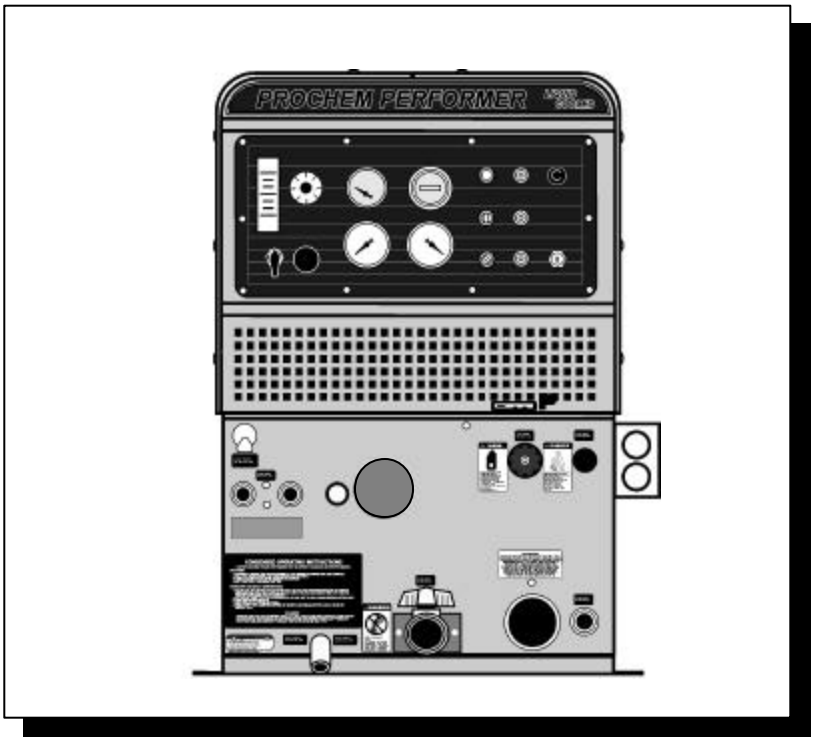
PERFORMER & PERFORMER 405

Mobile Cleaning Unit



Operating Instructions (ENG)

MODELS: *PERFORMER*
PERFORMER 405
AUTO HEAT DIVERTER UNITS

Read instructions before operating the machine.

J 980060
02/10/04

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 **PERFORMER/PERFORMER 405** 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 AT THE TIME OF INSTALLATION AND IS RETURNED TO PROCHEM!

This operation and service manual is written specifically for the PROCHEM PERFORMER/PERFORMER 405 Mobile Cleaning Unit which are manufactured by:

PROFESSIONAL CHEMICALS CORPORATION
325 SOUTH PRICE ROAD
CHANDLER, ARIZONA 85224

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

TABLE OF CONTENTS

PARTS LIST

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 _____

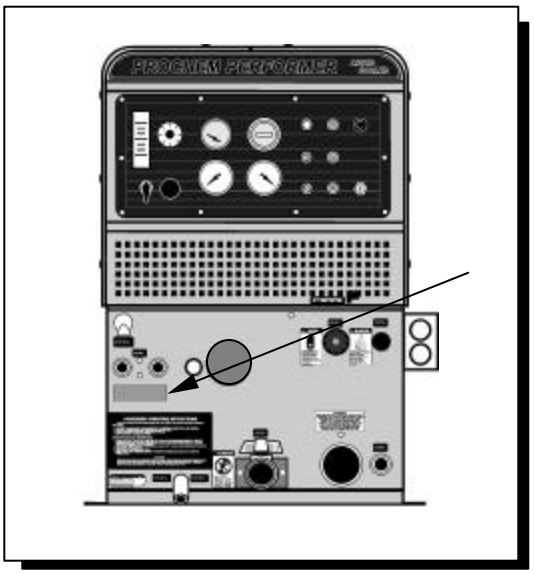
SALES REPRESENTATIVE # _____

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 precautions must always be followed, including the following:

READ ALL INSTRUCTIONS BEFORE USING THIS MACHINE.

⚠ WARNING:
⚠ CAUTION:

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 1209 lbs. (Performer 405 is 1255 lbs.) 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.

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.

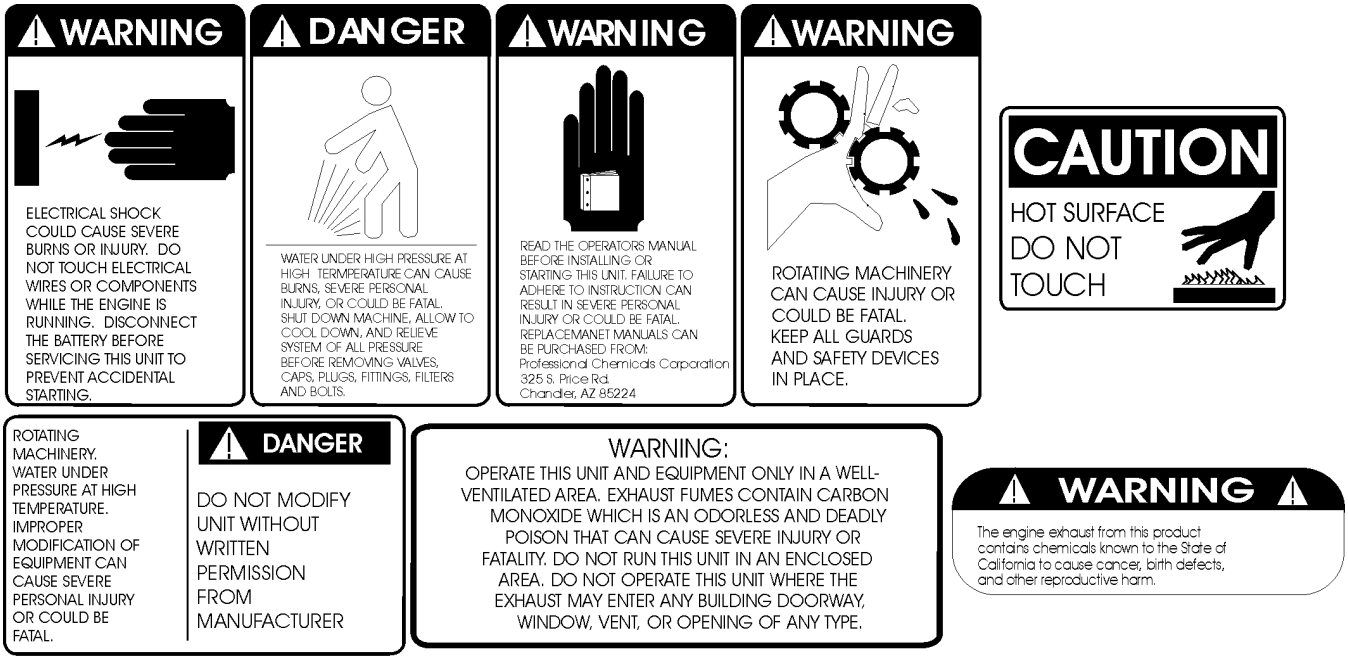
Make certain that you receive complete training by the distributor from whom you purchased this unit.

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

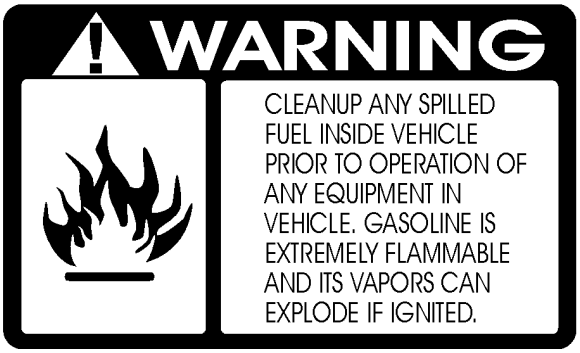
Do not modify this unit in any manner. Improper modification can cause severe personal injury or fatality.

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.

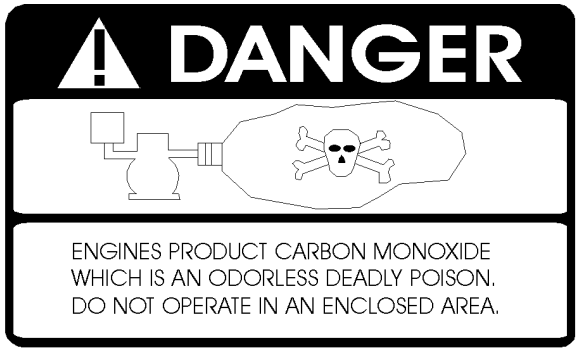
*The following **WARNING LABELS** are found on your PERFORMER/PERFORMER 405 console. These labels point out important **Warnings** and **Cautions** which should be followed at **all** times. Failure to follow warnings and cautions could result in fatality, personal injury to yourself and/or others, or 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 PROCHEM PERFORMER/PERFORMER 405 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	2400 rpm (high speed) Water Pump ON 1900 rpm (low speed) Water Pump OFF. 900 rpm (idle speed) Water Pump OFF.
Water pump rpm	1625 rpm
Vacuum pump rpm	2650 rpm
Water flow rate	5.0 GPM (maximum)
Water pump pressure	1000 PSI (maximum)
Vacuum relief valve	14” Hg (13” Hg - Performer 405)
Waste tank capacity	66 gallons (55 gallons to shut-off)
Console weight	964 lbs. (1010 lbs - Performer 405)
Console weight (with waste tank & accessories)	1209 lbs (1626 lbs. If waste tank is full) 1255 lbs. (1672 lbs. If waste tank is full - Performer 405)
TORQUE VALUES	
Engine hub	720 inch lbs 60 foot/lbs
Vacuum pump hub	192 inch/lbs 16 foot/lbs

JET SIZING:

PROCHEM recommends **floor tool** tip sizing not exceed a total of “.06”. Using larger jet sizes on your PERFORMER/PERFORMER 405 may reduce cleaning temperatures.

Example: **Tri-jet wand uses three 9502 jets** (95° spray angle w/ 02 orifice).
02 x 3 = 06

When using two floor tools while cleaning with this unit, PROCHEM recommends that each tool tip size does not exceed a total of “.045”.

Example: **Tri-jet wand uses three 95015 jets** (95° spray angle w/ 015 orifice).
015 x 3 = 045…….045 x 2 tools = 09

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

DEALER RESPONSIBILITY

The Prochem distributor 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 PERFORMER/ PERFORMER 405 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 PERFORMER/ PERFORMER 405 cleaning unit should arrive equipped with the following items (unless otherwise specified) and any optional accessories which were ordered.

EQUIPMENT LIST:

1. PROCHEM PERFORMER/PERFORMER 405 console.

2. Operation and service manual with engine, water pump, and vacuum pump manuals.

3. Installation bolting kit.

4. Installation mounting plates.

5. Hose clamps for vacuum hoses.

6. Carpet wand.

7. Waste tank w/float switch.

8. Waste tank filter and strainer basket (PERFORMER 405 units have two filters).

9. 150 ft. of 2" vacuum hose.

10. 2 vacuum hose connectors.

11. 150 ft. of 1/4" high pressure hose with quick connects.

12. 50 ft. water supply hose with quick connect.

OPTIONAL EQUIPMENT:

13. Winterizing loop hose. Part #10-805380.

14. Upholstery tool and stair tool.

15. Extra wands.

16. Hose reel.

17. Extra vacuum hoses. Part #10-805060.

18. Extra vacuum hose connectors. Part #12-800078.

19. Extra high pressure water hoses. Part #10-805122.

20. Van storage unit. Part #65-950392.

21. Dual auxiliary water tanks with demand pump. Part #66-945260.

22. Automatic waste pump kit. Part #66-951506

23. Galvanized drip tray. Part #56-501845.

24. Water softener. Part #66-945430

INSTALLATION

INSTALLATION REQUIREMENTS

Prior to starting the installation, first read the **ENTIRE** "Installation" section of this manual. Since the PERFORMER cleaning unit (with waste tank and accessories) weighs 1209 pounds (PERFORMER 405 weighs 1255 lbs.), consider the following recommendations before installing this unit.

1. The unit should **NOT** be mounted in any motor vehicle of less than **3/4 ton capacity**.

⚠ CAUTION:

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).

7. If using a trailer, the PERFORMER/PERFORMER 405 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.

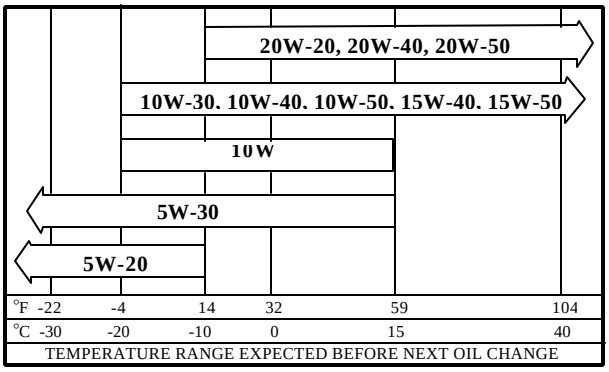
FUEL REQUIREMENTS

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



CHEMICAL REQUIREMENTS

The PROCHEM PERFORMER/PERFORMER 405, 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

⚠ 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 PERFORMER console weighs approximately 964 pounds (PERFORMER 405 weighs 1010 lbs.), 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 PERFORMER/PERFORMER 405 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 PERFORMER/ PERFORMER 405 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.

WASTE TANK TO CONSOLE CONNECTION

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

1. Connect the 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. **NOTE:** On the PERFORMER 405, the hose and tubing will be 3-1/2" diameter.

2. Connect the 2" I.D. waste removal hose to the 2" dia. tube at the bottom of the waste tank. Tighten the hose clamps.

3. 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.

4. Connect the console engine shut-off cord to the waste tank level sensor cord.

5. Connect the 3/16 stainless steel hose from the bypass valve to the connector on the waste tank.

BATTERY CONNECTION

⚠ WARNING:

Dangerous Acid, Explosive Gases! Batteries contain sulfuric acid. To prevent acid burns, avoid contact with skin, eyes, and clothing.

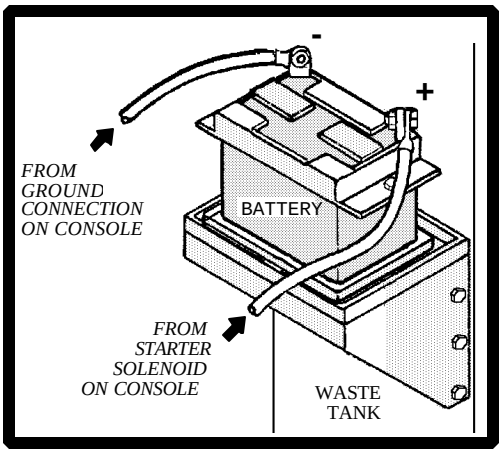
Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well-ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when 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.

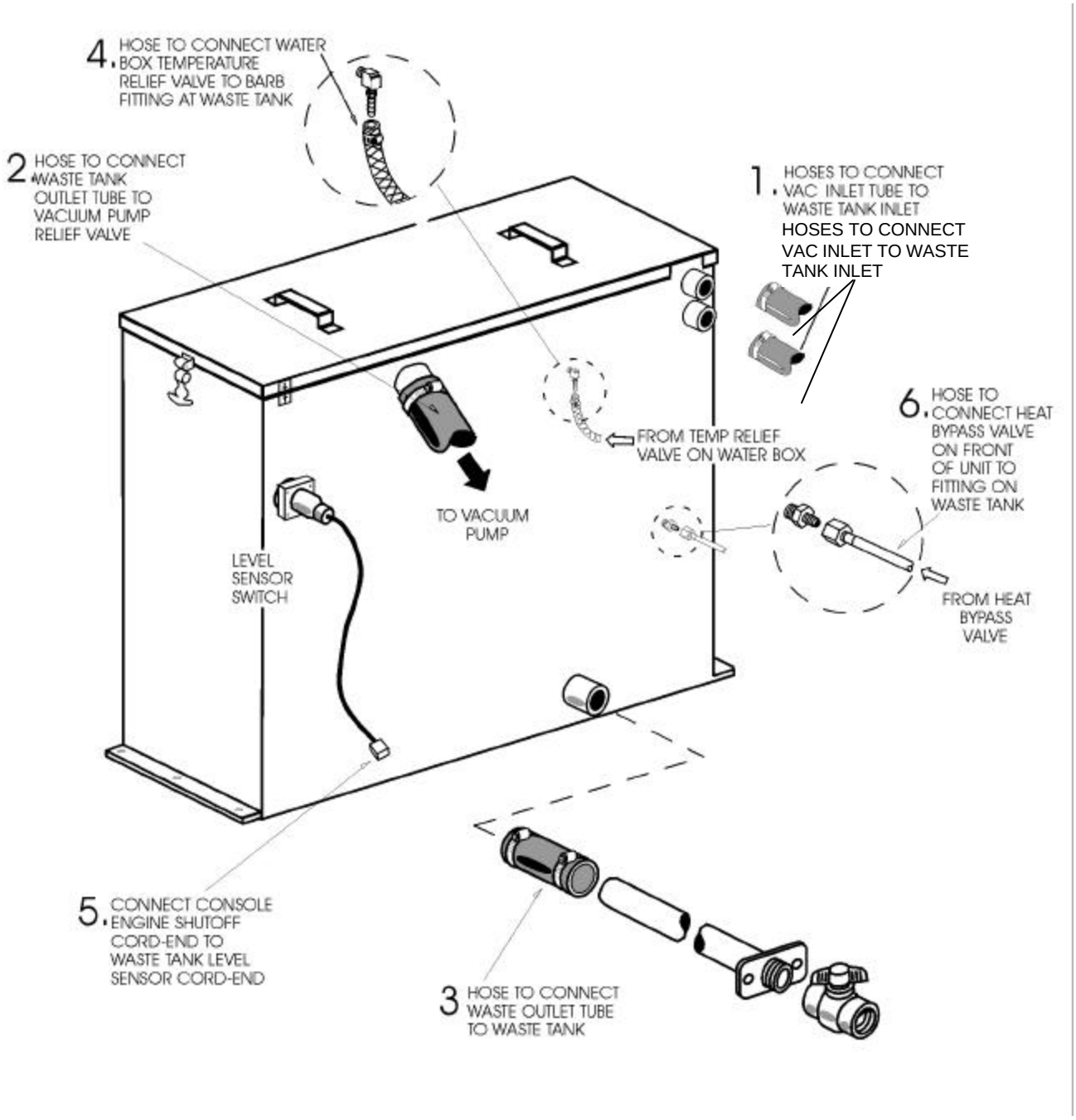
2. Next, attach the black negative (-) battery cable from the console ground to the negative (-) terminal on the battery and tighten the holding nut.

BATTERY HOOK-UP



FIRE EXTINGUISHER

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



SPECIAL INSTRUCTIONS:

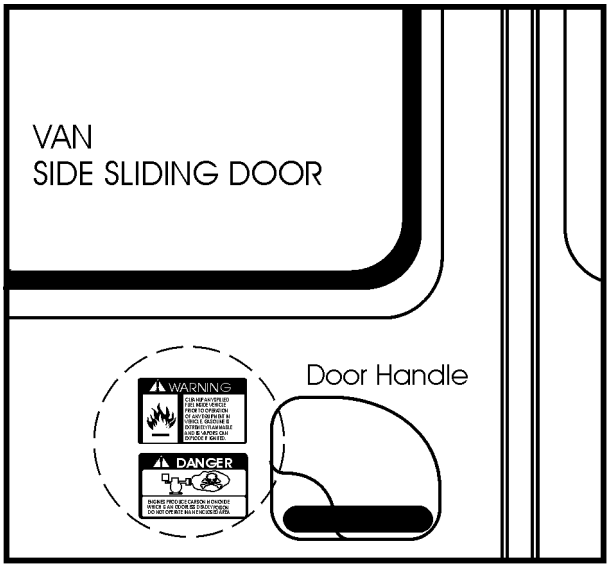
1. Cut hoses to fit, if necessary.

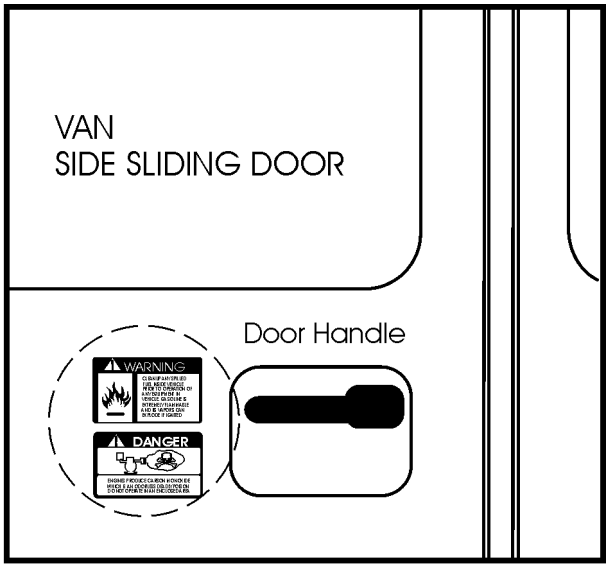
2. When cutting hoses, make certain that the cutting blade is facing away from you hands, fingers, or any other part of your body to avoid injury.

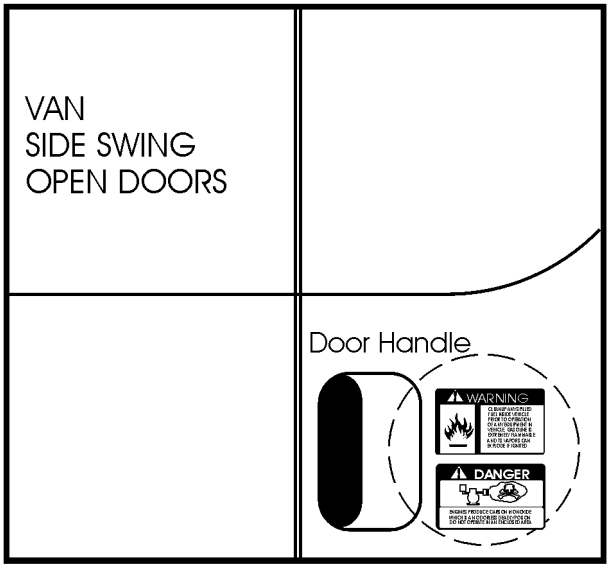
3. Do not install hoses with excessive bends or kinks.

4. Place clamps on hoses before installing.

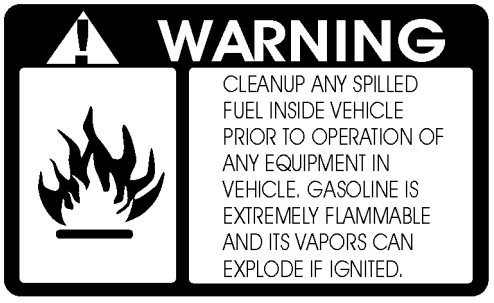
5. Tighten all hose clamps firmly.

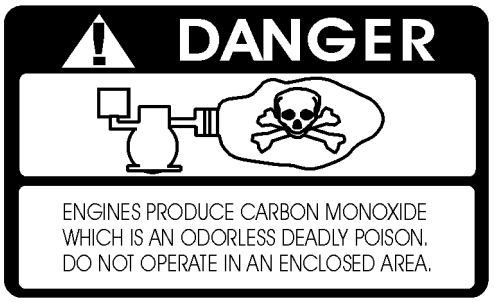






Decal, Fuel Clean-up
Part# 48-941317





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 the 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 replaced.

WATER PUMPING SYSTEM

See Figures 13 and 14. 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.

If the tool valve is closed, water flows from the pressure regulator through the vacuum exhaust radiator-type heat exchangers, 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, through the heli-coil heat exchanger, to the engine exhaust heat exchanger, where it 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.

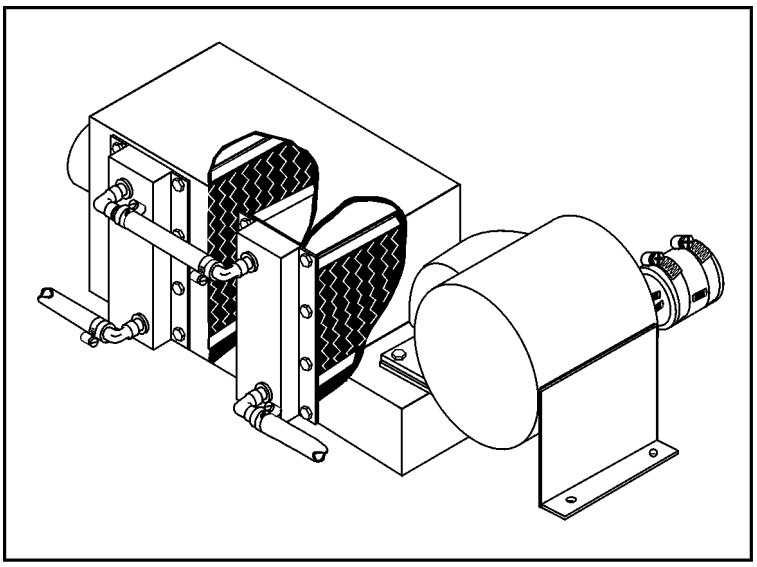
An additional temperature sensor on the engine exhaust heat exchanger outlet will shut down the engine if the water temperature exceeds 285°F. If this occurs, consult the "Trouble-shooting" section of this manual to determine the cause of overheating before restarting your unit.

HEAT TRANSFER SYSTEM

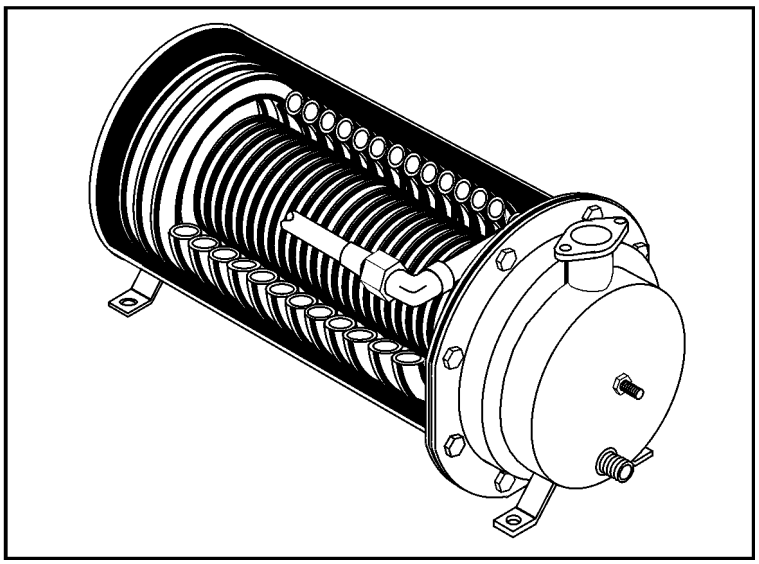
See Figures 13 and 14. Water is heated through a three stage heat exchange system which utilizes vacuum exhaust, engine coolant, and engine exhaust**.**

Stage one utilizes vacuum exhaust heat blowing over two radiator-type heat exchangers in series prior to discharging the exhaust into the atmosphere. When the tool valve is closed, the water bypasses from the pressure regulator manifold to the water box through the vacuum exhaust heat exchangers. Water then flows from the water box to the water pump, where it is pressurized. It then travels to the pressure regulator manifold.

When the tool valve is open, the water flows through the stage two heli-coil heat exchanger system which uses heated engine coolant pumped over copper coils. The pressurized water flows through the copper coils and collects heat from the engine's cooling system. The water then flows to the stage three heat exchange system.



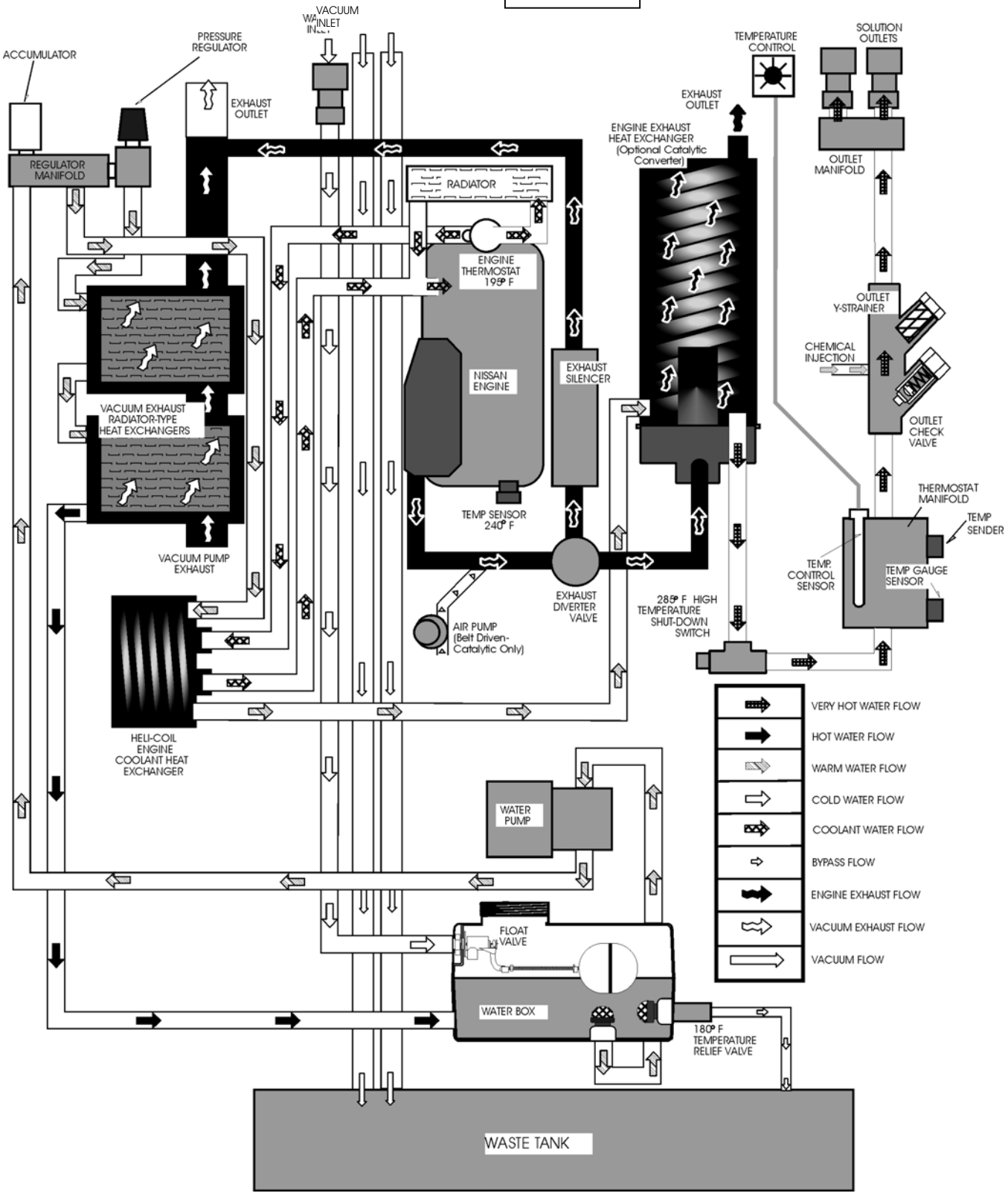
CATALYTIC ENGINE EXHAUST HEAT EXCHANGER



VACUUM EXHAUST HEAT EXCHANGER

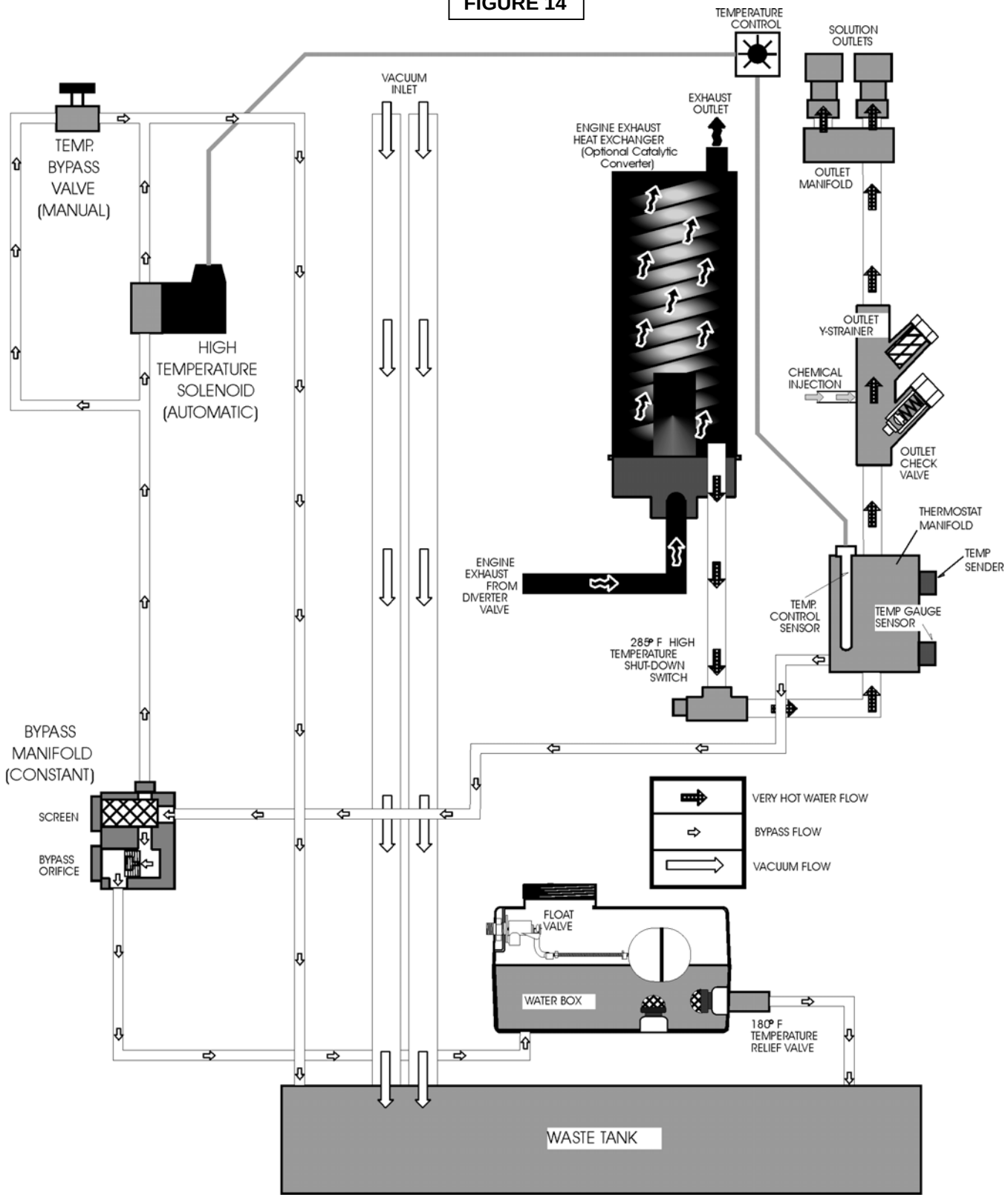
HEAT TRANSFER & WATER PUMPING SYSTEM

FIGURE 13



MANUAL & AUTOMATIC HOT WATER BYPASS SYSTEMS

FIGURE 14



The stage three heat exchanger is an engine exhaust chamber containing a stainless steel heating coil and catalytic converter (optional). Water flows through the coil and is heated by the engine exhaust as it leaves the engine. The catalytic heat exchanger uses a catalytic core.

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 outlet manifold to the cleaning tools.

The exhaust diverter valve is located on the engine exhaust system. The automatic rotary solenoid directs engine exhaust either to the heat exchanger or muffler to automatically maintain the desired temperature.

⚠ CAUTION:

For flood extraction operations set temperature control to 50°. This will direct all exhaust though muffler and bypass heat exchanger

VACUUM SYSTEM

See Figure 15. Vacuum flow is initiated by the vacuum pump, with air and water being drawn into the vacuum inlet at the front of the console.

