HYDRAMASTER

Corporation
11015 47th Avenue W, Mukilteo, WA 98275

MAXX 550

Machine Serial Number _____

D-182-055

Revised April 4, 2000

Table of Contents

MAXX 550

Introduction

MAXX 550
Section 1-1

This manual contains installation and operation instructions as well as information required for proper maintenance, adjustment and repair of this unit. Since the first and most important part of repair work is the correct diagnosis of the problem, component manual troubleshooting charts have been included for your convenience.

Unlike a garden tractor, lawn mower or cement mixer, all having one or two functions to perform, the truckmounted carpet cleaning plant has many functions to perform simultaneously.

- The engine has to run at a consistent RPM.
- The vacuum has to pull air and dirty water back from cleaning site.
- The water pump provides stable pressure at proper water flow for cleaning.
- The chemical has to be injected into the water stream at the right concentration.
- The heating system must maintain proper heat.
- The vacuum tank must store dirty water until drained.

As you can see, it is not just a turn-key operation with one thing to worry about, **Does it start?**!

♦ WARNING ♦

The manufacturer uses this symbol throughout the manual to warn of possible injury or death.

♦ CAUTION ♦

This symbol is used to warn of possible equipment damage.

Hours	**Telephone Numbers**
Monday - Friday	(425) 775-7276 Parts
8:00 am to 5:00 pm	(425) 775-7275 Service
PACIFIC STANDARD TIME	(800) 426-4225 Parts / Service FAX

Precautions

Although this unit has been factory adjusted, it may require additional adjustments to achieve optimum performance, for instance altitude may require carburetor adjustment and ambient temperatures may require heat control adjustment. When required, consult an authorized representative.

♦ CAUTION ♦

THROUGH-FLOOR DRILLING: Be cautious when drilling holes through the van floor. Many vans have critical components mounted directly below the van floor that could be damaged by a misplaced drill bit. (See Product Support Bulletins 92102, 94062 and 94063 at the end of the manual.)

♦ CAUTION ♦

ENGINE COOLING: Units employing internal combustion engines must not be enclosed within a van with doors and windows closed. Excessive temperatures within the engine will result in premature engine failure and a compromise of applicable warranty.

♦ CAUTION ♦

LEVEL OPERATION: During operation, van or trailer must be parked on level ground not to exceed + or - 10°. Failure to insure proper leveling may prevent proper internal lubrication of engine, vacuum and/or high pressure components.

♦ WARNING ♦

MOVING PARTS: Never touch any part of the machine that is in motion. Severe bodily injury may result.

♦ CAUTION ♦

ACID RINSE AGENTS: The increased demand for "clear water" rinsing results in the need for special care when using these acid based chemicals in your equipment. The negative side of these products is the corrosive effects the acid can have on metals, including swivels, pumps, heat exchangers, etc.

HydraMaster's ***ClearWater Rinse*** has been formulated to protect vital components. HydraMaster will not warranty parts that have been damaged from using unprotected acid products that have obviously caused failures.

♦ CAUTION ♦

HARD WATER PROTECTION: Failure to take appropriate measures to prevent scale build up can result in **system failure** and **loss of warranty** on affected parts. Test the water in your immediate and surrounding areas with hard water test strips. Assume all water obtained from wells is hard. If you are operating in a "Hard Water Area" (3.5 grains or more per gallon), use a water softening system.

♦ CAUTION ♦

FREEZE PROTECTION: There is often little warning before a cold spell. Therefore, not protecting this equipment from freezing will result in costly

down-time. Placing an electric heater in the truck or parking the truck indoors will help to insure against freezing, but should not be the primary method of freeze protection.

♦ CAUTION ♦

EXHAUST SYSTEM: Do not allow flammable material (i.e. oil, fuel, plastic or wood products) to come in contact with the exhaust system.

♦ WARNING ♦

HOT SURFACES: During the operation of this equipment, many surfaces on the machine will become very hot. When near the van for any reason care must be taken not to touch any hot surface, such as heater, engine, exhaust, etc.

♦ WARNING ♦

HEARING PROTECTION: The Occupational Safety and Health Administration (OSHA) recommends the use of hearing protection when a technician is exposed to an *average* of 85 decibels (this is an average of exposure over an 8 hour period). This equipment can produce 85 decibels to a distance of 10 feet. Please check with your local state agencies to see if OSHA standards apply to your application.

♦ WARNING ♦

NO SMOKING: It is unsafe to smoke in or around the vehicle.

♦ WARNING ♦

CARBON MONOXIDE: This unit generates toxic fumes. Position the vehicle so that the fumes will be directed **away** from the job site. **Do not park** where exhaust fumes can enter a building through open doors, windows, air conditioning units or kitchen fans.

♦ WARNING ♦

TOXIC FUMES: Do not occupy the vehicle when the cleaning equipment is operating. Toxic fumes may accumulate inside a stationary vehicle.

♦ WARNING ♦

ENGINE EXHAUST: The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

♦ WARNING ♦

CARBURETOR DRAIN: Under no circumstances should the drain in the carburetor bowl be utilized when the machine is hot.

♦ WARNING ♦

PORTABLE GAS TANK: Never operate this machine with a portable gas can inside the truck. Doing so increases the risk of a fire or explosion.

♦ WARNING ♦

PORTABLE PROPANE TANK: Do not use a portable tank inside of the truck or van. It is dangerous and illegal in most states.

♦ WARNING ♦

TRANSPORTATION OF FUEL CONTAINERS: Transportation in a vehicle of any vented fuel container that presently has or has ever contained a flammable liquid is strictly forbidden by HydraMaster Corporation and by federal and state regulation.

System Overview

The MAXX 550 heat exchanger system is a highly engineered cleaning plant designed by HydraMaster Corporation. The system utilizes a dynamic heating system comprised of three separate exhaust heat exchangers for capturing "free heat."

The water flow is as follows:

> Water is fed into the machine under tap pressure. It is automatically combined with a cleaning solution as it enters the mix tank. The solution is then picked up by the high pressure pump and pressurized to the desired level. The water then splits flow, as demanded by the technician. The majority of the water flows to the by-pass valve assembly, then back to the mix tank. The water demanded by the technician flows from the water pump through the engine heat exchanger, secondary exhaust heat exchanger, and then through the primary heat exchanger, then out to the cleaning tool.

When the cleaning solution reaches a pre-set high temperature, it is released from the system and directed to the recovery tank. Then cool water enters the system to regulate the temperature.

