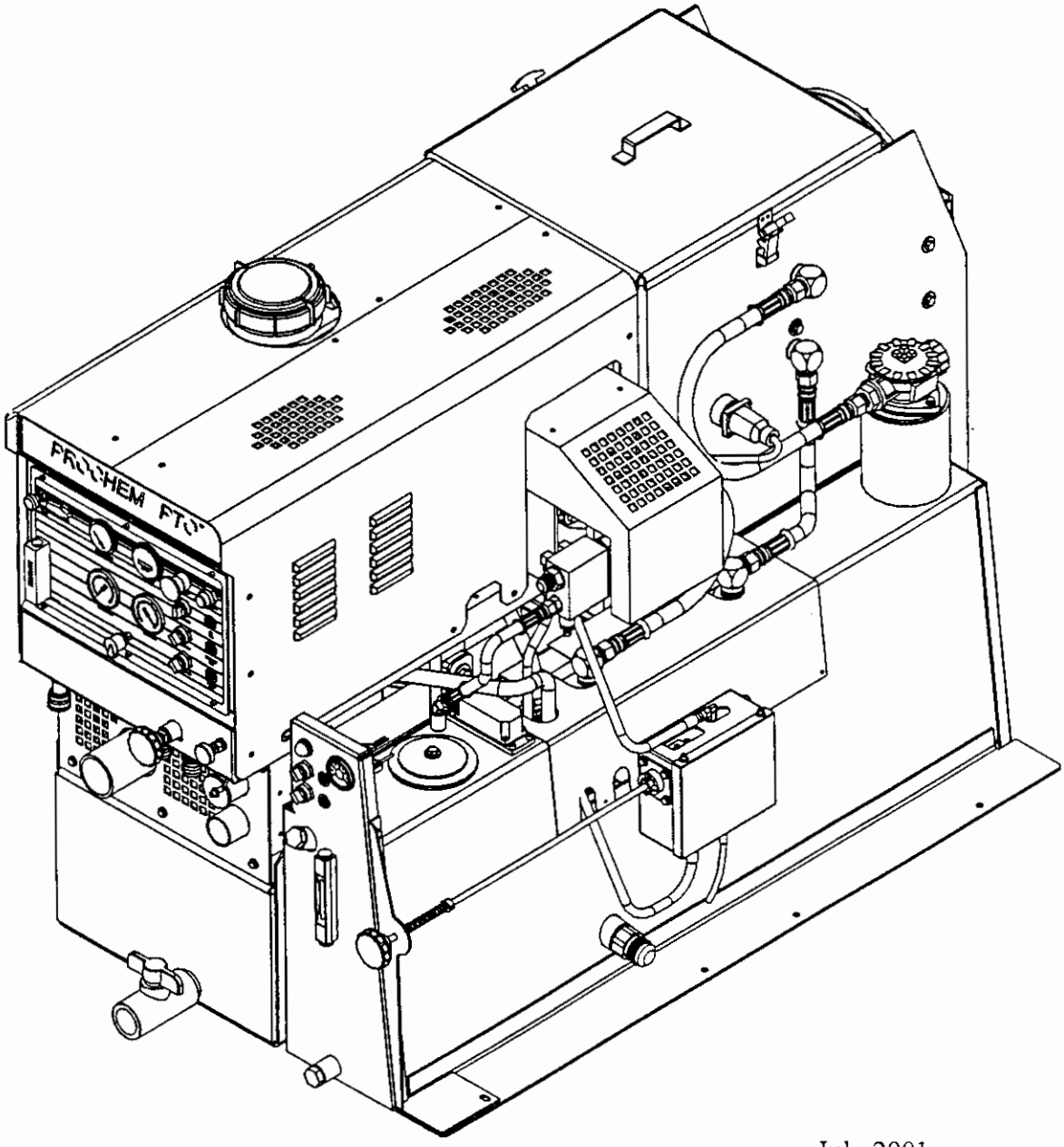
PROCHEM PTO

Mobile Cleaning Unit



July 2001

OPERATION & SERVICE MANUAL

Welcome...and congratulations on your purchase of the **PTO Mobile Cleaning Unit**. This instruction manual is a guide for operating and servicing your PROCHEM PTO 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 starts 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 and parts. Any questions pertaining to operating or servicing this unit should be directed to your nearest PROCHEM dealer and/or service center.

The headings: **CAUTION** or **WARNING** is used to warn you that steps must be taken to prevent damage to the unit and/or personal injury. Make certain that you read all instructions entirely before proceeding with the operation of the unit.

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

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

Please record your unit serial number here for future information or if you should need to contact the factory for any reason.

This operation and service manual is written specifically for the **PROCHEM PTO Mobile Cleaning Unit**, which is 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.

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PROCHEM
PTO MANUAL
#67-945597

LIMITED WARRANTY

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

Hydraulic Pump	2 years
Hydraulic Motor	2 years
Vacuum Pump	18 months
Heli-Coil Heat Exchanger	1 year
Tube & Shell Heat Exchanger	1 year
Water Pump	2 years
Wands (Except shut off valve and orifices)	1 year
Waste, Oil, & Water Tanks	1 year
Pressure Regulator	1 year
All other components	1 year

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

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

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

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

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

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

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

TABLE OF CONTENTS

PTO CHECKOUT SHEET

The Following Items **Must** Be Checked And Logged Prior To Release

- ☐ Check all mounting hardware attaching the hydraulic pump and bracket to the engine block.
- ☐ Check for proper belt alignment (pump to engine harmonic balancer)
- ☐ Check clearances on all hoses and wiring in the engine compartment.
- ☐ Check all throttle cable to throttle connections (nuts and bolts tight)
- ☐ Check all factory components (air horn, ground wires, vacuum lines, etc) are reconnected properly.
- ☐ Ensure all hose routings through engine compartment are secured.
- ☐ Ensure all air has been bled from the heli-coil (coolant system) and it has been refilled with proper coolant to proper level.
- ☐ Check governor for proper operation (all components operate freely)
- ☐ Check governor LOW speed (1900—2100 rpm)
- ☐ Check governor HIGH speed (2400—2600 rpm)
- ☐ Check for proper hydraulic oil level (approx. 120°F on temp. gauge)
- ☐ Check all hoses and fittings for leaks.
- ☐ Check Secure-Idle connections soldered and operating properly.

Installer:_____

Date:_____

Serial #:_____

M.I.N.#:_____

PROCHEM
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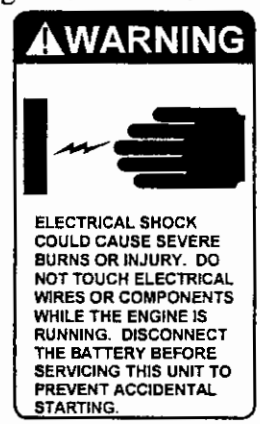
2265 Crosswind Drive
Prescott AZ. 86302
www.prochem.com

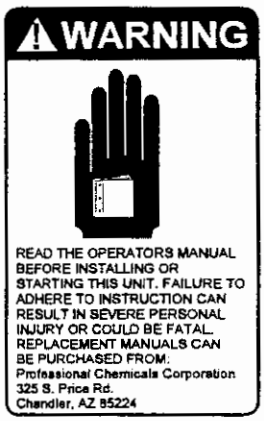
SECTION 1: GENERAL INFORMATION

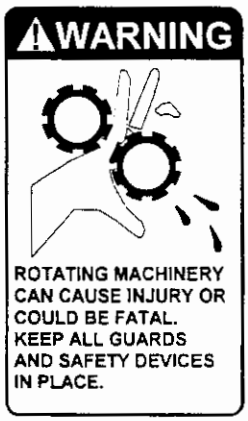
1 SAFETY

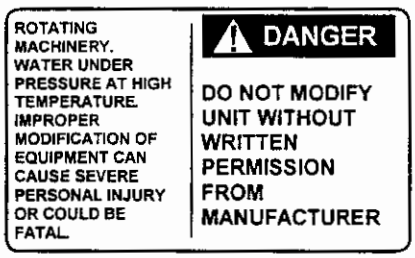
⚠ WARNING: For Your Safety

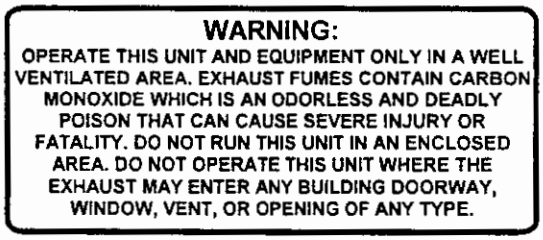
The following **WARNING LABELS** are found on your PTO cleaning unit console. These labels point out important **Warnings** and **Cautions**, which should be followed at **all** times. Failure to follow warnings and cautions could result in fatality, personal injury to yourself and/or others, or property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



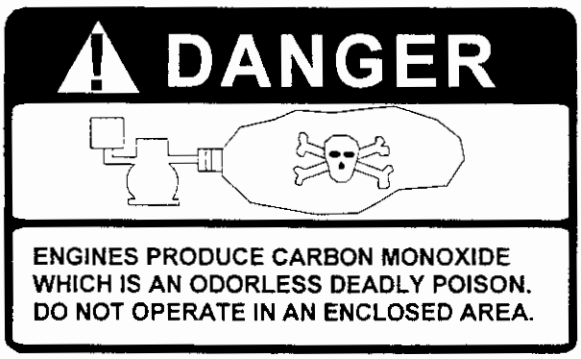








Order Part #48-941212 to get a complete set of decals (safety and instrumentation) for your PTO cleaning unit. The following decal must be placed in a prominent spot on the vehicle that this unit is to be installed in where access is given to operate the unit.



Decal, Carbon Monoxide
Part #48-941316

This symbol means 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!

WARNING!

1. Read the operator's manual before installing or starting the PTO cleaning unit. Failure to follow instructions could result in severe personal injury or could be fatal.

2. Operate the PTO cleaning unit and equipment only in a well-ventilated area. Vehicle exhaust fumes contain carbon monoxide, an odorless and deadly poison that can cause severe injury or fatality. **DO NOT** operate this unit in an enclosed area. **DO NOT** operate this unit where the vehicle exhaust may enter any building doorway, window, vent, or opening of any type.

3. 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 could be fatal.

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

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

6. Before servicing this unit, allow the PTO cleaning unit and vehicle to "cool down." This will prevent burns from occurring.

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

8. DO NOT damage the vehicle in any manner during installation. Before cutting or drilling the vehicle floor, ensure you will not drill or saw into any fuel lines, the vehicle fuel tank, or vehicle wiring. Before drilling into the vehicle floor for the console and hydraulic oil reservoir installation, ensure you will not drill into any vehicle equipment other than the necessary sheet metal.

9. DO NOT attempt to engage the PTO cleaning unit unless the vehicle is completely stopped, the vehicle transmission is in park, and the PTO cleaning unit speed switch is in the idle position. Failure to do so may cause equipment damage.

10. DO NOT press the vehicle accelerator pedal when the PTO cleaning unit is engaged. An over speed condition may result, causing damage to the water, hydraulic, and/or vacuum pumps and voiding the warranty.

11. DO NOT exceed your vehicle's weight limit. The console, hydraulic oil reservoir, and installation hardware weigh approximately 915 lbs. make certain that the vehicle has the correct axle rating. This will prevent unsafe vehicle driving conditions.

12. We require high-back seats on all vehicles in which units are to be installed for head and neck protection.

13. Keep your vehicle work area clean. Wands, cleaning tools, and other accessories must be securely fastened before driving the vehicle. This will prevent damage to yourselves or your equipment in the event of sudden stops.

14. 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.

15. DO NOT attempt to repair high pressure oil or water hoses. Replace any high-pressure hose that is damaged or worn.

16. 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.

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

18. Do not modify this unit in any manner. Improper modification can cause severe personal injury or could be fatal.

19. Do not set any heavy items on the throttle push-pull cable. Crushing the push-pull cable will effect the operation of the cleaning unit.

SPECIFICATIONS:

Vehicle engine speed (PTO engaged)	1100 rpm (low speed) 1300 rpm (high speed)
Water pump rpm	1800 rpm
Water flow rate	5.0 GPM
Water pump pressure	1000 psi (maximum)
Vacuum pump rpm	2800 rpm
Vacuum relief valve	14" Hg
Hydraulic oil flow rate	11.0 GPM
Waste tank capacity	70 gallons to shut-off
Console & oil reservoir weight (With installation H/W)	915 lbs. (approximately)
Console & oil res. weight (w/installation H/W, waste and oil tanks full)	1755 lbs. (approximately)

TORQUE VALUES:

Vacuum pump hub	192 inch/lbs.	16 foot/lbs.

JET SIZING:

Prochem recommends **floor tool** tip sizing not exceed a total of ".06".

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 this unit, Prochem recommends that each tool tip size does not exceed a total of ".040".

Example: Quad-jet wand uses four 9501 jets. (95° spray angle w/01 orifice)
01 x 4 = 040 ... 040 x 2 tools = 08

Using larger jet sizes with your PTO cleaning unit may reduce cleaning temperatures.

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

1. INSTALLATION REQUIREMENTS

Prior to starting the installation, first read the **ENTIRE** "Installation Section," section 2 of this manual. Since the PTO cleaning unit (including installation hardware) weighs approximately 915 pounds, consider the following recommendations before installing this unit.

1. Be certain that the vehicle you've chosen is appropriate for a PTO cleaning unit installation. The PTO hydraulic pumps are available for later Chevy vans with the 5.7-liter engine, and later Ford vans with the 5.4 liter or V-10 engines. The PTO hydraulic pump was also designed to be compatible with other vans, but is not intended for every commercially available vehicle. If you are unsure whether your vehicle can accept a PTO cleaning unit installation, contact your nearest Prochem Service Center.

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

CAUTION:

The console, hydraulic oil reservoir, installation hardware, and accessories must NOT exceed the vehicle's axle weight limit.

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.

2. CHEMICAL REQUIREMENTS

The Prochem PTO cleaning unit, 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.

3. WATER REQUIREMENTS

1. Hard water deposits will adversely affect the plumbing and heat exchange systems on this unit.

2. **Figure 1** 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:

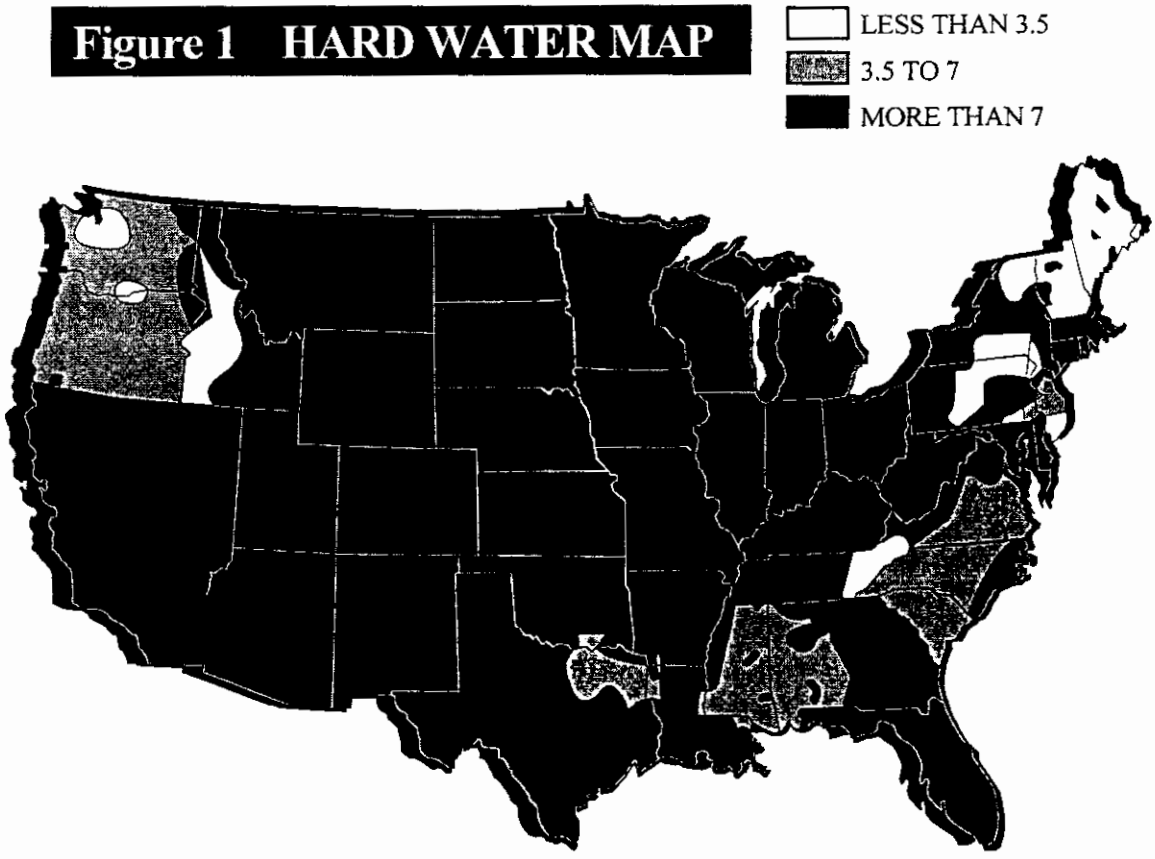
Equipment malfunction or component failure caused by hard water scaling is not covered under the warranty.

3. 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 restrictions.

4. 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.

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

Figure 1 HARD WATER MAP



2 RECEIVING YOUR UNIT

This chapter of the manual contains information on receiving your Prochem PTO cleaning unit.

1. DEALER RESPONSIBILITY

THE PROCHEM DEALER FROM WHOM YOU PURCHASED THIS MOBILE CLEANING UNIT IS RESPONSIBLE FOR THE CORRECT INSTALLATION OF THIS MACHINE. THE DEALER IS ALSO RESPONSIBLE FOR INITIAL TRAINING OF YOUR OPERATORS AND MAINTENANCE PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THIS UNIT.

2. ACCEPTANCE OF SHIPMENT

Upon receiving your Prochem PTO cleaning unit make sure to check the following:

1. Check the unit for any outward signs of damage. If damaged, notify the common carrier immediately.

2. Check your equipment and packing list. The standard Prochem PTO cleaning unit should arrive equipped with the following items (unless otherwise specified) and any optional equipment which was ordered:

3. EQUIPMENT LIST

A) Prochem PTO cleaning unit console and hydraulic oil reservoir.

B) Installation kit including hydraulic pump kit, belts, hoses, and mounting hardware.

C) Operation and service manual, water pump, and vacuum pump manuals.

D) Installation bolting kit.

E) Installation mounting plates.

F) Waste tank filter and strainer basket.

G) Carpet wand.

H) 100 ft. of 2" vacuum hose.

I) One vacuum hose connector.

J) 100 ft. of 1/4" high-pressure hose with quick connects.

K) 50 ft. water supply hose with quick connect.

4. OPTIONAL EQUIPMENT

SEE PAGE 58 FOR ILLUSTRATION INDEX

L) Winterizing loop hose. Part #10-805380.

M) Upholstery tool. Part #60-950422

N) Stair tool. Part #60-950421 / 60-950450

O) Extra wands.

P) Extra vacuum hoses. Part #10-805060.

Q) Extra vacuum hose connectors. Part #12-800078.

R) Extra high- pressure water hoses. Part #10-805122.

S) Auxiliary water tank(s) with demand pumps. Part #66-945260 (dual tanks). Part #66-945265 (single tank).

T) Pressure wash gun. Part #60-950168.

U) Hose reel.
Part #65-950393 (vac & hp hose).
Part # 65-950438 (vac hose only).
Part #65-950482 (door-mount, hp hose only).
Part #65-950521 (mtr dr hose reel/wtr tnk)

V) Van storage unit. Part #65-950392.

W) Automatic waste pump-out kit.
Part #66-945533.

N O T E S

SECTION 2: INSTALLATION

3 INSTALLATION 11

3 INSTALLATION

WARNING!

All PTO cleaning units must be bolted to the floor of the vehicle by an authorized Prochem Dealer / Service center.

NOTE: REFER TO PAGE 58 (ILLUSTRATION INDEX) FOR PART NUMBERS AND ANY ADDITIONAL INSTALLATION INFORMATION.

1. LIFTING THE UNIT ONTO THE VEHICLE

Since the Prochem PTO console and hydraulic oil reservoir weigh approximately 915 pounds, we recommend using a forklift to lift the unit into 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.

WARNING!

The vehicle parking brake must be set throughout the PTO cleaning unit installation. A rolling vehicle may result in equipment damage, injury, or fatality.

2. POSITIONING THE UNIT IN THE VEHICLE

Because vehicles vary in size and openings, individuals have their own preference as to where they want their cleaning units installed. We strongly recommend a side door installation for the PTO cleaning unit and **DO NOT** recommend a rear door installation. The installation kit includes hoses that will only fit the installation instructions that follow.

The cleaning unit with accessories must **NOT** exceed the vehicle's axle weight limit.

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

3. BOLTING DOWN THE UNIT

1. Loosen and remove the two ½-13 hex head screws and flat washers, which fasten the right side of the console equipment base to the hydraulic oil reservoir.

2. Place the console in the vehicle. Using the console mounting holes as a template, drill eight 13/32" diameter holes for mounting the console. With the hardware installation kit:

a) Insert eight 3/8-16 x 3" hex head screws with flat washers through the mounting holes in the PTO console.

b) Install the mounting plates underneath the vehicle floor. See **figure 3**.

c) Screw the 3/8-16 hex head nuts and lockwashers onto the mounting screws and tighten them until the console is firmly secured to the vehicle floor.

3. Now place the hydraulic oil reservoir in the vehicle for mounting. For Chevy vans remove the passenger seat and slide the hydraulic oil reservoir into the vehicle through the passenger door. Use an 18mm deep socket to loosen and remove the nuts at the floor under the seat. For Ford vans move the passenger seat forward and slide the hydraulic oil reservoir into the vehicle through the side door. For Isuzu box trucks slide the hydraulic oil reservoir into the vehicle through the side door.

4. Attach the hydraulic oil reservoir to the console with the two ½-13 hex head screws and flat washers that you removed from the console equipment base. Make the two screws snug, but loose enough that you can adjust the position of the hydraulic oil reservoir.

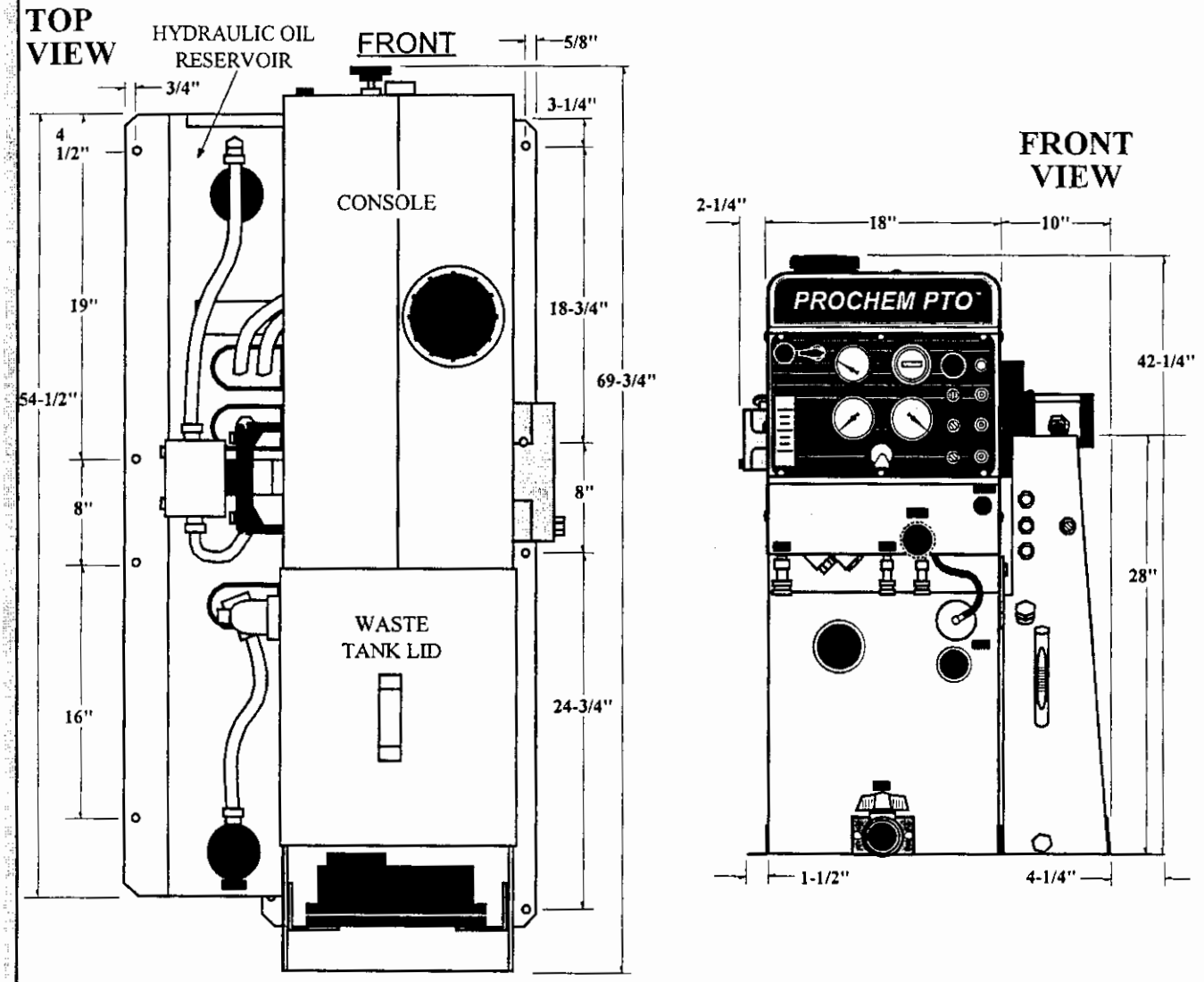
5. Using the hydraulic oil reservoir mounting holes as a template, drill four 13/32" diameter holes for mounting the hydraulic oil reservoir.

6. Using the hardware installation kit:

a) Insert four 3/8-16 x 3" hex head screws with flat washers through the mounting holes in the hydraulic oil reservoir.

b) Install the mounting plates underneath the vehicle floor. See **figure 3**.

Figure 2 DIMENSIONAL DATA



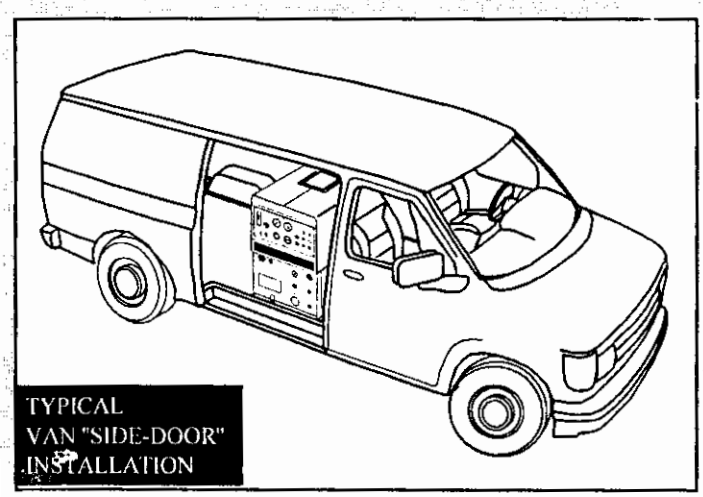


Figure 3 MOUNTING PLATE INSTALLATION

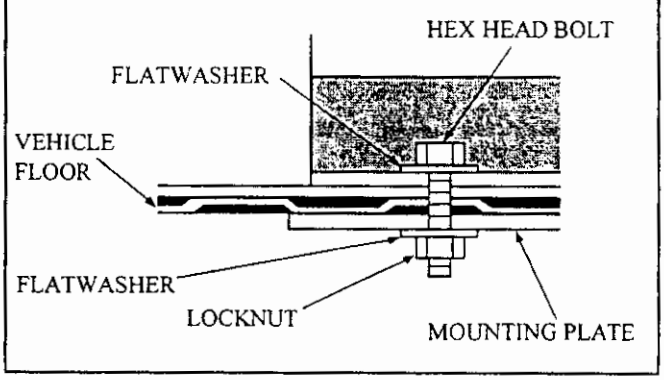


Figure 4 CONSOLE PLACEMENT, CHEVY VANS

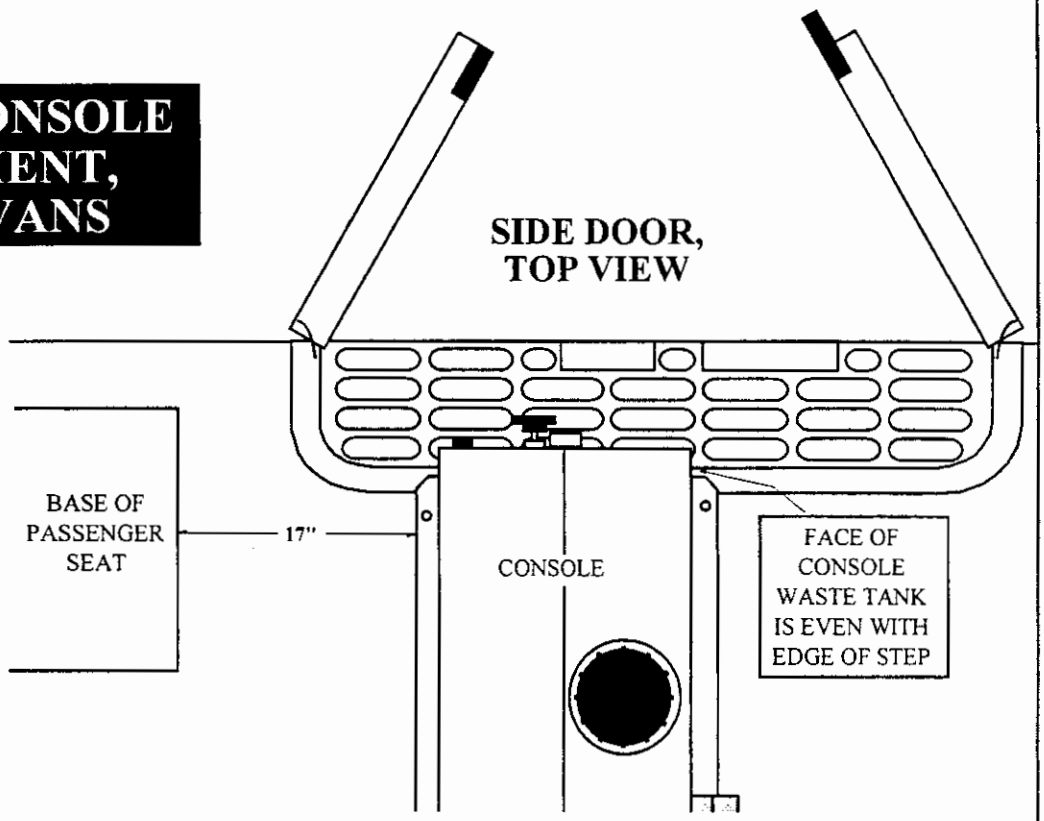


Figure 5 CONSOLE PLACEMENT, FORD VANS

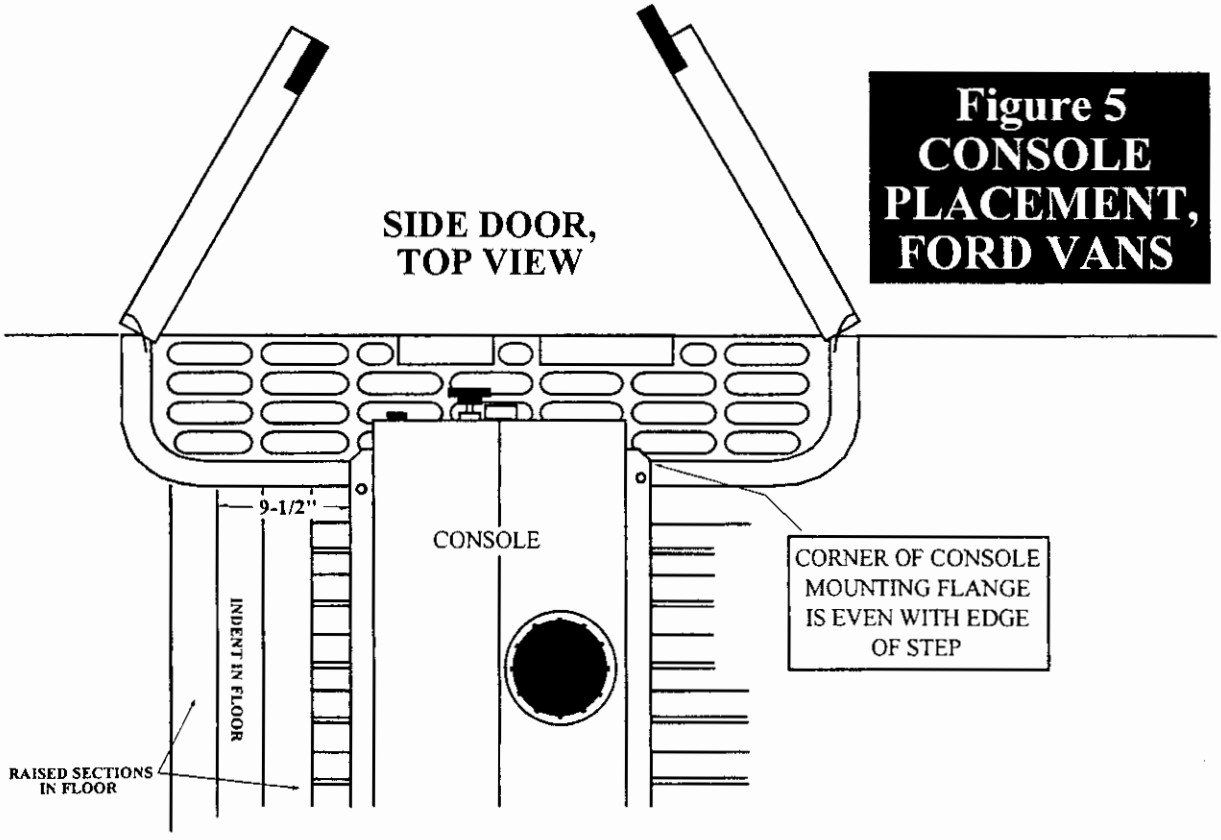


Figure 6 CONSOLE PLACEMENT, ISUZU BOX TRUCK

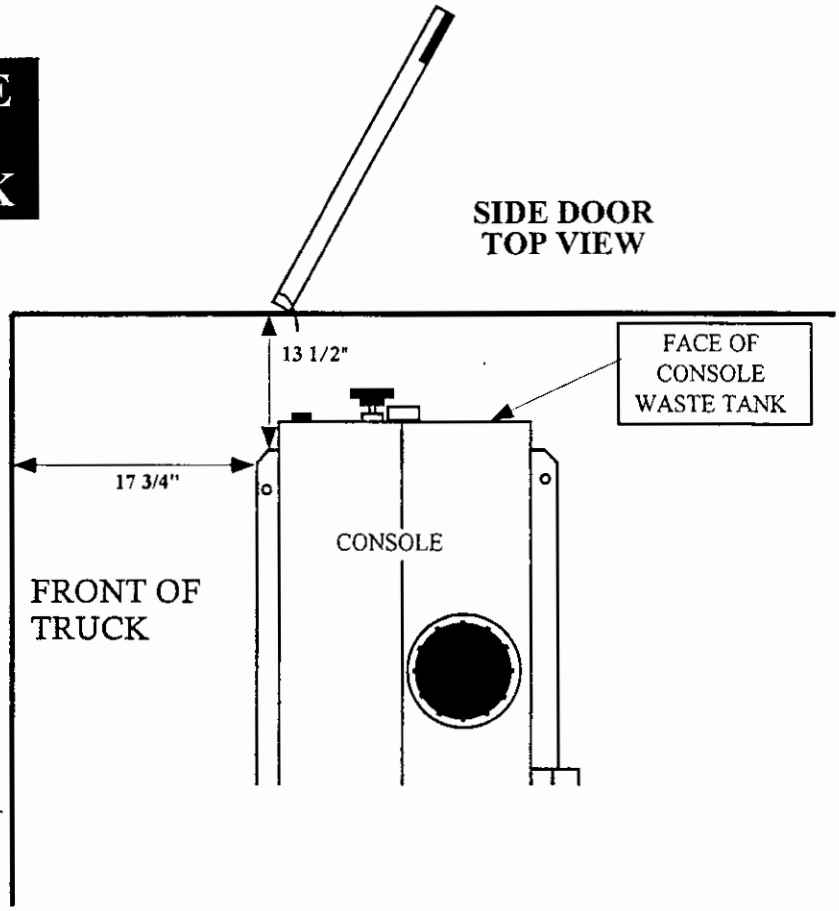
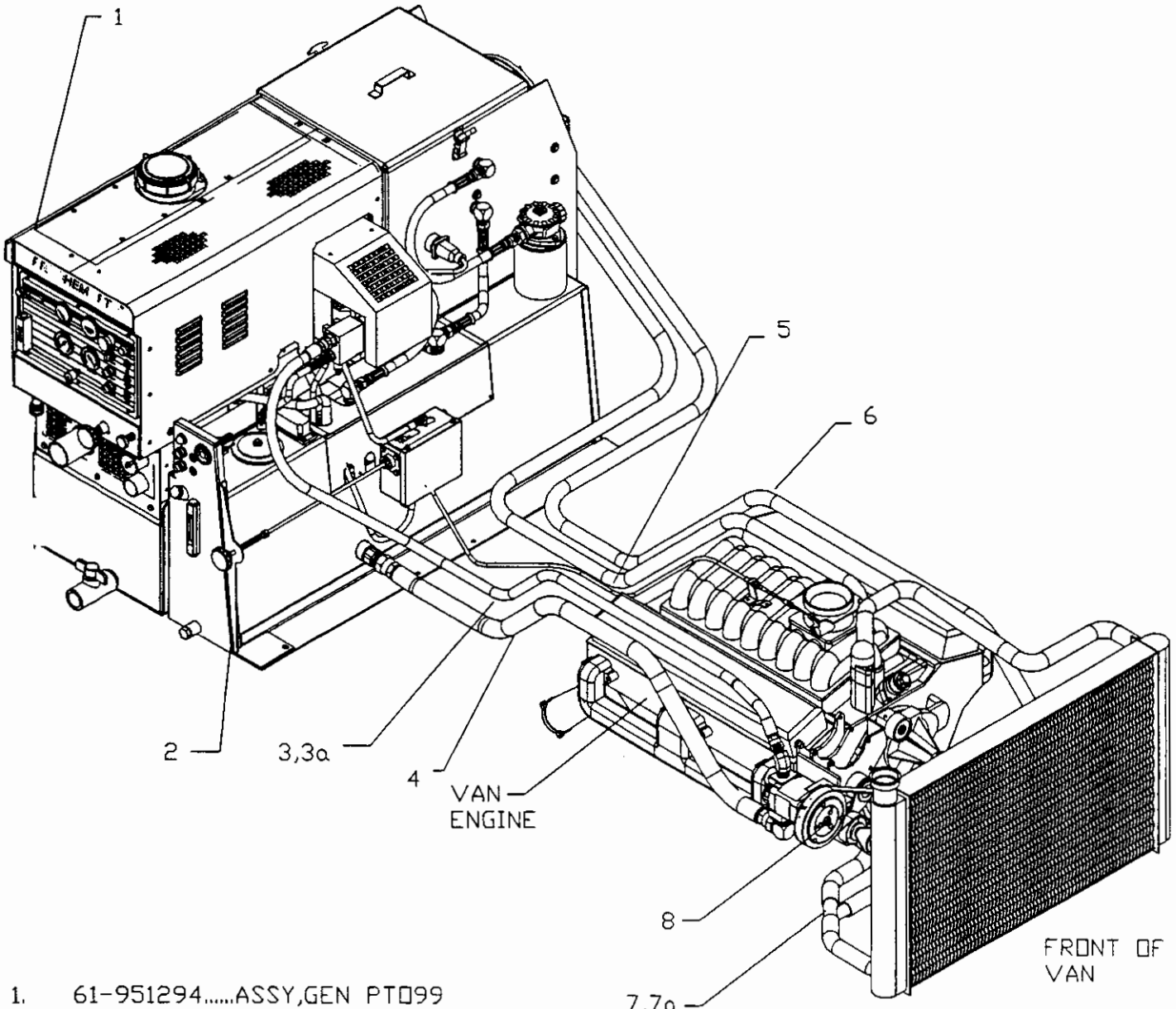


FIGURE 7 HOSE LAYOUT



1. 61-951294.....ASSY,GEN PTO99
2. 61-951313.....ASSY,TNK HYD OIL PTO99
3. 10-805490.....HOSE,HP 3/4x100"CHEVY
3a 10-806492.....HOSE,HP 3/4x94"FORD
4 10-806496.....HOSE,HP 1-1/4x75"CHEVY/FORD
5 10-805497.....HOSE,RAD 1-1/4x162"CHEVY/FORD
6 10-805498.....HOSE,.RAD 1-1/4x200"CHEVY/FORD
7 52-501966.....CSTG,COOLANT "Y"CHEVY
7 52-501967.....CSTG,COOLANT "Y"FORD
8 41-905042.....PMP,HYDRAULIC CHEVY/FORD

c) Screw the 3/8-16 hex head nuts and lockwashers onto the mounting screws and tighten them until the hydraulic oil reservoir is firmly secured to the vehicle floor.