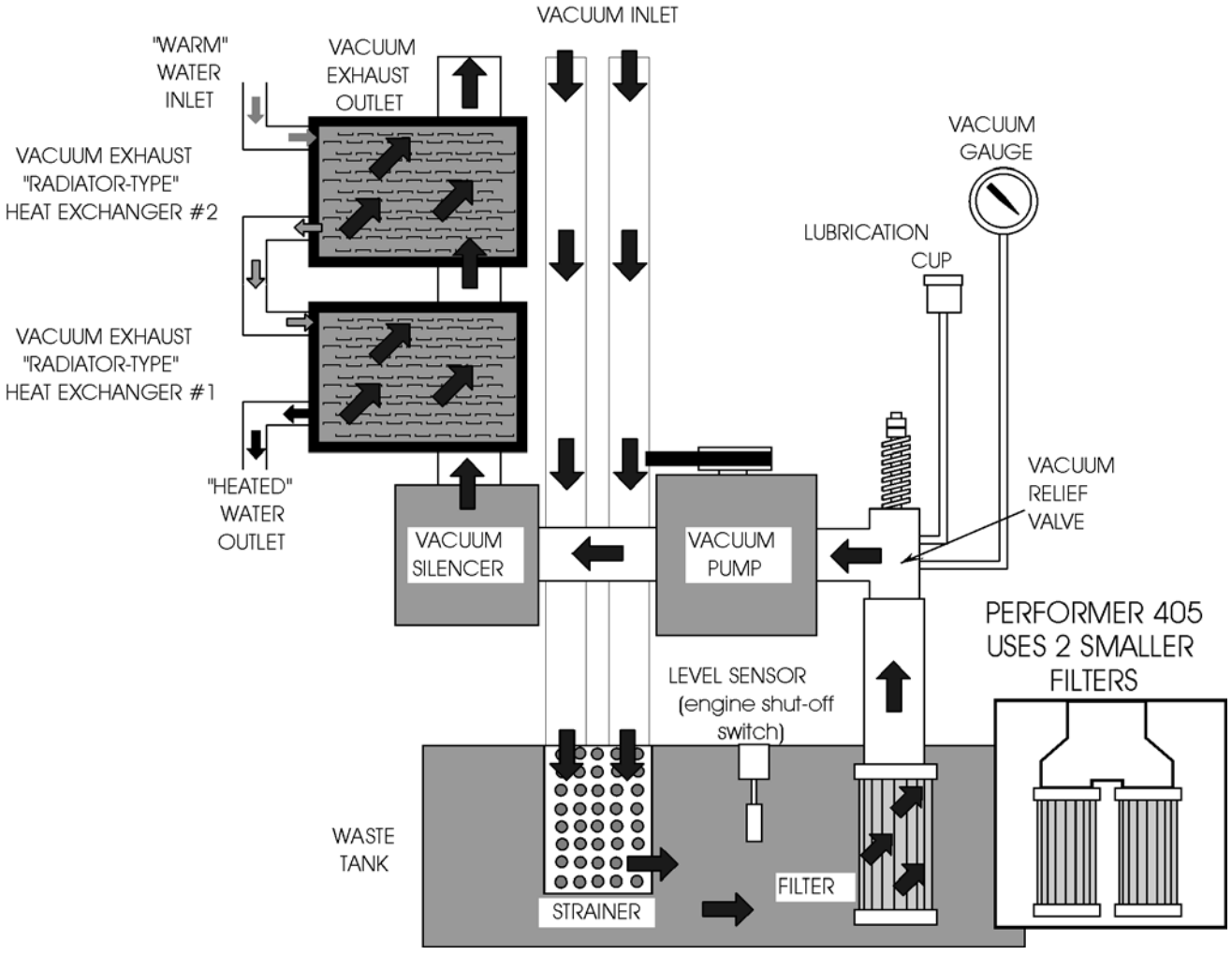


FIGURE 15

The mixture then flows through a strainer basket into the waste tank. Air exits the waste tank through a 100-mesh filter (the PERFORMER 405 uses two filters), 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 two radiator-type heat exchangers 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 16. 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.

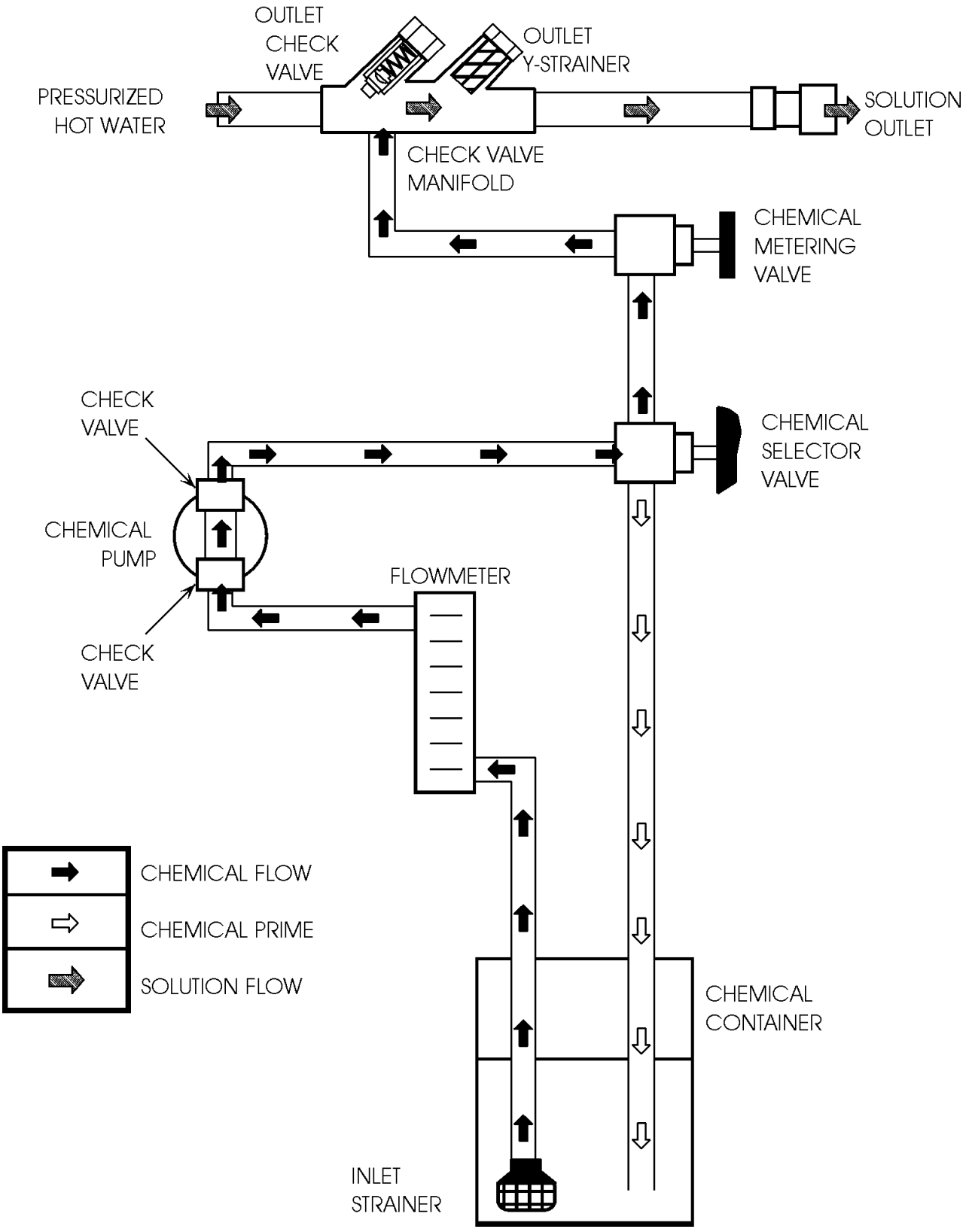

OUTLET
CHECK
VALVE
OUTLET
Y-STRAINER
PRESSURIZED
HOT WATER
SOLUTION
OUTLET
CHECK VALVE
MANIFOLD
CHEMICAL
METERING
VALVE
CHECK
VALVE
CHEMICAL
SELECTOR
VALVE
CHEMICAL
PUMP
FLOWMETER
CHECK
VALVE
CHEMICAL FLOW
CHEMICAL PRIME
SOLUTION FLOW
CHEMICAL
CONTAINER
INLET
STRAINER

FIGURE 16

This section of the operator's manual explains how to prepare, start, operate, shut down, and maintain the PROCHEM PERFORMER/ PERFORMER 405 cleaning unit. Operation of the PERFORMER/PERFORMER 405 is simple. However, only trained personnel should proceed.

⚠ 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 1.18 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.

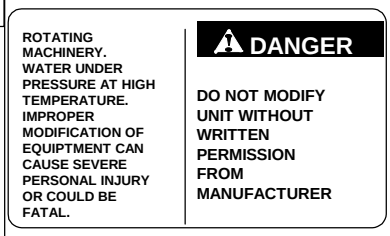
1. Connect the **water supply hose** to the **water inlet** quick-connect at the front of the unit. Connect the hose to the water supply faucet.

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**.

HIGH PRESSURE HOSE

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



VACUUM HOSE

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

JET SIZING

PROCHEM recommends **floor tool** tip sizing not exceed a total of "06". Using larger jet sizes on your PERFORMER/PERFORMER 405 may reduce cleaning temperatures.

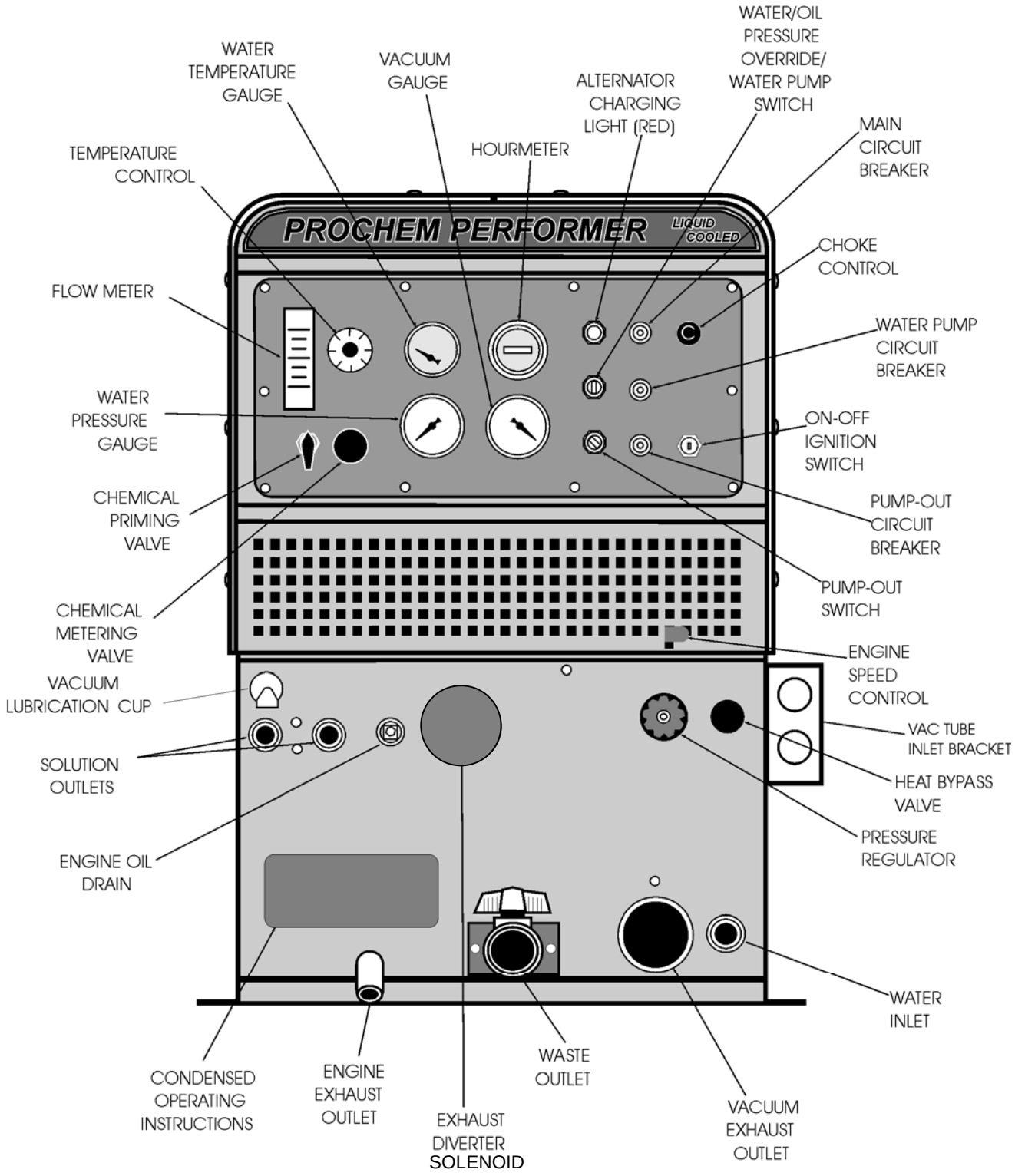

WATER/OIL PRESSURE OVERRIDE/ WATER PUMP SWITCH
WATER TEMPERATURE GAUGE
VACUUM GAUGE
ALTERNATOR CHARGING LIGHT (RED)
MAIN CIRCUIT BREAKER
TEMPERATURE CONTROL
HOURMETER
PROCHEM PERFORMER
LIQUID COOLED
CHOKE CONTROL
FLOW METER
WATER PUMP CIRCUIT BREAKER
WATER PRESSURE GAUGE
ON-OFF IGNITION SWITCH
CHEMICAL PRIMING VALVE
PUMP-OUT CIRCUIT BREAKER
PUMP-OUT SWITCH
CHEMICAL METERING VALVE
ENGINE SPEED CONTROL
VACUUM LUBRICATION CUP
VAC TUBE INLET BRACKET
SOLUTION OUTLETS
HEAT BYPASS VALVE
PRESSURE REGULATOR
ENGINE OIL DRAIN
WATER INLET
CONDENSED OPERATING INSTRUCTIONS
ENGINE EXHAUST OUTLET
WASTE OUTLET
EXHAUST DIVERTER SOLENOID
VACUUM EXHAUST OUTLET

FIGURE 17

Example: Quad-jet wand uses four 95015 jets. (95° spray angle w/ 015 orifice)

015 x 4 = 06

When using two floor tools while cleaning with your unit, PROCHEM recommends that each tool tip size does not exceed a total of ".04".

Example: Quad-jet wand uses four 9501 jets.

01 x 4 = 04…….04 x 2 tools = 08

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

STARTING THE UNIT

1. For carpet/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 to 50° F. This temperature setting energizes the rotary solenoid and puts the exhaust diverter in muffler 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 Out)
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 operation, 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, push the **throttle** into the appropriate engine speed position for your cleaning extraction operation.

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 flow meter).

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.

⚠ WARNING:

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.

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OPERATION

Once you have completed steps 1 through 9, proceed with the cleaning operation. Your unit should be in the correct throttle position for your 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 directs exhaust through either:

a) the engine exhaust HEAT EXCHANGER for high temperature cleaning, or

b) through the exhaust MUFFLER for cooler temperature, such as flood restoration.

Set temperature control to desired temperature for cleaning operations. The auto diverter will automatically switch between A & B to maintain temperature. Set temperature control to 50°F for flood extraction.

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. Use one (1) "80015" spray tip in either tool.

3. 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 the **temperature control** to the desired temperature setting. Slow engine speed down to minimize excess heat.

2. Use one (1) "9502" spray tip in your stair tool.

FLOOD RESTORATION

⚠ CAUTION:

Set the temperature to 50°F.

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 the first notch (low speed).

4. Disconnect the **vacuum hoses** from the unit.

5. Set temperature dial to 50°F and allow the unit to cool down to 180°F or less, and then close the **heat bypass valve** completely. **DO NOT** over-tighten the valve.

6. Pull the **throttle** all the way out 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: Push the throttle all the way in, plug the vacuum inlets 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.

⚠ WARNING:

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 for PERFORMER, #14-806509 for PERFORMER 405) 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.

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. Start the unit and turn water pump on. Open the tool valve until water pressure drops and water stops flowing.

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

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

6. Turn the **water pressure override switch** to the override position and start the unit. Turn the **water pump switch** ON.

7. 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 re-cycle 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.

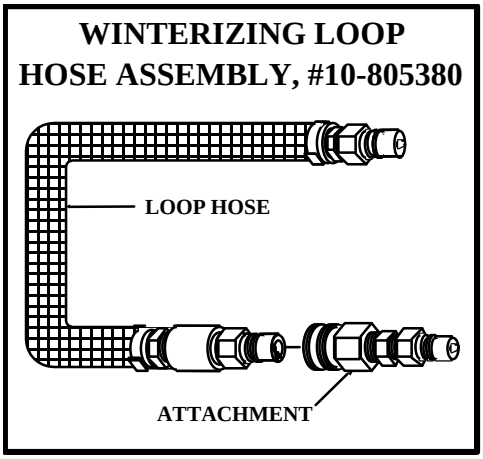
8. Turn the **water pump switch** OFF. Attach the **winterizing loop hose** with attachment, Part #10-805380, to the solution outlet connection and the water inlet connection. Turn the **water pump switch** ON.

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

9. 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.



10. Open the **heat bypass valve** by turning the knob counter-clockwise. After 10 seconds, close the **heat bypass valve**.

Turn the **temperature control** on the control panel to 50°F for 10 seconds.

11. 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(s).

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.

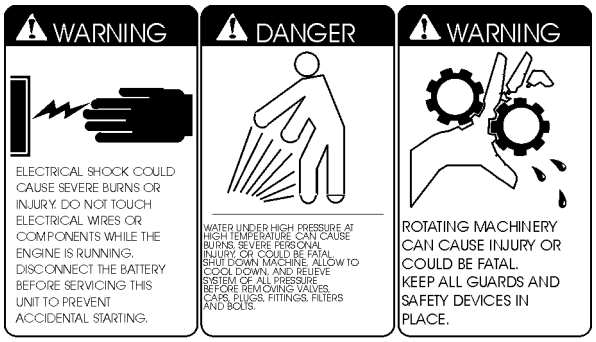
MAINTENANCE

SERVICE SCHEDULE

Engine	Daily	Check engine oil level. *** Fill to proper level
Engine	Daily	Check coolant level in overflow bottle.
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
Water Pump Inlet Filter	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	Change oil filter***
Battery	100 hrs*	Clean battery terminals
Engine	100 hrs	Check fan belt tightness
Engine	200 hrs	Service air cleaner elements*
Engine	200 hrs	Check radiator hoses and clamp tightness
Engine	200 hrs	Check spark plugs for carbon deposits and proper gap
Heat bypass and chemical valves	200 hrs	Inspect and/or adjust packing nuts
Temperature solenoid	200 hrs*	Remove any hard water deposits
Vacuum exhaust heat exchanger	200 hrs	Inspect core and remove debris
Vacuum pump	250 hrs	Lubricate bearing on pulley end with grease
Water pump	500 hrs	Change oil**
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****
Engine	1000 hrs	Replace spark plugs
Engine	1000 hrs	Flush radiator and change engine coolant
Engine	1000 hrs	Drain and refill engine governor oil
Chemical pump & check valve	1000 hrs	Replace diaphragm and check valves
Check valve (solution outlet)	1000 hrs	Inspect, clean and repair, if needed.
Vacuum pump	1500 hrs	Drain, flush, and replace oil.*****
Engine	Yearly*	Replace in-line fuel filter on engine
Engine	Yearly*	Replace air cleaner element
Nitrogen accumulator	Yearly*	Replace, if needed.
Engine	2 years	Replace radiator hoses and hose clamps
Engine	3 years	Replace ignition wires

* 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

This section of the operator's manual contains the maintenance information for this unit. Initiation of a planned preventative maintenance program will assure that your PROCHEM PERFORMER/PERFORMER 405 has optimum performance, a long operating life, and a minimal amount of "down" time.



⚠ 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.

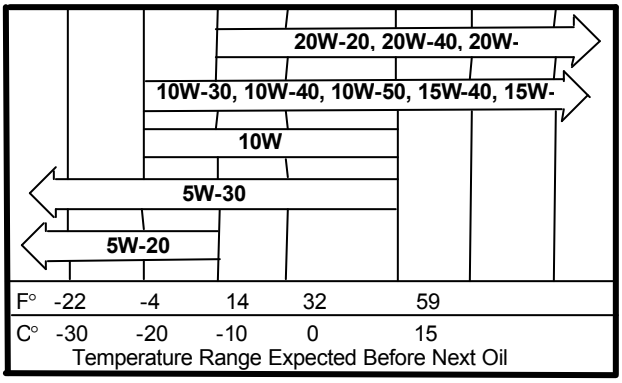
ENGINE

1. Check the engine oil level **daily**, when in use. Make certain that proper oil level is maintained. **NEVER** overfill.

2. Change the break-in oil after the first **50 hours** of operation. Thereafter, change oil every **100 hours** of operation. USE ONLY NISSAN BRAND OIL FILTERS. USING ANY OTHER TYPE OIL FILTER WILL VOID YOUR ENGINE WARRANTY.

Oil Recommendation. 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:

RECOMMENDED SAE VISCOSITY GRADE



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

3. Re-torque the manifold and exhaust tube nuts, cylinder head bolts, and carburetor attaching nuts after the **first 200 hours** of use.

4. Check the oil level in the engine governor every **100 hours**. When empty, the governor requires approximately 1-1/2 fluid ounces of 30 weight non-detergent oil (see Figure 18).

   Drain and refill the engine governor every **500 hours**.

5. Check the spark plugs every **200 hours**. Clean if necessary. Replace the spark plugs every **1000 hours**. **NOTE:** Never sandblast spark plugs. Spark plugs should be cleaned by scraping or wire brushing.

6. Clean the air cleaner element every **200 hours**. Replace the element every **2400 hours**

CHECK ENGINE GOVERNOR OIL LEVEL EVERY 100 HOURS

WHEN FILLING, REMOVE THE GOVERNOR FILL PLUG AND, USING A SYRINGE OR OTHER MEASURABLE FILLING DEVICE, ADD 30-WEIGHT NON-DETERGENT OIL. REPLACE THE FILL PLUG. WHEN EMPTY, THE GOVERNOR REQUIRES 1-1/2 FLUID OZ.

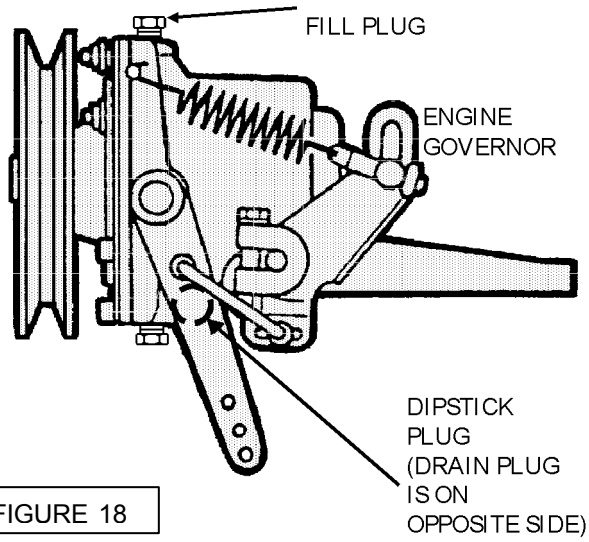


FIGURE 18

7. Check the engine idle RPM every **200 hours** and adjust, if necessary. **NEVER** adjust engine RPM without a tachometer. Refer to Nissan Engine Operation and Service Manual.

8. Check the coolant level in the radiator overflow container **daily**. If no coolant is seen, remove the cap and add coolant. Change the coolant with a 70:30 coolant to water ratio every **1000 hours**.

9. Replace the in-line gas filter **yearly**.

NOTE: For additional engine service information, obtain a "Nissan A-12 Service and Repair Manual" from any authorized Nissan Service Center. If service or repair is required, contact an authorized Nissan Service Center. You will need to provide the serial number of the engine.

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 the next 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.

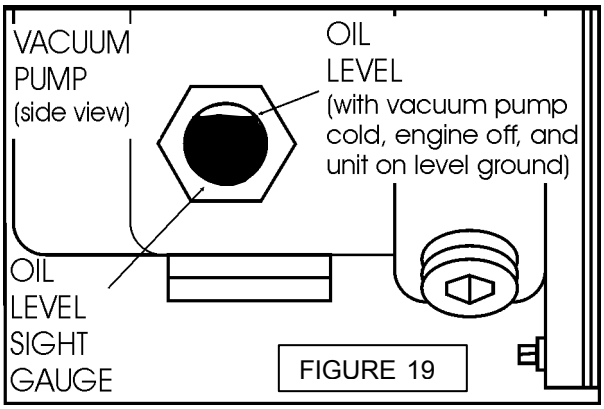


FIGURE 19

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.

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 inlets are 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.**

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	

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 high temperature lithium complex grease of the specification NLGI Grade 2.

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.

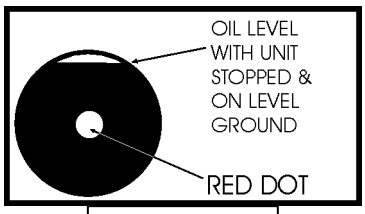


FIGURE 20

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**.

⚠ 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 a stainless steel PROCHEM filter (#14-806518 for PERFORMER. The PERFORMER 405 requires two filters, #14-806509) only.

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 following chart. 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.

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 remove 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.

NITROGEN ACCUMULATOR

Check the nitrogen pre-charge **at least once a year**. Recharge the accumulator and replace the bladder, when needed. This should be performed by an Authorized Service Center.

⚠ WARNING:

Recharge accumulator with nitrogen ONLY. DO NOT charge accumulator over 250 PSI.

PRESSURE REGULATOR

Lubricate the o-rings **every 50 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

⚠ WARNING:

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.

   ⚠ CAUTION:

   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.

VACUUM EXHAUST HEAT EXCHANGER

Removing and cleaning the vacuum exhaust pre-heater cores 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 sub-merging 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.

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.

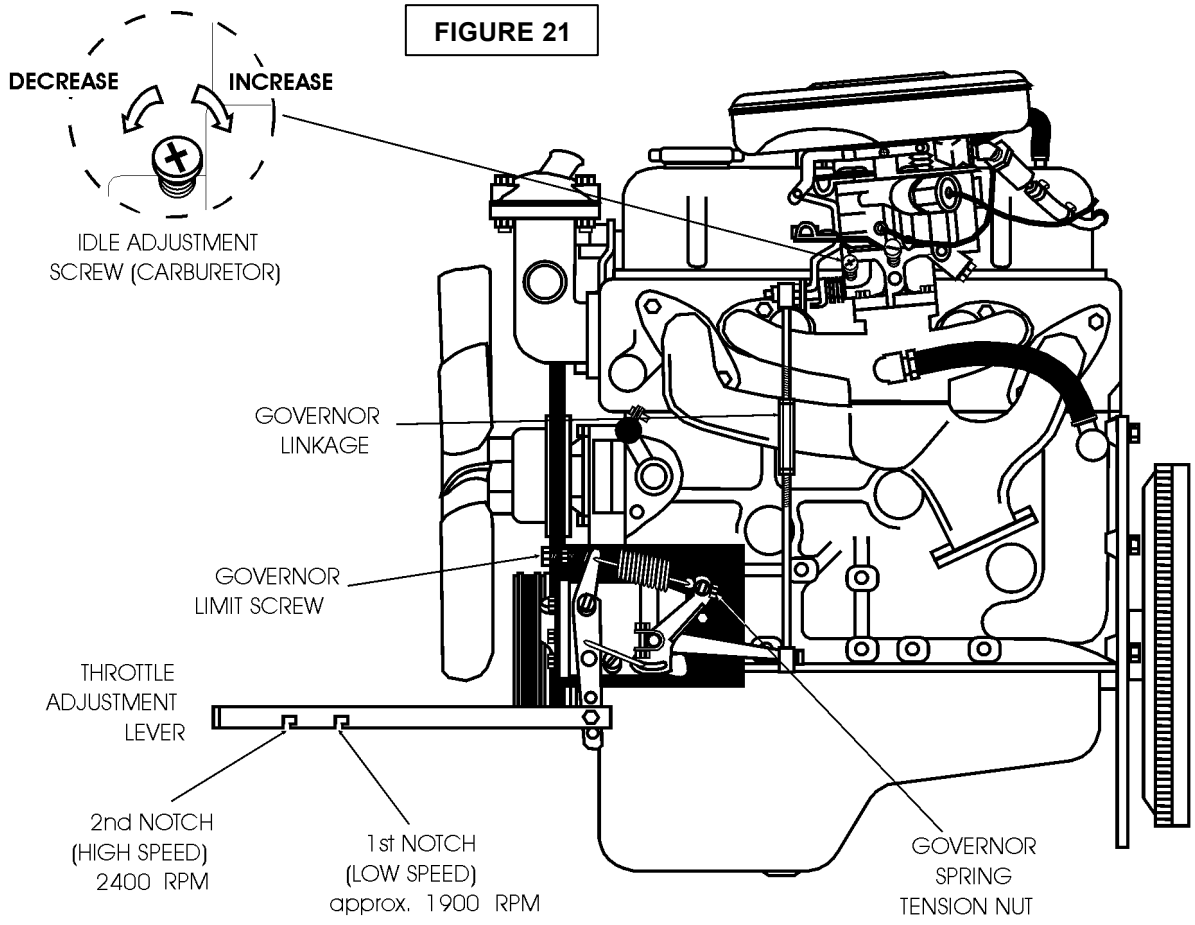
Remove the waste pump unit from the waste tank and clean inside the screen at least **once a week, or more frequently if required.**

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.

FIGURE 21



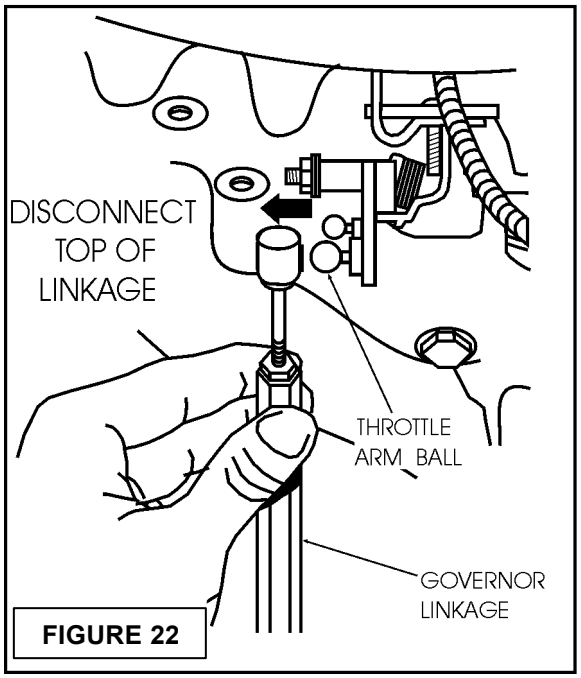


FIGURE 22

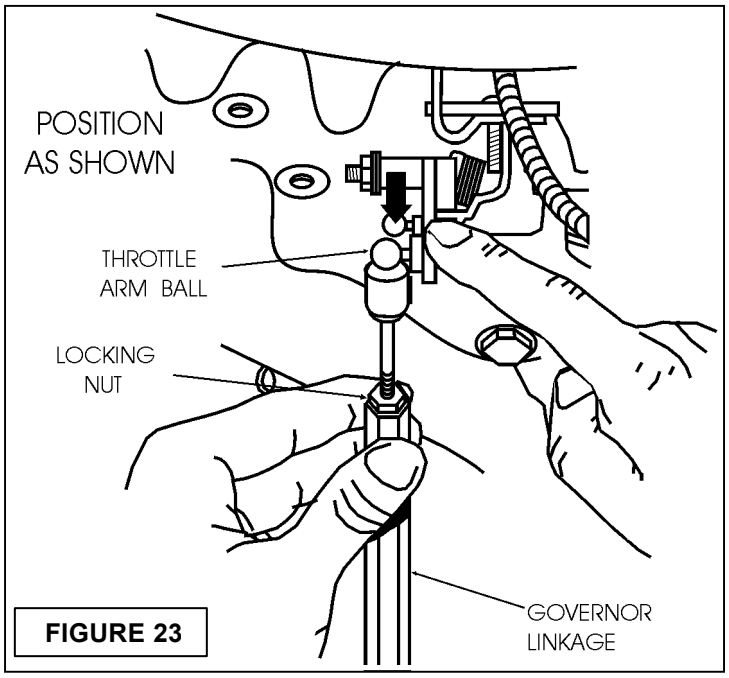


FIGURE 23

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 14" Hg (13” Hg for the PERFORMER 405).

VACUUM PUMP DRIVE BELTS

To tighten the vacuum pump belts:

1. Loosen the two nuts which hold the air pump mount in place (for units equipped with the catalytic engine exhaust heat exchanger and air pump).

2. Loosen the four screws 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 screws 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.

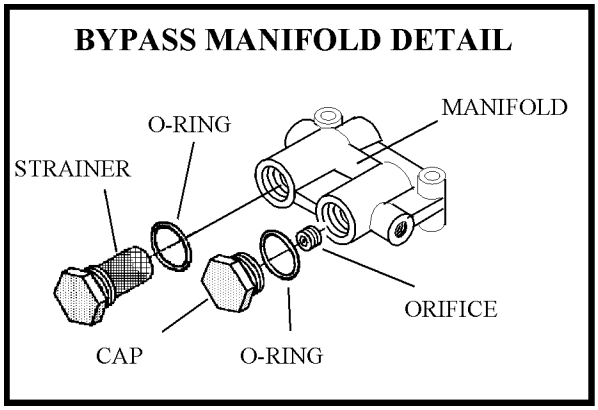
2. Disassemble the valve and check the piston and seat for damage, replace if needed. See the “Illustrated Parts Listing” for a parts break-down.

BYPASS MANIFOLD

Clean the bypass strainer and orifice **weekly**, 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:

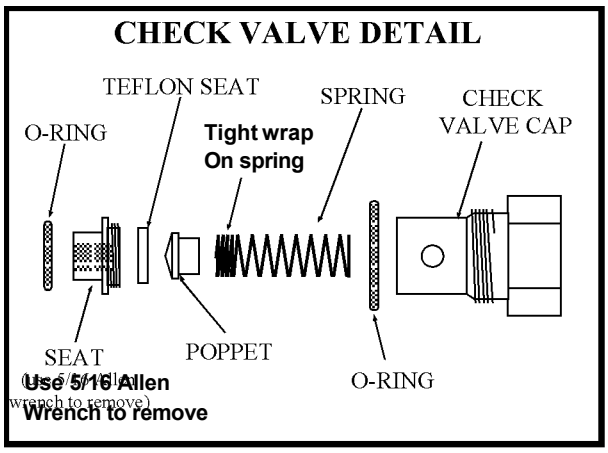
1. Remove the check valve. Be sure the small o-ring for the seat comes out with the check valve.

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.

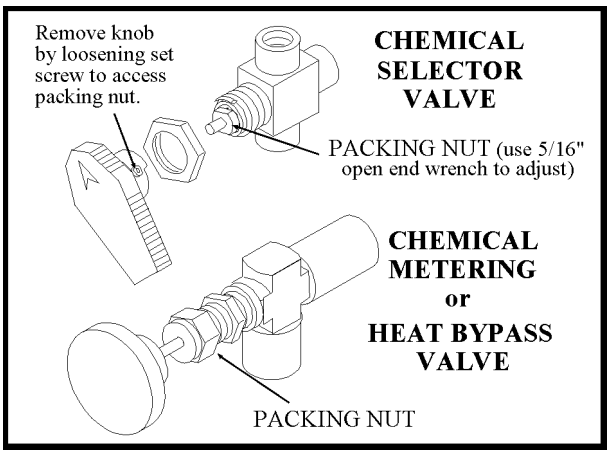
CHEMICAL PUMP

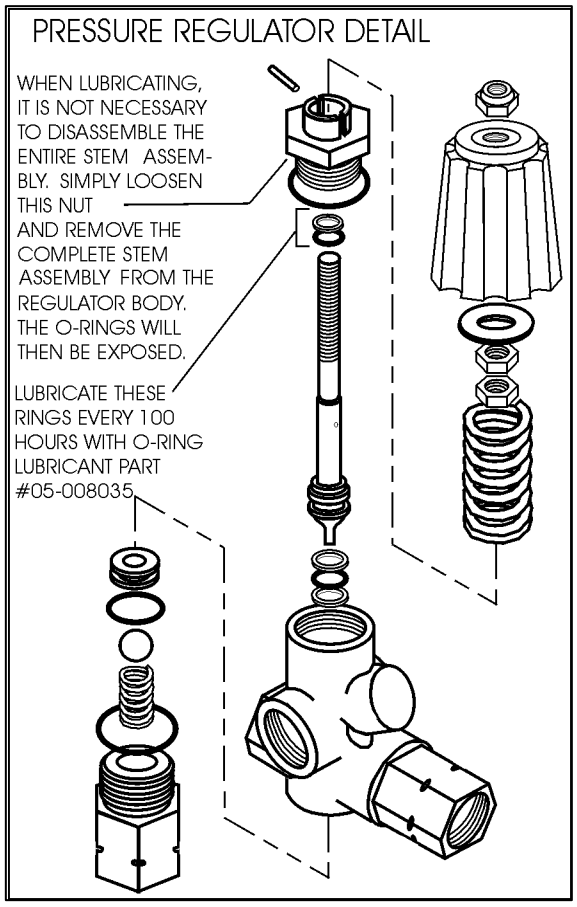
The only repairs which the chemical pump may require is the replacement of the diaphragm or check valves. To replace the diaphragm, unscrew the cover from the body. When replacing the diaphragm, lubricate the outer edges of the diaphragm with o-ring lubricant Part #05-008035 and reassemble. To replace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

ADDING/DRAINING ENGINE COOLANT

Use a 70:30 coolant to water ratio in this unit's cooling system. **NOTE:** See the "Maintenance Chart" for specific details.

1. To drain the coolant, remove the radiator cap and turn the lower engine radiator draincock counter-clockwise. Also open the draincock on the heli-coil and remove the lower heli-coil plug, until drained.

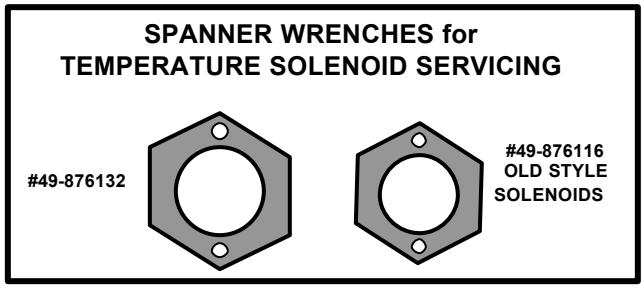
2. To add coolant, first install the heli-coil plug and fill the radiator. Next, bleed the air out of the system by turning the heli-coil heat exchanger draincock counter-clockwise. The heli-coil heat exchanger draincock is located on the heat exchanger casting on the right side of the console. After bleeding the air out of the heli-coil heat exchanger draincock, close the heli-coil heat exchanger draincock by turning it clockwise. Fill the engine radiator once again. Then add to the overflow container (fill **ONLY** halfway between the "add" and "fill" marks). After running the unit, add more coolant, if necessary, into the overflow container only.