As there is no guess work in the manufacture of these highly advanced cleaning plants, there must be none in preparing it to get the job done in the field. It is the purpose of this manual to help you properly understand, maintain and service your cleaning plant. Follow the directions carefully and you will be rewarded with years of profitable, trouble-free operation.

It is imperative that no section be overlooked when preparing for operation of this equipment.

Machine Specifications

Frame: 27.5"W x 48"L x 40.5"H Stainless Steel

Weight: 1000 lbs.

Cowling: Aluminum with Baked-on Epoxy Finish

Engine:
Ford VSG 413
Displacement: 1300 cc
Ignition: Electronic
12 v Electric Starter Motor
12 v, 35 amp Alternator, Regulated
Integrated Electronic Governor
Pressurized Oil System with Filter
Pressurized Cooling System
Double Row Radiator

Vacuum Blower: 56 RAI J WhispAir™

Chemical System: Electro-mechanical, Meter Controlled

Heating System:
1. Stainless Steel Heat Exchanger
2. Air to water Heat Exchangers
3. Copper Shell and Tube Heat Exchangers

Instruments and Controls:
Water Pressure Gauge,
Liquid Filled, 0-1000 PSI
Water Temperature Gauge, 0-280° F
Vacuum Level Gauge, 0-30" Hg
Hour Meter, machine run time
Chemical Flowmeter, clear acrylic, 0-10 GPH
Adjustable Temperature Dial
"Run" Indicator Lamp

"Vac Tank" Full Lamp
"Pump Out Operating" Lamp
"Mix Tank Filling" Lamp
"High Temp Bypass" Lamp
"High Temp Shutdown" Lamp
Keyed Ignition
Resettable Circuit Breakers
Accessory Switches
Three Position Engine Throttle
Mix Tank Drain Valve
Recovery Tank Drain Valve
Panel Mounted Pressure Adjustment Valve
Blower Lubrication Port

Recovery Tank: 100 gallon Aluminum, Epoxy Finish

Cleaning Wand: Stainless Steel with Heat Shield. Grip and Replaceable Vacuum Lips with Stainless Steel Solution Valve.

High Pressure Hose: ¼" High temperature, Lined, Rubber Cover, Single braid Stainless Hose rated to 2200 PSI.

Vacuum Hose: 2" Reinforced, 1½" Reinforced

Standard Equipment:
Machine Power Console
Full Instrumentation
WhispAir™ Vacuum Blower
MAXX™ Water Heating Package
Deluxe Sound Suppression Package
Vacuum Recovery Tank
Carpet Cleaning Wand
5 gallon Chemical Jug
Chemical Jug Holder
Chemical Jug Fill Line
150 ft, 2" Vacuum Hose
10 ft, 1½" Wand Whip-line
10 ft, 1½" Recovery Drain Line

50 ft, Water Supply Line
150 ft, ¼" Super Flex Solution Line
Dual-Wand Vacuum Fittings
Dual-Wand Solution Fittings
Freeze Guard System
Battery Box with Holder
Van Decal Package
Van Installation Kit
Operation Manual
HydraMaster Jacket

Optional Equipment: Please refer to Section 14.

Spare Parts

Down-time on the unit can be very expensive, because your truck-mounted unit is capable of generating several hundred dollars per day. In order to minimize such down-time, it is strongly recommended by the manufacturer that you purchase and keep in your truck the parts listed below.

Parts Orders

To expedite your parts needs, please call your sales representative. In most instances, he either stocks or has access to parts through a regional service center. If further assistance is needed, contact the factory and coordinate your needs. If this becomes necessary, always indicate the method of shipment you desire, i.e. UPS, Blue Label, Air Freight, Air Express, etc.

HydraMaster Parts Dept. Phone.....(425) 775-7276
HydraMaster Parts Dept. Toll Free Fax.....1-800-426-4225

Spare Parts List (078-310)

PART NO	DESCRIPTION	QTY
010-011	Belt, #9335 Pump Drive	1
010-013	Belt, Air pump drive	1
010-026	Belt, Alternator drive	1
010-070	Belt, B-46 V-Belt drive	1
018-004	Breaker, 25 amp Circuit	1
018-005	Breaker, 20 amp Circuit	1
049-015	Filter, ½" Replacement Y	1

PART NO	DESCRIPTION	QTY
049-016	Filter, 1/4" Replacement Y	2
049-023	Screen, Garden Hose	1
049-042	Filter screen, blower inlet	1
049-054	Filter, Air – Ford engine	1
049-061	Filter, Engine oil - Ford	1
052-050	Quick Connect, 440 Male	3
052-051	Quick Connect, 440 Female	2
052-052	Quick Connect, 660 Male	1
052-053	Quick Connect, 660 Female	1
057-042	Gasket, Recovery Tank - 550	1
074-003	Gauge, Hi PSI (0-1000)	1
074-020	Meter, Chemical Flow - CDS	1
076-005	Jet, #6 S/S - Hydra Hoe	1
078-015	Kit, Chem Flowmeter	1
078-019	Kit, H/M Solution Valve	1
078-301	Kit, 550 Cat pump seal	1
106-051	Spark Plug, 1.3 liter Ford	4
149-017	Sensor, 260 4.4 High Temp. Cut-off	1
149-026	Thermostat, 4.4 Adjustable Bulb and Capillary	1
157-0012	Switch, Tethered Mercury	1
157-008	Switch, Ignition	1
157-022	Switch, Relay - A/C, B/C, CDS	2
157-031	Switch, Side Mount w/Bulk Head Fitting	1
157-040	Switch, 12V Lighted Rocker	1
157-041	Switch, 15 Amp micro	1
169-011	Valve, 185°F Thermo Valve	1
169-022	Valve, 1 1/2" Full Port	1
169-062	Valve, 1/4 Anti-Siphon	1
169-120	Valve, Chemical System	1

Responsibilities

The **Purchaser's** responsibilities are:

Prior to arrival of unit, install 5/8" exterior plywood flooring in the vehicle and cover it with artificial turf.

♦ CAUTION ♦

Purchase heavy duty 42 - 60 amp hour battery and have the battery 'slow' charge if new. If the battery is not fully charged, damage can occur to the engine charging regulator.