7. Tighten the two ½-13 hex head screws, which attach the hydraulic oil reservoir to the console.

4. ROUTE HOSES BETWEEN THE CONSOLE AND HYDRAULIC OIL RESERVOIR, WIRING CONNECTORS

NOTE: FOR ROUTING OF HYDRAULIC AND COOLANT HOSES REFER TO FIGURE 7 PAGE 15 AND ILLUSTRATION INDEX ON PAGE 58.

1. Route and connect the hoses between the hydraulic oil reservoir and the console.

2. Connect the two three-terminal connectors between the console and hydraulic oil reservoir.

5. INSTALL THE HYDRAULIC PUMP

1. Install the hydraulic pump mounting kit on the engine in accordance with the mounting kit instructions. For Chevy vans, the mounting kit is Part #49-876335. For Ford vans, the mounting kit is Part #49-876344.

2. Before attaching the hydraulic pump to the mounting kit, attach the hose fittings and hoses to the hydraulic pump. Then mount the hydraulic pump to the mounting kit.

CAUTION:

Use Loctite Hydraulic Sealant (or equivalent) when installing hydraulic fittings. DO NOT use Teflon tape with hydraulic fittings. Using Teflon tape may lead to hydraulic pump damage and will void the hydraulic pump warranty.

6. ROUTE HOSES FROM THE HYDRAULIC PUMP TO THE HYDRAULIC OIL RESERVOIR

1. Attach the fittings to the side of the hydraulic oil reservoir.

2. Connect the hoses from the hydraulic pump to the fittings on the side of the hydraulic oil reservoir.

7. CONNECT HOSES

1. Connect the hoses running from the heli-coil heat exchanger to the thermostat adapter & "y" connection. The top or thermostat housing hose should attach to the heli-coil top fitting. The lower or "y" connector hose attaches to the heli-coil bottom fitting.

8. INSTALL COOLANT HOUSING THERMOSTAT ADAPTER (CHEVY)

1. Use a 14mm deep socket to remove the nut holding the ground wire to the vehicle thermostat housing. Use a 13mm deep socket to remove the studs securing the vehicle thermostat housing.

2. Remove the vehicle thermostat.

3. Secure the thermostat adapter, Part #52-501871, to the 1-1/4" hose which leads to the upper heli-coil heat exchanger fitting. Use a #24 hose clamp to secure the thermostat adapter to the hose.

4. Install the o-ring, Part #43-810089, thermostat housing, vehicle thermostat, and vehicle thermostat housing on the engine block and reattach the ground wire. Use 8mm x 1.25 x 70mm screws.

9. INSTALL COOLANT HOUSING THERMOSTAT ADAPTER (FORD)

1. Remove the vehicle thermostat housing, leaving it attached to its hose. Remove the vehicle thermostat.

2. Secure the thermostat adapter, Part #52-501932, to the 1-1/4" hose which leads to the upper heli-coil heat exchanger fitting. Use a #24 hose clamp to secure the thermostat adapter to the hose.

3. Install the o-ring, Part #43-810090, thermostat housing, vehicle thermostat, a second o-ring, and vehicle thermostat housing on the engine block. Use 8mm x 1.25 x 70mm screws.

10. INSTALL COOLANT HOUSING THERMOSTAT ADAPTER (ISUZU)

1. Remove the vehicle thermostat housing, leaving it attached to its hose. Remove the vehicle thermostat.

2. Secure the thermostat adapter, Part #52-501953, to the 1-1/4" hose which leads to the upper heli-coil heat exchanger fitting. Use hose clamp #03-000259 to secure the thermostat adapter to the hose.

3. Install the o-ring, Part #43-810089, thermostat housing, vehicle thermostat, a second o-ring, and vehicle thermostat housing on the engine block. Use 8mm x 1.25 x 70mm screws.

11. INSTALL LOWER RADIATOR COOLANT "Y" (CHEVY)

1. Place a large, clean bucket under the vehicle coolant return hose, which runs from the bottom of the radiator to the vehicle water pump. Using a utility knife cut this hose at its lowest point and allow the coolant to drain into the bucket. Cut about 4" out of the spring, centered where you cut the hose. Set aside the coolant for use later.

2. Secure the coolant "Y", Part #52-501966, to the 1-1/4" hose. Use hose clamp #03-000259.

3. Secure the coolant "Y" to the splice in the vehicle coolant return hose. Use hose clamp 03-000259. For 2000 make Chevy and newer, utilize new lower radiator hose supplied in kit.

12. INSTALL LOWER RADIATOR COOLANT "Y" (FORD)

1. Place a large, clean bucket under the vehicle coolant return hose, which runs from the bottom of the radiator to the vehicle water pump. Using a utility knife cut this hose at its lowest point and allow the coolant to drain into the bucket. Cut about 4" out of the spring, centered where you cut the hose. Set aside the coolant for use later.

2. Secure the coolant "Y", Part #52-501968, to the 1-3/4" hose. Use hose clamp 03-000259.

3. Secure the coolant "Y" to the splice in the vehicle coolant return hose. Use hose clamp 03-000259.

13. INSTALL LOWER RADIATOR COOLANT "Y" (ISUZU)

1. Place a large, clean bucket under the vehicle coolant return hose, which runs from the bottom of the radiator to the vehicle water pump. Using a utility knife cut this hose 1-1/2" from the end of the water pump fitting and allow the coolant to drain into the bucket. Set aside the coolant for use later.

2. Secure the coolant "Y", Part #52-501966, to the 1-1/4" hose. Use hose clamp #03-000259.

3. Secure the coolant "Y" to the splice in the vehicle coolant return hose. Use hose clamps #03-000259.

14. INSTALL WIRING HARNESS (CHEVY)

1. Temporarily cover the red wire spade terminal of the wiring harness with electrical tape. This will prevent grounding of the vehicle power bus.

2. Remove the vehicle power bus cover by lifting it straight up. This is a 1-1/2" x 3" plastic cover to the rear of the wiper fluid reservoir. Removing the power bus cover exposes two studs. Set aside the cover for re-installation later.

3. Run the wiring harness around the back of the console towards the front of the van. Turn 90 deg in front of the hydraulic tank towards

the center of the van. Turn 90deg again towards the engine compartment. Place the ring terminal over one of the studs, and secure with a 5/16 lock washer and 8mm nut.

4. Re-install the vehicle power bus cover.

5. Modify the wiring harness that comes with the hydraulic pump kit. Cut the red wire 3 feet from the connector and crimp a male spade connector, Part #31-900028, on the end of the wire. Cut the black wire 6" from the connector and crimp a ring terminal, Part #31-900175, on the end of the wire. Connect the hydraulic pump wiring harness to the hydraulic pump pigtails. Add wire loom and ground the black wire to the vehicle frame with a self-tapping screw. Add wire loom and connect the red wire to the PTO wiring harness.

6. Route the console grounding cable, Part #64-950515, from the console, to the rear console mounting bolt.

7. Check that the 1-1/4" hoses and wiring harness are clear of pinch points, moving parts, and areas of high temperature. Secure the hoses, console grounding cable, and wiring harness with cable ties and cable clamps.

8. Install two 3-terminal electrical connectors, Part #31-900173, on the wiring harness. Install the red wire terminal (the one with electrical tape on it) last. Connect the wiring harness to the console wiring near the heli-coil heat exchanger.

15. INSTALL WIRING HARNESS (FORD)

1. Temporarily cover the red wire spade terminal of the wiring harness with electrical tape. This will prevent grounding of the vehicle power bus.

2. Remove the vehicle power bus cover by lifting it straight up. This is a 1-1/2" x 3" plastic cover to the rear of the wiper fluid reservoir. Set aside the cover for re-installation later.

3. Run the wiring harness around back of the console towards the front of the van. Turn 90 deg in front of the hydraulic tank towards the center of the van. Turn 90 deg again towards the front of the van towards the engine compartment. Remove the nut on the stud marked "Alt." Place the ring terminal over the stud, and replace the nut on this stud.

4. Re-install the vehicle power bus cover.

5. Modify the wiring harness that comes with the hydraulic pump kit. Cut the red wire 3 feet from the connector and crimp a male spade connector, Part #31-900028, on the end of the wire. Cut the black wire 6" from the connector and crimp a ring terminal, Part #31-900175, on the end of the wire. Connect the hydraulic pump wiring harness to the hydraulic pump pigtails. Add wire loom and ground the black wire to the vehicle frame with a self-tapping screw. Add wire loom and connect the red wire to the PTO wiring harness.

6. Route the console grounding cable, Part #64-950515, from the console to the rear console mounting bolt.

7. Check that the 1-1/4" hoses and wiring harness are clear of pinch points, moving parts, and areas of high temperature. Secure the hoses, console grounding cable, and wiring harness with cable ties and cable clamps.

8. Install two 3-terminal electrical connectors, Part #31-900173, on the wiring harness. Install the red wire terminal (the one with electrical tape on it) last. Connect the wiring harness to the console wiring near the heli-coil heat exchanger.

16. INSTALL WIRING HARNESS (ISUZU)

17. FILL HYDRAULIC OIL RESERVOIR

Fill the hydraulic oil reservoir with 25 gallons ISO 68 oil, such as Shell Tellus T68 or Amoco Rykow 68. When the vehicle is on level ground and the hydraulic oil reservoir is full, the oil level is about half way in the sight gauge.

18. FILL ENGINE COOLING SYSTEM

1. Remove the vehicle radiator cap and fill the radiator with engine coolant.

2. Open the heli-coil heat exchanger drain cock. Attach and secure one end of a ¼" hose to the drain cock and place the other end of the ¼" hose into a clean bucket.

3. Start the vehicle's engine, and let the engine run. When the thermostat opens and the level of coolant in the radiator falls, add more coolant to the radiator. Continue this process until coolant is flowing steadily through the heli-coil drain cock. Then close the drain cock and remove the hose from the drain cock.

4. Add coolant to the radiator until the level of coolant remains the same. Place the radiator cap back on the radiator.

5. Shut off the vehicle engine. Fill the coolant reservoir with engine coolant.

6. After your first extended operations with the PTO cleaning unit, check the coolant level and add coolant until the proper level is reached.

19. INSTALL THROTTLE PUSH-PULL CABLE (CHEVY)

1. To gain access to the vehicle throttle body, remove the glove box console below the vehicle dashboard. Start by removing the narrow plastic panel above the glove box console. The plastic panel is hinged on the passenger's side, so remove it by prying it out of its snaps on the driver's side.

2. When you've removed the narrow plastic panel, you have access to the two screws and four nuts holding the glove box console in place. Use a 10mm nut driver to loosen and remove the two screws and four nuts. Be sure to disconnect the cigarette lighter electrical connector at the rear of the glove box console before moving the glove box console away.

3. Set aside the narrow plastic panel, glove box console, and mounting hardware for re-installation later.

4. Remove the a/c vent resting on the plastic engine cover (doghouse). Remove the strap holding the doghouse in place, and remove the doghouse. Set aside the a/c vent, doghouse strap, and doghouse for re-installation later.

5. Attach the throttle lever, Part #50-501969, to the vehicle throttle body with an 6-32 x 5/8" screw and 6-32 lock nut.

6. Mount the push-pull cable-mounting bracket, Part #50-501968, on the push-pull cable, Part # 49-876336. The mounting bracket should be positioned in the center of the threaded area of the push-pull cable. Install a 10-32 nut and the chain coupling, Part #49-876305, on the same end of the push-pull cable.

7. Mount the push-pull cable-mounting bracket to the vehicle intake manifold-mounting studs. Use ¼ lock washers and 6mm nuts.

8. Now you'll position the chain link on the push-pull cable. Pull the push-pull cable all the way forward. Adjust the position of the chain link until the forward end of its slot is 1/8" beyond the top hole on the throttle lever. Fix the chain link in this position with the 10-32 nut. Attach the chain link to the throttle lever with a 10-32 x ½" screw, #10 flat washer, and 10-32 lock nut.

20. INSTALL THROTTLE PUSH-PULL CABLE (FORD)

1. Remove the engine cover, the boot on the air cleaner assembly, and slip the plastic cover off the throttle body.

2. If the vehicle has cruise control, skip to step #5. If the vehicle doesn't have cruise control, remove one of the throttle push-pull cable mounting nuts and slide the push-pull cable through the square hole in the vehicle throttle mount. Then re-install the mounting nut on the push-pull cable. Secure the push-pull cable to the vehicle throttle mount while locating the nuts near the chain end of the push-pull cable.

3. Install a 10-32 nut and the chain coupling, Part #49-876305, onto the push-pull cable. Secure the chain link as far onto the push-pull cable as you can.

4. Pull the push-pull cable all the way forward. Rotate the vehicle throttle body until the throttle body slide pin will fit in the chain link. Then release the throttle body.

5. Drill a 7/16" dia. hole, 1" above the center of the square hole in the vehicle throttle mount. Remove one of the throttle push-pull cable mounting nuts and slide the push-pull cable through the 7/16" hole you drilled. Then re-install the mounting nut on the push-pull cable. Secure the push-pull cable to the vehicle throttle mount while locating the nuts near the chain end of the push-pull cable.

6. Use a belt sander to remove .050" from the linkage face of the slider link, Part #56-502327.

7. Install a 10-32 nut and the slider link onto the push-pull cable. Secure the slider link as far onto the push-pull cable as you can.

8. Remove the cruise control linkage from the vehicle throttle body. Pull the push-pull cable all the way forward. Rotate the vehicle throttle body until the throttle body slide pin will fit in the chain link. Re-install the cruise control linkage. Then release the throttle body.

21. INSTALL THROTTLE PUSH-PULL CABLE (ISUZU)

22. SECURE THROTTLE PUSH-PULL CABLE TO GOVERNOR

1. Run the push-pull cable across the vehicle floor to the governor assembly. Remove the governor housing cover panel and one of the mounting nuts on the push-pull cable.

2. Route the push-pull cable through the hole in the bottom of the governor housing. Re-install the mounting nut on the push-pull cable, and route the end of the push-pull cable through the middle hole in the governor compound swivel bracket. Then place two 10-32 nuts on the end of the push-pull cable. The position of the 10-32 nuts will be adjusted later.

3. Secure the push-pull cable to the governor housing. Position the cable so that the threaded area is centered in the hole.

4. Now replace the lower dashboard panels and hardware.

a) For Chevy vans: place the doghouse in position without securing it. Mark the doghouse at the spot where it sets on the throttle push-pull cable. Remove the doghouse and cut away ½" high by 1" wide area where the throttle push-pull cable will pass through the doghouse. Re-install the doghouse, doghouse strap, a/c vent, glove box console, and narrow plastic panel.

b) For Ford vans: place the engine cover in position without securing it. Mark the engine cover at the spot where it sets on the throttle push-pull cable. Remove the engine cover and cut away ½" high by 1" wide area where the throttle push-pull cable will pass through the engine cover. Re-install the engine cover.

23 GOVERNOR SETUP AND ADJUSTMENT

1. See **Figure 8**. After completing installation but prior to starting engine, check all components of governor to ensure that:
   1) All bolts are tight except the two holding the cross arm to the governor leaf springs. The ¼-20 nylock nuts should be tightened and backed off one flat on nut.
   2) The low speed adjusting screw should be raised to its highest point.
   3) The high speed adjusting screw should be raised to its highest point.
   4) The governor pivot arms should move up and down freely.
   5) Approx. four threads should be showing on the mini cylinder (below the plate).
   6) There should be approx. .125 between the governor box and the stop plate on the pivot arm.
   7) Adjust the over travel screw down onto the leaf spring so that it just makes contact and tighten the jam nut.
   8) Adjust the sensitivity screw so approx. 1 inch of screw is protruding from the housing. This is a mild loaded condition.
   9) Set the speed-adjusting knob to the middle location (idle) and turn on the machine. The mini cylinder will extend locking the pivot plates together. Check for leaks. Adjust the two 10-32 nuts on the throttle cable that goes through the hole in the cross arm so that there is no play in the cable, and the nuts are just touching the arm. Lock these two nuts together.

2. With the machine running and a 50ft. section of vacuum hose attached but not plugged, rotate the selector knob to the high speed setting. Loosen the 3/8 jam nut on the high speed adjusting screw (item 3) and turn it in until you reach 2500 RPM on the tachometer (this is the hydraulic motor RPM **not** vehicle RPM) and lock the jam nut down.

3. Now turn the selector knob to the low setting and repeat the process (item 2) setting the speed to 2000 RPM. This now has your base speeds set; these settings may need to be fine-tuned after all other adjustments are made.

4. Now we can begin to adjust the governor to compensate for load. First make sure your water supply line is connected and there is water in the water box, turn on the water pump, and plug the vacuum line. There should be 13hg of vacuum on the gauge, if not it should be adjusted. When the vacuum hose was plugged the rpm should have dropped. At this point loosen the over travel screw (item 7) and back out the screw until the RPM climbs back to the 2500 setting, and lock down the jam nut. If the speed does not climb the sensitivity screw may be too tight and should be loosened.

CAUTION:

Be sure to keep the vacuum hose plugged at this point, if load is released prior to adjusting the sensitivity screw, the RPM could increase dramatically and cause damage to the unit.

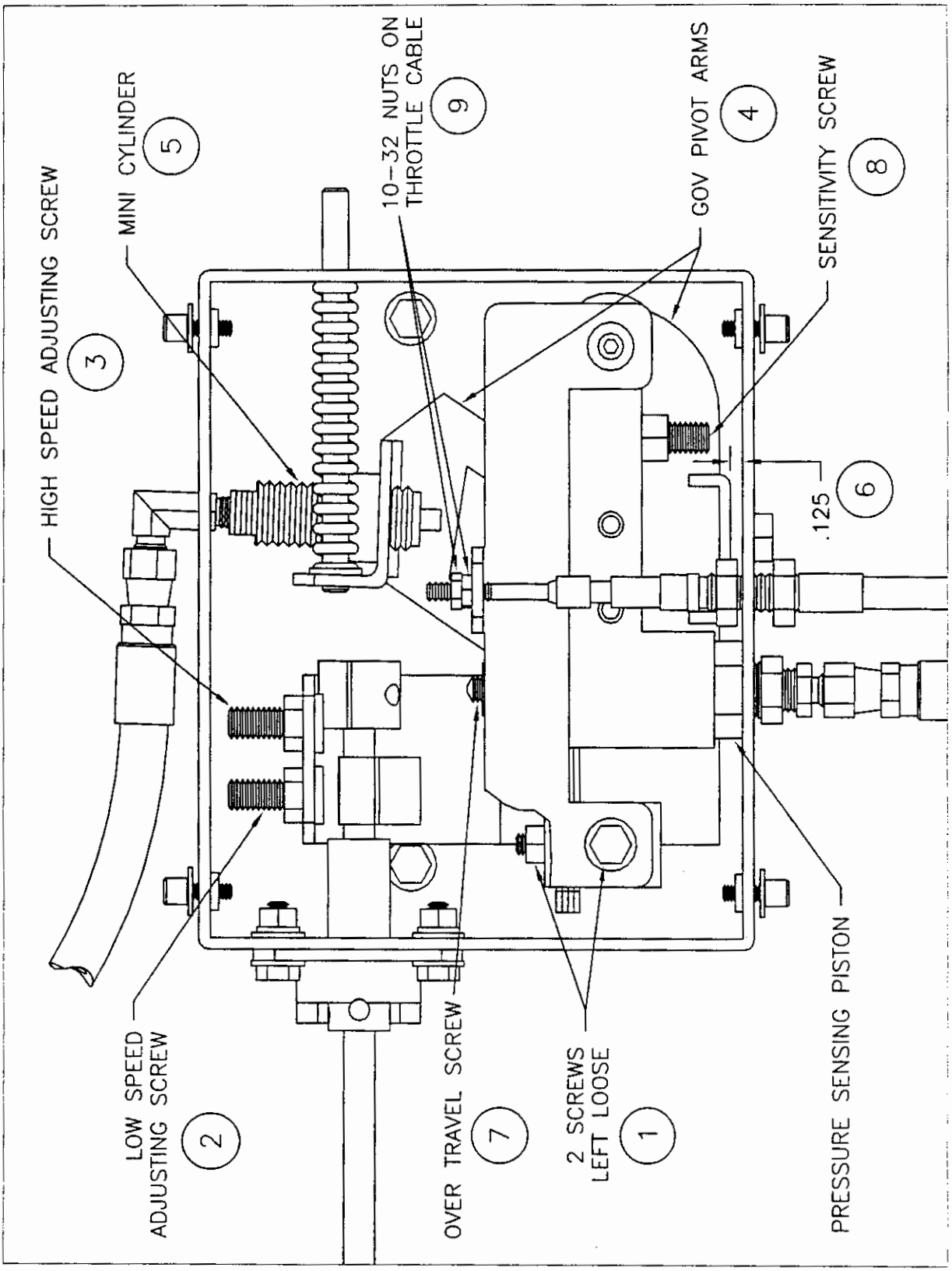
5. Now start screwing in the sensitivity screw (item 8) adding pressure to the spring to balance spring pressure and hydraulic pressure. If the RPM starts to drop, back off slightly and unplug the vacuum hose. If the RPM rises slightly and then drops, you are close to the correct adjustments. If the RPM just rises you will need more pressure on the spring. Keep adjusting and plugging and unplugging the vacuum hose until the RPM rises and falls as needed.

6. Now turn the selector knob to the low speed setting, plug and unplug the vacuum hose to see if the speed increases and decreases and the governor responds to the load. If the governor does not react, screw out the sensitivity screw to remove some of the pressure and check again.

7. Repeat all the above adjustments, low and high speed settings, plug and unplug the vacuum hose to check response, until the unit responds as desired. The governor may not be able to compensate exactly (return to exact RPM) every time. The governor will maintain a respectable variation in RPM allowing the unit to perform.

NOTE: Variations in oil temperature and elevation may effect slightly the previously set RPM. Some variation can be expected and is not cause for concern.

FIGURE 8. GOVERNOR DETAIL



24. ADJUST HYDRAULIC MOTOR MANIFOLD PRESSURE REG. (IF NECESSARY)

1. Remove the plug at the bottom of the hydraulic motor manifold using a 3/16" Allen wrenches. Replace the plug with a pressure gauge, terminated with ¼ o-ring boss fitting.

2. Using a 5/16" Allen wrench, remove the cap from the cartridge valve mounted on the hydraulic motor manifold. Use a 3/16" Allen wrench to back out the pressure regulator plug, just until you hear the unit slow down.

3. While watching the pressure gauge on the hydraulic motor manifold, screw the pressure regulator plug back in. When the pressure stops climbing, make an additional ½ turn on the pressure regulator plug. Replace the cartridge valve cap. Unblock the vacuum inlets.

4. With the cleaning unit shut down and cool, place a bucket under the manifold to catch any hydraulic oil. Remove the pressure gauge from the hydraulic motor manifold. Replace the plug in the hydraulic motor manifold.

25. FIRE EXTINGUISHER

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

SECTION 3: OPERATION

4 SYSTEMS

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

1. WATER PUMPING SYSTEM

See **Figure 9**. Cold water enters the console through the water inlet connection located on the front panel. The water flows to the water box through a float valve, which shuts off water flow when the box is full.

Water then flows 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. A nitrogen-charged accumulator, located between the water pump outlet and the pressure regulator manifold, helps reduce pressure spikes.

If the tool valve is closed, water flows from the pressure regulator manifold to the tube & shell heat exchanger. Hydraulic oil flows through the tube & shell heat exchanger and transfers heat to the water. The heated water then returns to the water box.

If the temperature in the water box exceeds 165°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.

A bypass valve, located on the front panel, can be used to bleed a small amount of hot water from the pressure regulator manifold to the waste tank. This will allow cool water to enter the water box and reduce the cleaning temperature.

When the tool valve is opened, water flows from the pressure regulator manifold to the heli-coil heat exchanger. The vehicle's engine coolant transfers heat to the water while the water is passing through the heli-coil heat exchanger.

Next, the water passes through the vacuum exhaust radiator-type heat exchangers, where heat is transferred from the vacuum pump exhaust to the water. The water returns to the pressure regulator manifold and passes through a check valve. This is where chemical injection occurs.

A 3-way valve, located near the vacuum exhaust heat exchangers, can be used to bypass the water from the heli-coil heat exchanger directly to the pressure regulator manifold. This would bypass the vacuum exhaust heat exchangers and reduce the cleaning temperature.

Finally, the hot solution flows through a Y-strainer and to the cleaning tool.

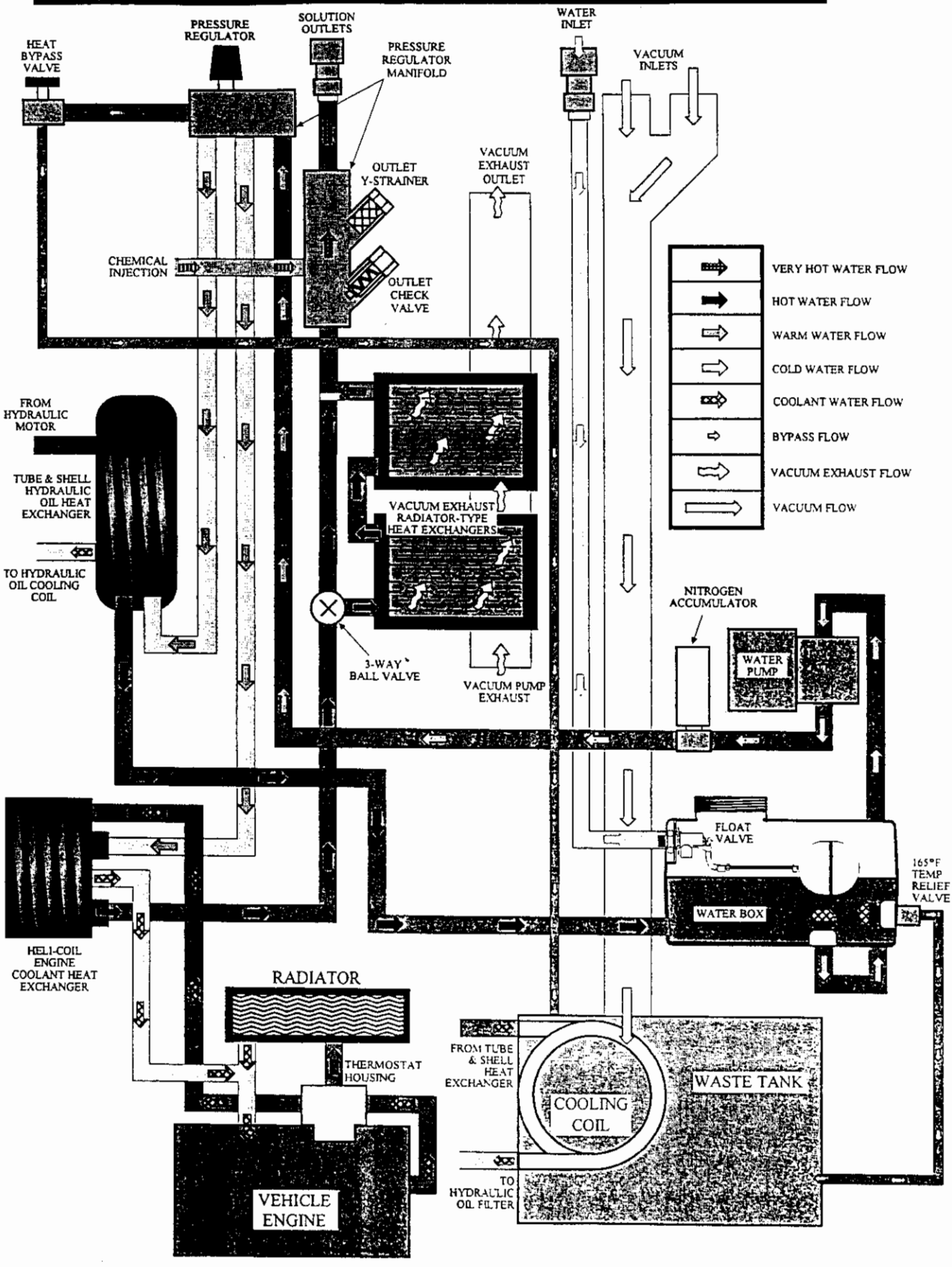
The water pressure in the pressure regulator manifold is displayed on the control panel. The water temperature in the pressure regulator manifold is determined by a sensor and is also displayed on the control panel.

2. HEAT TRANSFER SYSTEM

See **Figure 9**. Water is heated through a three-stage heat exchanger system, using hydraulic oil, vehicle engine coolant, and vacuum pump exhaust to transfer heat to the water.

Stage one uses hydraulic oil flowing through a tube & shell heat exchanger to transfer heat to the water. When the tool valve is closed, water bypasses from the pressure regulator manifold to the water box through the tube & shell heat exchanger.

Figure 9 HEAT TRANSFER & WATER SYSTEM



When the tool valve is open, the water flows through the second stage of the heat exchanger system, a heli-coil using heated engine coolant pumped over copper coils. The pressurized water flows through the copper coils and collects maximum heat from the engine's cooling system. The pressurized water then flows to the third stage heat exchanger.

The vehicle's engine thermostat acts to regulate the temperature of the coolant flowing through the heli-coil heat exchanger. The engine coolant will only flow through the engine and heli-coil until the coolant temperature reaches 195°F, opening the engine thermostat. Then the engine coolant flows from the engine to both the heli-coil and vehicle radiator.

The third stage of the heat exchanger system uses vacuum pump exhaust blowing over two radiator-type heat exchangers. The vacuum pump exhaust is then discharged into the atmosphere. When the tool valve is open, water flows from the heli-coil heat exchanger to the radiator-type heat exchangers, where the vacuum pump exhaust transfers heat to the water. The water then flows to the pressure regulator manifold.

A 3-way valve can be used to bypass the water from the heli-coil heat exchanger directly to the pressure regulator manifold. This would reduce cleaning temperatures.

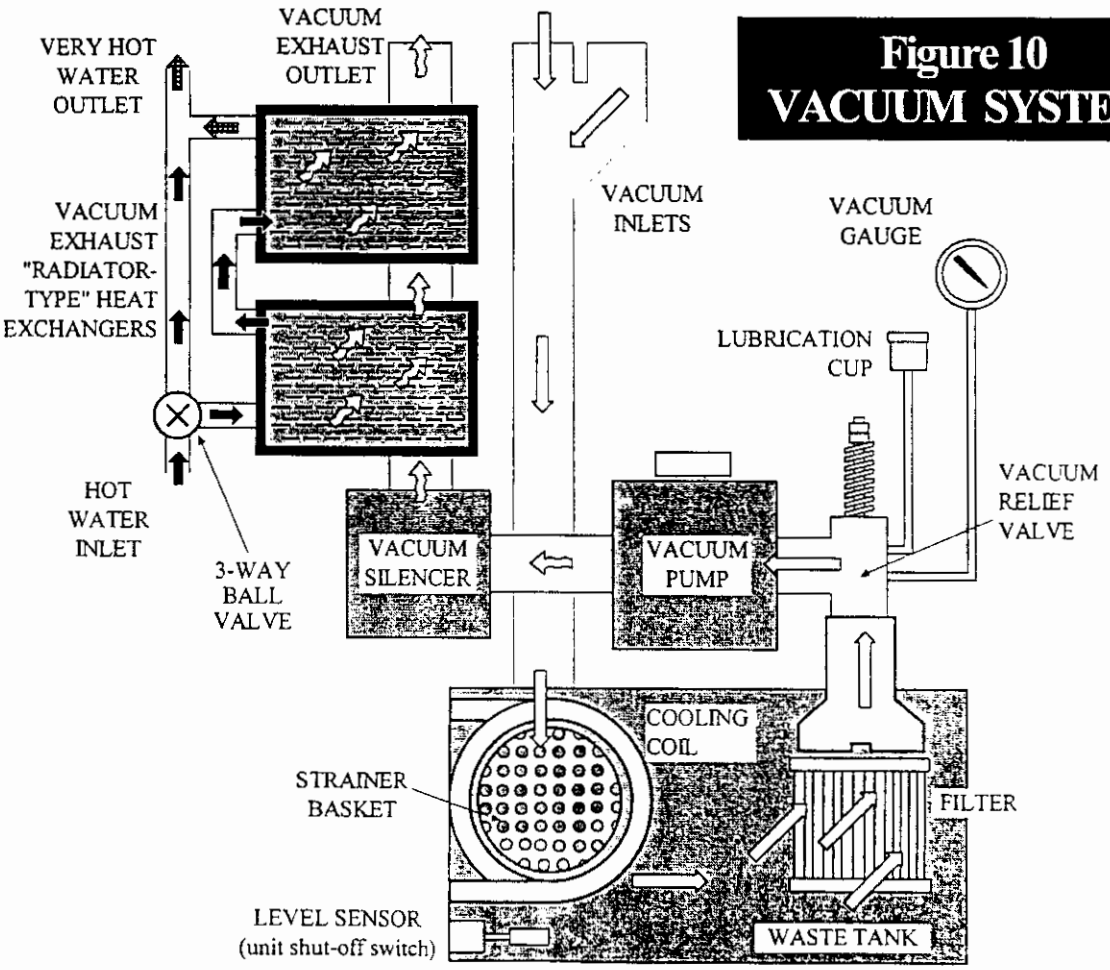


Figure 10
VACUUM SYSTEM

3. VACUUM SYSTEM

See **Figure 10**. Vacuum flow is initiated by the vacuum pump, with air and water being drawn into the vacuum inlets at the front of the console.

From the vacuum inlet tube at the front of the console the air and water mixture flows over the hydraulic oil cooling tube and through a strainer basket in the waste tank. The airflow acts to cool the hydraulic oil flowing through the cooling tube before the oil returns to the hydraulic oil reservoir.

Air then exits the waste tank through one 60-mesh filter and flows into the vacuum pump, vacuum silencer, vacuum exhaust heat exchangers, and is discharged at the console front panel.

A vacuum pump relief valve has been provided to protect the vacuum pump.

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. When the waste tank is full, the level sensor switch removes power from the hydraulic pump clutch and from the console, and the "Waste Tank Full" lamp on the control panel is lit.

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.)

4. CHEMICAL SYSTEM

See **Figure 11**. 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 (CHEMICAL)**, **OFF**, or **PRIME** the chemical pump.

The chemical then flows through a metering valve to the pressure regulator manifold. The metering valve controls the rate of flow of chemical injection into the cleaning solution.

At the pressure regulator manifold, the chemical mixes with hot pressurized water to form the cleaning solution. The cleaning solution flows through a Y-strainer, to the solution outlets, and finally to the cleaning tool.

5. HYDRAULIC SYSTEM

See **Figure 12**. Oil from the hydraulic oil reservoir is drawn into the clutch-driven hydraulic pump, and the oil is pressurized. A switch on the hydraulic oil reservoir selects the vehicle's engine speed, which drives the hydraulic pump's clutch. The speed can be set to idle, low, or high. The hydraulic pump clutch is energized with a switch on the control panel.

The pressurized hydraulic oil flows to the hydraulic motor manifold. This manifold includes a hose to vent hydraulic oil back to the hydraulic oil reservoir in the case of an over-pressure condition. The manifold also includes a plug, which may be removed to insert a pressure gauge.

The hydraulic motor manifold includes one additional hose. The hose is routed to the governor so the governor may sense the pressure of the hydraulic oil.

Figure 11 CHEMICAL SYSTEM

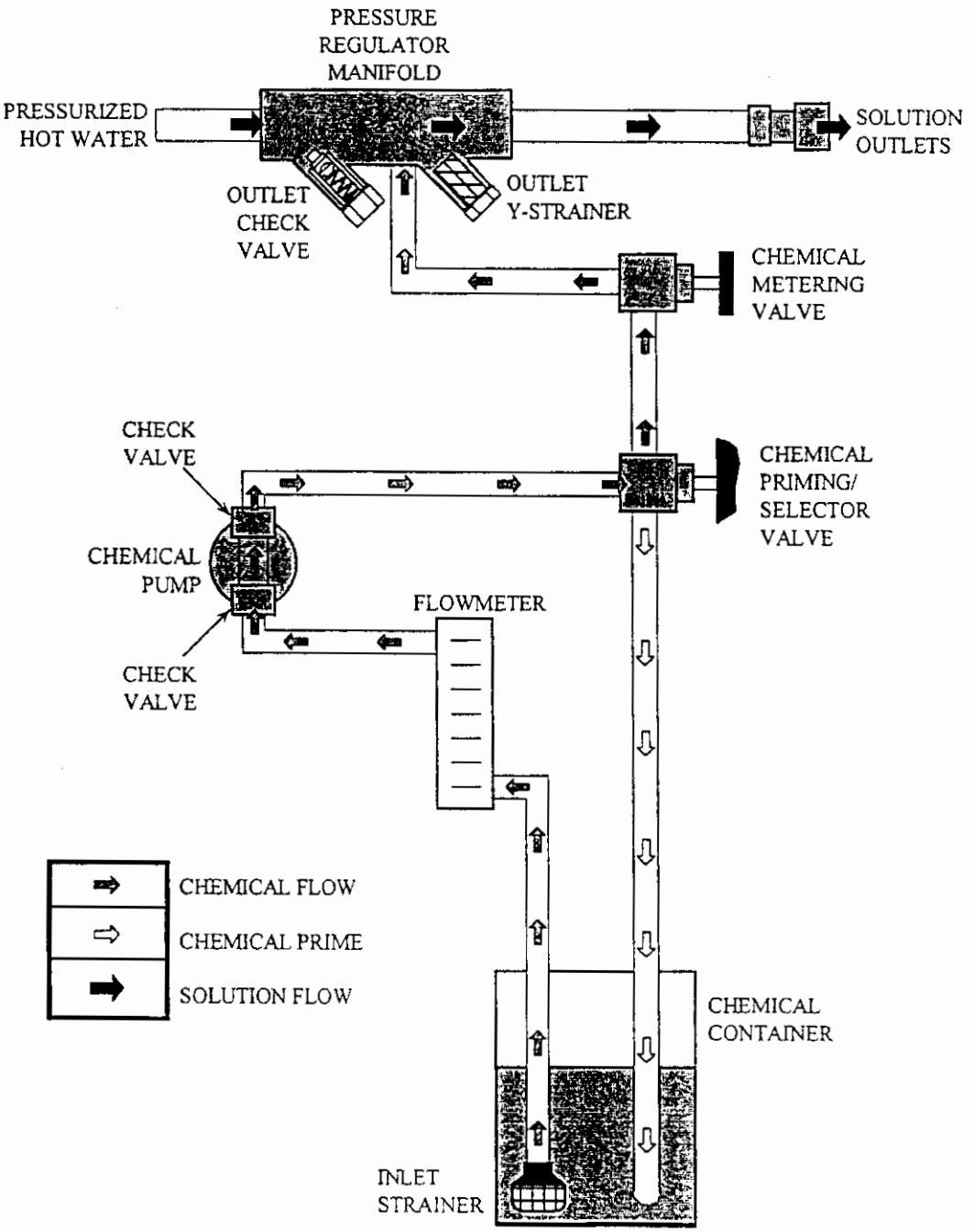
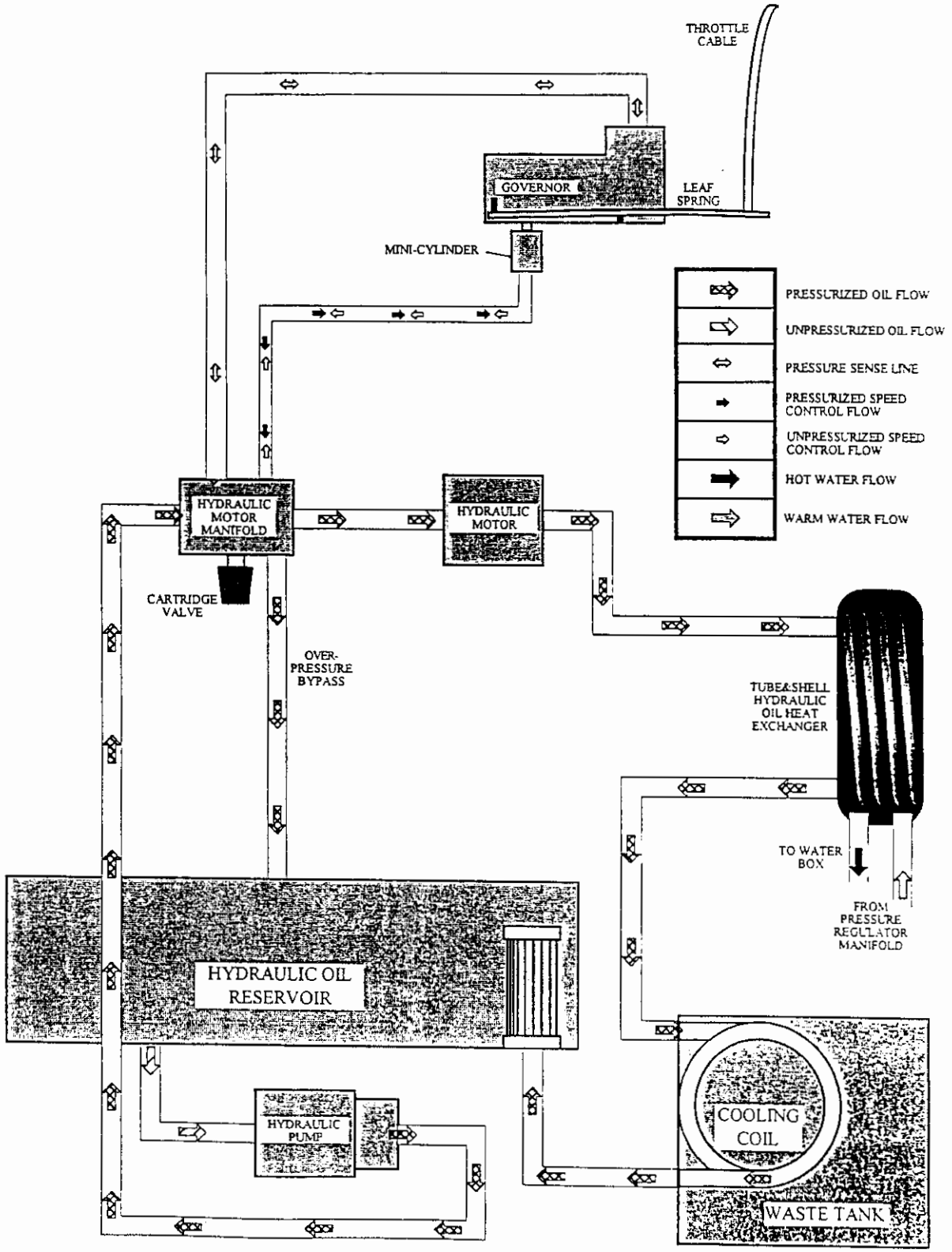


Figure 12 HYDRAULIC SYSTEM



The pressurized hydraulic oil flows from the hydraulic motor manifold to the hydraulic motor, which drives the vacuum and water pumps. The hydraulic oil next flows through a tube and shell heat exchanger, a cooling coil in the waste tank, and then is filtered before returning to the hydraulic oil reservoir.