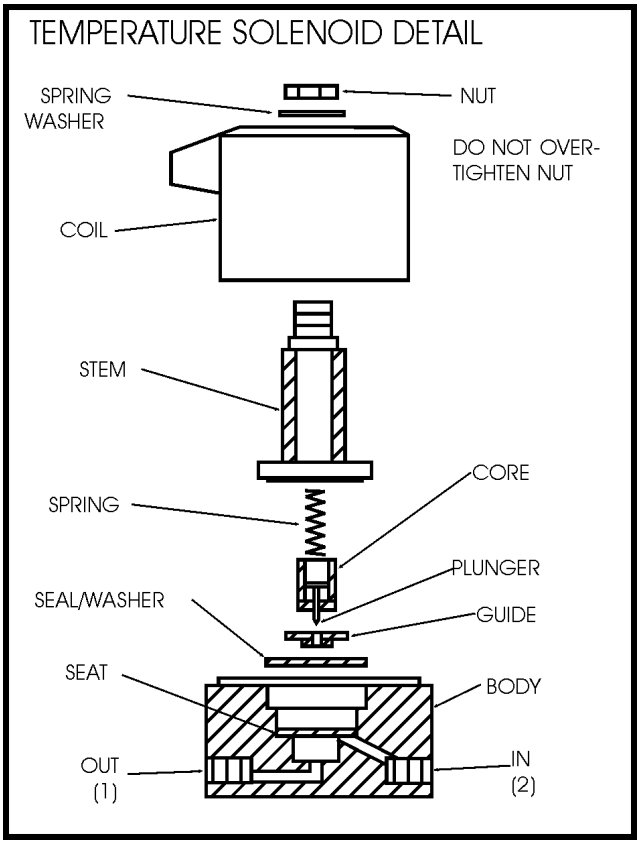
TEMPERATURE SOLENOID

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.

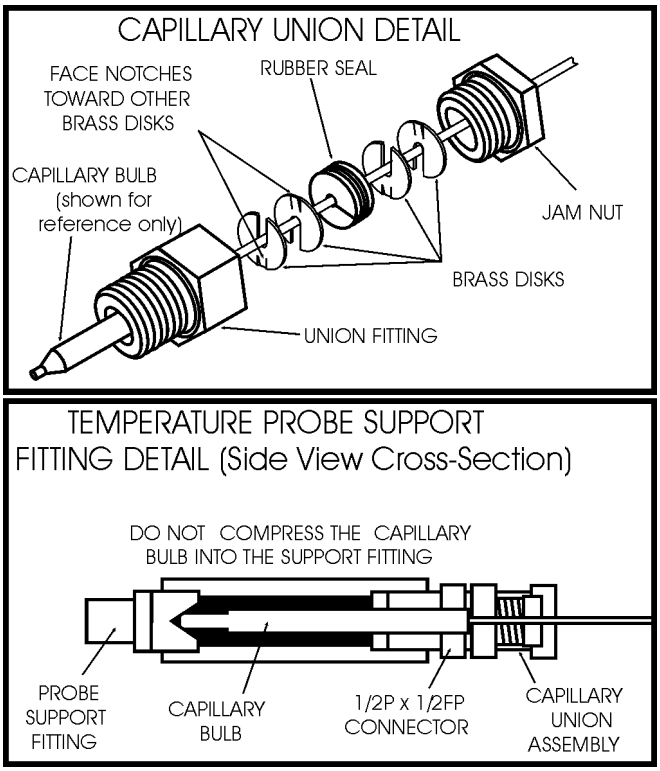




TEMPERATURE CAPILLARY & PACKING ASSEMBLY

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 2400 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 3.4 GPM. An additional .25 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 3.65 GPM.

PROBLEM	CAUSE	SOLUTION
Loss of water pump pressure. With the cleaning tool open, the water pressure gauge reads below the normal operating pressure. *NOTE: If the water pump pressure drops below 50 PSI or exceeds 1200 PSI, the unit will automatically shut down.*	Water supply is turned off or the float valve is stuck or improperly adjusted. NOTE: This may also cause the water pressure switch to shut the unit down.	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. NOTE: This may also cause the water pressure to shut the unit down.	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 2400 RPM. Idle engine speed is 900 RPM. Re-adjust in accordance with the instructions on pages 4-9 & 4-10 of this 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 minifold 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.
Loss of solution volume at cleaning tool orifice. Water gauge reads normal.	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 in blocking proper flow. Replace any defective hoses. Remove, inspect, and clean the Y-strainer screen. De-scale unit and install a water softner, 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-connects(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 softner, if necessary, to protect the equipment. If water contains 3-1/2 grains or more of water hardness, a water softener is needed.

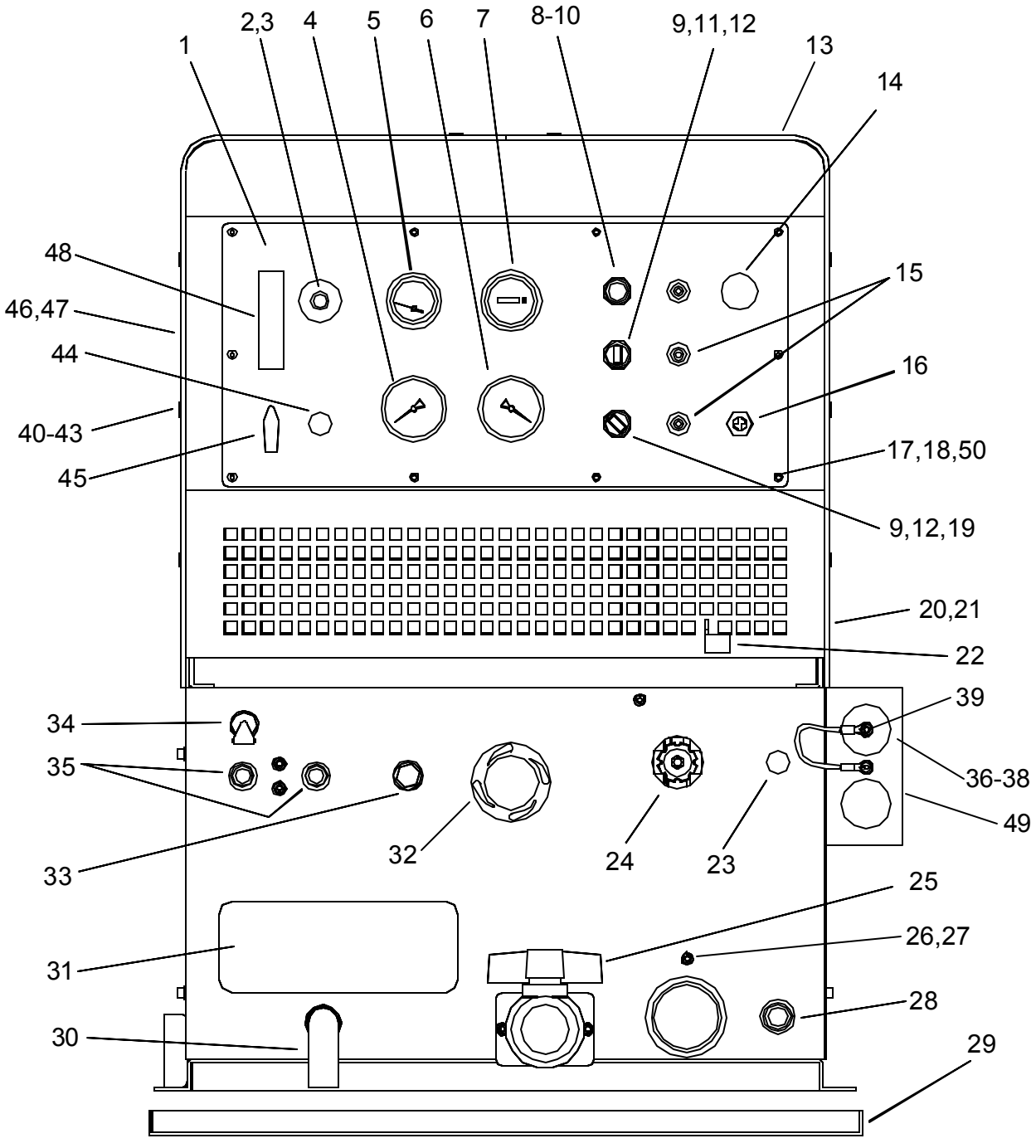
PROBLEM	CAUSE	SOLUTION
Loss of vacuum While cleaning, the vacuum is not up to par. Engine RPM is normal.	Vacuum gauge is giving an improper reading.	Examine the tubing between the vacuum relief valve and the vacuum gauge and remove any blockage.
	Vacuum hose(s) is damaged, causing a suction leak.	Inspect 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 exchanges are plugged with lint.	Remove and clean.
	Vacuum pump is wore out.	Replace the vacuum pump.
Loss of chemical With the cleaning tool valve open, no chemical	Chemcial 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 damgaed, 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.
Chemical flow meter indicates flow with the tool valve closed	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.

PROBLEM	CAUSE	SOLUTION
Water pump does not engage	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 ciruit 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 damage, 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.
	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.	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 240°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 Nissan Engine Operation and Maintenance Manual.

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 Nissan Engine Operation and Maintenance 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.	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.	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 Nissan Engine Operation and Maintenance 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 240°F engine coolant high-temperature shudown switch.	Test switch. If necessary, replace.
	Oil pressure gauge on engine has shut down, due to insufficient oil pressure.	Refer to the Nissan Engine Operation and Maintencnade Manual. **DO NOT** restart the engine until the cause is determined and corrected.
	285°F solution temperature switch is defective.	Test switch. If necessary, replace.
	No ignition in the engine or engine is malfunctioning.	Refer to the Nissan Engine Operation and Maintenance Manual.
Excessive heating	Check instrumentation settings: Temperature bypass valve is closed. Temperature control is set at a high temperature.	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 of 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.

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.	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.
	Defective temperature control or temperature microswitch.	Inspect temperature control for proper operation. Repair, 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 temperature gauge.	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 waste 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.

FRONT PANEL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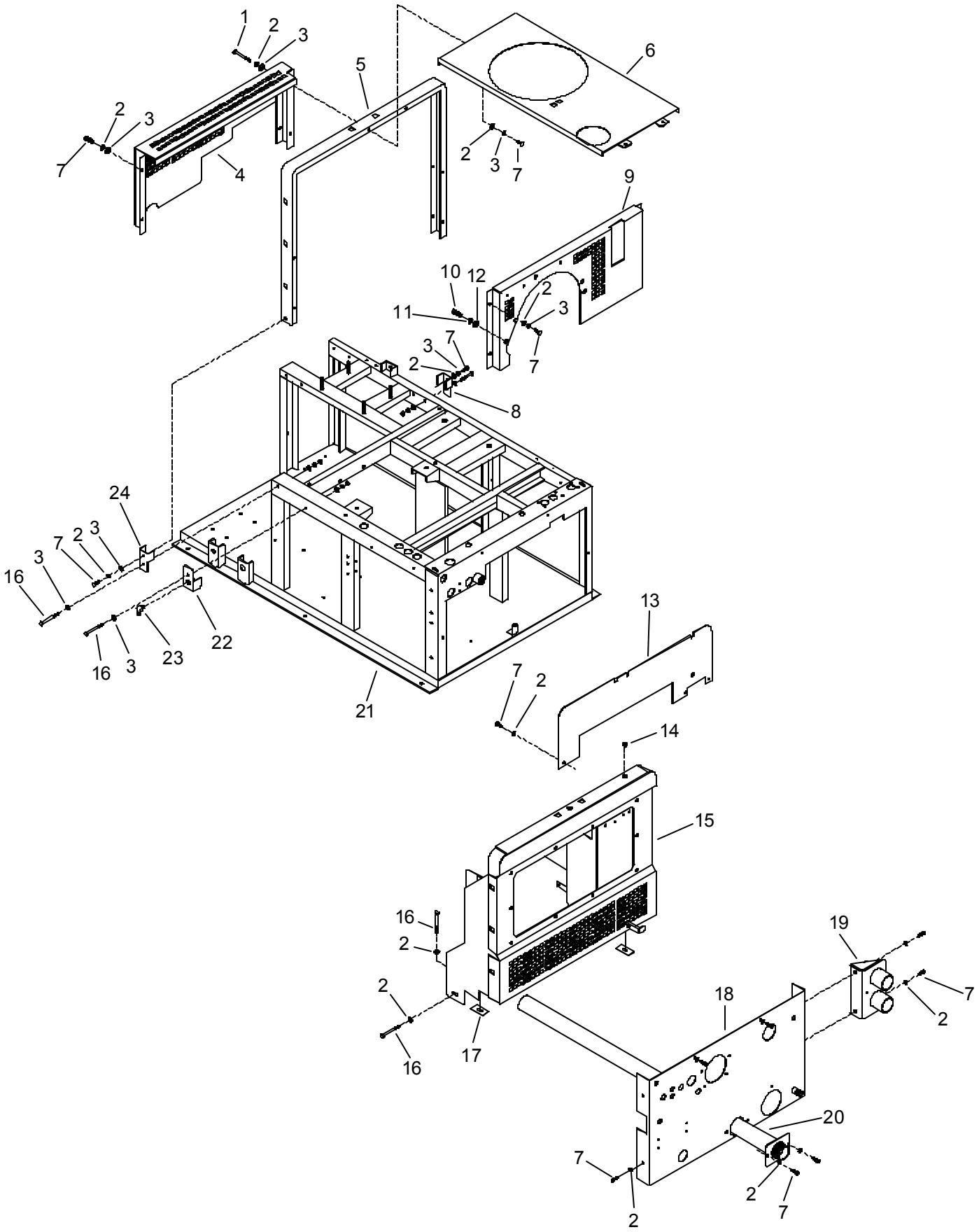
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	50-501738	PNL, CONTR PRF		
2	35-900182	CONTR, TEMP 275 DEG F		
3	33-900193	MICROSW, TEMP CONTR		
4	18-808526	GAUGE, WATER PRESSURE		
5	18-808530	GA, WTR TEMP 320DEG BC		
6	18-808525	GAUGE, VACUUM 30” HG		
7	34-903000	HOURMETER		
8	34-900099	LT, INDIC (DOME) RED		
9	33-900169	BULB, ROTARY SW		
10	34-900103	CVR, LENS RED-DOME LT		
11	61-950739	ASSY, OIL/W TR OVRRD SW P		
12	34-900101	CVR, LENS-RTRY SW		
13	33-900161	BREAKER, CIRC 30A		
14	49-802518	CABLE, CHOKE		
15	33-900163	BREAKER, CIRC 20A		
16	32-900198	STARTER SWITCH AND KEY		
17	00-000508	SCR, 10-32 X 1-1/2” SOCHD SST		
18	01-000273	NUT, WELL 10-32		
19	32-900205	SW, RTRY NON-ILLIM TM		
20	61-951458	ASSY, HOOD RT ‘A15’ PRF/405		
21	50-502081	HOOD, RT PRF A15 ENGINE		
22	50-501679	LVR, THROT CONTRL, PRF 405		
23	15-808107	VLV, MET 1/8FP (BYPASS) RT		
24	790067	REG. PRESS AWI		
25	15-808080	VALVE, BALL PVC 1-1/2 FP		
26	87162	WASHER, 1/4 SPLIT LOCK		
27	00-000210	SCR, 1/4-20 X 3/4” SOCHD		
28	13-806008	DSC, 3/8F X 3/8FP		
29	56-501845	PAN, DRIP BRU2, BC,PRF		
30	55-501672	TUBE, EXH DEFLECTOR		
31	48-941197	DECAL, CONDENSED INSTRUCT.		
32	36-900182	ROTARY SOLENOID		
33	11-800168	PLUG, 1/2 BRASS HXHD		
34	19-800075	CUP, OIL FILL 1/8P		
35	22015	COUPLER, 1/4 QD		
36	66-945236	KIT, VAC INL PLG BRU2, PRF		
37	52-501679	PLG, VAC INL TM		
38	43-810081	O-RING, 1-3/8 ID 1-3/4 OD		
39	64-950383	CABL, RETAIN VAC PLG 800		
40	01-000259	RECEPT, SNAPIN 1/4 TURNFA		
41	00-000272	STUD, 1/4 TURNFAST #85 OV		
42	02-000268	SPLIT RING, RETAIN, 1/4 TUR		
43	58-700023	PAD, 1/4 TURN VIBR		
44	15-808106	VALVE, METER 1/8FP		
45	15-808022	VALVE, 3-WAY BALL 1/8FP		
46	61-651459	ASSY, HOOD L ‘A15’ PRF/405		
47	50-501956	HOOD, L PRT A15 ENGINE		
48	18-808513	FLOWMETER 1/8FP		
49	790014	BRKT, VAC INLET 2 HOSE		
50	04-000358	SPACER, NYLON 1/2 OD X 1/2 LG		
-	48-941198	DECAL, PNL PRF		NOT SHOWN
-	48-941318	DECAL, PNL PRF405		NOT SHOWN
-	48-941212	DECAL, WARN & INTRUMNT		NOT SHOWN
-	48-941195	DECAL, HOOD PROCHEM TM		NOT SHOWN

FRAMEWORK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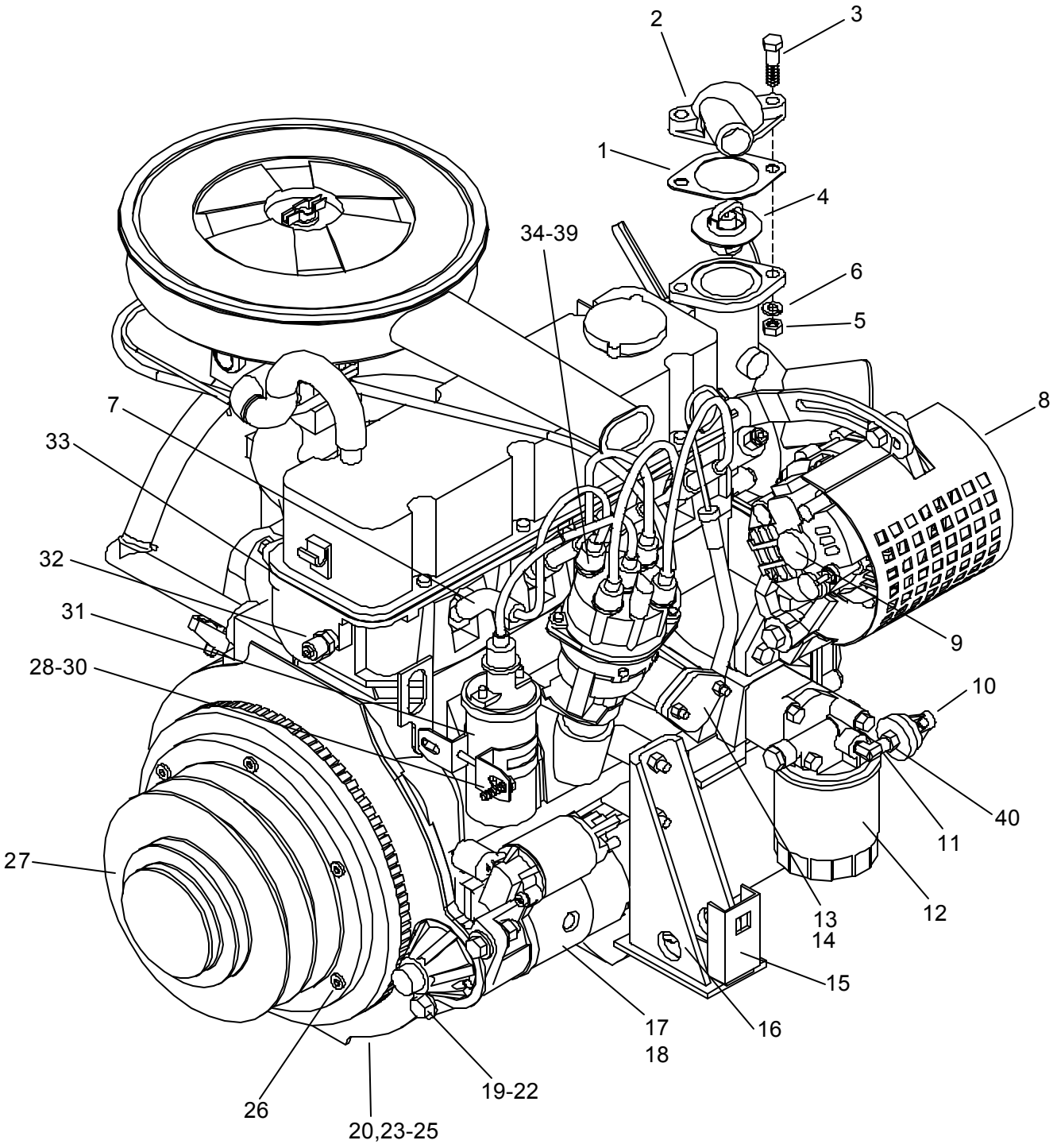
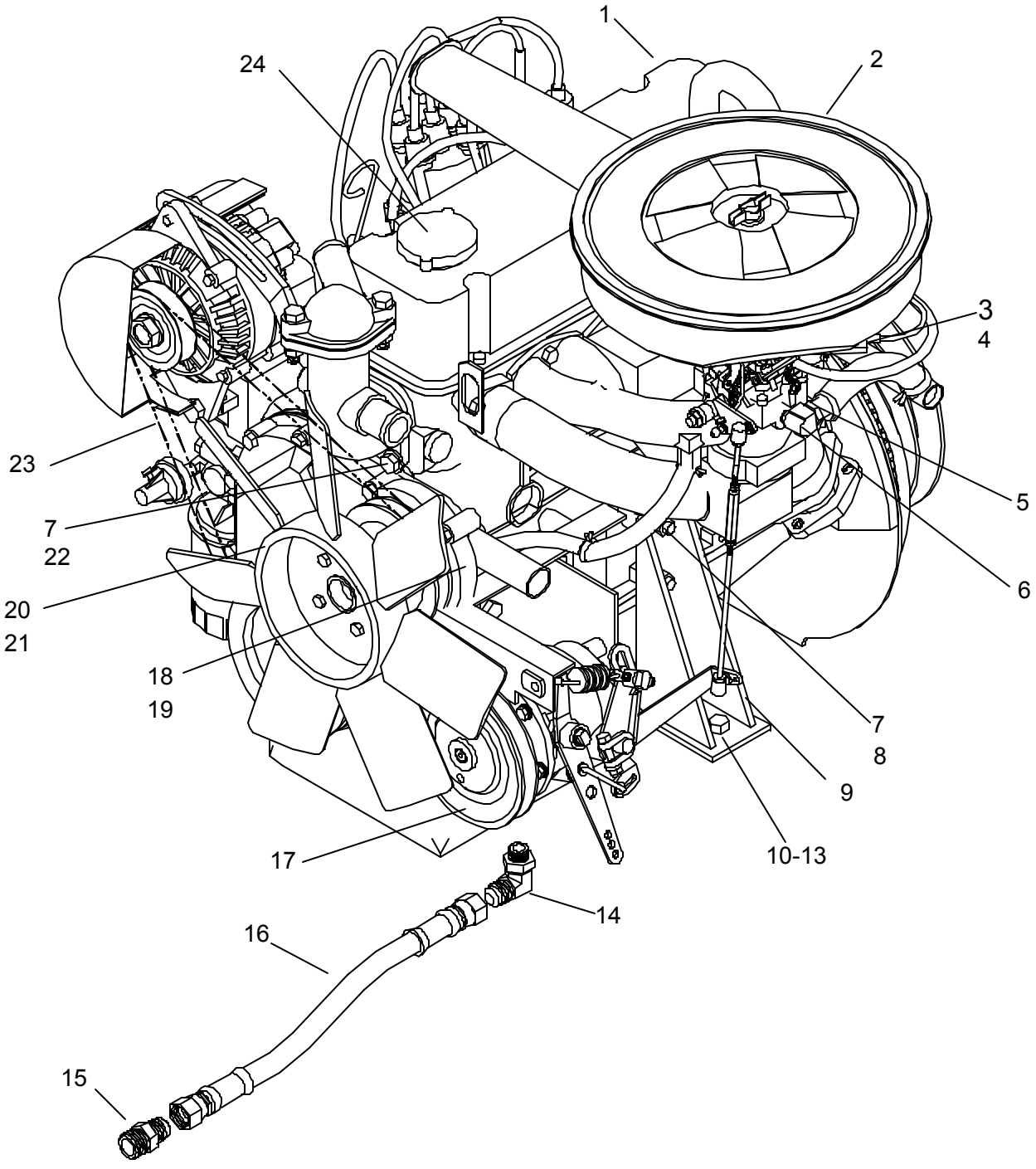
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	70017	SCR, 1/4-20 X 2.5 HHCS		
2	87162	WASHER, 1/4 SPLIT LOCK		
3	02-000066	FLATWASHER, 1/4		
4	56-501903	GUARD, BELT		
5	56-502231	BRKT, R HOOD		
6	56-502187	BRKT, CTR HOOD		
7	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
8	56-502050	BRKT, HOOD MTG RT SP		
9	56-501904	MT, BELT GD		
10	70262	SCR, M8 X 20 HHMS PLTD		
11	87083	WASHER, 5/16 SPLIT LOCK PLTD		
12	02-000143	FLAT, WASHER, 5/16		
13	56-502466	PANEL, UPR RAD CLOSE-OUT		
14	00-000216	SCR, CAP 1/4-20 X1/2 FLTSO		
15	790012	MT, CONTRL PNL, AD SOL		
16	00-000286	SCR, CAP 1/4-20 X 2.75 HXHD		
17	58-700024	PAD, VIBR CONTR PNL MT		
18	790040	ASSY, PNL LWR FR, AD SOL		
19	790014	BRKT, VAC INLET 2 HOSE		
20	56-501686	TUBE, WASTE DUMP		
21	56-502222	BASE		
22	56-501857	BRKT,FUEL LINE		
23	790605	EL, 90DEG 1/8 X 5/16 16HB		

ENGINE ASSEMBLY, LEFT



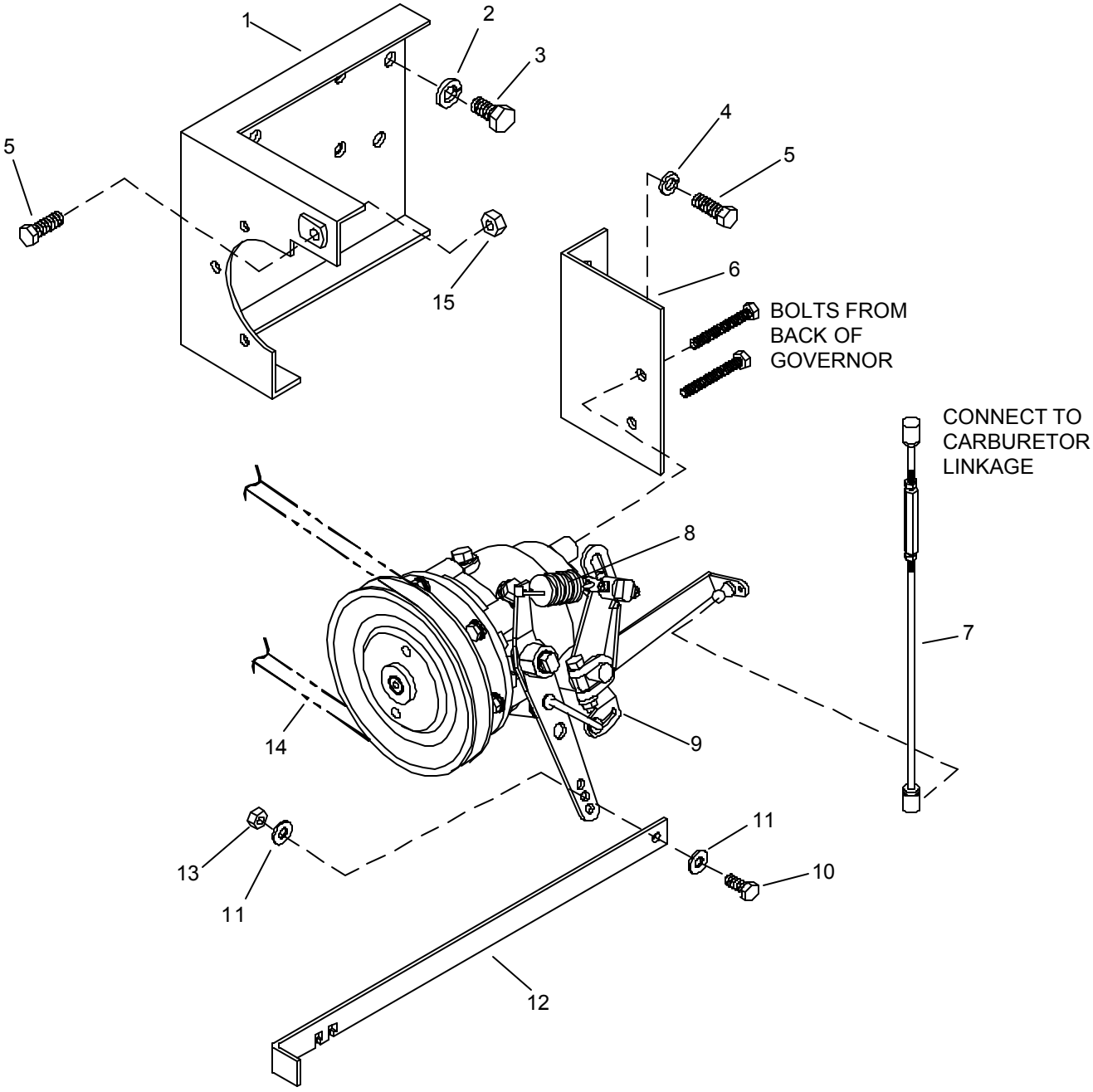
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	43-807067	GSKT, THERM-NIS A12		
2	42-902132	NIS HSG, THERM #11060-H50		
3	70258	SCR, 516-18 X 1.5 HHCS GR5PLT		
4	35-900202	THERM, 195 DEG		
5	87083	WASHER, 5/16 SPLIT LOCK PLTD		
6	57031	NUT, 5/16-18 HEX		
7	42-902148	NIS PLG, SPRK #22401-M7714		
8	56-501740	CVR, ALT		
9	42-902188	NIS ALT (50AMP) #23100-H77		
10	32-900029	SW, OIL PRESS		
11	11-800014	ELL, STREET 1/8 BR		
12	42-902139	NIS FLTR, OIL#15208-55Y00		
13	50-501915	PL, FUEL PMP CVR		
14	42-902152	NIS, GSKT, FUEL PMP D24076		
15	56-502006	BRKT, L HD		
16	56-502007	MT, L ENG.		
17	42-902146	NIS START #12200-H5015		
18	42-902147	NIS SOLEN, START #23343-B5		
19	00-000222	SCR, CAP 7/16-14 X 1.5 HX		
20	87171	WASHER, 3/8 FLAT		
21	87176	WASHER, 7/16 SPLIT LOCK PLTD		
22	57114	NUT, 7/16-14 HEX		
23	00-000072	SCR, 3/8-16 X 2” HXHD		
24	87163	WASHER, 3/8 SPLIT LOCK		
25	57111	NUT, 3/8-16 HEX		
26	00-000428	SCR, CAP 8MM X 1.25MM X 25MM		
27	52-501686	PULLEY, ENG		
28	02-000066	FLATWASHER, 1/4		
29	87162	WASHER, 1/4 SPLIT LOCK		
30	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
31	42-902144	NIS COIL #22433-52A60		
32	35-900050	SENS. TEMP 240DEG		
33	42-902137	NIS GSTK, VLV CVR #13270-H		
34	42-902196	NIS DIST#22100-G5110		
35	42-902271	NIS CAP, DIST #2216278A10		
36	42-902153	NIS SEAL, DISTR CAP #22185NIS		
37	42-902272	NIS ROTOR #22157-05M02		
38	42-902352	NIS UNIT, TRANS #22020-G51		
39	42-902143	NIS SET, WIRE #22450-G1625		
40	04080	ADAPTER, #2 BSPT X 1/8 FNPT BR		
-	52-502020	ADAPTER, COOLANT OUTLET		
-	10-805357	HOS, 3/16 X 3/8 (1/4 FT BS) MET		
-	03-000249	CLMP, CABL 1/4ID 3/8 BLT		
-	42-902134	NIS SET, PAN GSKT, #11132-H		

ENGINE ASSEMBLY, RIGHT

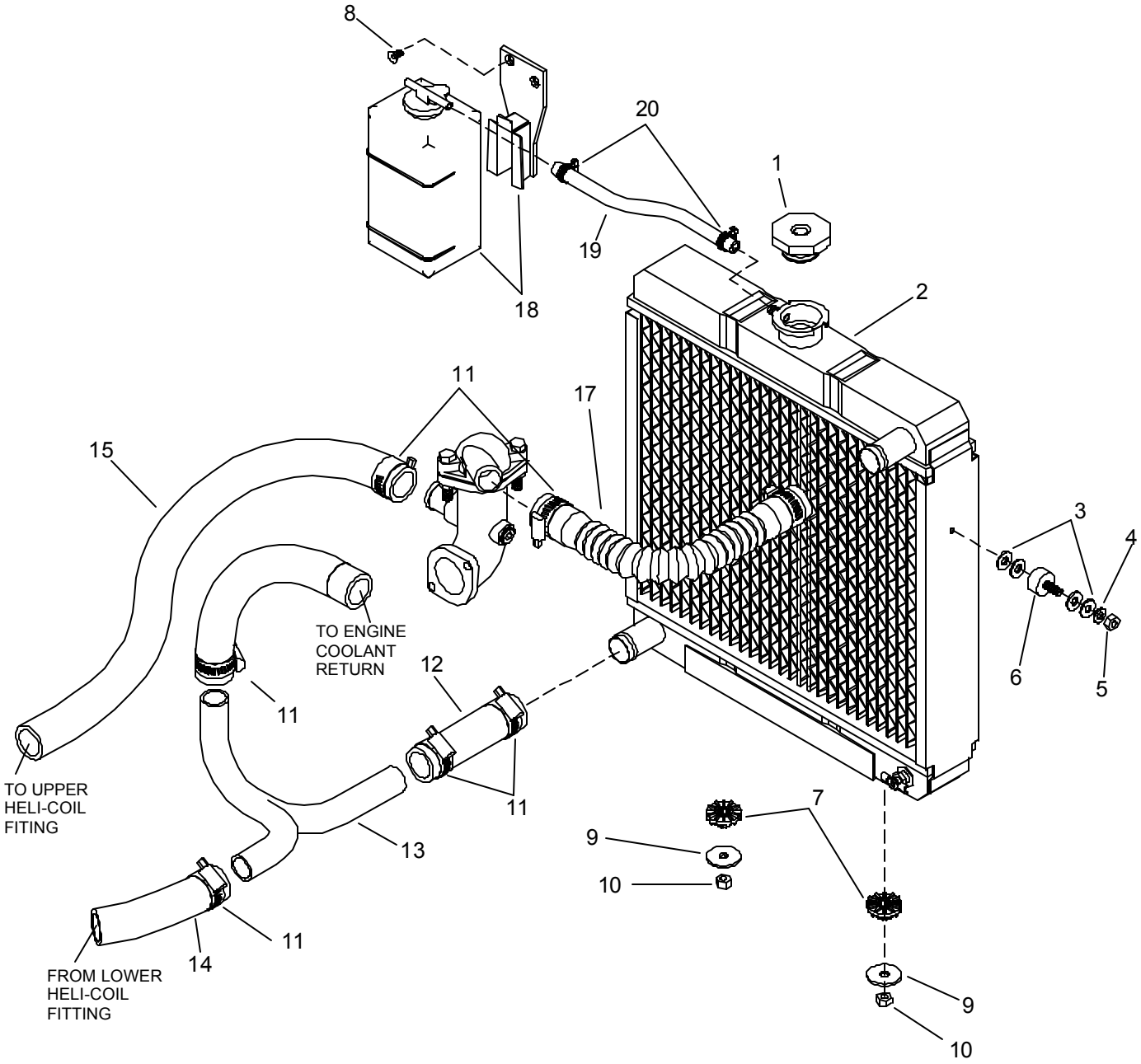


REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	40-902145	ENGINE, NISSAN , A-15		
2	42-902140	FILTER, AIR		
3	42-902208	CARBURETOR		
4	42-902149	SOLENOID, ANTI-DIESEL		
5	42-902138	VALVE, PCV		
6	31089	ELBOW, #4 BSPT 90DEG ST		
7	87083	WASHER, 5/16 SPLIT LOCK PLTD		
8	57054	NUT, M8		
9	56-501953	MOUNT, RIGHT ENGINE		
10	70266	SCR, 3/8-16 X 1" HHCS GR 5 PLTD		
11	70069	SCR, 3/8-16 X 3 HHCS GR5		
12	87171	WASHER, 3/8 FLAT		
13	87163	WASHER, SPLIT LOCK PLTD		
14	12-800177	ELL, #6BSTX1/2T SNC PL		
15	12-800141	CONN, 1/2PX1/2T		
16	10-805315	HOSE, HP 3/8X13"		
17	42-902199	GOVERNOR		
18	42-902349	PUMP, WATER		
19	42-902350	GASKET, WATER PUMP		
20	42-902209	BLADE, FAN		
21	42-902253	BOLT, FAN		
22	70549	SCR, M8 X 25 HHCS GR8 PLTD		
23	44-802230	BELT, 11720-77702		
24	42-902258	CAP, OIL FILL		
-	42-902198	KIT, CARB REP (STANDARD)		NOT SHOWN