Reading of owner's manual: It is the purchaser's responsibility to read the unit operation manual and to familiarize himself with the information contained therein. *Special attention should be paid to all **Cautions** and **Warnings**.*

The **Sales Representative's** responsibilities are:

ACCEPTANCE OF SHIPMENT:

1. If the unit shows any outward signs of damage, do not sign the delivery receipt until you have closely inspected the unit and noted any damage on the delivery receipt.

2. The salesman from whom you purchased your unit is responsible for supervising the correct installation of the unit in your vehicle and thoroughly training you in its operation, maintenance and precautions.

CORRECT INSTALLATION INCLUDES:

- Installation of through-floor fittings for gasoline fuel lines;
- Placing the unit and recovery tank in your vehicle and securing them with bolts or tie down cleats;
- Connecting gasoline lines;
- Connecting the battery;
- Checking the pump, vacuum blower and engine oil levels prior to staring the unit;
- Starting the unit to check engine and see that all systems function normally;
- Checking all hoses, wands, etc. for correct operation.

TRAINING SHALL INCLUDE:

- A thorough review of the operation manual with purchaser;
- Instruction and familiarization in: how to correctly start up and shut down the unit, how to correctly clean with the unit, where and how often to check and change component oil levels, how the unit's systems work, how to troubleshoot the unit, how to do basic repairs, safety precautions and their importance, freezing damage and how to avoid it, hard water damage and how to avoid it;
- A thorough review of the unit warranty and warranty procedures.
- A thorough review of hard water precautions and warnings.
- How to determine hard water areas.
- Use of water softening systems.

Vehicle Prep

The preferable vehicle for a MAXX 550 installation is a cargo van with a heavy-duty suspension package. The van should have 3/4 ton capacity.

TRUCK PREPARATION

The manufacturer recommends the installation of plywood flooring, covered with polypropylene backed astroturf (do not use rubber-backed), in the vehicle prior to installation of machine.

♦ CAUTION ♦

Be cautious when drilling any holes through the van floor. Many vans have critical components mounted directly below the van floor that could be damaged by a misplaced drill bit. (See Product Support Bulletins 92102, 94062 and 94063 at the end of this manual.)

This provides a metal-to-cushion mounting rather than metal-to-metal, insulation and makes an attractive van interior. The astroturf should be color keyed to the van interior.

Materials Needed:

1. 2 sheets 4x8x⅝" exterior plywood
2. 6'x12' piece of commercial astroturf
3. 16 - 1½" sheet metal screws
4. 1 quart marine adhesive (optional)
5. 1 staple hammer with ½" staples

(See illustration for correct placement of plywood flooring)

ROOF VENTS

HydraMaster strongly recommends installation of roof vents in all truckmount installations. When installing equipment with propane heaters, these must be vented through the roof of the van.

PLACEMENT OF UNIT IN VEHICLE

The recommended unit placement is described below and illustrated in the following diagram.

Side door installation is necessary for this equipment.

♦ WARNING ♦

Ensure that the machine is well secured to the floor of the van with the hardware supplied. A sudden or crash stop will cause the machine to rocket forward, all 1000 lbs. worth! Protect yourself and the machine. **SECURE IT!**

♦ WARNING ♦

It is recommended by the manufacturer that the exhaust from the front of the machine be vented down under the truck to prevent carbon monoxide from entering the job site. **Always park the truck so the exhaust is blowing away from the job site.**

The manufacturer also recommends the installation of aluminum vents in the truck roof to allow heat to escape.

Mount a fire extinguisher just inside the rear or side door for emergencies.

Figure 1-1 **Plywood Installation**

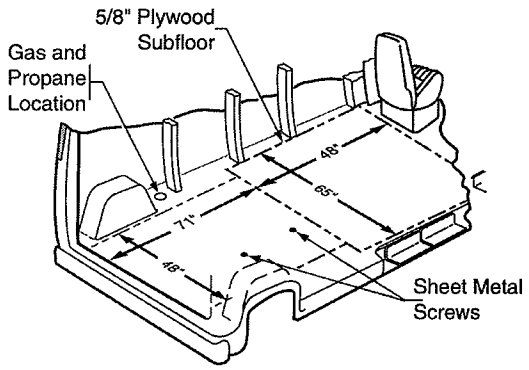
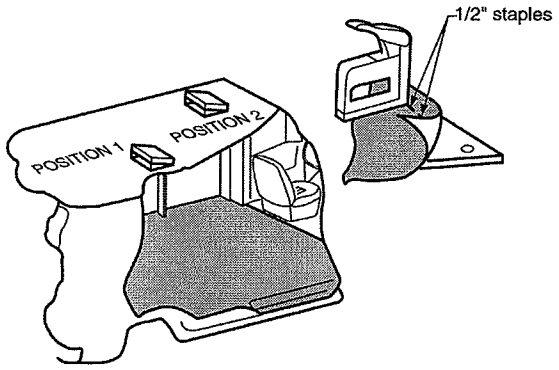


Figure 1-2 **Astroturf and Roof Vent**



♦ WARNING ♦

Never operate this machine with a portable gas can inside the truck. Doing so increases the risk of a fire or explosion.

♦ WARNING ♦

Transportation in a vehicle of any vented fuel container that presently holds or has ever held a flammable liquid is strictly forbidden by HydraMaster Corporation and by federal and state regulation.

♦ WARNING ♦

Do not use a portable propane tank inside of the truck or van. It is dangerous and illegal in most states.

Local Water Precautions

The quality of water varies greatly. Many areas have an excess of minerals in the water which results in what is commonly called "hard water." These minerals tend to adhere to the insides of heater coils and other parts of the machines causing damage and a loss of cleaning effectiveness. This influences the reliability and efficiency of equipment in direct proportion to the level of hardness.

HARD WATER ADVISORY

HydraMaster recognizes that any hard water deposits which might occur within the water system of our truckmounts is a serious problem. The precision technology of truckmount heat exchanger systems is intolerant of any foreign material. Hard water deposits will ultimately decrease the performance of the system and are expected to seriously lower the reliability of the machine.

To validate a machine's warranty, HydraMaster requires that all machines operating in designated "Hard Water Areas" (3.5 grains or more per gallon) be fitted with a water softening system or a properly installed magnetic-type de-scaler must be used and maintained. Periodic de-scaling or acid-rinsing alone is *not* adequate in these areas. HydraMaster does not recommend any particular type or brand, however the relative effectiveness of some types of magnetic de-scalers or softeners may require additional periodic use of de-scaling agents.

HydraMaster also recommends, in the strongest possible terms, that machines in *all areas* be fitted with a water softening system for improved operation and reliability.

