terminals should be cleaned **every 100 hours** to prevent corrosion build-up. Wash the cables, terminals and external surfaces with a mild baking soda and water solution. Rinse thoroughly with clear water.



DO NOT allow the baking soda to enter the battery cells as this will destroy the electrolyte.

ENGINE EXHAUST HEAT EXCHANGER

If the engine and/or air pump are not properly maintained, the exhaust gases may deposit carbon on the outside of the heat exchanger coil and affect the cleaning solution temperature and damage the catalytic converter. If this condition exists, remove the heat exchanger from the unit and clean the carbon off the coil. This may be done by taking it to a radiator dealer and having it boiled out. **The catalytic converter must be completely removed before cleaning carbon deposits or damage may result.**

Proper maintenance of the unit, such as regular tune-ups, proper fuel, and a properly operating air pump will help prevent carbon build-up on the coil and increase the life of the unit.

Using A212 ULTRA CLEAN INDUSTRIAL CLEANER or A217-1 ULTRAPAC RENO-VATE will also greatly enhance the removal of carbon deposits. Soak the coil and casing **ONLY, NEVER** soak the catalytic converter core.

MAINTENANCE

VACUUM EXHAUST HEAT EXCHANGER

1. Cleaning the vacuum exhaust pre-heater core is recommended as needed or if the unit was operated with the vacuum inlet filter damaged, removed, or improperly installed. Pull out the core and remove all debris, being **careful not to drive debris deeper into the core**. We recommend removing the debris with water by either submerging the core and moving it back and forth until the debris loosens and falls off or by spraying the debris out of the core. Allow the core to dry before reinstalling.
2. Remove and inspect the vacuum exhaust pre-heater core **every 200 hours**.

HIGH PRESSURE HOSES

Inspect your high pressure hoses for wear after the **first 100 hours** of use. Inspect **every 25 hours thereafter**. If hoses show any signs of damage or impending rupture, **replace the hose**.

WARNING:

DO NOT attempt to repair high pressure hoses! Repairing high pressure hoses may result in severe burns and serious injury!

All high pressure hoses must be rated for 3000 PSI at 250°F. Thermoplastic hoses do not meet these specifications and should not be used. Severe burns and injury may result if the hoses do not meet these requirements.

OPTIONAL WASTE PUMP-OUT

At the end of each work day, make certain that you remove any debris or sediment which may be inside the waste pump.

Remove the waste pump unit from the waste tank and clean inside the screen at least **once a week, or more frequently if required**.

TEMPERATURE PROBE PACKING

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

For the procedure, see the “General Service Adjustments” section in this manual.

GENERAL SERVICE ADJUSTMENTS

WARNING:

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

ENGINE SPEED

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

WARNING:

DO NOT attempt to adjust without a tachometer and NEVER adjust the engine above 2600 RPM.

VACUUM RELIEF VALVE

While the unit is running at full RPM, block the air flow at the vacuum inlet connection and read the vacuum gauge. If adjustment is required, shut the unit down and adjust the vacuum relief valve locking nut tension. Start your unit and read the vacuum gauge. Repeat this process until the relief valve opens at 13" Hg for LEGEND, 14" Hg for the LEGEND SE.

VACUUM PUMP DRIVE BELTS

To tighten the vacuum pump belts:

1. Loosen the two nuts which hold the air pump mount in place.
2. Loosen the four nuts which hold the vacuum pump mount in place.
3. Turn the adjusting bolts until the proper belt tension is achieved (1/2" deflection in the center of the belt, halfway between the pulleys).

NOTE: When adjusting belt tension, make certain that the engine shaft and vacuum pump shaft remain parallel, and the belt tension is equal throughout the belt width.

4. After adjusting, re-tighten the four nuts which hold the vacuum pump mount in position. Check belt alignment with straight- edge.
5. Readjust and check air pump belt. **DO NOT** over-tighten belt. Re-tighten the two nuts which hold the air pump mount in place. Check belt alignment with straight-edge.

WATER PUMP DRIVE BELT

To tighten the water pump belt:

1. Loosen the nuts which hold the water pump mount to base.
2. Adjust the position of the belt tension adjusting bolt until the proper belt tension is achieved. (1/2" deflection in the center of the belt, halfway between the pulleys).
3. While checking the alignment, tighten the nuts which hold the water pump mount to base.

FLOAT VALVE (WATER BOX)

The float valve should only be adjusted if the water box is overflowing or the water level in the box is lower than 5-1/2":

1. If the box is overflowing, remove and check the float valve for debris or damage.

NOTE: If the float ball has any water inside it must be replaced.

CAUTION:

When replacing float ball, DO NOT over- tighten, as the rod can puncture the ball. Make sure to tighten the nuts on the rod.

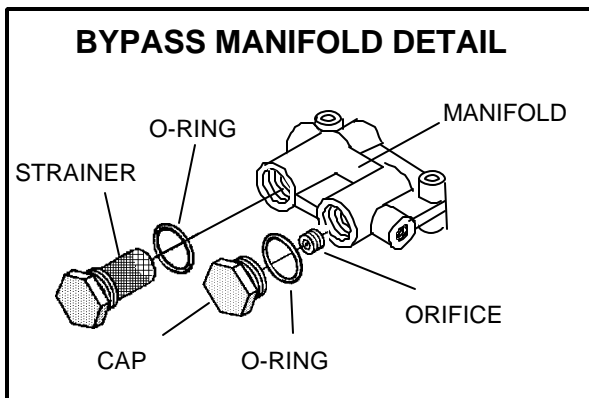
2. Disassemble the valve and check the piston and seat for damage, replace if needed. See the "Illustrated Parts Listing" for a parts break-down.

MAINTENANCE

BYPASS MANIFOLD

Clean the bypass strainer and orifice using the following guidelines:

1. Remove the strainer. Clean and re-install. **DO NOT** over-tighten strainer.
2. Remove the cap. Remove the orifice, using a 3/16" Allen wrench (the 3/16" Allen wrench is provided with Part #66-945280, the bypass maintenance kit.)



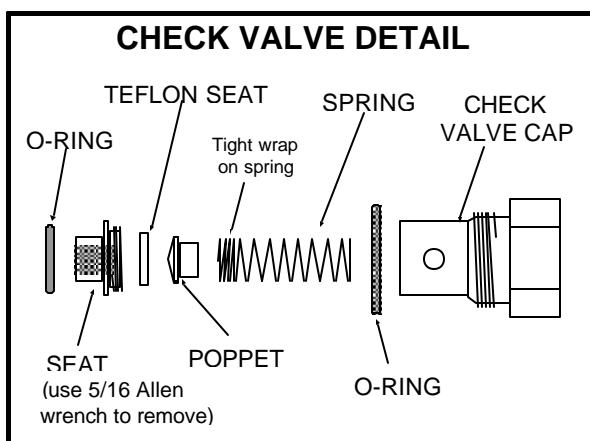
3. Re-install the cap and run the unit with the water pump ON for 15 seconds to flush out the bypass manifold.
4. Remove the cap and re-install the cleaned orifice, using the 3/16" Allen wrench. Tighten orifice just enough to seat. **DO NOT** over-tighten. Re-install cap. **DO NOT** over-tighten cap.

NOTE: If o-ring seals leak, replace them. If strainer is damaged, replace strainer.

CHECK VALVE (SOLUTION OUTLET)

Inspect the check valve whenever doing service on the chemical pump or if flow problems occur in the chemical system:

1. Remove the check valve. Be sure the small o-ring for the seat comes out with the check valve.
2. Remove the seat, using a 5/16" Allen wrench.
3. Check the Teflon seat for debris or wear. Clean or replace Teflon seat if needed.
4. Clean the poppet and spring, inspect for wear or damage, and replace as needed.



5. Re-assemble the check valve. Start the seat by hand, tighten using a 5/16" Allen wrench. **DO NOT** over-tighten seat.

NOTE: Improper seating of the check valve poppet, damaged spring or o-rings will cause poor operation of the chemical system.

6. Lubricate the o-rings with o-ring lubricant, Part #05-008035, and reinstall.

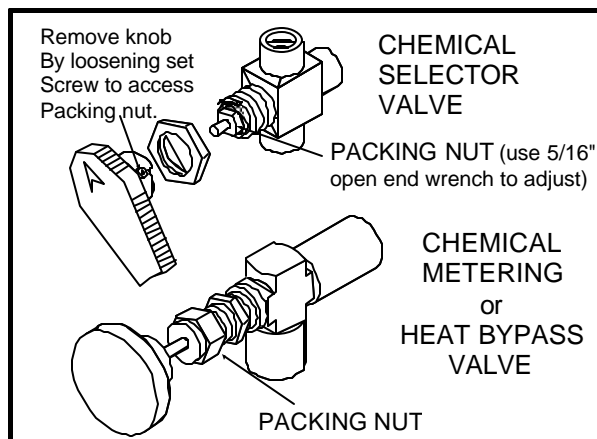
CHEMICAL PUMP

The only repairs which the chemical pump may require is the replacement of the diaphragm or check valves. To replace the diaphragm, unscrew the cover from the body. When replacing the diaphragm, lubricate the outer edges of the diaphragm with o-ring lubricant, Part #05-008035, and reassemble. To replace the check valves, unscrew the check valve caps. Replace the check valves and reassemble, using new o-rings.

DO NOT attempt to re-use o-rings once the check valves have been removed. See the "Illustrated Parts Listing" for a parts break-down on the chemical pump.

PACKING NUT ADJUSTMENT FOR CHEMICAL METERING, BYPASS, & CHEMICAL SELECTOR VALVES

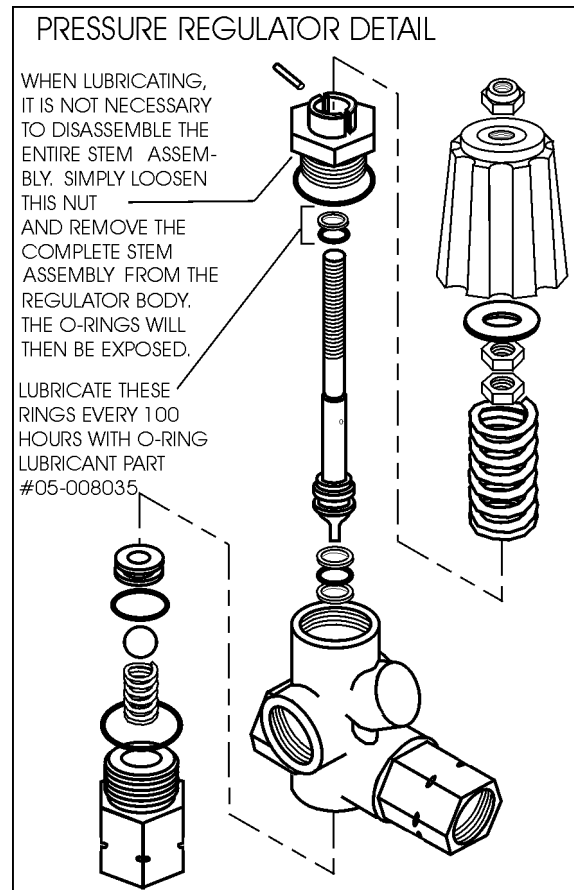
Examine the packing nut on the chemical metering, heat bypass, and chemical selector valves for proper tension every **200 hours**. When turning the knob, there should be a small amount of resistance. If not, slightly tighten the packing nut. **DO NOT** over-tighten. Keeping the valve packings properly adjusted will eliminate possible leakage from the valve stems and add to overall valve life.



PRESSURE REGULATOR

The pressure regulator serves only to hold locked up water pressure at a preset point and to bypass this water back to the water box.

To adjust:



1. With your unit running, close the cleaning tool. Check the pressure gauge. Open the tool valve. We recommend setting the pressure regulator so that the pressure gauge reads 350 PSI with the tool valve **open**.

When the tool valve is opened, there is an approximate drop of 100 PSI in pressure. **If there is a pressure drop greater than 100 PSI, it may be necessary to lubricate the o-rings in the pressure regulator.**

2. If the pressure regulator requires adjustment, turn the adjusting knob (while observing the pressure gauge on the control panel) until the desired pressure is obtained. Turning the knob clockwise increases pressure, turning the knob counter-clockwise decreases pressure.

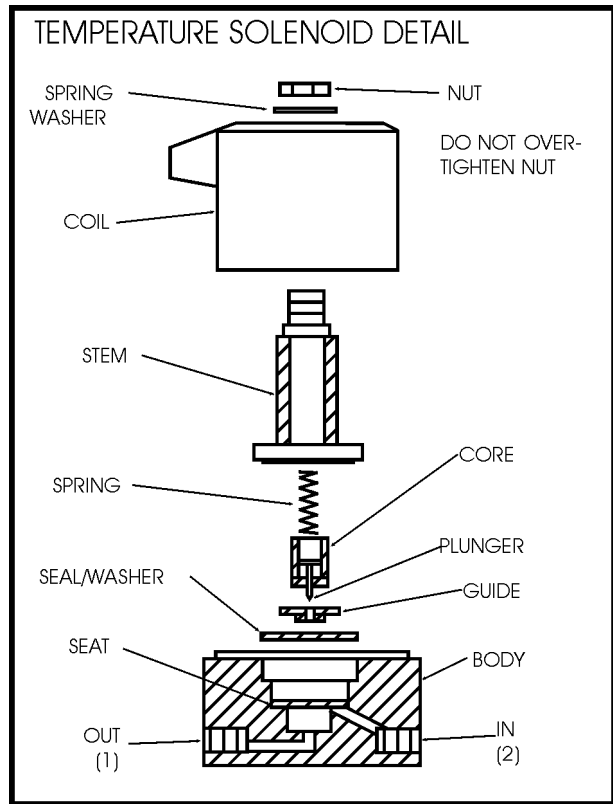
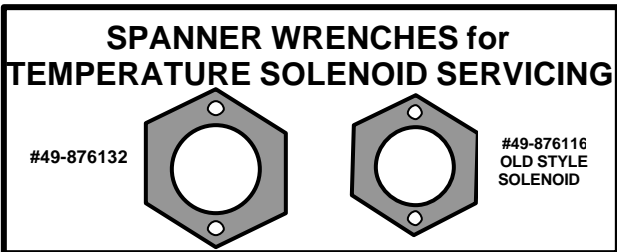
MAINTENANCE

TEMPERATURE SOLENOID

The temperature solenoid may become seized due to hard water deposits. Make certain that the core moves freely in the stem. Also, the plunger must move freely within the guide. Clean with #0000 steel wool.

Check the seat to make sure that it is not distorted. Clean the seat, using a 3/64" drill bit. ROTATE THE DRILL BIT WITH YOUR FINGERS ONLY.

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



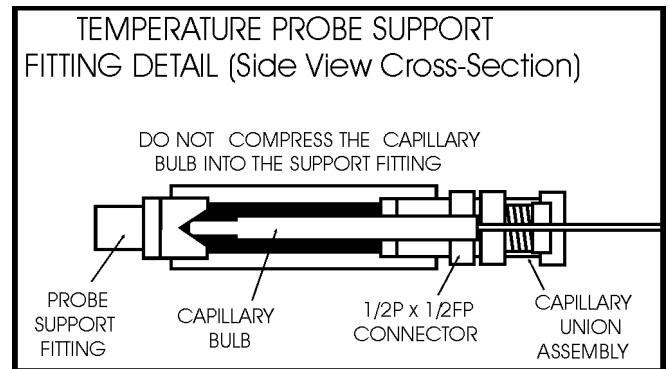
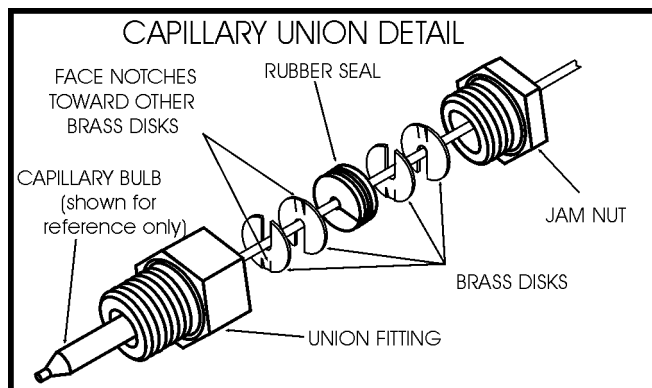
TEMPERATURE CAPILLARY & PACKING ASSEMBLY

INSTALLATION INSTRUCTIONS

1. Using thread sealant, thread the tapered end of the union fitting into the thermostat manifold and tighten.
2. Slide the jam nut over the capillary bulb with the threaded end toward the end of the capillary bulb.
3. Insert the capillary bulb through the union fitting and into the thermostat manifold.
4. Place the rubber seal onto the capillary tube with the split facing 90° from the top (see the capillary union detail).
5. Fit 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 nearby brass disk to lock the brass disks together. Then face the notches on the brass disks 90° from the split in the rubber seal.

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

6. Insert the rubber seal and brass disks into the union fitting, hand tight.
7. Position the capillary bulb in the temperature manifold as shown in the illustration. When positioning the capillary bulb, do not allow the bulb to compress against the support fitting.
8. Tighten the jam nut lightly, about 1-1/2 turns.
9. Examine the capillary union assembly for leaks and tighten the union fitting just enough to stop leaks. **DO NOT** over-tighten.



TROUBLESHOOTING

! WARNING:

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

This chapter of the operator's manual explains how to look for and repair malfunctions which may occur.

Intelligent, accurate troubleshooting is based on a complete and thorough understanding of the WATER, VACUUM, CHEMICAL, HEAT TRANSFER, SAFETY and WIRING systems on this unit.

If there is a malfunction occurring in a system which you do not fully understand, turn back to the "Operation" section of this manual and review "Systems".

In addition, prior to proceeding, you can save time by checking that:

1. The water supply is ON.
2. The engine speed at full throttle is 2600 RPM, with the diverter valve in the HEAT EXCHANGER position.
3. Check that water pump volume is correct. Check the pump volume with the cleaning tool closed. Measure the water flow returning to the water box from the pressure regulator. The flow rate should be 3.0 GPM. An additional .2 GPM of water should be flowing through the bypass manifold orifice, which is adjacent to the water box. If you block the heat bypass flow, the flow rate will be 3.2 - 3.3 GPM.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
<p>Loss of water pump pressure.</p> <p>With the cleaning tool open, the water pressure gauge reads below the normal operating pressure. <i>NOTE: If the water pump pressure drops below 50 PSI or exceeds 1200 PSI, the unit will automatically shut down.</i></p>	Water supply is turned off or the float valve is stuck or improperly adjusted. <i>NOTE: This may also cause the water pressure switch to shut the unit down.</i>	Turn the water supply on or up. Check for kinks in the water supply hose. Examine the float valve and adjust or replace.
	Water pump inlet supply line is plugged or drawing air. <i>NOTE: This may also cause the water pressure to shut the unit down.</i>	Examine the water inlet filter inside the water box. Remove accumulated debris and replace if required. Check for suction leaks and loose clamps or fittings. Tighten any loose fittings or clamps. Replace any ruptured hose(s).
	Improper engine speed	Using a tachometer, check the engine speed. Full throttle engine speed is 2600 RPM. Re-adjust in accordance with the Kohler Engine Operation and Service Manual.
	Pressure regulator o-rings are dry.	Lubricate o-rings, using o-ring lubricant Part #05-008035.
	Pressure regulator has worn o-rings	Check o-rings. If necessary, replace.
	Pressure regulator is dirty, stuck open, or improperly adjusted.	Clean or repair regulator. Adjust to working pressure. Lubricate o-rings, using o-ring lubricant Part #05-008035.
	Low pump volume. (Measure the amount of water being returned to the water box from the pressure regulator. It should fill a gallon container about every 17 seconds).	Examine the check valves, plunger cups, and cylinder head on the water pump. Repair, whenever required (refer to the water pump service manual).
	Defective water pressure gauge.	Replace gauge
	Orifice (spray nozzle) in the cleaning tool is worn, defective, or wrong size.	Replace Nozzle or change nozzle size.
	Bypass manifold orifice not installed or installed improperly (threads damaged in manifold).	Check bypass manifold and orifice for proper installation and repair, if necessary.
	Debris clogging water lines or water inlet disconnect.	Clean or replace as needed.
Belt loose or broken	Re-tension or replace as needed.	
<p>Loss of solution volume at cleaning tool orifice.</p> <p>Water gauge reads normal.</p>	Plugged orifice and/or screen in the cleaning tool.	Unplug or replace orifice and/or screen
	Internal block between the pressure regulator manifold and the outlet Y-strainer, or the Y-strainer screen is clogged	Inspect all lines, remove accumulated debris which is blocking proper flow. Replace any defective hoses. Remove, inspect, and clean the Y-strainer screen. De-scale unit and install a water softener, if necessary.
	Outlet check valve is plugged	Examine the check valve, remove any debris
	Defective quick-connect on one or more of the high pressure hoses.	Replace defective quick-connect(s) on high pressure hoses(s).
	Cleaning tool valve is malfunctioning.	Repair or replace valve.
	Hose inner lining is constricted.	Remove restriction or replace hose.
	Engine exhaust heat exchanger is scaled on inside of coil.	De-scale coil, and install the water softener, if necessary, to protect the equipment. If water contains 3-1/2 grains or more of water hardness, a water softener is needed.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
<p>Loss of vacuum</p> <p>While cleaning, the vacuum is not up to par. Engine RPM is normal.</p>	Vacuum gauge is giving an improper reading.	Examine the tubing between the vacuum relief valve and the vacuum gauge and remove any blockage.
	Vacuum hose(s) is damaged, causing a suction leak.	Inspect all lines, remove accumulated debris
	Waste tank gasket not sealing properly, not positioned properly	Inspect the gasket. Repair seal or replace Re-position lid.
	Plugged vacuum hose or vacuum plumbing between vacuum inlet and strainer basket.	Unplug vacuum hose or inlet plumbing.
	Waste tank filter or strainer basket is plugged.	Clean or replace filter. Clean strainer basket.
	Loose vacuum pump drive belts.	Tighten the drive belts
	Waste tank drain valve is damaged or left open, causing a vacuum leak.	Drain the waste tank. Close drain valve, if open. Remove the dump valve and, after inspecting, replace the defective components.
	Vacuum relief valve requires adjustment or has a vacuum leak due to damaged diaphragm.	Re-adjust the vacuum relief valve. If the vacuum does not increase, remove and inspect the relief valve diaphragm. If damaged, replace
	Vacuum exhaust heat exchangers are plugged with lint.	Remove and clean.
	Vacuum pump is wore out.	Replace the vacuum pump.
<p>Loss of chemical</p> <p>With the cleaning tool valve open, no chemical</p>	Chemical pump is improperly primed.	Refer to chemical pump priming instructions.
	The strainer at the inlet end of the chemical inlet line is clogged	Unclog the strainer. If damaged, replace.
	Suction leak in the inlet line leading into the chemical pump.	Inspect inlet lines and flow meter for damage and replace, if required.
	Chemical pump check valve(s) is clogged	Remove any debris from the chemical check valve(s). Replace chemical check valve(s) or seals, if necessary.
	Chemical prime/on-off valve or chemical metering valve is defective.	Replace valve(s).
	Chemical pump diaphragm is ruptured.	Disassemble the chemical pump and replace the damage diaphragm.
	Defective cylinder in the water pump.	Measure the pump volume. If the pump volume is less than normal, refer to "Loss of Pump Volume" in the Troubleshooting section in this manual.
<p>Chemical flow meter indicates flow with the tool valve closed</p>	External leak in chemical piping	Tighten fittings. Re-apply thread sealant where required. If any fittings are damaged, replace.
	Outlet check valve is full of debris or damaged, not allowing it to close properly	Close the chemical valve on the instrument panel. If the flow meter does not indicate flow, remove debris or replace check valve, if necessary.
	Chemical pump diaphragm is ruptured	Close the chemical valve on the instrument panel. If the flow meter still indicates flow, replace the chemical pump diaphragm.
	Internal leak in chemical valve causing continual flow through prime tube returning to container.	Tighten valve packing nut (see "General Service Adjustments" section in this manual). Replace valve, if necessary.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Water pump does not engage when the diverter valve is in the "Heat Exchanger" position	Water pump circuit breaker has been tripped	If the blue light is OFF, check the water pump circuit breaker on the control panel. Press the circuit breaker reset button.
	Defective electrical connection in the console wiring or defective switch.	If the blue light is OFF and the water pump circuit breaker is not tripped, examine switch, electrical connections, and wiring. Repair any defective connections. If there is power going to the switch but not going out, replace the defective switch.
	Water pump has not been activated	Adjust activator arm to assure contact and activation of the microswitch. If the microswitch is defective or damaged, replace.
	Defective water pump clutch. NOTE: The clutch may be manually set by inserting two 1/4-20 x 1/2 bolts. Line up the holes on the clutch and insert the bolts. To disengage the pump, remove the bolts.	If the blue light is ON, check the white wire which leads from the switch to the clutch. If there is power in the switch, but not power at the clutch, replace the defective wire. If there is power at the clutch, replace the defective switch.
	Loose or broken water pump belt.	Tighten or replace belt.
Engine will not start The engine does not turn over	Main circuit breaker on the control panel has been tripped.	After inspecting the unit to determine the cause of the tripped circuit breaker, press the reset button.
	Loose or corroded battery.	Clean, tighten, or replace the battery terminals.
	Dead battery.	Recharge or replace battery.
	Defective ignition switch.	Test ignition switch for power going into the switch. If there is power going in but NO power going out, replace the switch.
	Defective starter motor.	Test the starter motor. If necessary replace.
	Engine Problem.	Refer to Kohler Engine Operation and Service Manual.
	Vacuum pump seized.	Refer to Sutorbilt Service & Repair Manual.
Starter turns over engine, but will not start	Waste tank is full.	Empty the waste tank.
	Water pressure has not reached 50 PSI, triggering the pressure switch to prevent starting.	Turn water pump switch to the override position. If the unit shuts back down, refer to the "Loss of Water Pump Pressure" in the "Troubleshooting" section of this manual.
	Engine temperature has exceeded 285°F, triggering the high temperature switch to shut the unit down.	Determine the cause of overheating before restarting the unit. See "Excessive Heating" in the "Troubleshooting" section of this manual.
	Defective fuel pump.	Replace the fuel pump.
	Loose or broken wires leading to waste tank float switch.	Repair or replace any broken electrical connections.
	Defective float switch in the waste tank.	Disconnect the float switch plugs and bypass the switch. If the unit starts, repair or replace the defective float switch.
	Oil pressure switch (located on engine), anti-diesel solenoid (located on engine), high temperature switch (located on engine).	Test these components. If any are defective, replace. Consult the Kohler Engine Operation and Service Manual.