ENGINE GOVERNOR



REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	51-802295	PANEL, GOV BRKT		
2	87176	WASHER, 7/16 SPLIT LOCK PLTD		
3	00-000298	SCR, MACH 10MMX20MM HXHD		
4	87083	WASHER, 5/16 SPLIT LOCK PLTD		
5	70302	SCR, 5/16-18 X 1" HHCSGR5PLTD		
6	56-501870	BRKT, R GOV		
7	42-902200	NIS ASSY, ROD #16370-K4910		
8	04-000288	SPRING, GOV GRN BAND		
9	42-902199	NIS GOV #19101 K7505		
10	70270	SCR, M6 X 1 16MM HHCS		
11	02-000066	FLAT WASHER, 1/4		
12	50-501679	LEVER, THROT CONTRL		
13	57245	NUT, 1/4-20 HEX NYLOCK SS		
14	44-802311	BELT, AX29 GOODYEAR MTCH MKR		
15	57031	NUT, 5/16-18 HEX		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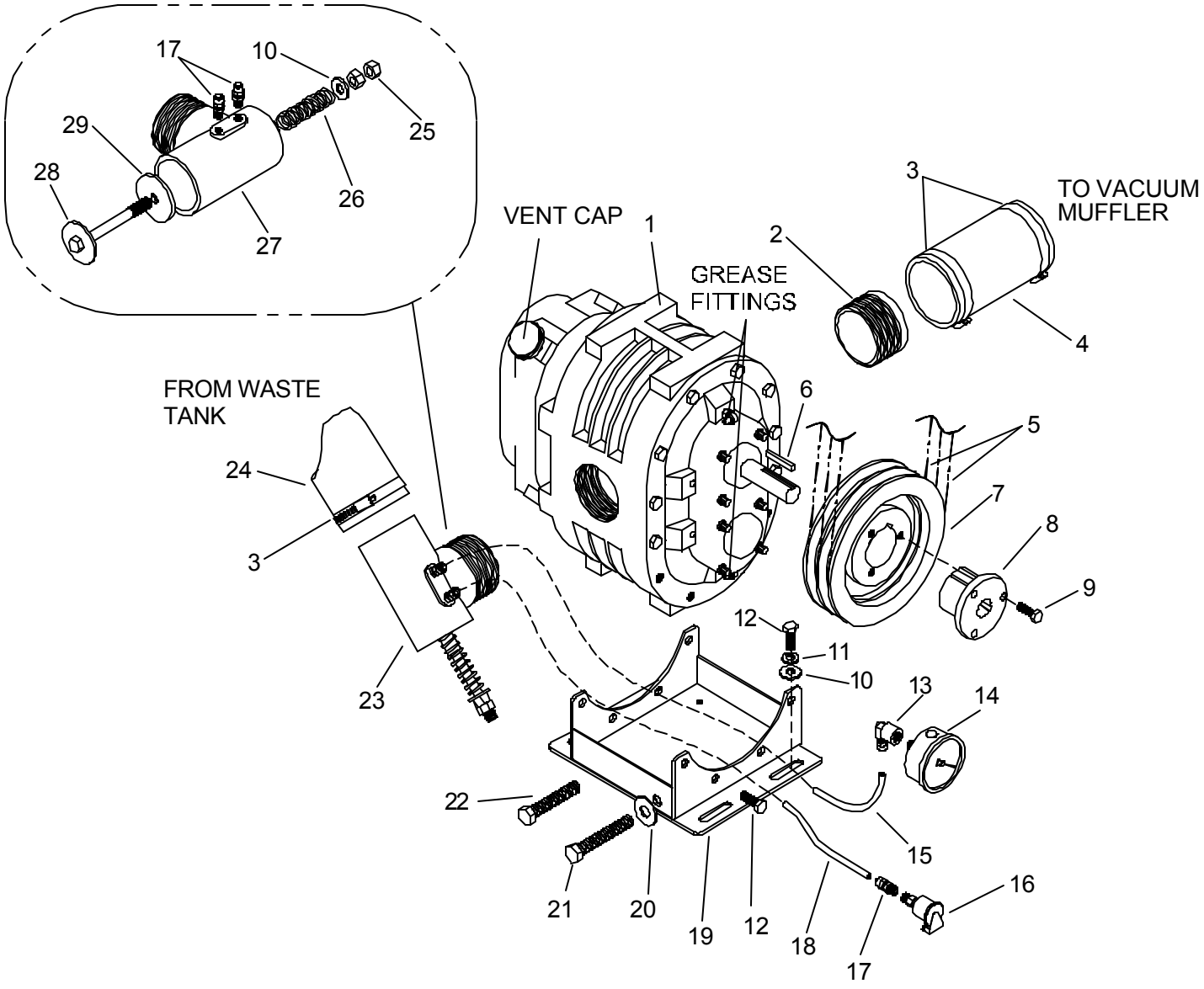
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	49-802010	CAP, RAD, STANT AGX2643-01		
2	57-520035	RADIATOR		
3	02-000143	FLATWASHER, 5/16		
4	87083	WASHER, 5/16 SPLIT LOCK PLTD		
5	57031	NUT, 5/16-18 HEX		
6	52-502038	MT, RAD		
7	04-000296	FLEX FINGER (BUSH)		
8	00-000216	SCR, CAP 1/4-20 X 1/2 FLTSO		
9	50-501761	WASHER, RAD		
10	57113	NUT, 5/16-18 HEX NYLOCK		
11	03-000248	CLMP, HOSE #16 1-1/2 MIN 1-3/4		
12	09-805375	HOSE, RAD, 1.13 X 5.5 GRN STRP		
13	58-500654	CSTG, COOLANT MNFLD		
14	09-805423	HOSE, RAD 1.13 X 4.5 GRN		
15	790647	HOSE, ENGINE TO Y ADAPTER		
16	09-805432	HOSE, RAD 1.13 X 13.5 GRN		
17	790649	HOSE, THERM HSG TO RADIATOR		
18	42-902308	KBT BTL, OVRFLW#19059-70		
19	09-805159	HOSE, BRD 5/16 X 13.5”		
20	03-000065	CLAMP, HOSE #4 SST		

VACUUM PUMP - PERFORMER



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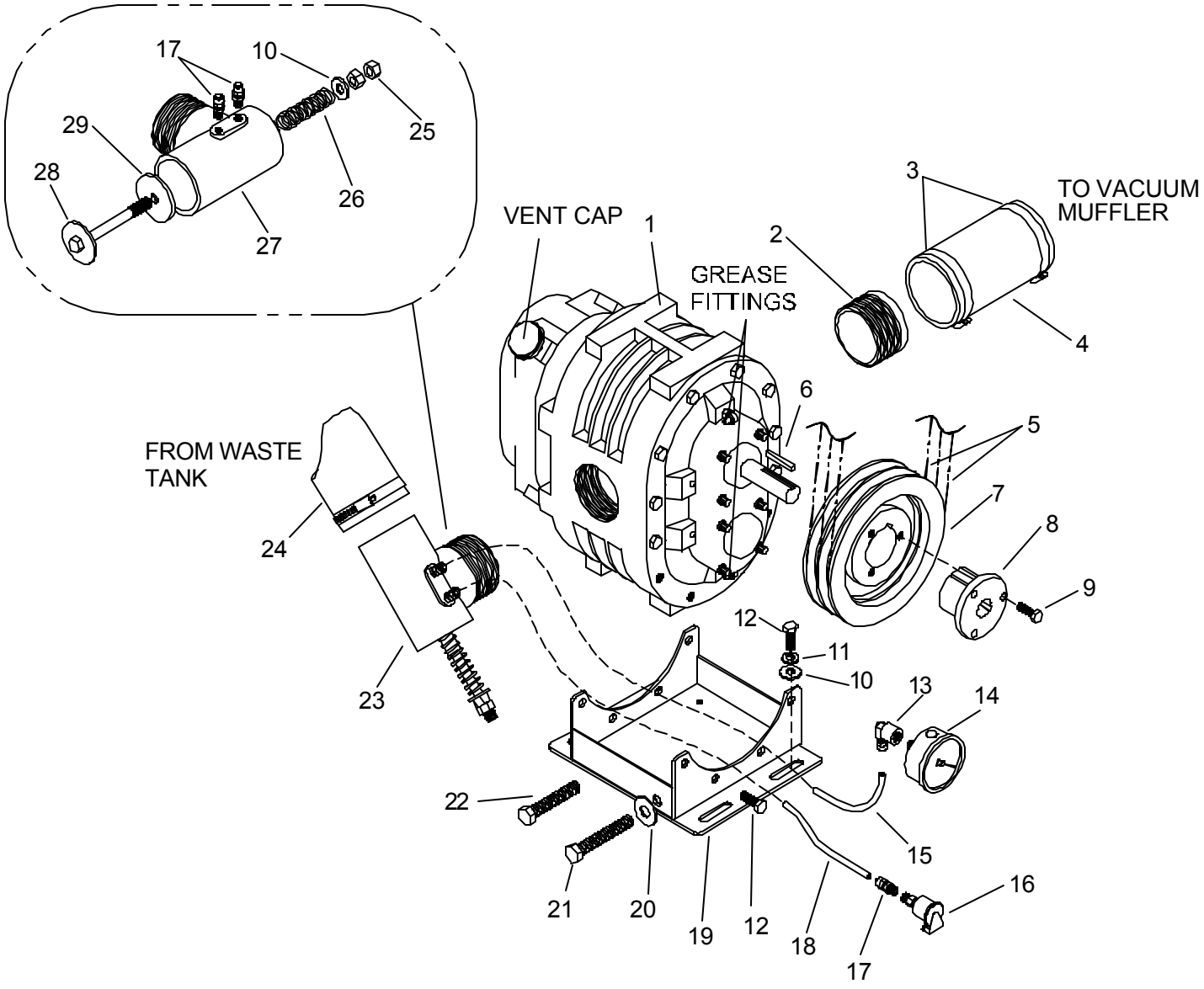
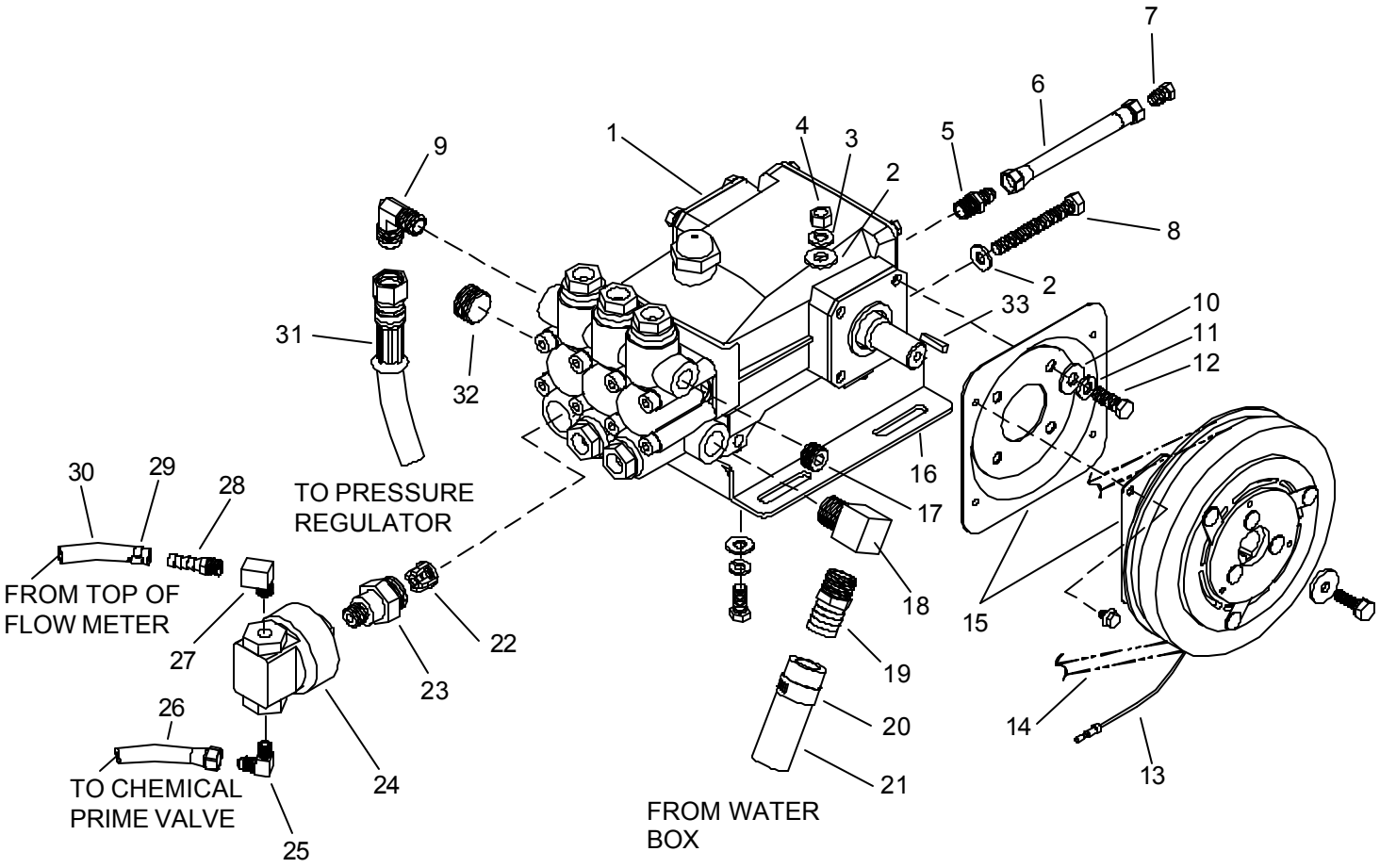
1	41-905021	PUMP, VAC 4M-L		
2	54-501593	NIP, VAC EXH OUTL		
3	03-000112	CLAMP, HOSE #48		
4	09-805156	HOSE, INT VAC 2.88 X 6.0 BLK		
5	44-802307	BLET, BX42 GOODYEAR MATCH		
6	54-501735	KEYSTOCK, 3/16 X 1 5/8		
7	44-802245	PULLEY, 2TB58, PWRVC2		
8	44-802196	HUB, P1X7/8		
9	00-000340	SCR, MACH 5/16-18 X 1 GR8		
10	87171	WASHER, 3/8 FLAT		
11	87163	WASHER, 3/8 SPLIT LOCK		
12	70266	SCR, 3/8-19 X 1" HHCSGR5PLT		
13	12-800101	ELL, 1/4FPX1/4POLY BR		
14	18-808525	GAUGE, VACUUM 30" HG		
15	09-805427	TUBE, IMPOL 1/4X54		
16	19-800075	CUP, OIL FILL 1/8P		
17	12-800059	CONN, 1/8P X 1/4 POLY BR		
18	09-805429	TBG, IMPOL 1/4X42		
19	56-501866	BRKT, VAC ADJ		
20	02-000057	FLATWASHER, 1/2" HEAVY		
21	00-000323	SCR, 1/2-13X3-1/2 HHCS FULL THD		
22	70357	SCR, 1/2-13 X 3 FULL THREADS		
23	61-950451	ASSY, VAC REL VLV		
24	09-805341	HOSE, VA 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

VACUUM PUMP - PERFORMER 405



REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	41-905026	PUMP, VAC 4LL		
2	54-501642	NIP, VAC OUTL (4LL)		
3	03-000250	CLAMP, HOSE #60 3.3125/4.5, SST		
4	09-805425	HOSE, INT VAC 3.5 X 5.00 BLK		
5	44-802307	BELT, BX42 GOODYEAR MATCH		
6	54-501735	KEYSTOCK, 3/16X 1-5/8		
7	44-802245	PULLEY, 2TB58		
8	44-802196	HUB, P1X7/8		
9	00-000340	HUB & SCR, 5/16-18 X 1” GRD8		
10	87171	WASHER, 3/8 FLAT		
11	87163	WASHER, 3/8 SPLIT LOCK		
12	70266	SCR, 3/8-16 X 1” HHCSGR5PLT DL		
13	12-800101	ELL, 1/4FPX1/4POLY BR		
14	18-808525	GAUGE, VACUUM 30” HG		
15	09-805566	TBG, IMPOL 1/4X57		
16	19-800075	CUP, OIL FILL 1/8P		
17	12-800059	CONN, 1/8P X 1/4 POLY BR		
18	09-805567	TBG, IMPOL 1/4X45		
19	56-502386	BRKT, VAC ADJ		
20	02-000057	FLATWASHER, 1/2” HEAVY		
21	00-000323	SCR, 1/2-13 X 3-1/2 HHCS FULL THD		
22	70357	SCR, 1/2-13 X 3 FULL THREADS		
23	61-950732	ASSY, VAC REL VLV		
24	09-805426	HOS, INT VAC 3.5 X 25.0		
25	57114	NUT, 7/16-14 HEX		
26	04-000091	SPRING, VAC REL VLV		
27	52-501684	ELL, VAC REL VLV		
28	56-501994	STM-VAC REL VLV		
29	43-807106	DIAPH, VAC REL VLV		
-	05-008039	OIL, AEON PD (28G24 SUTORBILT)		NOT SHOWN
-	05-008032	GREASE, MA3830150		NOT SHOWN

WATER PUMP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TO PRESSURE
REGULATOR
FROM TOP OF
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TO CHEMICAL
PRIME VALVE
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FROM WATER
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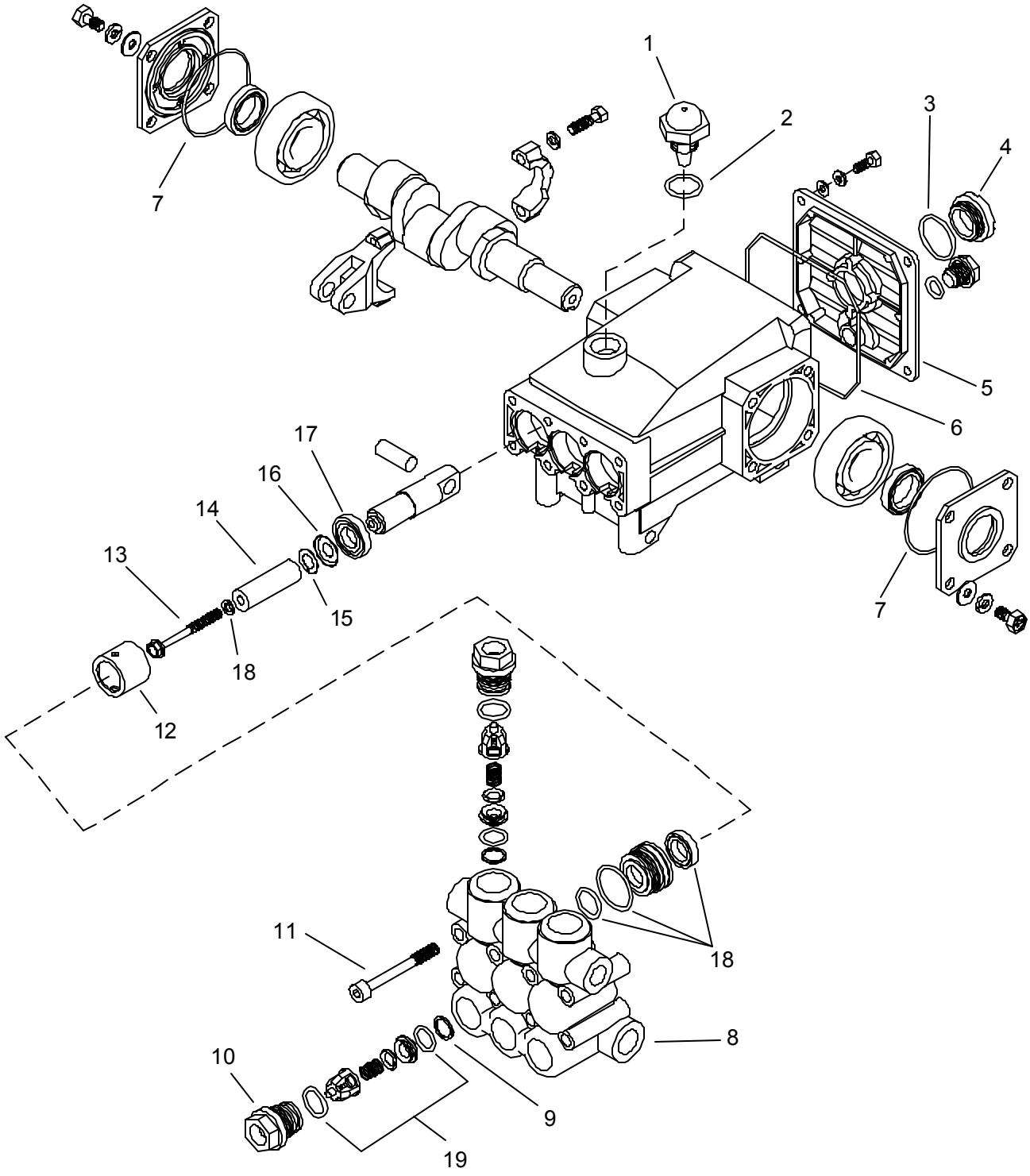
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	41-809149	PUMP, WTR, CAT 5CP2150		
2	87171	WASHER, 3/8 FLAT		
3	87163	WASHER, 3/8 SPLIT LOCK		
4	57111	NUT, 3/8-16 HEX		
5	12-800060	CONN, 1/4P X 1/4T BR		
6	10-805316	HOSE, 3/16 X 5 (1/4FT BS) MET		
7	12-800029	PLUG, 1/4T BR		
8	70461	SCR, 3/8-16 X 3.5 HHTB GR5 PLTD		
9	12-800225	ELL, 3/8PX1/2T BR		
10	02-000143	FLATWASHER, 5/16		
11	87083	WASHER, 5/16 SPLIT LOCK PLTD		
12	70262	SCR, M8 X 20 HHMS PLTD		
13	31-900185	CONN, BULLET M (.156)		
14	44-802314	BELT, AX39 GOODYEAR MATCH		
15	36-900141	CLUTCH, ELEC WTR PMP CAT		
16	56-501995	BRKT, PMP ADJ		
17	11-800224	PLUG, 3/8 SOCHD BR		
18	52-800315	ELL, ST 1/2 (CAT PMP)		
19	12-800278	FTTG, BTB 1/2P X 3/4P BR		
20	03-000113	CLAMP, HOSE #12 SST		
21	09-805435	HOSE, WATER .75 X 33.0		
22	52-809123	RETAIN, VALVE STRING		
23	52-809125	ADPT, CAT CHEM PMP		
24	41-809158	PUMP, CHEM (O-RING CAP)		
25	12-800040	ELL, 1/8P X 1/4T BR		
26	10-805278	HOSE, 3/16 X54 (1/4FT BS) MET		
27	11-800014	ELL, STREET 1/8 BR		
28	12-800093	FTTG, BRB 1/8P X 5/16H		
29	03-000065	CLAMP, HOSE #4 SST		
30	09-805088	HOSE, BRD 5/16X64		
31	10-805359	HOSE, HP 3/8 X 42 (1/2FT BS)		
32	11-800069	PLUG, 1/2 SOCHD BR		
33	48008	KEY, 3/16 X 17.75		
-	05-008016	OIL, CAT-WTR PMP		NOT SHOWN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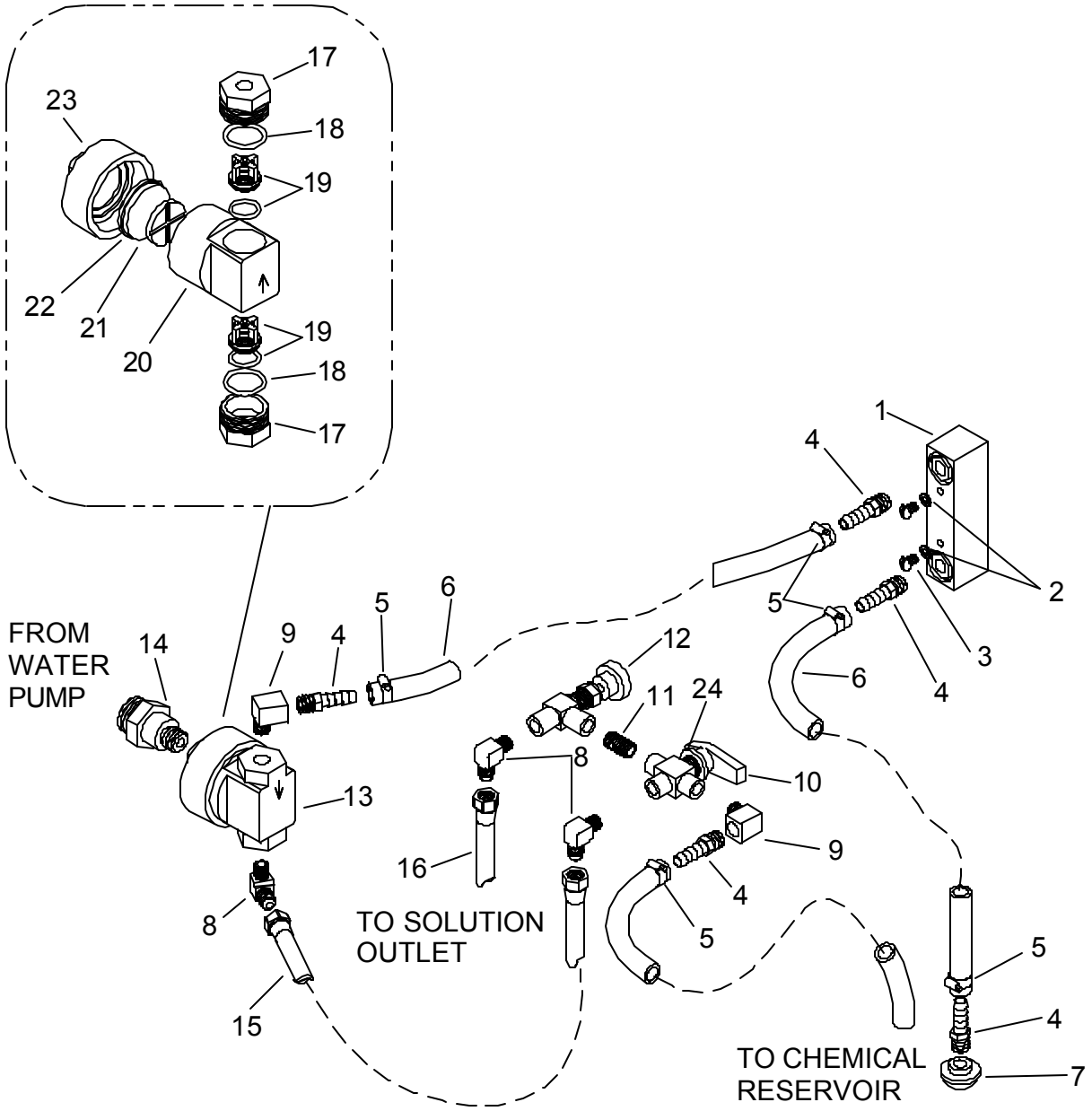
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	42-809393	CAT#46798 CAP, OIL FILLER		
2	42-809239	O-RING, OIL FILL CAP		
3	43-807063	GASKET, OIL GAUGE		
4	42-902380	GAUGE, OIL LEVEL		
5	42-809392	CAT#46940 CVR, CRANKCASE		
6	42-809391	CAT#14044 O-RING, CRANKCASE		
7	42-809394	O-RING, BEARING CVR		
8	42-809412	CAT#48245 MNFLD, HEAD 5CP		
9	42-809398	CAT#48361 RNG, BACK-UP SE		
10	42-809253	CAT#43849 PLG, VLV		
11	42-809385	CAT#87872 BLT, MNFLD HEAD		
12	42-809384	CAT# 46749 REAIN, SEAL 5C		
13	42-809383	CAT#48201 RETAIN, PLNGR		
14	42-809413	CAT# 46841 PLNGR, 5CP2150		
15	42-809249	WASHER, KEYHOLE M18		
16	42-809246	CAT#43328 SLNGR, BARRIER		
17	42-809380	CAT#46838 SEAL, OIL CRANK		
17A	42-809396	CAT#31638 KIT, SEAL CAT 5		
17B	30821	HANDLE, TOP		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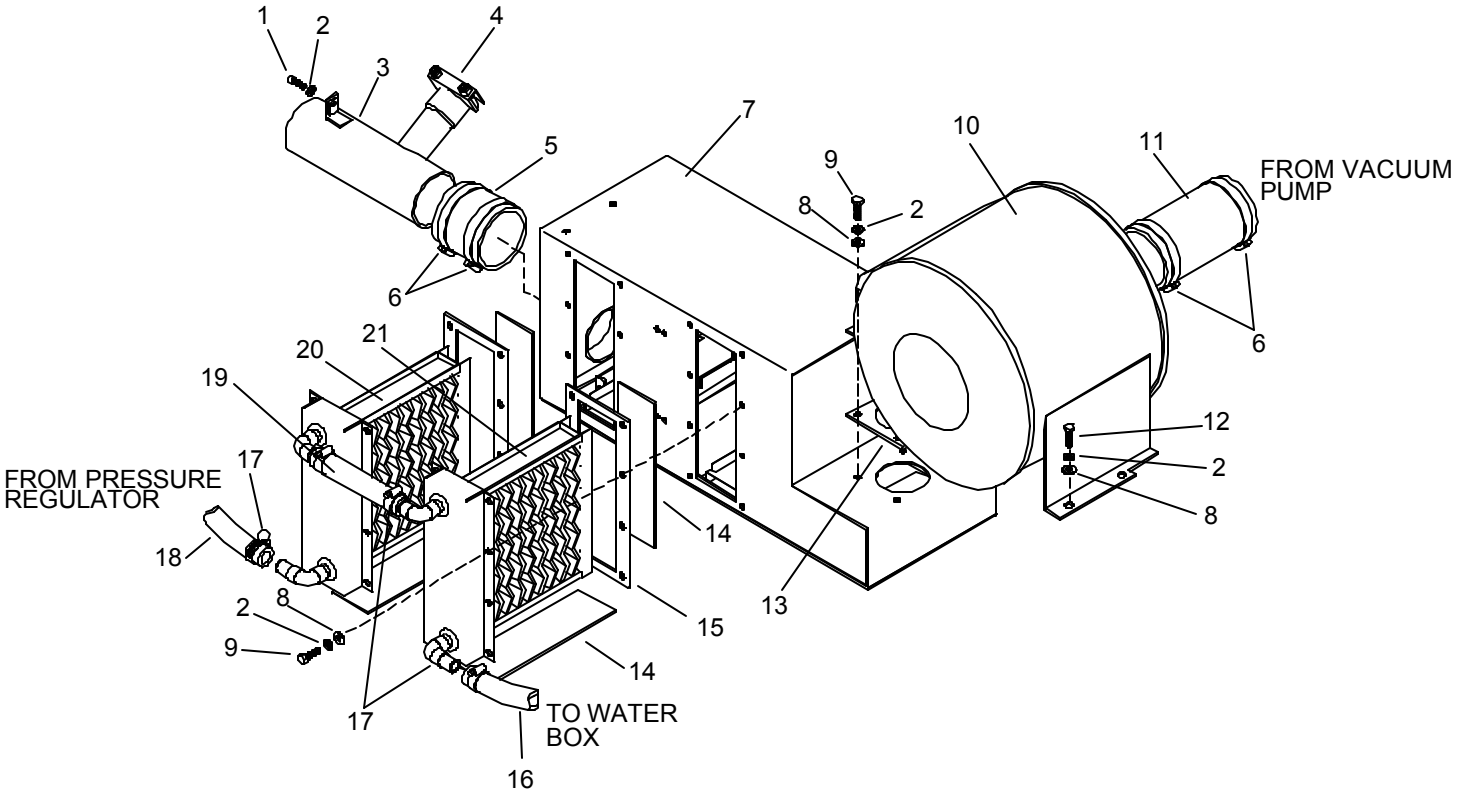
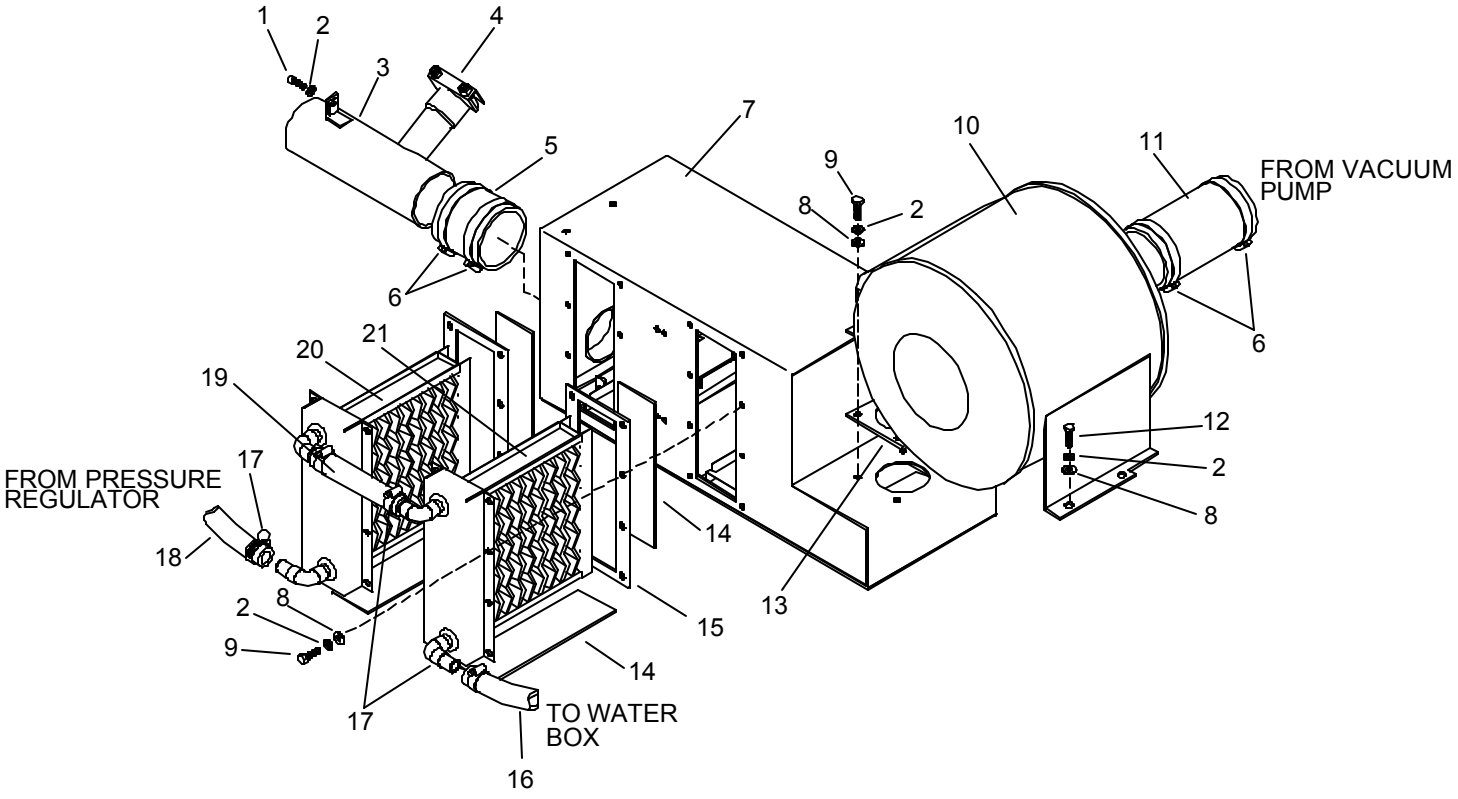
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	18-808513	FLOW METER 18FP		
2	87165	WASHER, #10 SPLIT LOCK		
3	00-000065	SCR, 10-32 X 3/8" PNHD		
4	12-800093	FTTG, BRB 1/8P X 5/16H		
5	03-000065	CLAMP, HOSE #4 SPOTTER SST		
6	09-805088	HOSE, BRD 5/16X64		
7	14-806506	SCREEN, 1/8FP		
8	12-800040	ELL, 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- PERFORMER



REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	00-000210	SCR, 1/4-20 X 3/4, SOCHD		
2	87162	WASHER, 1/4 SPLIT LOCK		
3	56-501939	ASSY, EXH OUTL		
4	03-000081	CLAMP, MFLR 1-1/2 ZNC PL		
5	09-805344	HOSE, INT VAC 2.88 X 3.0 BLK		
6	03-000112	CLAMP, HOSE #48		
7	56-501881	HSG, VAC HE , BRU2		
8	02-000066	FLATWASHER, 1/4		
9	70720	SCR, 10 X 3/8 PPHST TYPE B		
10	57-520082	MUFFLER, VAC		
11	09-805156	HOSE, INT VAC 2.88 X 6.0 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	43-807081	GASKET, VAC HE CORE		
16	09-805288	HOSE, WTR 5/8X27		
17	03-000246	CLAMP, HOSE #8 SST		
18	09-805343	HOSE, WTR 5/8X17		
19	09-805372	HOSE, WTR 5/8X6-1/2		
20	61-950695	SUB-ASSY, VAC HE CVR		
21	61-950696	VAC HE CORE		