HydraMaster has included five hard water test strips with your machine. These can be used to test the water in your immediate and surrounding areas as they can vary greatly. Assume all water obtained from wells is hard.

♦ CAUTION ♦

Failure to take appropriate measures to prevent scale build up can result in **system failure** and **loss of warranty** on affected parts.

HARD WATER AREA MAP

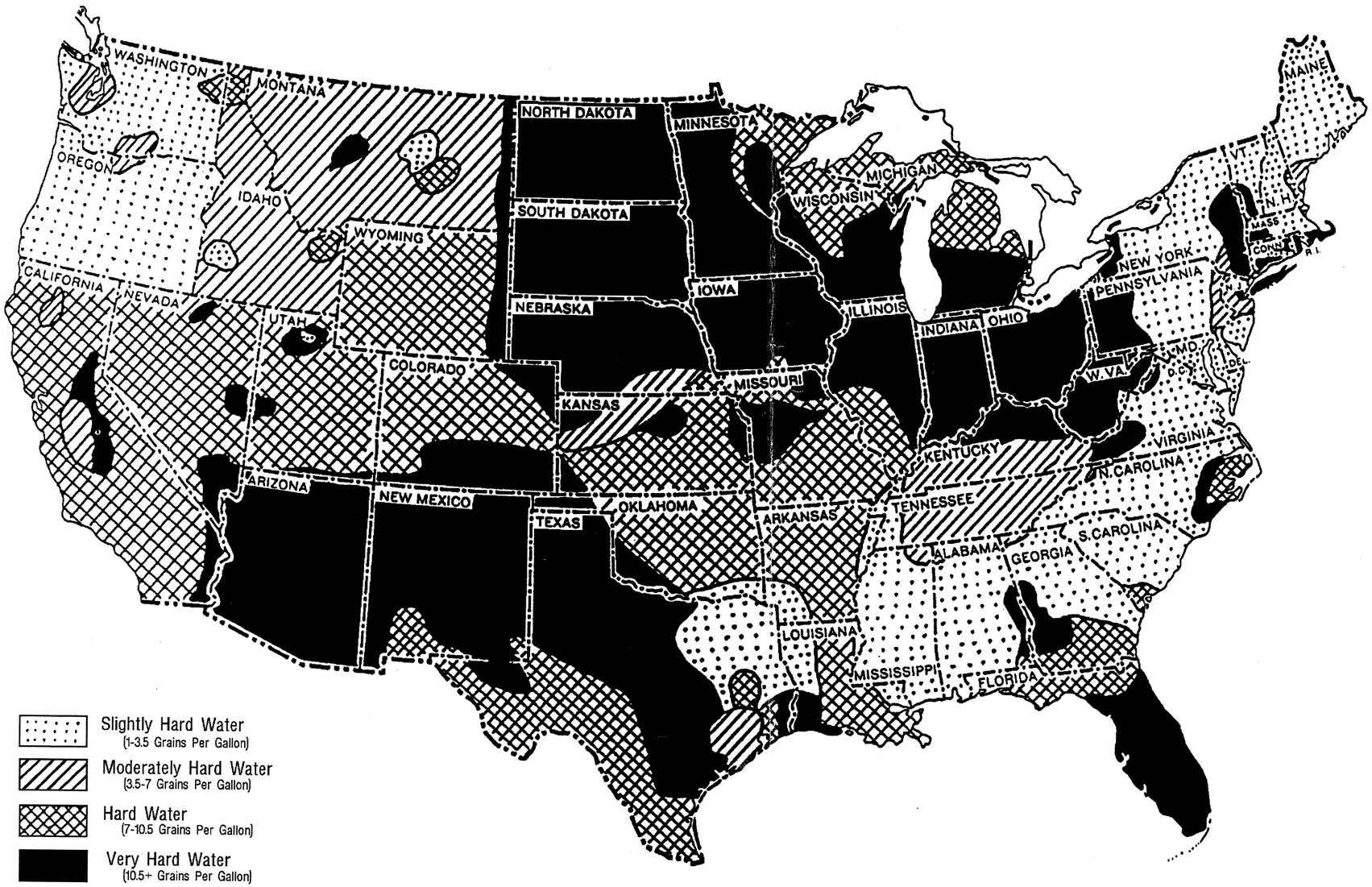
The following map defines areas in the United States which compromise fluid related components such as hoses, fittings, heaters, pumps, valves and water cooled engines. For other countries, hard water area maps can be obtained from geological societies.

WATER SOFTENER

Cleaning efficiency and equipment life is increased, chemical use decreased, and the appearance of cleaned carpets enhanced when water softeners are incorporated in hard water areas. The manufacturer strongly urges the use of water softener units in areas exceeding 3½ grains per gallon. Failure to use a water softener in these areas will invalidate the machine's warranty. Using a hard water area map as a reference, determine the quality of water in your area and take action immediately, if necessary.

Reports from several of our machine users commending the results of the use of water softeners in conjunction with their machines prompts us to recommend the procedure to everyone in a "hard water" area.

Figure 1-23: **Hard Water Map**



Source: Water Treatment Fundamentals, Water Quality Association, 1996.