TROUBLESHOOTING

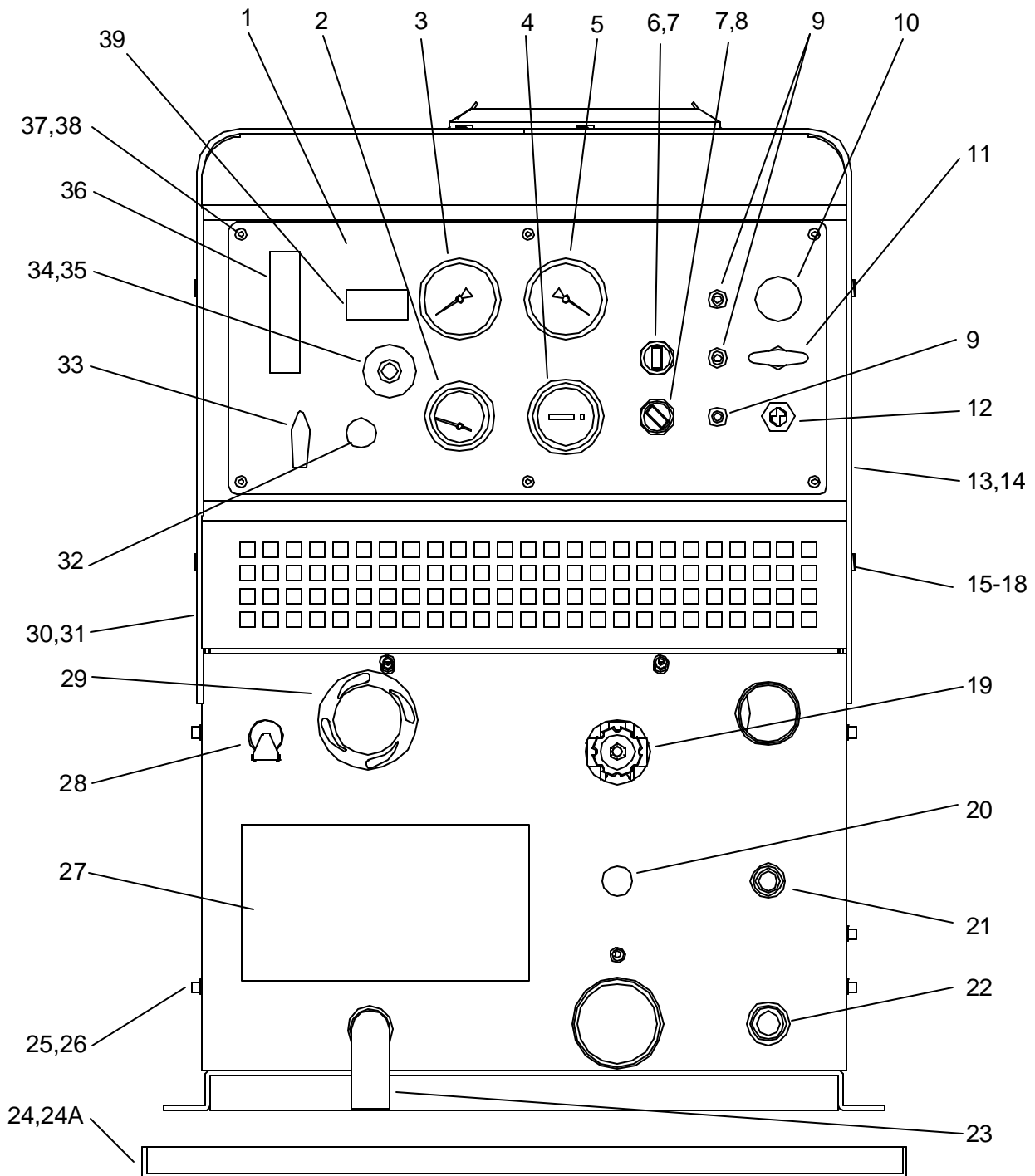
PROBLEM	CAUSE	SOLUTION
Starter turns over engine, but will not start	Defective 285°F high temperature shutdown switch (located at rear of exhaust heat exchanger).	Test. If necessary, replace.
	Engine is malfunctioning	Refer to Kohler Engine Operation and Service Manual.
Engine stops running While doing normal cleaning, the engine stops running	Engine is out of gasoline	Add gasoline to the fuel tank.
	Waste tank is full	Empty waste tank.
	Water pressure has dropped below 50 PSI, triggering the the pressure switch to shut the unit down.	Check water supply to your unit. Check water pump inlet screen in water box. Check supply hose for kinks.
	Water pressure has exceeded 1200 PSI, triggering the pressure switch to shut the unit down.	Check pressure regulator for proper setting.
	Main circuit breaker on the control panel has been tripped.	After inspecting the unit to determine the cause of the tripped circuit breaker, press the reset button.
	Solution temperature has exceeded 285°F, causing the unit to shut down.	Refer to "Excessive Heating" in the "Troubleshooting" section of this manual.
	Engine coolant temperture has exceeded 240°F, triggering the high temperature switch to shut the unit down.	Determine the cause of the overheating before restarting the unit. Refer to the Kohler Engine Operation and Service Manual.
	Defective fuel pump	Replace fuel pump.
	Defective float switch inside the waste tank.	Disconnect the float switch plugs and bypass the float switch. If the unit starts, repair or replace the defective float switch.
	Defective 285°F engine coolant high-temperature shutdown switch.	Test switch. If necessary, replace.
	Loss of oil pressure in engine.	Check for proper oil level or wrong type of oil being used.
	285°F solution temperature switch is defective.	Test switch. If necessary, replace.
	Defective engine oil pressure switch.	Test switch. If necessary, replace.
	No ignition in the engine or engine is malfunctioning.	Refer to the Kohler Engine Operation and Service Manual.
Excessive heating	Check instrumentation settings: Diverter valve is in the HEAT EXCHANGER position. Temperature bypass valve is closed. Temperature control is set at a high temperature.	Turn diverter valve to the MUFFLER position.(If cleaning , make certain that the water pump switch is in the ON position). Open the heat bypass valve. Set temperature control to a lower setting.
	Strainer or orifice is bypass manifold is closed position.	Clean strainer screen and orifice. replace, if needed.
	Defective solenoid-remains in closed position.	Inspect solenoid for proper operation. Clean, or replace, if needed.
	Bypass valve is completely closed and unit is left running for a long period fo time without using water.	Open bypass valve and allow system to cool down.
	Defective temperature control or temperature control microswitch	Inspect temperature control for proper operation. Repair, or replace, if necessary.
	Flow restriction caused by hard water scaling.	Descale unit, repair or replace damaged plumbing components as necessary. Install water softener.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Heat exchanger leaks NOTE: The engine exhaust heat exchanger will produce water condensation discharge at times during normal operation. DO NOT confuse this with a leak.	Engine and vacuum exhaust heat exchanger are damaged from frozen water	Inspect heat exchanger for leaks. On pre-heaters visually inspect for damage. Pressure check both styles after removing them from the unit. (Maximum test pressure engine exhaust H.E. 1200 PSI vacuum pre-heaters 300 PSI).
Loss of temperature The heat output of the unit is LESS than normal.	Check instrumentation settings: Diverter valve is in the MUFFLER position. Temperature bypass valve is open. Temperature control is set at a low temperature.	Turn diverter valve to the HEAT EXCHANGER position. Close the heat bypass valve. Set the temperature control to a higher setting.
	Defective solenoid - remains in open position.	Inspect solenoid for proper operation. Clean, or replace, if needed.
	Temperature relief valve on water box is stuck open.	Clean temperature relief valve and test. Replace, if necessary.
	Engine RPM is low.	Test gauge and sensor. Replace failed component.
	Defective air pump (catalytic converter not burning).	Replace air pump.
	Engine exhaust heat exchanger is carbon-coated on outside of coil (defective air pump).	Soak coil at a machine shop. Boil tank or soak in an industrial cleaner. Check air pump, replace if needed. DO NOT soak catalytic core.
	Engine exhaust heat exchanger is scaled on inside of coil.	De-scale coil. Install water softener if needed.
	Excessive bypass due to loose or damaged orifice.	Inspect bypass orifice. Repair or replace as needed.
Automatic waster pump is malfunctioning or not operating normally NOTE: When replacing either the pump or float switch, use new electrical connectors and heat shrink. Inspect connection for water tight seal.	Debris interfering in the normal operation of pump, pump check valve, or float switch.	Remove pump-out from waste tank, thoroughly check all components, inspect for proper operation.
	Pump-out circuit breaker on the control panel has been tripped.	After inspecting the waste pump to determine the cause of the tripped circuit breaker, press the reset button. (Check for debris in the impeller inside the pump head).
	Defective waste pump float switch.	Replace float switch.
	Worn out waste pump.	Check for voltage at the pump. If there is voltage and the pump does not run, replace the pump.
	Water has penetrated the electrical connectors.	Reseal or replace electrical connectors.
	Broken wiring leading to the waste pump.	Check for voltage at the pump. If no voltage, find broken connection and repair.
	Weak battery. Battery charge to low to maintain pump-out operation.	Charge or replace battery, if needed. If no voltage, find the broken connection and repair.
	Pump wired incorrectly. Pump impeller rotates backwards	Verify rotation using arrow marking on bottom of pump housing. Inspect using a voltage meter.

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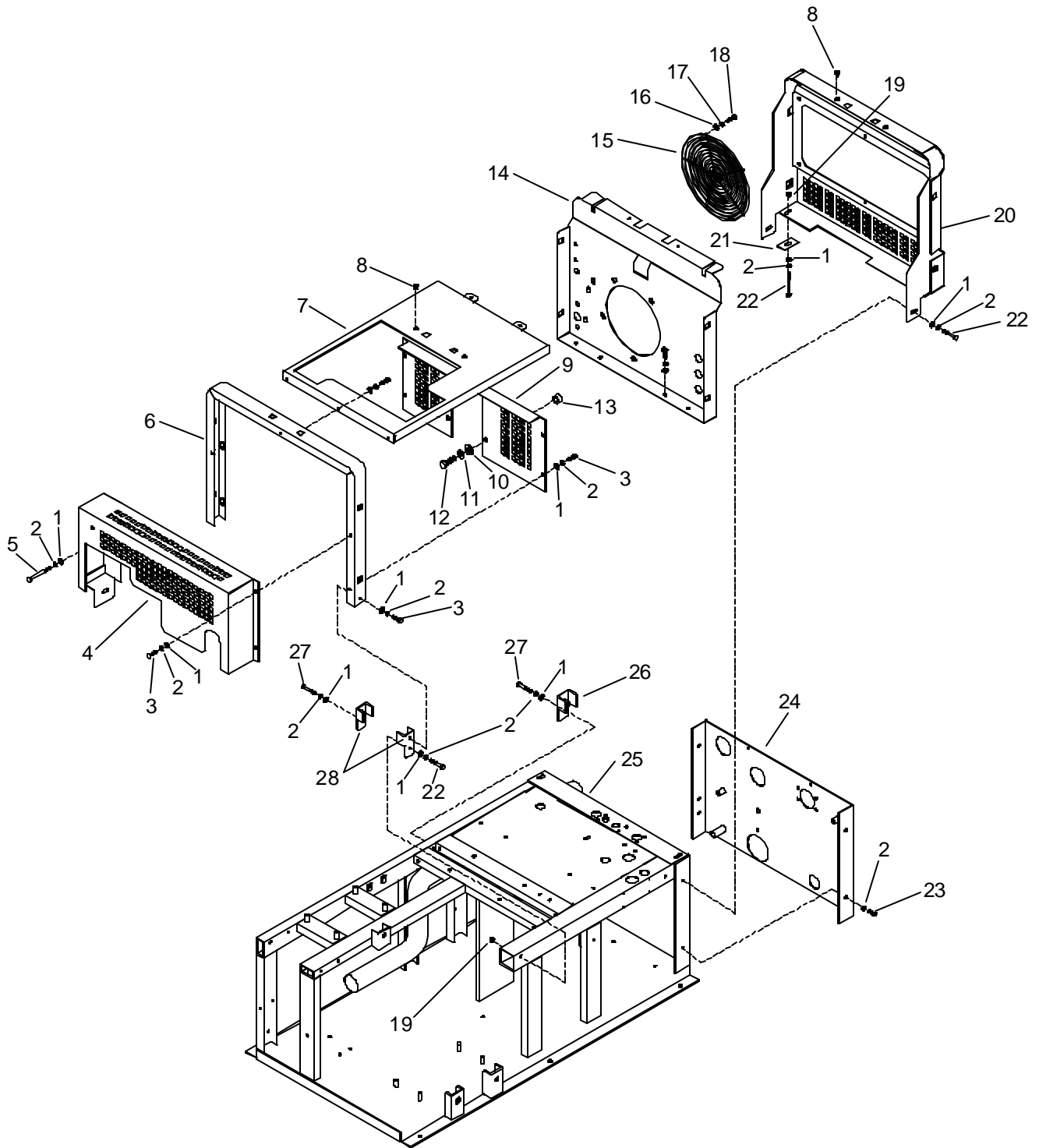
FRONT PANEL



FRONT PANEL

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	50-501745	PANEL, CNTRL, LEGEND		
2	18-808530	GA, WTR TEMP 320DEG BC		
3	18-808526	GAUGE, WATER PRESSURE		
4	34-903000	HOURMETER		
5	18-808525	GAUGE, VACUUM 30" HG		
6	61-950738	ASSY, OIL/WTR OVRDR SW TB		
7	34-900114	CVR, LENS-RTRY SW 99		
8	32-900205	SW, RTRY NON-ILLUM TM		
9	33-900163	BREAKER, CIRC 20 A		
10	49-802518	CABLE, CHOKE		
11	49-802505	CABLE, THROTTLE		
12	32-900174	KEY SWITCH		
13	61-950659	ASSY, RT HOOD		
14	50-501771	HOOD, RT		
15	01-000259	RECPT, SNAPIN 1/4 TURNFAST		
16	00-000272	STUD, 1/4 TURNFAST #85 OV		
17	02-000268	SPLITRING, RETAIN, 1/4 TURN		
18	58-700023	PAD, 1/4 TURN VIBR		
19	15-808068	REG, PRESS		
20	15-808107	VLV, MET 1/8FP (BYPASS) RT		
21	22015	COUPLER, 1/4 QD		
22	13-806008	DSC, 3/8F X 3/8 FP		
23	55-501672	TUBE, EXH DVFTR		
24	56-501845	PAN, DRIP		OPTIONAL
24A	56-501930	PAN, DRIP		OPTIONAL, UNITS ON WATER TANK
25	87162	WASHER, 1/4 SPLIT LOCK		
26	00-000210	SCR, 1/4-20 X 3/4 SOCHD		
27	48-941197	DECAL, CONDENSED INSTRUCT.		
28	19-800075	CUP, OIL FILL 1/8P		
29	36-900182	SOLENOID, ROTARY		
30	61-950660	ASSY, L HOOD		INCLUDES PARTS 16-18, 31 AND DECAL
31	50-501723	HOOD, L		
32	15-808106	VALVE, METER 1/8FP		
33	15-808022	VALVE, 3-WAY BALL 1/8FP		
34	35-900182	CONTR, TEMP 275DEG F		
35	33-900193	MICROSW, TEMP CONTR		
36	18-808513	FLOWMETER 1/8FP		
37	00-000337	SCR, 10-32 X 1" SOCHD SST		
38	01-000273	NUT, WELL 10-32		
39	48-941499	DECAL, FLOOD EXTRACTION		
-	48-941184	DECAL, PNL LEGEND		NOT SHOWN
-	48-941441	DECAL, PNL LEGEND SE		NOT SHOWN
-	48-941212	DECAL, WARN. & INTRUMNT		NOT SHOWN
-	48-941195	DECAL, HOOD PROCHEM		NOT SHOWN

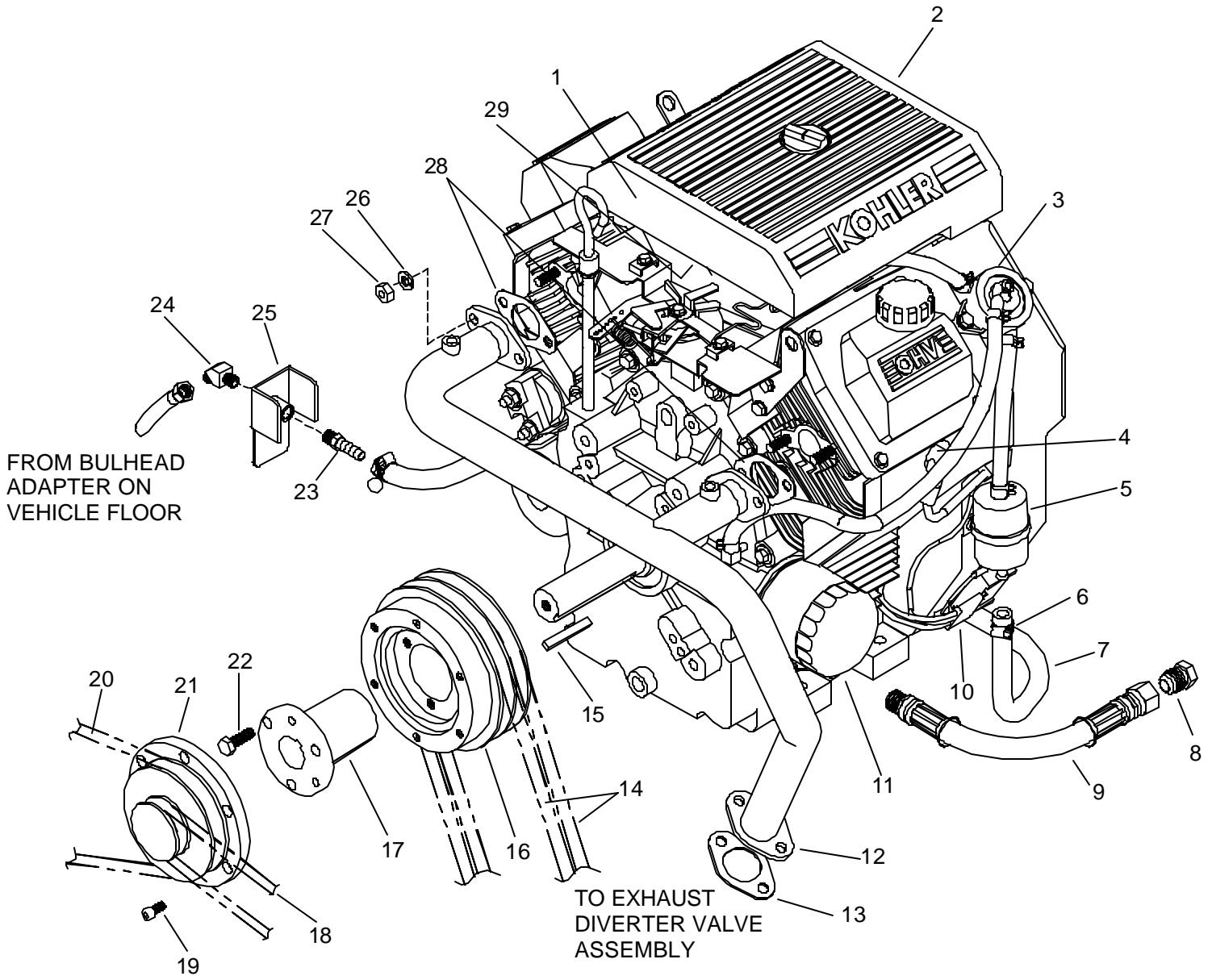
FRAMEWORK



FRAMEWORK

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	02-000066	FLATWASHER, 1/4		
2	87162	WASHER, 1/4 SPLIT LOCK		
3	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
4	56-501992	GUARD, BELT		
5	70075	SCR, 1/4-20 X 4.5 HHCS PLTD		
6	56-502025	BRKT, R HOOD PC BLU		
7	56-502026	BRKT, CTR HOOD PC BL		
8	00-000216	SCR, CAP 1/4-20 X 1/2 FLTSD		
9	50-501768	GUARD, R BELT		
10	87144	WASHER, .531ID C 1.25 X .1 FLT PLT		
11	87176	WASHER, 7/16 SPLIT LOCK PLTD		
12	00-000222	SCR, CAP, 7/16-14 X 1.5 HX		
13	54-501653	SPCR, BELT GUARD		
14	56-501993	PNL, ENG INS		
15	42-902282	GUARD, FLYWHEEL		(PART OF ENGINE)
16	87139	WASHER, 3/16 FLAT		
17	87165	WASHER, #10 SPLIT LOCK		
18	70497	SCR, #10-24 X 1/2 SHCS		
19	57006	NUT, 1/4-20 HEX		
20	56-501929	MOUNT, CONTR PNL BLUE		
21	58-700024	PAD, VIBR CONTR PNL MT		
22	00-000286	SCR, CAP 1/4-20 X 2.75 HXHD		
23	00-000210	SCR, 1/4-20 X 3/4" SOCHD		
24	790074	PANEL, LWR FR		
25	790070	BASE, AD SOL		
26	56-501857	BRKT, FUEL LINE		
27	70105	SCR, 1/4-20 X 1.75 HHCS PLTD		
28	56-502050	BRKT, HOOD MTG		

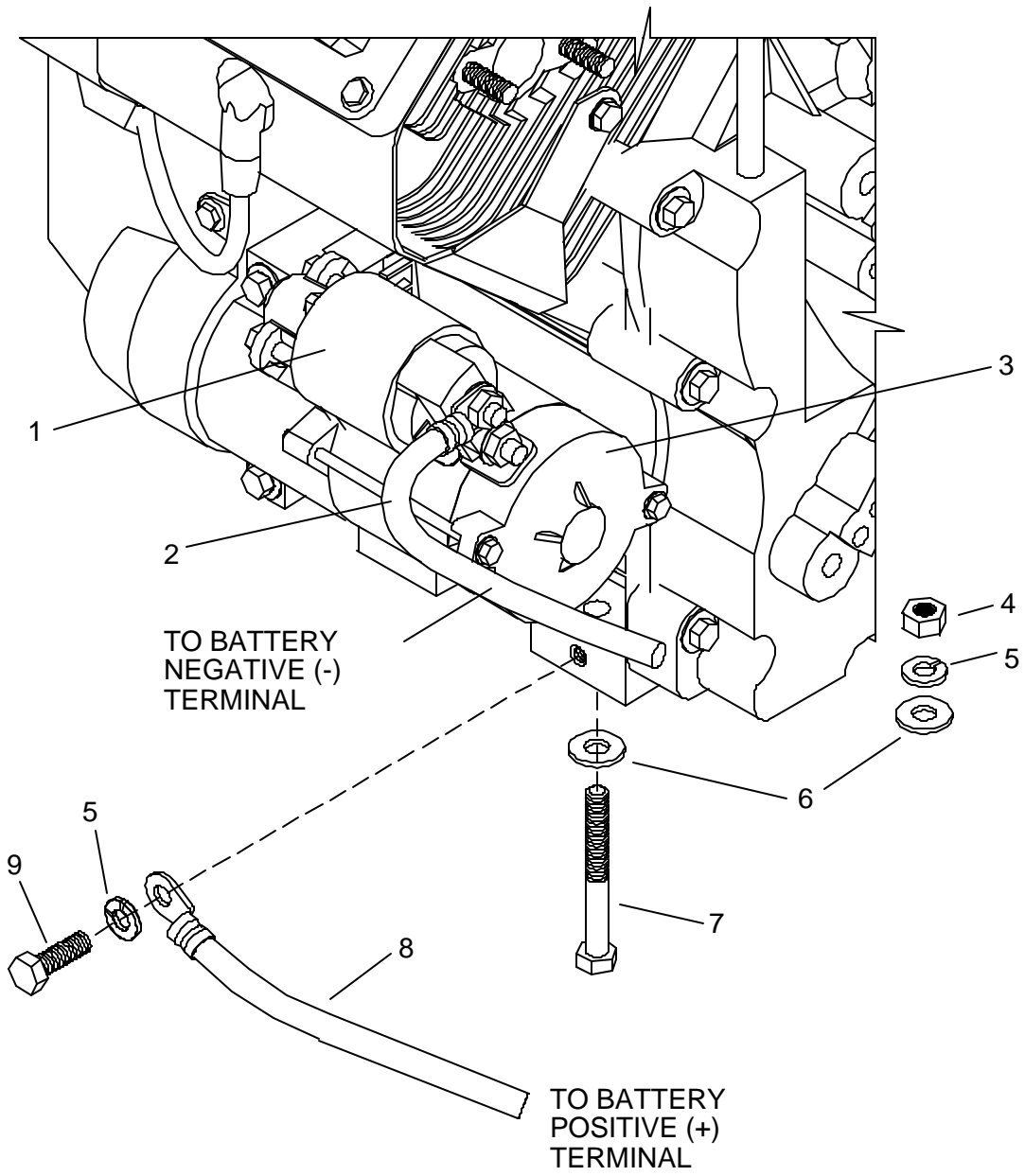
ENGINE



ENGINE

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	40-902152	ENG, KOHLER 20HP		
2	42-902299	KOH ELEM, AIR CLNR#470830		
3	42-902297	KOH PMP, FUEL PULSE #2439316L P		
4	42-902289	KOH SPK PLG #1213202		
5	42-902296	KOH FLTR, FUEL #2505003		
6	03-000065	CLAMP, HOSE #4 SST		
7	09-805091	HOSE, FUEL 1/4 X 27 1/2		
8	12-800062	PLUG, 1/2T		
9	10-805291	HOSE, HP 3/8 X 10 (3/8 X1/2 FT)		
10	42-902365	SUB 42-902396 KOH KIT, VO		
11	42-902277	KOH FLTR, OIL #1205001		
12	56-502090	MNFLD, ENG EXH		
13	42-902212	ONAN GSKT, EXH #154-2747		
14	44-802237	BELT, AX42 GOODYEAR MATCH		
15	54-500412	KEY, 1/4 SQ X 1.88		
16	52-501660	PULL, ENG		
17	44-802182	HUB, P2X1-1/8		
18	44-802240	BELT, 3V X265		
19	00-000311	SCR, 1/4-20 X 1/2 SHCS SS		
20	44-802311	BLET, AX29 GOODYEAR MTCH MKR		
21	52-501661	PULL, OTR ENG		
22	00-000340	SCR, MACH 5/16-18 X 1" GR 8		
23	12-800041	FTTG, BARB 1/8P X 1/4H		
24	790605	EL, 90DEG 1/8 X 5/16HB		
25	56-501857	BRKT, FUEL LINE		
26	87083	WASHER, 5/16 SPLIT LOCK PLTD		
27	57054	NUT, M8		
28	790626	GSKT, EXHST, KHLR 25HP		
29	42-902293	KOH CARB, #2485335S		
-	42-902286	KOH SE, OIL PRESS		NOT SHOWN
-	42-902287	KOH GSKT, CYL HD #2404108		NOT SHOWN
-	42-902359	KOH ASSY, VLV CVR #2475574		NOT SHOWN
-	42-902360	KOH ASSY, VLV CVR (OIL)		NOT SHOWN
-	42-902291	KOH DRIVE PINION		NOT SHOWN
-	42-902294	KOH KIT, CARB REP #2475703		NOT SHOWN
-	42-902295	KOH KIT, HIGH ALTITUDE (9840 FT)		NOT SHOWN