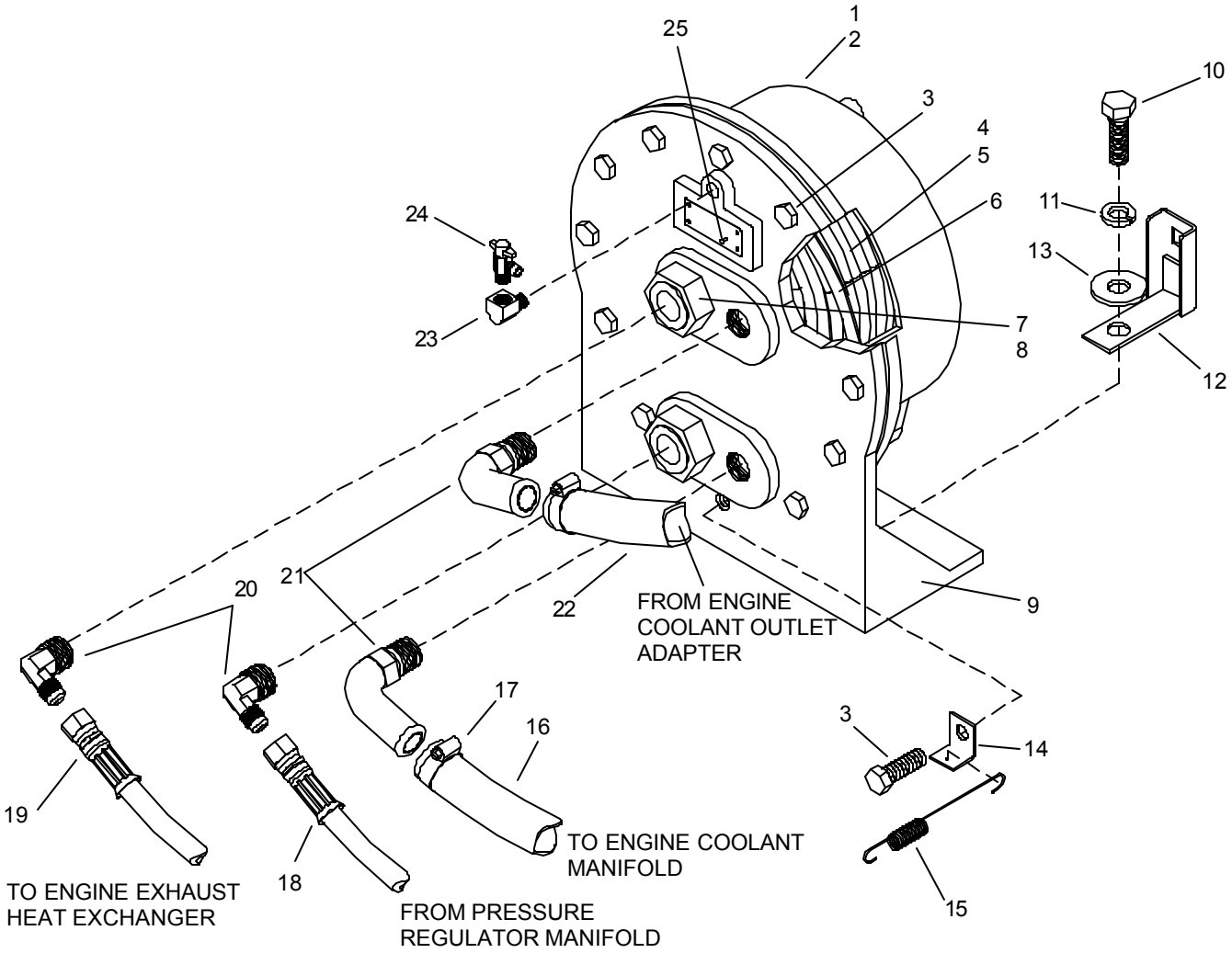
VACUUM EXHAUST HEAT EXCHANGER AND SILENCER - PERFORMER 405



VACUUM EXHAUST HEAT EXCHANGER AND SILENCER - PERFORMER 405

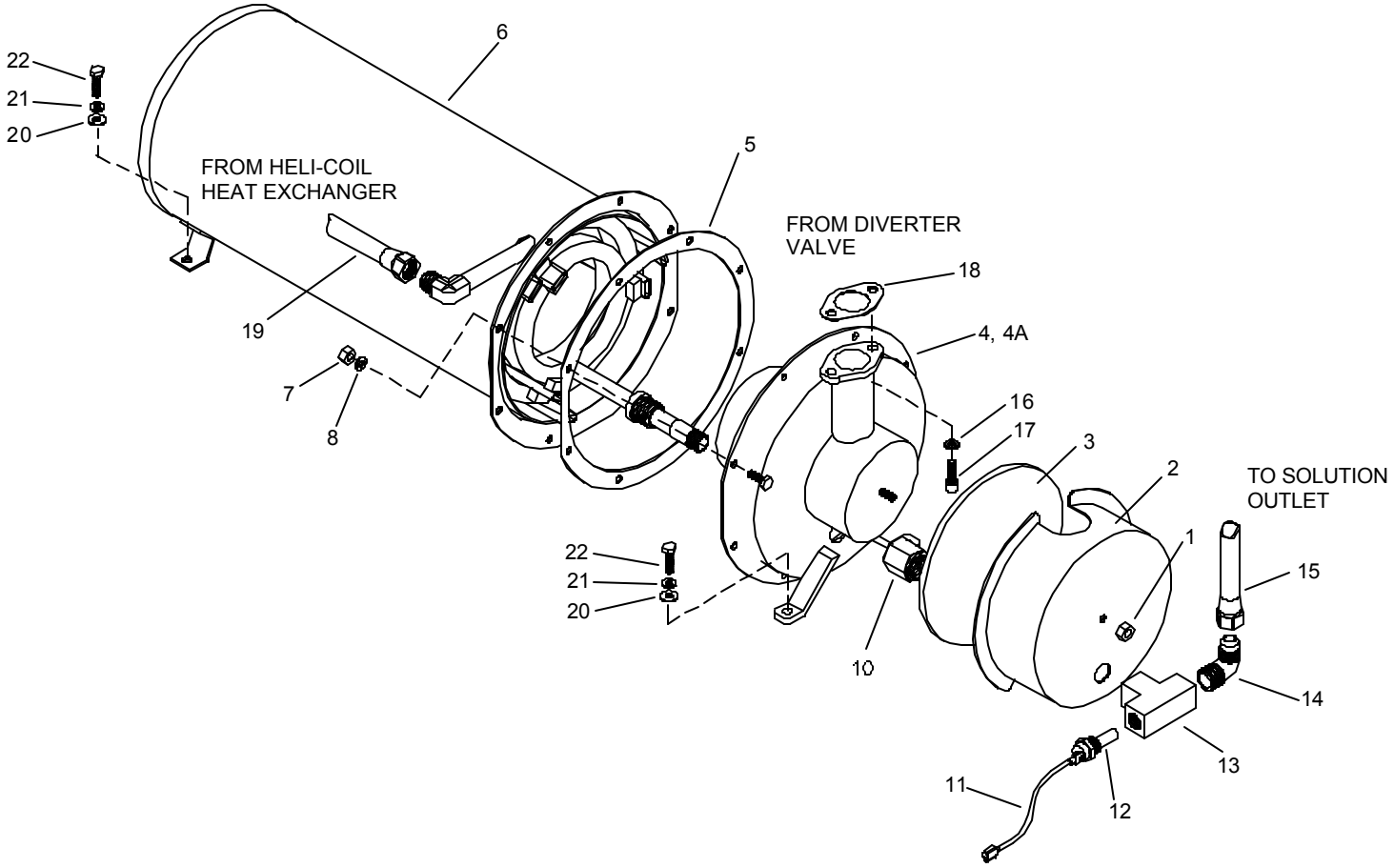
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	00-000210	SCR, 1/4-20 X 3/4, SOCHD		
2	87162	WASHER, 1/4 SPLIT LOCK		
3	56-501955	ASSY, EXH OUTL		
4	03-000081	CLMP, MFLR 1-1/2 ZNC PL		
5	09-805433	HOSE, INT VAC 3.25 X 2.5		
6	03-000250	CLAMP, HOSE #60 3.3125/4.5 SST		
7	56-501938	HSG, VAC HE , BRU2		
8	02-000066	FLATWASHER, 1/4		
9	70720	SCR, 10 X 3/8 PPHST TYPE B		
10	57-520089	MUFFLER, VAC		
11	09-805425	HOSE, INT VAC 3.5 X 5.0 BLK		
12	00-000078	SCR, 1/4-20 X 1' HXHD GRD8		
13	43-807108	GASKET, VAC HE INLET		
14	58-700027	PAD, VAC HE CORE		
15	43-807081	GASKET, VAC HE CORE		
16	09-805288	HOSE, WTR 5/8X27		
17	03-000246	CLAMP, HOSE #8 SST		
18	09-805343	HOSE, WTR 5/8X17		
19	09-805372	HOSE, WTR 5/8X6-1/2		
20	61-950695	SUB-ASSY, VAC HE CVR		
21	61-950696	VAC HE CORE		

HELI-COIL HEAT EXCHANGER



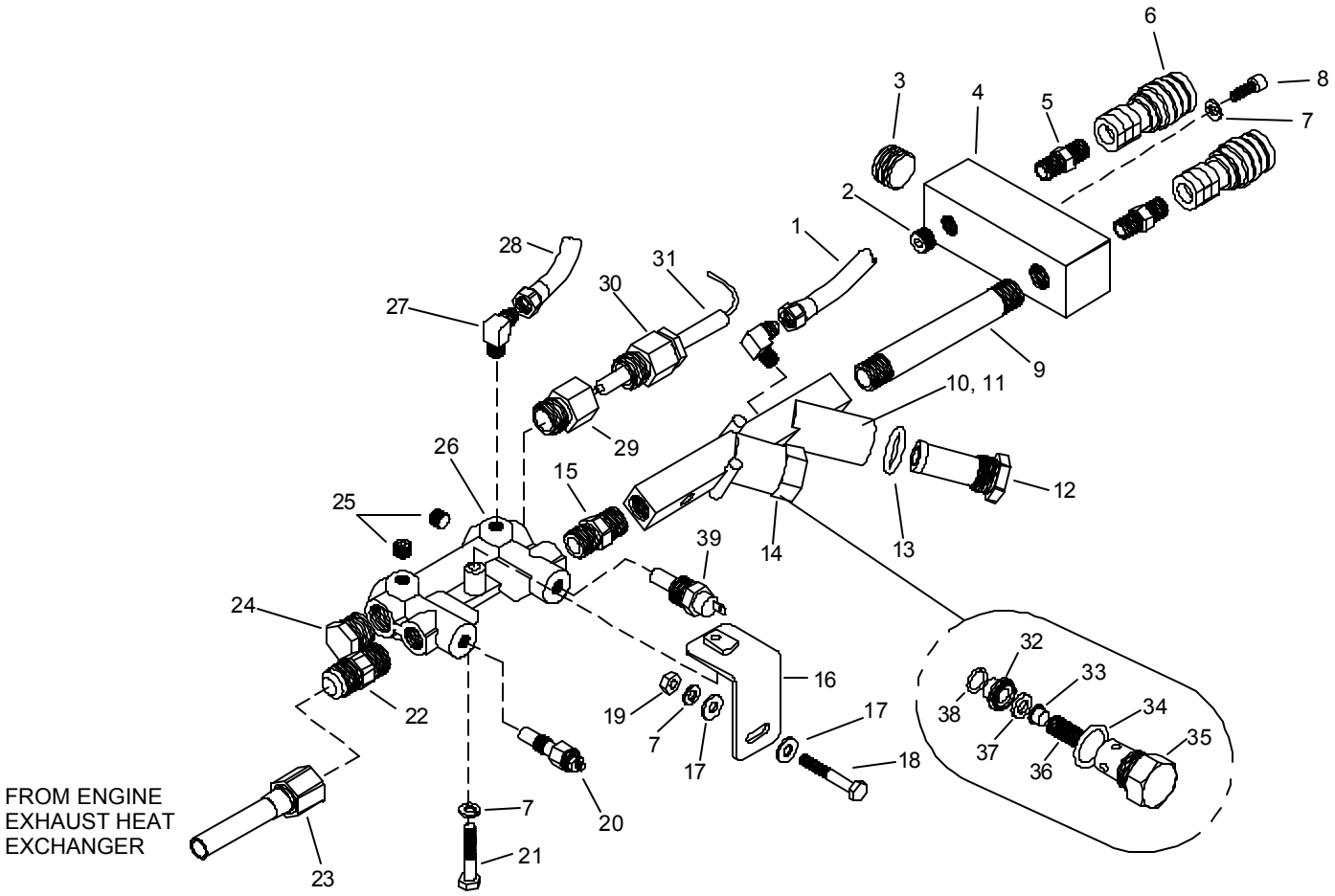
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	57-520073	HE, HELI-COIL		INCLUDES PARTS 2-9
2	52-501583	SHELL, HE 800A, 800RD		
3	70340	SCR, 1/2-13 X 1.25 HHCS GR5PLT		
4	57-520033	COIL, HE		
5	43-807051	GSKT, MNFLD HE		
6	43-807049	GSKT, HE		
7	52-000124	NUT, 1-3/4-12HXHD HE		
8	56-501505	RNG, LOCK, MNFLD, HE		
9	52-501631	PL, CVR HE BC		
10	00-000363	SCR, CAP 5/8-11 X 2 HXHD		
11	02-000232	LOCK WASHER, 5/8		
12	56-502005	BRKT, RT HOOD		
13	02-000088	FLAT WASHER, 5/8 HVY		
14	50-501686	CLIP, SPRING		
15	04-000287	SPRING, DVTR RET		
16	790648	HOSE, THERM ADAPT TO HELICOIL		
17	03-000248	CLMP, HOSE #16 1-1/2 MIN 1-3/4		
18	10-805375	HOSE, HP 3/8 X 19 (1/2FT BS)		
19	10-805274	HOSE, HP 3/8 X 26 (1/2FT BS)		
20	12-800326	ELL, 3/4P X 1/2T BR		
21	52-501627	INLET, HE		
22	790647	HOSE, ENGINE TO Y ADAPTER		
23	31016	ELBOW, 1/4NPT STREET		
24	15-808073	COCK, DRN 1/4P X 1/4 HOSE ELL		
25	00-000015	SCR, DRV .098 X 3/16		
-	66-945200	KIT, HELI-COIL W/GASKETS		NOT SHOWN

ENGINE EXHAUST HEAT EXCHANGER



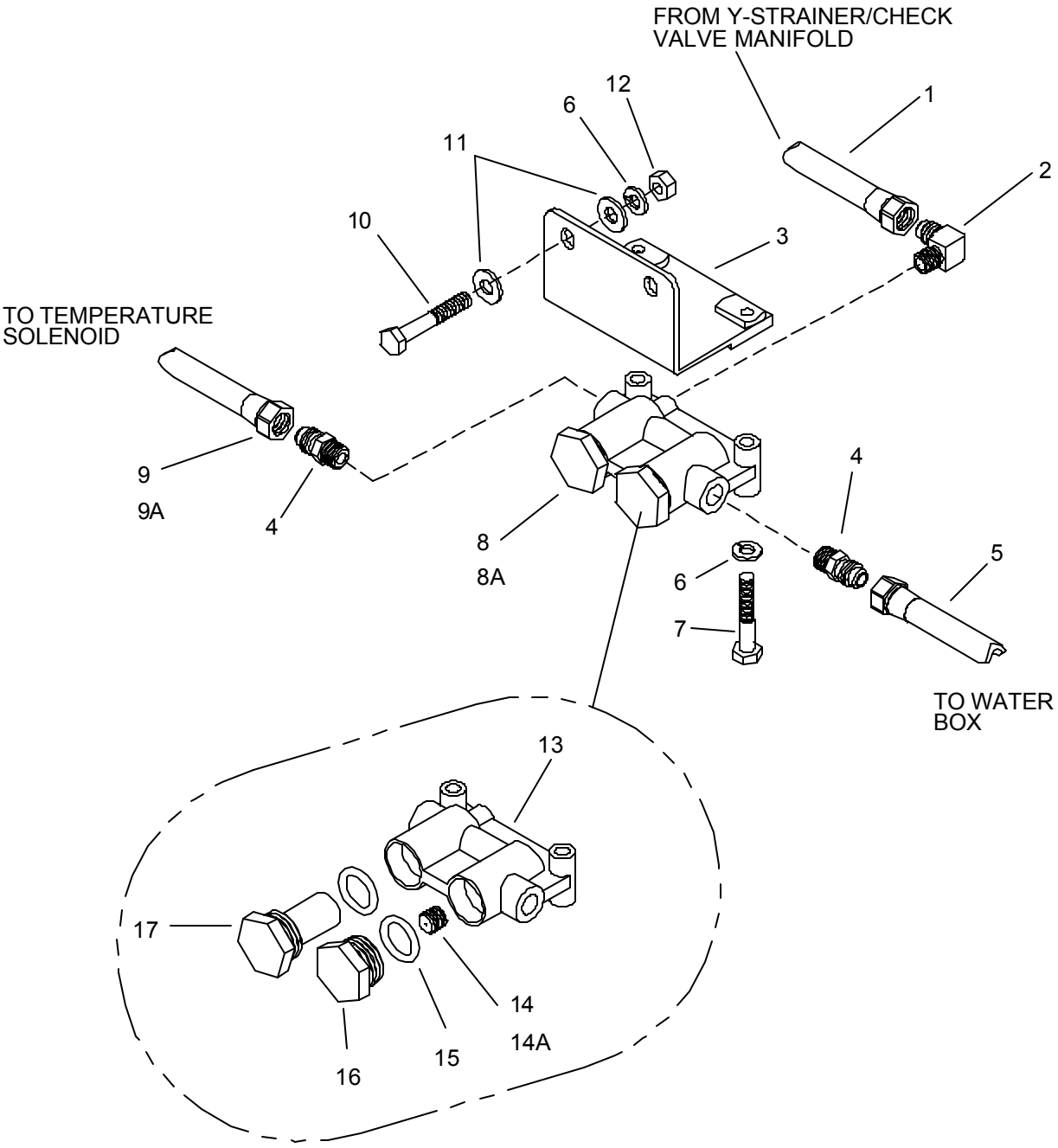
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	61-950628	ASSY, CAT HE		INCLUDES PARTS 1-4, 5-14
-	61-950582	ASSY, HE NON-CAT		INCLUDES PARTS 4A-14
1	01-000271	NUT, 1/4-20 HXHD BR		
2	52-501643	SHIELD, CAT HE		
3	58-700028	PAD, CAT HT SHLD		
4	56-501759	COVER, CAT HE END BC		CATALYTIC
4A	58-500791	CSTG, CAT CONV W/TUBE TM		NON-CATALYTIC
5	43-807086	GSKT, EXH FLG BC		
6	57-520074	ASSY, COIL MT&CSG BC		
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, HE TEMP SHTOFF		
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 14-1/2 (1/2FT BS)		
16	02-000274	LOCKWASHER, 5/16 (ALLEN SCREW)		
17	00-000315	SCR, CAP 5/16-18 X 7/8 SOCHD		
18	42-902212	ONAN GSKT, EXH #154-2747		
19	10-805274	HOSE, HP 3/8 X 26 (1/2FT BS)		
20	02-000066	FLATWASHER, 1/4		
21	87162	WASHER, 1/4 SPLIT LOCK PLTD		
22	00-000078	SCR, 1/4 X 1" HXHD GRD8		
-	66-945532	KIT, EXH HE CORE		NOT SHOWN (INCLUDES PARTS 3,5,6 AND 18)

SOLUTION OUTLET

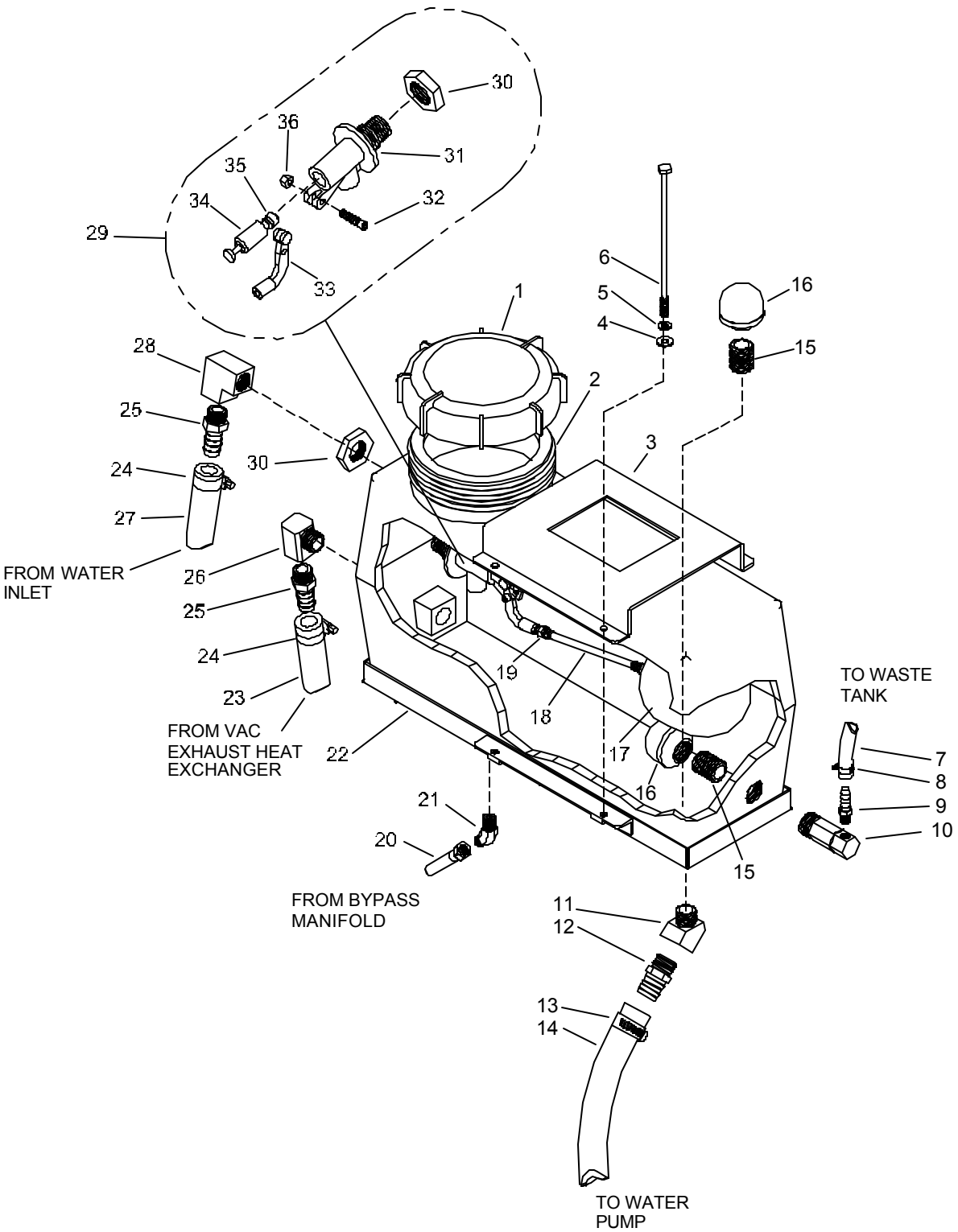


REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	10-805131	HOSE, 3/16 X 20-1/2		
2	66017	PLUG, 1/4 BRASS PIPE		
3	11-800069	PLUG, 1/2 SOCHD BR		
4	52-501653	MANIFOLD, OUTLET		
5	56015	NIPPLE, 1/4 HEX		
6	22015	COUPLER, 1/4 QD		
7	87162	WASHER, 1/4 SPLIT LOCK		
8	00-000210	SCXR, 1/4-20 X 3/4" SOCHD		
9	11-800426	NIP, 3/8 X 5 SST		
10	15-808095	ASSY, CHK VLV		INCLUDES PARTS 11-14
11	52-501621	MANIFOLD, CHK VLV		
12	14-806549	SCREEN, CHECK VALVE		
13	43-810053	O-RING, .676ID X .816OD		
14	15-808094	VALVE, CHECK		
15	11-800429	NIP, HEX 3/8 SST		
16	56-501975	BRKT, THERM MANIFOLD MTG		
17	02-000066	FLATWASHER, 1/4		
18	70105	SCR, 1/4-20 X 1.75 HHCS PLTD		
19	57006	NUT, 1/4-20 HEX		
20	34-903019	SENDER, TEMP, 140-320DEG		
21	00-000132	SCR, 1/4-20 X 1-1/2 HXHD		
22	12-800282	CONN, 3/8P X 1/2T BR		
23	10-805376	HOSE, 1/2X 14-1/2 (1/2FT BS)		
24	52-501680	FTTG, SENSOR SUPT TM		
25	11-800206	PLUG, 1/8 SOCHD BR		
26	52-502566	MANIFOLD, THERM		
27	12-800040	ELL, 1/8P X 1/4T BR		
28	10-805357	HOSE, 3/16 X 38 (1/4FT BS) MET		
29	11-800342	CONN, 1/2P X 1/2 FP BR		
30	12-800391	UNION, CAPILLARY-THERM		
31	35-900182	CONTR, TEMP 275DEG F		
32	16-808223	SEAT CHK VLV ASSY TM		
33	16-808226	POPPET CHK VLV ASSY		
34	43-810079	O-RING, 7/8 ID X 1-1/16 OD		
35	16-808222	CAP, VALVE		
36	16-808224	SPRING, VALVE		
37	16-808225	TEFLON SEAT		
38	43-810008	O-RING, VALVE		
39	35-901039	SENSOR, TEMP 260°		

BYPASS MANIFOLD



REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	10-805357	HOSE, 3/16X38 (1/4FT BS) MET		
2	12-800040	ELL, 1/8P X 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		(CATALYTIC)
8A	15-808111	ASSY, BYPASS MANIFOLD		(NON-CATALYTIC)
9	10-805130	HOSE, 3/16 X 13-1/2 (1/4FT BS)		(CATALYTIC)
9A	10-805393	HOSE, 3/16X14-1/4 (1/4FT BS)		(NON-CATALYTIC)
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		(CATALYTIC)
14A	52-501665	ORIF, BYPLASS MAINFOLD (BLUE)		(NON-CATALYTIC)
15	43-810053	O-RING, .676ID X .816OD		
16	53-501523	CAP, CHK VALVE MANIFOLD STRNR		
17	14-806552	SCREEN, BYPASS MANIFOLD		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FROM WATER INLET
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FROM VAC EXHAUST HEAT EXCHANGER
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TO WASTE TANK
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FROM BYPASS MANIFOLD
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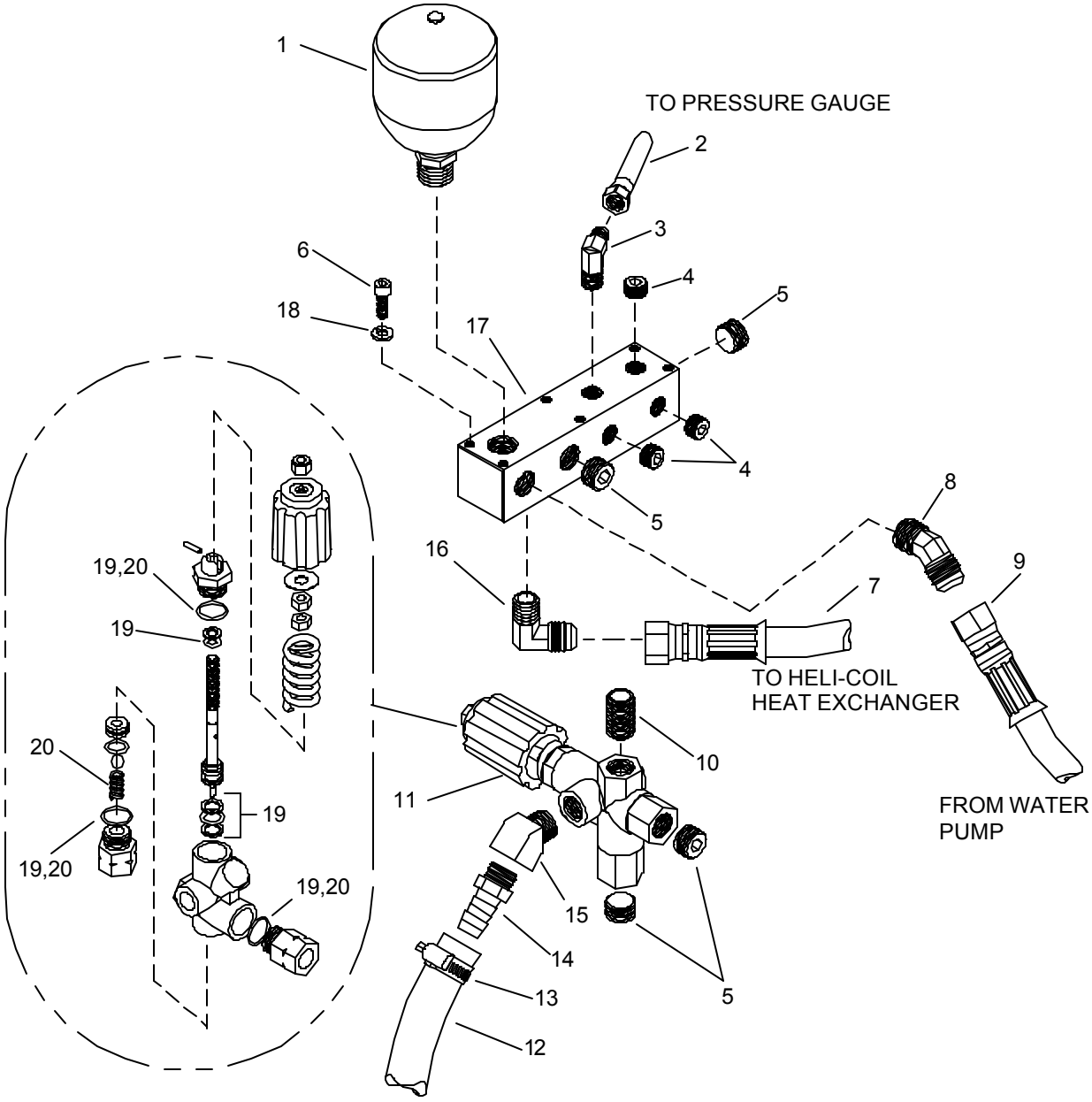
TO WATER PUMP

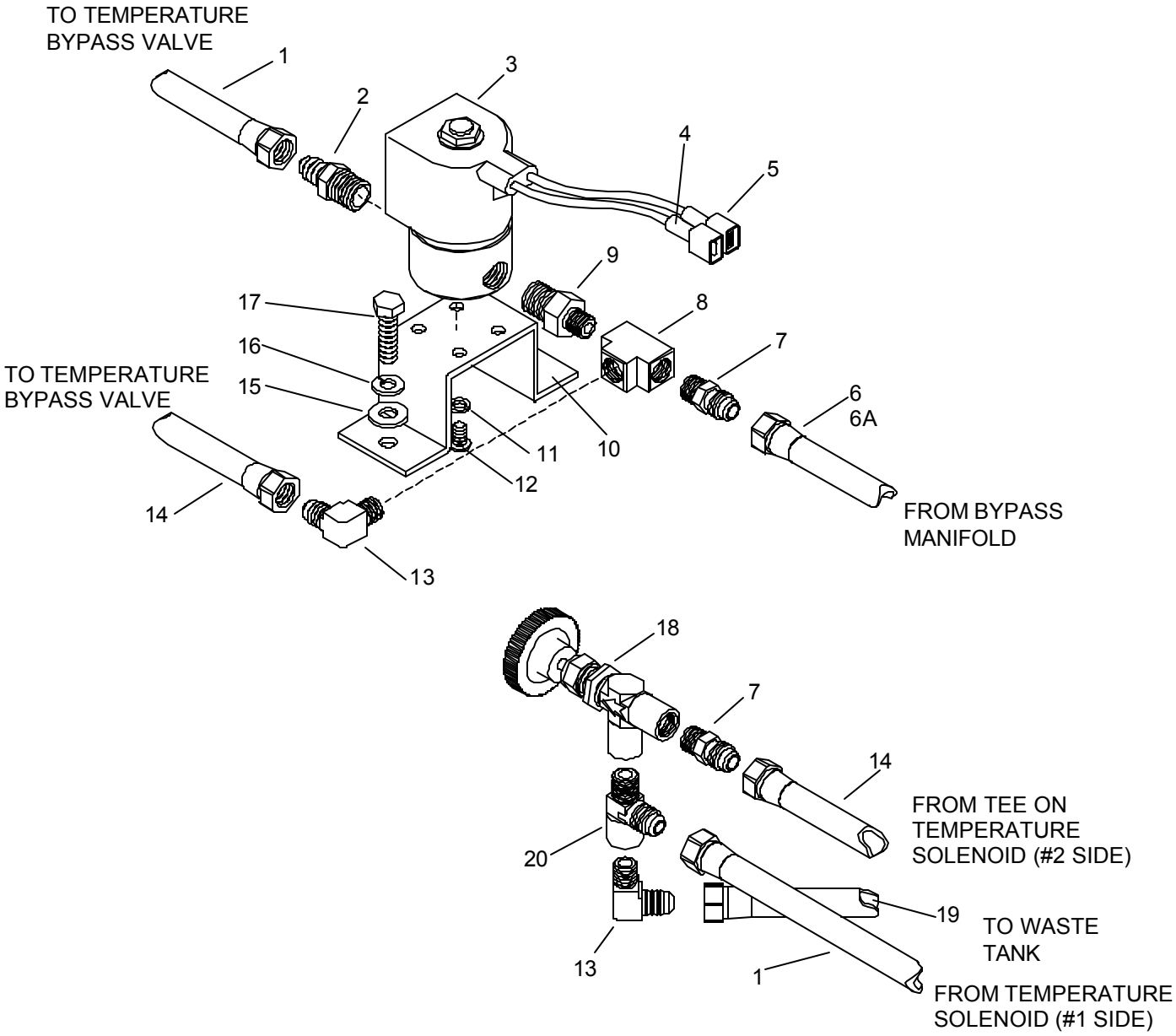
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	11-800432	CAP, WATER BOX		
2	58-500781	MOLDING, WATER BOX		
3	50-501763	HOLD DOWN WTR BOX		
4	02-000066	FLATWASHER, 1/4		
5	87162	WASHER, 1/4 SPLIT LOCK		
6	00-000335	SCR, 1/4-20 X 8 HXHD		
7	09-805099	HOSE, BRD 5/16 X 40		
8	03-000065	CLAMP, HOSE #4 SST		
9	12-800093	FTG, BRB 1/8P X 5/16H		
10	15-808083	VALVE, TEMP REL 180 DEG G		
11	11-800299	ELL, STREET 1/2 45 DEG		
12	12-800278	FTTG, BRB 1/2P X 3/4H BR		
13	03-000113	CLAMP, HOSE #12 SST		
14	09-805435	HOSE, WATER .75 X 33.0		
15	11-800300	NIP, 1/2 X CL		
16	14-806540	STRAINER, SUC END 1/2FP		
17	19-807014	BALL, FLOAT		
18	54-501715	FLOAT ROD		
19	57006	NUT, 1/4-20 HEX		
20	10-805130	HOSE, 3/16 X 13-1/2 (1/4FT BS)		
21	12-800356	ELL, 1/4P X 1/4T 45 DEG BR		
22	56-501902	ASSY, TRY WTR BX		
23	09-805288	HOSE, WTR 5/8 X 27		
24	03-000246	CLAMP, HOSE #8 SST		
25	12-800269	FTTG, BRB 1/2P X 5/8 H BR		
26	11-800041	ELL, STREET 1/2 BR		
27	09-805428	HOSE, WTR 5/8 X 58		
28	11-800361	ELL, 1/2 BR		
29	15-808110	VALVE, FLOAT		
30	52-501706	NUT, FLOAT VALVE		
31	16-808217	BDY, FLOAT VLV		
32	00-000337	SCR, 10-32 X 1” SOCHD SST		
33	16-808216	ARM, PIVOT-FH VLV		
34	16-808219	PISTON, FH VLV		
35	16-808164	SEAT, FLOAT VLV		
36	57090	NUT, 10-32 HEX NYLOCK SS		