The cooling coil in the waste tank uses vacuum airflow to remove heat from the hydraulic oil before the oil is returned to the hydraulic oil reservoir.

The PROCHEM hydraulic governor unit, when properly adjusted, will automatically maintain engine speed to compensate for increased demand in vacuum and pressure requirements.

This compensation is achieved through a series of pivot points and a hydraulic piston. This piston places pressure on a series of leaf springs that work against a fulcrum screw.

SPRING TENSION: this is adjusted using the sensitivity screw. By turning the screw in, this adds more tension to the leaf spring causing the hydraulic pressure-sensing piston to work harder and have less effect on the spring, which is attached to the throttle cable. Too little pressure applied to the sensitivity screw will allow the piston to extend all the way out and have no effect on the spring. The amount of pressure applied on the leaf spring by the sensitivity screw needs to balance out the pressure exerted by the piston to make the throttle respond properly.

SPRING TRAVEL: this is adjusted with the over travel screw. This will limit the distance the leaf spring can deflect when pressure is applied by the piston. This screw will in effect stop the rise in the throttle. Since engine RPM is in direct relation to hydraulic flow and pressure, this will stop an over rev over pressure situation.

When the unit is under load during idle, low, or high speed, the hydraulic oil pressure tends to increase. The increased oil pressure will bend the governor's leaf spring and position the throttle cable to increase engine speed and meet the increased load.

The indicating lamp mounted on the face of the hydraulic oil reservoir shows when the hydraulic system has reached 200°F. When the hydraulic oil temperature reaches 200°F, power is removed from the hydraulic pump clutch and the unit shuts down.

The unit may be re-started with a switch on the control panel.

5 OPERATION

This chapter of the operator's manual explains how to prepare, start, operate, shut down, and maintain the Prochem PTO cleaning unit. Operation of the unit is simple. However, only trained personnel should proceed.

CAUTION:

Operate this unit and equipment only in a well-ventilated area. Vehicle exhaust fumes contain carbon monoxide, 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.

1. CHECK FOR ADEQUATE FUEL

Check the vehicle fuel gauge to be certain there is adequate fuel to complete the job. The vehicle uses approximately 1.5 to 2.0 gallons of fuel per hour while operating the unit, depending on operator technique.

2. REMOVE TOOLS FROM VEHICLE

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

3. WATER SUPPLY CONNECTION

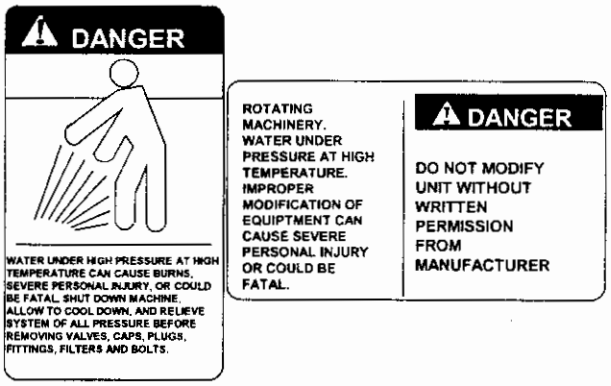
NOTE: **Before** connecting your water hose to the supply faucet, flush out the faucet until the water is free of any debris. Flush out any debris, which may be in your water inlet hose.

1. Connect the **water supply hose** to the **water inlet** quick-connect at the front of the console. Connect the hose to the water supply faucet. Use only clean hoses for water inlet.

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

4. HIGH PRESSURE HOSE

Connect the **pressure hose(s)** to **the solution outlet connection(s)** on the console front panel. Connect the **cleaning tool(s)** to the **pressure hose(s)**.



5. VACUUM HOSE

Connect the **vacuum hose(s)** to the **vacuum inlet connections(s)** at the front of the console. Plug the unused vacuum inlet connection. Connect the other end of the **vacuum hose(s)** to the **cleaning tool(s)**.

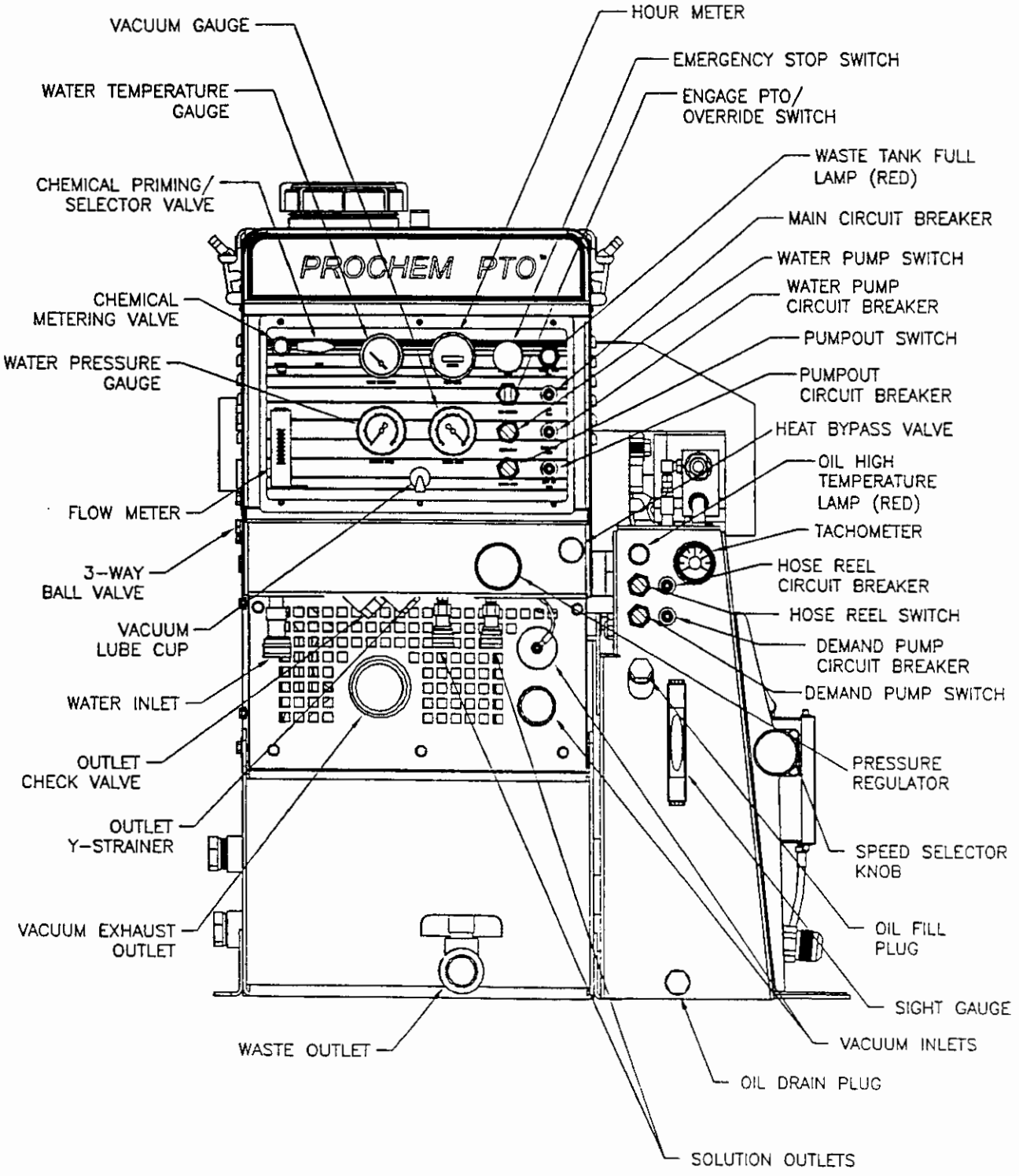
6. JET SIZING

Prochem recommends floor tool tip sizing not exceed a total of ".06". Using larger jet sizes on your PTO cleaning unit may reduce cleaning temperatures.

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

015 x 4 = 06

FIGURE 13 INSTRUMENTATION



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

7. STARTING THE UNIT

1. Allow adequate time for your vehicle to warm up before you start cleaning operations - about 5-10 minutes. Usually your vehicle will warm up just by driving to the job site.

2. Set the **vehicle parking brake**. With the vehicle's engine on, put the **vehicle transmission** in Park. Turn off the vehicle's **air conditioning** system. **NOTE:** If left on, the air conditioning system will make the engine speed and hydraulic pump speed fluctuate.

3. Set the Secure Idle by pressing the red button located on the dash panel to the left of the steering column. Turn the key to the off position and remove key before exiting the drivers position.

4. Set the **PTO speed adjusting knob**, located on the side of the hydraulic oil reservoir, to idle (center position).

5. Turn the **engage PTO switch**, located on the control panel, to the right (ON). The hydraulic pump clutch will engage and power the unit.

CAUTION:

DO NOT press the vehicle accelerator pedal when the PTO is engaged. An over speed condition may result, causing damage to the water and/or vacuum pumps and voiding the warranty.

6. Turn the **water pump switch** to the right to engage the water pump clutch and power the water pump.

CAUTION:

DO NOT operate this cleaning unit without constant water flowing into the console. Damage to the water pump may result.

7. Open (handle pointing up) the **3-way valve** located on the left side of the console near the vacuum exhaust heat exchangers. This allows water to flow through the vacuum exhaust heat exchangers for maximum heat.

8. 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 pulsations 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 chemical inlet tube. **DO NOT** operate the chemical pump without the chemical 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, returning to the chemical container through the chemical prime tube.

If the chemical does not flow, then:

a) Put the **chemical prime tube** into one of the **vacuum inlets** on the front of the console and seal off the vacuum inlets. 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 ON (CHEMICAL). With the **cleaning tool valve** 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 above the flow meter).

9. WASTE PUMP

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

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

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

NEVER start pump with end of hose capped.

WARNING!

NEVER dispose of waste in storm drains, waterways, or on ground areas. Always dispose of waste in accordance with local, state, and federal laws.

10. OPERATION

1. Once you have completed steps 1 through 4, proceed with the cleaning operation. Your unit should be at HIGH speed (**PTO speed adjusting knob** turned to the right or lower position) when cleaning or extracting.

2. A **float switch** located inside the waste tank will automatically shut down the cleaning unit and illuminate the **waste tank full lamp** (on the control panel) when it reaches its full capacity. When this occurs, empty the waste tank before continuing.

3. The cleaning unit will automatically shut down and illuminate the **oil high temperature lamp** when the hydraulic oil reaches 200°F. The cleaning unit can be re-started by turning the **engage PTO switch** to the left (momentarily).

4. If the cleaning unit is operated with the hydraulic oil temperature at 200°F, the operator must circulate water through the cleaning unit to moderate the oil temperature. Open the **heat bypass valve** to let cool water flow into the water box. Open the **tool valve** without loading the vacuum pump to let water flow through the system.

11. CLEANING

Observe the following guidelines while cleaning:

1. Before proceeding, make sure the cleaning tool nozzles are working properly.

a) To check, hold the wand about one foot above the surface to be cleaned and open the wand valve. A full spray pattern should be observed from the cleaning tool nozzles.

b) If any nozzle is not showing a full spray pattern, adjust nozzle for proper pattern, clean, or replace nozzle, as 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 pushes 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 tool moving when the tool valve is open.

4. The unit will automatically shut down when the waste tank is full. This will prevent water from being drawn into the vacuum pump. If the unit shuts down automatically, empty the waste tank before proceeding.

WARNING!

DO NOT dispose of waste in any manner, which, in so doing, would violate any Local, State, or Federal law.

12. UPHOLSTERY CLEANING

Upholstery Tool Part #60-950422

1. Since the upholstery tool has a lower flow rate and a smaller orifice than a wand, you may want to reduce heat in the water pumping system. You may reduce heat by closing the **3-way valve** (handle pointed horizontal) on the left side of the console to bypass the vacuum exhaust heat exchangers.

2. To further reduce heat, open the **heat bypass valve** located below the control panel.

3. Use one "80015" spray tip in the tool.

4. Pressure adjustment below 300 psi can be made at the upholstery tool by using the adjusting knob located on the valve.

13. STAIR TOOL CLEANING

Stair Tool, Long, Part #60-950421
Stair Tool, Short, Part #60-950450

1. Since stair tools have a lower flow rate and smaller orifices than a wand, you may want to reduce heat in the water pumping system. You may reduce heat by closing the **3-way valve** (handle pointed horizontal) on the left side of the console to bypass the vacuum exhaust heat exchangers.

2. To further reduce heat, open the **heat bypass valve** located below the control panel.

3. Use one "9502" spray tip in either tool.

14. FLOOD RESTORATION

1. During flood restoration, turn the **water pump switch** OFF. This will prevent the water pump from running dry and possibly being damaged.

2. The cleaning unit will automatically shut down and illuminate the oil high temperature lamp when the hydraulic oil reaches 200°F. The cleaning unit can be re-started by turning the **engage PTO switch** to the left (momentarily).

3. If the cleaning unit is operated with the hydraulic oil temperature at 200°F, the operator must circulate water through the cleaning unit to moderate the hydraulic oil temperature. Turn the **water pump switch** ON. Open the **heat bypass valve** to let cool water flow into the water box. Open the **tool valve** without loading the vacuum pump to let water flow through the system.

15. SHUT-DOWN 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. Turn the **PTO speed adjusting knob** to the left or LOW speed position.

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

5. Open the **heat bypass valve** two (2) turns and allow the unit to cool down for approximately **2 minutes**, and then close the **heat bypass valve** completely. Do not over-tighten the heat bypass valve.

6. Turn the **PTO speed adjusting knob** to the middle or IDLE speed position and allow the cleaning unit to run at idle speed **for 1 minute** in order to remove all moisture from the **vacuum pump**.

7. Turn the **engage PTO switch** to the center position (OFF).

8. Turn the **water supply faucet** off. Bleed the pressure out of the **water supply hose** by loosening the hose at the water supply. Un-hook 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 cleaning unit and store away all equipment.

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

NOTE: If finishing for the day: After draining the waste tank, turn the **PTO speed adjusting knob** to the upper or HIGH speed position, plug both **vacuum inlets**, and spray WD-40 (or equivalent) into the **vacuum lubrication cup** (located on the control panel) for **5 seconds**. This will lubricate the **vacuum pump**. Turn the **PTO speed adjusting knob** to the middle or IDLE speed position and continue with steps #7 thru #9.

WARNING!

NEVER dispose of waste in storm drains, waterways, 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 section of the filter. Grasping the filter by the screen may collapse or ruin the filter. Re-install the filter. **NEVER operate the cleaning unit with the filter removed, damaged, or improperly installed.**

NOTE: When replacing the filter, we recommend using only stainless steel filter, Part **#14-806569**.

12. At the end of your workday, 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, vans interior, etc., as needed. Inspect all equipment for any damage, wear, leaks, etc.

16. EMERGENCY SHUT-DOWN

If for any reason the operator needs to quickly shutdown the cleaning unit, press the red emergency shutdown switch on the console. This removes power from the vehicle's hydraulic pump clutch, in turn stopping the hydraulic pump driving the unit.

17. 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 and vehicle 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 or completely drained 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. Open the **3-way valve** on the left side of the console to let water flow through the vacuum exhaust heat exchangers.

3. Start your cleaning unit and turn the **water pump switch** ON.

4. Open the tool valve until the water in the water box is exhausted. Turn the **water pump switch** OFF.

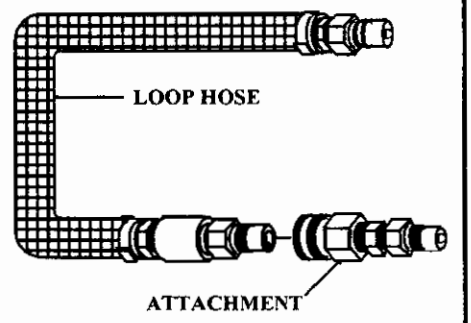
5. Fill the water box with approximately two gallons of 100% glycol base anti-freeze.

6. 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 (Part #10-805380, see **Figure 14**) to the solution outlet connection and the water inlet connection. Close the **3-way valve** on the left side of the console to bypass the vacuum exhaust heat exchangers. Turn the **water pump switch** ON. Allow the unit to run for approximately 3 minutes with the winterizing loop hose attached.

Figure 14 WINTERIZING HOSE ASSEMBLY



9. Prime the **chemical system** with 100 percent of anti-freeze. Insert the chemical inlet and prime tubes into the anti-freeze container. Turn the **chemical selector valve** to PRIME until anti-freeze begins to flow out of the chemical prime hose.

Now turn the **chemical selector valve** to the ON (CHEMICAL) position, making certain that the flow meter indicates a flow. Make certain that all anti-freeze drains out of the chemical hose into an approved container. After about 20 seconds, turn the **chemical selector valve** to the OFF position.

10. Open the **heat bypass valve** by turning the knob counter-clockwise. After about 10 seconds, close the **heat bypass valve**. Do not over-tighten the valve.

11. After completing these procedures, shut the cleaning unit down. The unit is now "winterized".

REMOVING THE ANTI-FREEZE FROM YOUR 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 storage container.

2. Start the cleaning unit. Turn the **water pump switch** ON. Allow anti-freeze to flow into the storage container until the supply in the water box is exhausted. Turn the **water pump switch** OFF.

3. Fill the water box with fresh water and repeat step #2 as necessary until anti-freeze is completely removed from the system. Do this with the **3-way valve** both open and closed.

4. Connect the **water inlet hose** to the water inlet connection on the console. Turn the water supply on.

5. Connect all **pressure hoses and any tools,** which require purging of anti-freeze to the solution outlet connection(s).

6. Turn the **water pump switch** ON. Open the tool valves and drain the anti-freeze into an approved container until anti-freeze is purged from the tools and hoses and the flow is clear.

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

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

9. Open the **heat bypass valve** by turning the knob counter-clockwise. After about 10 seconds, close the **heat bypass valve**. Do not over-tighten the valve.

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

Eventually, the anti-freeze in the storage container will become diluted with water. If the anti-freeze 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. We recommend that you recycle. Do not drain used anti-freeze onto the ground or into storm drainage systems.

SECTION 4: MAINTENANCE & SERVICE

MAINTENANCE CHART

Hydraulic Oil Reservoir	daily	Check oil level. Fill to proper level.
Vacuum Pump	daily	Spray WD-40 in lubrication cup at front of console for 5 sec.******
Water Pump	daily	Check oil level. * Fill to proper level.
Vacuum Inlet Filter (in waste tank)	daily**	Clean filter, inspect, replace if damaged.
Vacuum Hoses	daily	Wash out with clean water.
Waste Tank Strainer Basket	daily**	Remove and clean.
(Optional) Automatic Waste Pump	daily**	Inspect and remove any debris or sediment.

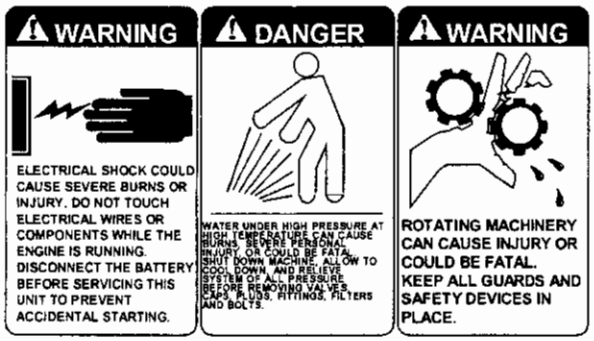
Vacuum Pump	weekly**	Check oil level. Fill to proper level.
Water Pump Inlet Filter (in water box)	weekly**	Check for debris and clean.
Solution Outlet Y-Strainer	monthly***	Inspect and remove any debris or blockage.
High Pressure Hoses	25**	Inspect for damage or impending damage.
Pressure Regulator	500	Lubricate o-rings.
Hydraulic Pump Drive Belts	500	Inspect and clean. ****
Heat Bypass and Chemical Valves	500**	Inspect and/or adjust packing nuts.
Hydraulic Oil Reservoir Filter	1000**	Inspect and clean.
Vacuum Exhaust Heat Exchanger	500	Inspect cores and remove debris.
Water Pump	500	Change oil. *
Vacuum Pump	500	Lubricate bearing on pulley end with grease.
Pulley Set Screws & Hub Cap Screws	500	Check for proper torque values. Re-torque, if required. ****
Drive Pulleys	500	Inspect, clean, and check for pulley groove wear. ****
Drive Pulleys	500	Check pulley alignment. ****
Water Pump Drive Belt	500	Inspect and clean. ****
Water Pump Drive Belt	500	Check belt tension. ****
Chemical Pump & Check Valves	1000	Replace diaphragm and check valves.
Check Valve (Solution Outlet)	1000	Inspect, clean, and repair, if needed.
Vacuum Pump	1500	Drain, flush, and replace oil. *****
Nitrogen Accumulator	yearly**	Check and have re-charged with nitrogen, if required.
Vacuum Inlet Filter	yearly**	Replace.

* Change water pump crankcase oil after the **first 50 hours** of operation.
** Or as often as required.
*** Inspect the Y-strainer after the first, second, and fourth week of operations.
**** Perform drive belt, pulley, & 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**.
****** **AFTER** waste tank is emptied.

6 MAINTENANCE

This chapter of the operator's manual contains the maintenance information for this unit.

Initiation of a planned preventative maintenance program will assure that your Prochem PTO cleaning unit has optimal 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.

1. HYDRAULIC SYSTEM

1. Check the hydraulic oil level **daily**, when in use. The level should be approximately ½" below the top of the sight gauge when the vehicle is on level ground. Add ISO 68 oil to maintain proper hydraulic oil level. Changing the hydraulic oil is not necessary unless it has become contaminated.

2. Any drop in hydraulic oil level should be taken as an indication of a leak. Investigate all hydraulic oil leaks and repair immediately.

3. Inspect the hydraulic oil reservoir filter every **200 hours** and clean as necessary.

4. Check hydraulic pump belt tension, wear, and alignment after the **first 25 hours** and then every **100 hours**.

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 belts for excessive wear. If they have a slick, glazed look, belts are slipping. Check belt tension.

Place a straightedge across the top of belts. There should be no more than 1/2" deflection in the center of the belts, halfway between the pulleys. If there is too much slack, tighten belts, making sure they stay properly aligned. See the "General Service Adjustments" section in this manual for details.

Check alignment with straightedge, string, or machinist level. Correct alignment to as near perfect as possible.

2. VACUUM PUMP

Refer to 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.

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 viscosities listed on the Vacuum Pump Lubricant chart that follows.

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.

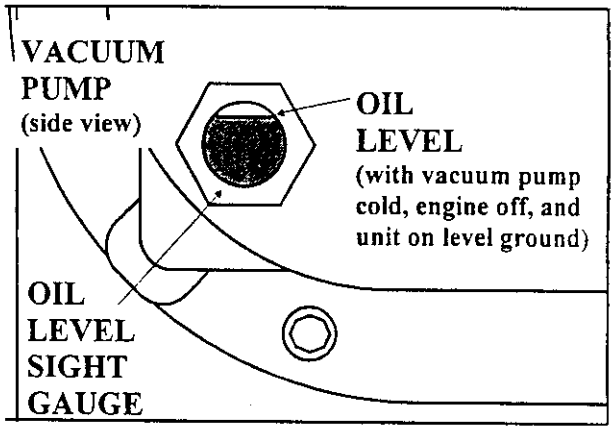
For Grease Lubricated Bearings
Service every 500 hours of operation

Blower Discharge Temperature	Type Grease
-40° to 275° F (-40° to 120° C)	No. 2 Non-Corrosive Bearing Grease

1. Check the oil level **weekly** to assure the proper level. With the vacuum pump cold, the vehicle engine off, and the unit on level ground, the oil level should be slightly below the top of the oil level sight gauge. Use **Figure 15** as a guide when adding oil. Proper level cannot be overemphasized. Too little oil will ruin bearings and gears. Too much oil will cause overheating.

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, plug both vacuum inlets. Then fill the lubrication cup with WD-40 or a similar lubricant for 5 seconds while the unit is running.

Figure 15 VACUUM PUMP OIL LEVEL



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 required. With AEON PD synthetic lubricant, perform the oil change maintenance every **4500 hours or every 2 years, whichever comes first.**

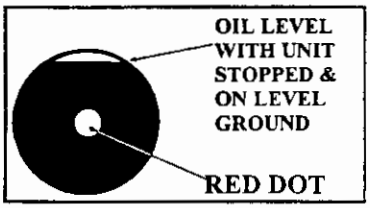
4. The bearings on the pulley end of the vacuum pump require grease lubrication **every 500 hours**. Re-pack the bearings until grease comes out of the vent holes. Use high temperature lithium grease of the specification NLGI Grade 2.

3. 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. With the unit stopped and on level ground, the oil level should be slightly below the top of the oil sight glass. Use **Figure 16** as a guide when adding oil. If the level has dropped, check for the source of leakage and repair.

Figure 16 SIGHT GLASS ON WATER PUMP CRANKCASE COVER



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.

4. VACUUM INLET FILTER (IN WASTE TANK)

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. Re-install the filter.

CAUTION:

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

Replace this filter at least **once a year**.

NOTE: When replacing the filter, we recommend using the stainless steel filter, Part #14-806569.

5. DRIVE BELT, PULLEYS, & HUBS

1. Check pulley set screws and/or hub (bushing) screws after the **first 25 hours** and then again at **100 hours**. Check pulley set screws and/or hub (bushing) screws every **500 hours** thereafter.

Re-torque these screws with a torque wrench, using 16 foot-pounds (192 inch-pounds).

WARNING!

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

2. Check for pulley groove wear, clean belt and pulley grooves, check for worn belt, proper belt tension, and pulley alignment after the **first 25 hours**, after the **first 100 hours**, and then every **500 hours** thereafter.

Check for belt ride in the groove. Check groove areas for wear. Sidewall of groove should be straight, not dished out. Bottom of groove should show no signs of belt contact.

Inspect belt for contaminants, such as oil or grease. Wipe belt 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, belt is slipping. Check belt tension.

Place a straightedge 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 "General Service Adjustments" section in this manual for details.

Check alignment with straightedge, string, or machinist level. Correct alignment to as near perfect as possible.

6. 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 depth in the water box should be about 5-1/2" to 6".

7. INLET FILTER (TO WATER PUMP)

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

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

8. 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.

9. Y-STRAINER (OUTLET)

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

10. 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.

11. CHECK VALVE (OUTLET)

Inspect the check valve every **1000 hours**, when rebuilding the chemical pump, or as needed. Remove and disassemble the check valve. Check the seat for debris or abnormal wear. Clean or replace seat if needed.

NOTE: Improper seating of the check valve poppet, or 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.

12. 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.

13. NITROGEN ACCUMULATOR

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

WARNING!

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

14. PRESSURE REGULATOR

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

15. 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**.

16. VACUUM EXHAUST HEAT EXCHANGER

Removing and cleaning the vacuum exhaust heat exchanger 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 submerging the core and moving it back and forth until the debris loosens and falls off or by spraying the debris out of the core. Allow the core to dry before reinstalling. Inspect for debris **every 200 hours**.

17. HIGH PRESSURE HOSES

Inspect your high pressure water and hydraulic hoses for wear **every 25 hours**. 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 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. Injury may result if the hoses do not meet these requirements.

18. WASTE PUMP

At the end of each work day, make certain that you remove any debris or sediment which may be inside the waste pump. After the waste tank has been emptied, partially fill the waste tank with fresh water. Drain the fresh water with the waste pump to remove sediment from the waste pump.

7 GENERAL SERVICE ADJUSTMENTS

WARNING!

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

1. VACUUM RELIEF VALVE

1. While the cleaning unit is running at full speed, block the airflow at both vacuum inlets and read the vacuum gauge.

2. If adjustment is required shut the cleaning unit down. Adjust the vacuum relief valve spring tension by moving the position of the two locking nuts on the vacuum relief valve stem. Moving the locking nuts away from the end of the vacuum relief valve stem will increase the spring tension, and increase the vacuum gauge reading when the relief valve opens.

3. Start your cleaning unit and read the vacuum gauge. Repeat this process until the relief valve opens at 13" Hg.

2. WATER PUMP DRIVE BELT

To tighten the water pump belt:

1. Loosen the nuts holding the water pump-mounting bracket to the unit console.

2. Turn the pump adjusting screw until the proper belt tension is achieved (1/2" deflection in the center of the belt halfway between the pulleys). A clockwise rotation of the pump adjusting screw moves the water pump away from the vacuum pump and increases belt tension.

3. While checking the alignment of the belt, tighten the nuts, which hold the water pump-mounting bracket to the unit console.

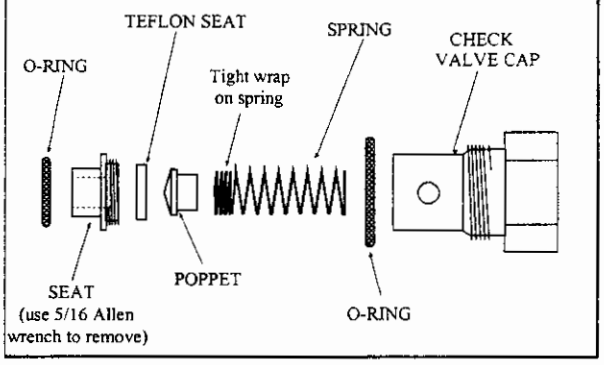
3. HYDRAULIC PUMP DRIVE BELTS

Belt tension is achieved through automatic tensioners and should not need adjustment.

4. CHECK VALVE (SOLUTION OUTLET)

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

Figure 17 CHECK VALVE DETAIL



1. Remove the check valve from the pressure regulator manifold assembly. Be sure the small o-ring for the check valve seat comes out with the check valve. See **Figure 17**.

2. Remove the seat, using a 5/16" hex Allen wrench.

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

4. Clean the poppet and spring. Inspect for wear or damage, and replace if needed.

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

NOTE: Improper seating of the check valve poppet, or 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 re-install.

5. CHEMICAL PUMP

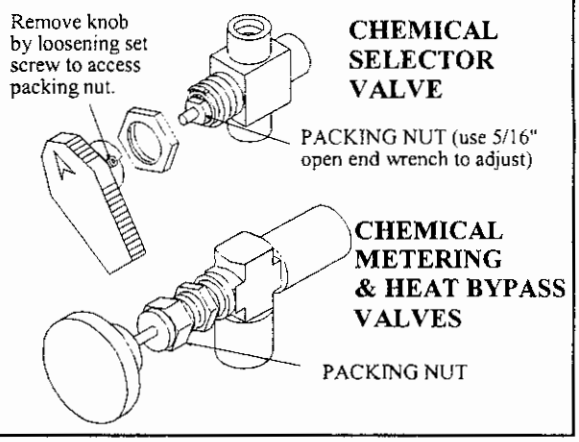
The only repairs, which the chemical pump may require, are the replacement of the diaphragm or check valves. To replace the diaphragm, unscrew the cover from the chemical pump body. When replacing the diaphragm, lubricate the outer edges of the diaphragm with o-ring lubricant, Part #05-008035, and re-assemble.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

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

See **Figure 18**. Examine the packing nut on the 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 packing properly adjusted will eliminate possible leakage from the valve stems and add to valve lifetime.

Figure 18 PACKING NUTS



7. PRESSURE REGULATOR

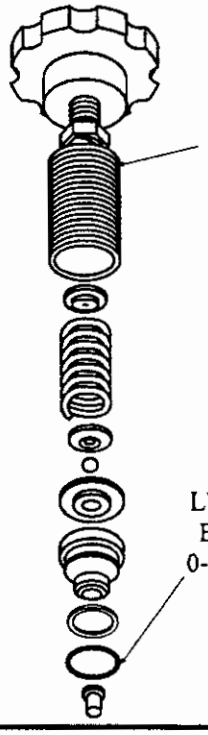
The pressure regulator serves only to hold locked-up water pressure at a preset point and to bypass this water back to the water box. Adjust as follows:

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

When the cleaning tool valve is open, there is a pressure drop of approximately 100-PSI compared to when the cleaning tool valve is closed. If there is a pressure drop of greater than 100 PSI, it may be necessary to lubricate the o-rings in the pressure regulator. Use o-ring lubricant Part #05-008035. See **Figure 19**.

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 reached. Turning the adjusting knob clockwise increases the pressure.

Figure 19 PRESSURE REG. DETAIL



WHEN LUBRICATING, USE A 1/2" OPEN END WRENCH TO REMOVE THE PRESSURE REGULATOR BODY FROM THE PRESSURE REGULATOR MANIFOLD. THEN USE A TELESCOPIC MAGNET TO REMOVE THE PRESSURE REGULATOR COMPONENTS AND EXPOSE THE O-RING.

LUBRICATE THIS O-RING EVERY 50 HOURS WITH O-RING LUBRICANT PART #05-008035

8. 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 breakdown.

8 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 fix malfunctions, which may occur.

Intelligent, accurate troubleshooting is based on a complete and thorough understanding of the WATER, VACUUM, CHEMICAL, HEAT TRANSFER, HYDRAULIC, 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. To check if 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 approximately 3.6 GPM with the heat bypass valve closed.

SPECIFIC PROBLEMS

1. LOSS OF WATER PUMP PRESSURE

With the cleaning tool open, the water pressure gauge reads below the normal operating pressure.

PROBABLE CAUSES	CORRECTIVE ACTION
Water supply is turned off or the float valve is stuck.	Turn the water supply on or up. Check for kinks in the water supply hose. Examine the float valve and adjust or replace.
Water inlet supply line is plugged or drawing air.	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).
Pressure regulator o-ring is dry.	Lubricate o-ring. using o-ring lubricant #05-008035.
Pressure regulator has worn o-ring.	Check o-ring. If necessary, replace.
Pressure regulator is dirty, stuck open, or improperly adjusted.	Clean or repair the pressure regulator. Adjust to working pressure. Lubricate o-ring, using o-ring lubricant #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 the wrong size	Replace nozzle or change nozzle size.
Debris clogging water lines, vacuum exhaust heat exchangers, or water inlet disconnect.	Clean or replace as needed.
Belt loose or broken.	Re-tension or replace as needed.

2. LOSS OF SOLUTION VOLUME AT CLEANING TOOL ORIFICE

Water pressure gauge reads normal.

PROBABLE CAUSES	CORRECTIVE ACTION
Plugged orifice and/or screen in the cleaning tool.	Unplug or replace orifice and/or screen.
Internal block between the pump outlet and the Y-strainer or the Y-strainer screen is clogged.	Inspect all lines, remove accumulated debris which is blocking proper flow. Replace any defective hoses. Remove, inspect, and clean the Y-strainer screen. Install a water softener, if necessary.
Outlet check valve is plugged.	Examine the check valve, remove any debris.
Defective quick-connect on one of more of the high pressure hoses.	Replace defective quick-connect(s) on high pressure hose(s).
Cleaning tool valve is malfunctioning.	Repair or replace valve.
Hose inner lining is constricted.	Remove restriction or replace hose.

3. LOSS OF VACUUM

While cleaning, the vacuum is not up to par. Engine RPM is normal.

PROBABLE CAUSES	CORRECTIVE ACTION
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 the vacuum hose(s). Repair any damage or replace.
Waste tank gasket not sealing properly, not positioned properly.	Inspect the gasket. Repair or replace if required. Re-position lid.
Debris and lint is trapped in vacuum line between cleaning tool & waste tank.	Locate obstruction and remove.
Waste tank filter or strainer basket is plugged.	Clean or replace filter. Clean strainer basket.
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 if required.
Vacuum relief requires adjustment or has a vacuum leak due to damaged gasket.	Re-adjust the vacuum relief valve. If the vacuum does not increase, remove and inspect the relief valve gasket. If damaged, replace.
Vacuum exhaust heat exchangers are plugged with lint.	Remove and clean.
Vacuum pump is worn out.	Replace the vacuum pump.

4. LOSS OF CHEMICAL

With the cleaning tool valve open, no chemical.

PROBABLE CAUSES	CORRECTIVE ACTION
Chemical pump is improperly primed.	Refer to chemical pump priming instructions.
The strainer at the inlet end of the chemical inlet line is clogged.	Unclog the strainer. If damaged, replace.
Suction leak in the inlet line leading into the chemical pump.	Inspect inlet lines and flow meter for damage and replace, if required.
Chemical pump check valve(s) is clogged.	Remove any debris from the chemical check valve(s). Replace chemical check valve(s) or seals, if necessary.
Chemical selector valve or chemical metering valve is defective.	Replace valve(s).
Chemical pump diaphragm is ruptured.	Disassemble the chemical pump and replace the damaged diaphragm.
Defective cylinder in the water pump.	Measure the pump volume. If the pump volume is less than normal, examine the check valves, plunger cups, and cylinder head on water pump. Repair as required.

5. CHEMICAL FLOW METER INDICATES FLOW WITH TOOL VALVE CLOSED

PROBABLE CAUSES	CORRECTIVE ACTION
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 control 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 control panel. If the flow meter still indicates flow, replace the chemical pump diaphragm.
Internal leak in chemical selector 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.

6. WATER PUMP DOES NOT ENGAGE

PROBABLE CAUSES	CORRECTIVE ACTION
Water pump circuit breaker has been tripped.	Check the "water pump" circuit breaker on the control panel. Press the RESET button.
Defective electrical connection in the console wiring or defective switch.	If the 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.
Defective water pump clutch. **NOTE:** The clutch May be MANUALLY set by inserting two ¼-20x1/2" screws. Line up the holes on the clutch and insert the screws. To disengage the pump, remove the screws.	Check the white wire which leads from the switch to the clutch. If there is power in the switch, but no power at the clutch, replace the defective wire. If there is power at the clutch, replace the defective switch.
Belt loose or broken water pump belt.	Re-tension or replace as needed.

7. VEHICLE ENGINE IS RUNNING AND ENGAGE PTO SWITCH IS ON, BUT THE CLEANING UNIT CONSOLE IS NOT POWERED

PROBABLE CAUSES	CORRECTIVE ACTION
Waste tank is full.	Empty the waste tank. Start the vehicle engine.
Loose or broken wires leading to float switch.	Repair or replace any broken electrical connections.
Defective float switch in waste tank.	Disconnect the float switch plugs and bypass the switch. If the unit starts, repair or replace the defective float switch.
Loose or broken belt at hydraulic pump.	Re-tension or replace belt.
Hydraulic oil temperature is 200°F.	Turn Engage PTO switch to left (momentary) to start cleaning unit. Open heat bypass valve and cleaning tool valve to let water flow through system and moderate the temperature.
Loose or broken wires leading to Engage PTO switch.	Repair or replace any broken electrical connections.
Vacuum pump is seized.	Refer to Sutorbilt Service & Repair Manual.
Main circuit breaker on the control panel has tripped.	After inspecting the unit to determine the cause of the Tripped circuit breaker, press the reset button.

8. STARTER TURNS OVER VEHICLE ENGINE, BUT ENGINE WILL NOT START

PROBABLE CAUSES	CORRECTIVE ACTION
Vehicle engine is out of gasoline.	Add gasoline to fuel tank.

9. VEHICLE ENGINE STOPS RUNNING

While doing normal cleaning, the vehicle engine stops running.

PROBABLE CAUSES	CORRECTIVE ACTION
Vehicle engine is out of gasoline.	Add gasoline to fuel tank.

10. LOSS OF TEMPERATURE

The heat output of the unit is LESS than normal

PROBABLE CAUSES	CORRECTIVE ACTION
Vacuum relief valve is set too low.	Reset vacuum relief valve to 13" Hg.
Defective temperature gauge.	Test gauge. If necessary, replace.
Heat bypass valve is left open.	Close heat bypass valve.
Ball valve is closed, or partially closed, bypassing vacuum exhaust heat exchangers.	Open vacuum heat exchanger ball valve.

11. HEAT EXCHANGER LEAKS

PROBABLE CAUSES	CORRECTIVE ACTION
Tube & shell, heli-coil, or vacuum exhaust heat exchanger are damaged from frozen water.	Visually inspect for damage. Pressure check after removing from the cleaning unit. Pressure check to 300 PSI. (vacuum exhaust heat exchanger cores) or 1200 PSI (tube & shell or heli-coil heat exchanger).

12. EXCESSIVE HEATING

PROBABLE CAUSES	CORRECTIVE ACTION
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.
Flow restriction caused by hard water scaling.	Descale unit, repair or replace damaged plumbing components as necessary. Install water softener.

12. EXCESSIVE HEATING

PROBABLE CAUSES	CORRECTIVE ACTION
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.
Flow restriction caused by hard water scaling.	Descale unit, repair or replace damaged plumbing components as necessary. Install water softener.