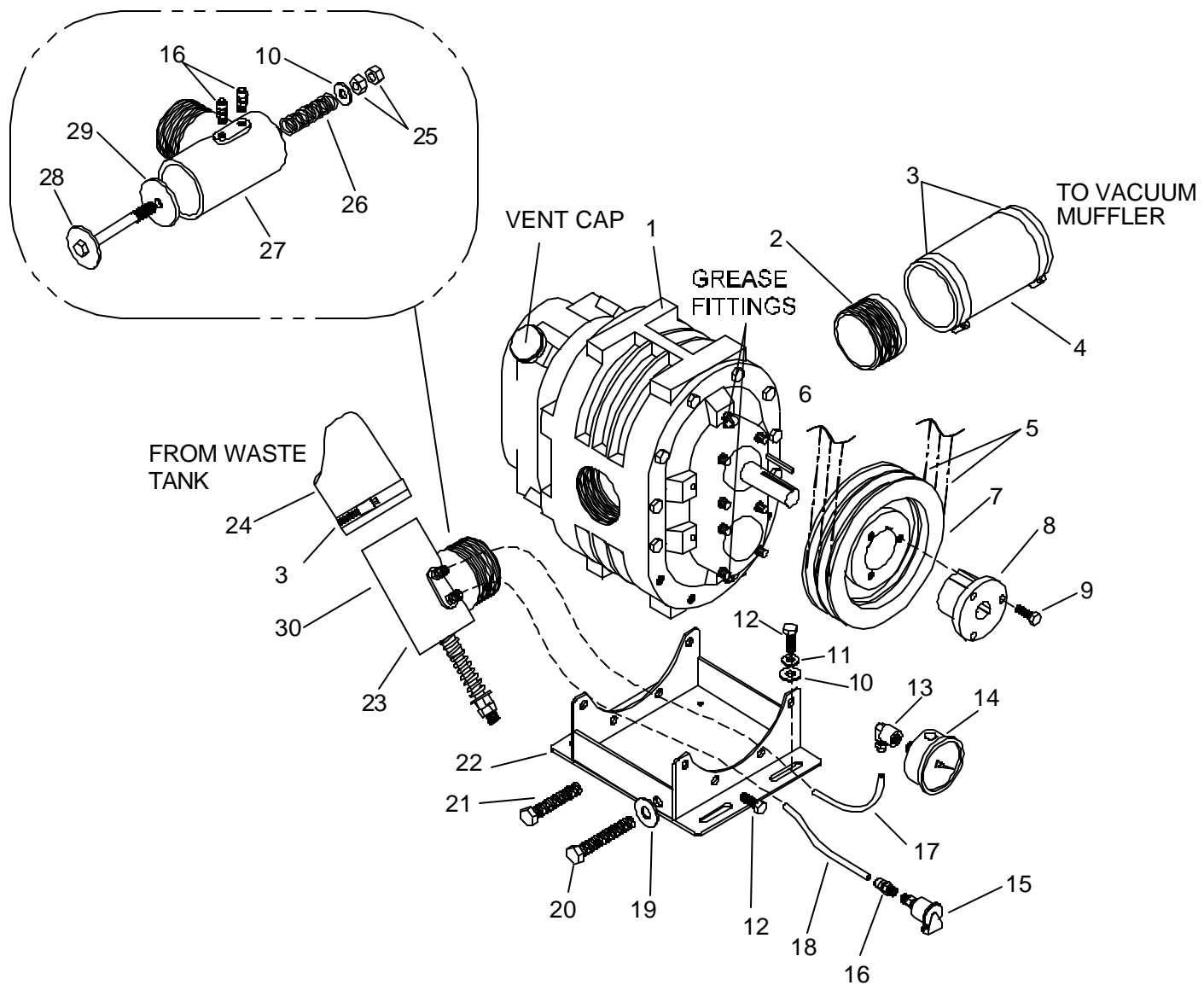
ENGINE STARTER



ENGINE STARTER

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	42-902292	KOH SOLENOID #5243502		
2	64-950514	CABLE, BAT X 101" RED		
3	42-902290	KOH STARTER #1209803		
4	57031	NUT, 5/16-18 HEX		
5	87083	WASHER, 5/16 SPLIT LOCK PLTD		
6	02-000143	FLATWASHER, 5/16		
7	70601	SCR, 5/16-18 X 2.75 HHCS GR5		
8	64-950515	CABLE, BAT X 111" BLK		
9	70262	SCR, M8 X 20 HHMS PLTD		

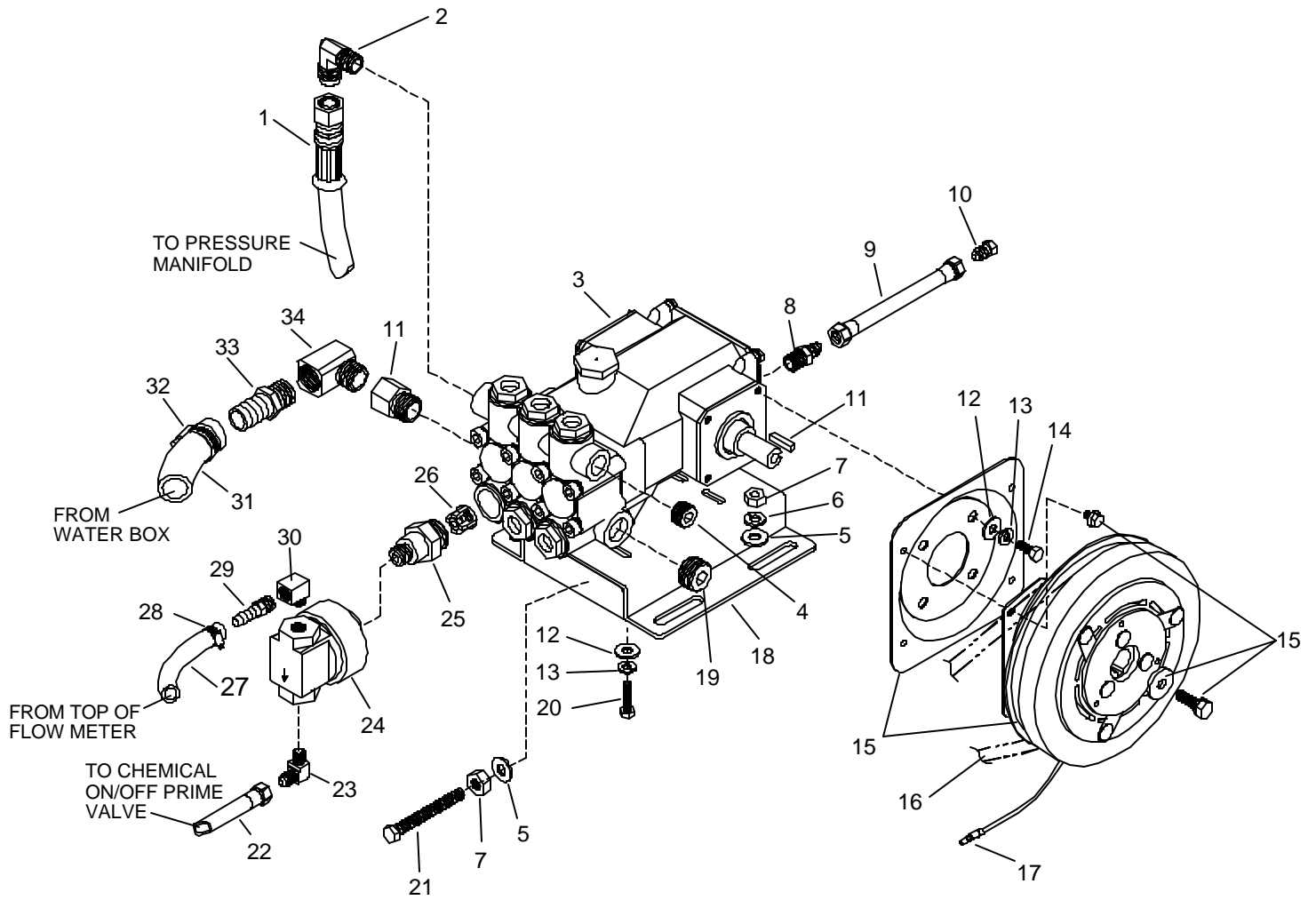
VACUUM PUMP



VACUUM PUMP

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	41-905021	PUMP, VAC 4M-L		
2	54-501593	NIP, VAC EXH OUTL		
3	03-000112	CLAMP, HOSE #48		
4	09-805396	HOSE, INT VAC 2.88 X 2.0 BLK		
5	54-501735	KEYSTOCK, 3/16 X 1 5/8		
6	44-802237	BELT, AX42 GOODYEAR MATCH		
7	44-802218	PULLEY, 2TA46		
8	44-802204	HUB, P1 X 3/4"		
9	00-000340	SCR, MACH 5/16-18 X 1" GR5		
10	87171	WASHER, 3/8 FLAT		
11	87163	WASHER, 3/8 SPLIT LOCK		
12	70266	SCR, 3/8-16 X 1" HHCS GR 5 PLT DL		
13	12-800101	ELL, 1/4FP X 1/4 POLY BR		
14	18-808525	GAUGE, VACUUM 30" HG		
15	19-800075	CUP, OIL FILL 1/8P		
16	12-800059	CONN, 1/8P X 1/4 POLY BR		
17	09-805224	TUBING, IMPOL 1/4 X 50		
18	09-805440	TUBING, IMPOLENE X 35"		
19	02-000057	FLATWASHER, 1/2" HEAVY		
20	00-000323	SCR, 1/2-13 X 3 1/2 HHCS FULL THD		
21	70357	SCR, 1/2-13 X 3 FULL THREADS		
22	56-502324	BRKT, VAC ADJ LEGEND SE		
23	61-950451	ASSY, VAC REL VLV		
24	09-805341	HOSE, VAC 2.88 X 25.0 BLK		
25	57114	NUT, 7/16-14 HEX		
26	04-000091	SPRING, VAC REL VLV		
27	52-501573	ELL, VAC REL VLV		
28	56-501615	STEM, VAC REL VLV #4 VAC		
29	43-807074	DIAPHRAGM, VAC REL VLV		
-	05-008039	OIL, AEON PD (28G24 SUTORBILT)		NOT SHOWN
-	05-008032	GREASE, MA3830150		NOT SHOWN

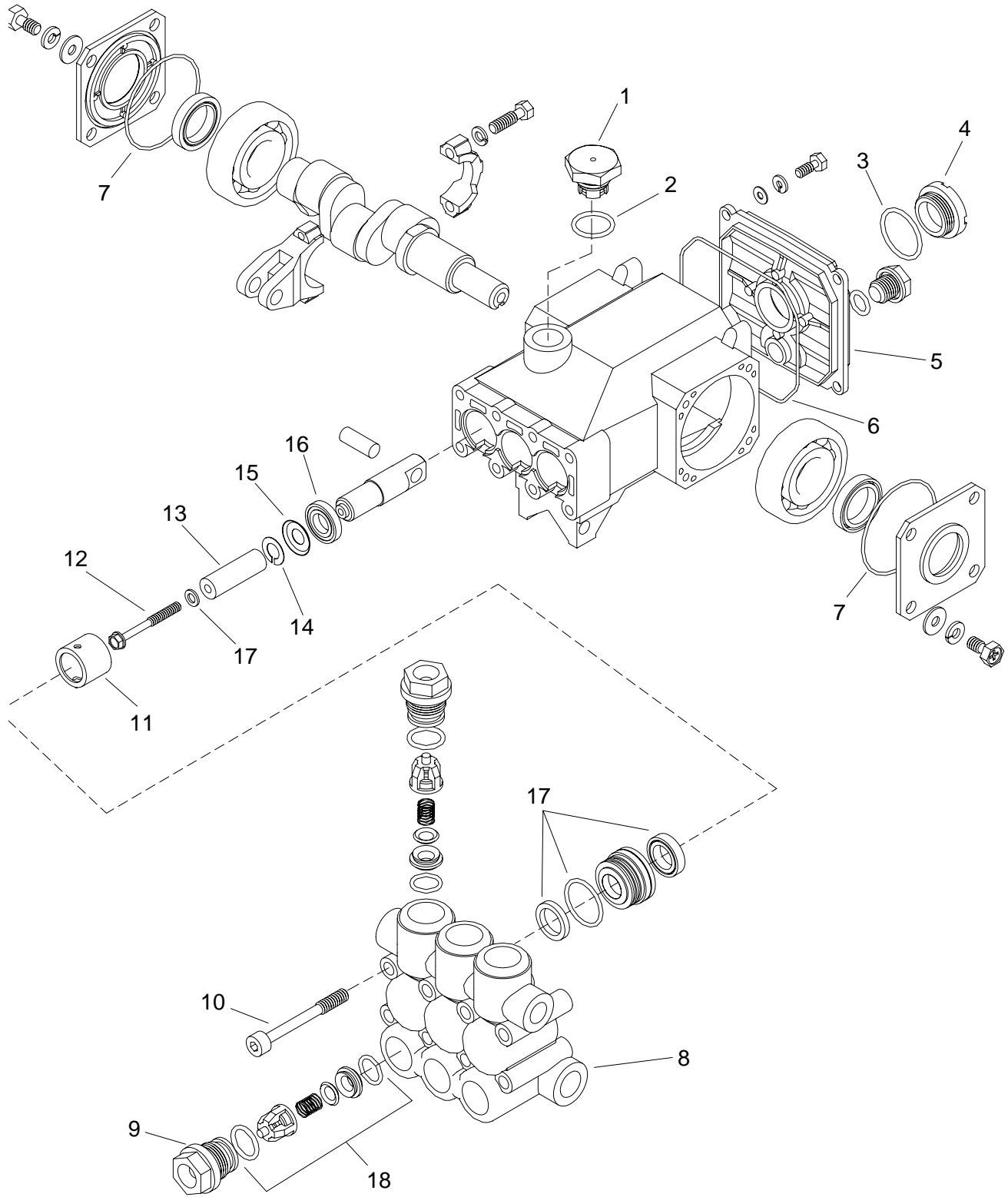
WATER PUMP



WATER PUMP

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	10-805424	HOSE, HP 3/8 X 10 1/2"		
2	12-800225	ELL, 3/8P X 1/2T BR		
3	41-809153	PUMP, WATER CAT 3CP1140		
4	11-800224	PLUG, 3/8 SOCHD BR		
5	87171	WASHER, 3/8 FLAT		
6	87163	WASHER, 3/8 SPLIT LOCK		
7	57111	NUT, 3/8-16 HEX		
8	12-800060	CONN. 1/4P X 1/4T BR		
9	10-805316	HOSE, 3/16 X 5 (1/4FT BS) MET		
10	12-800029	PLUG, 1/4T BR		
11	11-800342	CONN, 1/2P X 1/2FP BR		
12	02-000066	FLATWASHER, 1/4		
13	89162	WASHER, 1/4 SPLIT LOCK		
14	70260	SCR, M6 X 1 X 16MM HHCS		
15	36-900140	CLUTCH, ELC WTR PUMP CAT		
16	44-802311	BELT, AX29 GOODYEAR MTCH MKR		
17	31-900185	CONN, BULLET M (.156)		
18	56-502248	BRKT, PUMP ADJ		
19	11-800069	PLUG, 1/2 SOCHD BR		
20	00-000277	SCR, MACH 6MM X 14MM		
21	00-000336	SCR, CAP 3/8-16 X 3 ALL THD		
22	10-805300	HOSE, 3/16 X 45" HP W/1 1/4FT		
23	12-800040	ELL, 1/8P X 1/4T BR		
24	41-809158	PUMP, CHEM (O-RING CAP)		
25	52-809125	ADPT, CAT CHEM PUMP		
26	52-809123	RETAIN, VALVE SPRING		
27	09-805363	HOSE, BRD 5/16 X 52		
28	03-000065	CLAMP, HOSE #4 SPOTTER SST		
29	12-800093	FTTG, BRB 1/8P X 5/16H		
30	11-800014	ELL, STREET 1/8 BR		
31	39619	HOSE, WTR 3/4 X 10"		
32	03-000113	CLAMP, HOSE #12 SST		
33	12-800278	FTTG, BRB 1/2P X 3/4H BR		
34	11-800041	ELL, STREET 1/2 BR		
-	05-008016	OIL, CAT-WTR PUMP		NOT SHOWN

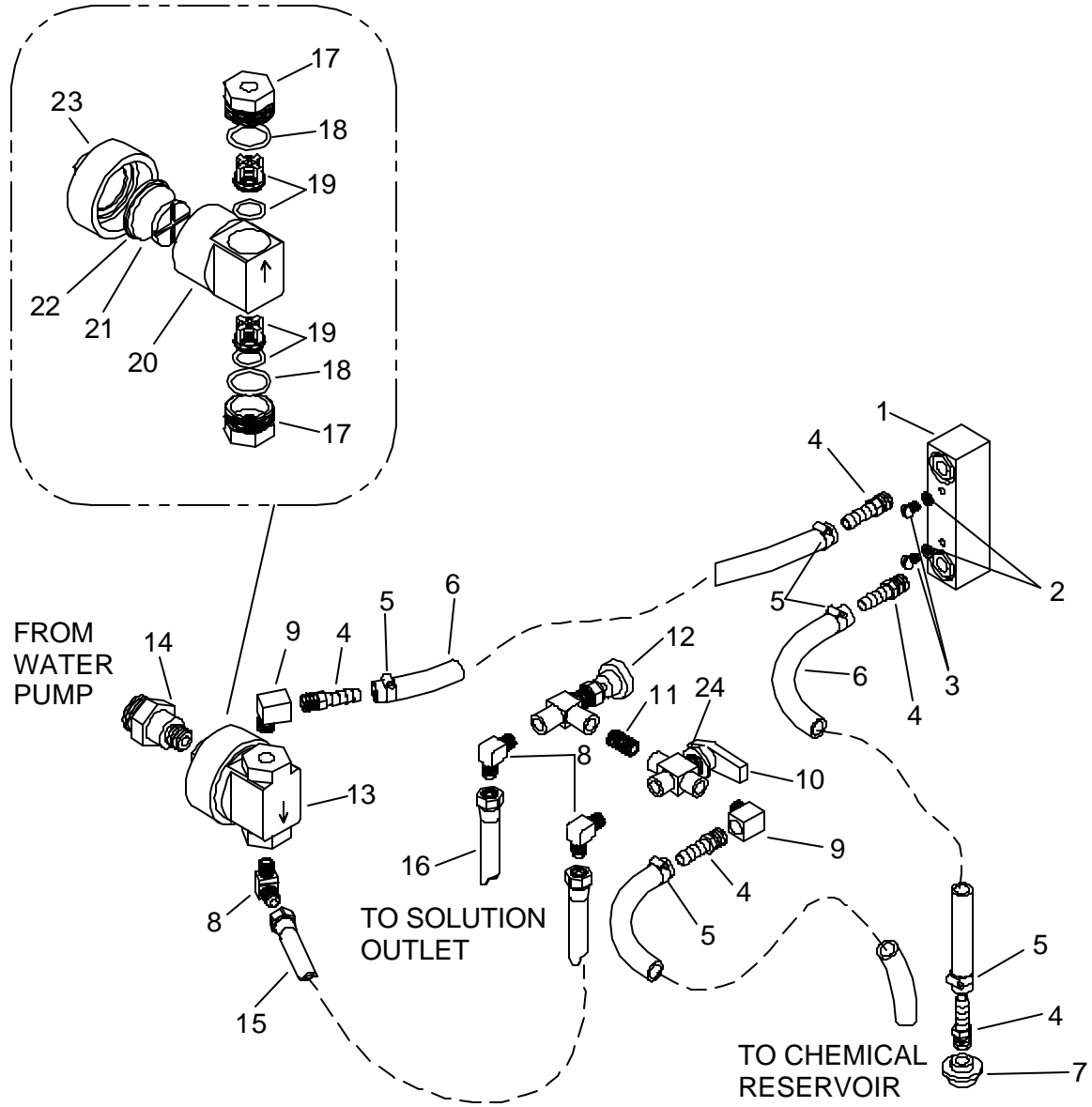
WATER PUMP



WATER PUMP

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	42-809238	CAP, OIL FILLER		
2	42-809239	O-RING, OIL FILL CAP		
3	43-807063	GASKET, OIL GAUGE		
4	42-902380	GAUGE, OIL LEVEL		
5	42-809401	COVER, CRANKCASE		
6	42-809402	O-RING, CRANK CVR		
7	42-809394	O-RING, BEARING CVR		
8	42-809403	MANIFOLD, HEAD		
9	42-809404	PLUG, VALVE		
10	42-809406	BOLT, MNFLD HD M8 X 65		
11	42-809405	RETAINER, SEAL		
12	42-809407	RETAINER, PNLGR W/STUD		
13	42-809408	PLUNGER		
14	42-809249	WASHER, KEYHOLE M18		
15	42-809381	SLINGER, BARRIER		
16	42-809409	SEAL, OIL CRANKCASE		
17	42-809410	KIT, SEAL		ORDER 1 EA. TO REPLACE ALL SEALS
18	66-950441	KIT, VLV		ORDER 1 EA. TO REPLACE ALL VALVES

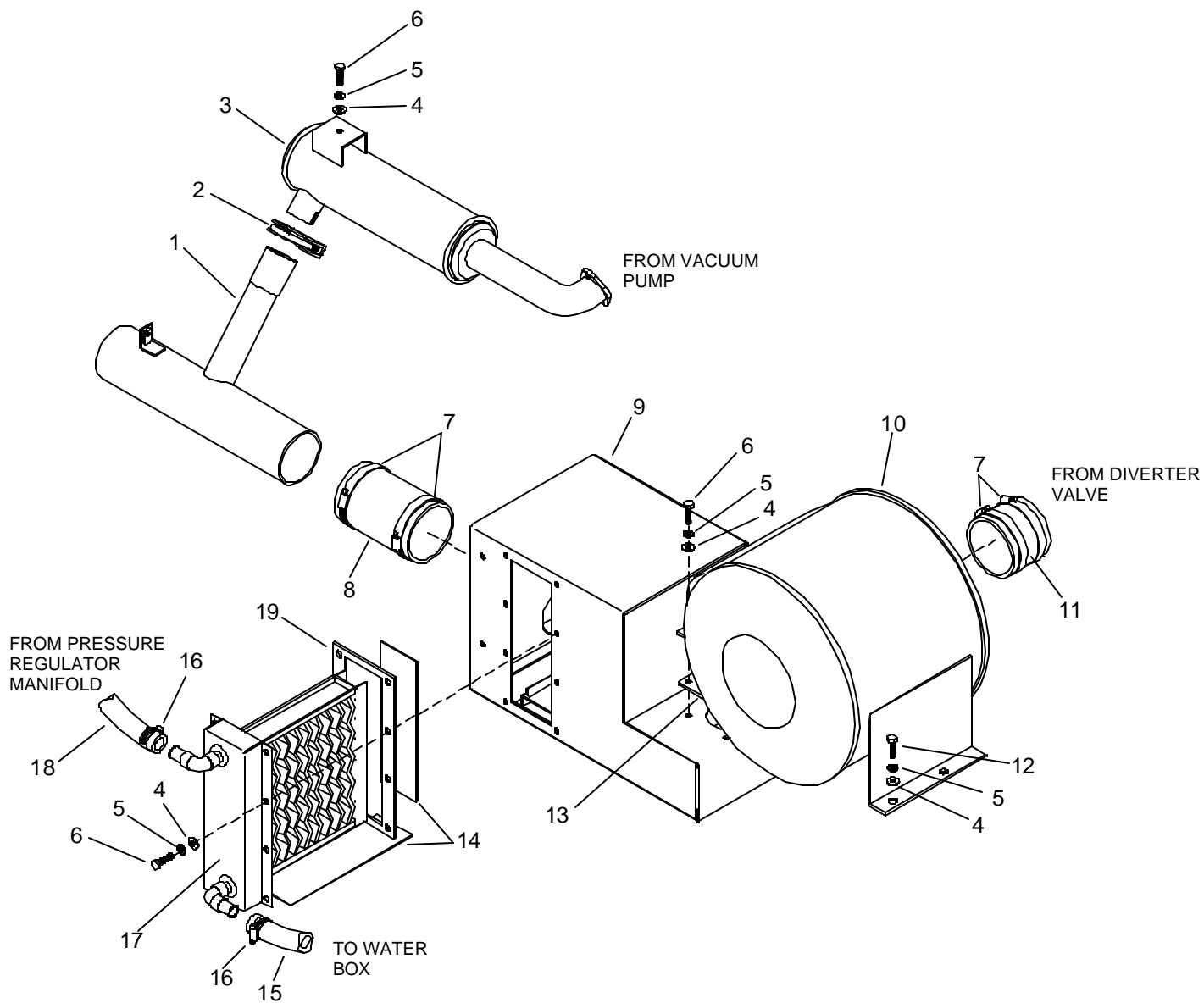
CHEMICAL SYSTEM



CHEMICAL SYSTEM

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	18-808513	FLOW METER 18FP		
2	87162	WASHER, 1/4 SPLIT LOCK		
3	00-000065	SCR, 10-32 X 3/8" PNHD		
4	12-800093	FTTG, BRB 1/8P X 5/16H		
5	03-000065	CLAMP, HOSE #4 SPOTTER SST		
6	09-805088	HOSE, BRD 5/16X64		
7	14-806506	SCREEN, 1/8FP		
8	12-800040	ELL, 1/8P X 1/4R BR		
9	11-800014	ELL, STREET 1/8 BR		
10	15-808022	VALVE, 3-WAY BALL 1/8FP		
11	56032	NIPPLE, 1/8 CLOSE		
12	15-808106	VALVE, METER 1/8FP		
13	41-809158	PUMP, CHEM (O-RING CAP)		
14	52-809125	ADPT, CAT CHEM PMP		
15	10-805278	HOSE, 3/16X54 (1/4FT BS)MET		
16	10-805131	HOSE, 3/16 X 20-1/2		
17	16-808237	CAP, CHK VALVE CHEM. PUMP		
18	43-810079	O-RING, 7/8 ID X 1-1/16 OD		
19	42-809265	CHECK VALVE, CHEM. PUMP		
20	42-809358	BODY, CHEM PUMP		
21	42-809264	DISK, CHEM PUMP		
22	42-809047	DIAPHRAGM, CHEM PUMP		
23	42-809045	COVER, CHEM PUMP		
24	50-501663	WASHER-SPCR, TRK MNT		