Figure 10-3: **Wiring Diagram**
D3376 Sht 3 Rev A

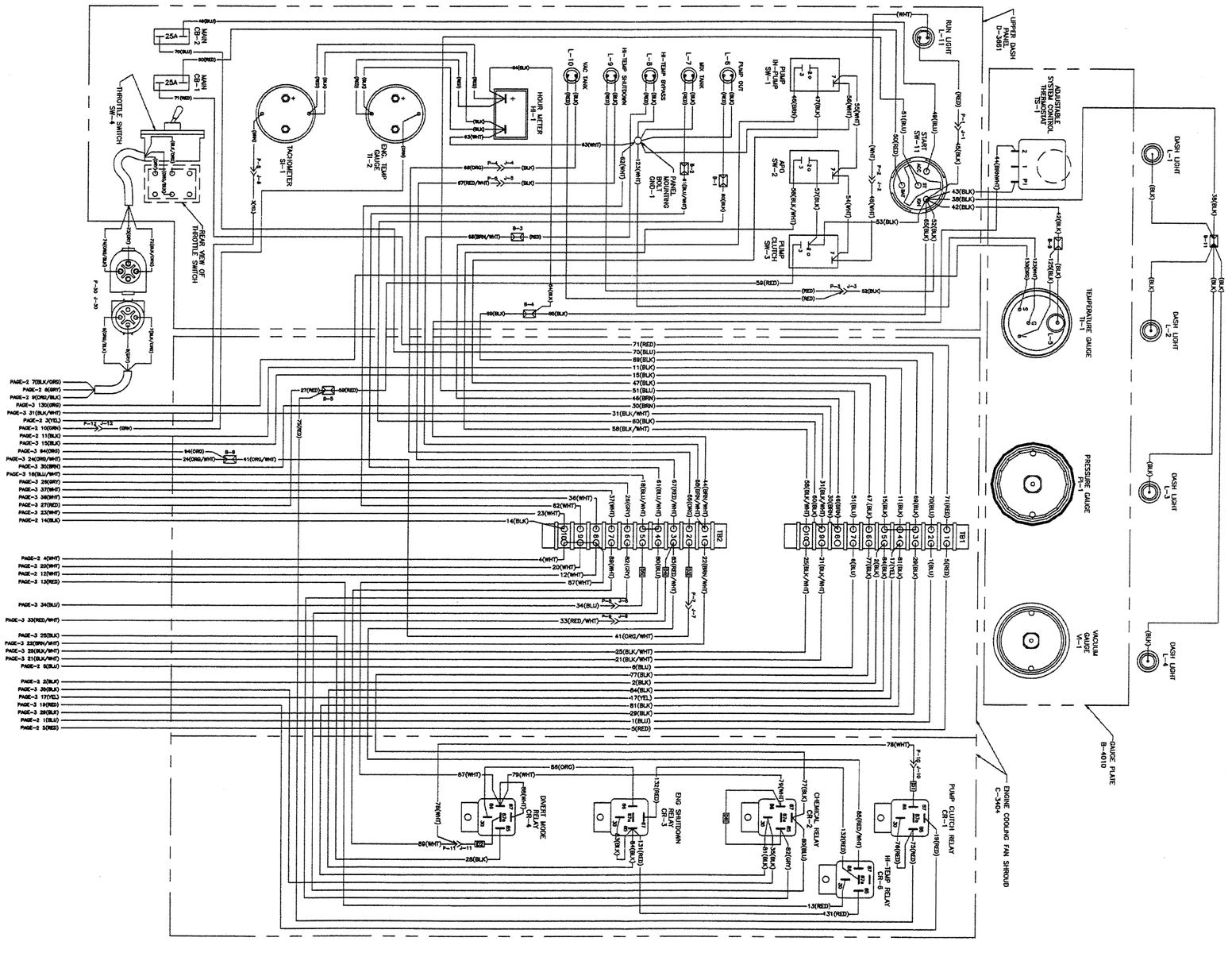


Figure 10-4: **Wiring Diagram**
D3376 Sht 4 Rev A

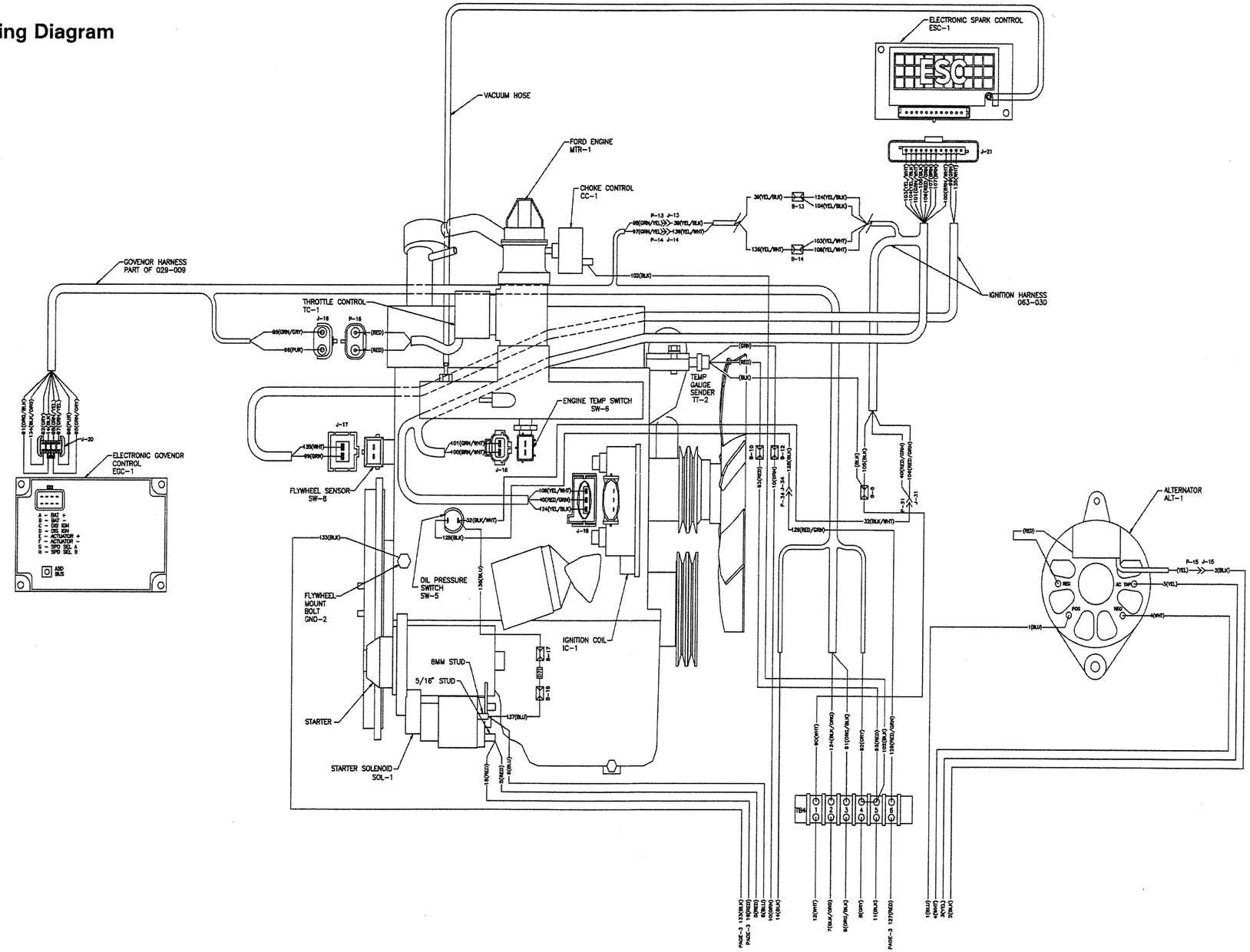
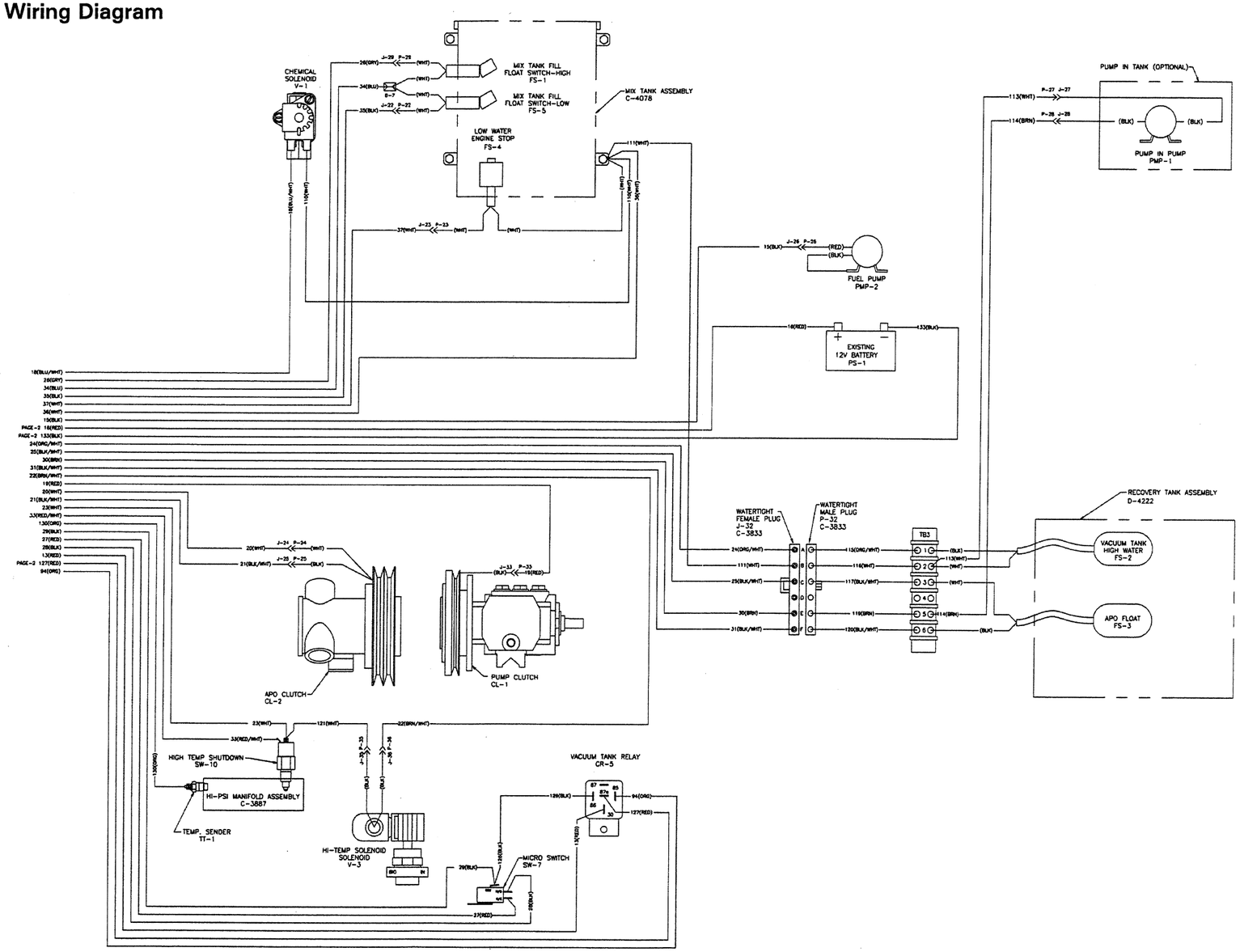


Figure 10-5: **Wiring Diagram**
D3376 Sht 5 Rev A



The relatively low cost of a water softener service is more than made up for by an increased life of machine parts, reduced chemical costs and continued cleaning efficiency. The water softener will also increase the *effectiveness* of the cleaning chemicals, therefore less chemical will be needed.

Contact a water softener distributor in your area for information on the rental of a simple water treatment unit to carry in your truck. Be sure to change the water softener in accordance with the capability of the softener. For example: If the softener will treat 900 gallons of water and the machine uses an average of 30 gallons per hour, for an average of 5 hours a day, this equals 150 gallons per day. In 6 days the machine would use 900 gallons of water. Therefore, the softener would need to be changed every 6 working days for maximum softening.

WASTE WATER DISPOSAL ADVISORY

There are laws in most communities prohibiting the dumping of recovered "gray" water from carpet cleaning in any place but a sanitary treatment system.

This cleaning rinse water, recovered into your unit's vacuum tank, contains materials such as detergents. These must be processed before being safe for streams, rivers and reservoirs.

IN ACCORDANCE WITH THE EPA, STATE AND LOCAL LAWS, DO NOT DISPOSE OF WASTE WATER INTO GUTTERS, STORM DRAINS, STREAMS, RESERVOIRS, ETC.

In most cases, an acceptable method of waste water disposal is to discharge into a municipal sewage treatment system after first filtering out solid material such as carpet fiber. Access to the sanitary system can be obtained through a toilet, laundry drain, RV dump, etc. Permission should first be obtained from any concerned party or agency.

One disposal method which usually complies with the law is to accumulate the waste water and haul it to an appropriate dump site. Another solution to the disposal problem is to equip yourself with an Automatic Pump-Out System. These systems are designed to remove waste water from the extractor's recovery system and actively pump the water through hoses to a suitable disposal drain. Properly designed, they will continuously monitor the level of waste water and pump it out simultaneously to the cleaning operation. The hidden benefit of this process is that the technician does not have to stop his cleaning to empty the recovery tank. HydraMaster makes an A.P.O. System available which can be ordered with new equipment or installed later.