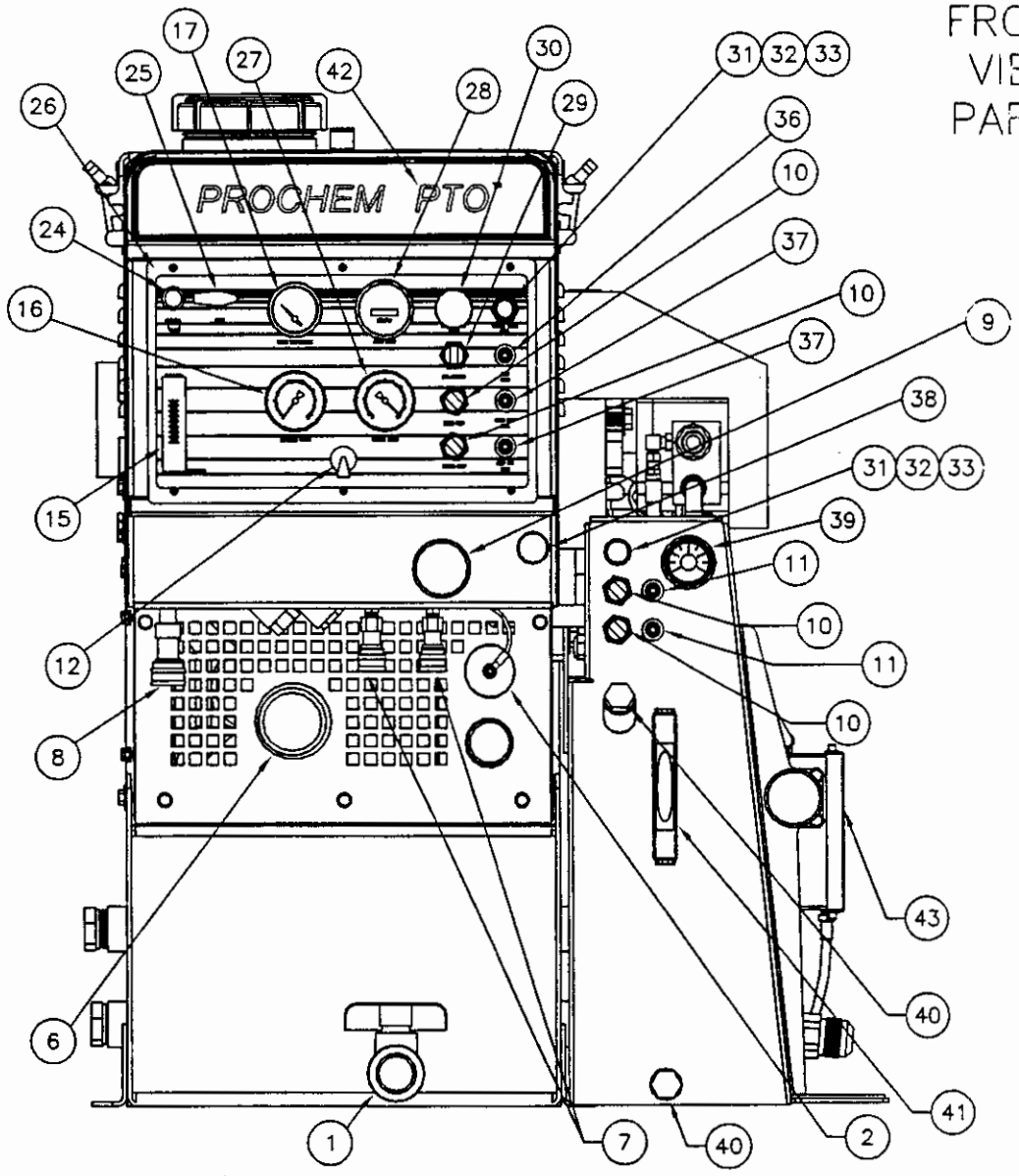
13. AUTOMATIC WASTE PUMP IS MALFUNCTIONING OR NOT OPERATING NORMALLY

(for units equipped with an automatic waste pump)

PROBABLE CAUSES	CORRECTIVE ACTION
Debris interfering in the normal operation of pump, or pump check valve.	Remove obstructions from pump and check valve.
Pump out circuit breaker or switch on the control panel or waste pump has been tripped.	After inspecting the waste pump to determine the cause of the tripped circuit breaker, press the RESET button. Make sure to check for debris in the impeller inside the pump head.
Worn out waste pump.	Check for voltage at the pump. If there is voltage and the pump does not run, replace the pump. **NOTE**: when replacing either the pump or float switch, use new electrical connectors and heat shrink. Inspect connection for water tight seal.
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 the broken connection and repair.

ILLUSTRATION INDEX (in alphabetical order)

FRONT VIEW PARTS

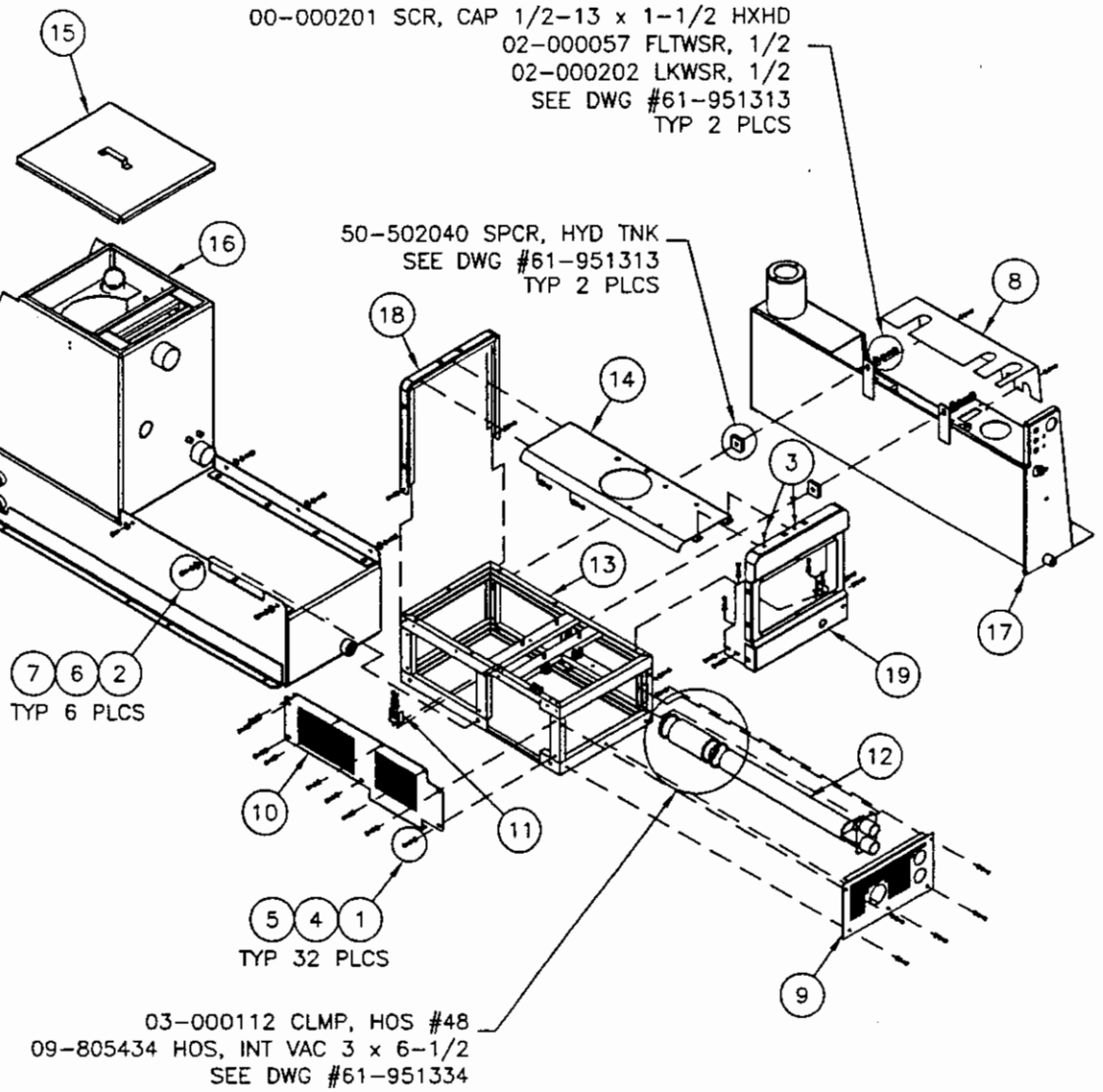


1. 15–808080....VALVE, BALL 1–1/2FP BS PVC
2. 66–945236....KIT, VACUUM INLET PLUG (INCLUDES PARTS 3–5)
3. 52–501679....PLUG, VACUUM INLET
4. 43–810081....O–RING, 1–3/8ID x 1–3/4OD
5. 64–950383....CABLE, RETAINER VACUUM PLUG
6. 61–951337....ASSEMBLY, VACUUM EXHAUST OUTLET
7. 13–806001....DISCONNECT, 1/4F x 1/4FP
8. 13–806008....DISCONNECT, 3/8F x 3/8FP
9. 15–808156....REGULATOR, PRESSURE
10. 32–900205....SWITCH, RETRY NON–ILLUMINATED
11. 33–900236....BREAKER, CIRCUIT 15 AMP SPADE
12. 19–800075....CUP, OIL FILL 1/8P
13. 00–000337....SCREW, 10–32 x 1 SOCHD SST
14. 01–000273....NUT, WELL 10–32
15. 18–808513....FLOW METER, 1/8FP
16. 18–808526....GAUGE, WATER PRESSURE 1500PSI
17. 18–808530....GAUGE, WATER TEMP 320deg
18. 61–951308....SUB–ASSY, LEFT HOOD (INCLUDES PARTS 19, 21–23 & DECAL)
19. 50–502049....HOOD, LEFT
20. 01–000259....RECEPTACLE, SNAP–IN 1/4 TURN FASTENER
21. 00–000272....STUD, 1/4 TURN FASTENER
22. 02–000268....RETAINER, SPLIT RING 1/4 TURN FASTENER
23. 58–700023....PAD, 1/4 TURN FASTENER
24. 15–808106....VALVE, METERING 1/8FP (CHEMICAL)
25. 15–808022....VALVE, BALL 3–WAY 1/8FP
26. 50–502018....PANEL, CONTROL
27. 18–808525....GAUGE, VACUUM 30"Hg
28. 34–903000....HOUR METER, PANEL MOUNT
29. 32–900206....SWITCH, RETRY W/BYPASS
30. 32–900197....SWITCH, EMERGENCY STOP
31. 34–900099....LIGHT, INDICATING (DOME) RED
32. 33–900227....LED, RED IDEC
33. 33–900230....COVER, LENS RED–DOME IDEC
34. 61–951307....SUB–ASSY, RIGHT HOOD (INCLUDES PARTS 35, 21–23 & DECAL)
35. 50–502048....HOOD, RIGHT
36. 33–900161....BREAKER, CIRCUIT 30 AMP
37. 33–900163....BREAKER, CIRCUIT 20 AMP
38. 15–808107....VALVE, METERING 1/8FP (BYPASS)
39. 66–950448....KIT, PTO TACH
40. 11–800499....PLUG, 3/4 HXHD
41. 18–808537....GAUGE, SIGHT & THERMOMETER
42. 48–941368....DECAL, PANEL PTO
43. 61–951367....SUB–ASSY, GOVERNOR

NOT SHOWN:

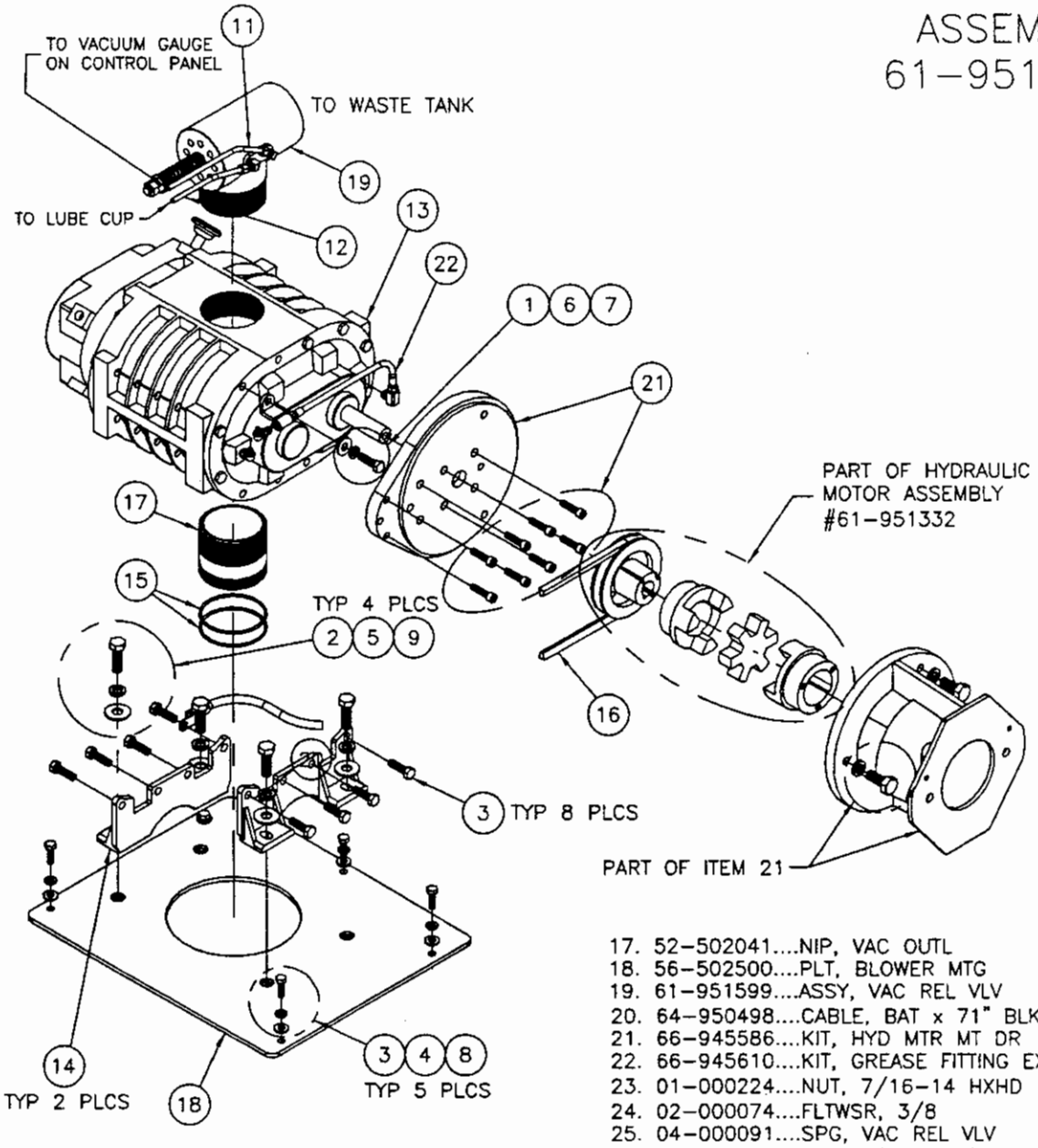
48–941195....DECAL, HOOD PROCHEM
48–941212....SHEET, COMPLETE UNIT DECALS (WARNING AND INSTRUMENTATION)

BASE SUB-ASSEMBLY
61-951335



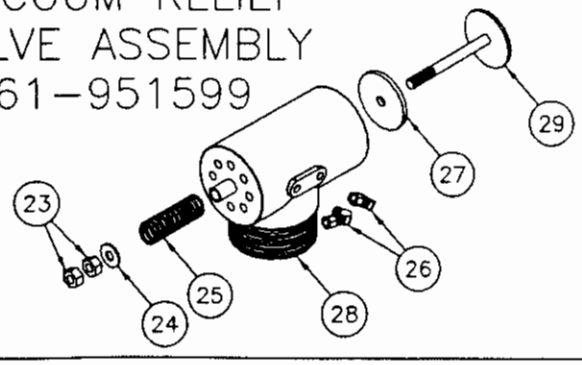
1. 00-000055....SCR, CAP 1/4-20 x 3/4 HXHD
2. 00-000095....SCR, CAP 3/8-16 x 1 HXHD
3. 00-000216....SCR, CAP 1/4-20 x 1/2 FLTSOCHD
4. 02-000038....LKWSR, 1/4
5. 02-000066....FLTWSR, 1/4
6. 02-000074....FLTWSR, 3/8
7. 02-000075....LKWSR, 3/8
8. 50-502020....CVR, HE HYD OIL TNK
9. 50-502046....PNL, FRT CVR
10. 50-502047....PNL, SIDE CVR
11. 50-502050....BRKT, HOOD MTG
12. 56-502197....ASSY, VAC INLET
13. 56-502352....ASSY, LOWER FRAME
14. 56-502355....ASSY, CENTER HOOD PNL
15. 56-502364....LID, WST TNK
16. 56-502365....ASSY, WST TNK
17. 56-502380....TNK, OIL HYD
18. 56-502496....BRKT, REAR HOOD
19. 56-502497....MT, CONTR PNL

VACUUM PUMP ASSEMBLY 61–951612

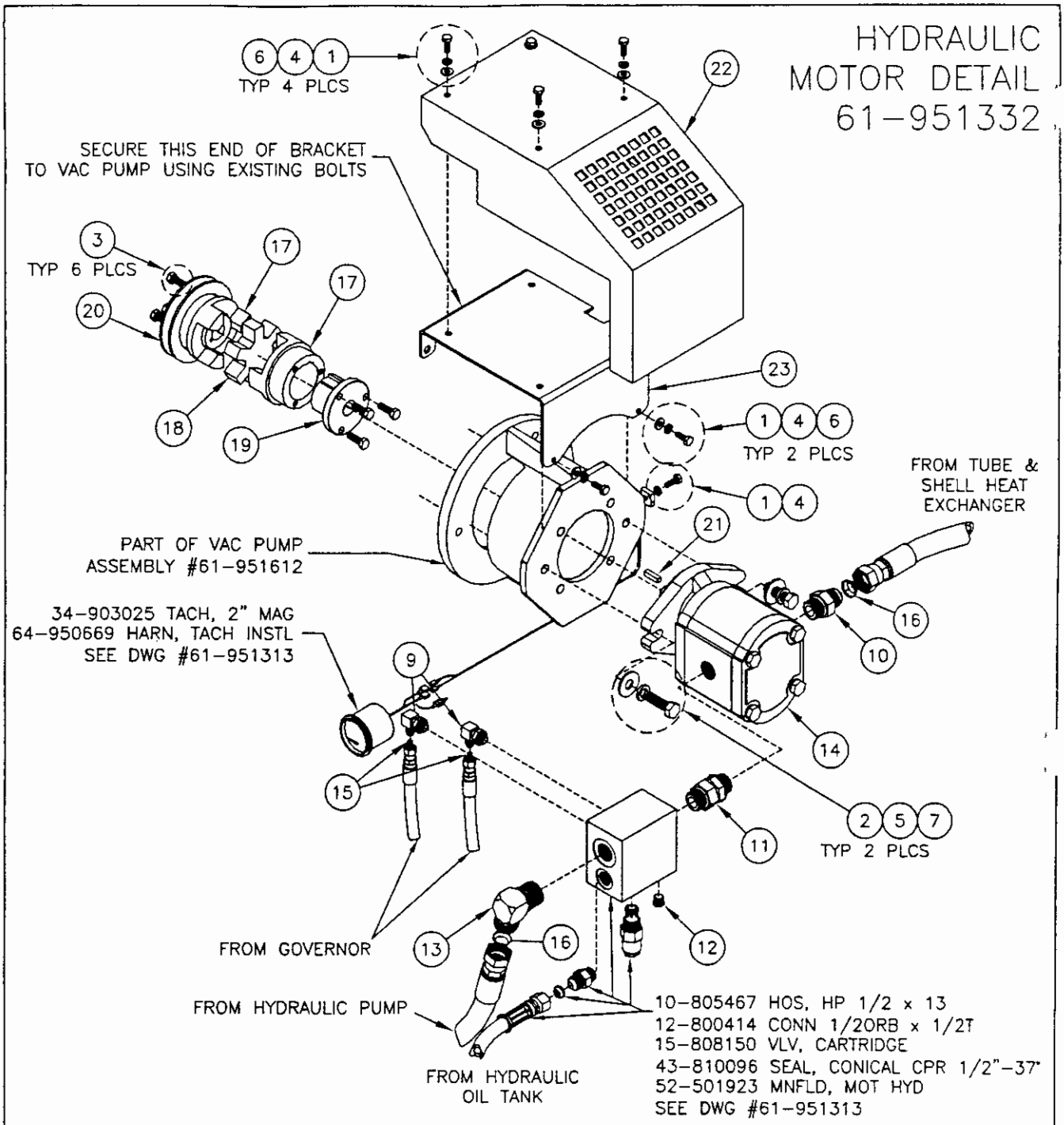


1. 00–000200....SCR, CAP 3/8–16 x 1–1/4 HXHD
2. 00–000201....SCR, CAP 1/2–13 x 1–1/2 HXHD
3. 00–000340....SCR, MACH 5/16–18 x 1 HXHD GRD8
4. 02–000040....LKWSR, 5/16
5. 02–000057....FLTWSR, 1/2 HVY
6. 02–000074....FLTWSR, 3/8
7. 02–000075....LKWSR, 3/8
8. 02–000143....FLTWSR, 5/16
9. 02–000202....LKWSR, 1/2
10. 05–008039....OIL, AEONPD (28G24 SUTORBILT)
11. 09–805549....TBG, IMPOL 1/4 x 30
12. 09–805584....TBG, IMPOL 1/4 x 33
13. 41–905026....PMP, VAC 4LL
14. 42–902452....MT, HORIZ VAC PMP
15. 43–810104....O–RNG, 3–1/4ID x 3–1/20D
16. 44–802237....BELT, AX42 GOODYEAR
17. 52–502041....NIP, VAC OUTL
18. 56–502500....PLT, BLOWER MTG
19. 61–951599....ASSY, VAC REL VLV
20. 64–950498....CABLE, BAT x 71" BLK
21. 66–945586....KIT, HYD MTR MT DR
22. 66–945610....KIT, GREASE FITTING EXT
23. 01–000224....NUT, 7/16–14 HXHD
24. 02–000074....FLTWSR, 3/8
25. 04–000091....SPG, VAC REL VLV
26. 12–800099....ELL, 1/8P x 1/4POLY BR
27. 43–807106....DIAPH, VAC REL VLV
28. 52–502040....ELL, VAC REL VLV
29. 56–501994....STM, VAC REL VLV

VACUUM RELIEF VALVE ASSEMBLY 61–951599

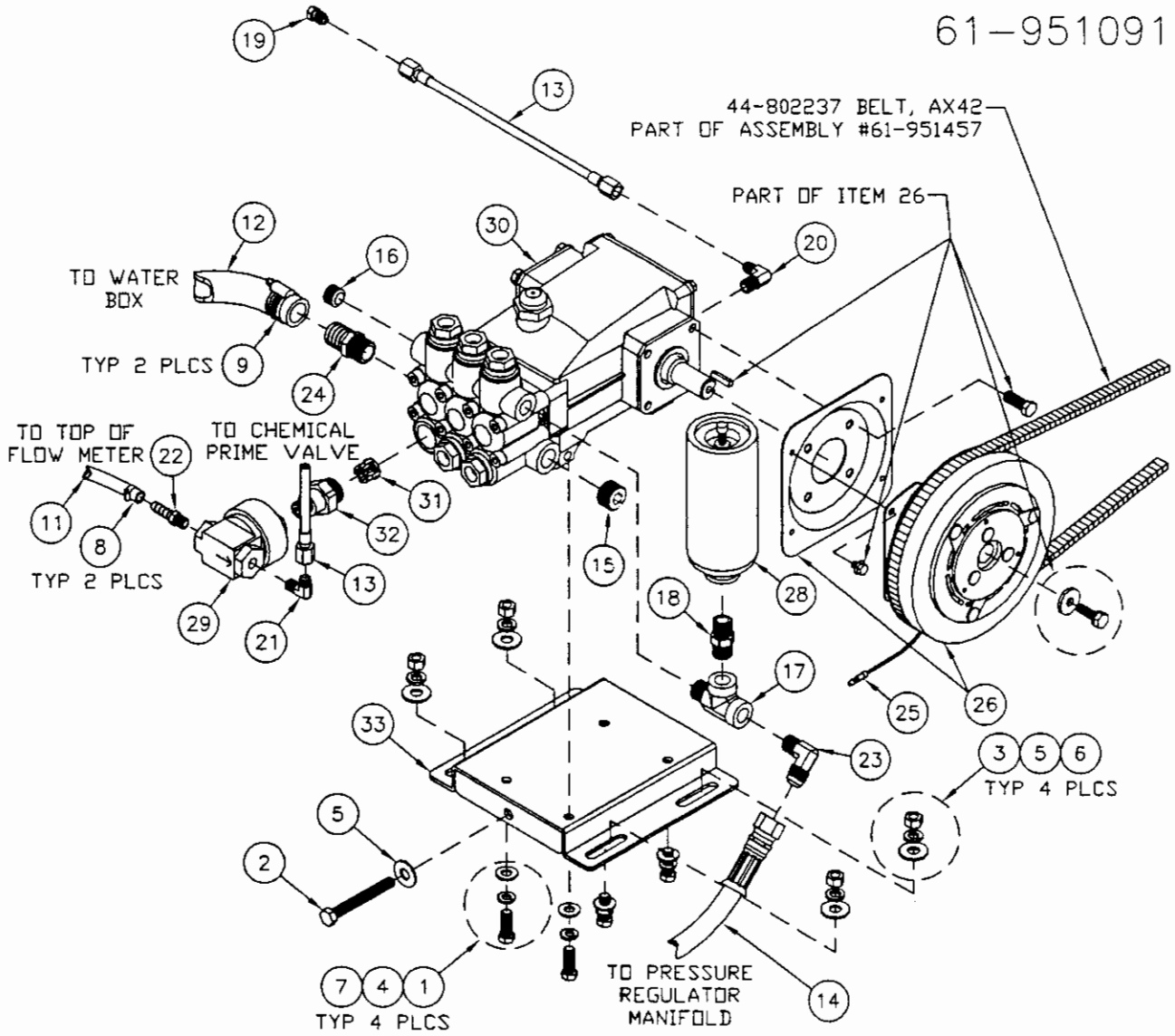


HYDRAULIC MOTOR DETAIL 61-951332



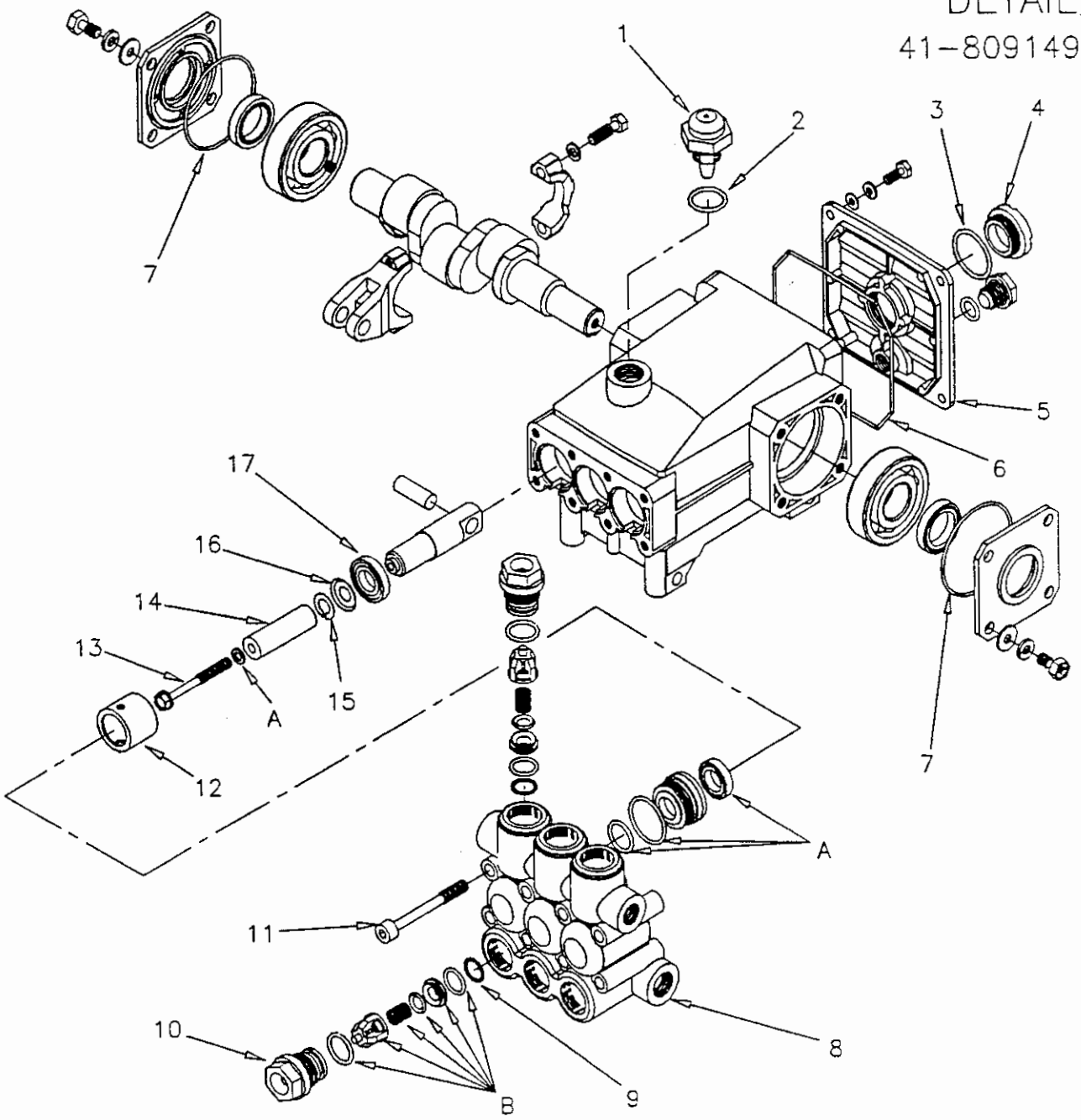
1. 00-000055....SCR, CAP 1/4-20 x 3/4 HXHD
2. 00-000201....SCR, CAP 1/2-13 x 1-1/2 HXHD
3. 00-000340....SCR, MACH 5/16-18 x 1 HXHD GRD8
4. 02-000038....LKWSR, 1/4
5. 02-000057....FLTWSR, 1/2 HVY
6. 02-000066....FLTWSR, 1/4
7. 02-000202....LKWSR, 1/2
8. 07-805247....TBG, HT SHRINK 1/2
9. 12-800406....ELL, 1/4ORB x 1/4T
10. 12-800407....CONN, 1ORB x 3/4T
11. 12-800416....NIP, HEX 3/4ORB ADJUST
12. 12-800418....PLG, 1/4ORB HOLLOW
13. 12-800437....ELL, 3/4 ORB x 12JIC 90°
14. 40-902149....MOT, DRIVE
15. 43-810095....SEAL, CONICAL CPR 1/4"-37°
16. 43-810097....SEAL, CONICAL CPR 3/4"-37°
17. 44-802300....CPLR, CHJS6P
18. 44-802301....INSRT, CPLR JS6U
19. 52-501929....HUB, HYD MOTOR
20. 52-502012....PULL, VAC
21. 54-501765....KYSTK, 1/4 x 1" MTR
22. 56-502336....CVR, HYD MOTOR
23. 56-502448....BRKT, MTR CVR MTG

WATER PUMP ASSEMBLY 61-951091



1. 00-000226....SCR, MACH 8MM x 1.25 x 20MM HXHD
2. 00-000336....SCR, CAP 3/8-16 x 3 ALL THD
3. 01-000073....NUT, 3/8-16 HXHD
4. 02-000040....LKWSR, 5/16
5. 02-000074....FLTWSR, 3/8
6. 02-000075....LKWSR, 3/8
7. 02-000143....FLTWSR, 5/16
8. 03-000065....CLMP, HOS #4 1/4MIN 5/8MAX SST
9. 03-000113....CLMP, HOS #12 11/16MIN 1-1/4MAX
10. 05-008040....OIL, SHELL TELLUS T68
11. 09-805159....HOS, BRD 5/16 x 13-1/2
12. 09-805292....HOS, WTR 3/4 x 12
13. 10-805369....HOS, 3/16 x 12-1/2 (1/4FT BS)
14. 10-805460....HOS, HP 3/8 x 12 (1/2FT BS)
15. 11-800069....PLG, 1/2 SOCHD BR
16. 11-800224....PLG, 3/8 SOCHD BR
17. 11-800362....TEE, 3/8 SERV STL
18. 11-800429....NIP, HX 3/8 STL
19. 12-800029....PLG, 1/4T BR
20. 12-800031....ELL, 1/4P x 1/4T BR
21. 12-800040....ELL, 1/8P x 1/4T BR
22. 12-800093....FTTG, BRB 1/8P x 5/16H BR
23. 12-800225....ELL, 3/8P x 1/2T BR
24. 12-800278....FTTG, BRB 1/2P x 3/4H BR
25. 31-900185....CONN, BULLET M (.156)
26. 36-900141....CLUTCH, ELEC WTR PMP
27. 37-900140....LOOM, 1/4 HIGH TEMP
28. 41-809119....ACCUMULATOR
29. 41-809144....PMP, CHEM TM (O-RING CAP)
30. 41-809149....PMP, WTR CAT 5CP2150W-CS3
31. 52-809123....CAT RETAIN, VLV SPRING
32. 52-809125....ADPT, CAT CHEM PMP
33. 56-502250....BRKT, PMP ADJ

WATER PUMP DETAIL
41–809149

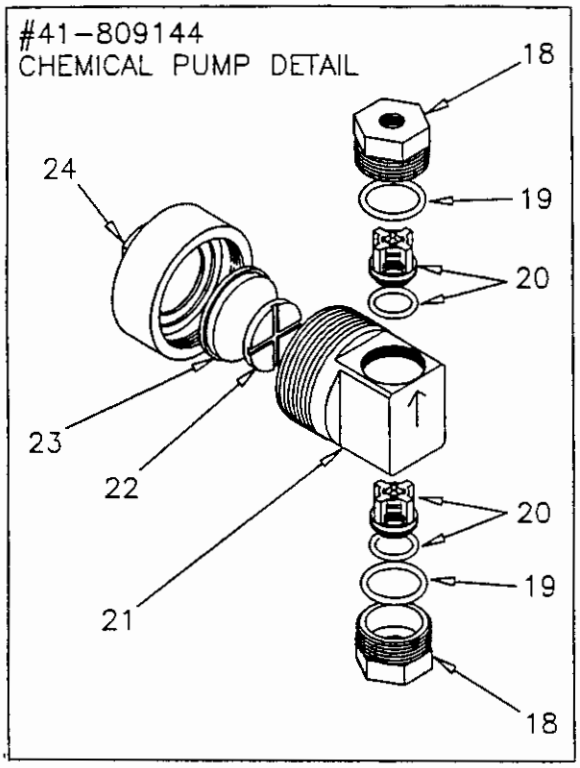


1	42–809393.....CAP, OIL FILLER	12	42–809384.....RETAINER, SEAL
2	42–809239.....O–RING, OIL FILL CAP	13	42–809383.....RETAIN, PLNGR W/STUD
3	43–807063.....GASKET, OIL GAUGE	14	42–809413.....PLUNGER, 5CP2150
4	42–902380.....GAUGE, OIL LEVEL	15	42–809249.....WASHER, KEYHOLE M18
5	42–809392.....COVER, CRANKCASE	16	42–809246.....SLINGER, BARRIER
6	42–809391.....O–RING, CRANK CVR	17	42–809380.....SEAL, OIL CRANKCASE
7	42–809394.....O–RING, BRNG CVR	A	42–809396.....KIT, SEAL (order 1 each to replace all seals)
8	42–809412.....MANIFOLD, HEAD		
9	42–809398.....RING, BACK–UP SEAT	B	66–950440.....KIT, VALVE (order 1 ea. to replace all valves)
10	42–809253.....PLUG, VALVE		
11	42–809385.....BOLT, MNFLD M8x70		

CHEMICAL SYSTEM

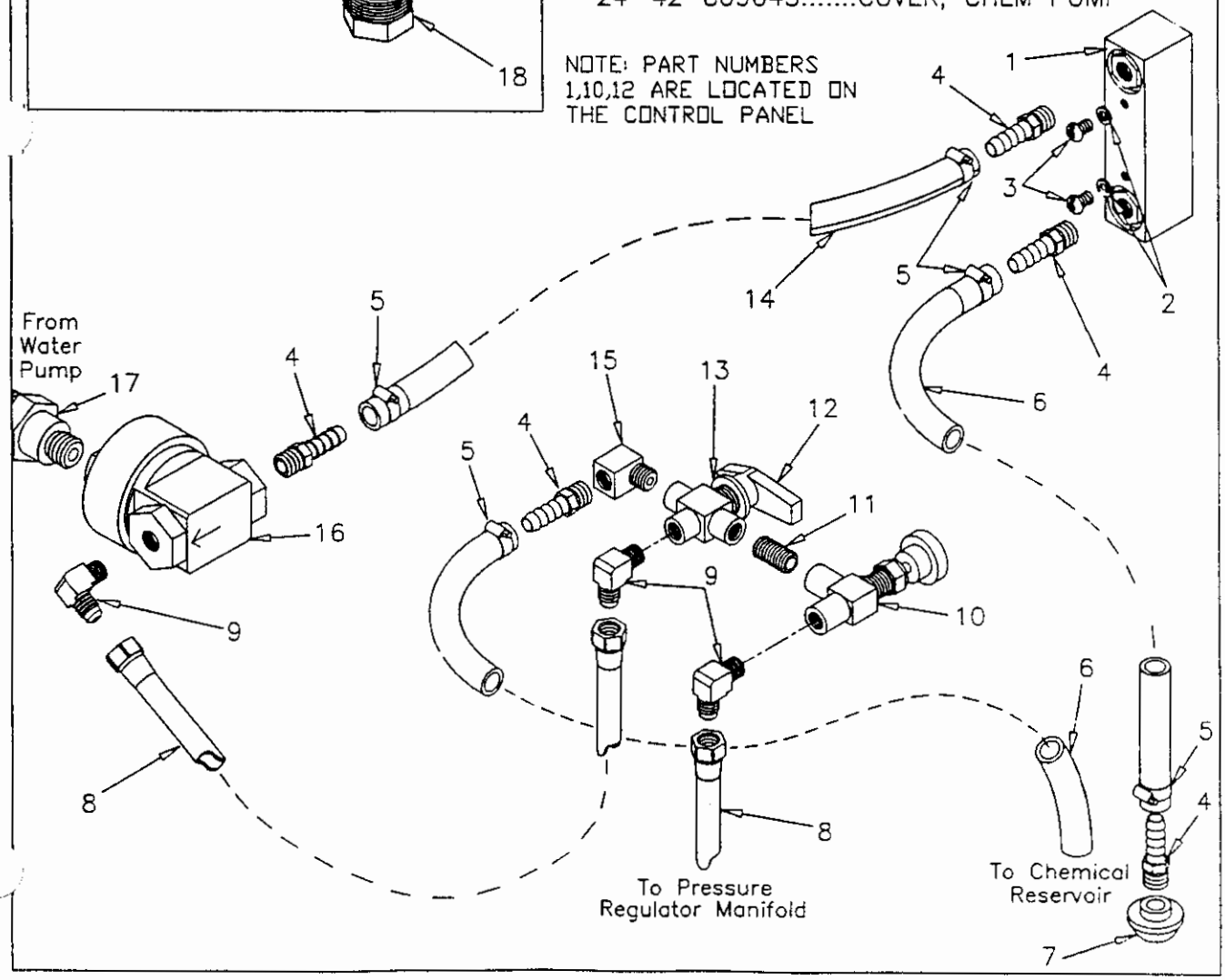
66-500252

#41-809144
CHEMICAL PUMP DETAIL

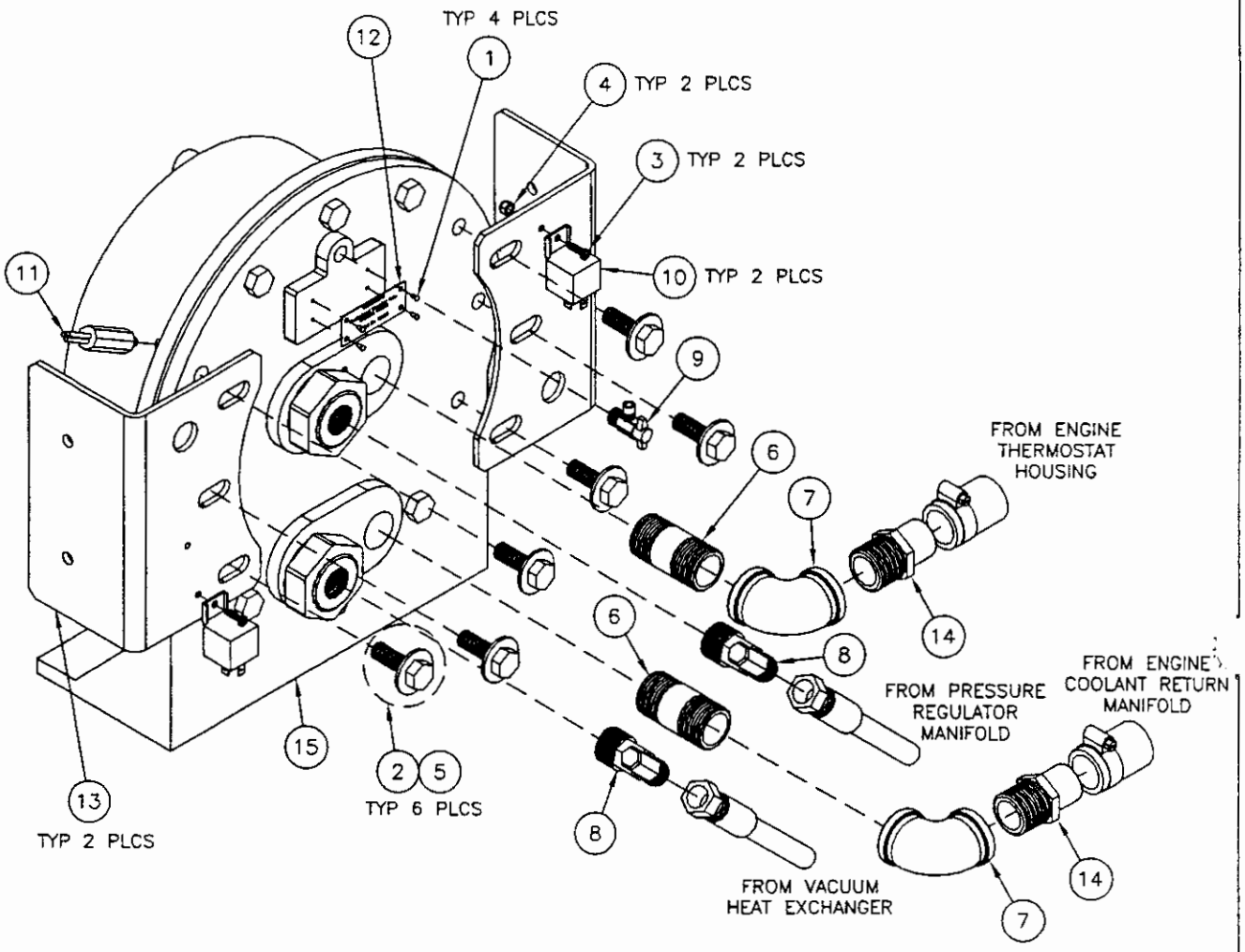


1	18-808513	FLOW METER, 1/8FP
2	02-000032	LOCK WASHER, #10
3	00-000065	SCREW, 10-32x3/8"
4	12-800093	FTTG, BARB 1/8Px5/16H
5	03-000065	CLAMP, HOSE #4
6	09-805555	HOSE, BRAID 5/16x88"
7	14-806506	STRNR, SUC END 1/8FP
8	10-805294	HOSE, 3/16x11-1/2"
9	12-800040	ELL, 1/8Px1/4T
10	15-808106	VALVE, METERING 1/8FP
11	11-800105	NIP, 1/8 CLOSE
12	15-808022	VLV, BALL 3-WAY 1/8FP
13	50-501663	WASHER, SPACER
14	09-805419	HOSE, BRD 5/16x11-1/2"
15	11-800014	ELL, STREET 1/8
16	41-809144	PUMP, CHEMICAL
17	52-809125	ADAPTER, CHEMICAL PUMP
18	16-808237	CAP, CHK VLV CHEM PMP
19	43-810079	O-RING, 7/8IDx1-1/16OD
20	42-809265	CHECK VALVE, CHEM PMP
21	42-809358	BODY, CHEM PUMP
22	42-809264	DISK, CHEM PUMP
23	42-809047	DIAPHRAGM, CHEM PMP
24	42-809045	COVER, CHEM PUMP