PRESSURE REGULATOR MANIFOLD



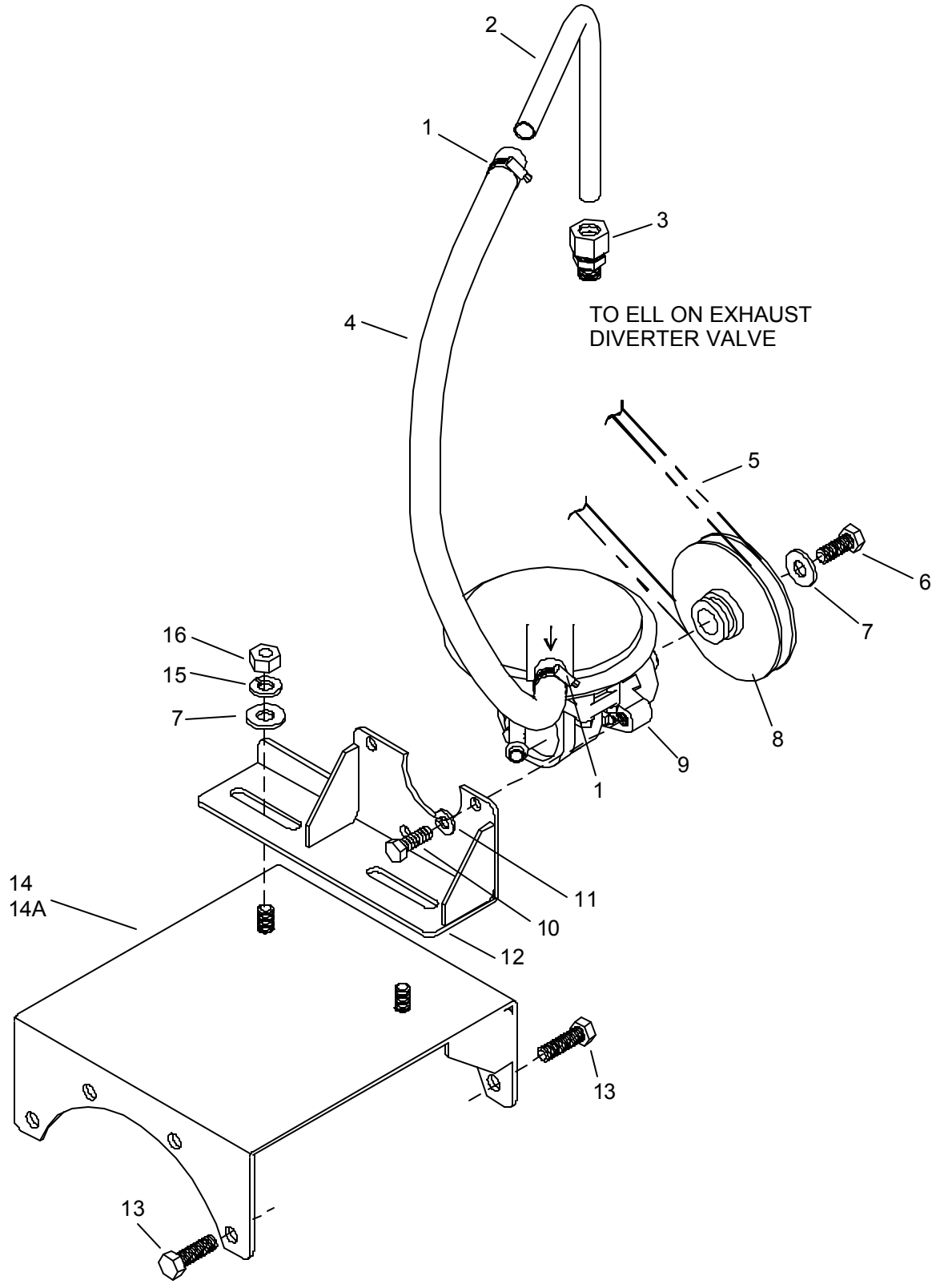
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	790106	ACCUMULATOR		
2	10-805362	HOSE, 3/16 X 16-1/2		
3	12-800031	ELL, 1/4P X 1/4T BR		
4	66017	PLUG, 1/4 BRASS PIPE		
5	11-800224	PLUG, 3/8 SOCHD BR		
6	00-000210	SCR, 1/4-20 X 3/4" SOCHD		
7	10-805375	HOSE, HP 3/8 X 19 (1/2FT BS)		
8	12-800347	ELL, 3/8P X 1/2T 45 DEG BR		
9	10-805359	HOSE, HP 3/8 X 42 (1/2FT BS)		
10	11-800368	NIP, 3/8 X CL SST		
11	790067	REG, PRESS		
12	09-805343	HOSE, STR 5/8 X 17		
13	03-000246	CLAMP, HOSE, #8 SST		
14	12-800345	FTTG, BRB 3/8P X 5/8H BR		
15	11-800341	ELL, ST 3/8 45DEG BR		
16	12-800225	ELL, 3/8P X 1/2T BR		
17	790112	MANIFOLD, PRESS REG. 1/2" PORT		
18	87162	WASHER, 1/4 SPLIT LOCK		
19	16-808201	CAT#33246 KIT, O-RING REP		
20	16-808200	CAT#33147 KIT, VLV, REP		

TEMPERATURE SOLENOID & BYPASS VALVE



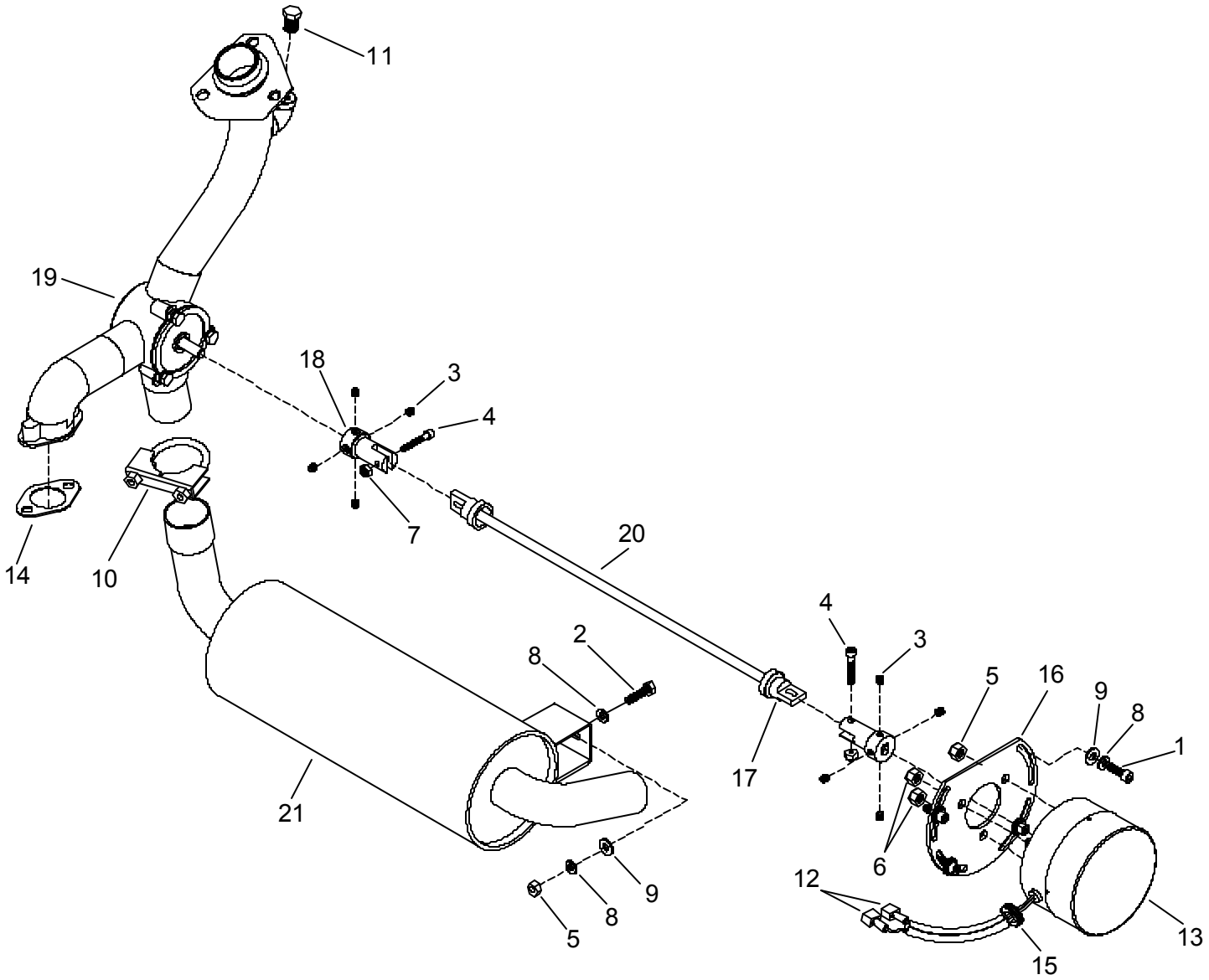
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	10-805000	HOSE, 3/16 X 9 (1/4FT BS) MET		
2	12-800060	CONN, 1/4P X 1/4T BR		
3	15-808105	VALVE, SOLENOID 1/4F X 1/4F		
4	31-900028	TERM, INS DSC 1/4M 14-16W		
5	31-900027	TERM, INS DSC 1/4F 14-16W		
6	10-805130	HOSE, 3/16 X 13-1/2 (1/4FT BS)		
6A	10-805393	HOSE, 3/16 X 14-1/4 (1/4 FT BS)		
7	12-800065	CONN, 1/8P X 1/4T		
8	11-800133	TEE, 1/8 BR		
9	11-800380	NIP, 1/4 X 1/8 HX SST		
10	50-501744	BRKT, SOLENOID		
11	87165	WASHER, #10 SPLIT LOCK		
12	00-000065	SCR, 10-32 X 3/8” PBHD		
13	12-800040	ELL, 1/8P X 1/4T BR		
14	10-805327	HOSE, 3/16 X 10 (1/4FT BS) MET		
15	02-000066	FLATWASHER, 1/4		
16	87162	WASHER, 1/4 SPLIT LOCK		
17	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
18	15-808107	VLV, MET 1/8FP (BYPASS) RT		
19	10-805363	HOSE, 3/16 X 63 1/2 (1/4FT BS)		
20	12-800088	TEE, ADPT 1/8FP X 1/8P X 1/4 T		
-	66-945280	KIT, BYPASS MAINT		NOT SHOWN

CATALYTIC AIR PUMP



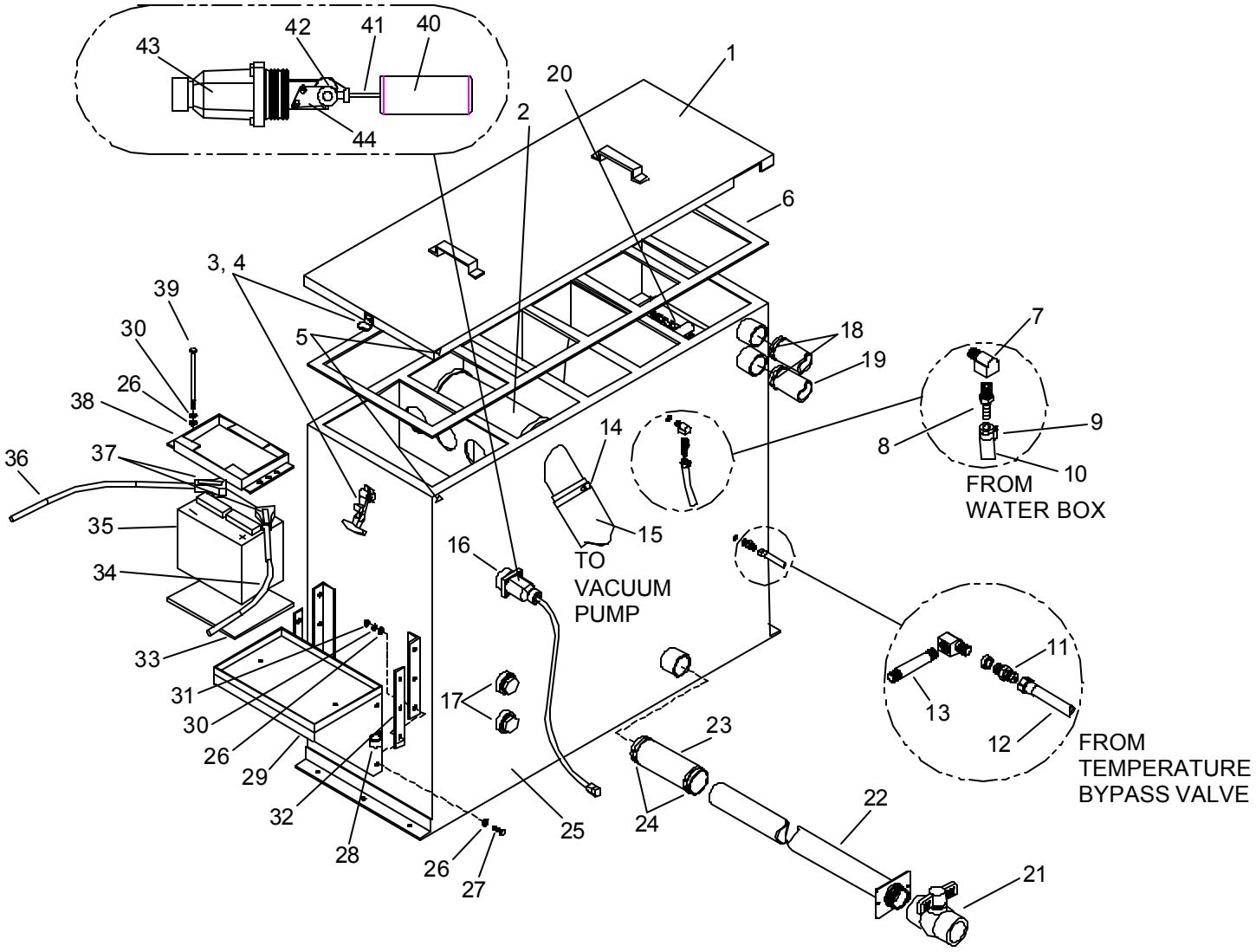
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	03-000246	CLAMP. HOSE, #8 SST		
2	55-501745	TUBE, AIR PMP		
3	12-800355	CONN, 1/4P X 1/2T COMP BR		
4	39174	HOSE, 1/2 WIRE BOUND X 23”		
5	44-802168	BELT, 3V X 250 GOODLYEAR		
6	00-000095	SCR, 3/8-16 X 1” HHCSGR5PLT		
7	02-000074	WASHER, 3/8 FLT		
8	52-501647	PULLEY, AIR PMP		
9	41-809122	PUMP, AIR		
10	70262	SCR, M8 X 20 HHMS PLTD		
11	87083	WASHER, 5/16 SPLIT LOCK PLTD		
12	56-501871	BRKT, UPR AIR PMP		
13	00-000266	SCR, CAP 3/8-16X1-1/4 HXH		
14	56-501849	BRKT, LWR AIR PMP		PERFORMER
14A	56-501936	BRKT,AIR PUMP		PERFORMER 405
15	87163	WASHER, 3/8 SPLIT LOCK		
16	57111	NUT, 3/8-16 HEX		

AUTOMATIC EXHAUST DIVERTER



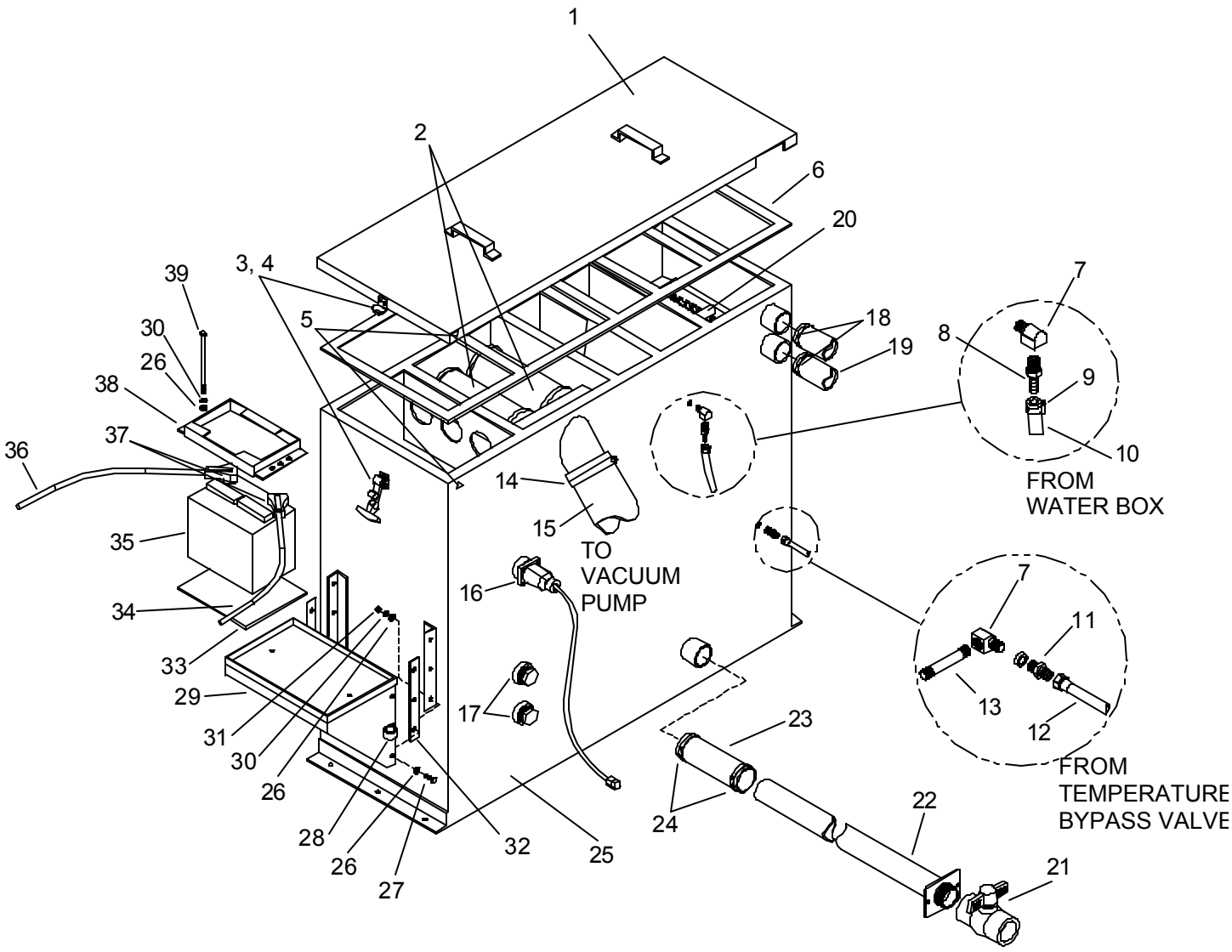
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	00-000210	SCR, 1/4-20 X 3/4" SOCHD		
2	00-000078	SCR, 1/4-20 X 1" HXHD GRD8		
3	00-000265	SCR, SET 1/4-20 X 1/4 SOCHD		
4	00-000317	SCR, CAP 10-32 X 1 1/4 SOCH		
5	57006	NUT, 1/4-20 HEX		
6	01-000186	LOCKNUT, 5/16-18 HCHD, SS		
7	01-000301	LOCKNUT, 10-32 SS		
8	87162	WASHER, 1/4 SPILT LOCK		
9	02-000066	FLATWASHER, 1/4		
10	03-000081	CLAMP, MUFFLER 1 1/2 ZNC PL		
11	11-800169	PLUG, 1/4 BR		NON-CATALYTIC UNITS
12	31-900027	TERM, INS DSC 1/4F 14-16W		
13	36-900182	ROTARY SOLENOID		
14	42-902212	ONAN GASKET		
15	43-807501	GROMMET, 1/2ID X 7/8 OD		
16	50-802158	PLATE, ROATARY		
17	52-502067	LINK, SOL CONN-FEM		
18	52-502068	LINK, DIVERTER		
19	56-502444	VALVE, EXH DVRTR, A-15W/CARB		
20	56-502541	ROD, DIVRTR CONN		
21	57-520072	MUFFLER, EXH		

WASTE TANK - PERFORMER



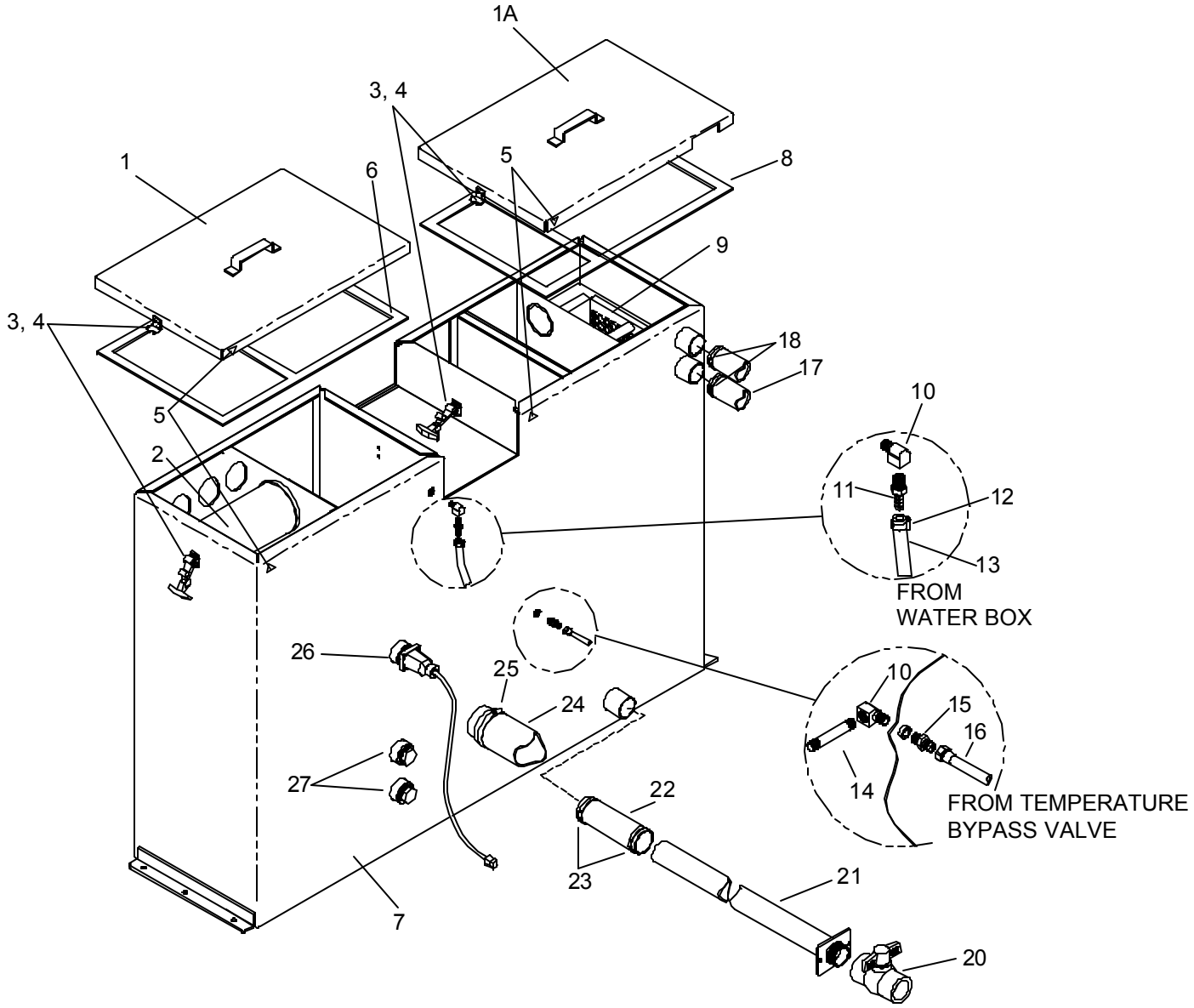
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	790107	LID, WASTE TANK		INCLUDES PARTS 2-6
2	14-806518	STRAINER, WASTE TANK 2-1/2"		
3	67006	RIVET, 3/16 OD X 5/8 AL		
4	46-802510	LATCH, DRAW 2-7/8 SST		
5	48-941297	DECAL, ARROW-WST TNK LID		
6	43-807094	GASKET, WST TNK LID		
7	31016	ELBOW, 1/4 NPT STREET		
8	12-800092	FTTG, BRB 1/4 X 5/16H BR		
9	03-000065	CLAMP, HOSE #4 SST		
10	09-805099	HOSE, BRD 5/16 X 40		
11	12-800060	CONN, 1/4P X 1/4T BR		
12	10-805363	HOSE, 3/16 X 63-1/2 (1/4FT BS)		
13	11-800404	NIP, 1/4 X 5 SST		
14	03-000112	CLAMP, HOSE #49		
15	09-805341	HOSE, VAC 2.88 X 25.0 BLK		
16	61-950621	ASSY, LVL SNS SHTOF SW		
17	11-800402	PLUG, 1-1/4 HXHD PVC		
18	03-000000	CLAMP, HOSE #40		
19	09-805554	HOSE, INT VAC 2 X 6'		
20	56-501793	STRAINER BOWL		
21	15-808080	VALVE, BALL PVC 1-1/2FP		
22	56-501686	TUBE, WASTE DUMP		
23	09-805339	HOSE, INT VAC 2 X 7		
24	03-000054	CLAMP, HOSE # 32		
25	790019	TANK, WASTE AD SOL		
26	02-000066	FLATWASHER, 1/4		
27	00-000078	SCR, 1/4-20 X 1" HXHD GRD8		
28	03-000242	CLAMP, CABLE 3/4ID 1/4BLT		
29	56-501779	TRAY, BATTERY		
30	87162	WASHER, 1/4 SPLIT LOCK		
31	57006	NUT, 1/4-20 HEX		
32	50-501697	SPACER, BAT SHLF MTG		
33	47-700007	SHIELD, BAT MT		
34	64-950499	CABLE, BAT X 61" RED		
35	36-900056	BATTERY		
36	64-950498	CABLE, BATX71" BLK		
37	31-900179	COVER, BATTERY TERMINAL		
38	56-500188	COVER, BATTERY		
39	00-000167	SCR, 1/4-20 X 6" HXHD		
40	33-900194	FLOAT		
41	33-900195	SHAFT, FLOAT		
42	33-900200	HOUSING, MAGNET		
43	33-900201	SUPPORT, PIVOT		
44	33-900214	SWITCH, MICRO		
-	05-008002	ADHESIVE, GASKET		NOT SHOWN

WASTE TANK - PERFORMER 405



REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	790107	LID, WASTE TANK		INCLUDES PARTS 2-6
2	14-806509	STRAINER, 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 TNK LID		
6	43-807107	GASKET, WST TNK LID		
7	31016	ELBOW, 1/4 NPT STREET		
8	12-800092	FTTG, BRB 1/4 X 5/16H BR		
9	03-000065	CLAMP, HOSE #4 SST		
10	09-805099	HOSE, BRD 5/16 X 40		
11	12-800060	CONN, 1/4P X 1/4T BR		
12	10-805363	HOSE, 3/16 X 63-1/2 (1/4FT BS)		
13	11-800404	NIP, 1/4 X 5 SST		
14	03-000250	CLAMP, HOSE #60		
15	09-805426	HOSE, INT VAC 3.5 X 25.0		
16	61-950621	ASSY, LVL SNS SHTOF SW		
17	11-800402	PLUG, 1-1/4 HXHD PVC		
18	03-000000	CLAMP, HOSE #40		
19	09-805554	HOSE, INT VAC 2 X 6’		
20	56-501793	STRAINER BOWL		
21	15-808080	VALVE, BALL PVC 1-1/2FP		
22	56-501686	TUBE, WASTE DUMP		
23	09-805339	HOSE, INT VAC 2 X 7		
24	03-000054	CLAMP, HOSE # 32		
25	790016	TANK, WASTE AD SOL		
26	02-000066	FLATWASHER, 1/4		
27	00-000078	SCR, 1/4-20 X 1” HXHD GRD8		
28	03-000242	CLAMP, CABLE 3/4ID 1/4BLT		
29	56-501779	TRAY, BATTERY		
30	87162	WASHER, 1/4 SPLIT LOCK		
31	57006	NUT, 1/4-20 HEX		
32	50-501697	SPACER, BAT SHLF MTG		
33	47-700007	SHIELD, BAT MT		
34	64-950499	CABLE, BAT X 61” RED		
35	36-900056	BATTERY		
36	64-950498	CABLE, BATX71” BLK		
37	31-900179	COVER, BATTERY TERMINAL		
38	56-500188	COVER, BATTERY		
39	00-000167	SCR, 1/4-20 X 6” HXHD		
-	05-008002	ADHESIVE, GASKET		NOT SHOWN

WASTE TANK - PERFORMER 100 GALLON (OPTIONAL)

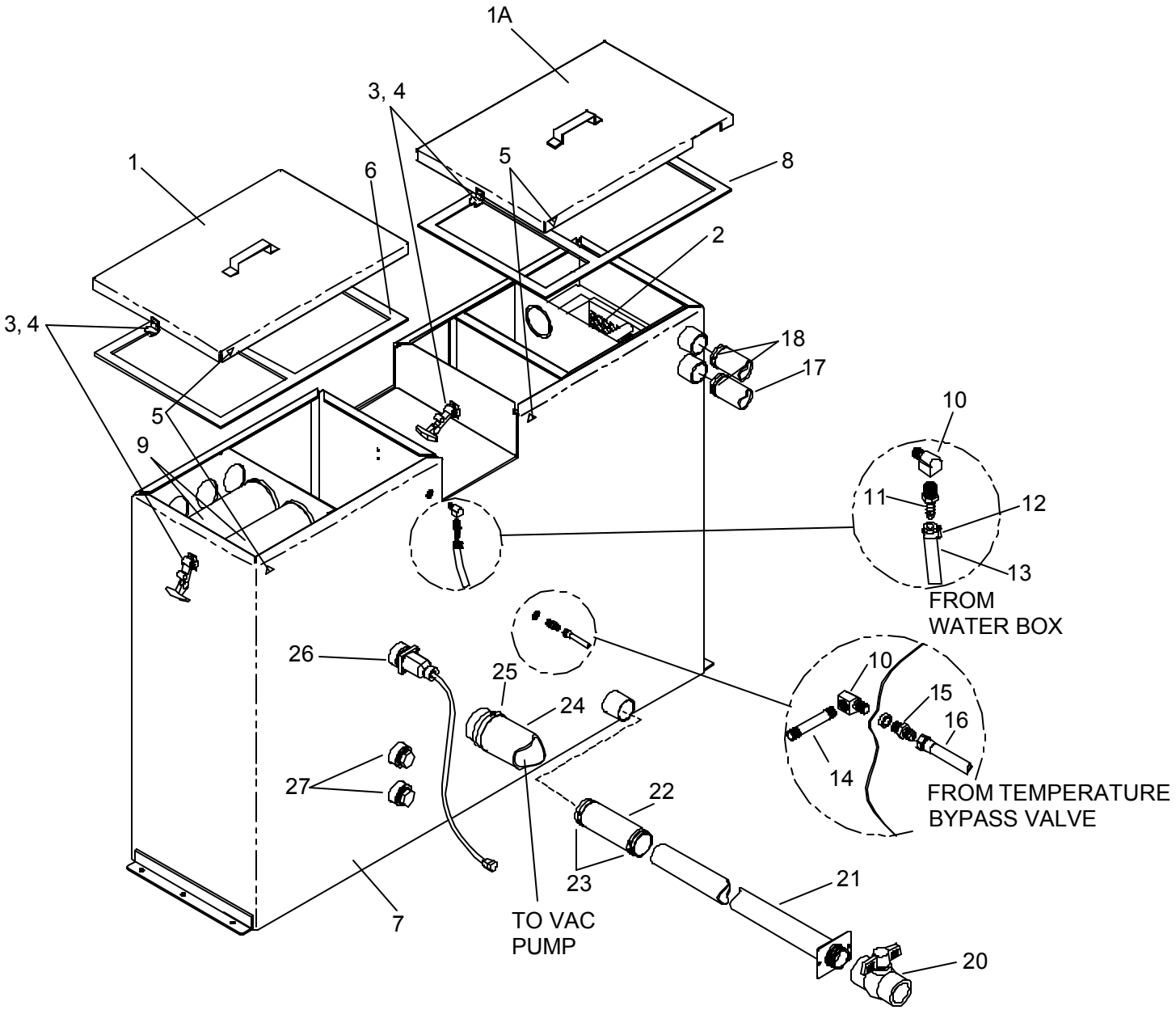


REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	05184	ASSY, WST TNK, LD FLTR 100G AD		INCLUDES PARTS 3-6
1A	05185	ASSY, WST TNK, STRN, 100G AD		
2	56-501793	STRAINER BOWL		
3	67006	RIVET, 3/16 OD X 5/8 AL		
4	46-802510	LATCH, DRAW 1-7/8 SST		
5	48-941297	DECAL, ARROW-WST TNK LID		
6	43-807547	GSKT, WST TNK LID		
7	790081	TANK, WASTE 100 GAL		
8	43-807546	GSKT, WST TNK LID 100G		
9	14-806518	STRAINER, WASTE TANK 2-1/2		
10	31016	ELBOW, 1/4NPT STREET		
11	12-800092	FTTG, BRB 1/4 X 5/16H BR		
12	03-000065	CLAMP, HOSE #4 SST		
13	09-805099	HOSE, BRD 5/16 X 40		
14	11-800404	NIP, 1/4 X 5 SST		
15	12-800060	CONN, 1/4P X 1/4T BR		
16	10-805363	HOSE, 3/16 X 63-1/2 (1/4FT BS)		
17	09-805554	HOSE, INT VAC 2 X 6'		
18	03-000000	CLAMP, HOSE #40		
19	56-500188	COVER, BATTERY		
20	15-808080	VALVE, BALL PVC 1-1/2FP		
21	56-501686	TUBE, WASTE DUMP		
22	09-805339	HOSE, INT VAC 2 X 7		
23	03-000054	CLAMP, HOSE #32		
24	09-805341	HOSE, VAC 2.88 X 25.0 BLK		
25	03-000112	CLAMP, HOSE #48		
26	61-950621	ASSY, LVL SENS SHTOF SW		
27	11-800402	PLUG, 1-1/4 HXHD PVC		
-	05-008002	ADHESIVE, GASKET		NOT SHOWN

* WHEN ORDERING INDICATE PART NUMBER AND COLOR : i.e 05184Y

Y= YELLOW
G= GREEN
S=SILVER VEIN

WASTE TANK-PERFORMER 405 - 100 GALLON (OPTIONAL)

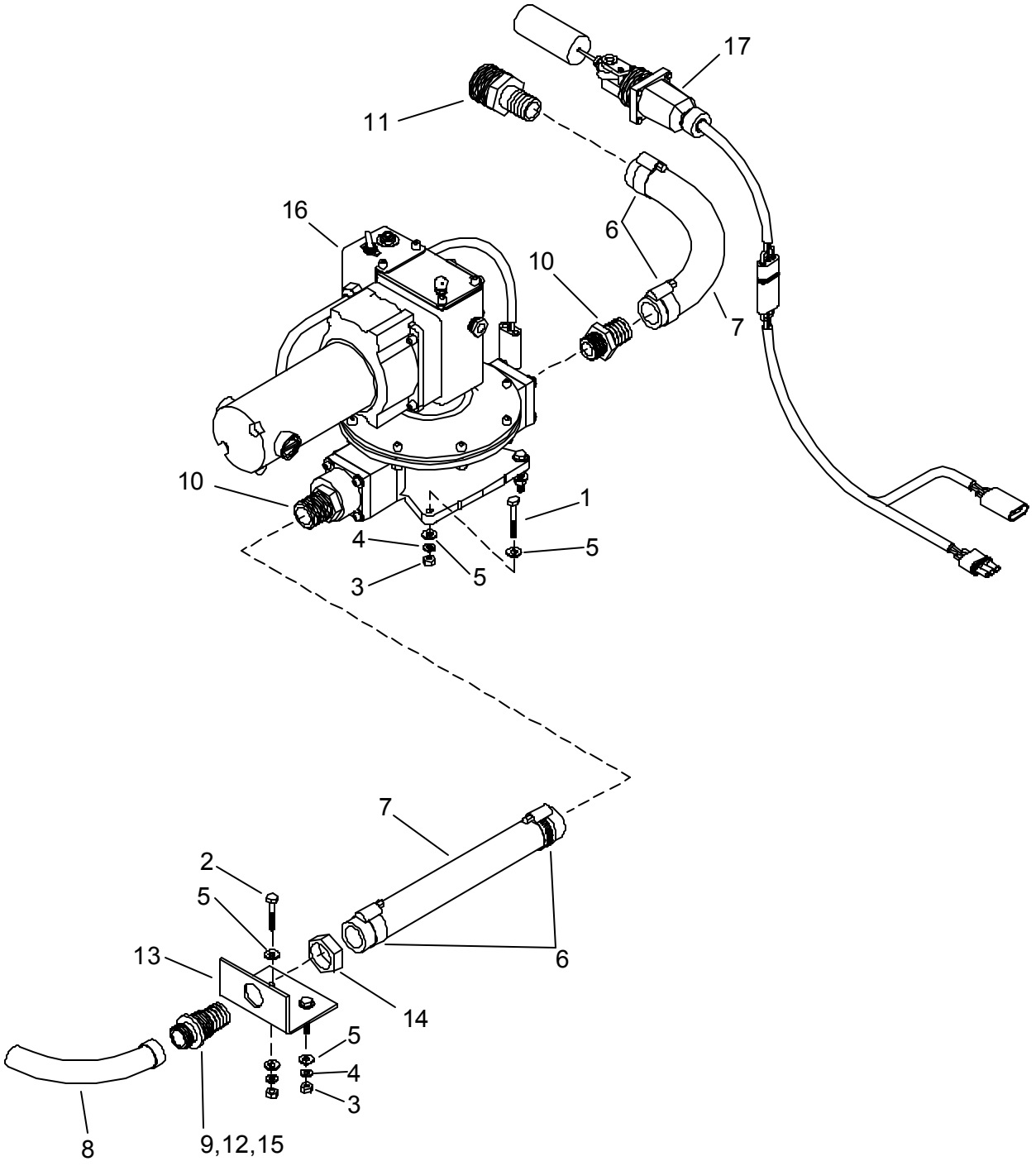


WASTE TANK-PERFORMER 405 - 100 GALLON (OPTIONAL)

REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	05184 *	ASSY, WST TNK, LD FLTR 100G AD		INCLUDES PARTS 3-6
1A	05185 *	ASSY, WST TNK, STRN, 100G AD		INCLUDES PARTS 3-6
2	56-501793	STRAINER BOWL		
3	67006	RIVET, 3/16 OD X 5/8 AL		
4	46-802510	LATCH, DRAW 1-7/8 SST		
5	48-941297	DECAL, ARROW-WST TNK LID		
6	43-807547	GSKT, WST TNK LID		
7	790089	TANK, WASTE 100 GAL		
8	43-807546	GSKT, WST TNK LID 100G		
9	14-806509	STRAINER, WST TNK 2”		
10	31016	ELBOW, 1/4NPT STREET		
11	12-800092	FTTG, BRB 1/4 X 5/16H BR		
12	03-000065	CLAMP, HOSE #4 SST		
13	09-805099	HOSE, BRD 5/16 X 40		
14	11-800404	NIP, 1/4 X 5 SST		
15	12-800060	CONN, 1/4P X 1/4T BR		
16	10-805363	HOSE, 3/16 X 63-1/2 (1/4FT BS)		
17	09-805554	HOSE, INT VAC 2 X 6'		
18	03-000000	CLAMP, HOSE #40		
19	56-500188	COVER, BATTERY		
20	15-808080	VALVE, BALL PVC 1-1/2FP		
21	56-501686	TUBE, WASTE DUMP		
22	09-805339	HOSE, INT VAC 2 X 7		
23	03-000054	CLAMP, HOSE #32		
24	09-805426	HOSE, INT VAC 3.5 X 25.0		
25	03-000250	CLAMP, HOSE #60		
26	61-950621	ASSY, LVL SENS SHTOF SW		
27	11-800402	PLUG, 1-1/4 HXHD PVC		
28	790089	TANK, WASTE 100 GAL		
-	05-008002	ADHESIVE, GASKET		NOT SHOWN

* WHEN ORDERING INDICATE PART NUMBER AND COLOR : i.e 05184Y

Y= YELLOW
G= GREEN
S=SILVER VEIN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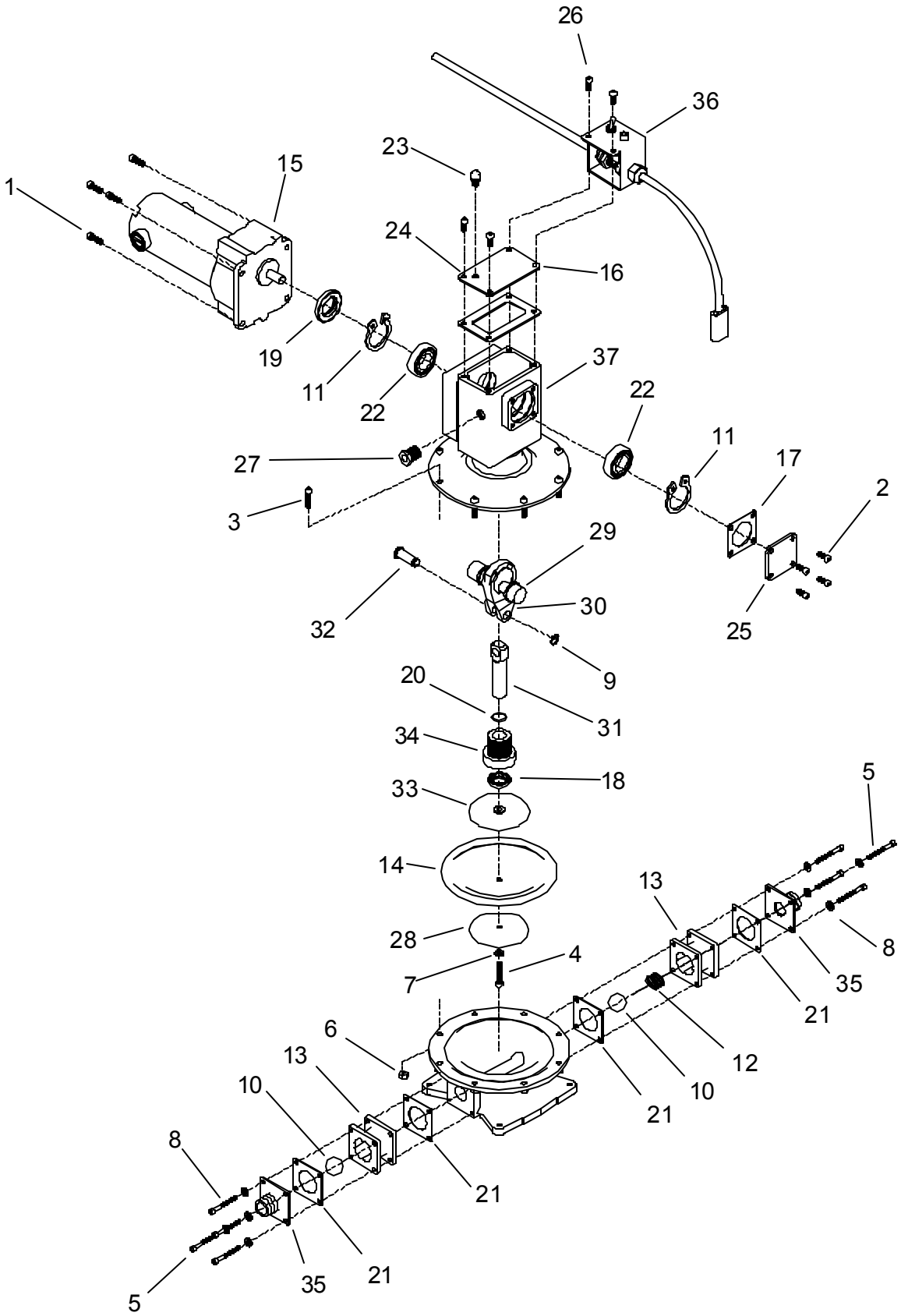
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	70105	SCR, M4 X 60 PH		
2	00-000132	SCR, 1/4-20 X 1/ 1/2 HXHD		
3	57006	NUT, 1/4-20 HEX		
4	87162	WASHER, 1/4 SPLIT LOCK PLTD		
5	02-000066	FLATWASHER, 1/4		
6	03-000176	CLAMP, HOSE #16		
7	09-805591	HOSE, WASTE PUMP 1" X 8'		
8	10-805484	HOSE, GARDEN 3/4 X 75'		
9	12-800052	CAP, HOSE 3/4 BR		
10	12-800367	FTTG, BRB 1PX1H BR		
11	12-800444	FTTG, 1-1/4P X 1" H BR		
12	43-807008	WASHER, HOSE 5/8 ID 1" OD		
13	50-502055	BRKT, CTR HOOD FR		
14	52-000123	NUT, 1-3/16-12 UN HXHD		
15	52-501993	CONN, HOSE WATER OUTL		
16	61-951306	PUMP, HD AUTO		
17	61-951319	ASSY, LVL SENS SHUT OFF SW		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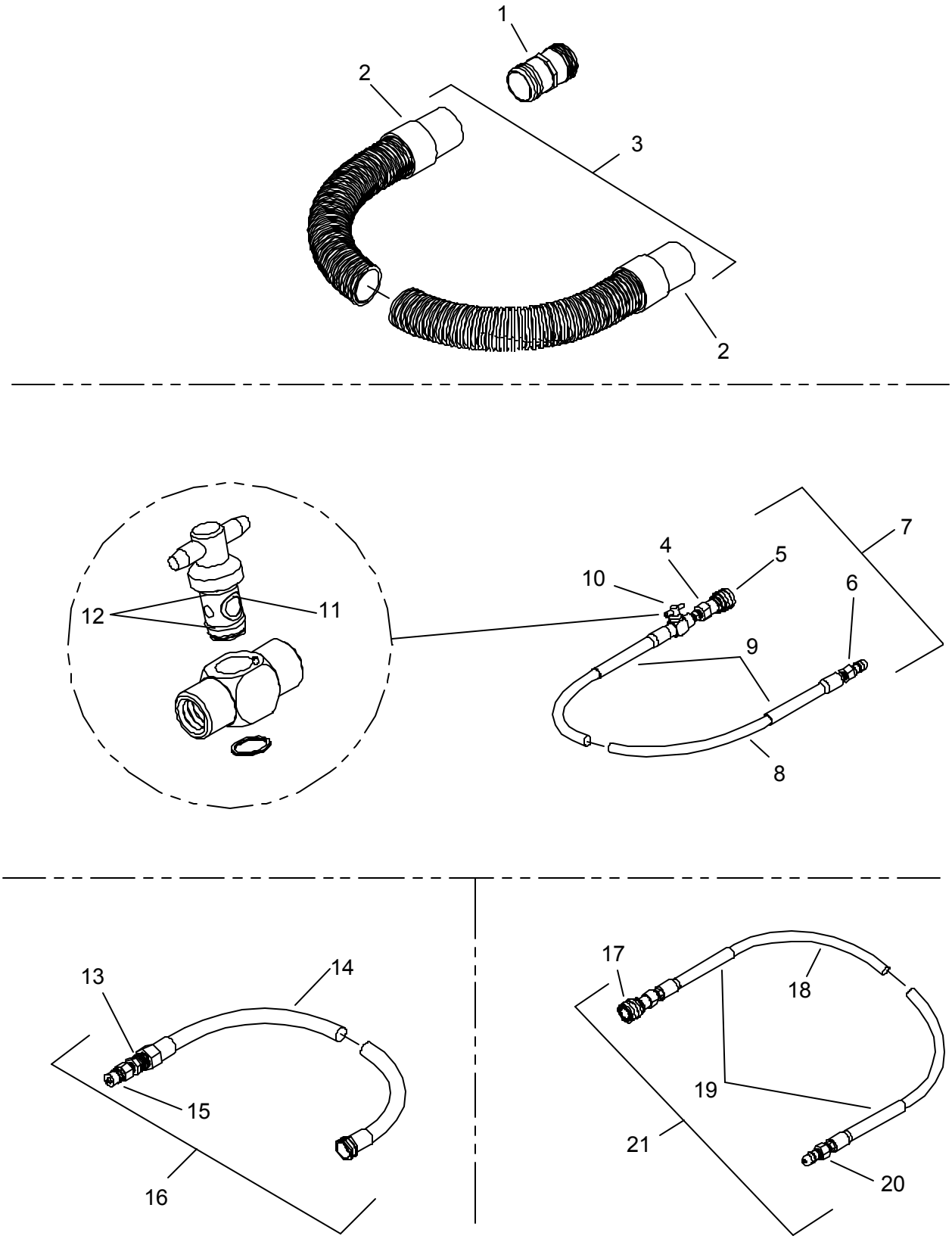
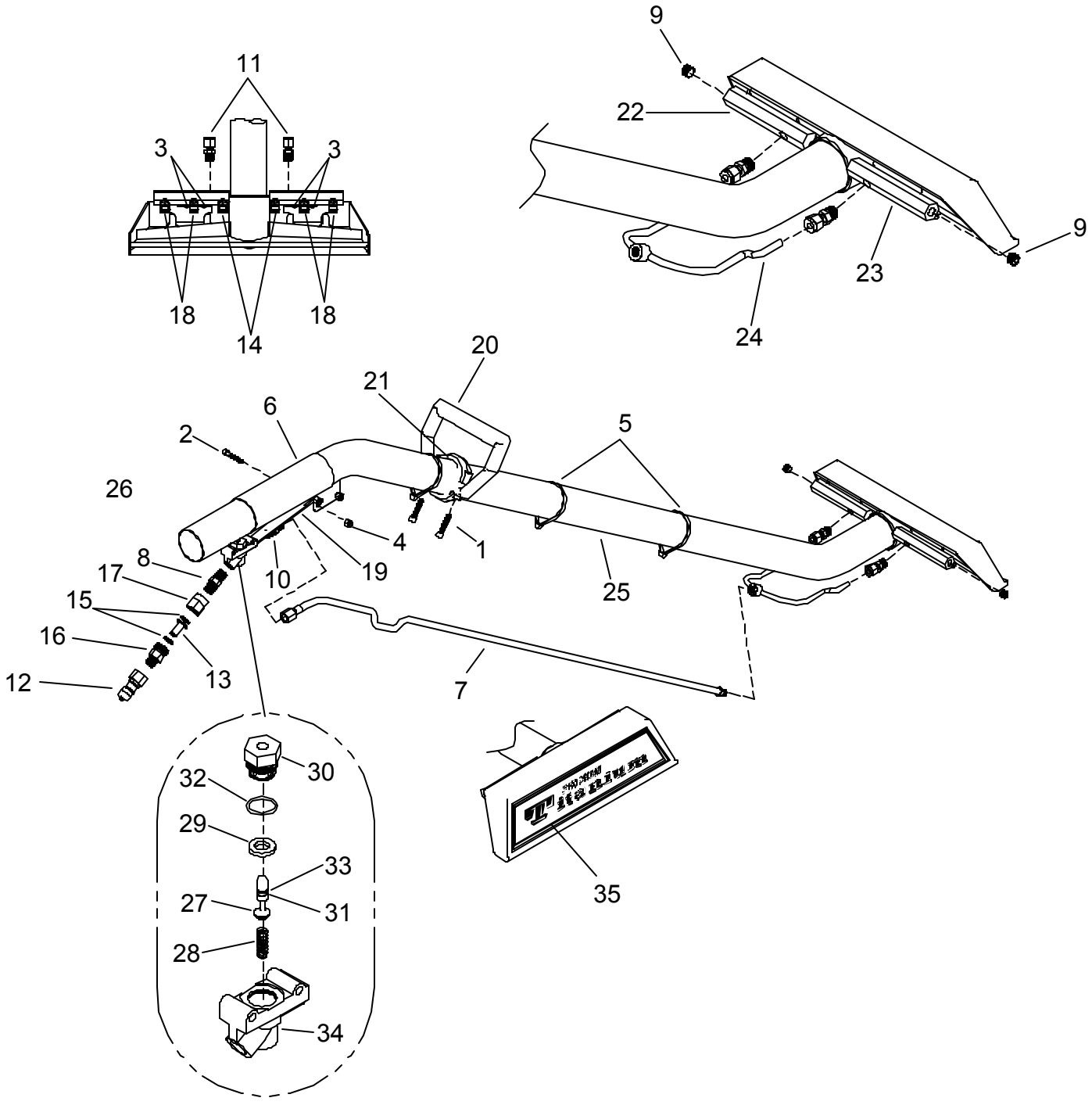
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	00-000210	SCR, 1/4-20 X 3/4 SOCHD		
2	00-000311	SCR, 1/4-20 X 1/2 SHCS SS		
3	00-000312	SCR, CAP 1/4 X 1 SOCHD		
4	00-000399	SCR, CAP 1/4 X 1 3/8 SOC		
5	00-000241	SCR, CAP 10-32 X 2 SOCHD SS		
6	57245	NUT, 1/4-20 HEX NYLOCK SS		
7	87162	WASHER, 1/4 SPLIT LOCK		
8	87165	WASHER, #10 SPLIT LOCK		
9	04-000312	RING, RETAIN EXT 1/2		
10	04-000334	BALL, NYL ID		
11	04-000335	RING, SNAP 1-7/8D		
12	04-000342	SPRING, PUMP-OUT BALL PRESS		
13	52-501822	INL, HOSE CONN WST TNK		
14	16-808241	DIAPH, WST TNK PMP-OUT		
15	40-902151	MOTOR, 1/8HP 12V		
16	43-807117	GSKT, CVR TOP PMPOUT		
17	43-807118	GSKT, CVR SD PMPOUT		
18	43-810091	SEAL, PUMPOUT SHFT		
19	43-810100	SEAL PUMPOUT CAM		
20	43-810101	O-RING, 800/1000 .072		
21	43-807116	GSKT, IN/OUTLT WST TNK-PM		
22	45-801927	BRG, SHFT PUMP-OUT		
23	49-876301	VENT, UPR SHFT BRNG HSG		
24	50-502025	PL, CVR TOP PUMP-OUT		
25	50-502026	PL, CVR SD PUMP-OUT		
26	00-000311	SCR, 1/4-20 X 1/2 SHCS SS		
27	11-800504	GA, FLOW SIGHT 3/8 NPT		
28	52-501828	BTM, PLNGR WST TNK PMP-OUT		
29	52-501829	SHT, 3/4” STROKE WST TNK		
30	52-501914	RD, CONNECT WST PMP-OUT		
31	52-501915	GUIDE, PLNGR WST PUMP-OUT		
32	52-501921	PIN, WRIST PUMP-OUT		
33	52-501934	TOP, PLNGR PUMP-OUT		
34	52-501950	BUSH, THREADED		
35	52-501822	INL, HOSE CONN WST TNK		
36	56-502428	BRKT, PMP-OUT SW/CCT BRKR		
37	52-501821	TOP, WST TNK PUMP-OUT		

HOSE ACCESSORIES



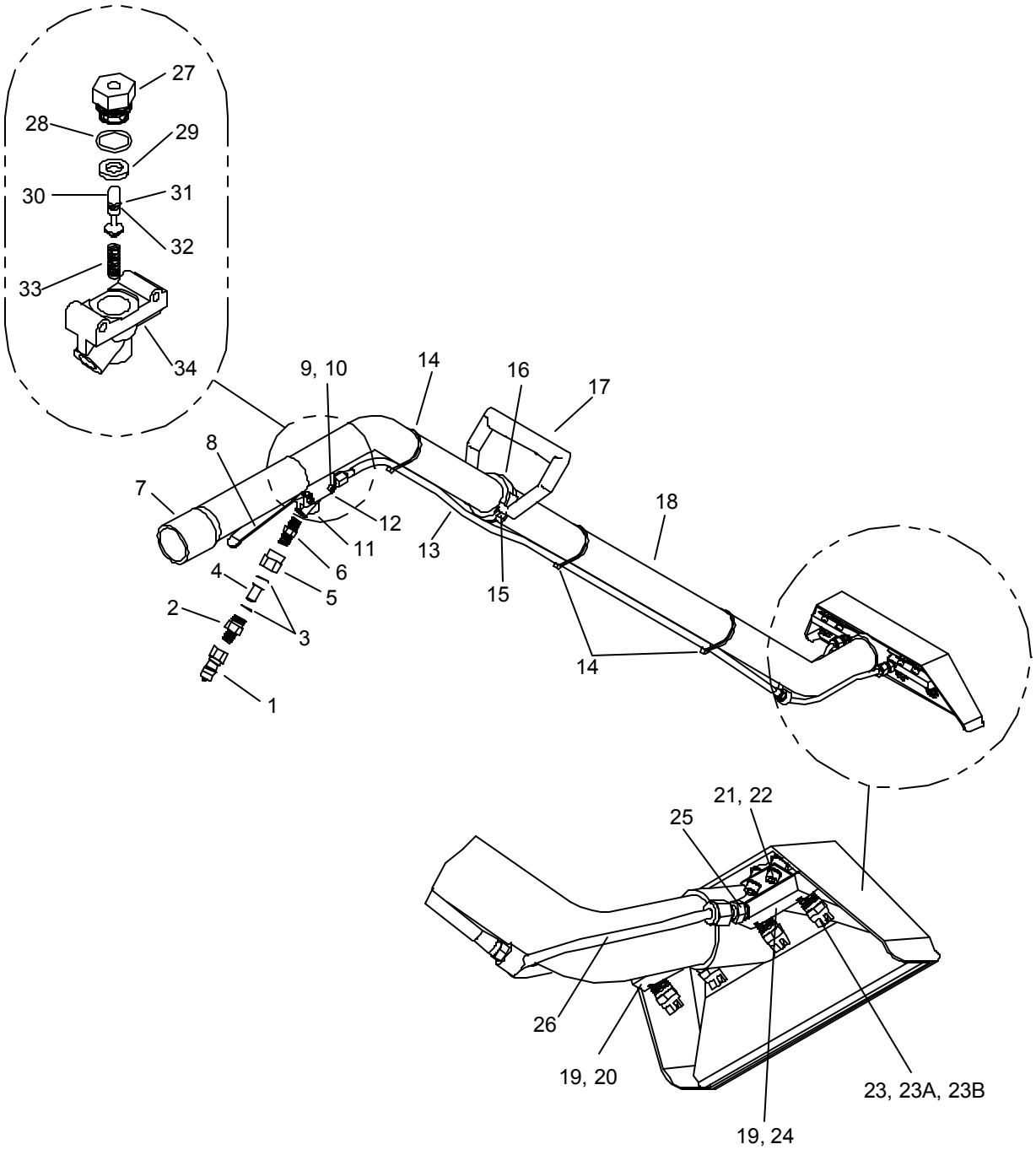
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	12-800078	FITTING, BRB 2H BS PVC		
2	08-805147	CUFF, 2”		
3	10-805060	HOSE, VAC 2”X50’ W/ CUFFS & HOSE		
4	56015	NIPPLE, 1/4 HEX		
5	22015	COUPLER, 1/4 QD		
6	56012	NIPPLE, 1/4 FPT QD		
7	10-805108	HOSE, HP 1/4 X 50FT W/QD & VLVE		
8	10-805077	HOSE, HP 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- TITANIUM SIX JET



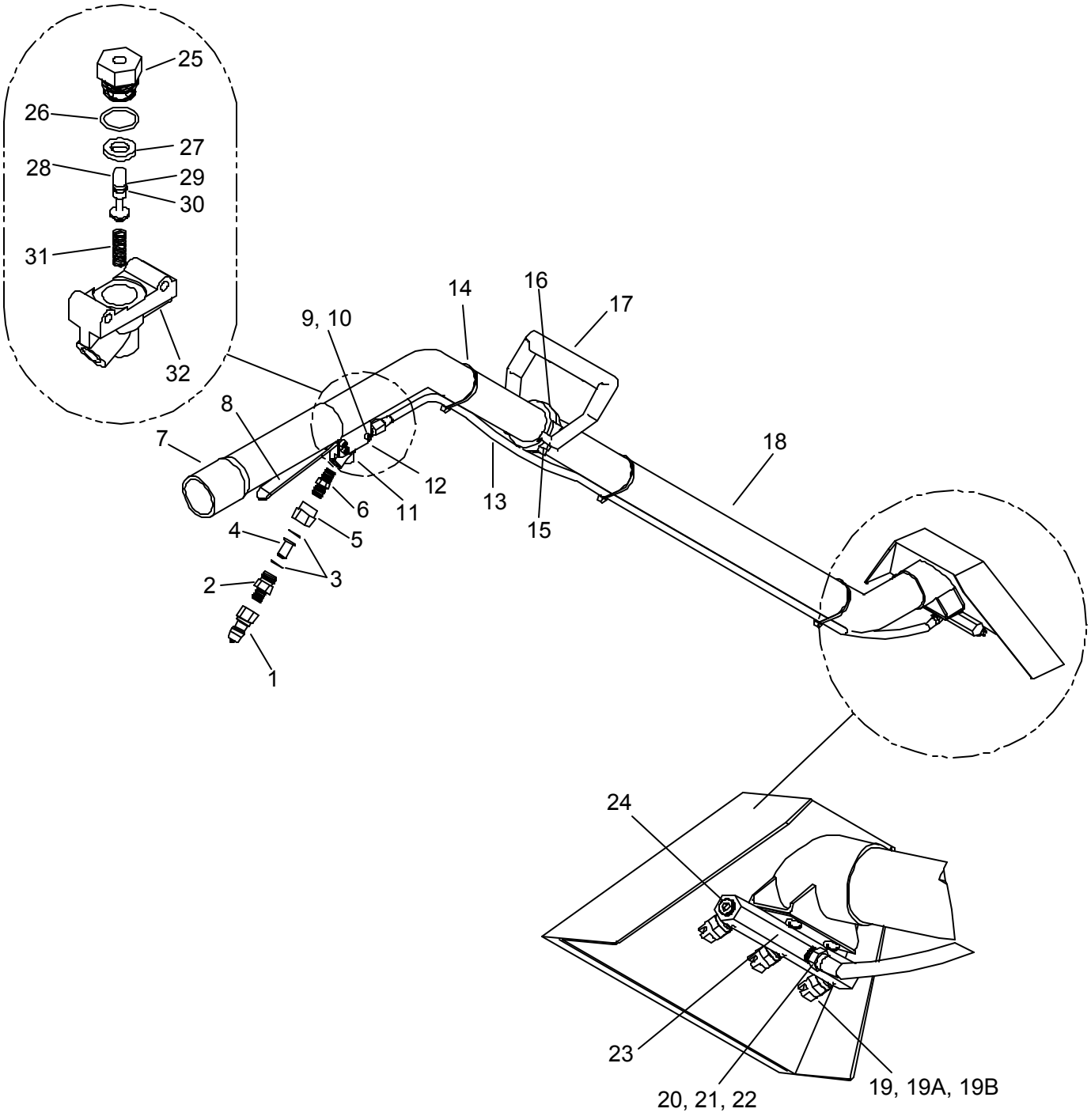
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	00-000282	SCR, CAP 1/4-20 X 1 1/4 SOC		
2	00-000317	SCR, CAP 10-32 X 1 1/4 SOCH		
3	70228	SCR, 10-32 X 1/4 PPHMS SS		
4	57090	NUT, 10-32 HEX NYLOCK SS		
5	04-000093	TIE, CABLE 13”		
6	09-805603	HOSE, INT VAC 4-1/2 X 48		
7	10-805504	HOSE, 3/16 X 44-1/2		
8	56015	NIPPLE, 1/4 HEX		
9	11-800206	PLUG, 1/8 SOCHD BR		
10	12-800060	CONN, 1/4P X 1/4T BR		
11	12-800322	CONN, 1/8P X 1/4T COMP BR		
12	56012	NIPPLE, 1/4 FPT QD		
13	14-806512	STRAINER, JET 50 MESH		
14	17-803018	TIP, SPRAY 9501 X 1/8P SST		
15	17-803006	WASHER, NYLON		
16	17-803010	CONN, 1/4P X 11/16-16M		
17	17-803036	CONN, 1/4FP X 11/16-16F BR		
18	17-803078	TIP, SPRAY 8001 SST 1/8 VJET		
19	52-501619	TRIGGER, WD VALVE		
20	52-502008BK	BODY, WD HDL, 2” TB, BK		
21	52-502009	HOLD DN-WD HDL 2” TUBE		
22	52-502057	MANFOLD, LEFT		
23	52-502058	MANIFOLD, RIGHT		
24	56-502548	ASSY, MNFLD S-BEND		
25	56-502534	WD & HD TITANIUM		
26	61-950496	ASSY, EXTRACTOR VALVE		
27	16-808189	STEM, EXTRACTOR VALVE		
28	16-808190	SPRING, EXTRACTOR VALVE		
29	16-808228	SEAT, EXTRACTOR VALVE		
30	16-808229	HLDR, VLV STEM-EXTRACTOR VL		
31	43-810062	O-RING, .114 ID .254OD		
32	43-810063	O-RING, .551ID .691OD		
33	43-810064	BACK-UP, .250DIA		
34	52-501590	BDY, EXTRACTOR VLV		
35	48-941462	DEC, WD HD TITANIUM		
-	48-941296	BLB, INSPECTION QC (PINK)		

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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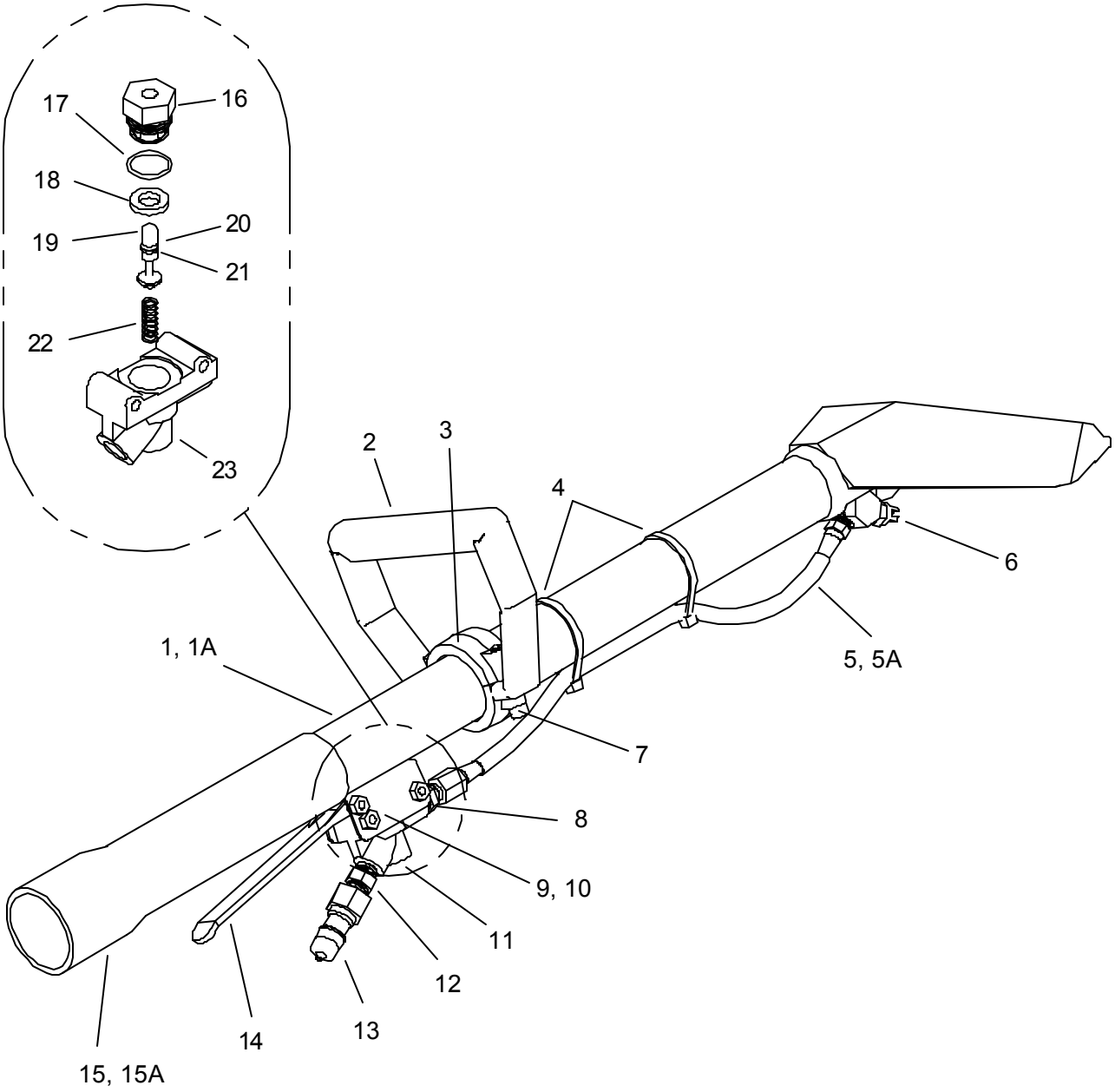
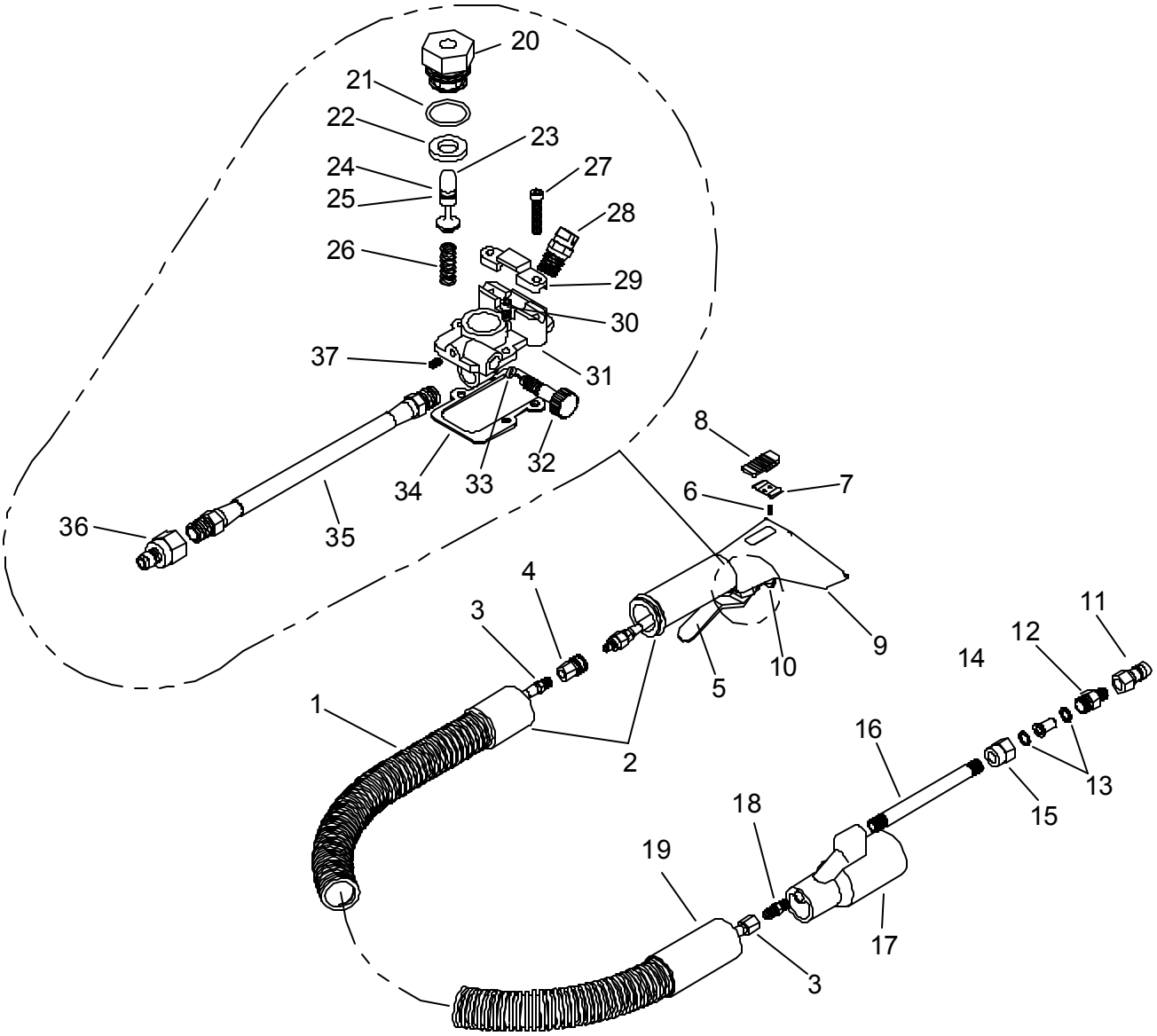
19, 19A, 19B

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

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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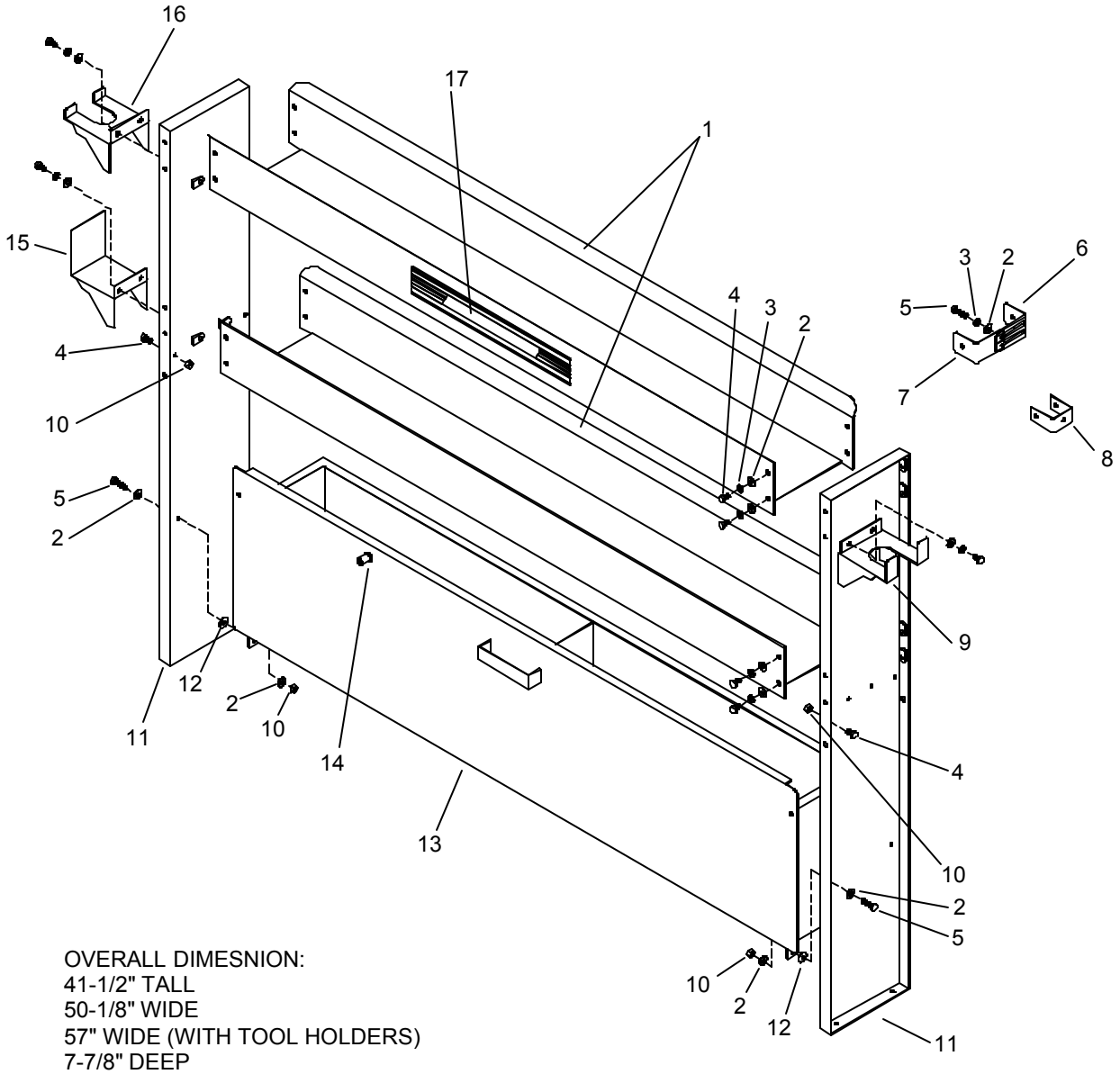
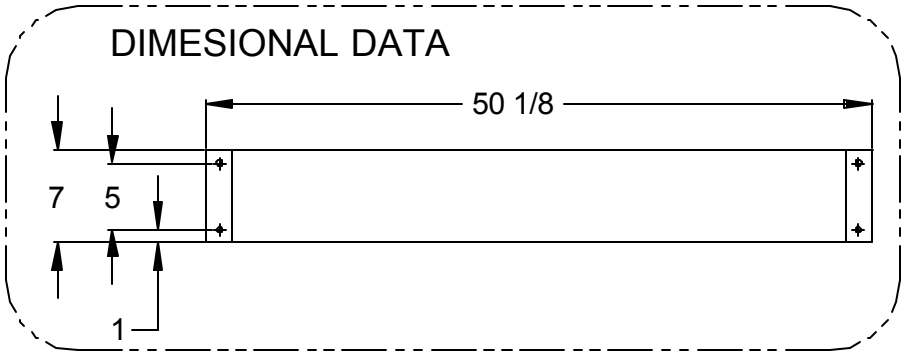
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	60-650422			COMPLETE
1	09-805131	HOSE, VAC 1-1/4X10' BLU		
2	08-805243	CUFF, SWIV 1-1/4HX1-1/4T		
3	10-805347	HOSE, 3/16X119-1/2 (1/8PX1/4FT)		
4	13-806023	DSC, 1/8FC1/8FP SST		
5	58-500639	UPHOLSTERY TL TRIGGER		
6	00-000310	SCR, CAP 4-40 X7/32 SHCS 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