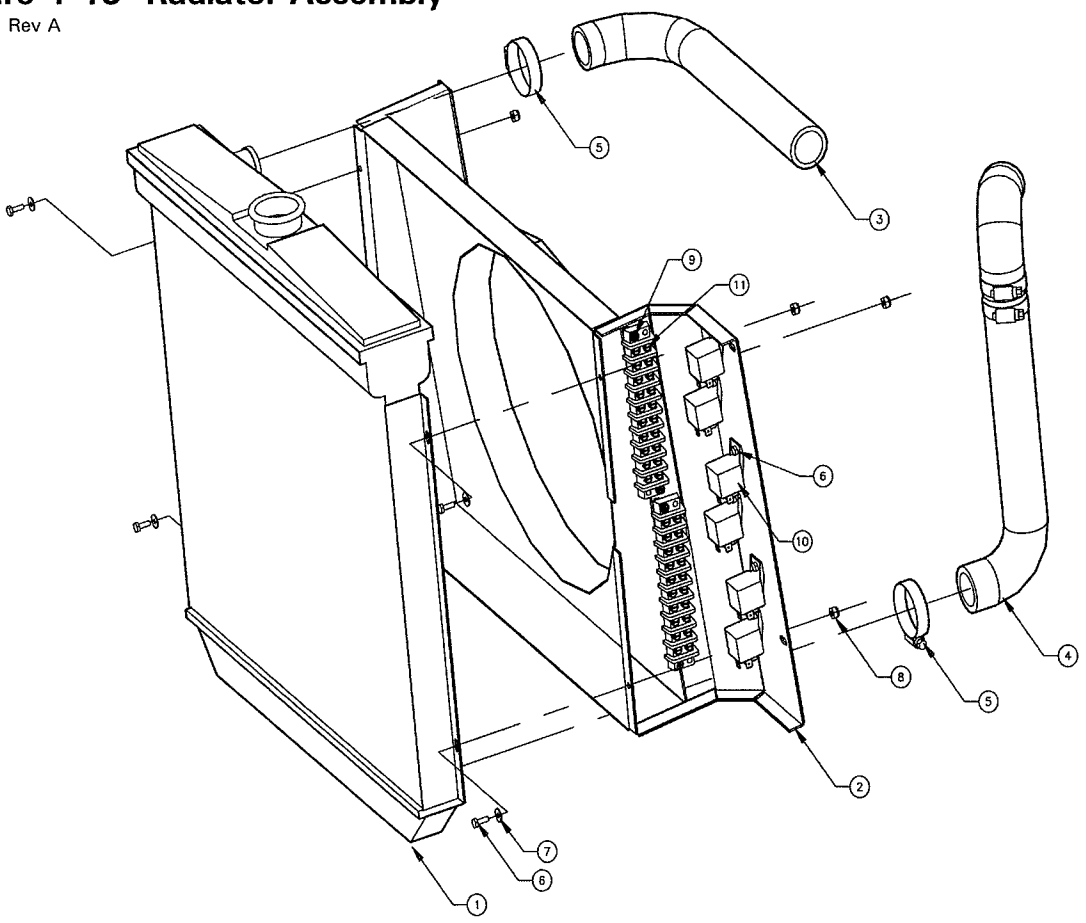
The penalties for non-compliance can be serious. Always check local laws and regulations to be sure you are in compliance.

Machine Assembly Parts

Figure 1-5 **Machine Assemblies**

To Be Added

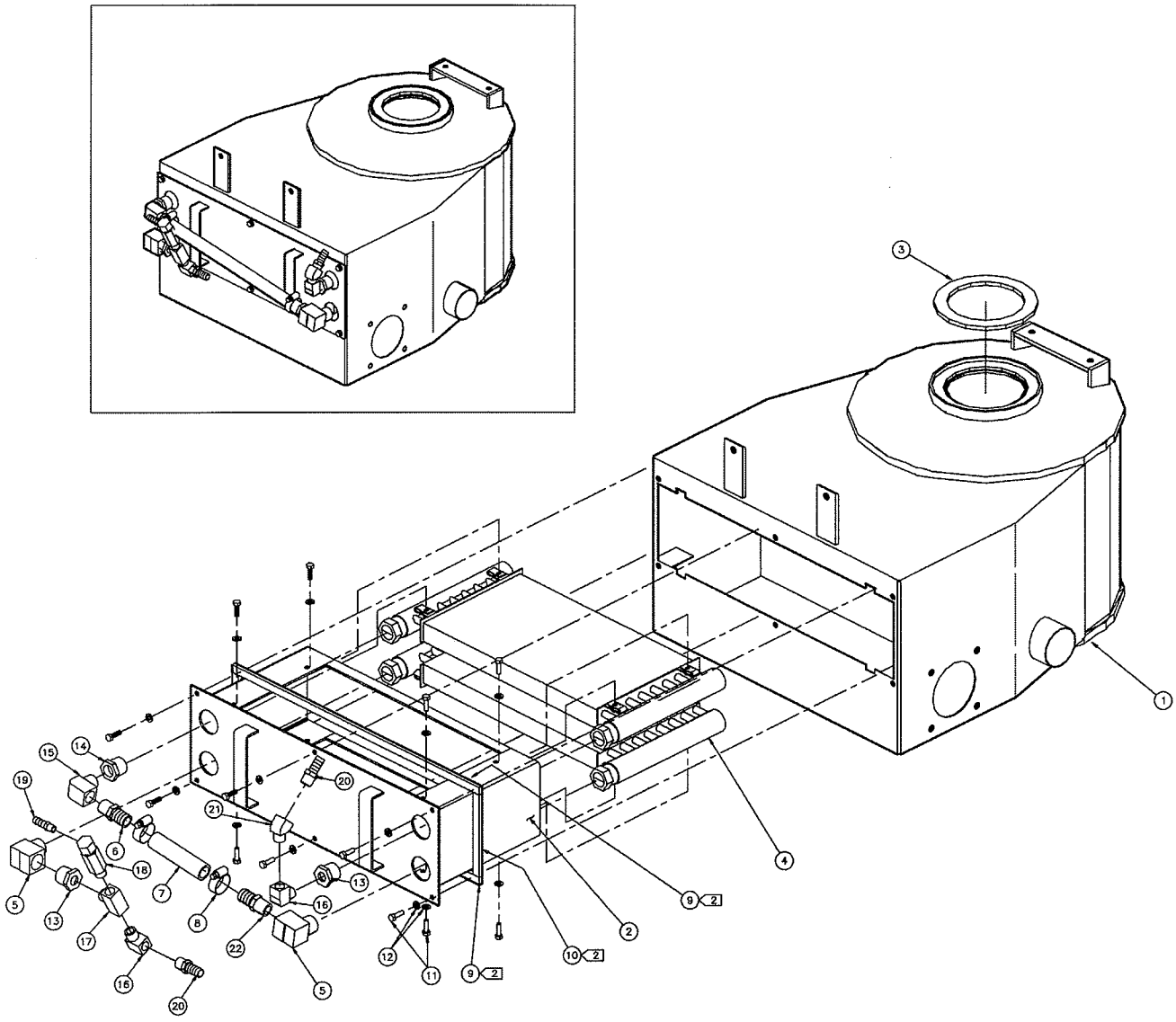
Figure 1-19 Radiator Assembly
C3371 Rev A