NOTE: PART NUMBERS 1,10,12 ARE LOCATED ON THE CONTROL PANEL

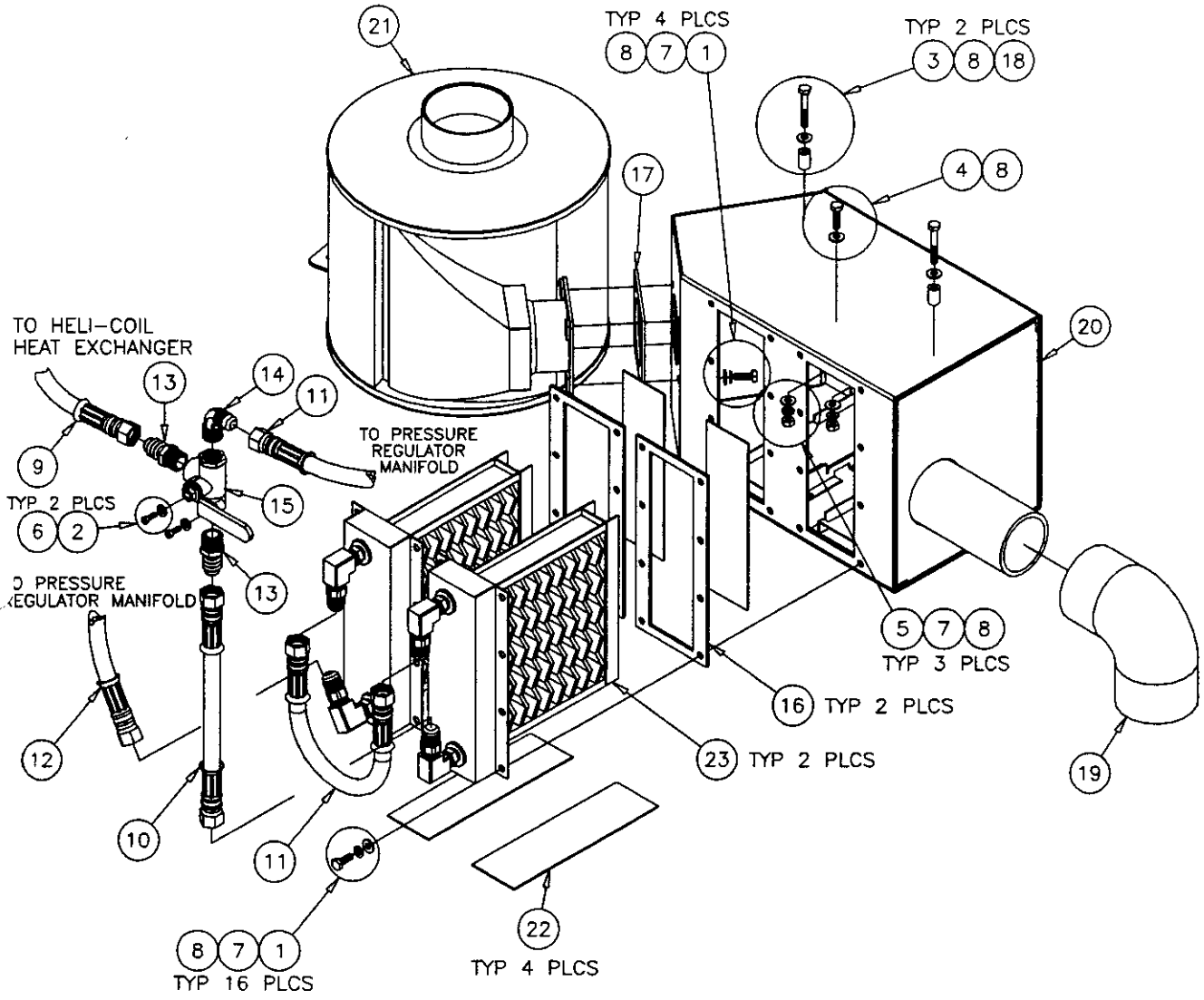


HELI–COIL HEAT EXCHANGER ASSEMBLY 61–951100



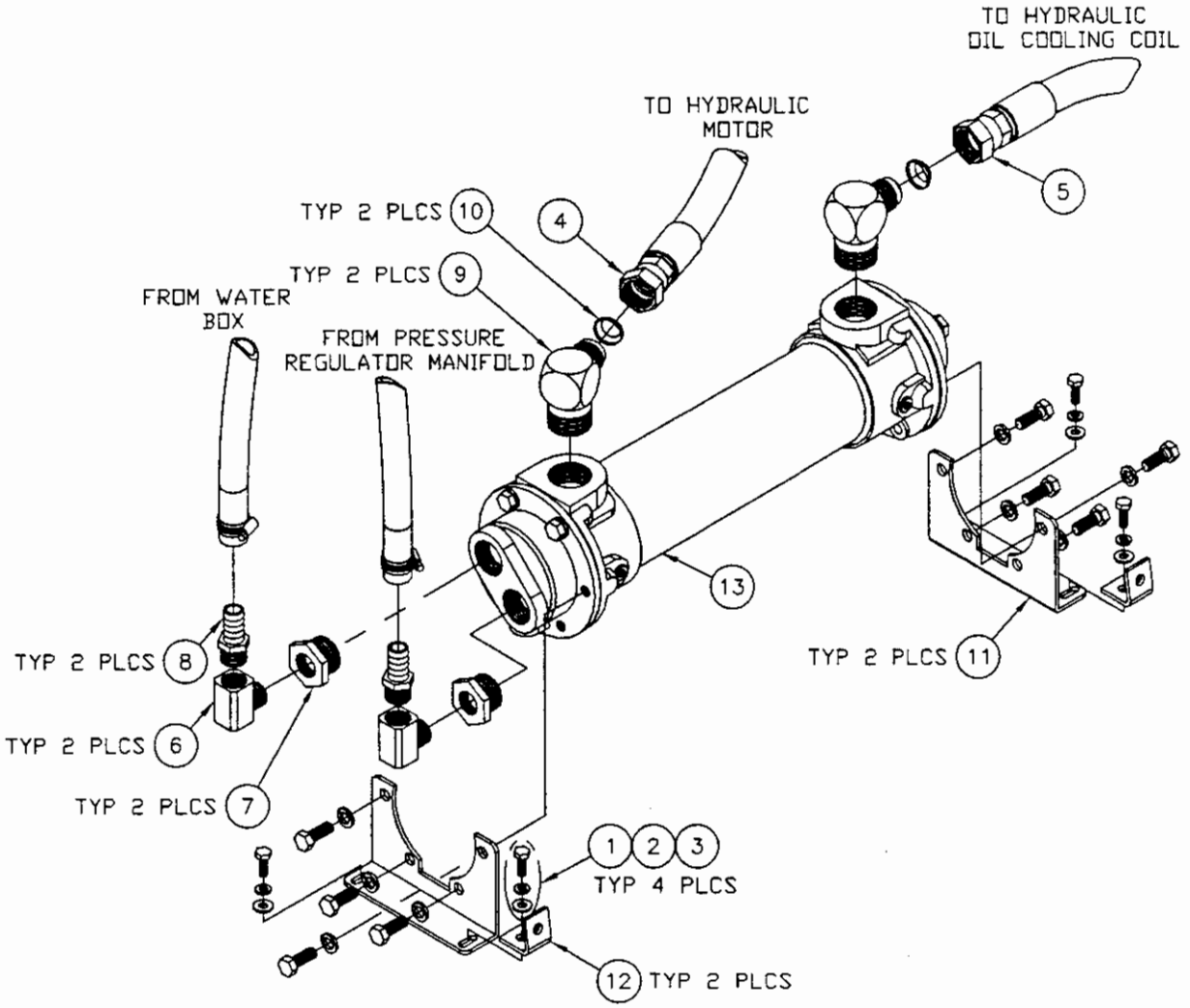
1. 00–000015....SCR, DRV .098D x 3/16
2. 00–000201....SCR, CAP 1/2–13 x 1–1/2 HXHD
3. 00–000348....SCR, MACH 8–32 x 5/8 SLTHD
4. 01–000061....LKNUT, 8–32 HXHD NYLOK
5. 02–000057....FLTWSR, 1/2 HVY
6. 11–800026....NIP, 1" x 2–1/2 BLK
7. 11–800493....ELL, 1" BR
8. 12–800326....ELL, 3/4 x 1/2T BR
9. 15–808073....COCK, DRAIN 1/4P x 1/4H
10. 35–900188....RELAY, ENG SHUTDOWN
11. 35–901019....SENSOR, OPTICAL LVL
12. 48–941096....PLATE, SERIAL HE
13. 50–502045....BRKT, HEAT EX MNT
14. 52–501928....FTTG, BRB 1"P x 1–1/4"H BR
15. 57–520104....HE, COOLANT

VACUUM MUFFLER AND HEAT EXCHANGER ASSEMBLY 61–951610



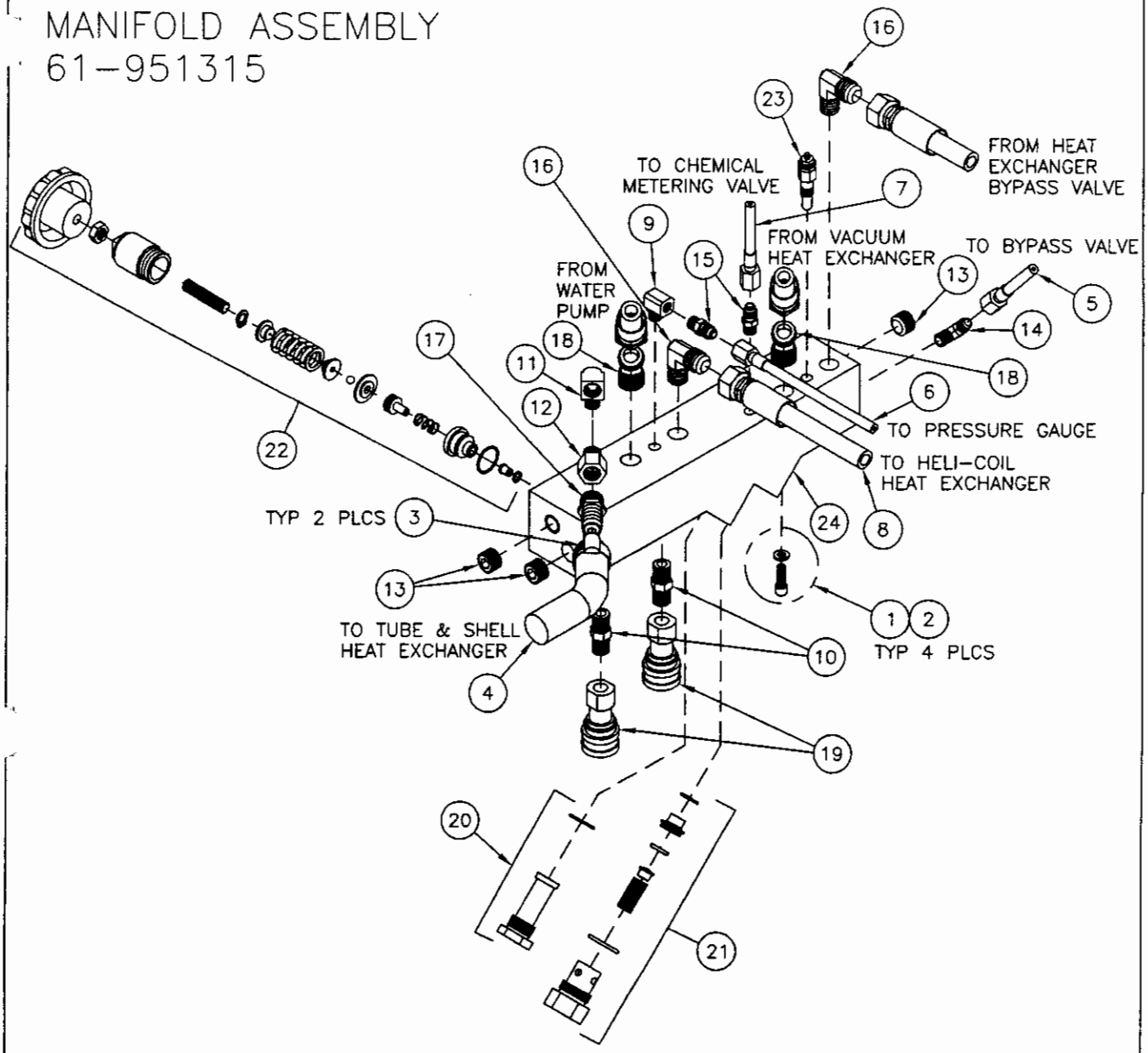
1. 00–000055....SCR, CAP 1/4–20 x 3/4 HXHD
2. 00–000071....SCR, MACH 10–24 x 1/2 SOCHD SST
3. 00–000122....SCR, CAP 1/4–20 x 1–3/4 HXHD
4. 00–000364....SCR, CAP 1/4–20 x 1 HXHD
5. 01–000037....NUT, 1/4–20 HXHD
6. 02–000032....LKWSR, #10
7. 02–000038....LKWSR, 1/4
8. 02–000066....FLTWSR, 1/4
9. 10–805459....HOS, HP 3/8 x 65 (1/2FT BS) W/HT BARRIER
10. 10–805520....HOS, HP 1/2 x 8 (1/2FT BS) SST
11. 10–805521....HOS, HP 1/2 x 11 (1/2FT BS) SST
12. 10–805522....HOS, HP 1/2 x 25 (1/2FT BS) SST
13. 12–800141....CONN, 1/2P x 1/2T
14. 12–800171....ELL, 1/2P x 1/2T BR
15. 15–808060....VLV, BALL 3WAY 1/2FP BR
16. 43–807081....GSKT, VAC HE CORE
17. 43–807108....GSKT, VAC HE INLET
18. 52–501959....SPCR, HEAT EX
19. 52–501981....ELBOW, VAC EXHAUST
20. 56–502511....HSG, VAC HE
21. 57–520127....MFLR, VAC MOD.
22. 58–700027....PAD, VAC HE CORE
23. 61–951278....ASSY, VAC HE CORE

TUBE & SHELL HEAT EXCHANGER ASSEMBLY 61-951333



1. 00-000055....SCR, CAP 1/4-20 x 3/4 HXHD
2. 02-000038....LKWSR, 1/4
3. 02-000066....FLTWSR, 1/4
4. 10-805462....HOS, HP 3/4 x 23 (3/4 FT BS)
5. 10-805466....HOS, HP 3/4 x 18-1/2 (3/4FT BS)
6. 11-800041....ELL, ST 1/2 BR
7. 11-800427....BUSH, 1 x 1/2 BR
8. 12-800269....FTTG, BRB 1/2P x 5/8H BR
9. 12-800404....ELL, 1P x 3/4T 2501-12-16
10. 43-810097....SEAL, CONICAL CPR 3/4"-37° FLRD
11. 50-501729....MOUNT, TB & SHELL HE
12. 56-502397....BRKT, HYDRAULIC TNK CVR
13. 57-520085....HE, TUBE & SHELL-HYDRA FLUID

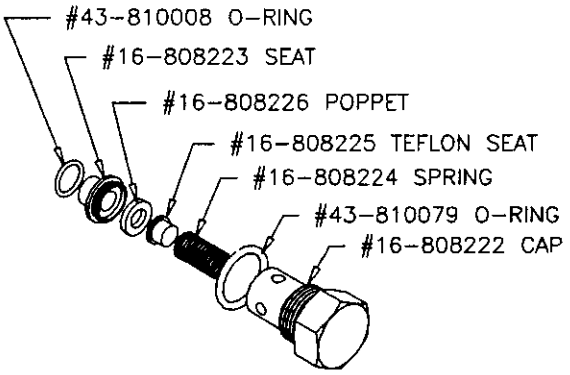
PRESSURE REGULATOR MANIFOLD ASSEMBLY 61-951315



1. 00-000210....SCR, MACH 1/4-20 x 3/4 SOCHD SST
2. 02-000038....LKWSR, 1/4
3. 03-000246....CLMP, HOS #8 1/2MIN 29/32MAX
4. 09-805288....HOS, WTR 5/8 x 27
5. 10-805131....HOS, 3/16 x 20-1/2 (1/4FT BS)
6. 10-805206....HOS, 3/16 x 14-3/4 (1/4FT BS)
7. 10-805294....HOS, 3/16 x 11-1/2 (1/4FT BS)
8. 10-805443....HOS, HP 3/8 x 72 (1/2FT BS)
9. 11-800014....ELL, ST 1/8 BR
10. 11-800029....NIP, HX 1/4 BR
11. 11-800045....ELL, ST 1/4 BR
12. 11-800090....CONN, 3/8FP x 1/4P BR
13. 11-800224....PLG, 3/8 SOCHD BR
14. 12-800040....ELL, 1/8P x 1/4T BR
15. 12-800065....CONN, 1/8P x 1/4T BR
16. 12-800225....ELL, 3/8P x 1/2T BR
17. 12-800345....FTTG, BRB 3/8 x 5/8H BR
18. 12-800347....ELL, 3/8P x 1/2T 45° BR
19. 13-806001....DSC, 1/4F x 1/4FP BR
20. 14-806549....SCRN, CHK VLV MNFLD
21. 15-808094....VLV, CHK-CHK VLV MNFLD
22. 15-808156....ASSY, PRESS REG
23. 34-903019....SENDER, TEMP 140-320°
24. 52-501963....MNFLD, PRESS REG

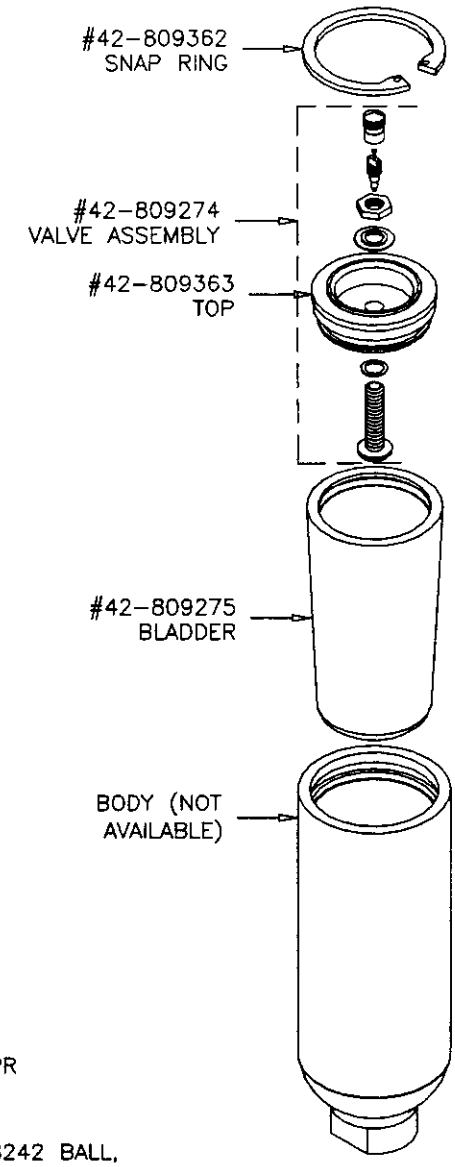
SOLUTION OUTLET CHECK VALVE DETAIL

VALVE, CHECK #15-808094



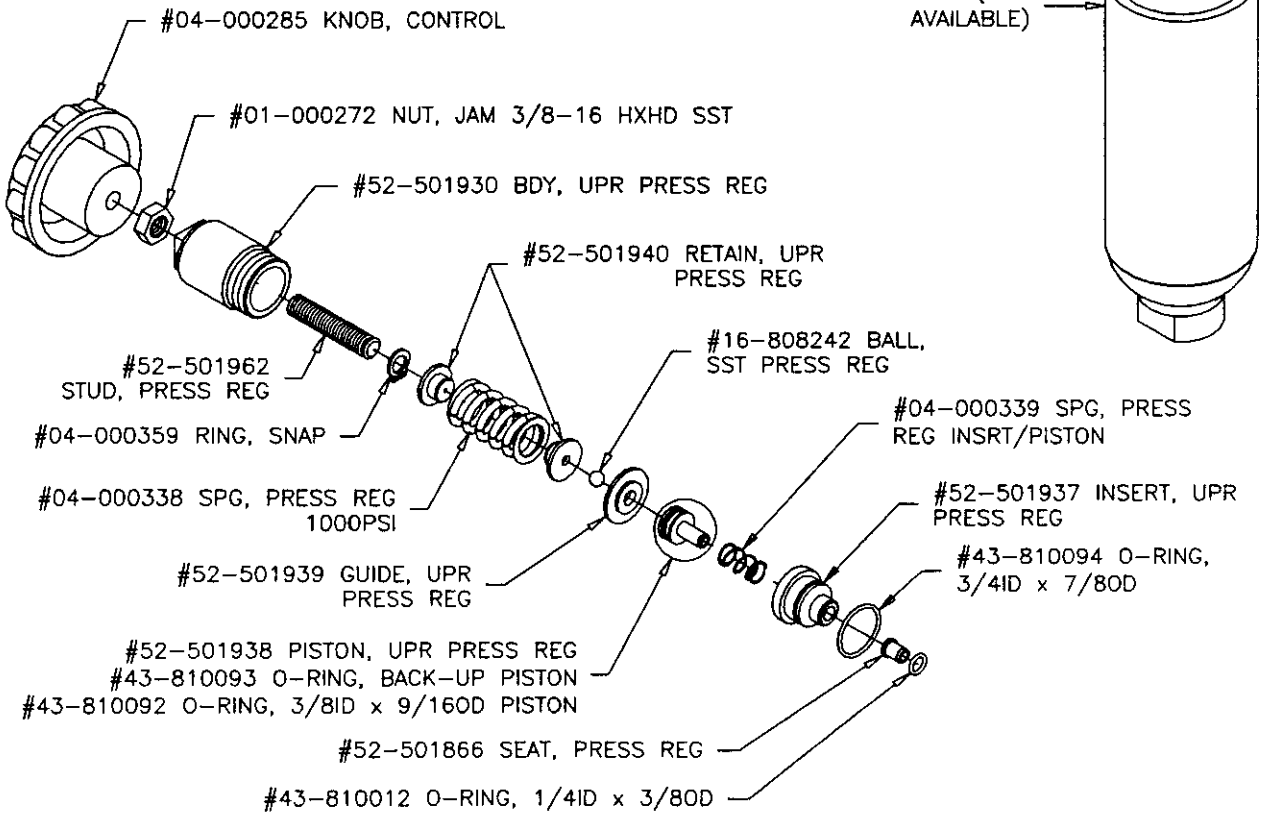
ACCUMULATOR DETAIL

ACCUMULATOR #41-809119

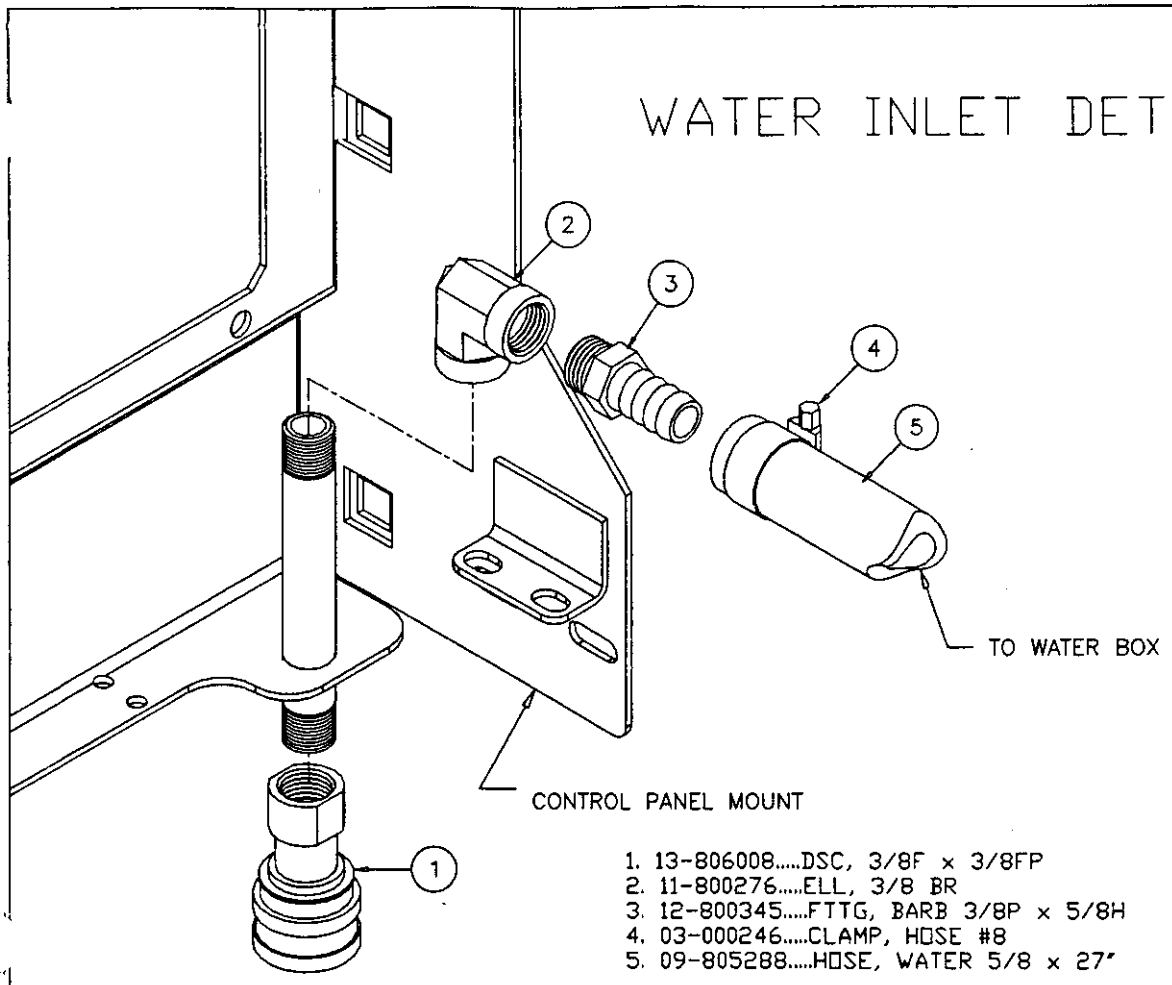


PRESSURE REGULATOR DETAIL

REGULATOR, PRESSURE PTO #15-808156

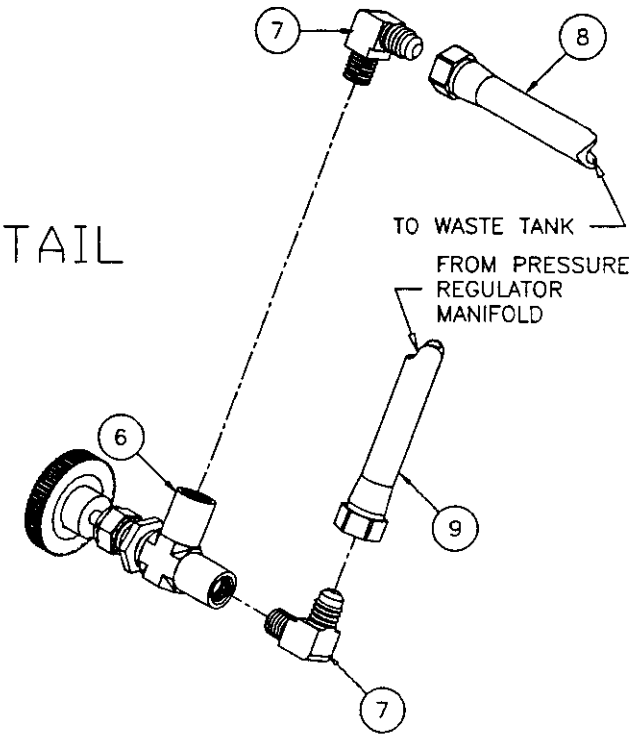


WATER INLET DETAIL



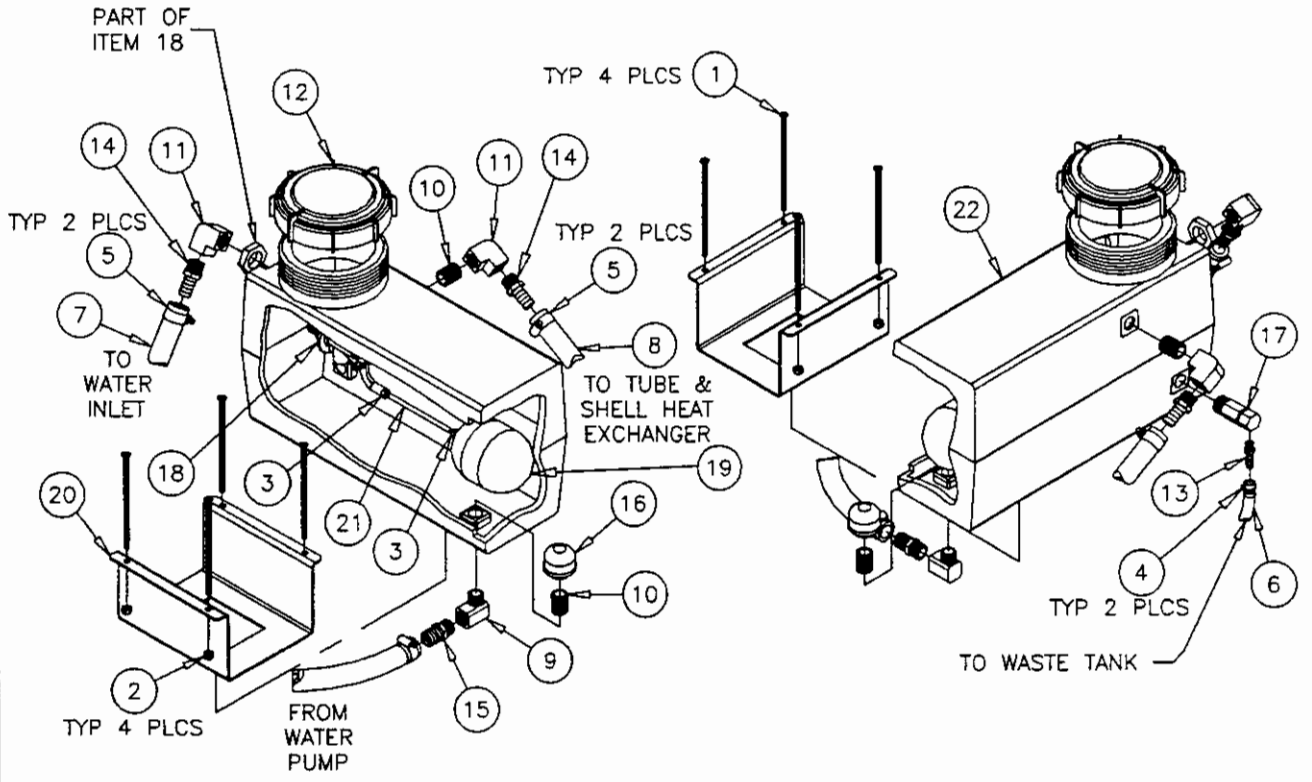
1. 13-806008.....DSC, 3/8F x 3/8FP
2. 11-800276.....ELL, 3/8 BR
3. 12-800345.....FTTG, BARB 3/8P x 5/8H
4. 03-000246.....CLAMP, HOSE #8
5. 09-805288.....HOSE, WATER 5/8 x 27"

BYPASS VALVE DETAIL



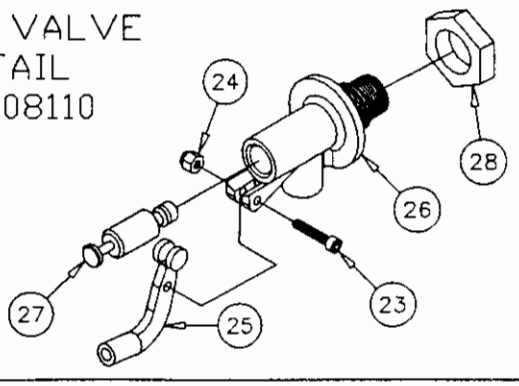
6. 15-808107.....VALVE, METER 1/8 FP (BYPASS)
7. 12-800040.....ELL, 1/8 P x 1/4 T
8. 10-805357.....HOSE, 3/16 x 39"
9. 10-805131.....HOSE, 3/16 x 20-1/2"

WATER BOX ASSEMBLY 61-951097

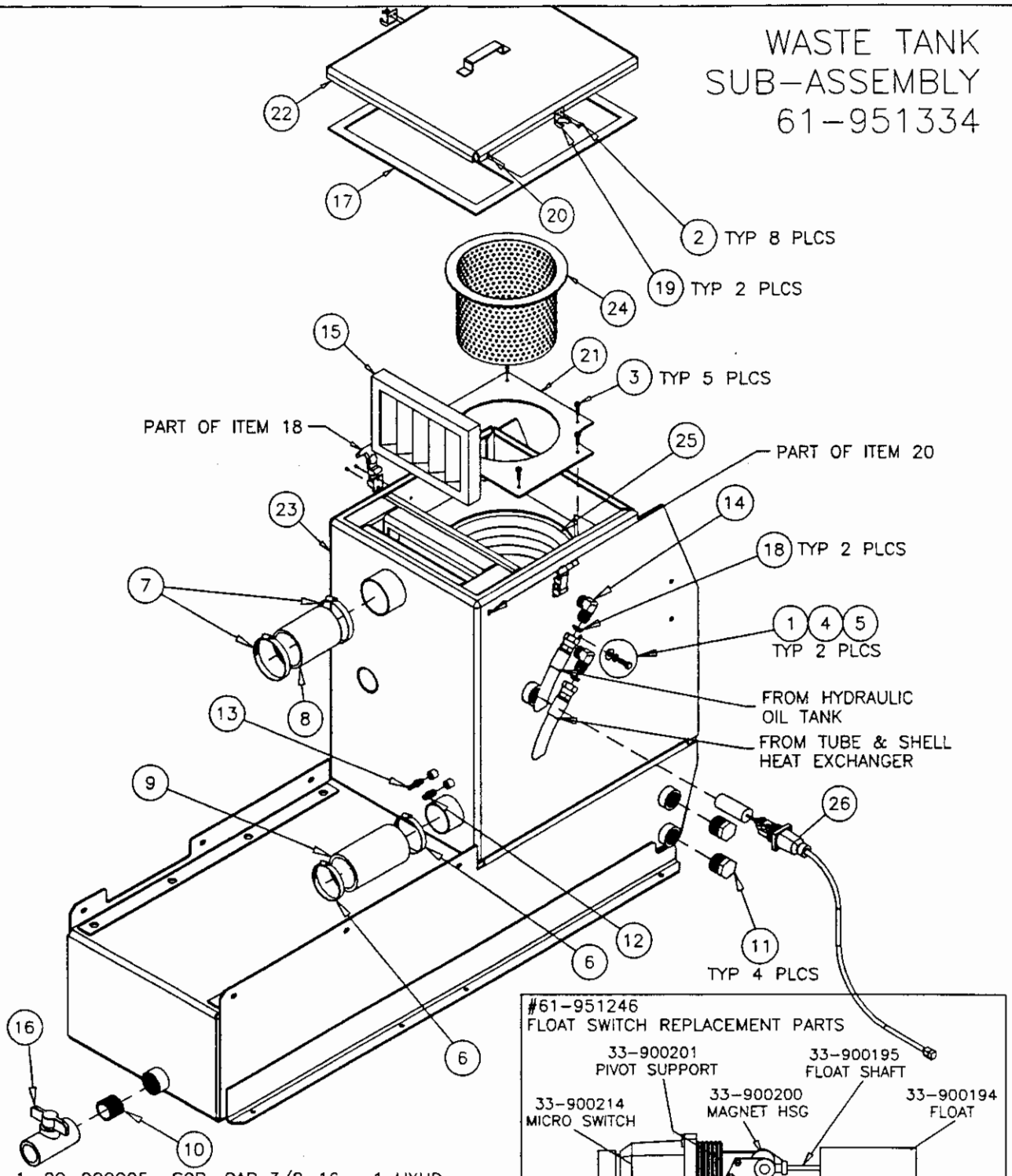


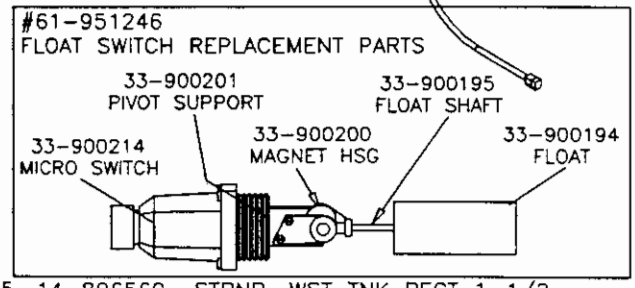
1. 00-000439....SCR, CAP 1/4-20 x 6 FLT SLTHD
2. 01-000023....LKNUT, 1/4-20 HXHD NYLOK SST
3. 01-000045....NUT, 1/4-20 HXHD SST
4. 03-000065....CLMP, HOS #4
5. 03-000246....CLMP, HOS #8
6. 09-805075....HOS, BRD 5/16 x 30
7. 09-805288....HOS, WTR 5/8 x 27
8. 09-805557....HOS, WTR 5/8 x 40
9. 11-800041....ELL, ST 1/2 BR
10. 11-800300....NIP, 1/2 x CL BR
11. 11-800361....ELL, 1/2 BR
12. 11-800432....CAP, WTR BX
13. 12-800093....FTTG, BRB 1/8P x 5/16H BR
14. 12-800269....FTTG, BRB 1/2P x 5/8H BR
15. 12-800278....FTTG, BRB 1/2P x 3/4H BR
16. 14-806540....STRNR, SUC END 1/2FP 40MESH
17. 15-808069....VLV, TEMP REL 165DEG
18. 15-808110....VLV, FLOAT
19. 19-807014....BALL, FLOAT
20. 50-502132....PNL, WTR BOX MT
21. 54-501715....RD, FLOAT 1/4-20 x 6 SST
22. 58-500814....MLDG, WTR BX
23. 00-000337....SCR, 10-32 x 1 SOCHD SST
24. 01-000241....LKNUT, 10-32 HXHD SST
25. 16-808216....ARM, PIVOT-FLT VLV
26. 16-808217....BODY, FLOAT VALVE
27. 16-808219....PISTON (INCLUDES SEAT)
28. 52-501706....NUT, FLOAT VALVE