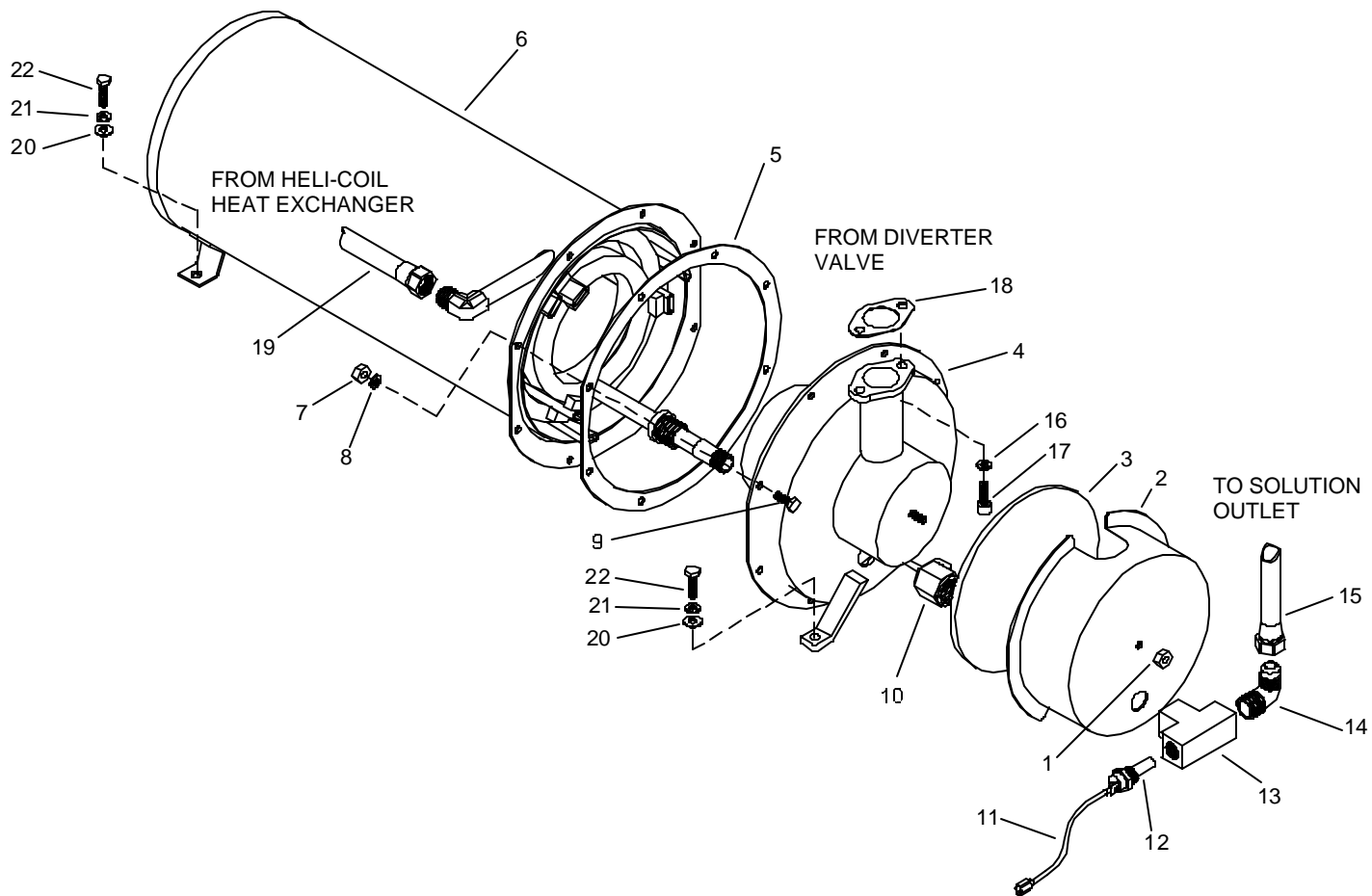
VACUUM EXHAUST HEAT EXCHANGER AND SILENCER



VACUUM EXHAUST HEAT EXCHANGER AND SILENCER

1	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	56-501928	EXH OUTLET		
2	03-000081	CLAMP, MFLR 1-1/2 ZNC PL		
3	57-520099	MUFFLER, ENG EXH VERSION D (FLNG)		
4	02-000066	FLATWASHER, 1/4		
5	87162	WASHER, 1/4 SPLIT LOCK		
6	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
7	03-000112	CLAMP, HOSE #48		
8	09-805344	HOSE, INT VAC 2.88 X 3.0 BLK		
9	56-501892	HOUSING VAC HE		
10	57-520082	MUFFLER, VACUUM		
11	09-805396	HOSE, INT VAC 2.88 X 2.0 BLK		
12	00-000078	SCR, 1/4-20 X 1" HXHD GRD8		
13	43-807080	GASKET, VAC HE INLET		
14	58-700027	PAD, VAC HE CORE		
15	09-805368	HOSE, WTR 5/8 X 29		
16	03-000246	CLAMP, HOSE #8 SST		
17	61-950696	VAC HE CORE		
18	09-805384	HOSE, WTR 5/8 X 16		
19	43-807081	GASKET, VAC HE CORE		

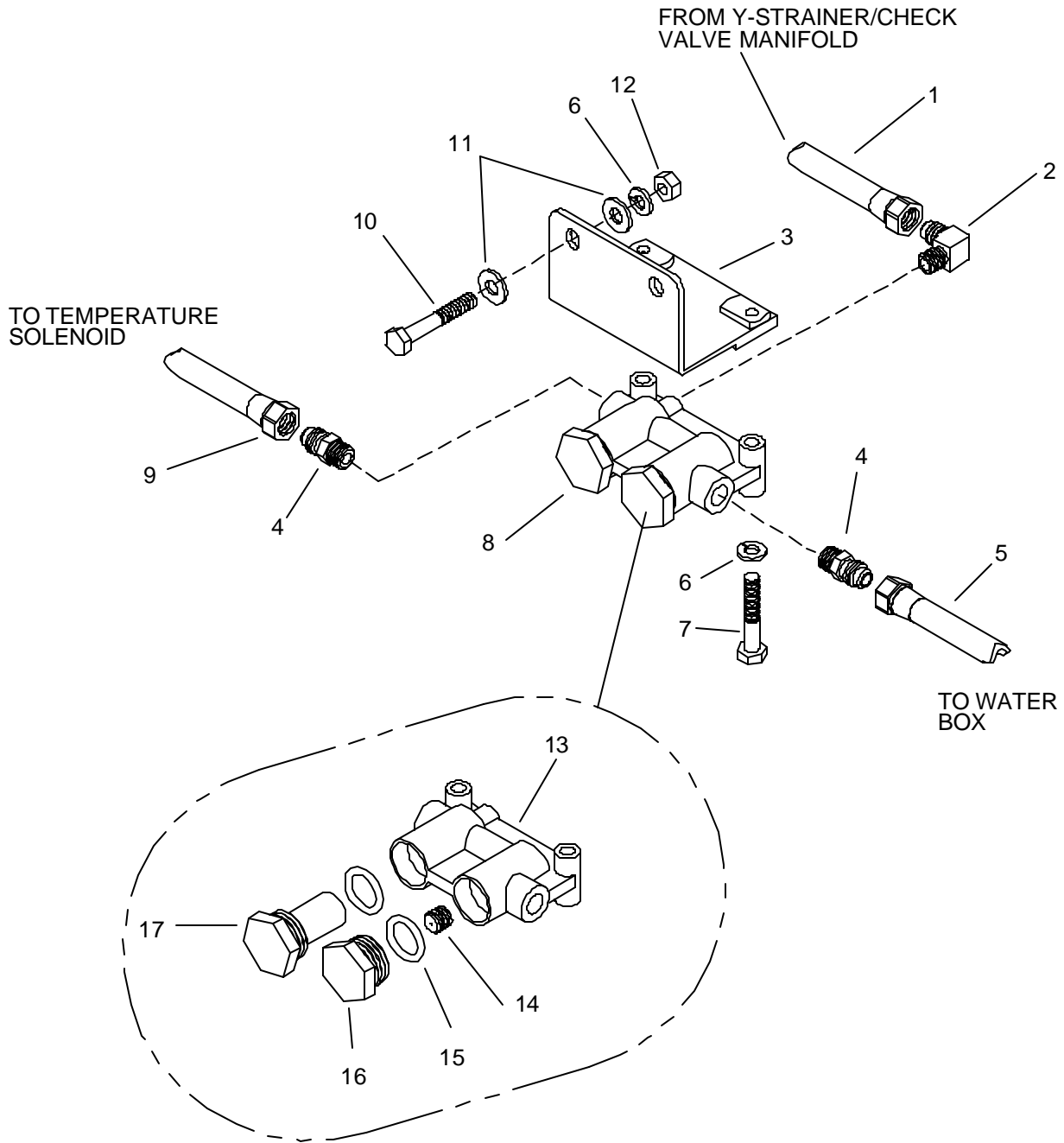
ENGINE EXHAUST HEAT EXCHANGER



ENGINE EXHAUST HEAT EXCHANGER

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	61-950628	ASSY, CAT HE		INCLUDES PARTS 1-14
1	01-000271	NUT, 1/4-20 HXHD BR		
2	52-501643	SHEILD, CAT HE		
3	58-700028	PAD, CAT HT SHEILD		
4	56-501759	CVR, CAT HE END BC		
5	43-807086	GSKT, EXH FLG		
6	57-520074	ASSY, COIL MOUNT & CASING		
7	57006	NUT, 1/4-20 HEX		
8	02-000044	LOCKWASHER, 1/4 SST		
9	70015	SCR, 1/4-20 X 3/4 HHCS SS		
10	52-501654	NUT, ADAPT BUSH		
11	64-950546	ASSY, HIGH TEMP SHUTOFF		
12	35-900184	SENSOR, TEMP 285DEG		
13	52-501671	FTTG, TEMP SENS ADPT TM		
14	12-800171	ELL, 1/2P X 1/2T BR		
15	10-805376	HOSE, 1/2 X 4 1/2 (1/2 FT BS)		
16	02-000274	LOCKWASHER, 5/16 (ALLEN SCREW)		
17	00-000315	SCR, CAP 5/19-18 X 7/8 SOCHD		
18	42-902212	ONAN CAKT, EXH #154-2747		
19	10-805275	HOSE, 1/2 X 19 (1/2FT BS) MET		
20	02-000066	FLATWASHER, 1/4		
21	87162	WASHER, 3/8 SPLIT LOCK		
22	00-000078	SCR, 1/4-20 X 1" HXHD GRD8		
-	66-945532	KIT, EXH HE CORE		INCLUDES PARTS 3,5,6 AND 18
-	57-520070	HE, EXH CAT		INCLUDES PARTS 4-10

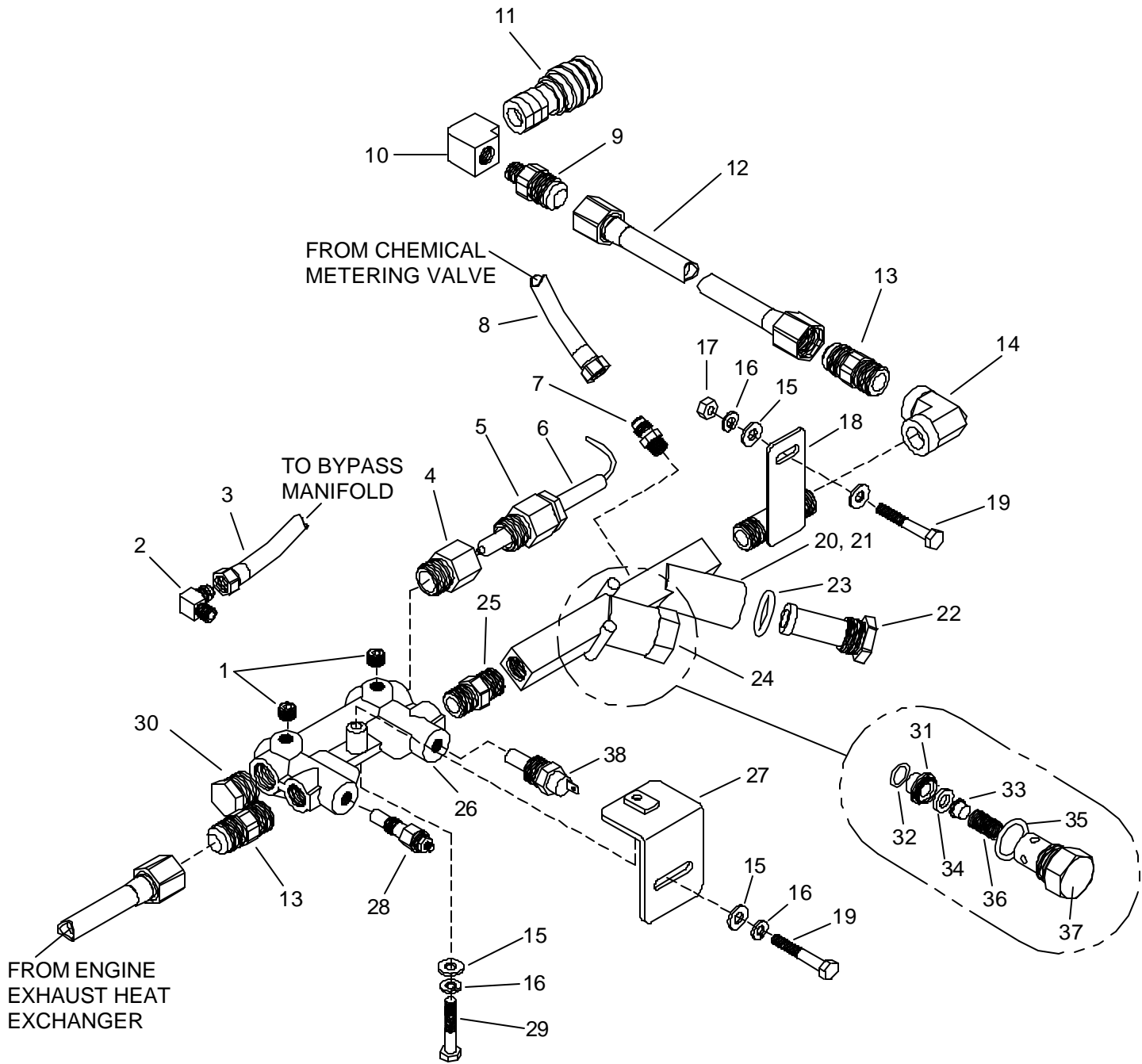
BYPASS MANIFOLD



BYPASS MANIFOLD

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	10-805357	HOSE, 3/16 X 38 (1/4FT BS) MET		
2	12-500040	ELL, 1/8P C 1/4T BR		
3	56-501906	ASSY, BRKT, BYPASS MTG		
4	12-800065	CONN, 1/8P X 1/4T		
5	10-805130	HOSE, 3/16 X 13-1/2 (1/4FT BS)		
6	87162	WASHER, 1/4 SPLIT LOCK		
7	00-000132	SCR, 1/4-20 X 1-1/2 HXHD		
8	15-808112	ASSY, BYPASS MNFLD		
9	10-805130	HOSE, 3/16 X 13-1/2 (1/4FT BS)		
10	70105	SCR, 1/4-20 X 1.75 HHCS PLTD		
11	02-000066	FLATWASHER, 1/4		
12	57006	NUT, 1/4-20 HEX		
13	52-501659	MANIFOLD, BYPASS		
14	52-501701	ORIF, BYP MNFLD		
15	43-810053	O-RING, .676ID X .816OD		
16	53-501523	CAP, CHK VALVE MANIFOLD STRNR		
17	14-806552	SCREEN, BYPASS MANIFOLD		

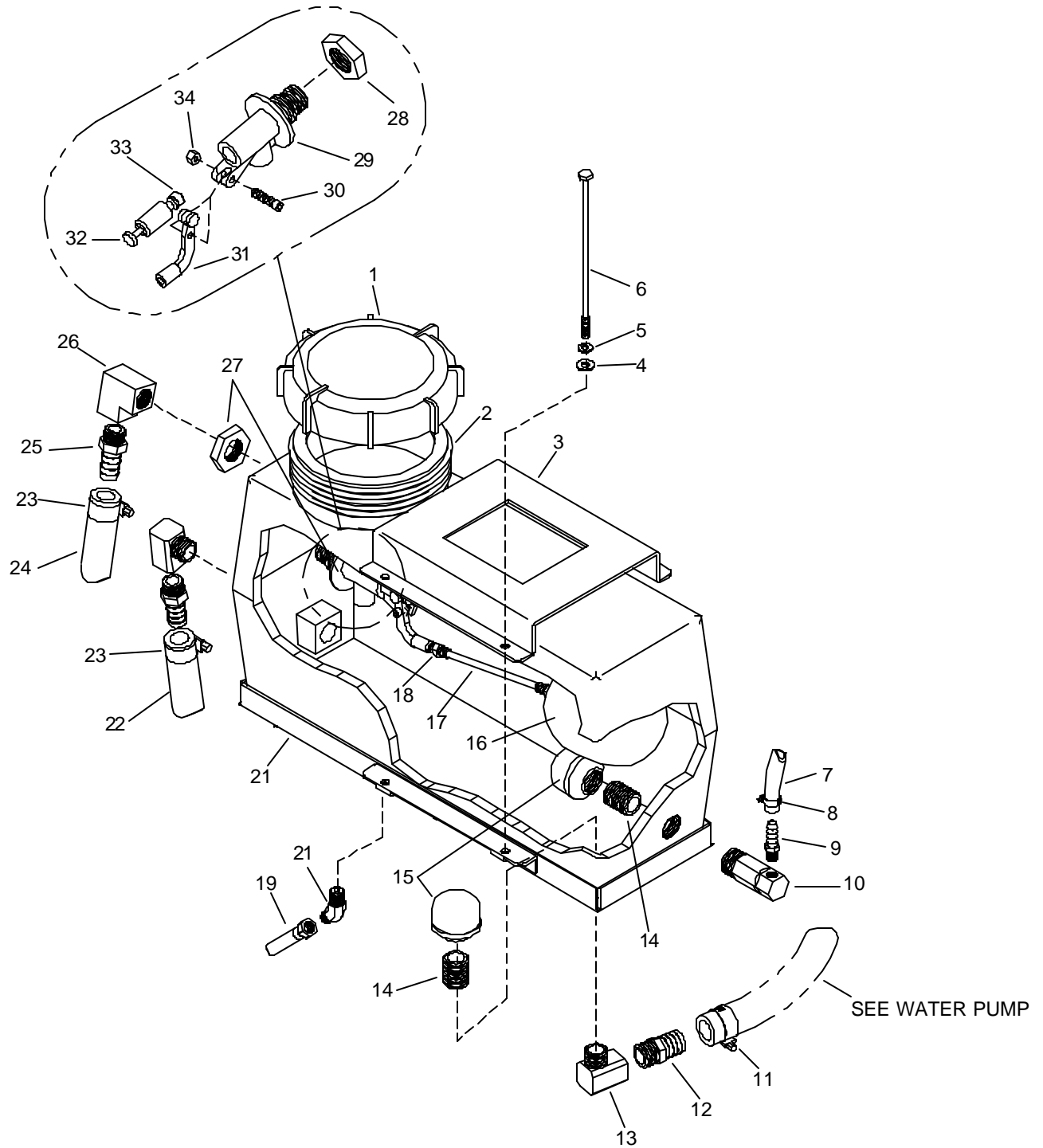
SOLUTION OUTLET



SOLUTION OUTLET

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	11-800101	PLUG, 1/8P		
2	12-800040	ELL, 1/8P X 1/4T BR		
3	10-805357	HOSE, 3/16 X38 (1/4 FT BS) MET)		
4	11-800342	CONN, 1/2P X 1/2FP BR		
5	12-800391	UNION, CAPILLARY-THERM		
6	35-900182	CONTR, TEMP 275 DEG		
7	12-800065	CONN, 1/8P X 1/4T		
8	10-805205	HOSE, 3/16 X 15-1/8 (1/4FT BS)		
9	12-800329	CONN, 1/4P X 1/2T SST		
10	31017	ELBOW, 1/4FPT X 1/4PT		
11	22015	COUPLER, 1/4 QD		
12	10-805376	HOSE, 1/2 X 14-1/2 (1/2FT BS)		
13	12-800282	CONN, 3/8P X 1/2T BR		
14	11-800276	ELL, 3/8 BR		
15	02-000066	FLATWASHER, 1/4		
16	87162	WASHER, 1/4 SPLIT LOCK		
17	57006	NUT, 1/4-20 HEX		
18	56-501910	BRKT, SOL OUT MTG		
19	70105	SCR, 1/4-20 X 1.75 HHCS PLTD		
20	15-808095	ASSY, CHK VLV		
21	52-501621	MANIFOLD, CHK VLV		
22	14-806549	SCREEN, CHECK VALVE		
23	43-810053	O-RING, .676ID X .816OD		
24	15-808094	VALVE, CHECK		
25	11-800429	NIP, NEX 3/8 SST		
26	52-502066	MANIFOLD, THERMOSTAT		
27	56-501974	BRKT, THERM MANIFOLD MOUNTING		
28	34-903019	SENDER, TEMP 140-320 DEG		
29	00-000132	SCR, 1/4-20 X 1-1/2 HXHD		
30	52-501680	FTTG, SENS SUPT TM		
31	16-808223	SEAT, CHK VLV ASSY TM		
32	43-810008	O-RING		
33	16-808226	POPPET CHK VLV ASSY		
34	16-808225	TEFLON SEAT		
35	43-810079	O-RING, 7/8ID X 1-1/16 OD		
36	16-808224	SPRING		
37	16-808222	CAP		
38	35-901039	SENSOR, TEMP, 260°		