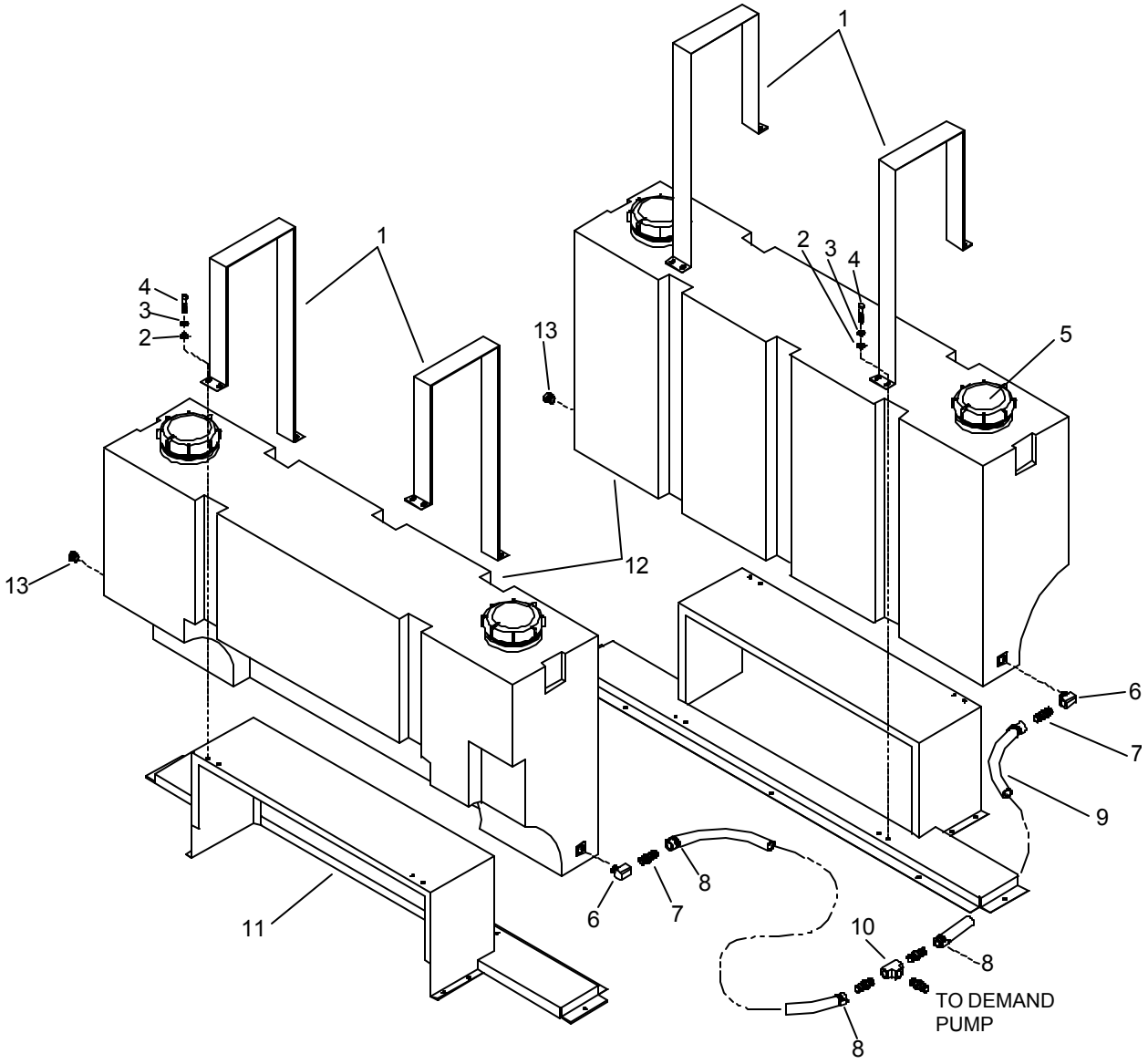


OVERALL DIMESNION:
41-1/2" TALL
50-1/8" WIDE
57" WIDE (WITH TOOL HOLDERS)
7-7/8" DEEP

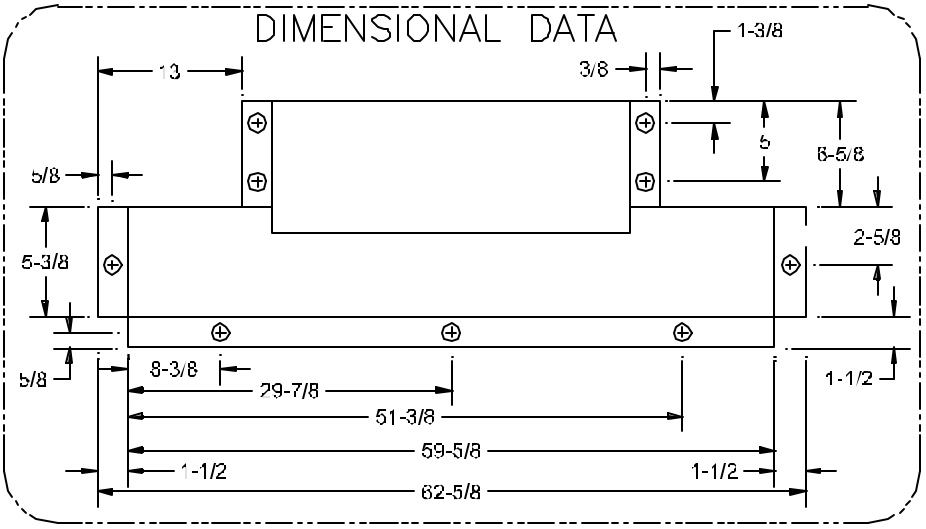


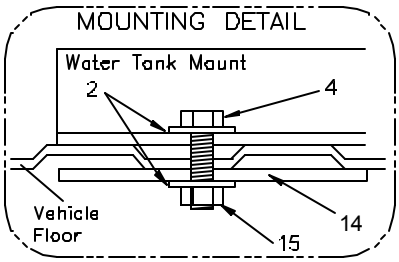
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	65-950392	VAN STORAGE UNIT		
1	56-501921	SHELF, LWR		
2	02-000066	FLATWASHER, 1/4		
3	87162	WASHER, 1/4 SPLIT LOCK		
4	70721	SHOULDER BOLT, 182 OD X 2.25 L		
5	70270	SCR, 1/4-20 X 3/4 HHCS PLTD		
6	50-501840	BRKT, ADJUST MTG SLOT		
7	56-502067	BRKT, ADJUST 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	DRAWER, SHELF GRAY		
14	46-802506	LATCH, ADJ GRIP		
15	50-501755	HOLDER, UP TO HOSE		
16	50-501754	HOLDER, UPHST TL		
17	48-941152	DECAL, PROCHEM		
-	66-945424	KIT, ADJ BRKT.		INCLUDES PARTS 6,7 & MOUNTING HARDWARE

WATER TANK, DUAL WITH DEMAND PUMP

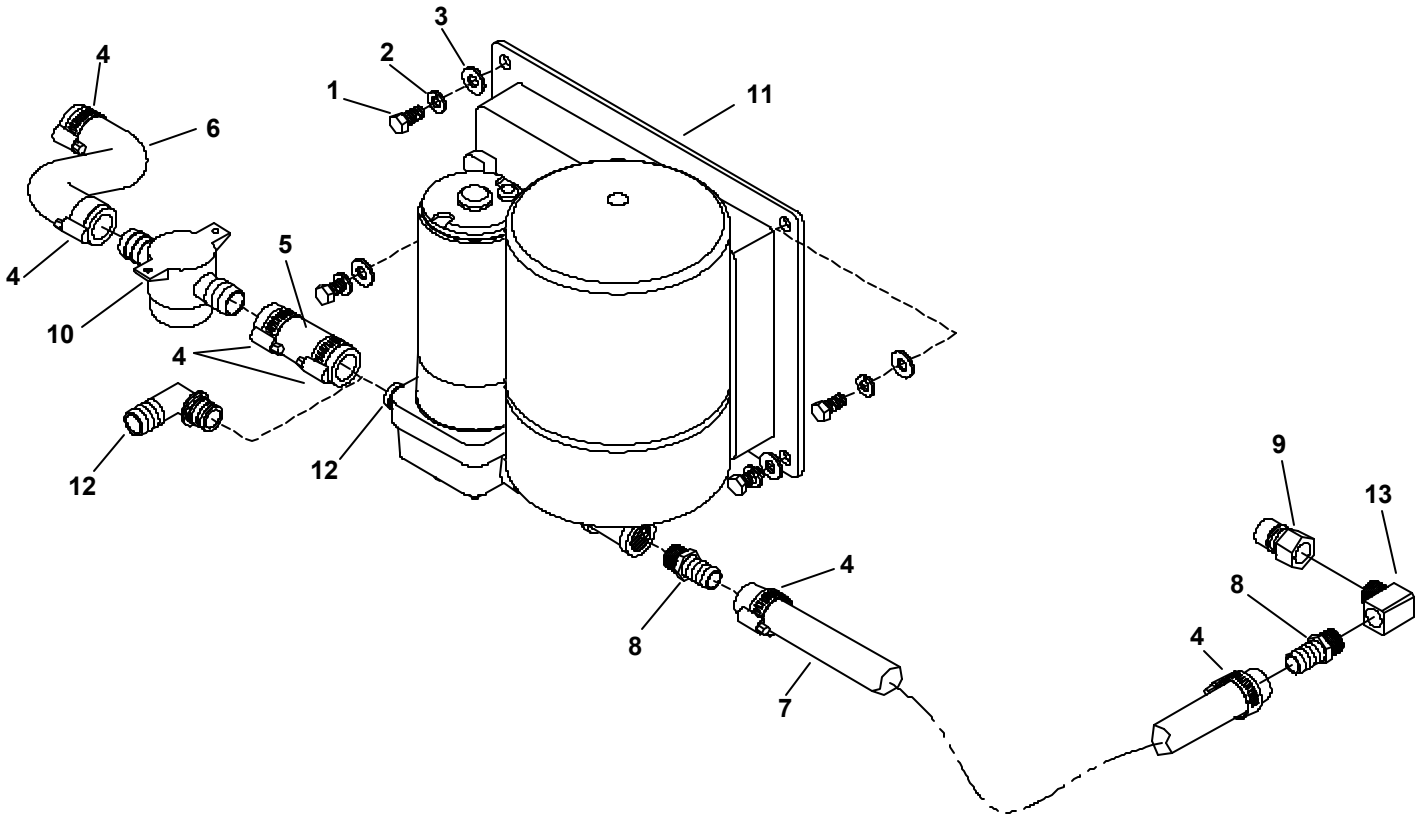


OVERALL DIMNSION:
32-1/2" TALL
62-5/8" WIDE
15-1/2" DEEP





REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	66-945260	TANK, DUAL SADDLE W/DMD PUMP		COMPLETE
-	66-945265	SINGLE SADDLE 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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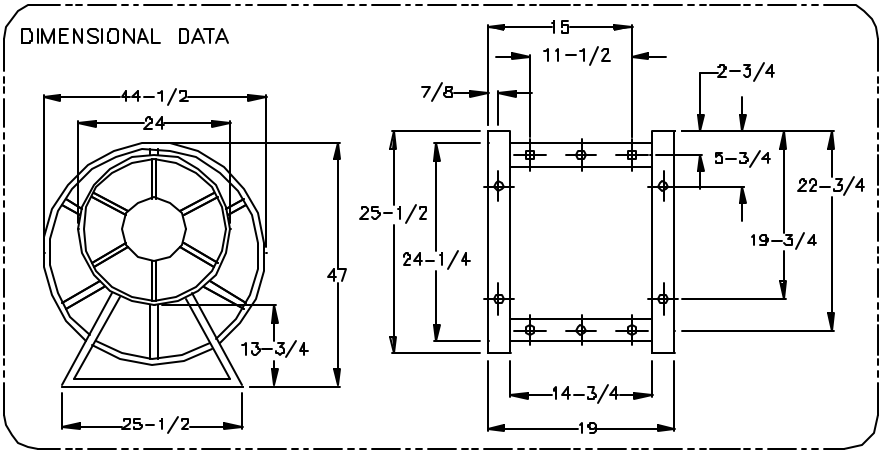
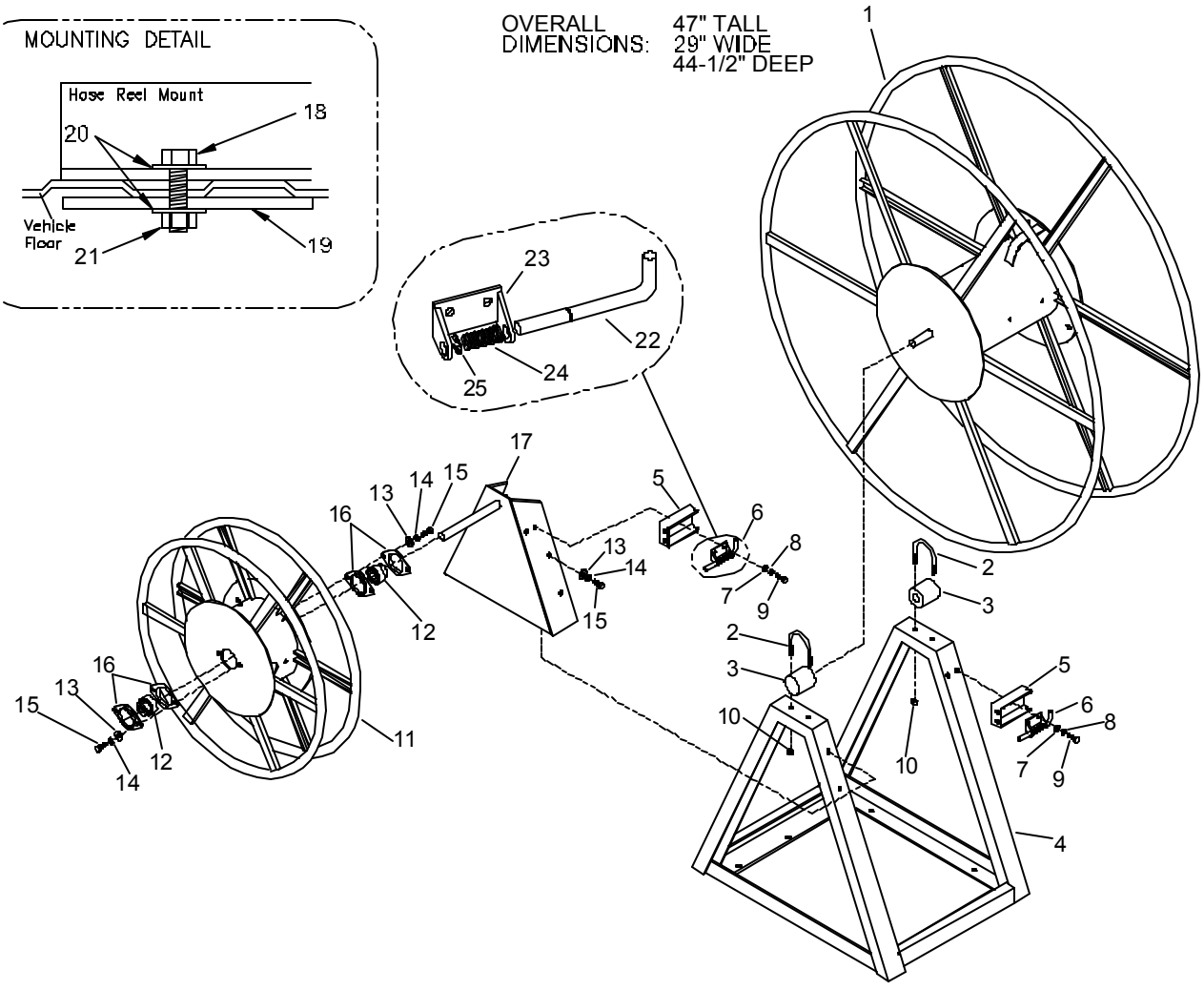
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	70305	SCR, 5/16-18 X 3/4 HHCS GR5 PL TDL		
2	87083	WASHER, 5/16 SPLIT LOCK PLTD		
3	02-000143	WASHER, 5/16 FLAT		
4	03-000113	CLAMP, HOSE #12 SST		
5	09-805278	HOSE, WATER 3/4 X 3”		
6	09-805357	HOSE, WATER .75 X 5.5		
7	09-805446	HOSE, WATE 5/8 X 55		
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

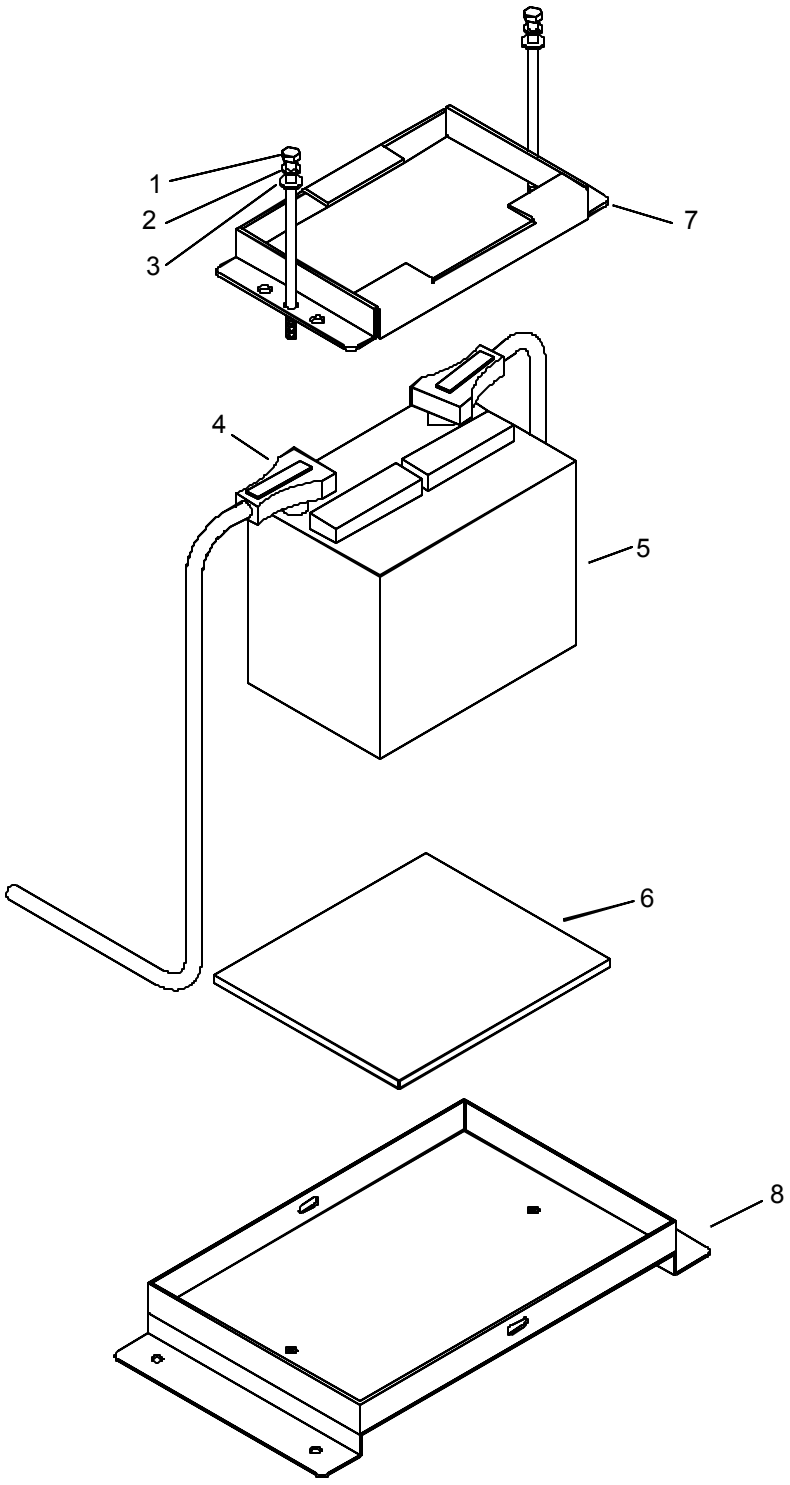


OVERALL DIMENSIONS: 47" TALL
29" WIDE
44-1/2" DEEP

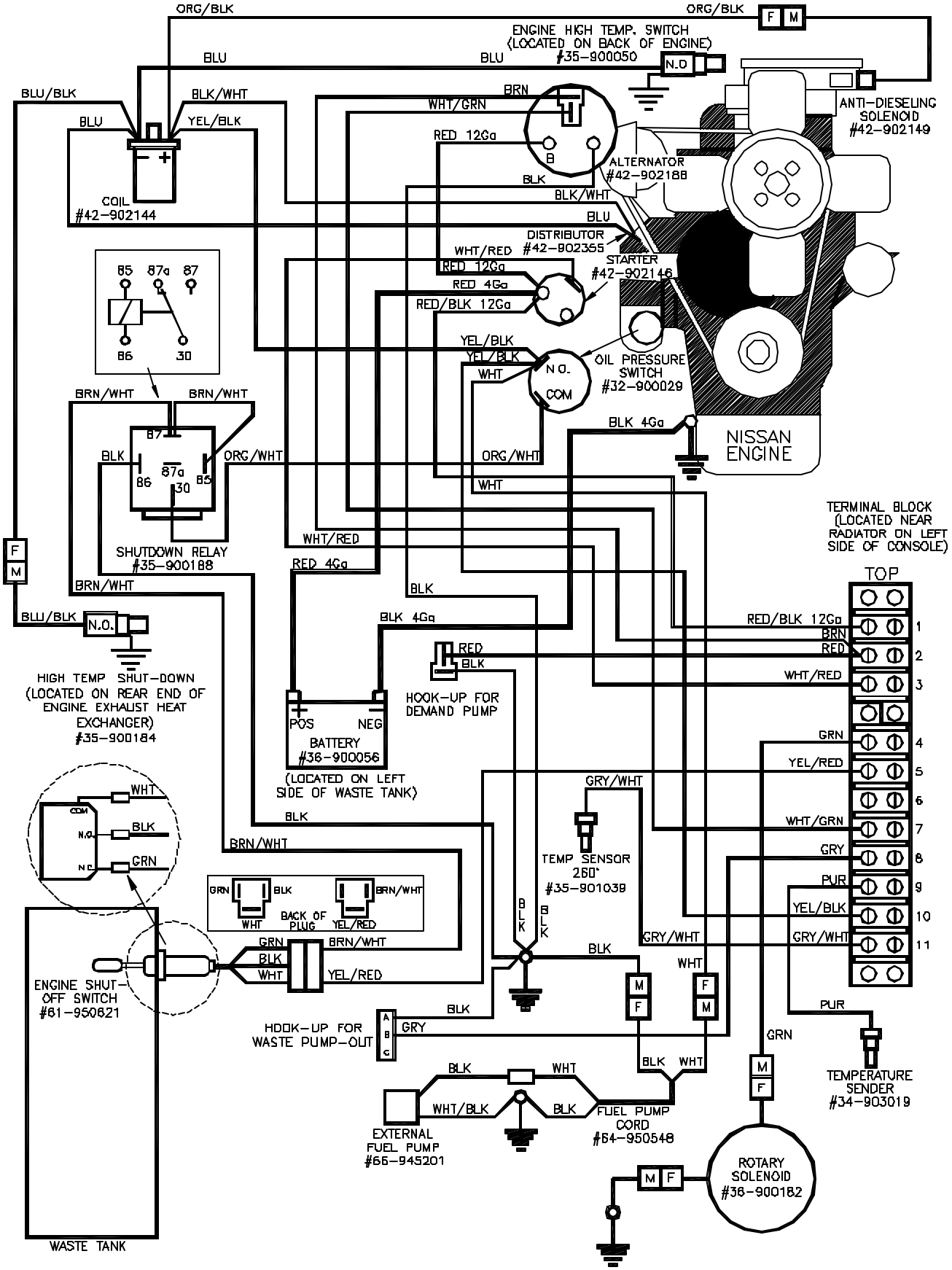


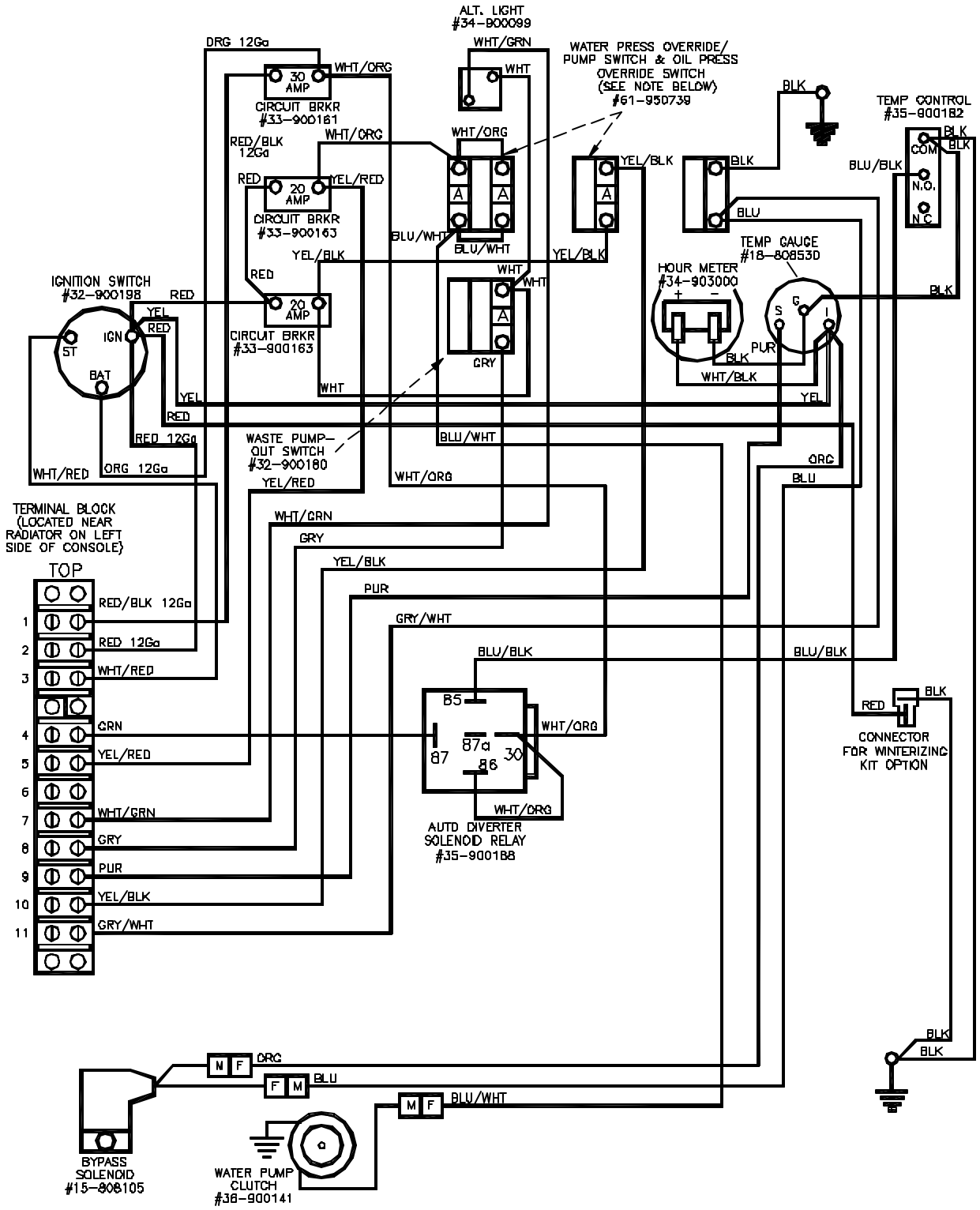
REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
-	65-950393	HOSE REEL, HIGH PROFILE PC		
1	56-501962	REEL, VACUUM HOSE GRAY		
2	03-000124	CLAMP, MFLR 1-3/4		
3	52-501685	BUSHING, HOSE REEL		
4	56-501960	BASE, HOSE RL (250')		
5	56-502207	BRKT, LOCKOUT HOSE REEL		
6	61-950854	LATCH ASSEMBLY		
7	02-000066	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		

BATTERY-FLOOR MOUNT



REF	PART NO.	DESCRIPTION	SERIAL NO. FROM	NOTES:
1	00-000167	SCR, 1/4-20 X 6" HXHD		
2	87162	WASHER, 1/4 SPLIT LOCK		
3	02-000066	FLATWASHER, 1/4		
4	31-900179	COVER, BATTERY TERMINAL		
5	36-900056	BATTERY		
6	47-700007	SHIELD, BAT MT HT		
7	56-500188	COVER, BATTERY		
8	56-502049	TRAY, BAT FLOOR MT		


ORG/BLK
ORG/BLK
F M
ENGINE HIGH TEMP. SWITCH
(LOCATED ON BACK OF ENGINE)
#35-900050
BLU
BLU
N.O
BLU/BLK
BLK/WHT
BRN
WHT/GRN
ANTI-DIESELING
SOLENOID
#42-902149
BLU
YEL/BLK
RED 12Ga
B
ALTERNATOR
#42-902188
BLK
BLK/WHT
COIL
#42-902144
BLU
DISTRIBUTOR
#42-902355
WHT/RED
RED 12Ga
STARTER
#42-902146
RED 4Ga
RED/BLK 12Ga
85 87a 87
86 30
YEL/BLK
YEL/BLK
WHT
N.O.
COM
OIL PRESSURE
SWITCH
#32-900029
BRN/WHT
BRN/WHT
87
BLK
87a
ORG/WHT
86 30 85
BLK 4Ga
NISSAN
ENGINE
ORG/WHT
WHT
TERMINAL BLOCK
(LOCATED NEAR
RADIATOR ON LEFT
SIDE OF CONSOLE)
TOP
WHT/RED
SHUTDOWN RELAY
#35-900188
RED 4Ga
F
M
BRN/WHT
BLK
BLU/BLK
N.O.
BLK 4Ga
RED/BLK 12Ga
1
BRN
RED
2
RED
BLK
WHT/RED
3
HIGH TEMP SHUT-DOWN
(LOCATED ON REAR END OF
ENGINE EXHAUST HEAT
EXCHANGER)
#35-900184
HOOK-UP FOR
DEMAND PUMP
GRN
4
POS
NEG
BATTERY
#36-900056
(LOCATED ON LEFT
SIDE OF WASTE TANK)
YEL/RED
5
GRY/WHT
6
WHT
COM
BLK
BLK
WHT/GRN
7
N.O.
N.C.
GRN
TEMP SENSOR
260°
#35-901039
GRY
8
BRN/WHT
PUR
9
GRN
BLK
BRN/WHT
BACK OF
PLUG
WHT
YEL/RED
BLK
BLK
YEL/BLK
10
GRY/WHT
GRY/WHT
11
BLK
WHT
M
F
F
M
ENGINE SHUT-
OFF SWITCH
#61-950621
BLK
HOOK-UP FOR
WASTE PUMP-OUT
A
B
C
GRY
BLK
WHT
BLK
WHT
PUR
GRN
M
F
TEMPERATURE
SENDER
#34-903019
WHT/BLK
BLK
FUEL PUMP
CORD
#64-950548
EXTERNAL
FUEL PUMP
#65-945201
M F
ROTARY
SOLENOID
#36-900182
WASTE TANK



NOTE: THE WATER PRESS OVERRIDE/PUMP SWITCH AND OIL PRESS 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.

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New Truck Mount Machine Warranty

Limited Warranty

PROCHEM warrants new machines against defects in material and workmanship under normal use and service to the original purchaser. Any statutory implied warranties, including any warranty of merchantability or fitness for a particular purpose, are expressly limited to the duration of this written warranty. *PROCHEM* will not be liable for any other damages, including but not limited to indirect or special consequential damages arising out of or in connection with the furnishing, performance, use or inability to use the machine. This remedy shall be the exclusive remedy of the buyer. The warranty period is subject to the conditions stated below.

Any local or distant transportation, related service labor, normal maintenance, and diagnostic calls are not included.

Parts replaced or repaired under this warranty are guaranteed for the remainder of the original warranty period or 90 days.

Component	Coverage Responsibility	Length of Warranty
Gasoline Engine*	**Engine Dependant:** **Briggs & Stratton – 1-800-233-3723** **Nissan – Contact Customer Care** **Kohler – 1-800-655-4356**	1 year
Vacuum Pump	**Gardner Denver – 1-800-982-3009**	18 months
Heat Exchanger	PROCHEM	1 year
Water Pump	PROCHEM	2 years
Waste Pump	PROCHEM	1 year
Wands(except shut off valve and jets)	PROCHEM	1 year
Waste and Water Tanks	PROCHEM	1 year
Pressure Regulator	PROCHEM	1 year
All other component not excluded	PROCHEM	1 year
Battery*	**Pro-rated through battery manufacturer's local dealer. 800-423-6569**	1 year

*** When applicable**

Product exceptions and Exclusions:

- Normal wear items and maintenance items including but not limited to disposable filters, any fluids, electrical components, belts, pulleys, bearings, fittings, hoses, o-rings, seals, gaskets, diaphragms, engine tune up components, wand shut off valve, and jets are covered**, parts only,** for 90 days**.**
- ***NOTE:*** Engine warranty is administered through the engine manufacturer and must be repaired at an authorized service center.

This Warranty Shall Not Apply To:

1. Any product that has been subject to abuse, misuse, neglect or unauthorized alteration (including the use of incompatible or corrosive chemicals or overloading of capacity).
2. Products that have experienced shipping or freight damage.
3. Repairs necessary to correct any failure due to imp roper pre-delivery service and inspection by the selling dealer.
4. Time for cleaning units in preparation for repair.
5. Any repairs resulting from poor initial service work or improper diagnosis.
6. Any design alterations performed by an organization not authorized or specified by PROCHEM.
7. A unit which is improperly repaired.
8. Damage due to hard water scaling.
9. Exposure to freezing temperature conditions.
10. Electrical components exposed to moisture.

The warranty commences on the purchase date by the original end user from an authorized *PROCHEM* agent, subject to proof of purchase. **The warranty is non transferable and is intended for the original purchaser only**. The Machine Registration Card must be completed and returned within 10 day of the time of purchase. If proof of purchase cannot be identified, the warranty start date is 90 days after the date of sale to an authorized *PROCHEM* distributor.

If difficulty develops during the warranty period, contact the authorized *PROCHEM* agent from whom the product was purchased. *PROCHEM* may elect to require the return of components to validate a claim. Any defective part to be returned must be shipped **freight prepaid** to an authorized *PROCHEM* Distributor/Service Center or to the *PROCHEM* factory.

Use Of Parts Not Approved By *PROCHEM* Will Void All Warranties.

PROCHEM. ? a Castle Rock Industries company ? 1351 W. Stanford Ave. ? (303) 762-1800 ? 800-444-7654 ? FAX (303) 865-2800