FLOAT VALVE DETAIL 15-808110



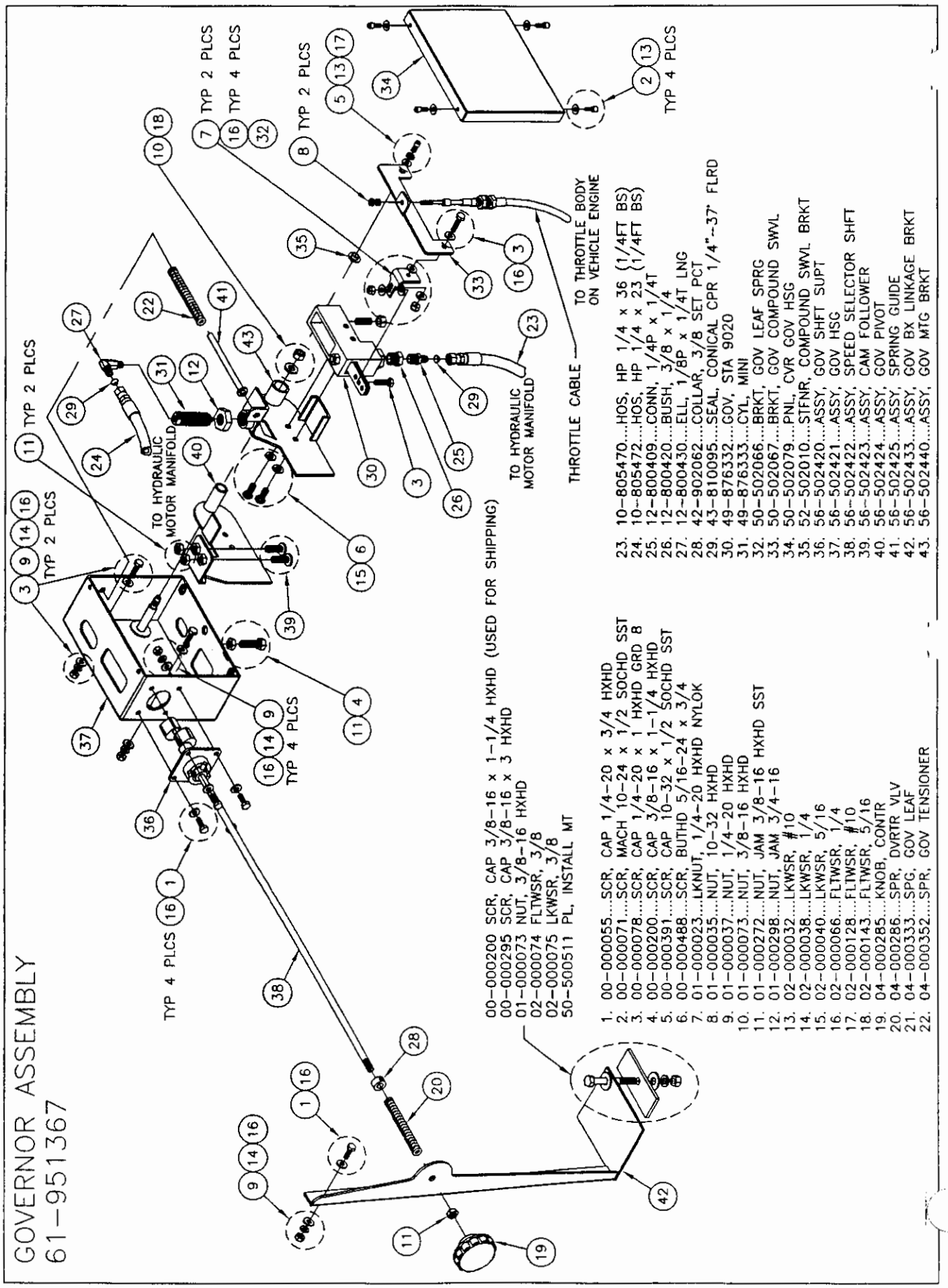
WASTE TANK SUB-ASSEMBLY 61-951334





1. 00-000095....SCR, CAP 3/8-16 x 1 HXHD
2. 00-000171....RIV, 3/16 x 5/16 ALUM
3. 00-000255....SCR, SLFDR #14 x 1 HXHD
4. 02-000074....FLTWSR, 3/8
5. 02-000075....LKWSR, 3/8
6. 03-000112....CLMP, HOS #48
7. 03-000250....CLMP, HOS #60
8. 09-805425....HOS, INT VAC 3-1/2 x 5
9. 09-805434....HOS, INT VAC 3 x 6-1/2
10. 11-800384....NIP, 1-1/2 x CL ALUM
11. 11-800508....PLG, 1-1/4 HEX HD BR
12. 12-800060....CONN, 1/4P x 1/4T BR
13. 12-800092....FTTG, BRB 1/4P x 5/16H BR
14. 12-800438....ELL, 3/4MPT x 12JIC 90DEG
15. 14-806569....STRNR, WST TNK RECT 1-1/2
16. 15-808080....VLV, BALL 1-1/2FP BS PVC
17. 43-807565....GSKT, WST TNK LID
18. 43-810097....SEAL, CONICAL CPR 3/4"-37° FLRD
19. 46-802510....LTCH, DRAW 2-7/8 SST
20. 48-941297....DEC, ARROW-WST TNK
21. 50-502031....PLT, FACE STRNR BSKT
22. 56-502364....LID, WST TNK
23. 56-502365....ASSY, WST TNK
24. 56-502369....BSKT, STRNR ROUND 7"
25. 57-520106....HE, OIL COOLING COIL
26. 61-951246....ASSY, LVL SENS SHUTTOFF SW

GOVERNOR ASSEMBLY
61-951367

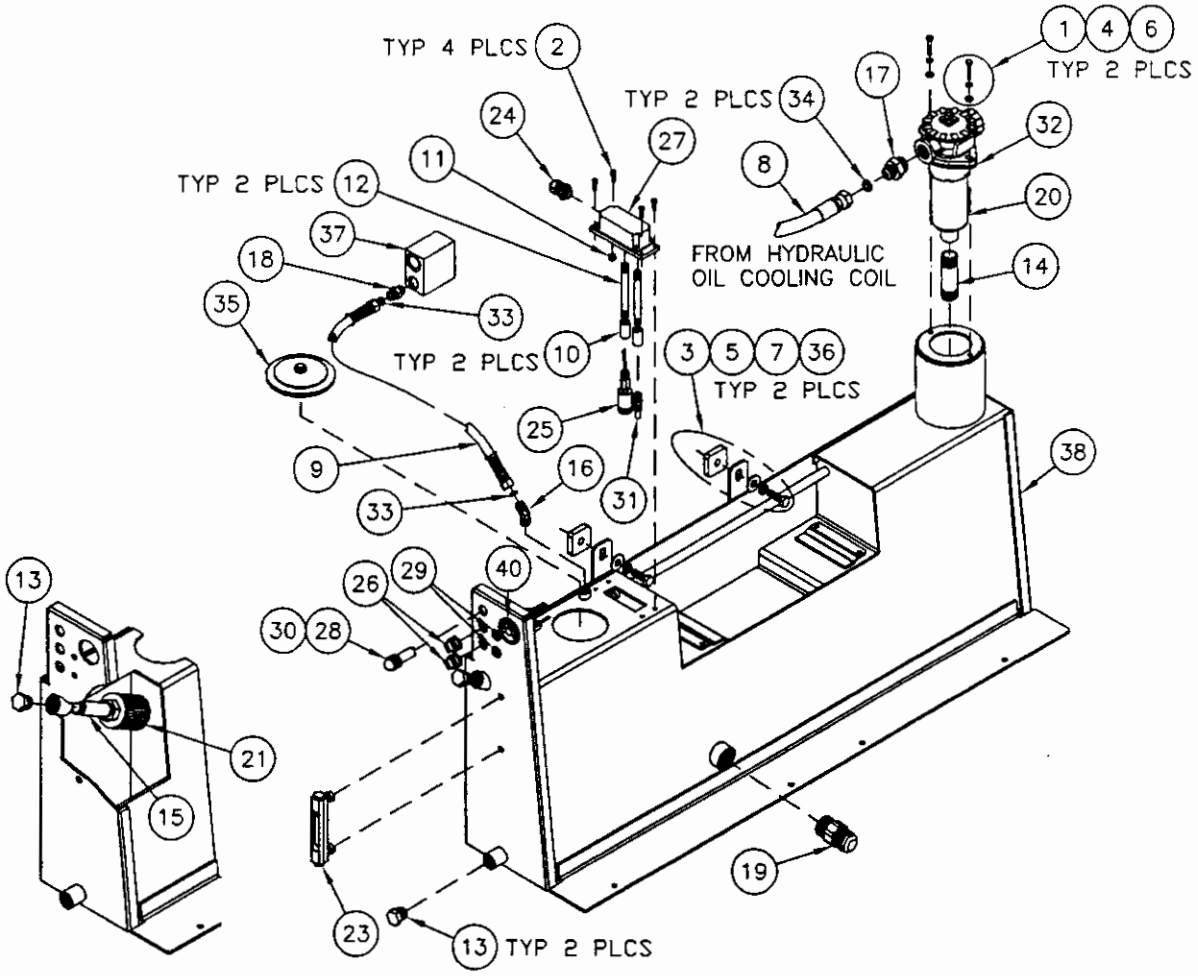


00-000200 SCR, CAP 3/8-16 x 1-1/4 HXHD (USED FOR SHIPPING)
00-000295 SCR, CAP 3/8-16 x 3 HXHD
01-000073 NUT, 3/8-16 HXHD
02-000074 FLTWSR, 3/8
02-000075 LKWSR, 3/8
50-500511 PL, INSTALL MT

1. 00-000055....SCR, CAP 1/4-20 x 3/4 HXHD
2. 00-000071....SCR, MACH 10-24 x 1/2 SOCHD SST
3. 00-000078....SCR, CAP 1/4-20 x 1 HXHD GRD 8
4. 00-000200....SCR, CAP 3/8-16 x 1-1/4 HXHD
5. 00-000391....SCR, CAP 10-32 x 1/2 SOCHD SST
6. 00-000488....SCR, BUTHD 5/16-24 x 3/4
7. 01-000023....LKNUT, 1/4-20 HXHD NYLOK
8. 01-000035....NUT, 10-32 HXHD
9. 01-000037....NUT, 1/4-20 HXHD
10. 01-000073....NUT, 3/8-16 HXHD
11. 01-000272....NUT, JAM 3/8-16 HXHD SST
12. 01-000298....NUT, JAM 3/4-16
13. 02-000032....LKWSR, #10
14. 02-000038....LKWSR, 1/4
15. 02-000040....LKWSR, 5/16
16. 02-000066....FLTWSR, 1/4
17. 02-000128....FLTWSR, #10
18. 02-000143....FLTWSR, 5/16
19. 04-000285....KNOB, CONTR
20. 04-000286....SPR, DVRTR VLV
21. 04-000333....SPG, GOV LEAF
22. 04-000352....SPR, GOV TENSIONER
23. 10-805470....HOS, HP 1/4 x 36 (1/4FT BS)
24. 10-805472....HOS, HP 1/4 x 23 (1/4FT BS)
25. 12-800409....CONN, 1/4P x 1/4T
26. 12-800420....BUSH, 3/8 x 1/4
27. 12-800430....ELL, 1/8P x 1/4T LNG
28. 42-902062....COLLAR, 3/8 SET PCT
29. 43-810095....SEAL, CONICAL CPR 1/4"-37° FLRD
30. 49-876332....GOV, STA 9020
31. 49-876333....CYL, MINI
32. 50-502066....BRKT, GOV LEAF SPRG
33. 50-502067....BRKT, GOV COMPOUND SWVL
34. 50-502079....PNL, CVR GOV HSG
35. 52-502010....STFNR, COMPOUND SWVL BRKT
36. 56-502420....ASSY, GOV SHFT SUPT
37. 56-502421....ASSY, GOV HSG
38. 56-502422....ASSY, SPEED SELECTOR SHFT
39. 56-502423....ASSY, CAM FOLLOWER
40. 56-502424....ASSY, GOV PIVOT
41. 56-502425....ASSY, SPRING GUIDE
42. 56-502433....ASSY, GOV BX LINKAGE BRKT
43. 56-502440....ASSY, GOV MTG BRKT

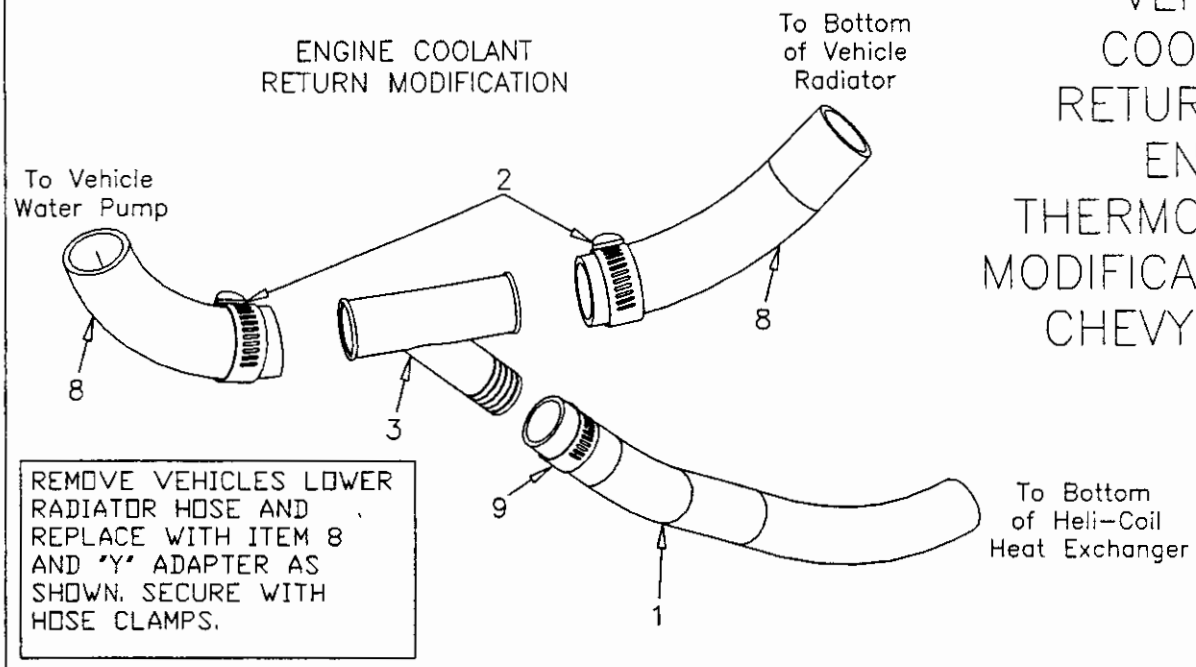
HYDRAULIC OIL TANK ASSEMBLY 61–951313

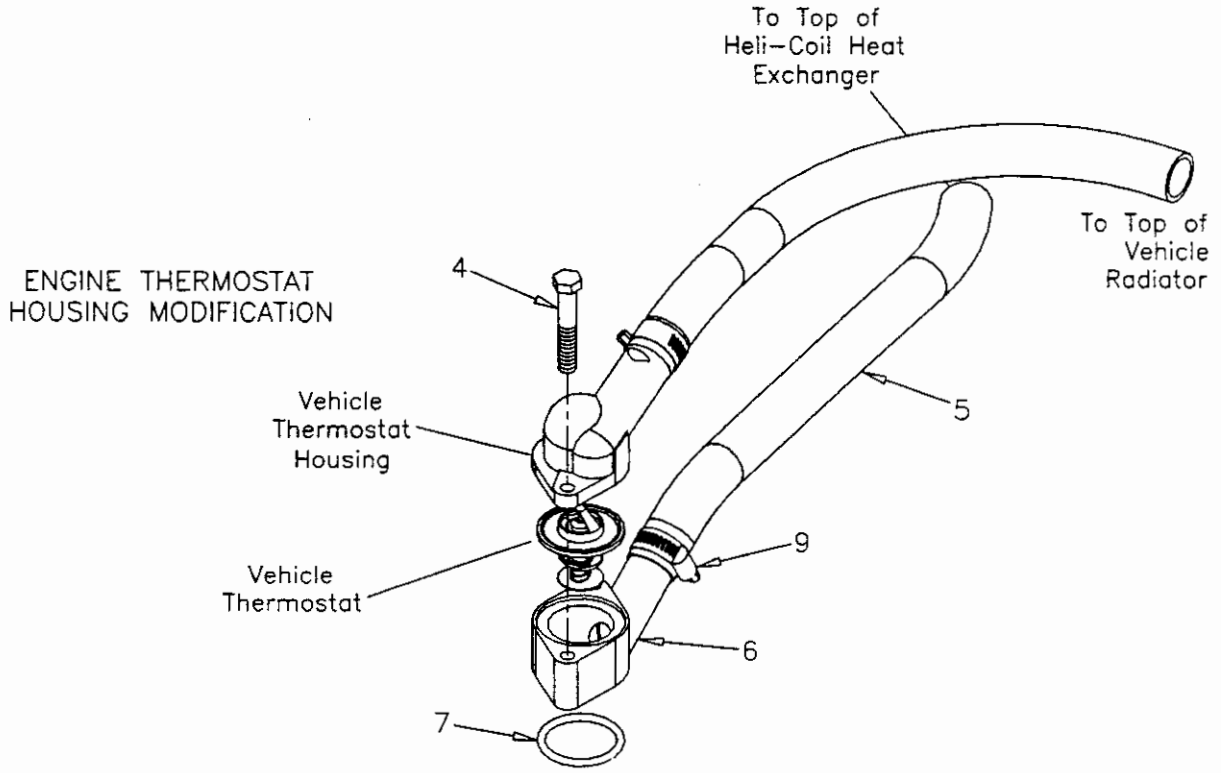
NOTE: ITEMS 22 AND 39 NOT SHOWN FOR CLARITY



1. 00–000132....SCR, CAP 1/4–20 x 1–1/2 HXHD
2. 00–000162....SCR, MACH 10–24 x 1 SOCHD SST
3. 00–000201....SCR, CAP 1/2–13 x 1–1/2 HXHD
4. 02–000038....LKWSR, 1/4
5. 02–000057....FLTWSR, 1/2 HVY
6. 02–000066....FLTWSR, 1/4
7. 02–000202....LKWSR, 1/2
8. 10–805462....HOS, HP 3/4 x 23 (3/4FP BS)
9. 10–805467....HOS, HP 1/2 x 13 (1/2FT BS)
10. 11–800007....CPLG, 1/4 ALUM
11. 11–800345....PLG, 1/4 SOCHD BR
12. 11–800404....NIP, 1/4 x 5 SST
13. 11–800499....PLG, 3/4 HXHD BR
14. 11–800501....NIP, 1 x 4 PVC
15. 11–800509....NIP, 3/4 x 4 PVC
16. 12–800347....ELL, 3/8P x 1/2T 45° BR
17. 12–800407....CONN, 1 ORB x 3/4T
18. 12–800414....CONN, 1/2 ORB x 1/2T
19. 12–800426....CONN, 1–1/4MP x 1–1/4T
20. 14–806564....FLTR, OIL HYD
21. 14–806565....STRNR, OIL HYD SFE25G125A1.0
22. 15–808150....VLV, CARTRIDGE
23. 18–808537....GA, SIGHT & THERM 5"VS ALG5T
24. 31–900194....CONN, CD STRN REL 1/2P (PLST)
25. 32–900203....SW, LVL AP L2400 N.C.
26. 32–900205....SW, RTRY NON–ILLUM TM
27. 33–900224....HSG, ELEC KIT AP 7700–HK
28. 33–900227....LED, RED IDEC
29. 33–900236....BRKR, CIRC 15AMP SPADE
30. 34–900099....LT, INDIC (DOME) RED
31. 35–900207....SENS, TEMP 200° AP
32. 43–807567....GSKT, HYD OIL FLTR
33. 43–810096....SEAL, CONICAL CPR 1/2"–37° FLRD
34. 43–810097....SEAL, CONICAL CPR 3/4"–37° FLRD
35. 49–876331....CVR, END VS V–1917 6"
36. 50–502040....SPCR, HYD TNK
37. 52–501923....MNFLD, MOT HYD
38. 56–502380....TNK, OIL HYD
39. 64–950670....HARN, HYD TNK
40. 66–950448....KIT, PTO TACH

VEHICLE COOLANT RETURN & ENGINE THERMOSTAT MODIFICATION, CHEVY PTO

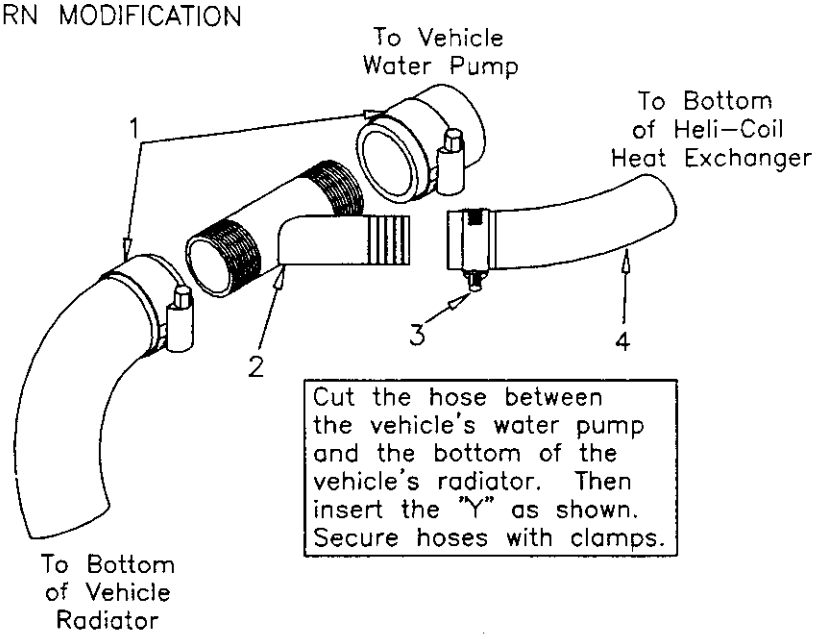




1	10-805498.....	HOSE, RAD 1-1/4x200" (cut to fit)
2	03-000110.....	CLAMP, HOSE #24
3	52-501966.....	CASTING, COOLANT "Y"
4	00-000454.....	SCREW, 8MMx1.25x70MM
5	10-805497.....	HOSE, RAD 1-1/4x162" (cut to fit)
6	52-501871.....	ADAPTER, THERMOSTAT
7	43-810089.....	O-RING, THERMOSTAT
8	10-805485.....	HOSE, LOWER RADIATOR
9	03-000259.....	CLAMP, HOSE 1-5/8 x 1-7/8

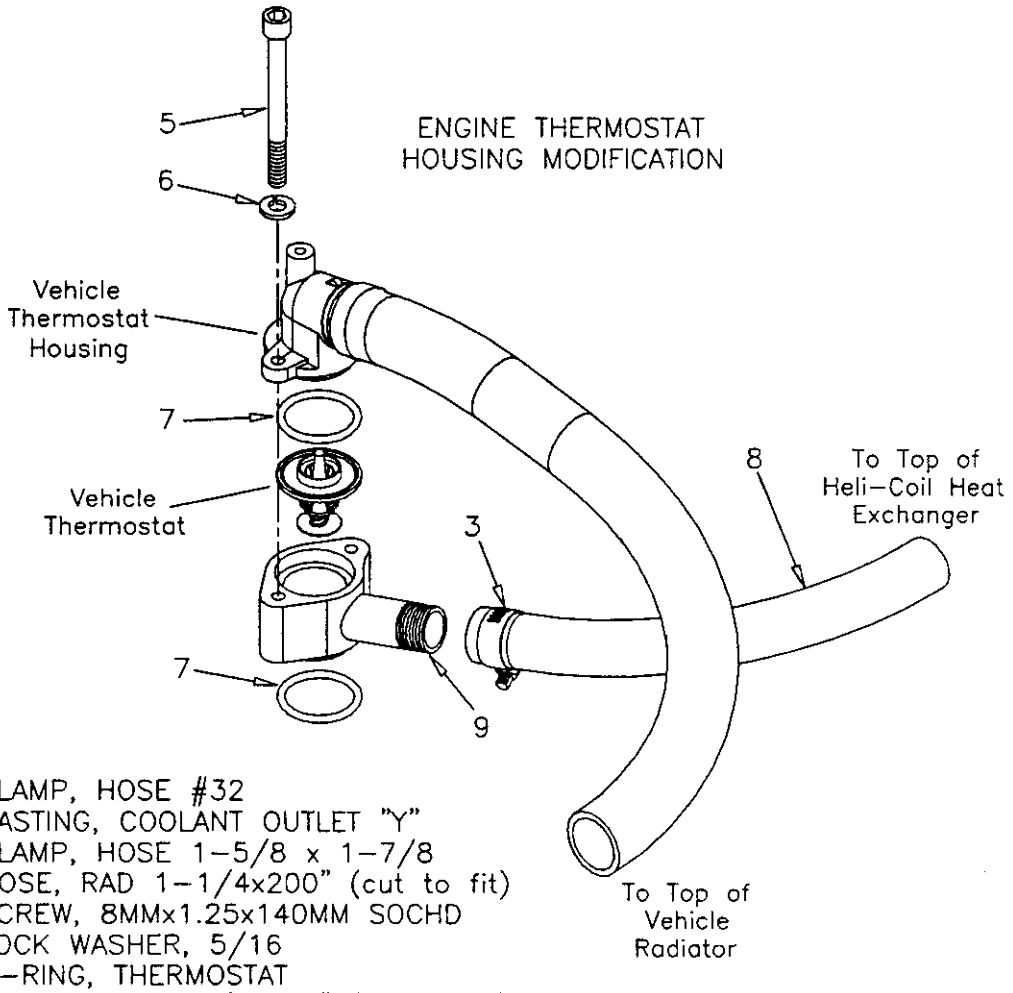
VEHICLE COOLANT RETURN & ENGINE THERMOSTAT MODIFICATION, FORD PTO

ENGINE COOLANT RETURN MODIFICATION



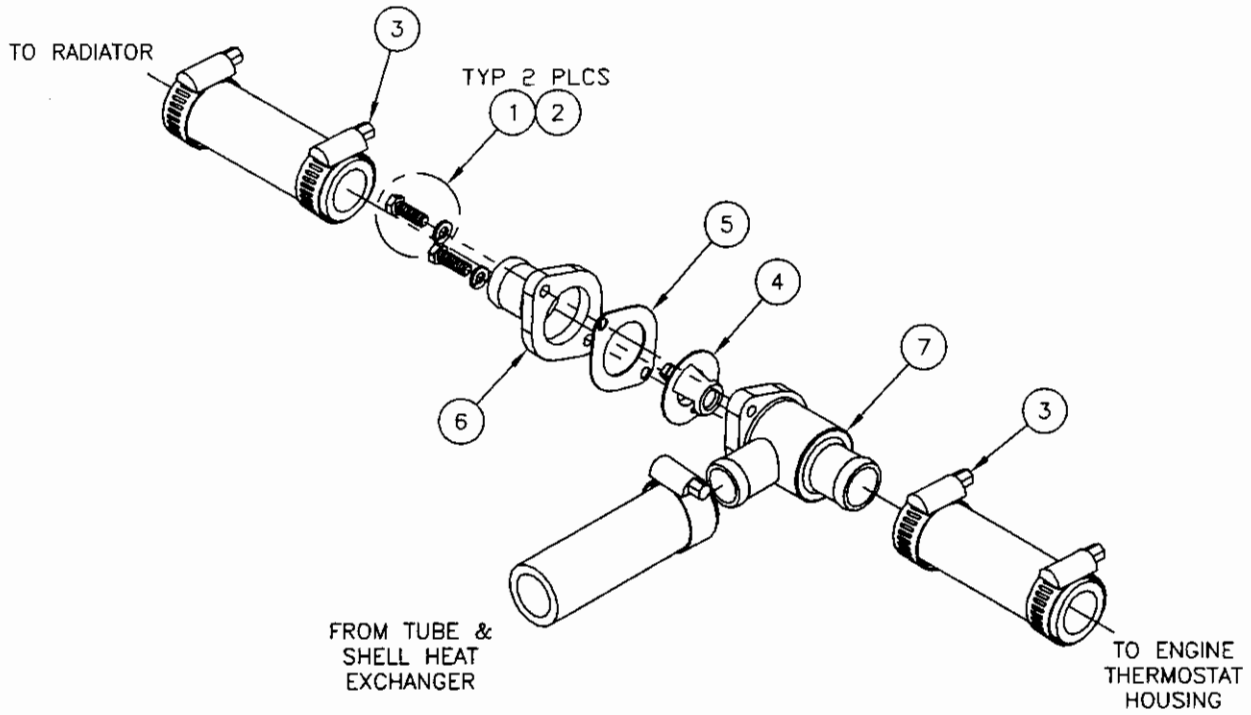
Cut the hose between the vehicle's water pump and the bottom of the vehicle's radiator. Then insert the "Y" as shown. Secure hoses with clamps.

ENGINE THERMOSTAT HOUSING MODIFICATION



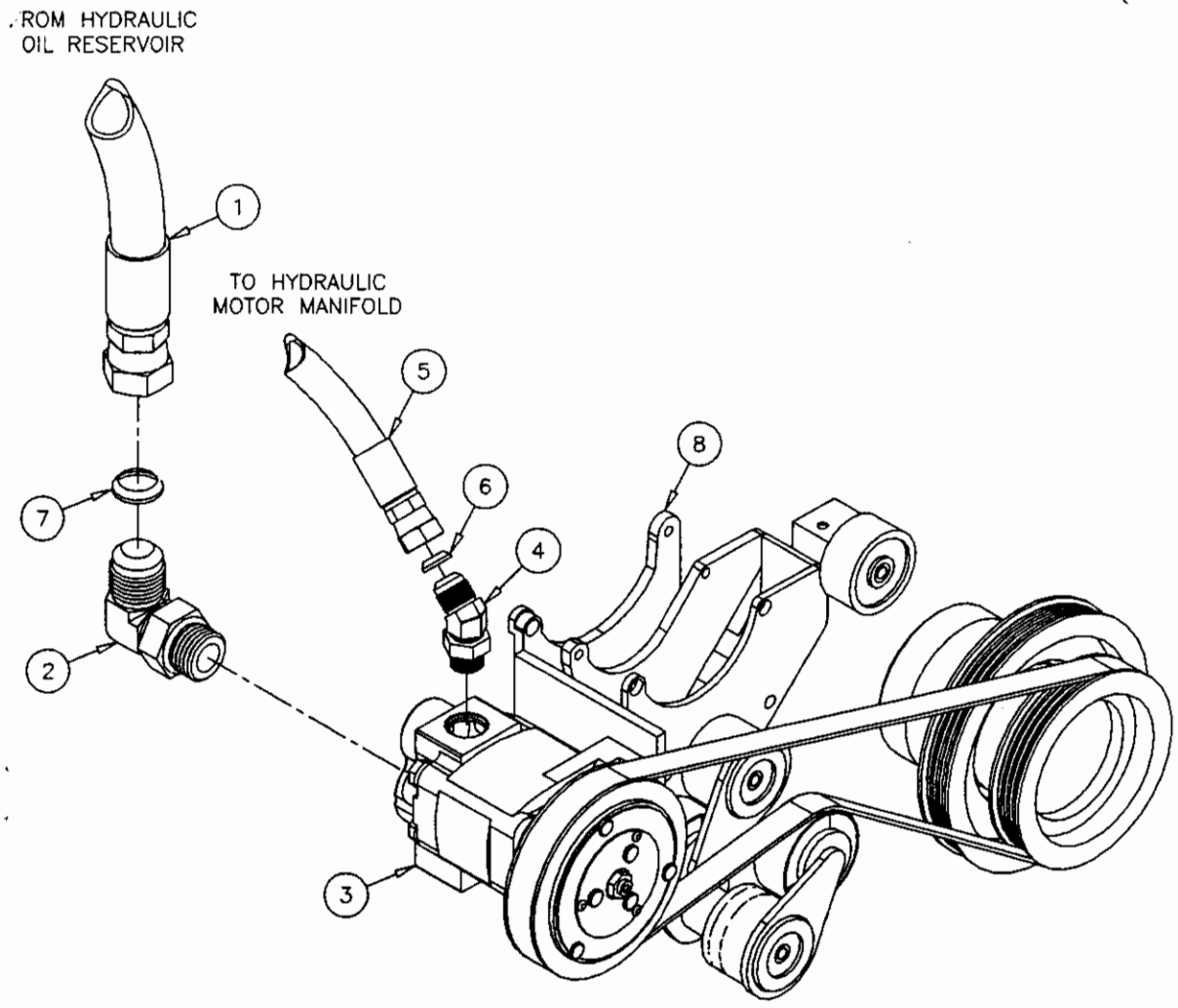
1	03-000054	CLAMP, HOSE #32
2	52-501967	CASTING, COOLANT OUTLET "Y"
3	03-000259	CLAMP, HOSE 1-5/8 x 1-7/8
4	10-805498	HOSE, RAD 1-1/4x200" (cut to fit)
5	00-000464	SCREW, 8MMx1.25x140MM SOCHD
6	02-000040	LOCK WASHER, 5/16
7	43-810090	O-RING, THERMOSTAT
8	10-805497	HOSE, RAD 1-1/4x162" (cut to fit)
9	52-501932	ADAPTER, THERMOSTAT

ENGINE THERMOSTAT MODIFICATION, DIESEL PTO



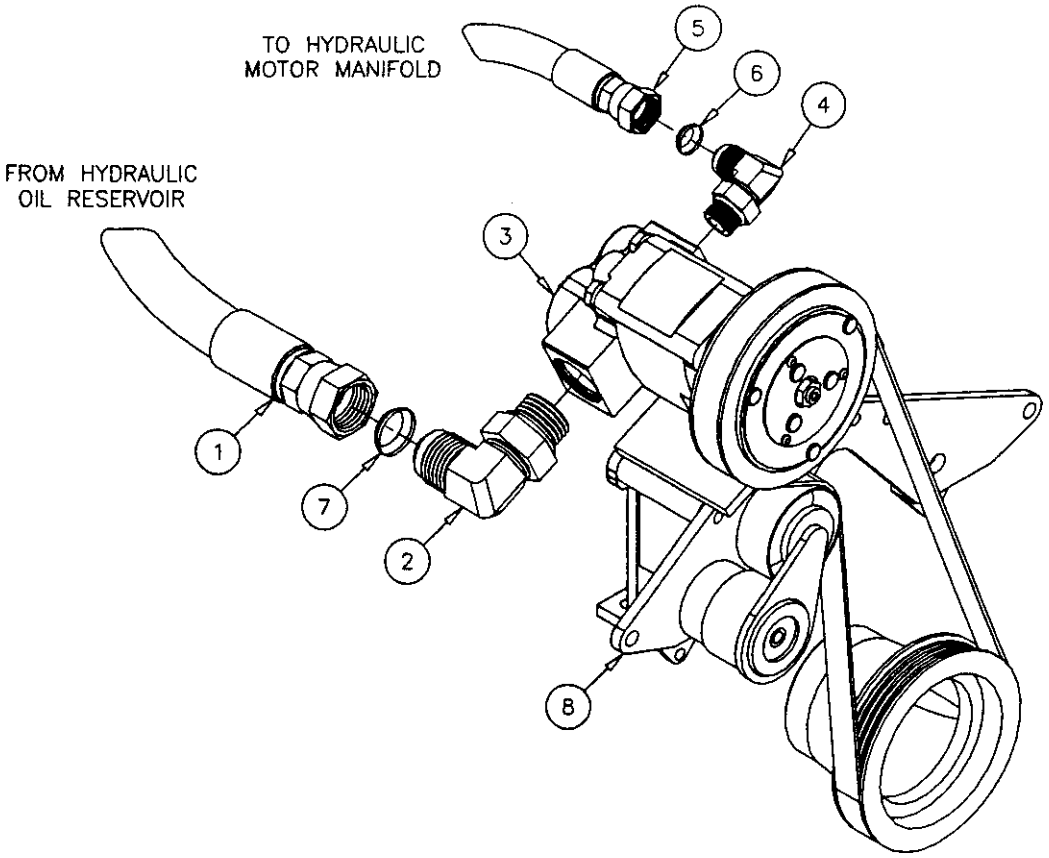
1. 00-000039....SCR, CAP 5/16-18 x 1 HXHD
2. 02-000040....LKWSR, 5/16
3. 03-000110....CLMP, HOS #24 1-1/16MIN 2MAX SST
4. 35-901035....THERMOSTAT, 205DEG
5. 43-807067....GASKET, THERMOSTAT
6. 52-502047....ADAPTER, COOLANT TOP
7. 52-502048....ADAPTER, COOLANT BOTTOM

HYDRAULIC PUMP ASSEMBLY (CHEVY)



1. 10–805496.....HOSE, HP 1–1/4 x 75"
2. 12–800455.....CONN, 1–1/4ORB x 1–1/4JIC 90DEG
3. 41–905053.....PUMP, HYDRAULIC OIL SB8PH9SR
4. 12–800454.....CONN, 3/4ORB x 3/4JIC 45DEG
5. 10–805490.....HOSE, HP 3/4 x 100"
6. 43–810097.....3/4 CONICAL SEAL
7. 43–810098.....1–1/4 CONICAL SEAL
8. 49–876335.....KIT, MTG HYDRAULIC PMP

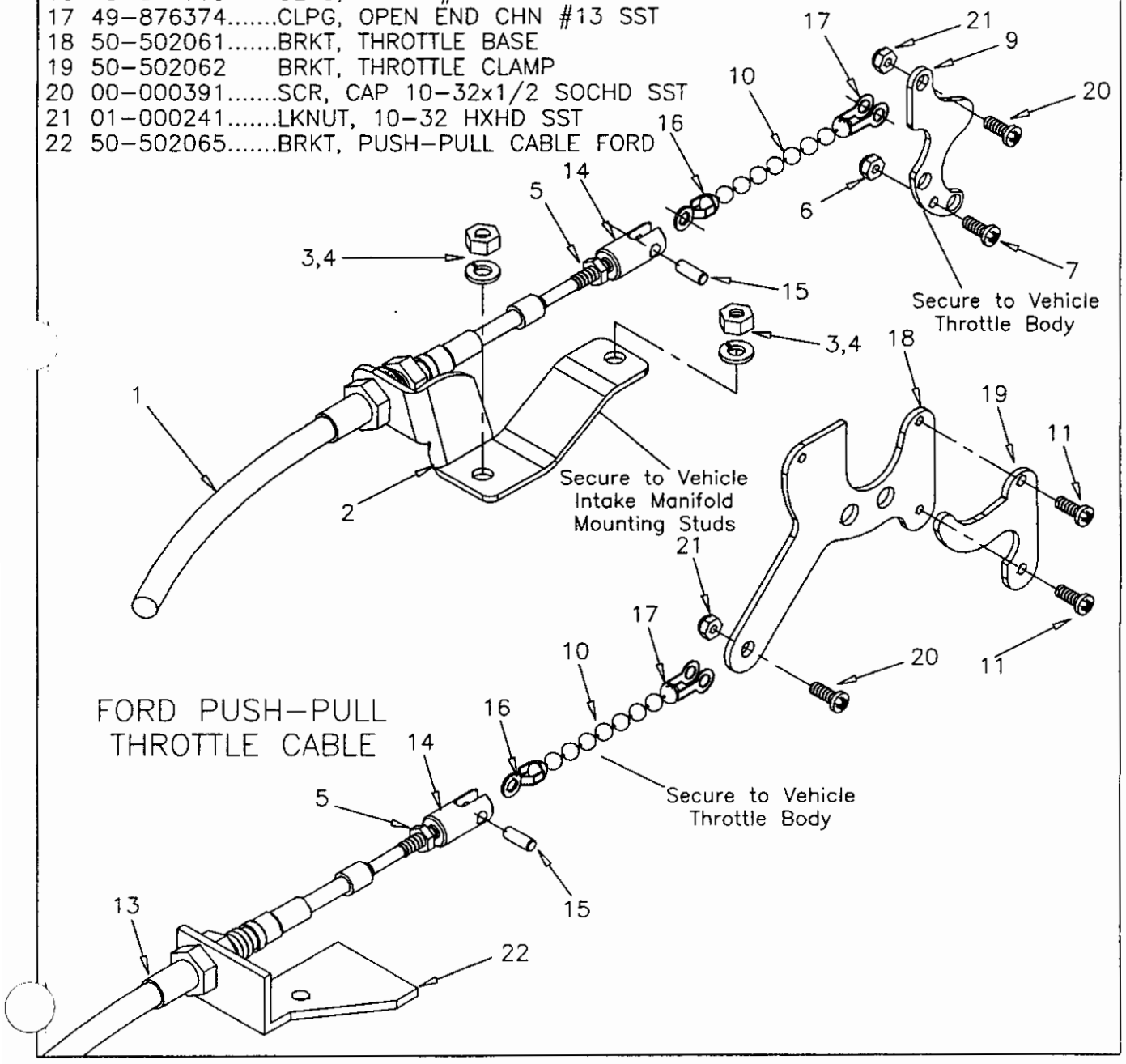
HYDRAULIC PUMP ASSEMBLY (FORD)