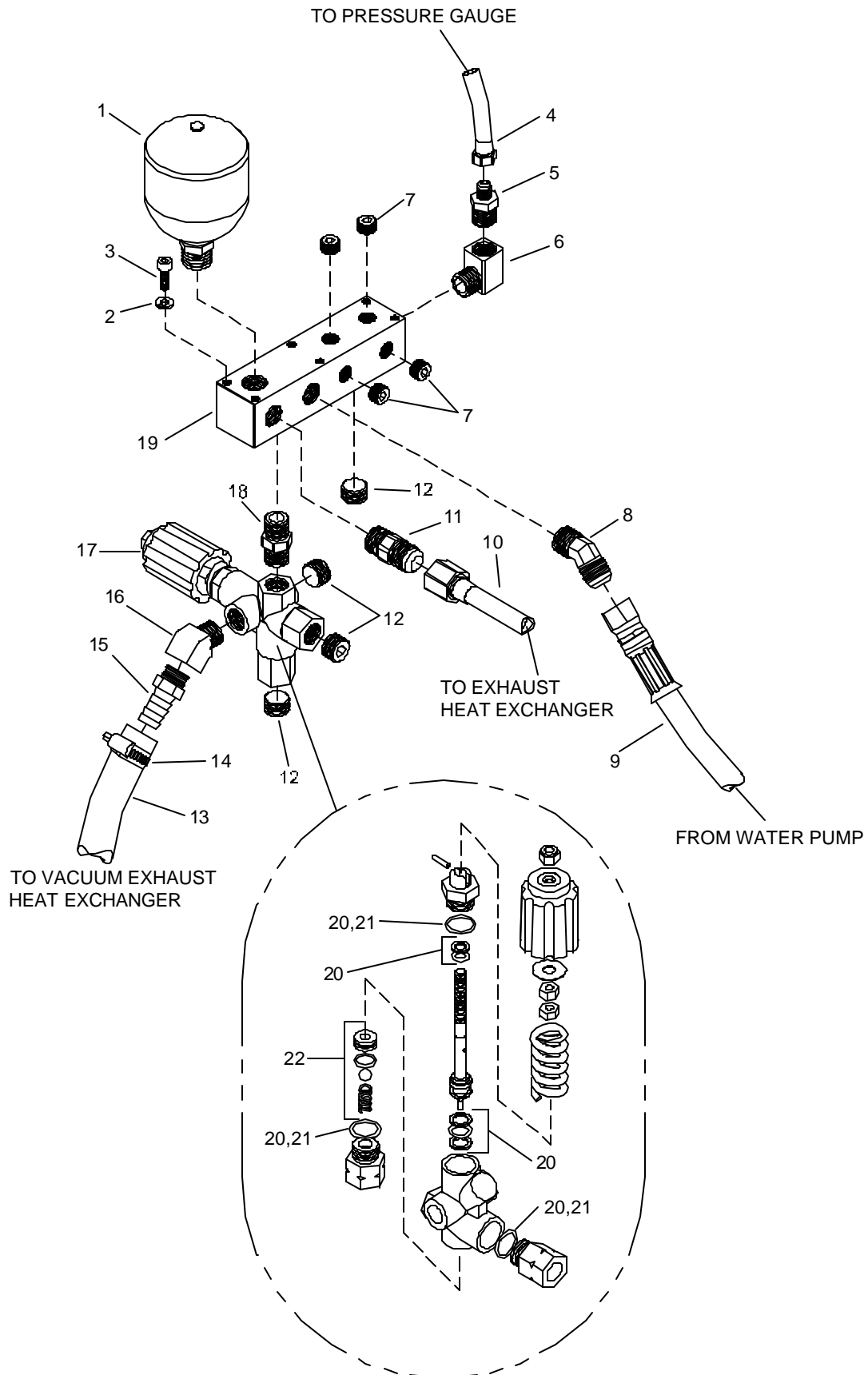
WATER BOX



WATER BOX

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	11-800432	CAP, WATER BOX		
2	58-500781	MOLDING, WATER BOX		
3	50-501763	HOLD DOWN WTR BOX		
4	02-000066	FLATWASHER, 1/4		
5	87162	WASHER, 1/4 SPLIT LOCK		
6	00-000335	SCR, 1/4-20 X 8 HXHD		
7	09-805099	HOSE, BRD 5/16 X40		
8	03-000065	CLAMP, HOSE #4 SST		
9	12-800093	FTTG, BRB 1/8P X 5/16H		
10	15-808083	VALVE, TEMP REL 180 DEG F		
11	03-000113	CLAMP, HOSE #12 SST		
12	12-800278	FTTG, BRB 1/2P X 3/4H BR		
13	11-800041	ELL, STREET 1/2 BR		
14	11-800300	NIP, 1/2 X CL		
15	14-806540	STRAINER, SUC END 1/2FP		
16	19-807014	BALL, FLOAT		
17	54-501715	FLOAT ROD		
18	57006	NUT, 1/4-20 HEX		
19	10-805206	HOSE, 3/16 X 14-3/4 (1/4FT BS)		
20	12-800356	ELL, 1/4P X 1/4T 45 DEG BR		
21	56-501901	TRAY, WTR BOX		
22	09-805368	HOSE, WTR 5/8 X 29		
23	03-000246	CLAMP, HOSE #8 SST		
24	12-800269	FTTG, BRB 1/2P X 5/8H BR		
25	09-805330	HOSE, WTR 5/8 X 53"		
26	11-800361	ELL, 1/2 BR		
27	15-808110	VALVE, FLOAT		
28	52-501706	NUT, FLOAT VALVE		
29	16-808217	BODY, FLOAT VLV		
30	00-000337	SCR, 10-32 X 1" SOCHD SST		
31	16-808216	ARM, PIVOT-FH VLV		
32	16-808219	PISTON, FH VLV		
33	16-808164	SEAT, FLOAT VLV		
34	57090	NUT, 10-32 HEX NYLOCK SS		

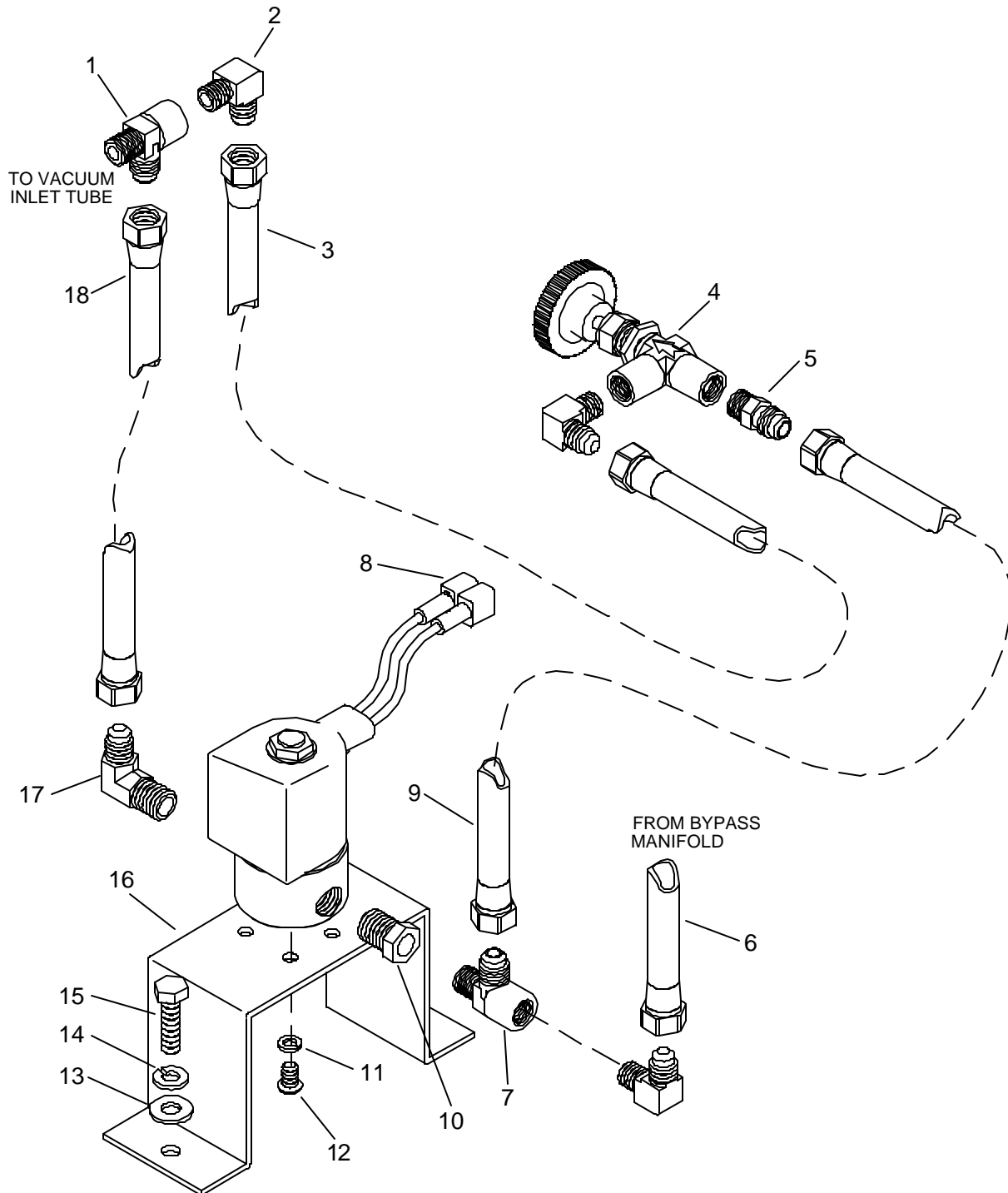
PRESSURE REGULATOR MANIFOLD



PRESSURE REGULATOR MANIFOLD

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	790106	ACCUMULATOR		
2	87162	WASHER, 1/4 SPLIT LOCK PLTD		
3	00-000210	SCR, 1/4-20 X 3/4 SOCHD		
4	10-805294	HOSE, 3/16 X 11.5 (1/4FT BS)		
5	12-800346	ADAPTER, 1/4T X 3/8P		
6	11-800275	ELBOW, ST 3/8 BR		
7	11-800345	PLUG, 1/4 SOCHD BRASS		
8	12-800347	ELBOW, 3/8P X 1/2T 45° BR		
9	10-805424	HOSE, HP 3/8 X 10.5		
10	10-805275	HOSE, 1/2 X 19 (1/2 FT BS) MET		
11	12-800282	CONN, 3/8P X 1/2 T BR		
12	11-800224	PLUG, 3/8 SOCHD BR		
13	09-805384	HOSE, WATER 5/8 X 16		
14	03-000246	CLAMP, HOSE #8 SST		
15	12-800345	FITTING, BRB 3/8P X 5/8H BR		
16	11-800341	ELL, ST 3/8 45DEG BR		
17	790067	REGULATOR, PRESSURE		
18	11-800429	NIP, HEX 3/8 SST		
19	790112	MANIFOLD, PRESS REG. 1/2 " PORT		
20	16-808201	CAT #33246 KIT, O-RING REP		
21	16-808200	CAT #33147 KIT, VALVE REP		

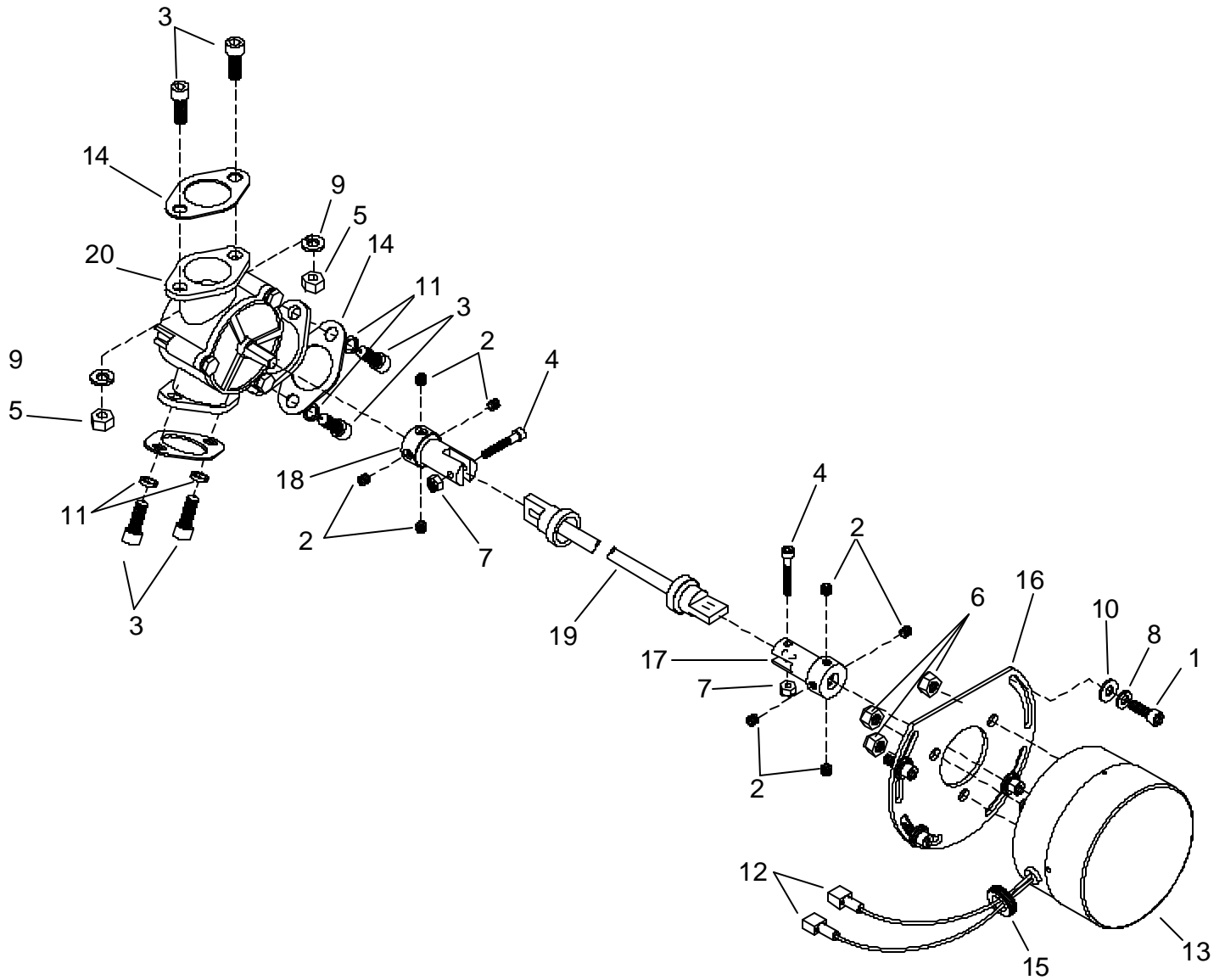
TEMPERATURE SOLENOID & BYPASS VALVE



TEMPERATURE SOLENOID & BYPASS VALVE

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	12-800088	TEE, ADPT 1/8FP X 1/8P X 1/4T		
2	12-800040	ELL, 1/8P X 1/4T BR		
3	10-805000	HOSE, 3/16 X 9 (1/4FT BS)		
4	15-808107	VALVE, METER 1/8FP (BYPASS)		
5	12-800065	CONN, 1/8P X 1/4T		
6	10-805204	HOSE, 3/16 X 23 (1/4FT BS)		
7	31-900028	TERM, INS DSC 1/4M 14-16W		
8	31-900027	TERM, INS DSC 1/4F 14-16W		
9	15-808105	VALVE, SOLENOID 1/4F X 1/4F		
10	11-800039	BUSH, 1/4 X 1/8 BR		
11	87165	WASHER, #10 SPLIT LOCK		
12	00-000065	SCR, 101-32 X 3/8" PNHD		
13	02-000066	FLATWASHER, 1/4		
14	87162	WASHER, 1/4 SPLIT LOCK		
15	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
16	50-501721	BRACKET, SOLENOID		
17	12-800031	ELL, 1/4P X 1/4T BR		
18	10-805311	HOSE, 3/16 X 10.5 (1/4 FT BS)		

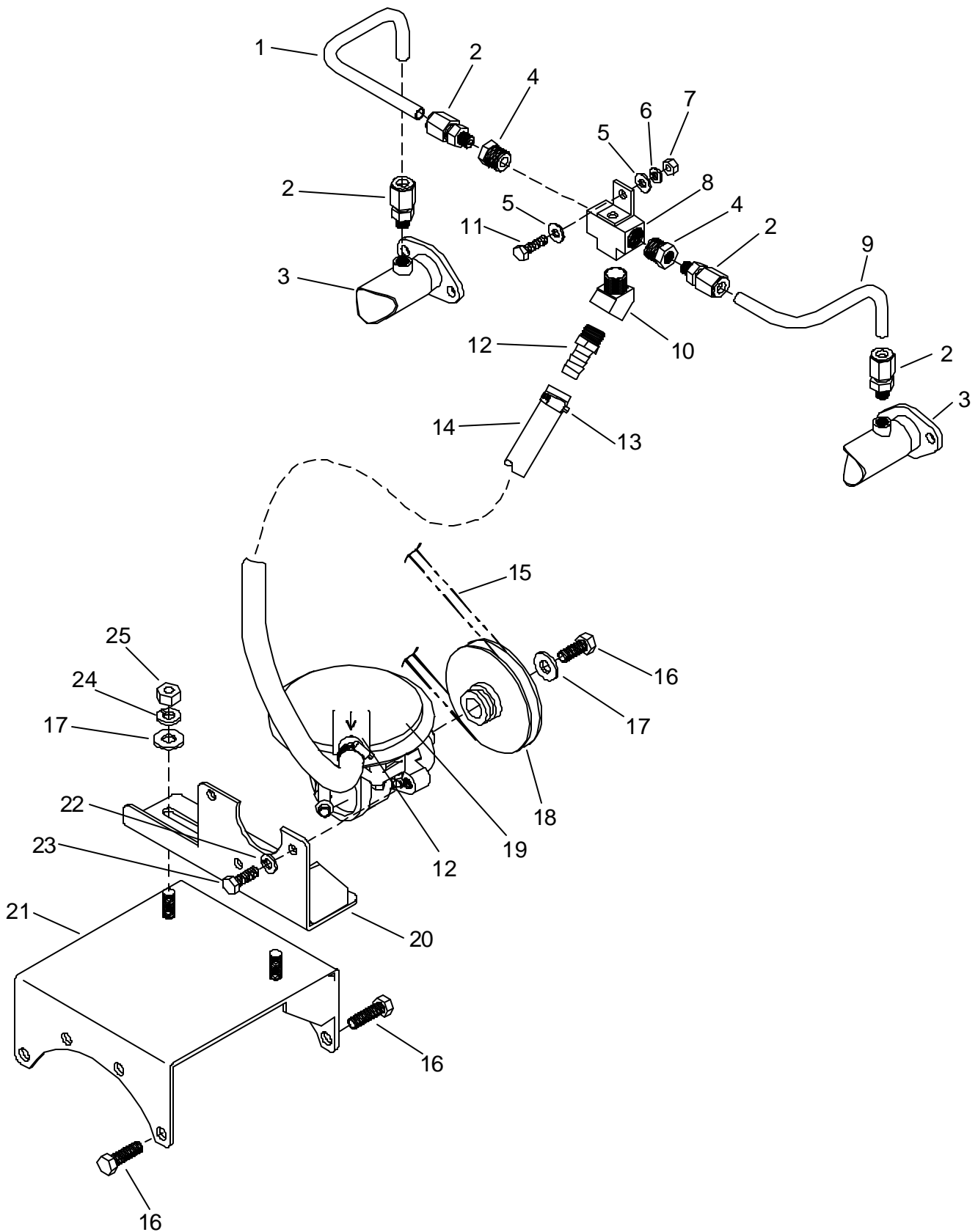
DIVERTER VALVE



DIVERTER VALVE

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	00-000210	SCR, 1/4-20 X 3/4 SOCHD		
2	00-000265	SCR, SET 1/4-20 X 1/4 SOCHD		
3	00-000315	SCR, CAP 5/16-18 X 7/8 SOCHD		
4	00-000317	SCR, CAP 10-32 X 1 1/4 SOCH		
5	87031	NUT, 5/16-18 HEX		
6	57113	LOCKNUT, 5/16-18 HEX NYLOCK		
7	01-000301	LOCKNUT, 10-32 SS		
8	87162	WASHER, 1/4 SPLIT LOCK		
9	87083	WASHER, 5/16 SPLIT LOCK PLTD		
10	02-000066	FLATWASHER, 1/4		
11	02-000274	LOCKWASHER, 5/16 (ALLEN SCREW)		
12	31-900027	TERMINAL, INS DCS 1/4F 14-16W		
13	36-900182	ROTARY SOLENOID		
14	42-902212	GASKET, ONAN		
15	43-807501	GROMMET, 1/2ID X 7/8OD		
16	50-502158	PLT, ROTARY		
17	52-502067	LINK, SOL CONN-FEM		
18	52-502068	LINK, DIVERTER		
19	56-502541	ROD, DIVRTR CONN		
20	61-950885	VALVE, EXH DIVERTER		

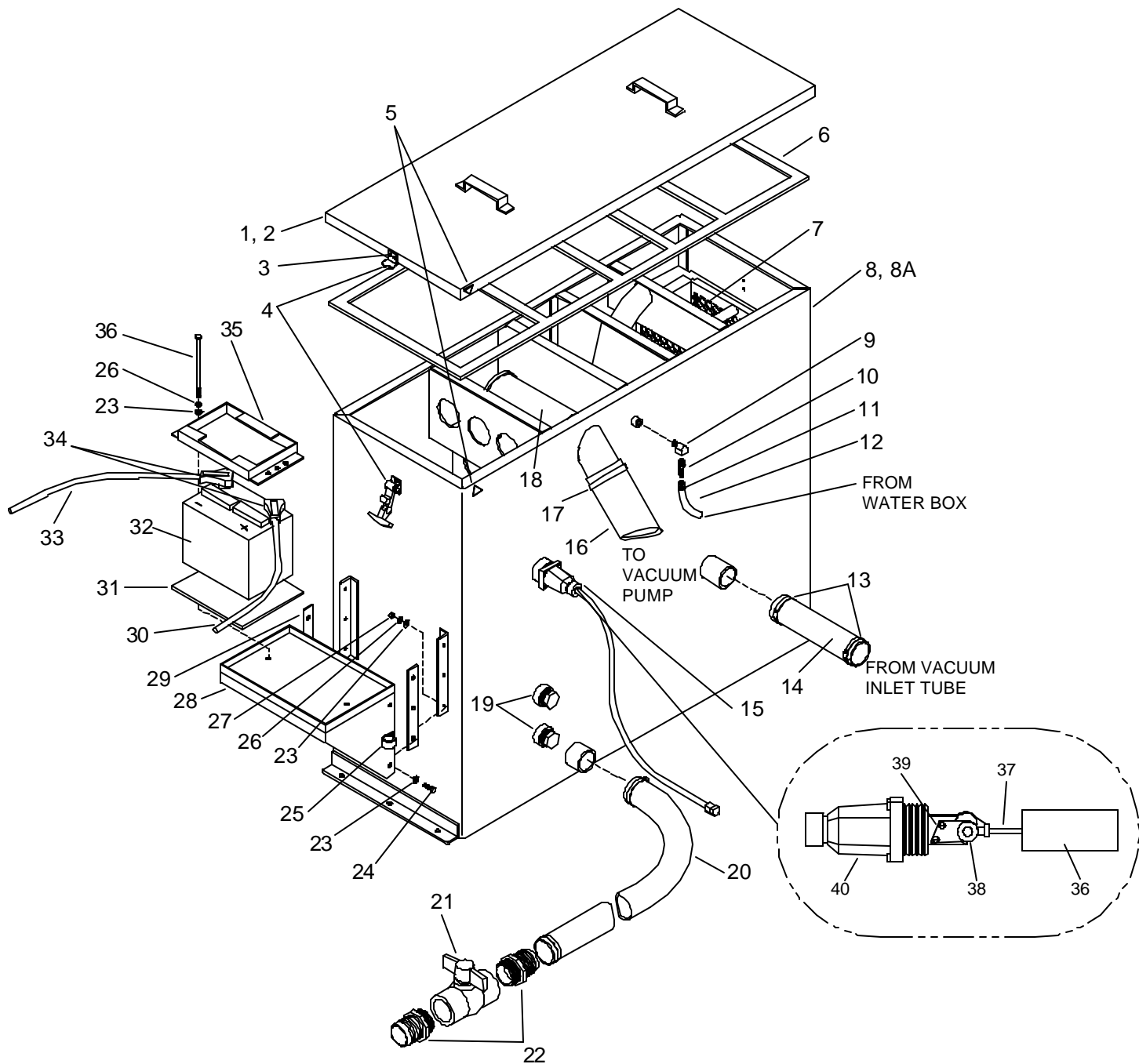
AIR PUMP



AIR PUMP

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	55-501700	TUBE, RT AIR PUMP		
2	12-800358	CONN, 1/8P X 3/8T COMP		
3	56-502090	MANIFOLD, ENG EXH		
4	11-800118	BUSH, 3/8 X 1/8 BR		
5	02-000066	FLATWASHER, 1/4		
6	87162	WASHER, 1/4 SPLIT LOCK		
7	57006	NUT, 1/4-20 HEX		
8	56-501791	TEE, CAT AIR PUMP		
9	55-501699	TUBE, L AIR PUMP		
10	11-800341	ELL, ST 3/8 45DEG BR		
11	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
12	12-800161	FTTG, BRB 3/8P X 1/2H BR		
13	03-000246	CLAMP, HOSE #8 SST		
14	39174	HOSE, WIRE BOUND X 23"		
15	44-802240	BELT, 3VX265 GOODYEAR		
16	70266	SCR, 3/8-16 X 1" HHCS GR5 PLTD DL		
17	87171	WASHER, 3/8 FLAT		
18	52-501647	PULLEY, AIR PUMP		
19	41-809122	PUMP, AIR		
20	56-502117	BRKT, AIR PUMP		
21	56-502328	BRKT, LWR ARI PUMP LEGEND SE		
22	87083	WASHER, 5/16 SPLIT LOCK PLTD		
23	70262	SCR, M8 X 20HHCS PLTD		
24	87163	WASHER, 3/8 SPLIT LOCK		
25	57111	NUT, 3/8-16 HEX		