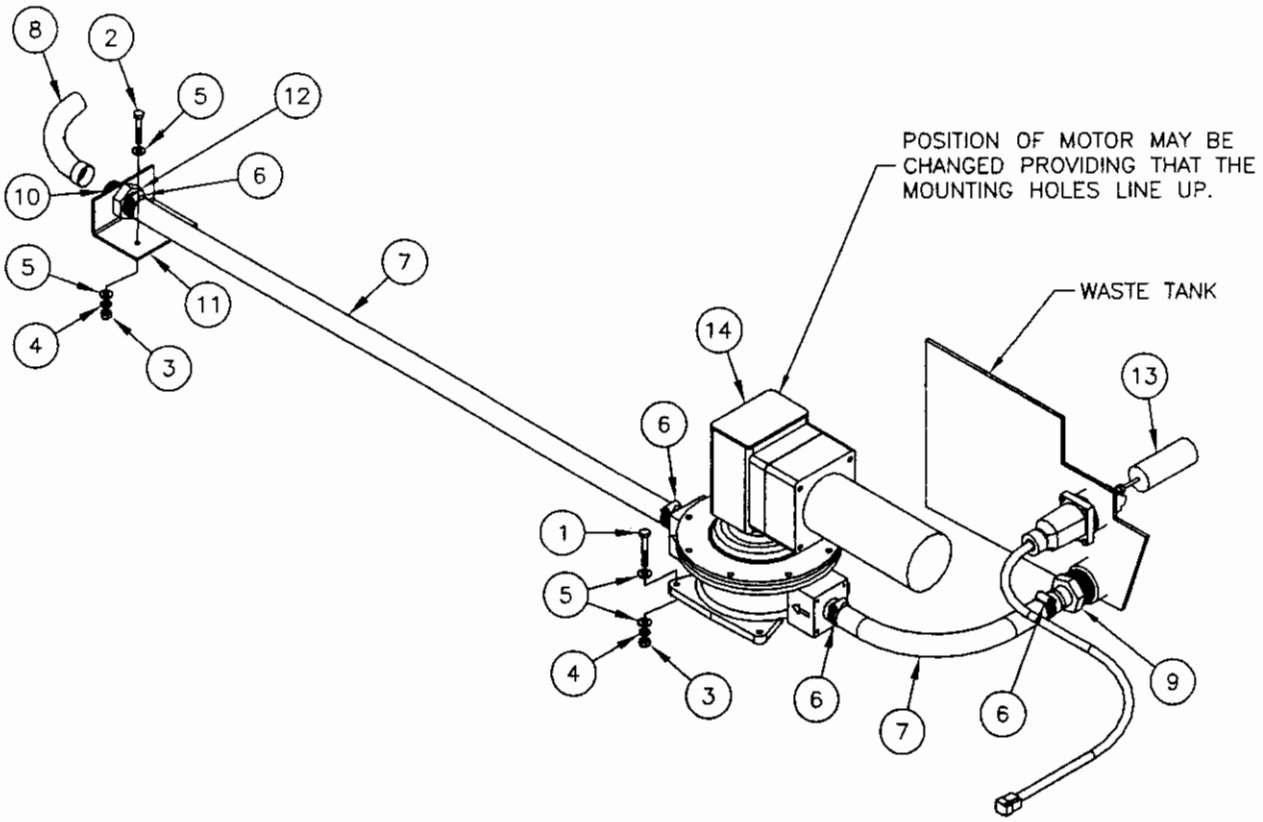
1. 10–805496.....HOSE, HP 1–1/4x75"
2. 12–800455.....CONN, 1–1/4ORB x 1–1/4JIC 90DEG
3. 41–905053.....PUMP, HYDRAULIC OIL SB8PH9SR
4. 12–800437.....ELL, 3/4ORB x 12JIC 90DEG
5. 10–805492.....HOSE, HP 3/4 x 94"
6. 43–810097.....3/4 CONICAL SEAL
7. 43–810098.....1–1/4 CONICAL SEAL
8. 49–876344.....KIT, MTG HYDRAULIC PMP

THROTTLE CABLE MOUNTING DETAIL

1	49-876336	CABLE, THROT PUSH-PULL CHEVY
2	50-501968	BRKT, MTG PUSH-PULL CABLE CHEVY
3	02-000038	LOCK WASHER, 1/4
	01-000270	NUT, 6MM-1 HXHD
5	01-000035	NUT, 10-32 HXHD
6	01-000059	LOCK NUT, 6-32 HXHD
7	00-000507	SCR, CAP 6-32x5/8 SOCHD SST
8	02-000066	FLAT WASHER, 1/4
9	50-501969	LEVER, THROTTLE PTO
10	27-100238	CHAIN, BALL #13 SST
11	00-000017	SCREW, 8-32x1/2" PANHEAD
12	49-876370	LINK, CABLE GOV/THROT FORD
13	49-876340	CABLE, THROT PUSH-PULL FORD
14	52-501864	PIVOT, GOV LINK PUSH-PULL CABLE PTO
15	52-501865	PIN, GOV LINK SLIDER PTO
16	49-876305	CLPG, CHAIN #13 SST
17	49-876374	CLPG, OPEN END CHN #13 SST
18	50-502061	BRKT, THROTTLE BASE
19	50-502062	BRKT, THROTTLE CLAMP
20	00-000391	SCR, CAP 10-32x1/2 SOCHD SST
21	01-000241	LKNUT, 10-32 HXHD SST
22	50-502065	BRKT, PUSH-PULL CABLE FORD

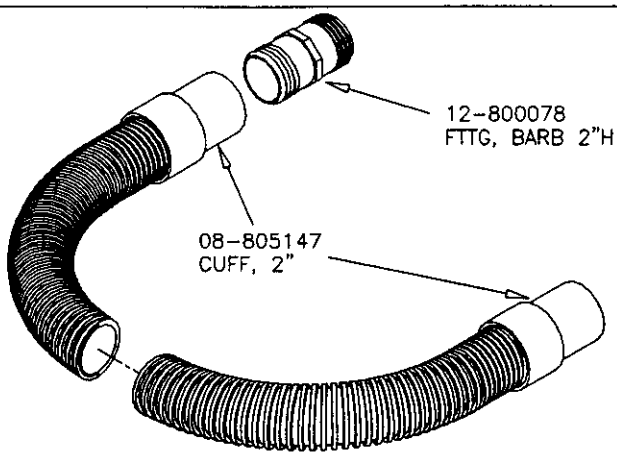


AUTOMATIC PUMPOUT ASSEMBLY, 66-945533

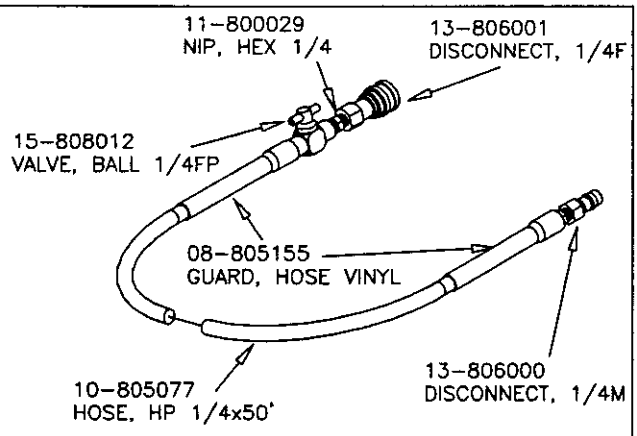


1. 00-000122....SCR, CAP 1/4-20 x 1-3/4 HXHD
2. 00-000132....SCR, CAP 1/4-20 x 1-1/2 HXHD
3. 01-000037....NUT, 1/4-20 HXHD
4. 02-000038....LKWSR, 1/4
5. 02-000066....FLTWSR, 1/4
6. 03-000176....CLMP, HOS #16
7. 09-805591....HOS, WST PMP 1" x 8'
8. 10-805484....HOS, GARDEN 3/4 x 75'
9. 12-800444....FTTG, 1-1/4P x 1"H BR
10. 52-501993....CONN, HOSE WTR OUTL
11. 50-502955....BRKT, PMP-OUT HOS CONN
12. 52-000123....NUT, 1-3/16-12 UN HXHD BR
13. 61-951319....ASSY, LVL SENS SHTOF SW
14. 61-951306....ASSY, WST PMP

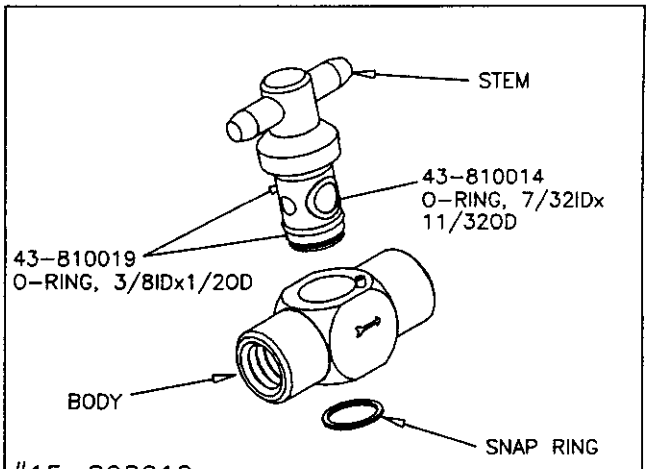
HOSE ACCESSORIES



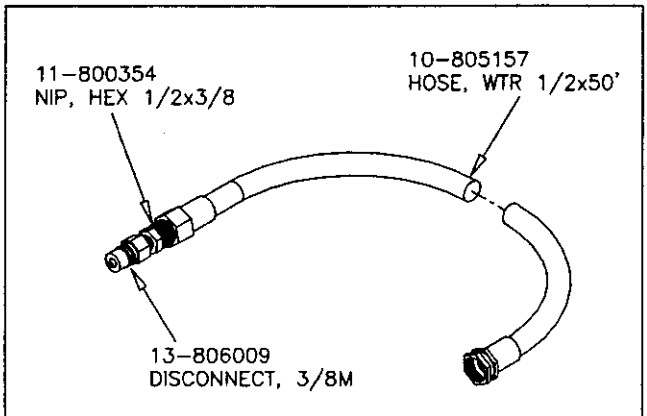
#10-805060, & #12-800078
HOSE, VAC 2"x50 FT w/ CUFFS, & HOSE CONNECTOR



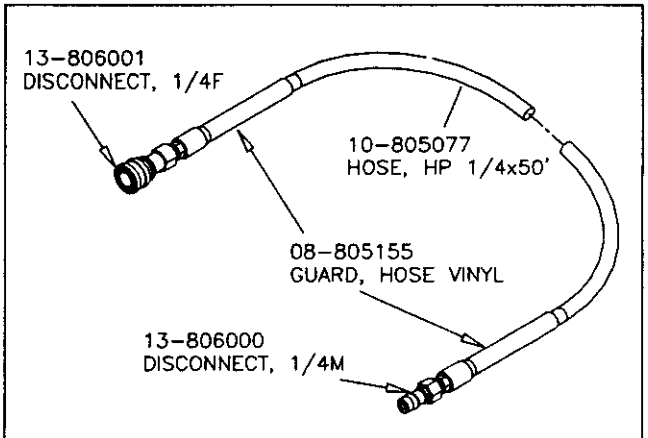
#10-805108
HOSE, HP 1/4"x50 FT w/VALVE & DSC



#15-808012
VALVE, BALL 1/4FP (Detail)

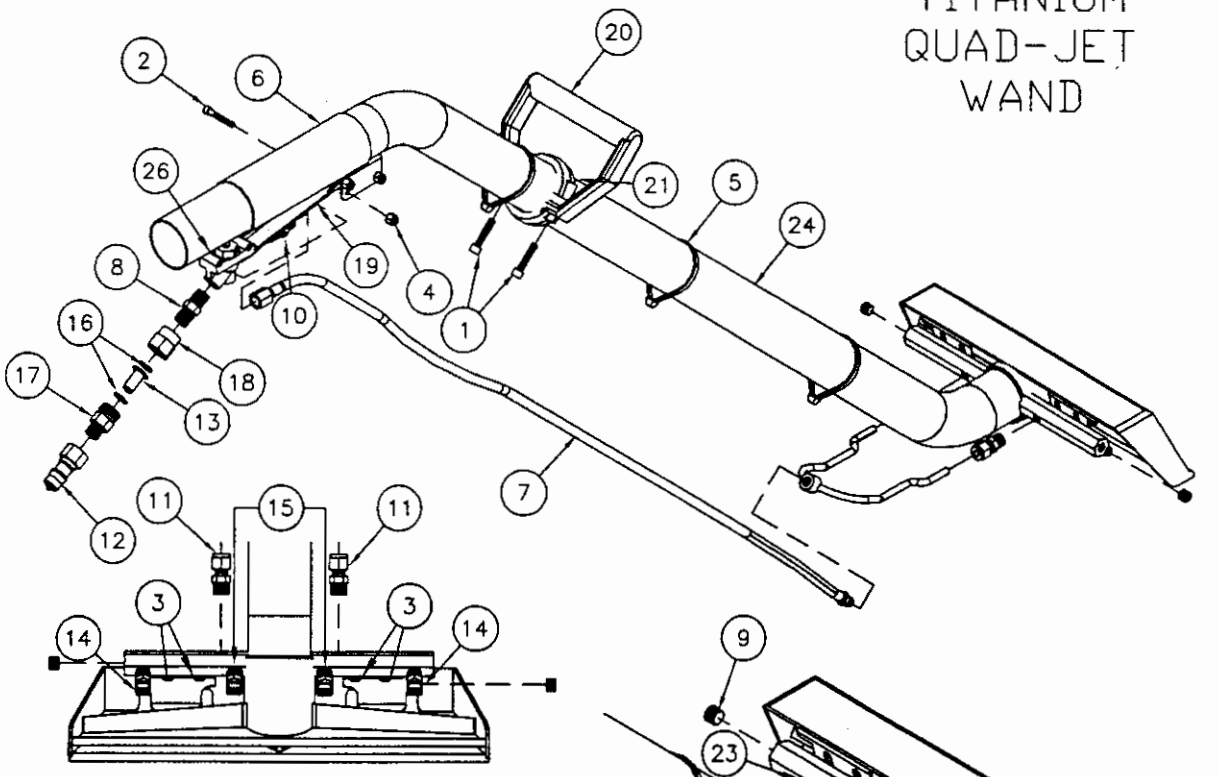


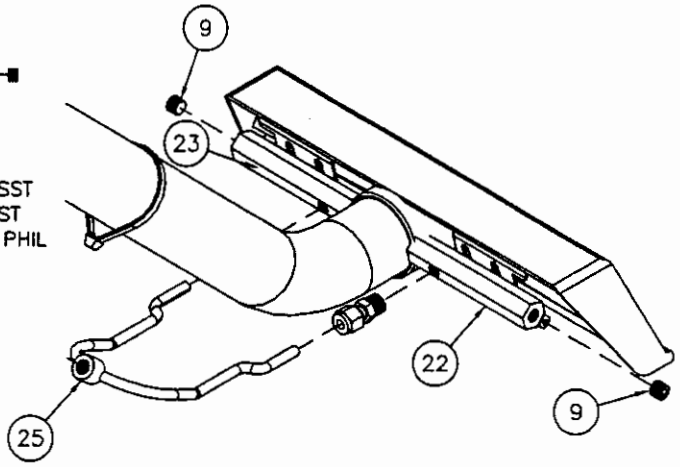
#10-805295
HOSE, WATER 1/2"x50 FT w/DISCONNECT

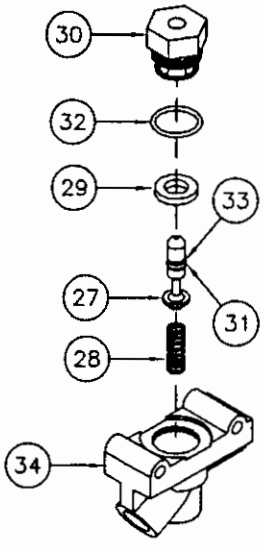


#10-805122
HOSE, HP 1/4"x50 FT w/DISCONNECTS

TITANIUM QUAD-JET WAND





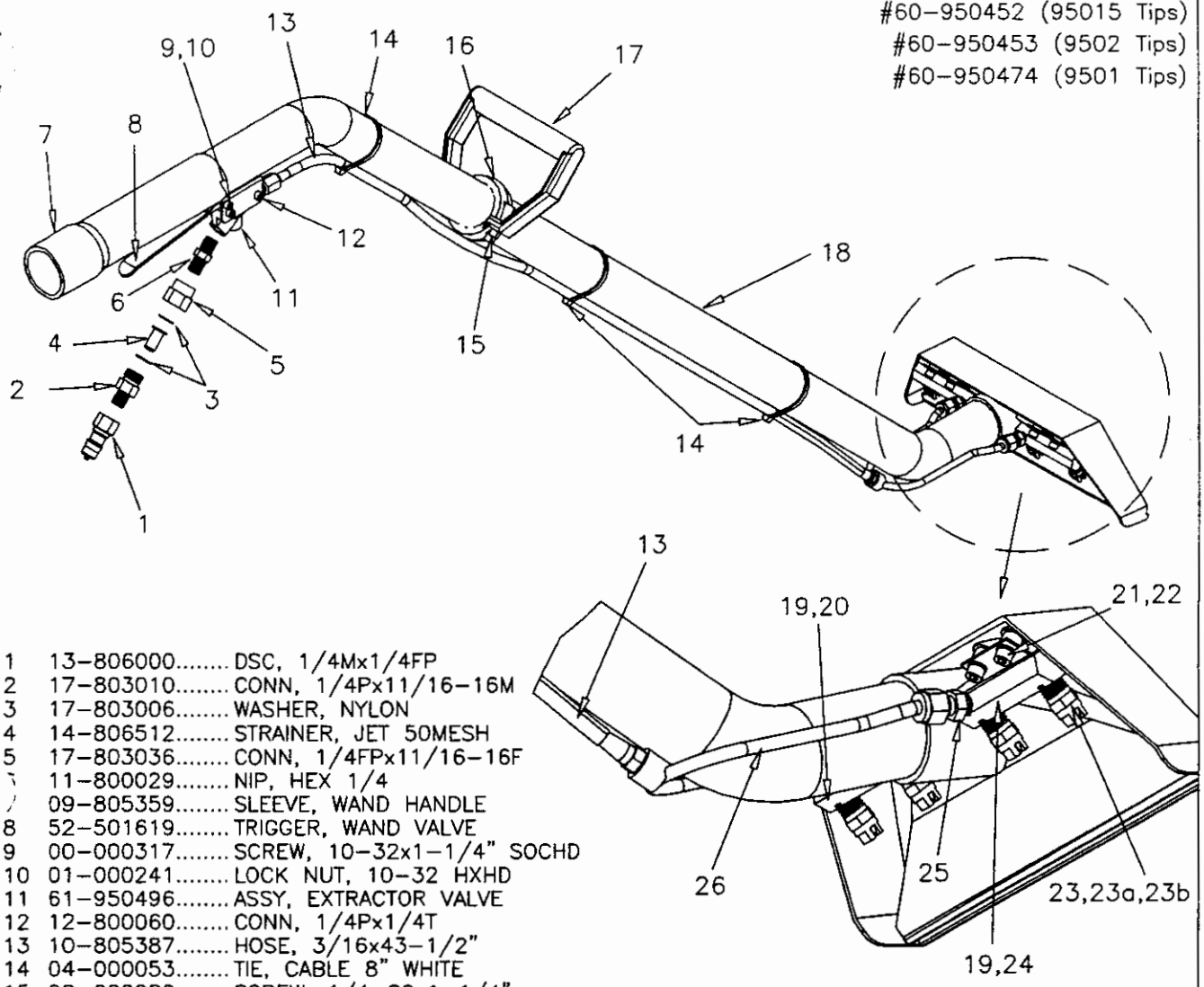


1. 00-000282.....SCREW, 1/4-20 x 1-1/4 SOCHD SST
2. 00-000317.....SCREW, 10-32 x 1-1/4 SOCHD SST
3. 00-000475.....SCREW, 10-32 x 1/4 PANHD SST PHIL
4. 01-000241.....LOCKNUT, 10-32 HXHD SST
5. 04-000053.....TIE, CABLE 8" WHITE
6. 09-805359.....SLEEVE, WAND HANDLE
7. 10-805504.....HOSE, 3/16 x 44-1/2"
8. 11-800029.....NIPPLE, 1/4 HEX BR
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
12. 13-806000.....DSC, 1/4M x 1/4FP BR
13. 14-806512.....STRAINER, JET 50 MESH
14. 17-803001.....TIP, SPRAY 95015 x 1/8P SST
15. 17-803035.....TIP, SPRAY 110015 x 1/8P SST
16. 17-803006.....WASHER, NYLON
17. 17-803010.....CONN, 1/4MP x 11/16-16M
18. 17-803036.....CONN, 1/4FP x 11/16-16F
19. 52-501619.....TRIGGER, WAND VALVE
20. 52-502008.....BODY, WAND HDL 2" TUBE
21. 52-502009.....HOLD DOWN, WAND HDL 2" TUBE
22. 52-502014.....MANIFOLD, RIGHT
23. 52-502015.....MANIFOLD, LEFT
24. 56-502340.....WAND & HANDLE, TITANIUM 13.5"
25. 56-502445.....ASSY, S-BEND MANFLD TUBE
26. 61-950496.....ASSY, EXTRACTOR VALVE
    (INCLUDES PARTS 26-33)
27. 16-808189.....STEM, EXTRACTOR VALVE
28. 16-808190.....SPRING, EXTRACTOR VALVE
29. 16-808228.....SEAT, EXTRACTOR VALVE
30. 16-808229.....HLDR, VLV STEM-EXTRCTR VLV
31. 43-810062.....O-RNG, .114ID .254OD
32. 43-810063.....O-RING, .551ID .691OD
33. 43-810064.....BACK-UP, .250 DIA
34. 52-501590.....BODY, EXTRACTOR VALVE

NOT SHOWN
48-941462.....DECAL, WAND HEAD TITANIUM
48-941296.....LBL INSPECTION QC (PINK)

QUAD–JET WAND

#60–950452 (95015 Tips)
#60–950453 (9502 Tips)
#60–950474 (9501 Tips)

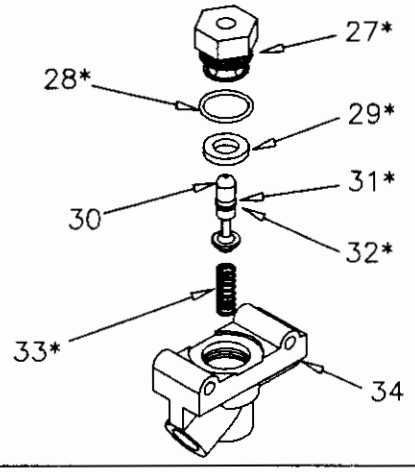


1	13–806000	DSC, 1/4Mx1/4FP
2	17–803010	CONN, 1/4Px11/16–16M
3	17–803006	WASHER, NYLON
4	14–806512	STRAINER, JET 50MESH
5	17–803036	CONN, 1/4FPx11/16–16F
6	11–800029	NIP, HEX 1/4
7	09–805359	SLEEVE, WAND HANDLE
8	52–501619	TRIGGER, WAND VALVE
9	00–000317	SCREW, 10–32x1–1/4" SOCHD
10	01–000241	LOCK NUT, 10–32 HXHD
11	61–950496	ASSY, EXTRACTOR VALVE
12	12–800060	CONN, 1/4Px1/4T
13	10–805387	HOSE, 3/16x43–1/2"
14	04–000053	TIE, CABLE 8" WHITE
15	00–000282	SCREW, 1/4–20x1–1/4"
16	52–501569	HOLD DOWN, WAND HANDLE
17	52–501568	BODY, WAND HANDLE
18	56–501940	WAND&HEAD, CAST SST
19	11–800206	PLUG, 1/8 SOCHD
20	56–501966	ASSY, LEFT S–BEND MNFLD
21	00–000347	SCREW, 10–24x1/4" SOCHD
22	02–000032	LOCK WASHER, #10
23	17–803001	TIP, SPRAY 95015x1/8P (60–950452)
23a	17–803002	TIP, SPRAY 9502x1/8P (60–950453)
23b	17–803018	TIP, SPRAY 9501x1/8P (60–950474)
24	56–501986	ASSY, RIGHT S–BEND MNFLD
25	12–800322	CONN, 1/8Px1/4T COMP
26	56–501967	ASSY, S–BEND MANIFOLD
27	16–808229	HOLDER, VALVE STEM
28	43–810063	O–RING, .551IDx.691OD
29	16–808228	SEAT, EXTRACTOR VALVE
30	16–808189	STEM, EXTRACTOR VALVE
31	43–810064	BACK–UP, .250DIA
32	43–810062	O–RING, .114IDx.254OD
33	16–808190	SPRING, EXTRACTOR VALVE
34	52–501590	BODY, EXTRACTOR VALVE

NOT SHOWN
48–941186 ..... DECAL, WAND HEAD (CAST SST)

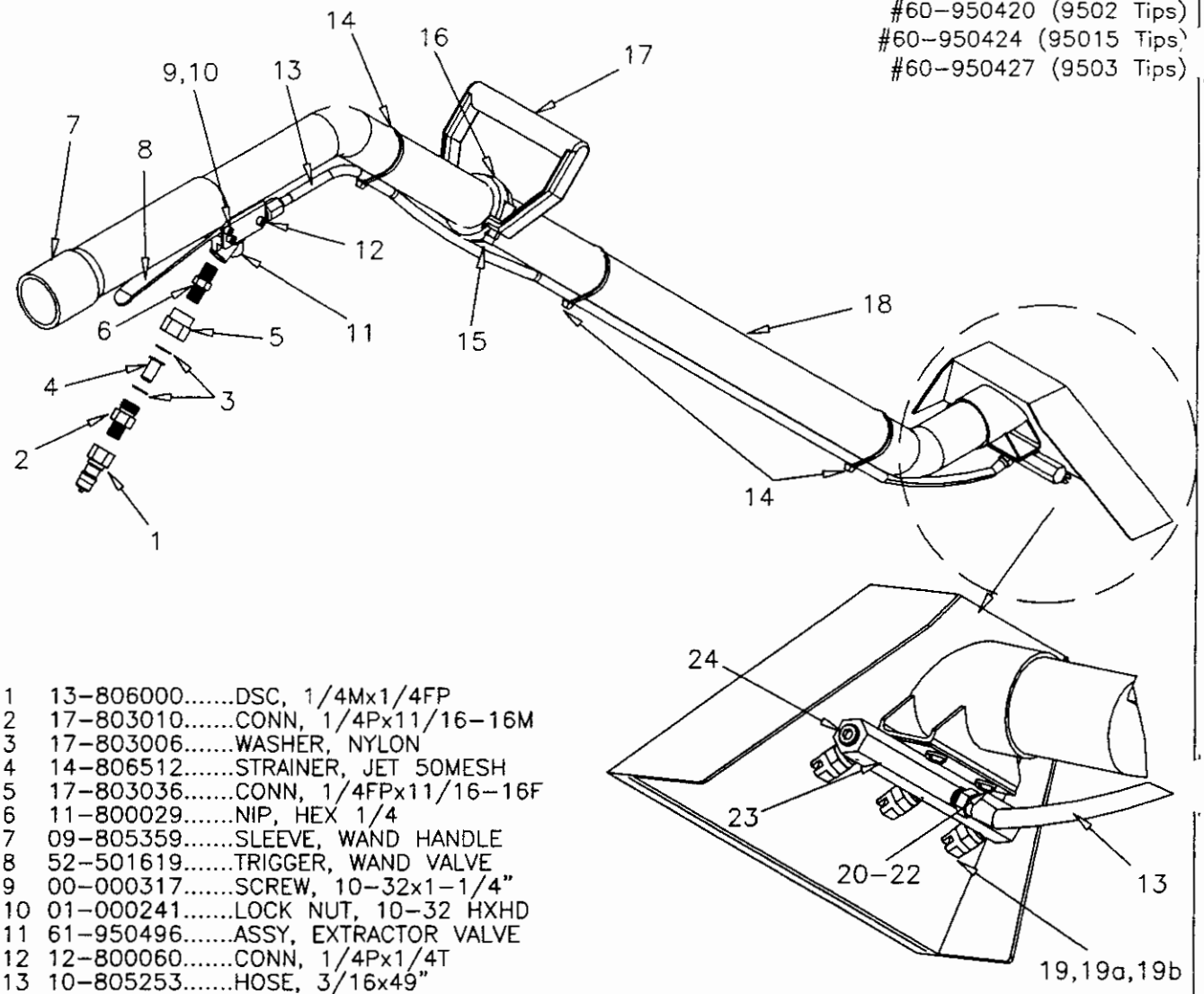
#61–950496
EXTRACTOR VALVE DETAIL

REPAIR KIT, PART #66–808169
(Includes parts with "*")



TRI–JET WAND

#60–950420 (9502 Tips)
#60–950424 (95015 Tips)
#60–950427 (9503 Tips)

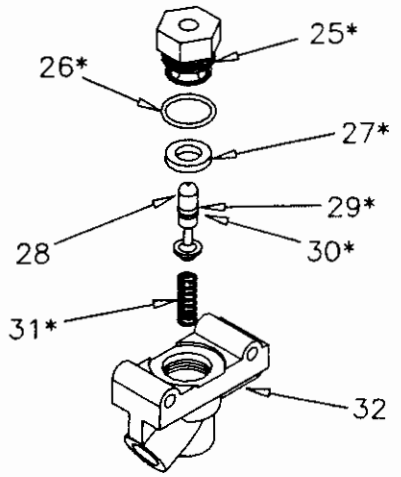


1	13–806000	DSC, 1/4Mx1/4FP
2	17–803010	CONN, 1/4Px11/16–16M
3	17–803006	WASHER, NYLON
4	14–806512	STRAINER, JET 50MESH
5	17–803036	CONN, 1/4FPx11/16–16F
6	11–800029	NIP, HEX 1/4
7	09–805359	SLEEVE, WAND HANDLE
8	52–501619	TRIGGER, WAND VALVE
9	00–000317	SCREW, 10–32x1–1/4"
10	01–000241	LOCK NUT, 10–32 HXHD
11	61–950496	ASSY, EXTRACTOR VALVE
12	12–800060	CONN, 1/4Px1/4T
13	10–805253	HOSE, 3/16x49"
14	04–000053	TIE, CABLE 8" WHITE
15	00–000282	SCREW, 1/4–20x1–1/4"
16	52–501569	HOLD DOWN, WAND HANDLE
17	52–501568	BODY, WAND HANDLE
18	56–501712	WAND&HEAD, TRI–JET WAND
19	17–803002	TIP, SPRAY 9502x1/8P (60–950420)
19a	17–803001	TIP, SPRAY 95015x1/8P (60–950424)
19b	17–803046	TIP, SPRAY 9503x1/8P (60–950427)
20	00–000331	SCREW, 10–32x3/8" SST
21	02–000032	LOCK WASHER, #10
22	01–000018	NUT, 10–32 HXHD SST
23	56–501739	MANIFOLD, WAND TRI–JET
24	11–800206	PLUG, 1/8 SOCHD
25	16–808229	HOLDER, VALVE STEM
26	43–810063	O–RING, .551IDx.691OD
27	16–808228	SEAT, EXTRACTOR VALVE
28	16–808189	STEM, EXTRACTOR VALVE
29	43–810064	BACK–UP, .250DIA
30	43–810062	O–RING, .114IDx.254OD
31	16–808190	SPRING, EXTRACTOR VALVE
32	52–501590	BODY, EXTRACTOR VALVE

NOT SHOWN
48–941166.....DECAL, WAND HEAD

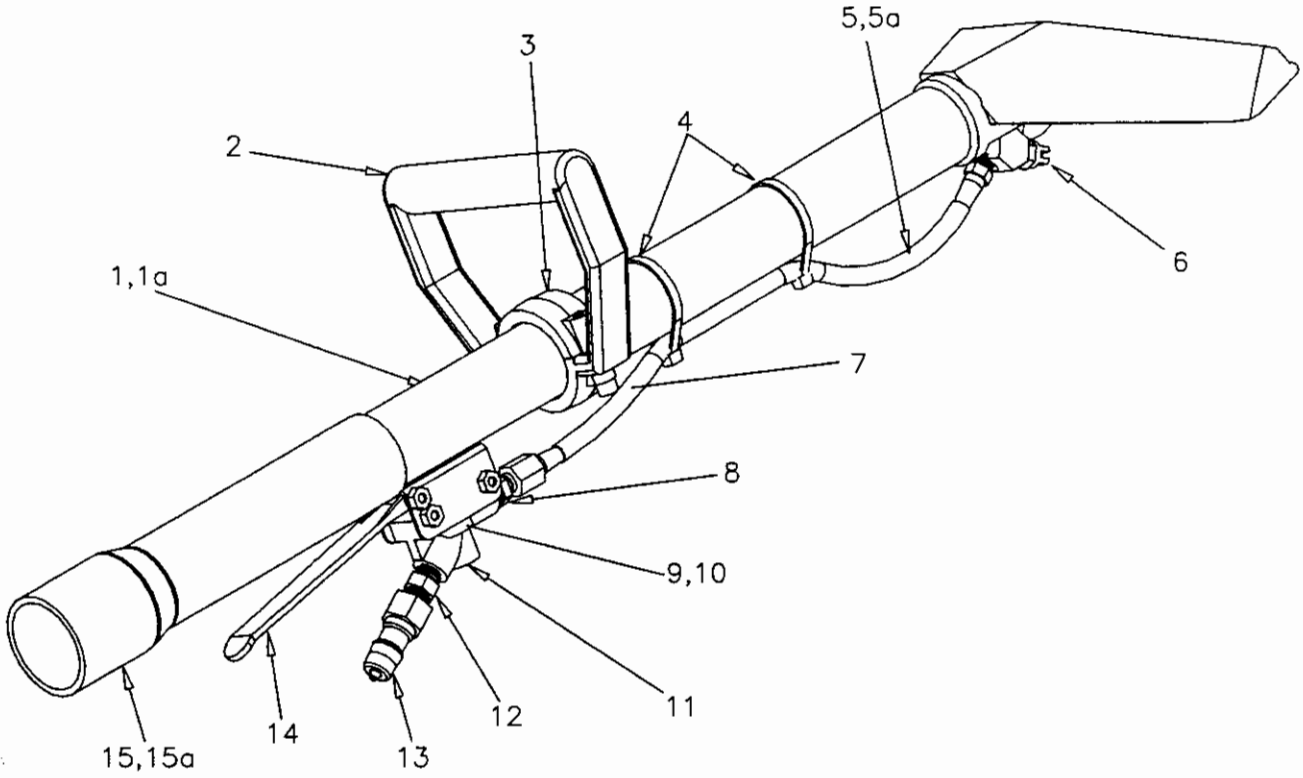
#61–950496
EXTRACTOR VALVE DETAIL

REPAIR KIT, PART #66–808169
(Includes parts with "*")



Truck Mount STAIR TOOL

Long (28-1/2") Truck Mt #60-950421
Short (20") Truck Mt #60-950450

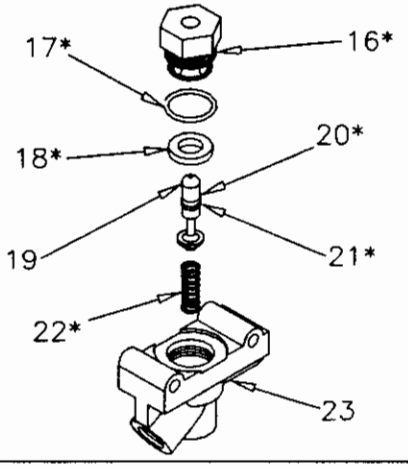


1	56-501715	WD&HD, STAIR TL (Long)
1a	56-501907	WD&HD, STAIR TL (Short)
2	52-501576	BODY, WAND HANDLE
3	52-501577	HOLD DOWN, WAND HDL
4	04-000053	TIE, CABLE 8" WHITE (Long)
5	10-805330	HOSE, 3/16x13-1/2" (Long)
5a	10-805397	HOSE, 3/16x7-1/2" (Short)
6	17-803002	TIP, SPRAY 9502x1/8P
7	00-000282	SCREW, 1/4-20x1-1/4"
8	12-800060	CONN, 1/4Px1/4T
9	00-000317	SCREW, 10-32x1-1/4"
10	01-000241	LOCK NUT, 10-32 HXHD
11	61-950496	ASSY, EXTRACTOR VALVE
12	11-800029	NIP, HEX 1/4
13	13-806000	DSC, 1/4Mx1/4FP
14	52-501619	TRIGGER, WAND VALVE
15	09-805359	SLEEVE, WAND HANDLE (Long)
15a	09-805504	SLEEVE, WAND HANDLE (Short)
16	16-808229	HOLDER, VALVE STEM
17	43-810063	O-RING, .551IDx.691OD
18	16-808228	SEAT, EXTRACTOR VALVE
19	16-808189	STEM, EXTRACTOR VALVE
20	43-810064	BACK-UP, .250DIA
21	43-810062	O-RING, .114IDx.254OD
22	16-808190	SPRING, EXTRACTOR VALVE
23	52-501590	BODY, EXTRACTOR VALVE

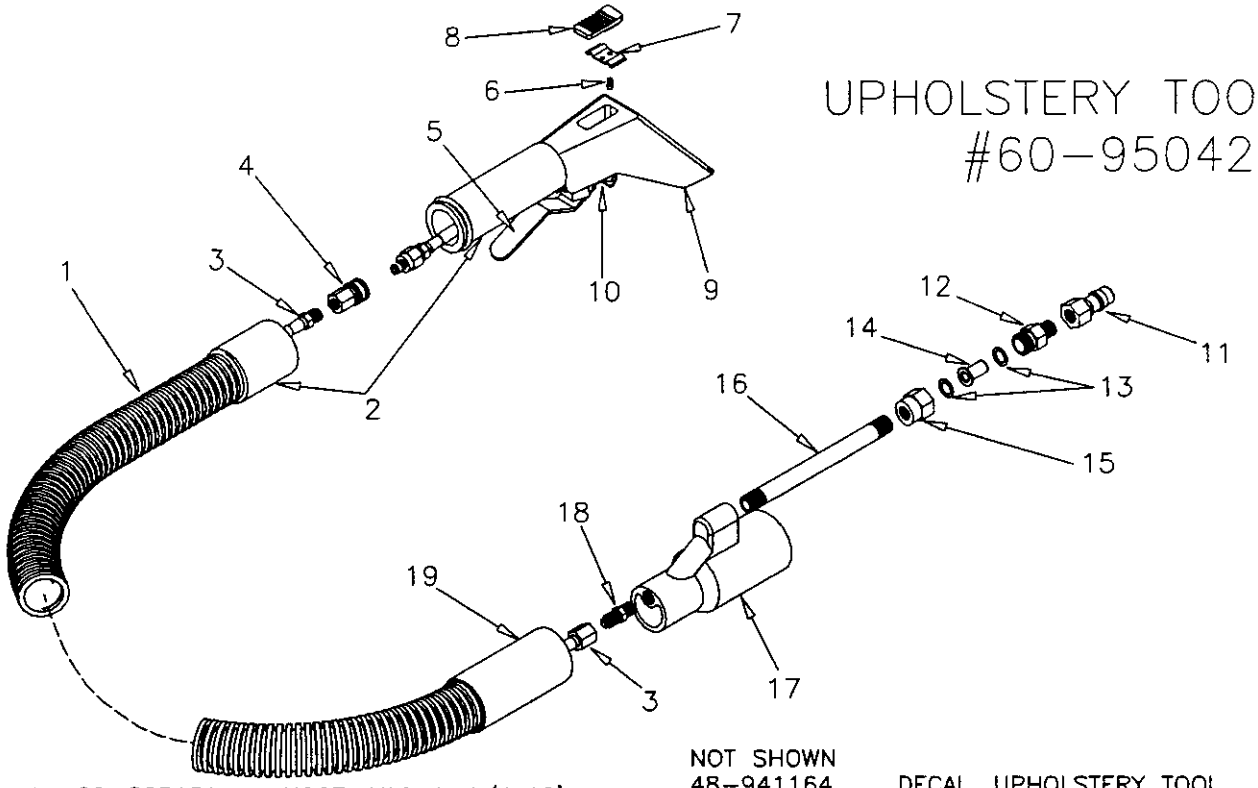
NOT SHOWN
48-941163.....DECAL, STAIR TOOL

#61-950496
EXTRACTOR VALVE DETAIL

REPAIR KIT, PART #66-808169
(Includes parts with "*")



UPHOLSTERY TOOL #60-950422

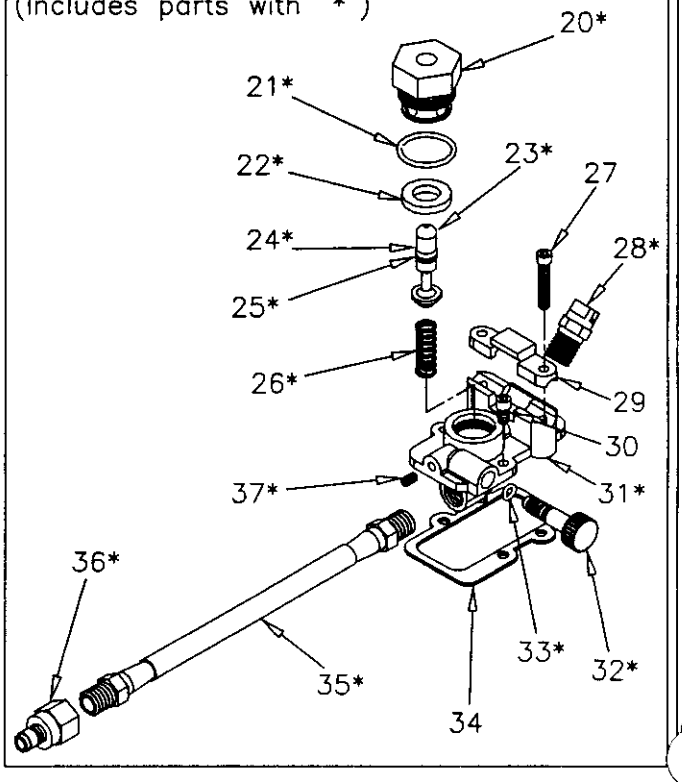


1	09-805131	HOSE, VAC 1-1/4x10'
2	08-805243	CUFF, SWIV 1-1/4Hx1-1/4T
3	10-805347	HOSE, 3/16x119-1/2"
4	13-806023	DSC, 1/8Fx1/8FP
5	58-500639	CASTING, UPHLST TL TRIG
6	00-000310	SCREW, 4-40x7/32"
7	04-000282	SPRING, VAC ADJUST
8	52-501624	BUTTON, VAC ADJUST
9	52-501842	TOOL, UPHOLSTERY
10	61-950570	ASSY, UPHLST TOOL VALVE
11	13-806000	DSC, 1/4Mx1/4FP
12	17-803010	CONN, 1/4MPx11/16-16M
13	17-803006	WASHER, NYLON
14	14-806512	STRAINER, JET 50MESH
15	17-803036	CONN, 1/4FPx11/16-16F
16	11-800404	NIP, 1/4x5" SST
17	52-501585	COUPLER, UPHOLSTERY TL
18	12-800065	CONN, 1/8Px1/4T
19	08-805138	CUFF, 1-1/4Hx1-1/2T
20	16-808229	HOLDER, VALVE STEM
21	43-810063	O-RING, .551IDx.691OD
22	16-808228	SEAT, EXTRACTOR VALVE
23	16-808189	STEM, EXTRACTOR VALVE
24	43-810064	BACK-UP, .250DIA
25	43-810062	O-RING, .114IDx.254OD
26	16-808190	SPRING, EXTRACTOR VALVE
27	00-000306	SCREW, 6-32x1"
28	17-803033	TIP, SPRAY 80015x1/8P
29	58-500638	CASTING, TRIGGER CLAMP
30	00-000307	SCREW, 6-32x3/8"
31	52-501623	VALVE, UPHOLSTERY TOOL
32	52-501626	VALVE, ADJUST UPHLST TL
33	43-810016	O-RING, 5/32IDx9/32OD
34	43-807513	GASKET, UPHLST TOOL VLV
35	10-805348	HOSE, 3/16x6-1/2"
36	13-806030	DSC, 1/8Mx1/8FP
37	00-000408	SCREW, SET 8-32x1/4"

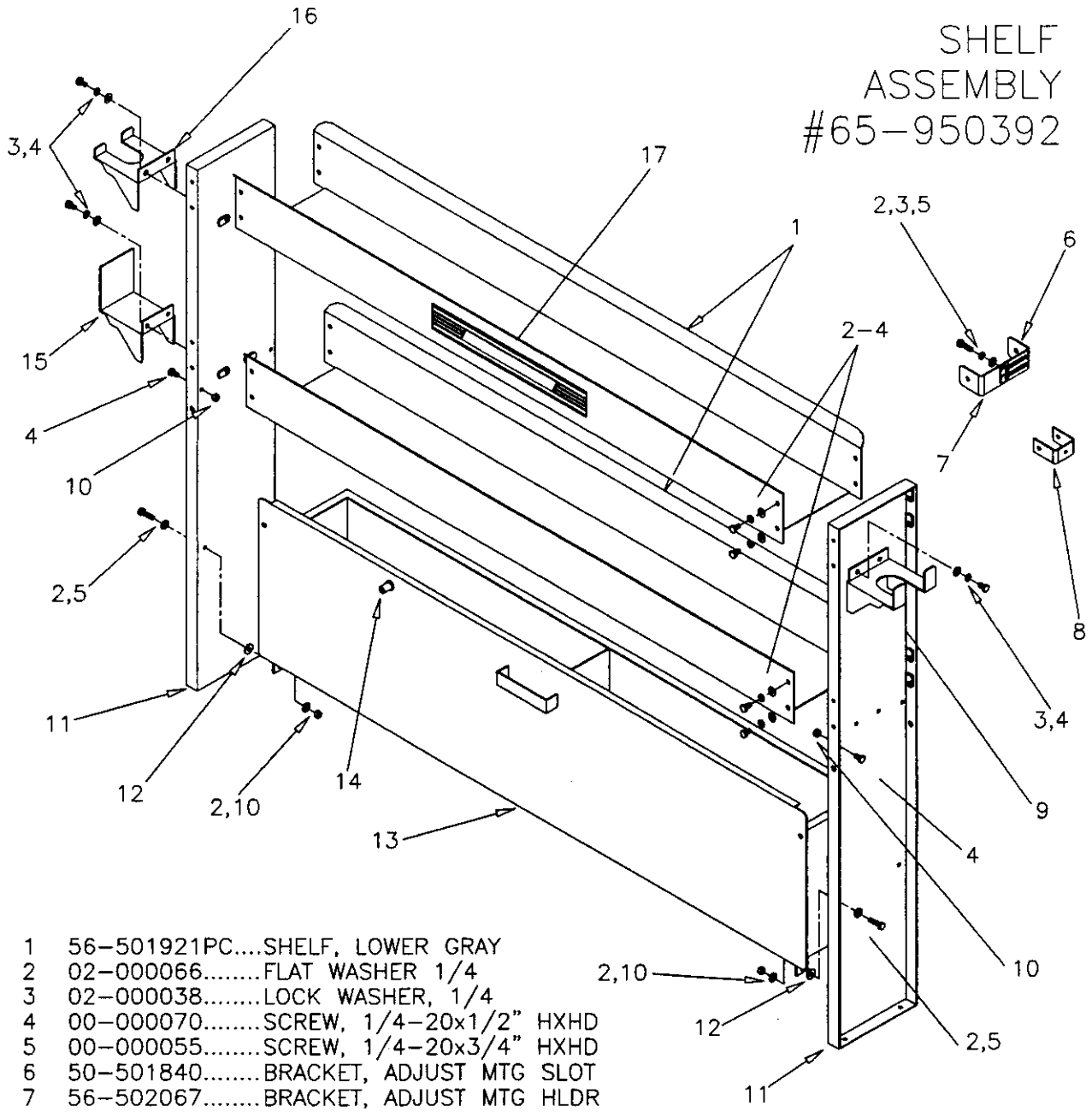
NOT SHOWN

48-941164	DECAL, UPHOLSTERY TOOL
66-808169	KIT, REPAIR WAND VALVE (Includes Parts 20-22, and 24-26)

#61-950570
UPHOLSTERY TOOL VALVE DETAIL
(Includes parts with "*")



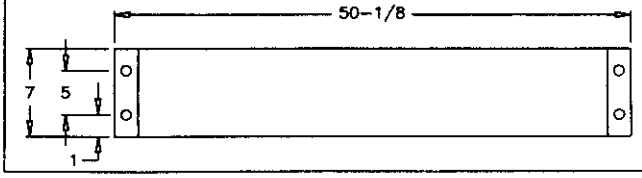
SHELF ASSEMBLY #65-950392



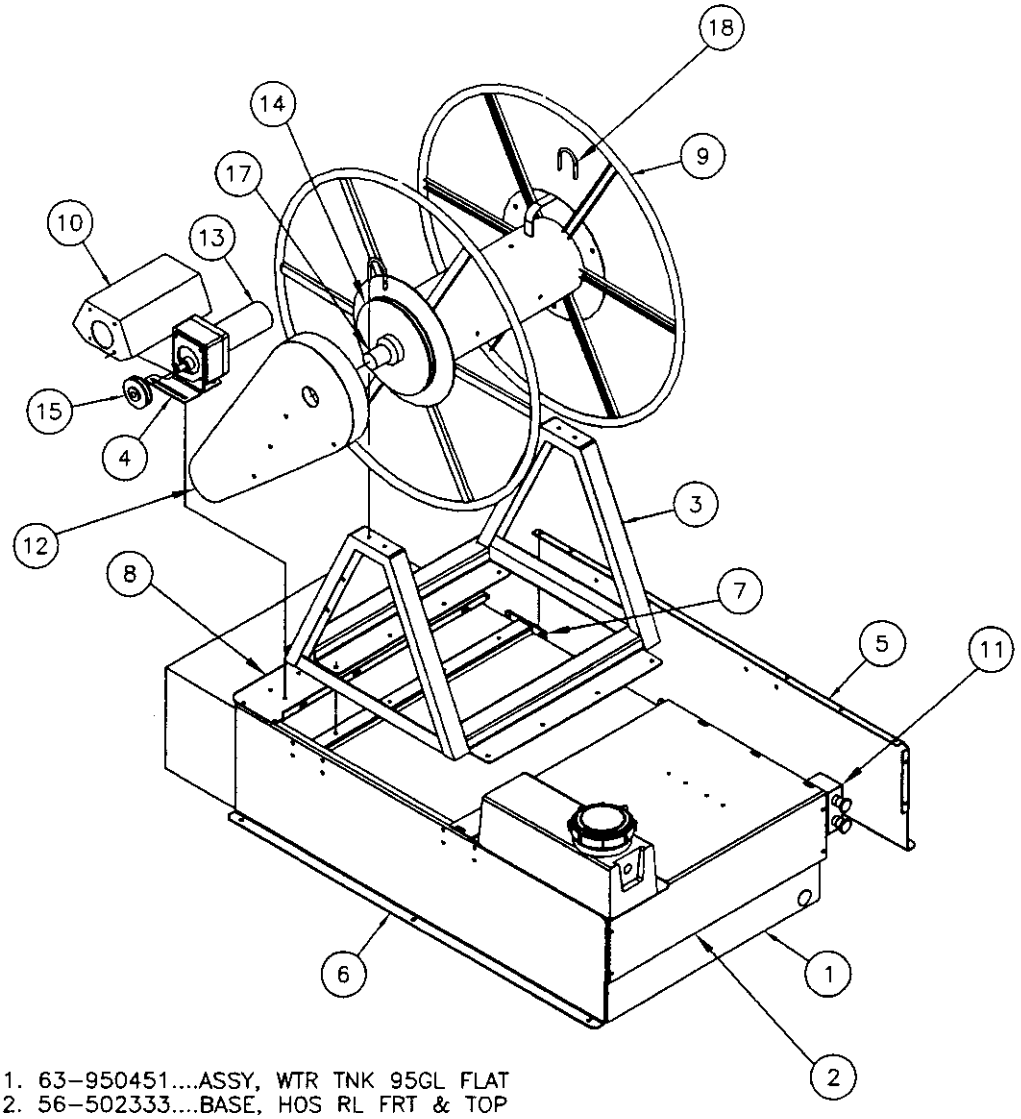
1	56-501921PC....	SHELF, LOWER GRAY
2	02-000066.....	FLAT WASHER 1/4
3	02-000038.....	LOCK WASHER, 1/4
4	00-000070.....	SCREW, 1/4-20x1/2" HXHD
5	00-000055.....	SCREW, 1/4-20x3/4" HXHD
6	50-501840.....	BRACKET, ADJUST MTG SLOT
7	56-502067.....	BRACKET, ADJUST MTG HLDR
8	56-501942.....	BRACKET, SHELF MOUNTING
9	50-501753.....	HOLDER, STAIR TOOL
10	01-000105.....	LOCK NUT, 1/4-20 HXHD
11	56-501922PC....	PANEL, SHELF END GRAY
12	50-501749.....	WASHER, NYLON
13	56-501920PC....	DRWR, SHLF GRAY
14	46-802506.....	LATCH, ADJ GRIP
15	50-501755.....	HLDR, UP TL HOS
16	50-501754.....	HLDR, UPHLST TL
17	48-941152.....	DECAL, PROCHEM
	NOT SHOWN	
	66-945424.....	KIT, ADJ BRACKET (Includes items 6,7 & mtg hardware)

OVERALL DIMENSIONS:
41-1/2" TALL
50-1/8" WIDE
57" WIDE (with tool holders)
7-7/8" DEEP

DIMENSIONAL DATA

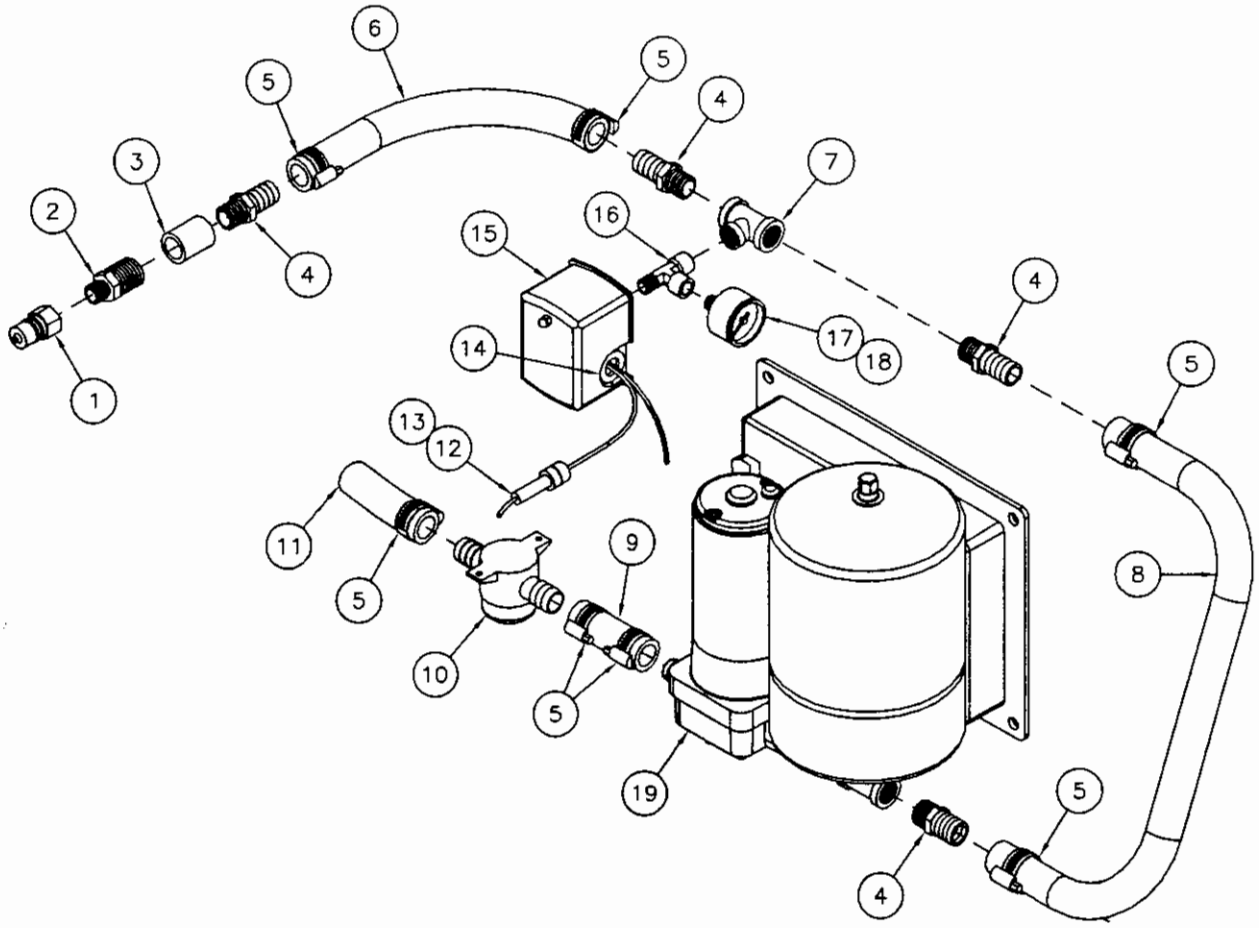


MOTORIZED HOSE REEL WITH WATER TANK ASSEMBLY 65–950521



1. 63–950451....ASSY, WTR TNK 95GL FLAT
2. 56–502333....BASE, HOS RL FRT & TOP
3. 56–502335....BASE, VAC HOS–HOS RL FRAME MTR DRIVE
4. 56–502339....MT, MTR HOS RL MTR DRIVE
5. 56–502356....BASE ,RT SD HOS RL MTR DR
6. 56–502357....BASE, LF SD HOS RL MTR DR
7. 56–502358....BASE, CROSS BAR TB HOS RL MTR DR
8. 56–502359....BASE, MTR MT PNL HOS RL MTR DR
9. 56–502360....RL, VAC HOS–HOS RL MTR DR
10. 56–502361....CVR, HOS RL MTR CVR
11. 56–502362....BX, SW HOS RL MTR DR
12. 56–502363....GUARD, BELT HOS RL MTR DR
13. 40–902151....MOT, 1/8HP 12V PMP–OUT BISON EP5786
14. 44–802309....PULL, AK104
15. 52–501971....PULLEY, AK32 MTR HOS RL
16. 44–802318....BELT, AX65 GOODYEAR MATCHMAKER
17. 52–501685....BUSH, HOS RL
18. 03–000124....CLMP, MFLR 1–3/4 BLK

DEMAND PUMP ASSEMBLY 66–945602



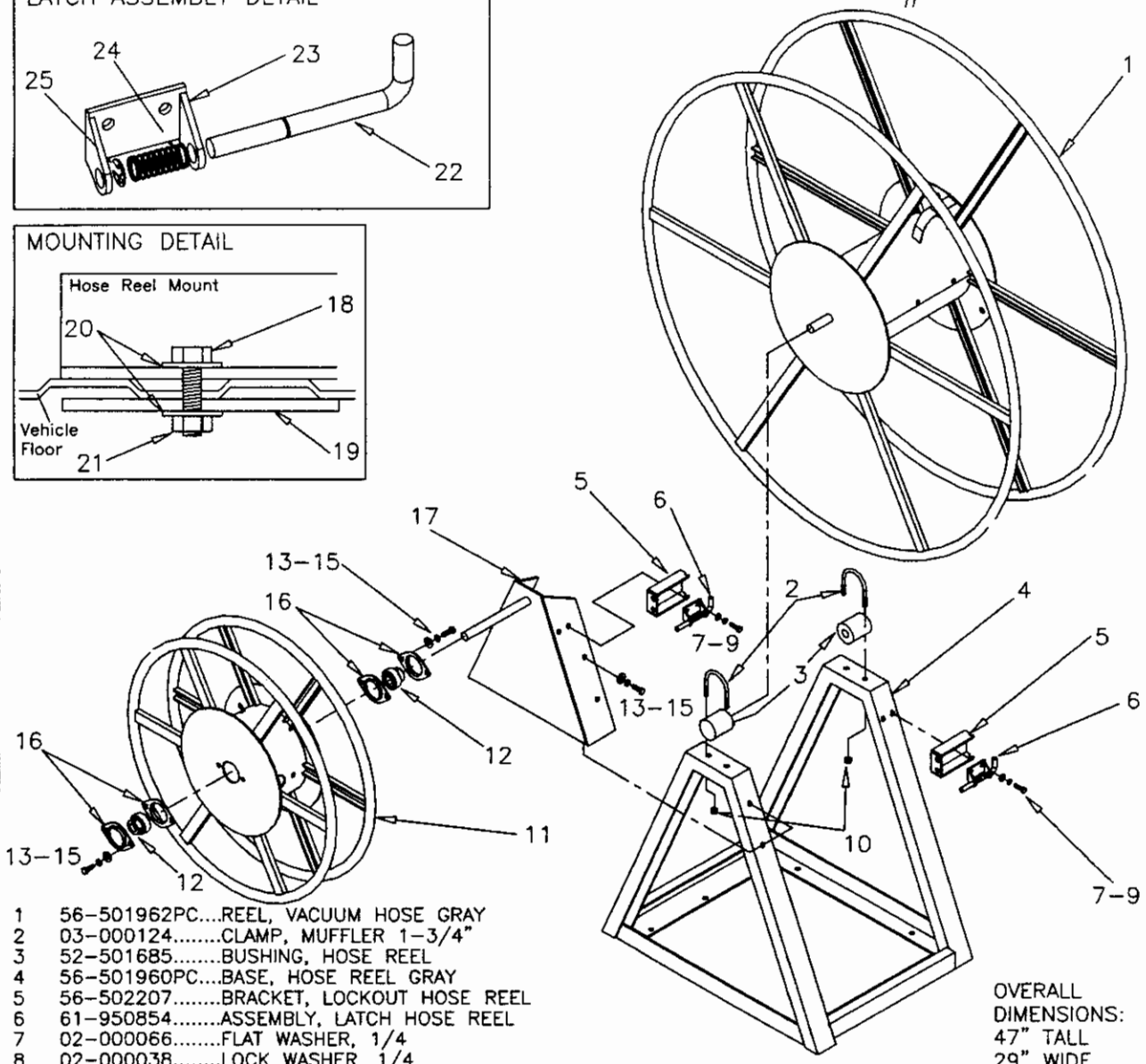
1. 13–806009.....DISCONNECT 3/8M x 3/8P
2. 11–800354.....NIP, HEX 1/2 x 3/8 BR
3. 11–800006.....COUPLING, 1/2 ALUM
4. 12–800278.....FTTG, BARB 1/2P x 3/4H BR
5. 03–000113.....CLAMP, HOSE #12
6. 09–805315.....HOSE, WATER 3/4 x 120"
7. 11–800129.....TEE, 1/2 GALV
8. 09–805291.....HOSE, WATER 3/4 x 19"
9. 09–805278.....HOSE, WATER 3/4 x 3"
10. 14–806553.....FILTER, DEMAND PUMP
11. 09–805061.....HOSE, WATER 3/4 x 63"
12. 31–900171.....HOLDER, FUSE
13. 33–900167.....FUSE AGW 20 AMP
14. 43–807506.....GROMMET, 5/ID x 1–1/8OD
15. 35–900187.....SWITCH WATER PRESSURE
16. 11–800472.....TEE, 1/4F x M x F BR
17. 11–800039.....BUSHING, 1/4 x 1/8 BR
18. 18–808536.....GAUGE, PRESSURE 0–60 PSI
19. 41–905049.....PUMP, WATER BOOSTER FLOJET 2840–100A

ACCESSORIES NOT SHOWN:
HOSE REEL, VACUUM HOSE ONLY #65-950438
DOOR-MOUNT HP HOSE REEL #65-950482

HOSE REEL ASSEMBLY #65-950393

#61-950854
LATCH ASSEMBLY DETAIL

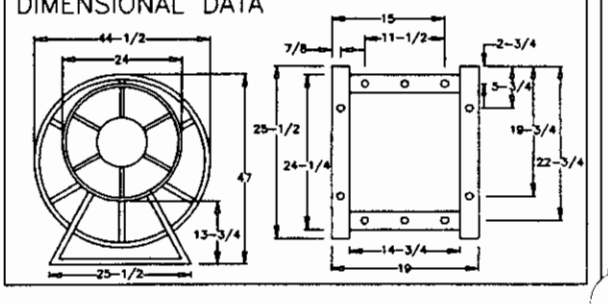
MOUNTING DETAIL

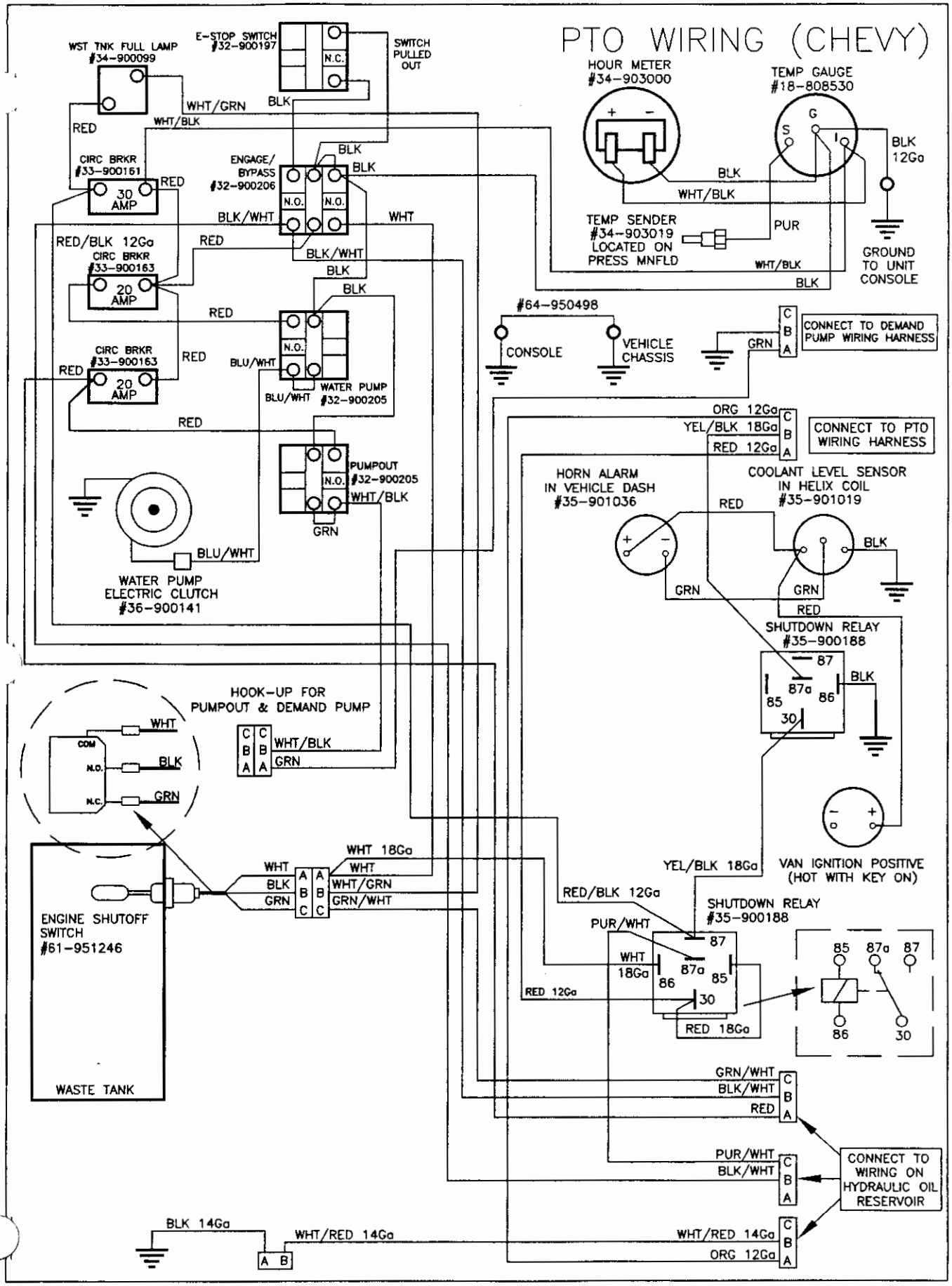


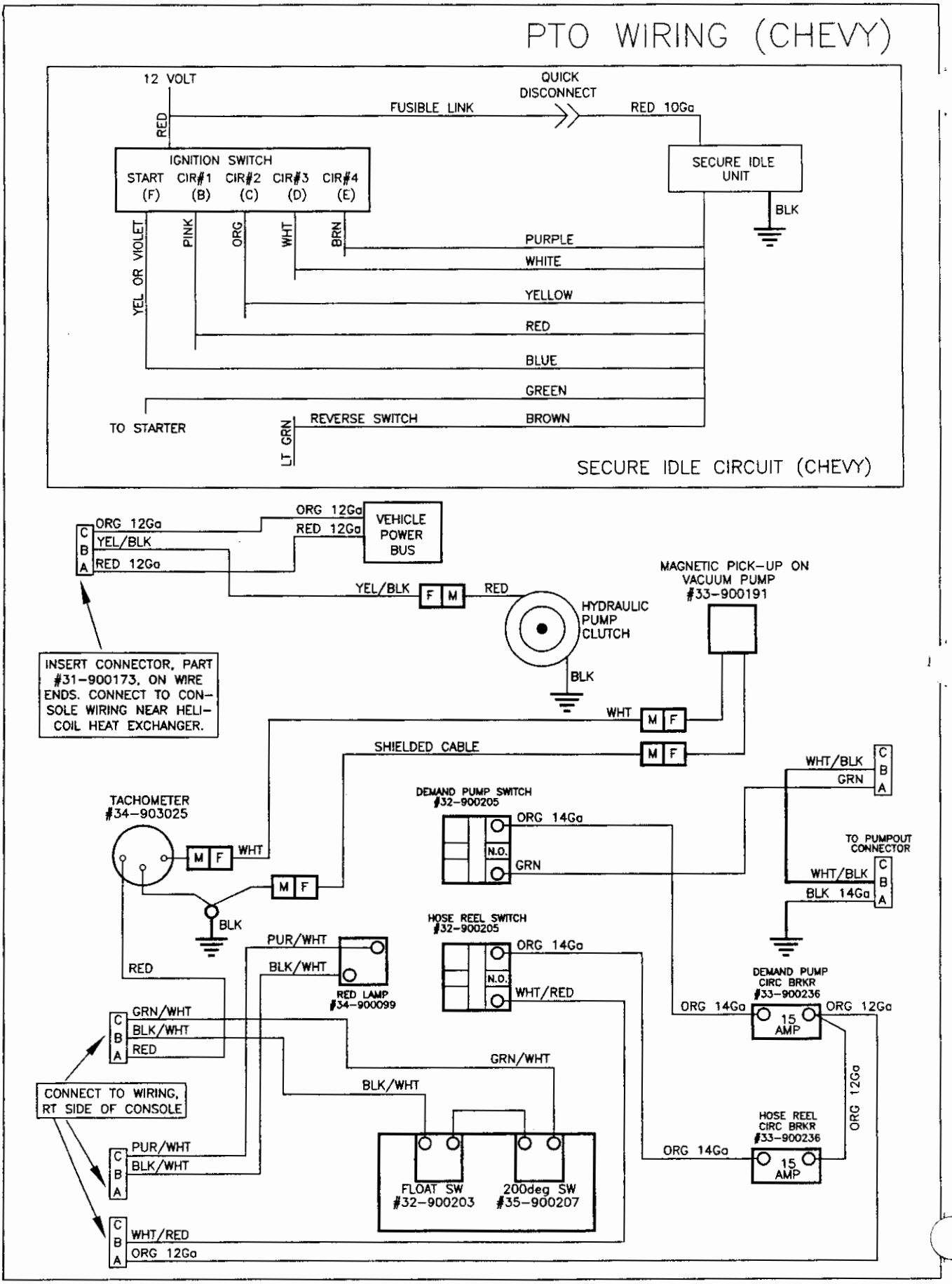
1	56-501962PC	REEL, VACUUM HOSE GRAY
2	03-000124	CLAMP, MUFFLER 1-3/4"
3	52-501685	BUSHING, HOSE REEL
4	56-501960PC	BASE, HOSE REEL GRAY
5	56-502207	BRACKET, LOCKOUT HOSE REEL
6	61-950854	ASSEMBLY, LATCH HOSE REEL
7	02-000066	FLAT WASHER, 1/4
8	02-000038	LOCK WASHER, 1/4
9	00-000055	SCREW, 1/4-20x3/4"
10	01-000041	NUT, 5/16-18 HXHD (Part of item #2)
11	56-501968PC	REEL, HP HOSE GRAY
12	45-802138	BEARING, HOSE REEL
13	02-000143	FLAT WASHER, 5/16
14	02-000040	LOCK WASHER, 5/16
15	00-000039	SCREW, 5/16-18x1"
16	44-802122	FLANGE, 47MST
17	56-501961PC	BODY, HP HOSE GRAY
18	00-000072	SCREW, 3/8-16x2"
19	50-500511	PLATE, INSTALL MOUNT
20	02-000074	FLAT WASHER, 3/8
21	01-000158	LOCK NUT, 3/8-16 HXHD NYLOK
22	55-501789	PIN, LOCK HOSE REEL
23	50-501812	BRACKET, HOSE REEL LOCK
24	04-000302	SPRING, LOCK-LOCK PIN ASSY
25	04-000303	CLIP, RETAINER-LOCK PIN ASSY

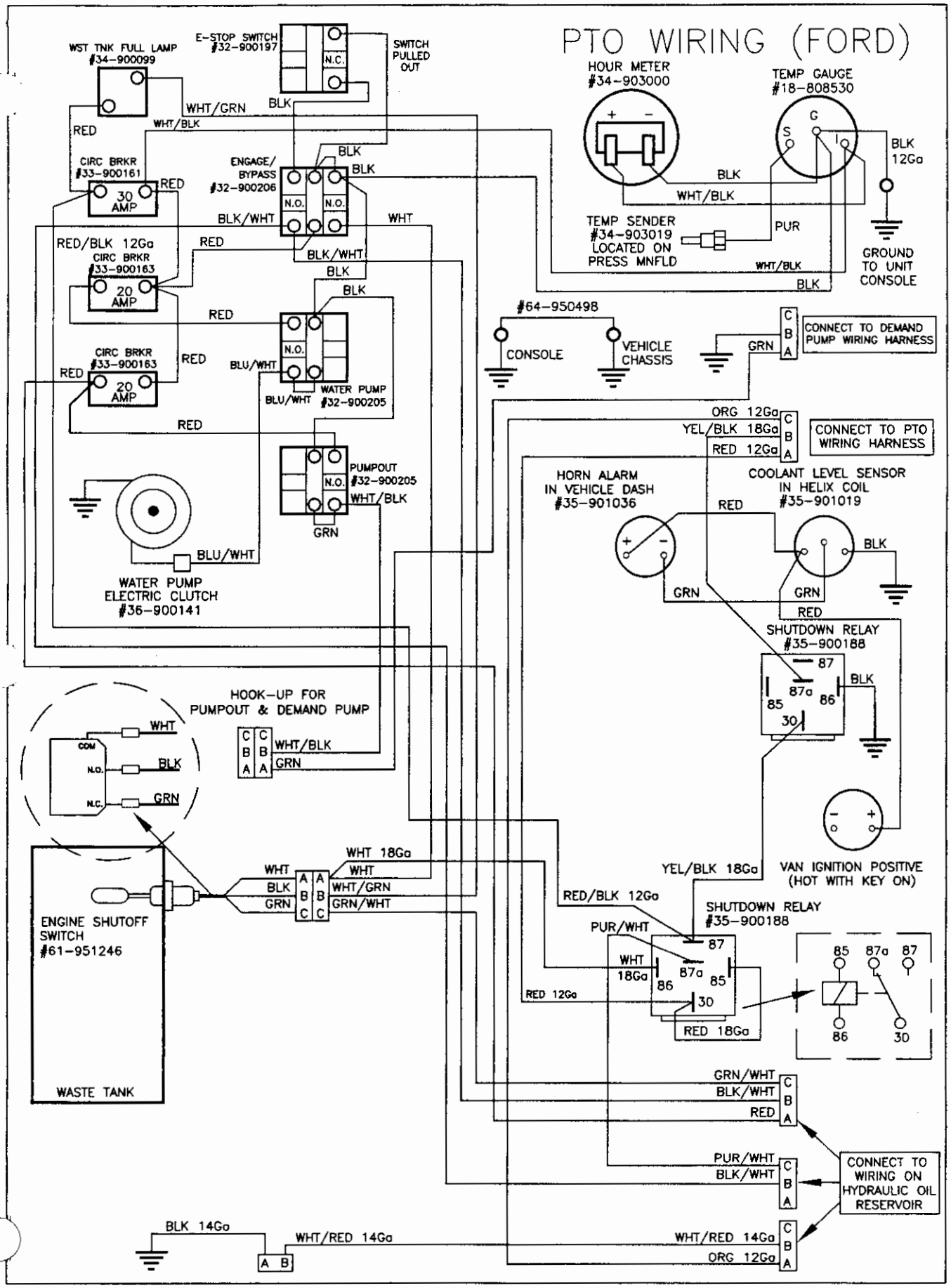
OVERALL DIMENSIONS:
47" TALL
29" WIDE
44-1/2" DEEP

DIMENSIONAL DATA




PTO WIRING (CHEVY)
WST TNK FULL LAMP #34-900099
E-STOP SWITCH #32-900197
SWITCH PULLED OUT
N.C.
WHT/GRN
BLK
RED
WHT/BLK
HOUR METER #34-903000
TEMP GAUGE #18-808530
BLK 12Ga
CIRC BRKR #33-900161
30 AMP
ENGAGE/ BYPASS #32-900206
N.O.
BLK/WHT
WHT
TEMP SENDER #34-903019 LOCATED ON PRESS MNFLD
PUR
GROUND TO UNIT CONSOLE
RED/BLK 12Ga
CIRC BRKR #33-900163
20 AMP
#64-950498
CONSOLE
VEHICLE CHASSIS
GRN
CONNECT TO DEMAND PUMP WIRING HARNESS
BLU/WHT
WATER PUMP #32-900205
ORG 12Ga
YEL/BLK 18Ga
RED 12Ga
CONNECT TO PTO WIRING HARNESS
PUMPOUT #32-900205
WATER PUMP ELECTRIC CLUTCH #36-900141
HORN ALARM IN VEHICLE DASH #35-901036
COOLANT LEVEL SENSOR IN HELIX COIL #35-901019
SHUTDOWN RELAY #35-900188
87
87a
85
86
30
HOOK-UP FOR PUMPOUT & DEMAND PUMP
COM
N.O.
N.C.
ENGINE SHUTOFF SWITCH #61-951246
WASTE TANK
WHT 18Ga
GRN/WHT
VAN IGNITION POSITIVE (HOT WITH KEY ON)
PUR/WHT
BLK/WHT
CONNECT TO WIRING ON HYDRAULIC OIL RESERVOIR
BLK 14Ga
WHT/RED 14Ga
ORG 12Ga


PTO WIRING (CHEVY)
12 VOLT
RED
FUSIBLE LINK
QUICK DISCONNECT
RED 10Ga
IGNITION SWITCH
START (F)
CIR#1 (B)
CIR#2 (C)
CIR#3 (D)
CIR#4 (E)
SECURE IDLE UNIT
BLK
YEL OR VIOLET
PINK
ORG
WHT
BRN
PURPLE
WHITE
YELLOW
RED
BLUE
GREEN
BROWN
TO STARTER
LT GRN
REVERSE SWITCH
SECURE IDLE CIRCUIT (CHEVY)
ORG 12Ga
RED 12Ga
YEL/BLK
VEHICLE POWER BUS
C B A
INSERT CONNECTOR, PART #31-900173, ON WIRE ENDS. CONNECT TO CONSOLE WIRING NEAR HELICOIL HEAT EXCHANGER.
YEL/BLK
F M
RED
HYDRAULIC PUMP CLUTCH
BLK
MAGNETIC PICK-UP ON VACUUM PUMP #33-900191
WHT
M F
SHIELDED CABLE
TACHOMETER #34-903025
WHT
BLK
DEMAND PUMP SWITCH #32-900205
ORG 14Ga
N.O.
GRN
WHT/BLK
GRN
TO PUMPOUT CONNECTOR
BLK 14Ga
HOSE REEL SWITCH #32-900205
PUR/WHT
BLK/WHT
RED LAMP #34-900099
RED
WHT/RED
DEMAND PUMP CIRC BRKR #33-900236
15 AMP
ORG 12Ga
GRN/WHT
BLK/WHT
RED
CONNECT TO WIRING, RT SIDE OF CONSOLE
FLOAT SW #32-900203
200deg SW #35-900207
HOSE REEL CIRC BRKR #33-900236
WHT/RED
ORG 12Ga


PTO WIRING (FORD)
WST TNK FULL LAMP #34-900099
E-STOP SWITCH #32-900197
N.C.
SWITCH PULLED OUT
WHT/GRN
BLK
RED
WHT/BLK
CIRC BRKR #33-900161
30 AMP
ENGAGE/ BYPASS #32-900206
N.O.
N.O.
BLK
BLK/WHT
WHT
RED/BLK 12Ga
CIRC BRKR #33-900163
20 AMP
RED
BLK/WHT
BLK
N.O.
BLU/WHT
WATER PUMP #32-900205
CIRC BRKR #33-900163
20 AMP
PUMPOUT #32-900205
N.O.
WHT/BLK
GRN
BLU/WHT
WATER PUMP ELECTRIC CLUTCH #36-900141
HOUR METER #34-903000
TEMP GAUGE #18-808530
G
S
I
BLK 12Ga
GROUND TO UNIT CONSOLE
TEMP SENDER #34-903019 LOCATED ON PRESS MNFLD
PUR
WHT/BLK
#64-950498
CONSOLE
VEHICLE CHASSIS
GRN
CONNECT TO DEMAND PUMP WIRING HARNESS
ORG 12Ga
YEL/BLK 18Ga
RED 12Ga
CONNECT TO PTO WIRING HARNESS
HORN ALARM IN VEHICLE DASH #35-901036
COOLANT LEVEL SENSOR IN HELIX COIL #35-901019
SHUTDOWN RELAY #35-900188
87
87a
85
86
30
HOOK-UP FOR PUMPOUT & DEMAND PUMP
COM
N.O.
N.C.
WHT
BLK
GRN
WHT/BLK
GRN
ENGINE SHUTOFF SWITCH #61-951246
WASTE TANK
WHT 18Ga
WHT/GRN
GRN/WHT
YEL/BLK 18Ga
VAN IGNITION POSITIVE (HOT WITH KEY ON)
RED/BLK 12Ga
PUR/WHT
RED 12Ga
RED 18Ga
GRN/WHT
BLK/WHT
RED
PUR/WHT
BLK/WHT
CONNECT TO WIRING ON HYDRAULIC OIL RESERVOIR
BLK 14Ga
WHT/RED 14Ga
ORG 12Ga

PTO WIRING (FORD)