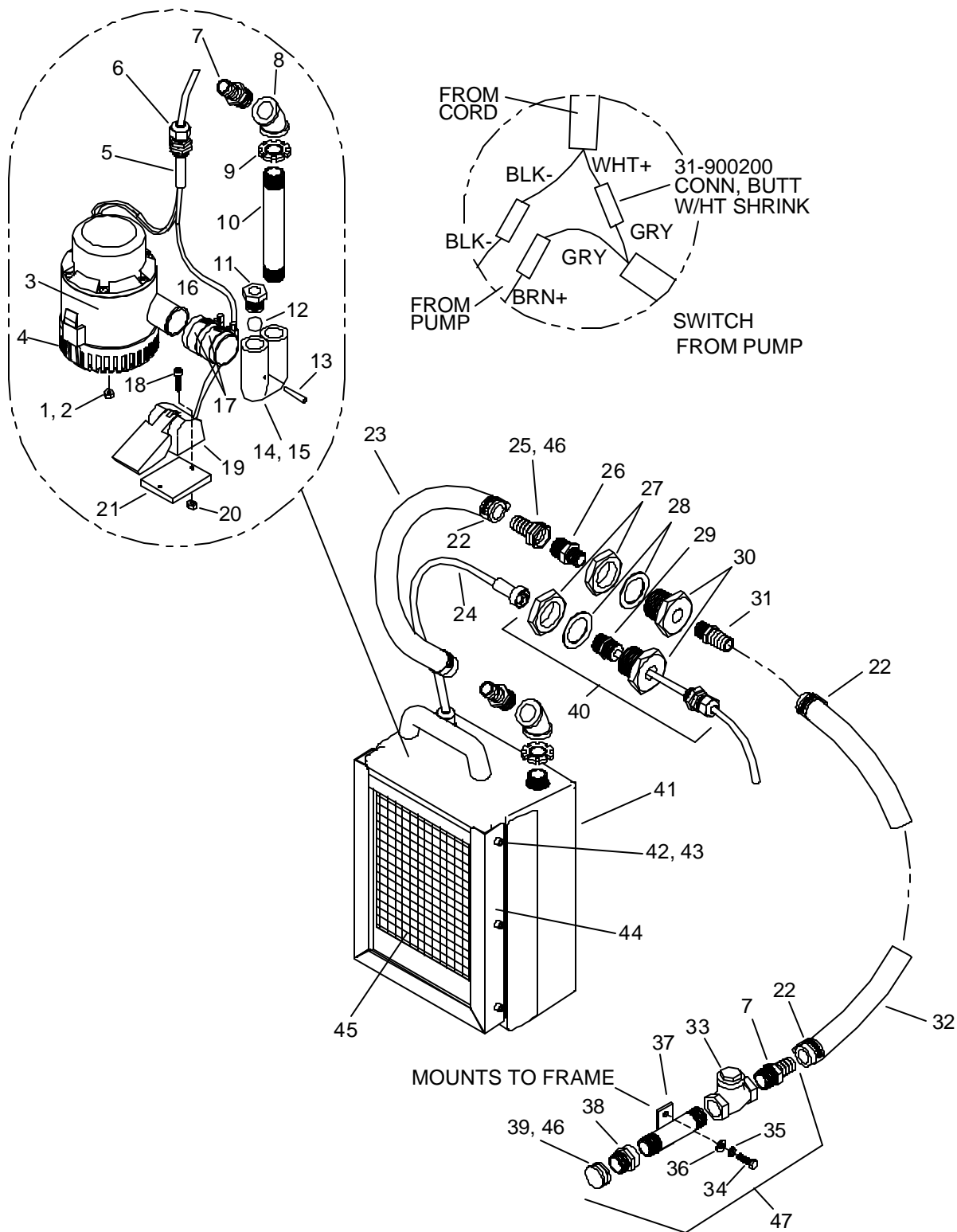
WASTE TANK



WASTE TANK

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	61-951175	ASSY, LID WST TNK		
2	56-501788	LID, WST TNK		
3	67006	RIVET, 3/16 OD X 5/8 AL		
4	46-802510	LATCH, DRAW 2-7/8 SST		
5	48-941297	DECAL, ARROW-WST TANK LID		
6	43-807094	GASKET, WST TNK LID		
7	56-501793	STRAINER BOWL		
8	56-501829	TANK, WST BLUE		
8A	56-501973	TANK, WST		FOR UNITS MOUNTED ON AUXILIARY WATER TANK
9	31016	ELBOW, 1/4 NPT STREET		
10	12-800092	FTTG, BRB 1/4 X 5/16H BR		
11	03-000065	CLAMP, HOSE #4 SST		
12	09-805099	HOSE, BRD 5/16 X 40		
13	03-000054	CLAMP, HOSE #32 1.5625/2.5 SST		
14	09-805415	HOSE, INT VAC 2 X 12"		
15	61-950621	ASSY, LVL SNS SHTOF SW		
16	09-805341	HOSE, VAC 2.88 X 25.0 BLK		
17	03-000112	CLAMP, HOSE #48		
18	14-806518	STRAINER, WASTE TANK 2-1/2"		
19	11-800402	PLUG, 1-1/4 HXHD PVC		
20	09-805332	HOSE, 2.0 X 120.0 BLK		
21	15-808080	VALVE, BALL PVC 1-1/2FP		
22	12-800357	FTTG, BARB 1-1/2P X 2H		
23	02-000066	FLATWASHER, 1/4		
24	00-000078	SCR, 1/4-20 X 1" HXHD GRD8		
25	03-000242	CLAMP, CABLE 3/4ID 1/4BLT		
26	87162	WASHER, 1/4 SPLIT LOCK		
27	57006	NUT, 1/4-20 HEX		
28	56-501779	TRAY, BATTERY		
29	50-501697	SPACER, BAT SHLF MTG		
30	64-950514	CABLE, BATX101" RED		
31	47-700007	SHIELD, BAT MT HT		
32	36-900056	BATTERY		
33	64-950515	CABLE, BATX111" BLK		
34	31-900179	COVER, BATTERY TERMINAL		
35	56-500188	COVER, BATTERY		
36	00-000167	SCR, 1/4-20 X 6" HXHD		
-	05-008002	ADHESIVE, GASKET		NOT SHOWN

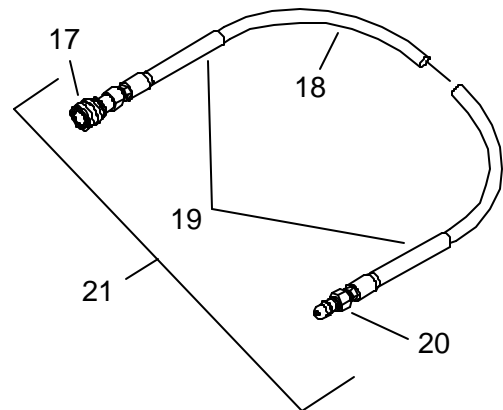
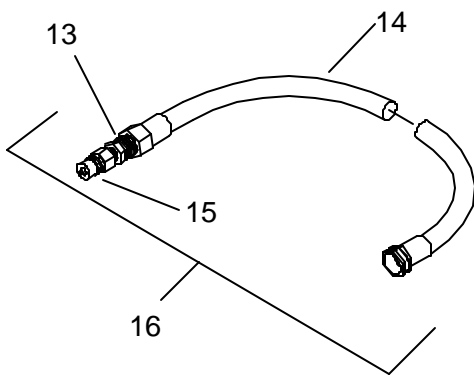
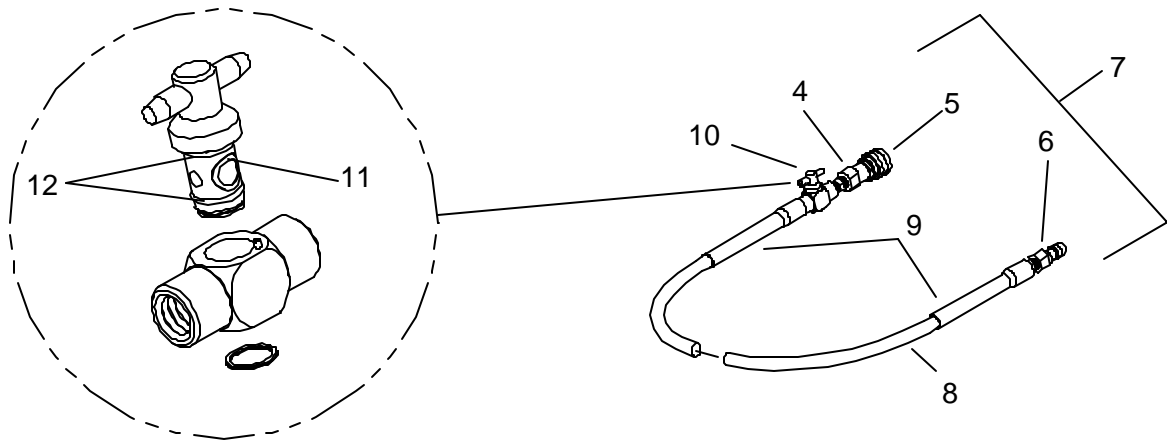
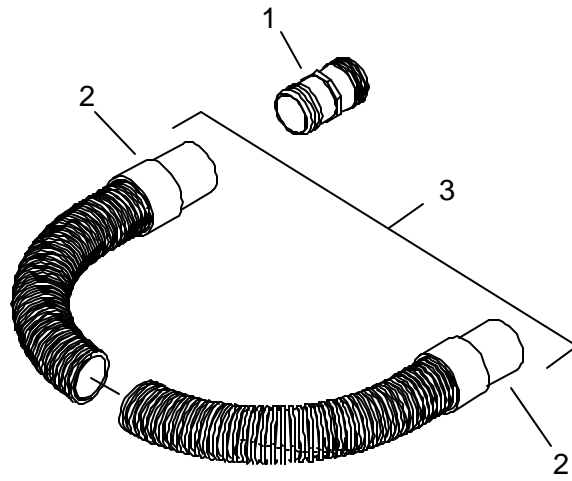
WASTE PUMP



WASTE PUMP

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	66-945193	AUTOMATIC WASTE PUMP OUT		COMPLETE
1	57252	NUT, 10-24 HEX NYLOCK SS		
2	70497	SCR, #10-24 X 1/2 SHCS		NOT SHOWN
3	41-809128	PUMP, BILGE-RULE #3700		
4	42-809267	RULE BSKT, STRNR#404		
5	09-805563	TUBE, HT SHRINK 3/4X7		
6	31-900194	CONN, CE STRNR REL 1/2P		
7	12-800095	FTTG, BRB 3/4p X 3/4H BR		
8	11-800434	ELL, 3/4 45DEG BR		
9	01-000119	LOCKNUT, 3/4 NPT		
10	11-800419	NIP, 3/4 X 6 5/8 PVC		
11	52-501666	SEAT, 1.00-20X1/2 BR		
12	04-000291	BALL, NYL 3/4D		
13	04-000290	PIN, 3/16D X 1-3/8 BR		
14	52-501662	BODY, WST PMP VLV		
15	15-808101	ASSY, WST PMP VLV		INCLUDES PARTS 11-14
16	08-805262	CUFF, WST PMP		
17	03-000110	CLAMP, HOSE #24		
18	00-000317	SCR, CAP 10-32X1-1/4 SOCH		
19	32-900183	SWITCH, PMP-RULE #37		
20	57090	NUT, 10-32 HEX NYLOCK SS		
21	50-501730	SPACER, WST PMP SW		
22	03-000113	CLAMP, HOSE #12 SST		
23	09-805436	HOSE, WTR 3/4X21		
24	31-900197	CONN, WST PMP F W/CORD CR		
25	12-800370	CONN, GRDN HOSE 3/4HX3/4BA		
26	12-800051	CONN, GRDN HOSE 1/2PX3/4H		
27	52-501651	NUT, HOSE&CD FTTG-WST PMP		
28	43-807092	SEAL, WST PMP KIT		
29	31-900198	CONN, WST PMP M CROUSE-HI		
30	52-501649	FTTG, CD-WST PMP KIT		
31	12-800278	FTTG, BRB 1/2P X 3/4H BR		
32	09-805320	HOSE, WTR 3/4X105		
33	15-808065	VLV, SWING CHK 3/4FP		
34	00-000078	SCR, 1/4-20 X 1" HXHD GRD8		
35	87162	WASHER, 1/4 SPLIT LOCK PLTD		
36	02-000066	FLATWASHER, 1/4		
37	56-501794	BRKT, OUTL WST PMP KIT		
38	12-800360	CONN, 3/4FXHOSE CONN		
39	12-800052	CAP, HOSE 3/4 BR		
40	64-950541	ASSY, WST PMP CORD		INCLUDES PARTS 6,27-30
41	58-500643	MOLDING, WST PMP		
42	00-000210	SCR, 1/4-20 X 3/4" SOCHD		
43	57245	NUT, 1/4-20 HEX NYLOCK SS		
44	50-501706	GUIDE, STRAINER		
45	14-806550	STRAINER, WST PMP		
46	43-807008	WASHER, HOSE 5/8 ID X1" OD		
47	66-950412	ASSY, OUTL WST PMP KIT		INCLUDE PARTS 7,33,37-39 & 46

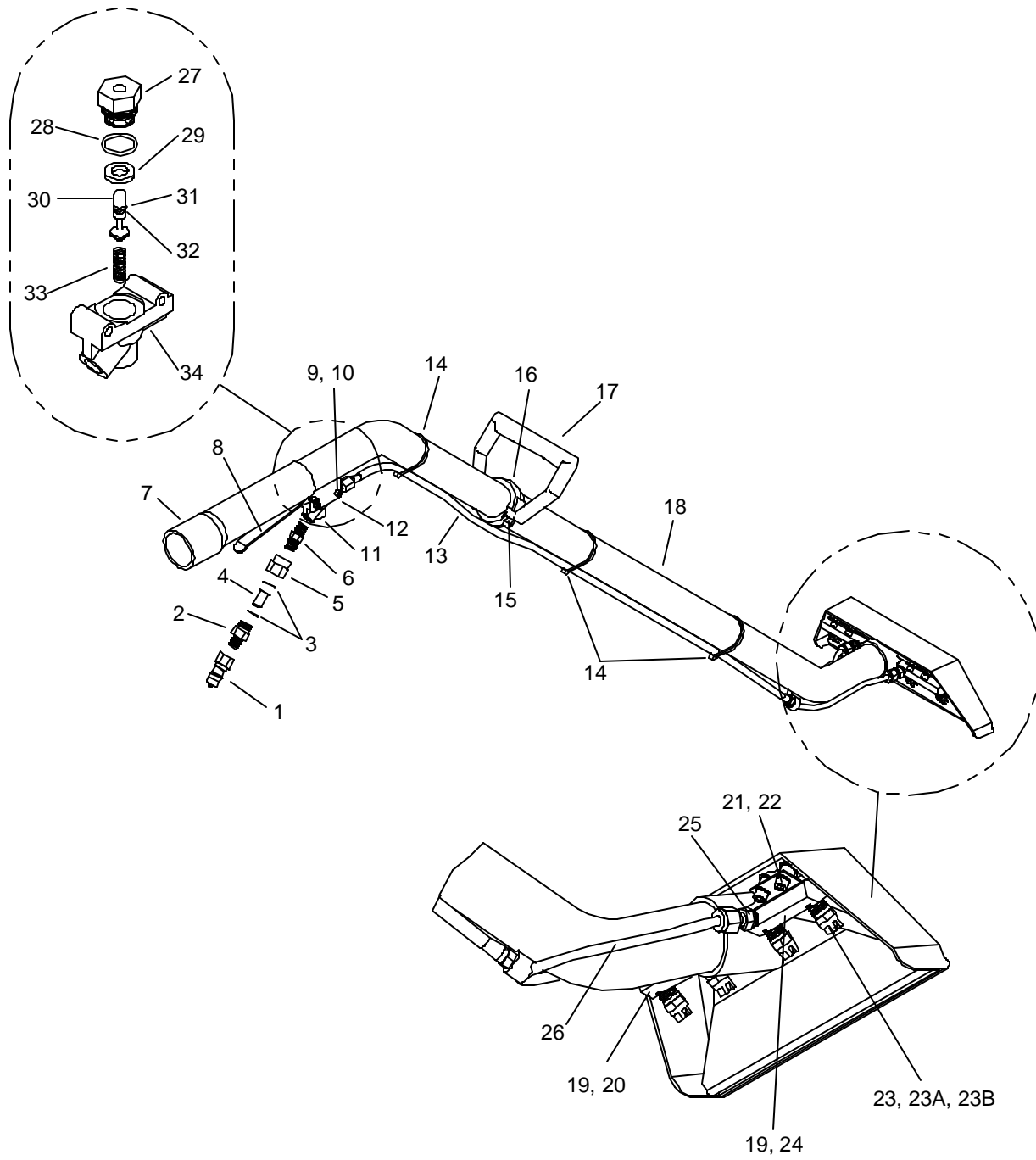
HOSE ACCESSORIES



HOSE ACCESSORIES

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	12-800078	FITTING, BRB 2H BS PVC		
2	08-805147	CUFF, 2"		
3	10-805060	HOSE, VAC 2"X50' W/ CUFFS & HOSE		
4	56015	NIPPLE, 1/4 HEX		
5	22015	COUPLER, 1/4 QD		
6	56012	NIPPLE, 1/4 FPT QD		
7	10-805108	HOSE, HP 1/4 X 50FT W/QD & VLVE		
8	10-805077	HOSE, HP 1/4 X 50'		
9	08-805155	GUARD, HOSE VINYL		
10	15-808012	VALVE, BALL 1/4FP		
11	43-810014	O-RING, 7/32ID X 11/32OD		
12	43-810019	O-RING, 3/8 ID X 1/2 OD		
13	11-800354	NIP, 1/2 X 3/8 HEX BR		
14	10-805157	HOSE, WATER 1/2 X 50'		
15	13-806009	DISCONNECT 3/8M X 3/8FP		
16	10-805295	HOSE, WATER 1/2 X 50'		
17	22015	COUPLER, 1/4 QD		
18	10-805077	HOSE, HP 1/4 X 50'		
19	08-805155	GUARD, HOSE VINYL		
20	56012	NIPPLE, 1/4 FPT QD		
21	10-805122	HOSE, HP 1/4 X 50FT W/QD		

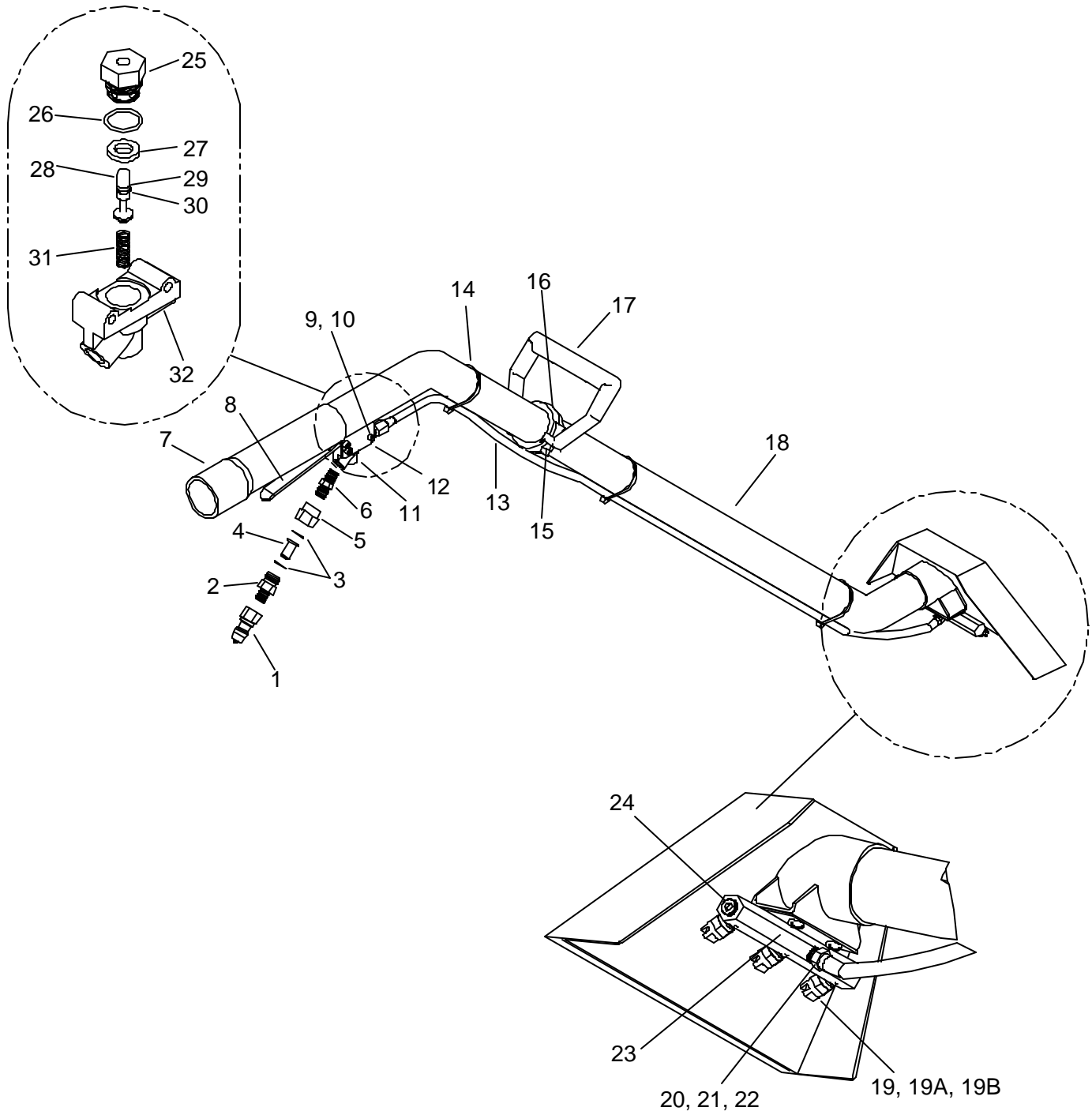
WAND - QUAD-JET



WAND - QUAD-JET

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	89238	WAND, TM, QJW (95015) PC		COMPLETE
-	89239	WAND, TM, QJW (9502) PC		COMPLETE
-	89237	WAND, TM QJW (9501) PC		COMPLETE
-	89235	WAND, TM, QJW, (9501) NO DECAL		COMPLETE
1	56012	NIPPLE, 1/4 FPT QD		
2	17-503010	CONN, 1/4P X 11/16-16M		
3	17-803006	WASHER, NYLON		
4	14-806512	STRAINER, JET 50 MESH		
5	17-803036	CONN, 1/4FP,11/16-16R BR		
6	56015	NIPPLE, 1/4 HEX		
7	09-805359	SLEEVE, WD HDL 9.5		
8	52-501619	TRIGGER, WD VLV		
9	00-000317	SCR, CAP 10-32X 1-1/4 SOCH		
10	57090	NUT, 10-32 HEX NYLOCK SS		
11	61-950496	ASSY, EXTRCTR VLV		
12	12-800060	CONN, 1/4P X 1/4T BR		
13	10-805387	HOSE, 3/16 X 43-1/2 (1/8P X 1/4)		
14	04-000053	TIE, CABLE 8" WHT		
15	00-000282	SCR, CAP 1/4-20 X 1-1/4 SOC		
16	52-501569	HOLD DOWN, WD HDL		
17	52-501568	BODY, WD HDL		
18	56-501940	WAND & HEAD, CAST SST		
19	11-800206	PLUG, 1/8 SOCHD BR		
20	56-501966	ASSY, L S-BEND MNFLD		
21	00-000347	SCR, CAP 10-24 X1/4 SOCHD		
22	87165	WASHER, #10 SPLIT LOCK		
23	17-803001	TIP, SPRY 95015X1/8P SST		89238
23A	17-803002	TIP, SPRY 9502X1/8P SST		89239
23B	17-803018	TIP, SPRY 9501X1/8P SST		89237 89235 (NO DECAL)
24	56-501986	ASSY, RT S-BEND MNFLD		
25	12-800322	CONN, 1/8PX1/4T COMP BR		
26	56-501967	ASSY, S-BEND MNFLD		
27	16-808229	HOLDER, VLV STEM-EXTRCTR VL		
28	43-810063	O-RING, .551 ID .691 OD		
29	16-808228	SEAT, EXTRCTR VLV		
30	16-808189	STEM, EXTRCTR VLV		
31	43-810064	BACK-UP, .250 DIA		
32	43-810062	O-RING, .144 ID .254 OD		
33	16-808190	SPRING, EXTRCTR VLV		
34	52-501590	BODY, EXTRCTR VLV		
-	48-941186	DECAL, WD HD (CAST SS)		NOT SHOWN
-	66-808169	KIT, REP-WD VLV		NOT SHOWN INCLUDES PARTS 27-29 & 31-33

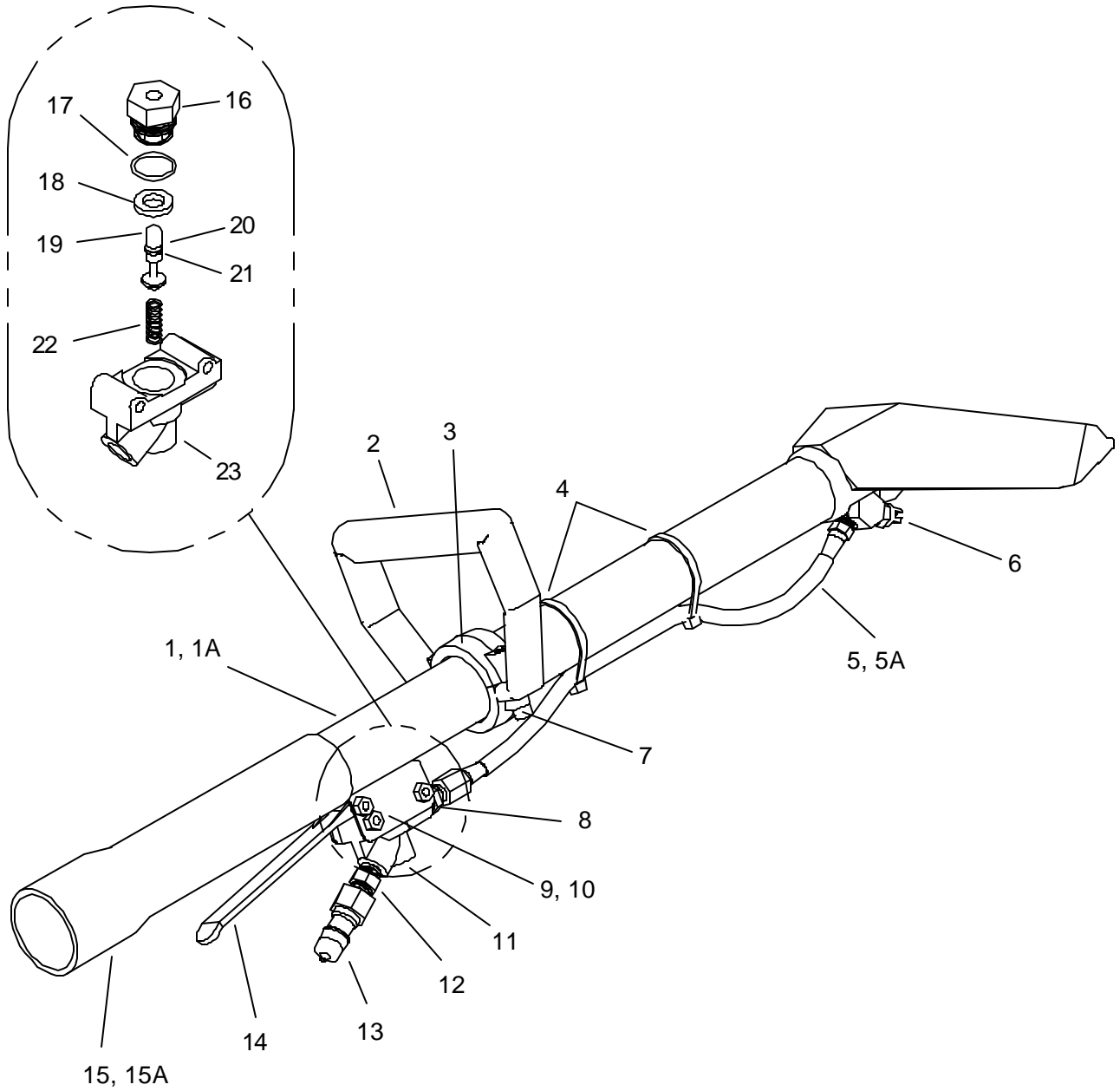
WAND - TRI-JET



WAND - TRI-JET

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	89233	WAND, TJW (9502) PC		COMPLETE
-	89232	WAND, TJW, (95015) CUBXL		COMPLETE
-	89234	WAND, TJW, (9503) PC		COMPLETE
1	56012	NIPPLE, 1/4 FPT QD		
2	17-503010	CONN, 1/4P X 11/16-16M		
3	17-803006	WASHER, NYLON		
4	14-806512	STRAINER, JET 50MESH		
5	17-803036	CONN, 1/4FP,11/16-16R BR		
6	56015	NIPPLE, 1/4 HEX		
7	09-805359	SLEEVE, WD HDL 9.5		
8	52-501619	TRIGGER, WD VLV		
9	00-000317	SCR, CAP 10-32X 1-1/4 SOCH		
10	57090	NUT, 10-32 HEX NYLOCK SS		
11	61-950496	ASSY, EXTRCTR VLV		
12	12-800060	CONN, 1/4P X 1/4T BR		
13	10-805253	HOSE, 3/16X49 (1/8P X 1/4FT)		
14	04-000053	TIE, CABLE 8" WHT		
15	00-000282	SCR, CAP 1/4-20 X 1-1/4 SOC		
16	52-501569	HOLD DOWN, WD HDL		
17	52-501568	BODY, WD HDL		
18	56-501712	WAND & HEAD, TRI-JET WD		
19	17-803002	TIP, SPRY 9502X1/8P SST		89233
19A	17-803001	TIP, SPRY 9501X1/8P SST		89232
19B	17-803046	TIP, SPRY 9503X1/8P SST		89234
20	70162	SCR, 10-32 X 3/8 PPHMS SS		
21	87165	WASHER, #10 SPLIT LOCK		
22	57014	NUT, 10-32 HEX SS		
23	56-501739	MANIFOLD, WD TRI-JET		
24	11-800206	PLUG, 1/8 SOCHD BR		
25	16-808229	HOLDER, VLV STEM-EXTRCTR VL		
26	43-810063	O-RING, .551 ID .691 OD		
27	16-808228	SEAT, EXTRCTR VLV		
28	16-808189	STEM, EXTRCT VLV		
29	43-810064	BACK-UP, .250DIA		
30	43-810062	O-RING, .114ID .254OD		
31	16-808190	SPRING, EXTRCTR VLV		
32	52-501590	BODY, EXTRCTR VLV		
-	48-941166	DECAL, WD HD		NOT SHOWN
-	66-808169	KIT, REP-WD VLV		NOT SHOWN INCLUDES PARTS 25-27 & 29-31

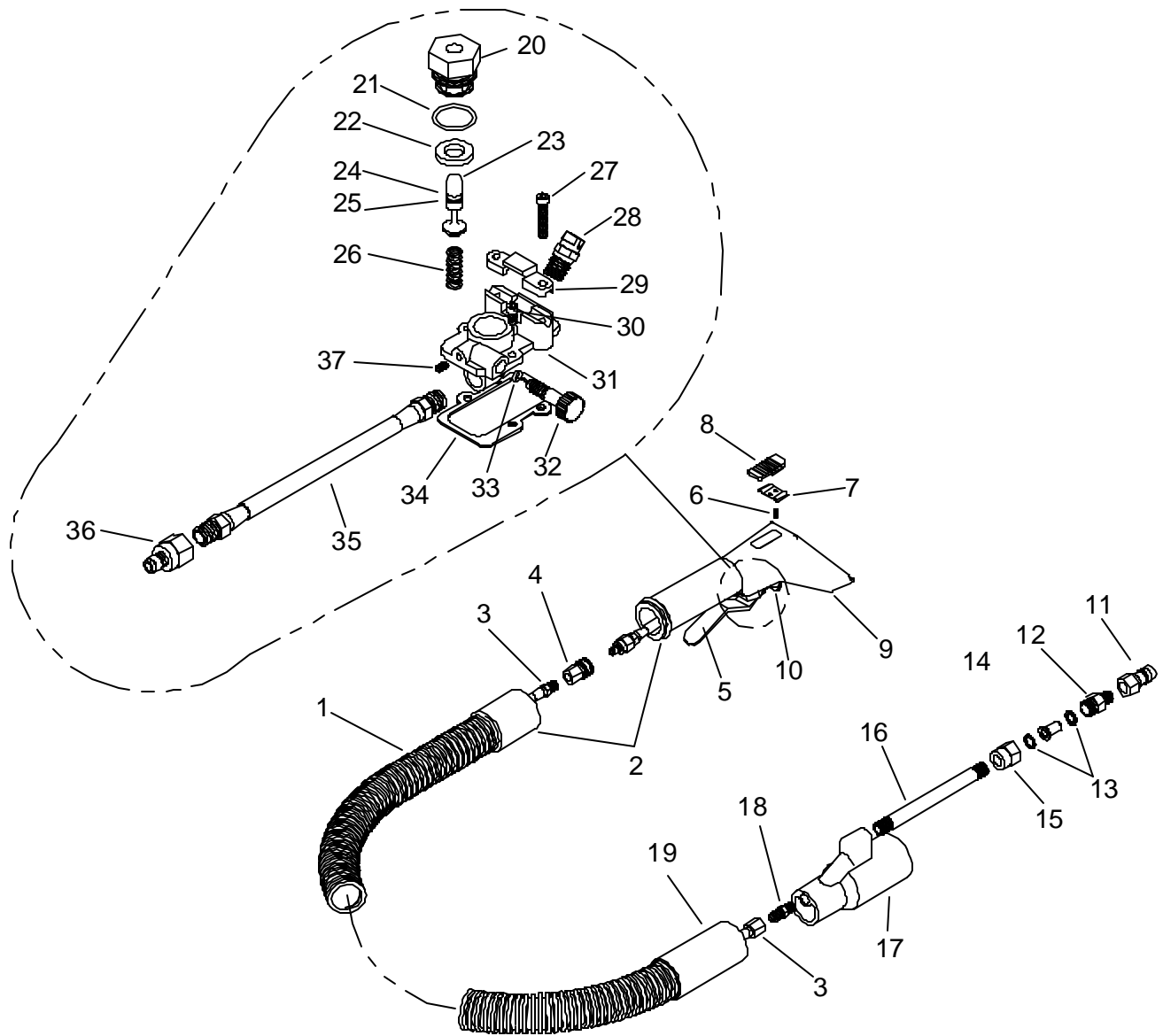
WAND - STAIR TOOL



WAND - STAIR TOOL

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	78519	TL, STAIR, LNG, TM DJ (80015)		COMPLETE
-	78521	TL, STAIR, SHT, TM (80015)		COMPLETE
1A	56-501715	WAND & HEAD, STAIR TL		
1B	56-501907	WAND & HEAD, SHRT STAIR TL		
2	52-501576	BODY, WD HDL PORT		
3	52-501577	HOLD DOWN, WD HDL PORT		
4	04-000053	TIE, CABLE 8" WHT		
5A	10-805330	HOSE, 3/16X13-3/4 (1/8PX1/4)		
5B	10-805397	HOSE, 3/16X7-1/2 (1/8P X 1/4F)		
6	17-803002	TIP, SPRY 9502X1/8P SST		
7	00-000282	SCR, CAP 1/4-20 X 1-1/4 SOC		
8	12-800060	CONN, 1/4P X 1/4T BR		
9	00-000317	SCR, CAP 10-32X1-1/4 SOCH		
10	57090	NUT, 10-32 HEX NYLOCK SS		
11	61-950496	ASSY, EXTRCTR VLV		
12	56015	NIPPLE, 1/4 HEX		
13	56012	NIPPLE, 1/4 FPT QD		
14	52-501619	TRIGGER, WD VLV		
15A	09-805359	SLEEVE, WD HDL 9.5		
15B	09-805504	SLEEVE, STAIR TL HDL 7-1/8		
16	16-808229	HOLDER, VLV STEM-EXTRCTR VL		
17	43-810063	O-RING, .551 ID .691 OD		
18	16-808228	SEAT, EXTRCTR VLV		
19	16-808189	STEM, EXTRCTR VLV		
20	43-810064	BACK-UP, .250DIA		
21	43-810062	O-RING, .114 ID .254 OD		
22	16-808190	SPRING, EXTRCTR VLV		
23	52-501590	BODY, EXTRCTR VLV		
-	48-941163	DECAL, STAIR TL		NOT SHOWN
-	66-808169	KIT, REP-WD VLV		NOT SHOWN INCLUDES PARTS 16-19 & 20-22

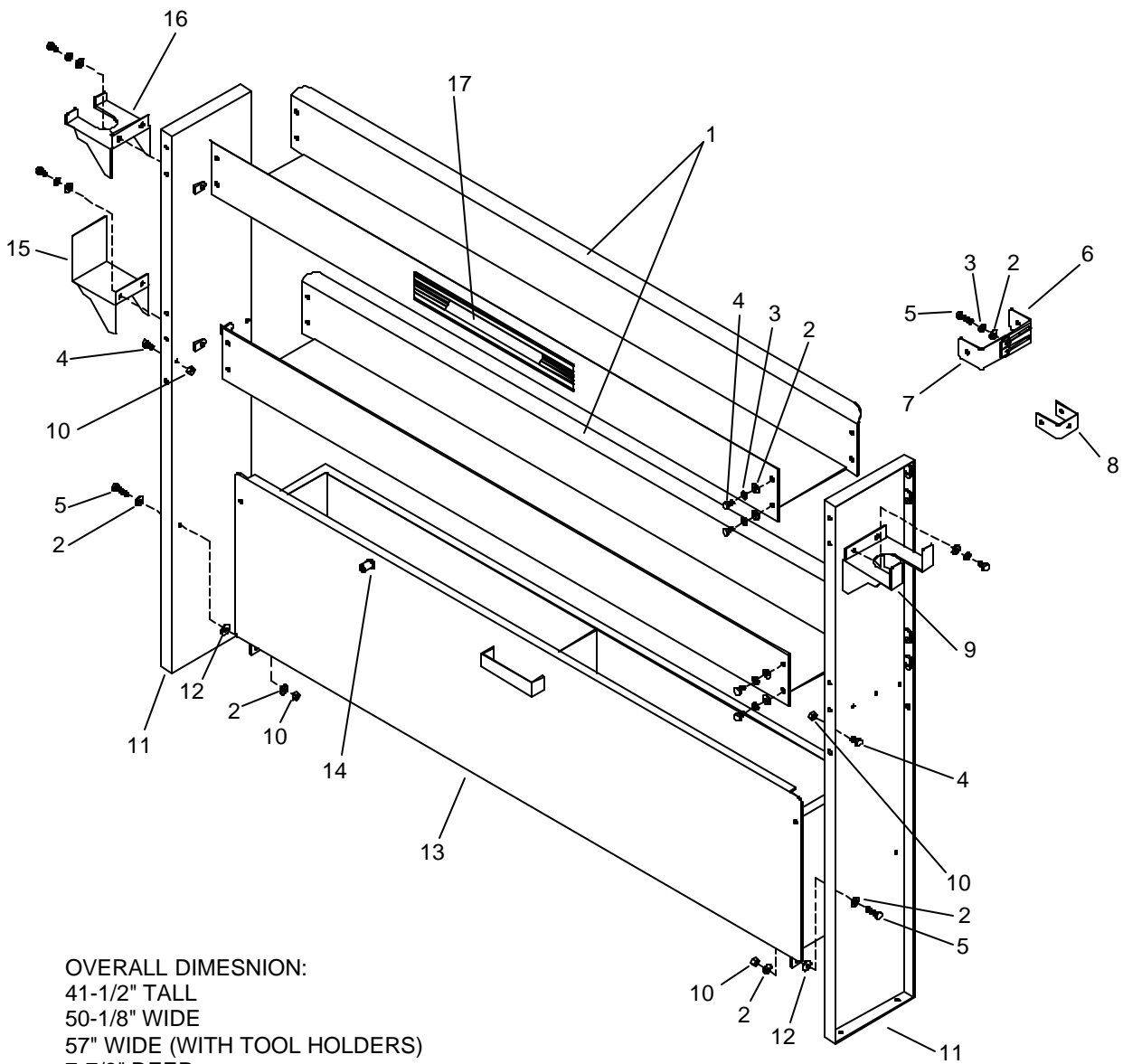
UPHOLSTERY TOOL



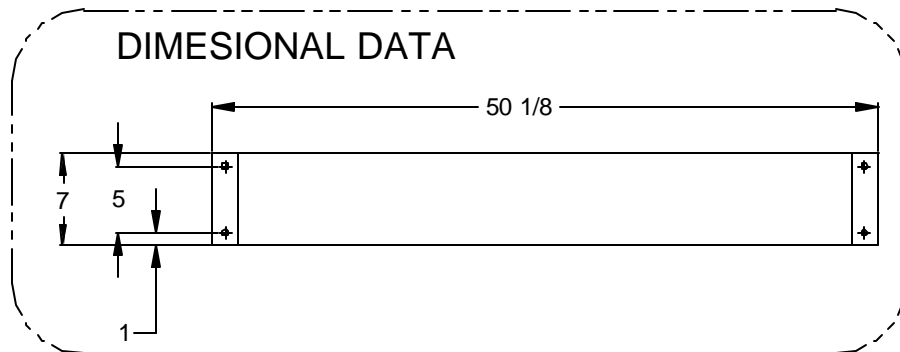
UPHOLSTERY TOOL

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	78513			COMPLETE
1	09-805131	HOSE, VAC 1-1/4X10' BLU		
2	08-805243	CUFF, SWIV 1-1/4HX1-1/4T		
3	10-805347	HOSE, 3/16X119-1/2 (1/8PX1/4FT)		
4	13-806023	DSC, 1/8FC1/8FP SST		
5	58-500639	UPHOLSTERY TL TRIGGER		
6	00-000310	SCR, CAP 4-40 X7/32 SHCS SS		
7	04-000282	SPRING, VAC ADJ BUTT		
8	52-501624	BUTTON, VAC ADJ		
9	52-501842	TOOL, UPHOLSTERY		
10	61-950570	ASSY, UPHLST TL VLV		INCLUDES PARTS 20-26, 28, & 31- 37
11	560012	NIPPLE, 1/4 NPT QD		
12	17-803010	CONN, 1/4P X 11/16-16M		
13	17-803006	WASHER, NYLON		
14	14-806512	STRAIRNER, JET 50MESH		
15	17-803036	CONN, 1/4FPX11/16-16F BR		
16	11-800404	NIP, 1/4X5 SST		
17	52-501585	COUPLER, UPHLST TL		
18	12-800065	CONN, 1/8P X 1/4T		
19	08-805138	CUFF, 1 1/4H X 1 1/2T GRY		
20	16-808229	HOLDER, VLV STEM-EXTRCTR VL		
21	43-810063	O-RING, .551 ID .691 OD		
22	16-808228	SEAT, EXTRCTR VLV		
23	16-808189	STEM, EXTRCTR VLV		
24	43-810064	BACK-UP, 250DIA		
25	43-810062	O-RING, .144 ID .254 OD		
26	16-808190	SPRING, EXTRCTR VLV		
27	00-000306	SCR, 6-32 X 1 SCHD SS		
28	17-803033	TIP, SPRY 80015X1/8P SST		
29	58-500638	CSTG, TRIGGER CLMP		
30	00-000307	SCR, CAP 6-32X3/8 SOCHD		
31	52-501623	VALVE, UPHLST TL		
32	52-501626	VALVE, ADJ-UPHLST TL VLV		
33	43-810016	O-RING, 5/32IDX9/32OD VIT		
34	43-807513	GASKET, UPHLST TL VLV		
35	10-805348	HOSE, 3/16X6-1/2 (1/8P BS)		
36	13-806030	DSC, 1/8MX1/8FP SST		
37	00-000408	SCR, SET 3-32 X 1/4 SOCHD		
-	48-941164	DECAL, UPHLST TL		NOT SHOWN
-	66-808169	KIT, REPAIR-WAND VLV		NOT SHOWN INCLUDES PARTS 20-22 & 24-26

SHELF ASSEMBLY



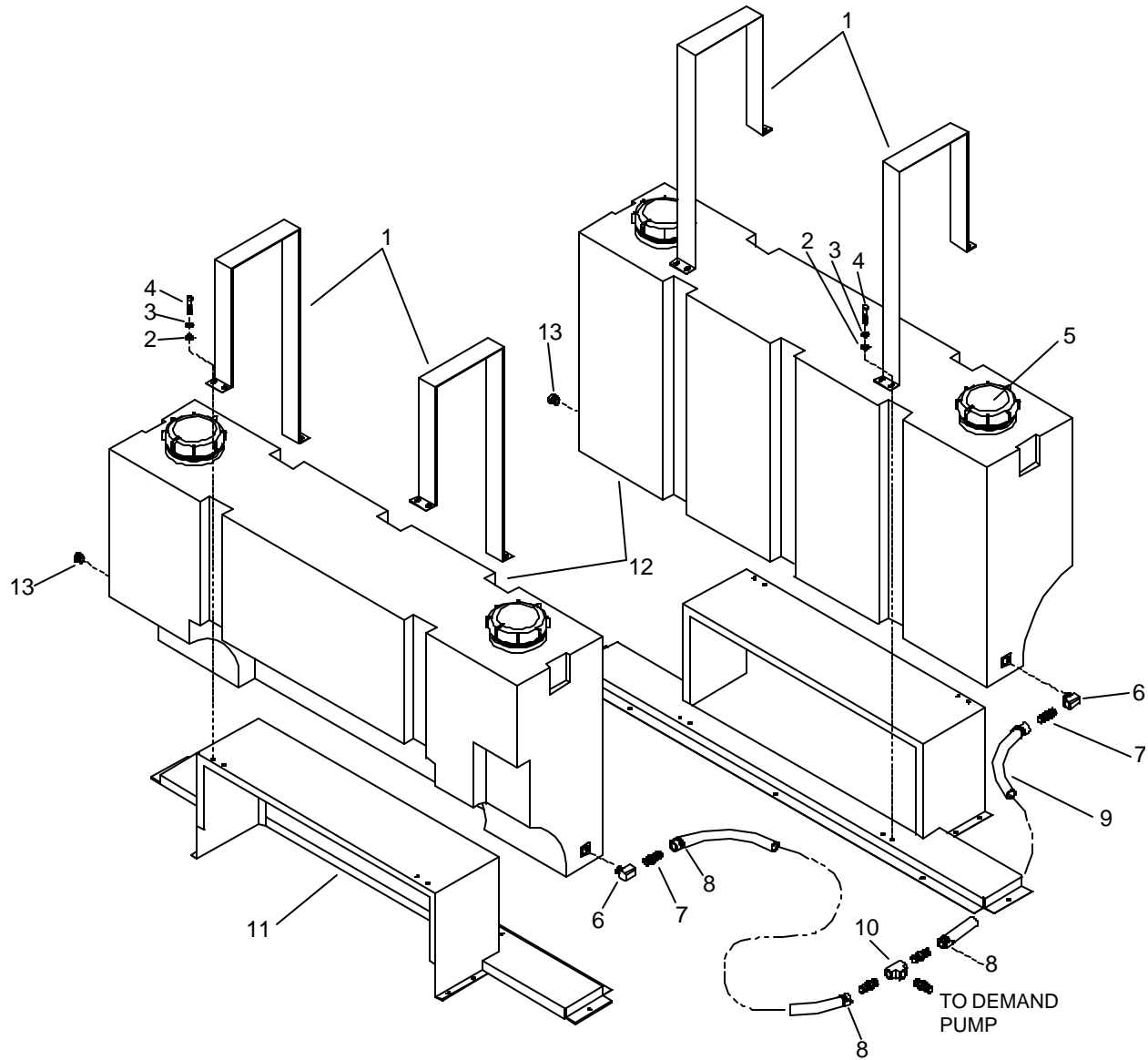
OVERALL DIMENSION:
 41-1/2" TALL
 50-1/8" WIDE
 57" WIDE (WITH TOOL HOLDERS)
 7-7/8" DEEP



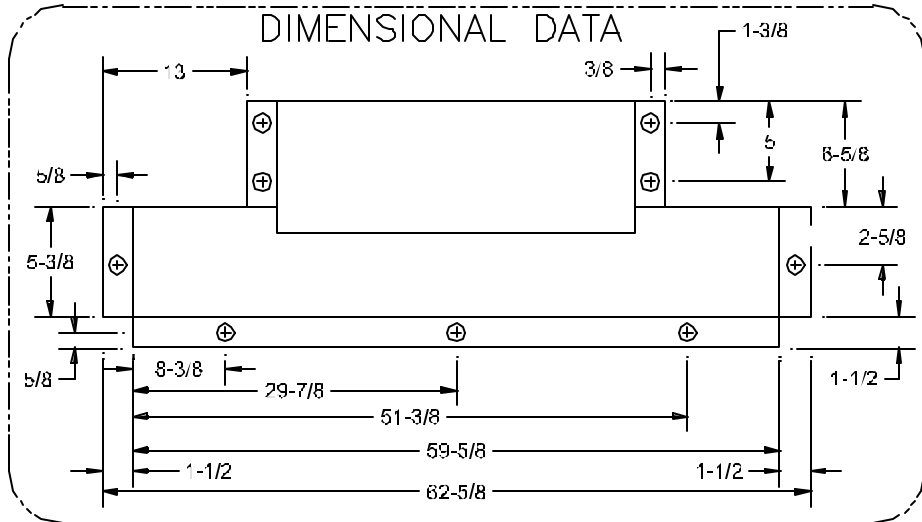
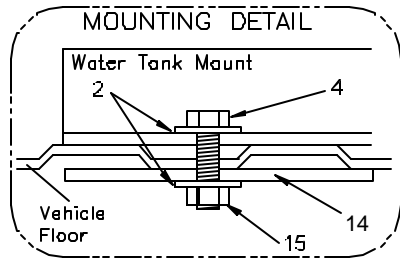
SHELF ASSEMBLY

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	65-950392	VAN STORAGE UNIT PC		
1	56-501921	SHELF, LWR		
2	02-000066	FLATWASHER, 1/4		
3	87162	WASHER, 1/4 SPLIT LOCK		
4	70721	SHOULDER BOLT, 182 OD X 2.25 L		
5	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
6	50-501840	BRKT, ADJUST MTG SLOT		
7	56-502067	BRKT, ADJUST MTF HLDR		
8	56-501942	BRKT, SHELF MOUNTING		
9	50-501753	HOLDER, STAIR TOOL		
10	01-000105	LOCK NUT, 1/4-20 HXHD		
11	56-501922	PANEL, SHLF END		
12	50-501749	WASHER, NYLON		
13	56-501920	DRWR, SHELF GRAY		
14	46-802506	LATCH, ADJ GRIP		
15	50-501755	HLDR, UP TO HOSE		
16	50-501754	HLDR, UPHST TL		
17	48-941152	DECAL, PROCHEM		
-	66-945424	KIT, ADJ BRKT.		INCLUDES PARTS 6,7 & MOUNTING HARDWARE

WATER TANK - DUAL WITH DEMAND PUMP



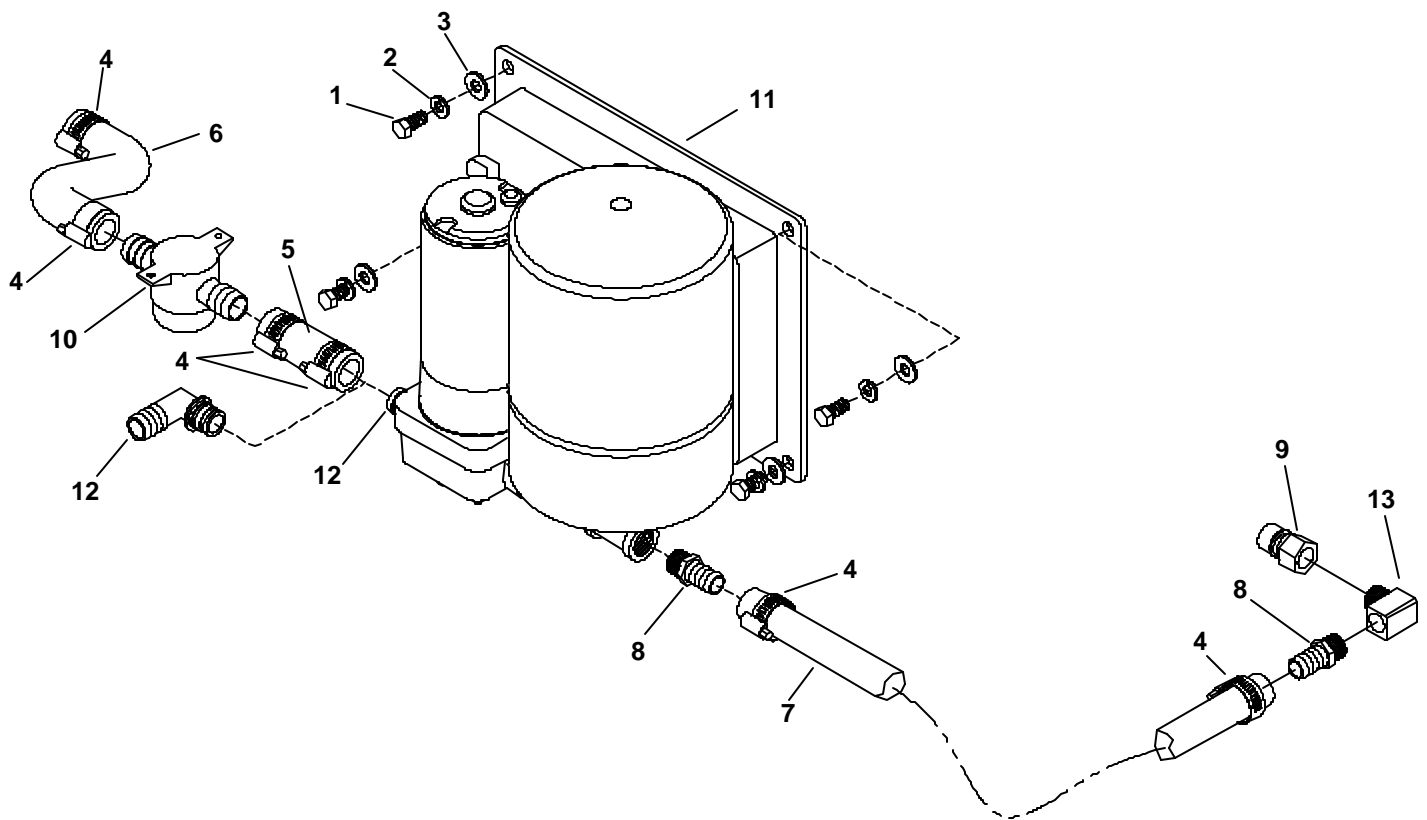
OVERALL DIMENSION:
 32-1/2" TALL
 62-5/8" WIDE
 15-1/2" DEEP



WATER TANK - DUAL WITH DEMAND PUMP

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	66-945260	TANK, DUAL SADDLE W/DMD PUMP		COMPLETE
-	66-945265	SINGLE DADDLE TANK W/DMND PMP		COMPLETE
1	50-501774	HOLD DOWN, SADDLE TANK GRAY		
2	87171	WASHER, 3/8 FLAT		
3	87163	WASHER 3/8 SPLIT LOCK		
4	00-000072	SCR, 3/8-16 X 2' HXHD		
5	11-800432	CAP, WATER BOX		
6	11-800041	ELL, STREET 1/2 BR		
7	12-800278	FTTG, BRB 1/2P X 3/4H BR		
8	03-000113	CLAMP, HOSE #12 SST		
9	09-805456	HOSE, WTR 3/4 X 96"		
10	11-800085	TEE, 1/2 BRASS		
11	56-502000	ASSY, BASE SADDLE TANK GRAY		
12	58-500661	MOLDING, WATER TANK		
13	11-800168	PLUG, 1/2 BRASS HXHD		
14	50-500511	PLATE, INSTALL MT		
15	57119	NUT, 3/8-16 HEX NYLOCK		
-	41458	SHLR, CHEM, 10-GAL JUG		NOT SHOWN

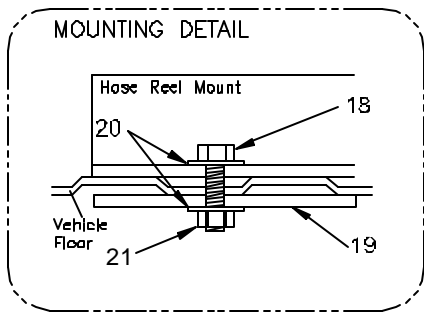
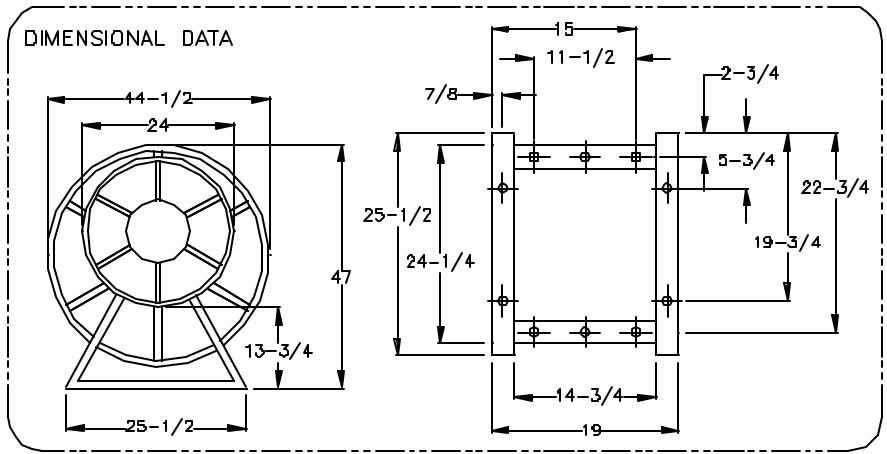
WATER TANK - DEMAND PUMP



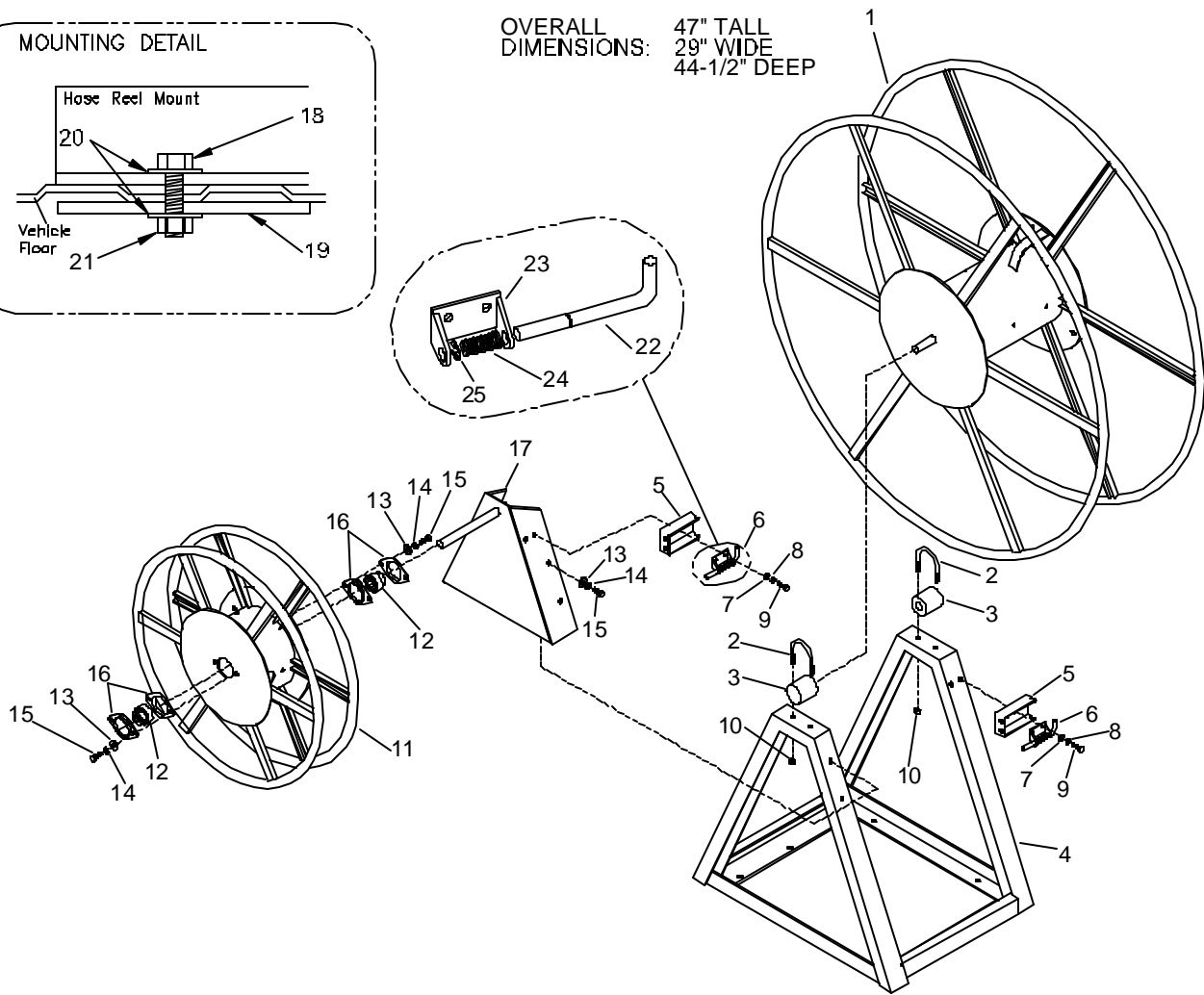
WATER TANK - DEMAND PUMP

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	70305	SCR, 5/16-18 X 3/4 HHCS GR5 PL TDL		
2	87083	WASHER, 5/16 SPLIT LOCK PLTD		
3	02-000143	WASHER, 5/16 FLAT		
4	03-000113	CLAMP, HOSE #12 SST		
5	09-805278	HOSE, WATER 3/4 X 3"		
6	09-805357	HOSE, WATER .75 X 5.5		
7	09-805446	HOSE, WATE 5/8 X 55		
8	12-800345	FTTG, BRB 3/8P X 5/8H BR		
9	13-806009	DISCONNECT, 3/8M X 3/8FP		
10	14-806553	FILTER, DEMAND PUMP		
11	41-905049	PUMP, WATER BOOSTER FLOJET 2		
12	20381-022	KIT, PORT		
13	11-800275	ELBOW, ST 3/8 BR		

HOSE REEL



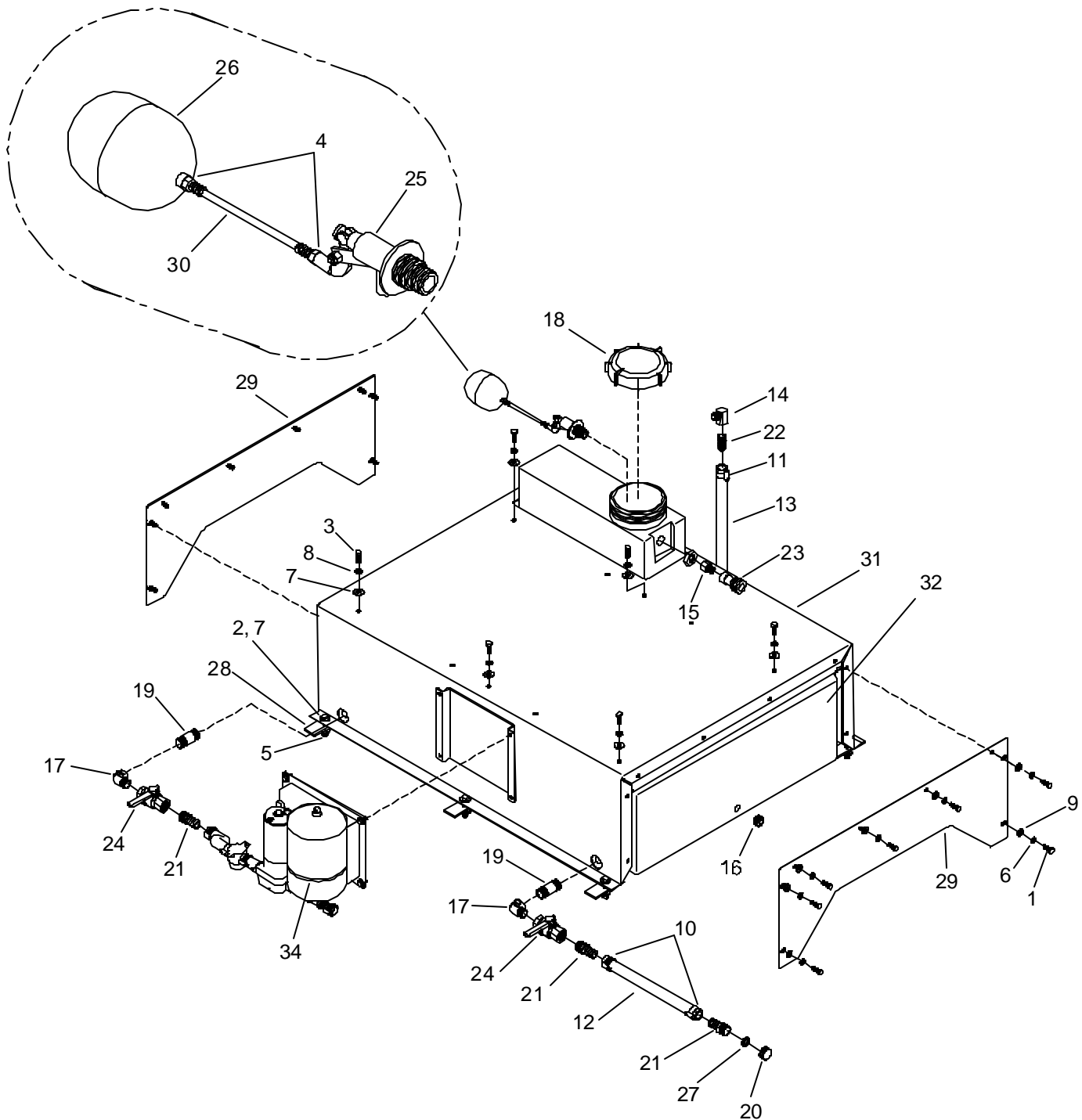
OVERALL DIMENSIONS: 47" TALL
29" WIDE
44-1/2" DEEP



HOSE REEL

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	65-950393	HOSE REEL, HIGH PROFILE PC		
1	56-501962	REEL, VACUUM HOSE GRAY		
2	03-000124	CLAMP, MFLR 1-3/4		
3	52-501685	BUSHING, HOSE REEL		
4	56-501960	BASE, HOSE RL (250')		
5	56-502207	BRKT, LOCKOUT HOSE REEL		
6	61-950854	LATCH ASSEMBLY		
7	02-000066	FLATWASHER, 1/4		
8	87162	WASHER, 1/4 SLPIT LOCK		
9	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
10	57031	NUT, 5/16-18 HEX		
11	56-501968	REEL, HP HOSE GRAY		
12	45-802138	BEARING HOSE REEL		
13	02-000143	FLATWASHER, 5/16		
14	87083	WASHER, 5/16 SPLIT LOCK PLTD		
15	70302	SCR, 5/16-18 X 1" HHCSGR5PLT		
16	44-802122	FLANGE, 47MST		
17	56-501961	BODY, HP HOSE GRAY		
18	00-000072	SCR, 3/8-16 X 2" HXHD		
19	50-500511	PLATE, INSTALL MT		
20	87171	WASHER, 3/8 FLAT		
21	57119	NUT, 3/8-16 HEX NYLOCK		
22	55-501789	PIN, LOCK HOSE REEL		
23	50-501812	BRKT, HOSE REEL LOCK		
24	04-000302	SPRING, LOCK-LOCK PIN ASSY		
25	04-000303	CLIP, RETAINER-LOCK PIN ASSY		

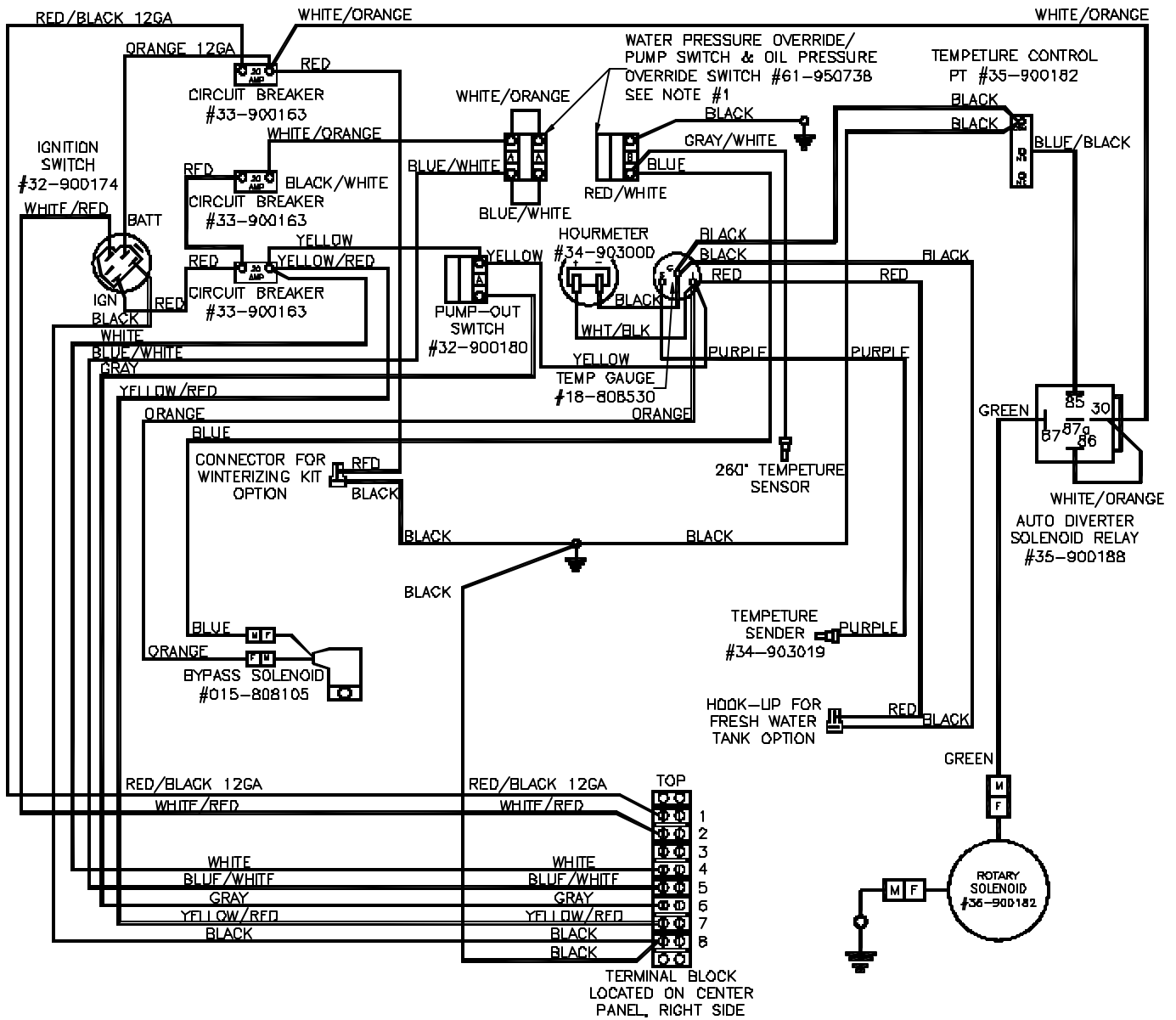
WATER BOX WITH AUXILIARY WATER TANK



WATER BOX WITH AUXILIARY WATER TANK

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	70302	SCR, 5/16-18 X 1" HHCS GR5 PLTD NP		
2	00-000072	SCR, 3/8-16 X 2" HXHD		
3	70266	SCR, 3/8-16 X 1" HHCS GR5 PLTD DL		
4	57006	NUT, 1/4-20 HEX		
5	57119	NUT, 3/8-16 HEX NYLOCK		
6	87083	WASHER, 5/16 SPLIT LOCK PLTD		
7	87171	WASHER, 3/8 FLAT		
8	87163	WASHER, 3/8 SPLIT LOCK PLTD		
9	02-000143	WASHER, 5/16 FLAT		
10	03-000113	CLAMP, HOSE #12 SST		
11	03-000246	CLAMP, HOSE #8 SST		
12	09-805100	HOSE, WATER 3/4 X 13.5		
13	09-805288	HOSE, WATER 5/8 X 27		
14	11-800041	ELBOW, STREET 1/2 BR		
15	11-800283	RED, 1/2FP X 3/8P BR		
16	11-800357	PLUG, 3/4 SOCHD BR		
17	11-800401	ELBOW, 3/4 ST BR		
18	11-800432	CAP, WATER BOX		
19	11-800525	NIP, 3/4 X 2-1/2 BR		
20	12-800052	CAP, HOS 3/4 BR		
21	12-800095	FTTG, BRB 3/4P X 3/4H BR		
22	12-800269	FTTG, BRB 1/2P X 5/8H BR		
23	13-806008	DSC, 3/8F X 3/8FP		
24	15-808072	VALVE, BALL 3/4FP BS		
25	15-808110	VALVE, FLOAT TM		
26	19-807014	BALL, FLOAT		
27	43-807008	WASHER, HOSE 5/8ID X 1"OD		
28	50-500511	PLATE, INSTALL MT		
29	50-502092	PLATE, FRT TANK SUPPORT		
30	54-501715	FLAT ROD, TM		
31	56-502505	ENCL, TANK SUPPORT W/ DEM PUMP		
32	58-500899	MLDG, WATER TANK 60G W/ OVRFI		
33	64-950681	HARNESS, WATER PUMP		NOT SHOWN
34	66-945614	KIT, DEM PUMP FLOJET 60G		

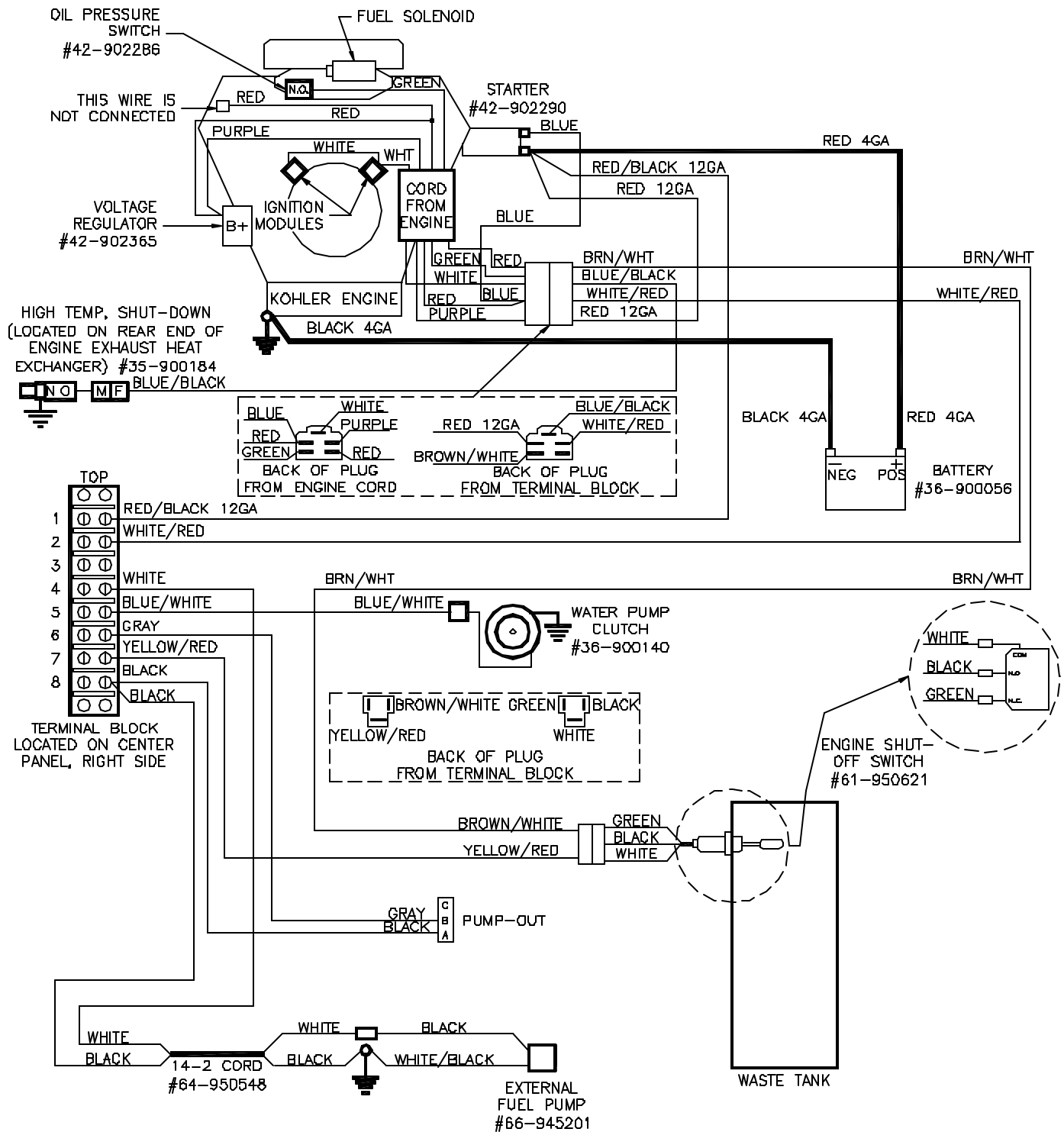
WIRING DIAGRAM



NOTE: THE WATER PRESS OVERRIDE/PUMP SWITCH AND OIL PRESSURE OVERRIDE SWITCH SHOWN ARE PART OF THE SAME SWITCH. THE OIL PRESS CONTACTS ARE STACKED ON TOP OF THE WATER PRESS. IT IS BEING SHOWN SPLIT FOR DETAIL ONLY.

RIGHT SIDE OF SWITCH (looking at back) IS SPRING RETURN (MOMENTARY). "A" ON THE CONTACT BLOCK INDICATES NORMALLY OPEN.

WIRING DIAGRAM



LIMITED WARRANTY

Prochem warrants your machine to be free of defects in material and workmanship. This warranty shall extend to the designated parts for the specific time period listed from the date of delivery to the user. If Prochem receives notice of such defects during the warranty period, Prochem will either, at its option, repair or replace products which prove to be defective. Any local or distant transportation, related service labor, normal maintenance, and diagnostic calls are not included.

Gasoline Engine (through manufacturer or local dealer)	_____	2 years
Vacuum Pump (through manufacturer or local dealer)	_____	18 months
Engine Heat Exchanger	_____	1 year
Water Pump	_____	2 years
Waste Pump	_____	1 year
Wands (Except shut off valve and orifices)	_____	1 year
Waste & Water Tanks	_____	1 year
Pressure Regulator	_____	1 year
All other components	_____	1 year
Battery (through dealer only, pro-rated)	_____	1 year (1-800-350-8068)

This warranty shall not apply to defects resulting from improper installation or operation, inadequate maintenance by the customer, unauthorized modification, misuse, a unit which is improperly repaired, exposure to freezing temperature conditions, or damage due to hard water scaling.

Disposable filters, electrical components, belts, fittings, hoses, o-rings, and other maintenance items are not under warranty. Components provided by Prochem, but supplied by other manufacturers, will only be warranted to the extent that they shall be warranted to Prochem.

To obtain warranty service, products must be returned to a service facility designated by Prochem. Customer shall prepay shipping charges for products returned to Prochem for warranty service and Prochem shall pay for return of the products to customer.

Prochem makes no other warranty, either expressed or implied, with respect to this product. Prochem disclaims the implied warranties of merchantability and fitness for a particular purpose. Any implied warranty of merchantability or fitness is limited to the specific duration of this limited warranty.

This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state, or province to province.

The remedies provided herein are the customer's sole and exclusive remedies. In no event shall Prochem be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Your Prochem unit is designed to give you years of reliable service. However, if a problem should arise after the warranty period, follow the troubleshooting procedures in the Operation and Service Manual. If you are still unable to determine the cause and solution to the problem, contact your nearest Prochem Service Center for details of the services available.