Radiator Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	115-006	Radiator, Ford	1
2	041-303	Cover, Engine Cooling Fan Shroud	1
3	068-559	Hose, 1.25 x 90' Preformed	1
4	068-560	Hose, 1.50 x 90' Preformed	1
5	033-007	Clamp, #28 Hose	2
6	143-126	Hex Head Machine Screw, #10-24UNC x ½" LG	10
7	174-001	Washer, #10 Flat	4
8	094-034	Nut, #10-24 Hylock	4
9	143-062	Screw, Phillips Head Machine	4
10	157-022	Relay	6
11	012-010	Terminal Strip	2

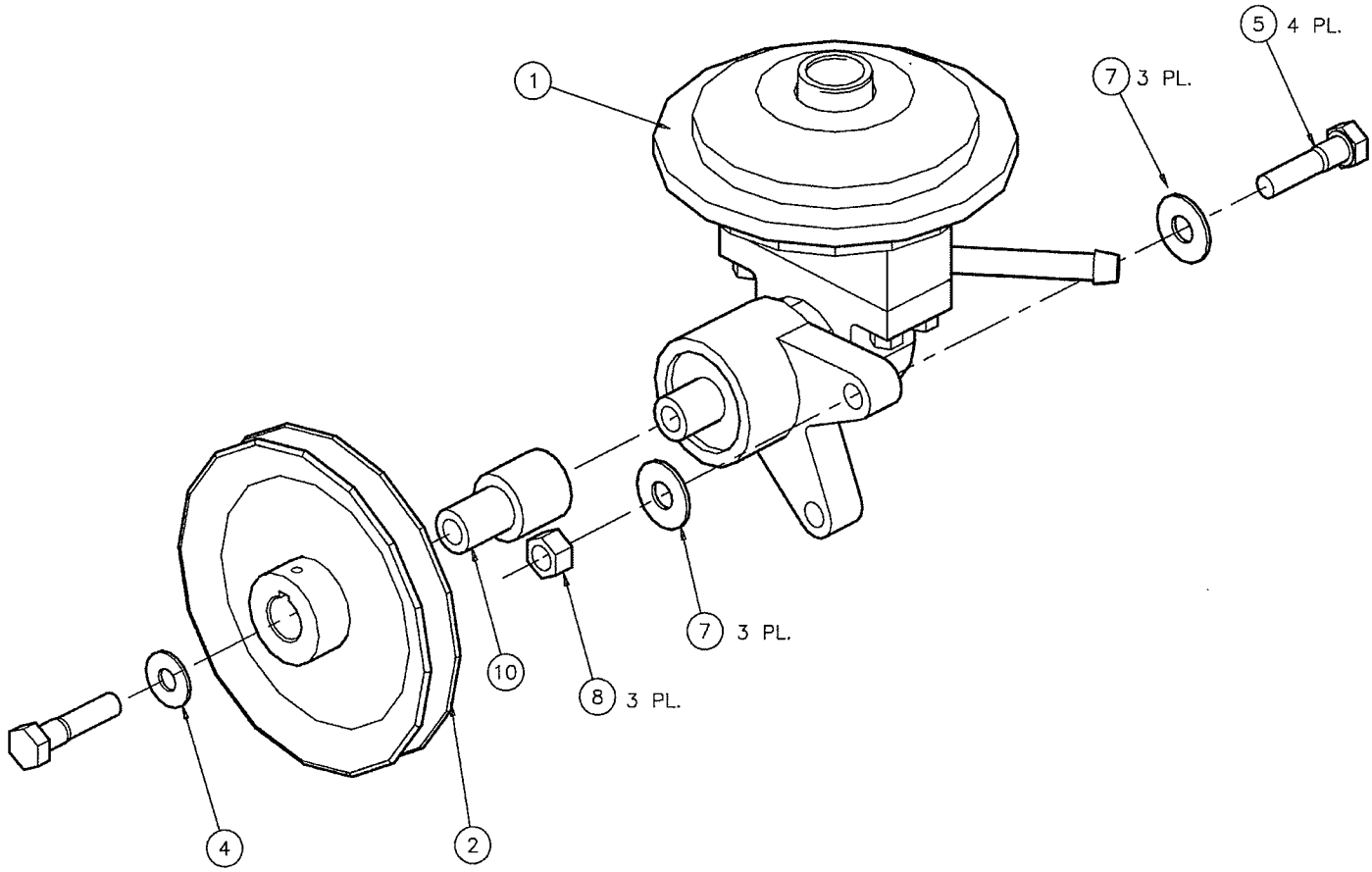
Figure 1-23 **Silencer/Radiator Assembly**
3382 Rev –



Silencer/Radiator Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	093-051	Silencer,CF 5.0 Primary	1
2	015-501	Bracket, Radiator Box	1
3	057-040	Gasket, Silicone Blower Ring	1
4	115-005	Radiator, Internal Finned	2
5	052-340	Elbow, ¾" Street	2
6	052-129	Insert, #812	1
7	068-459	Hose, ¾" Gates Green Stripe	1
8	033-008	Clamp, #20 S Stl.	2
9	057-026	Gasket, 0.25 THK x 20.25 LG	2
10	057-026	Gasket, 0.25 THK x 5.50 LG	2
11	143-001	Screw, ¼" – 20UNC x 0.75 LG	14
12	174-019	Washer, ¼" Lock	14
13	052-259	Bushing, ¾" x $^3/_8$" NPT	2
14	052-411	Bushing, ¾" x ½" NPT	1
15	052-087	Elbow, ½" Street	1
16	052-086	Elbow, $^3/_8$" Street	2
17	052-447	$^3/_8$" Male Brass Tee	1
18	169-011	Hi Temp Control Valve	1
19	052-099	Insert #26	1
20	052-105	Insert #68	2
21	052-083	Elbow, $^3/_8$-45° Street	1
22	052-338	Insert # 1212	1

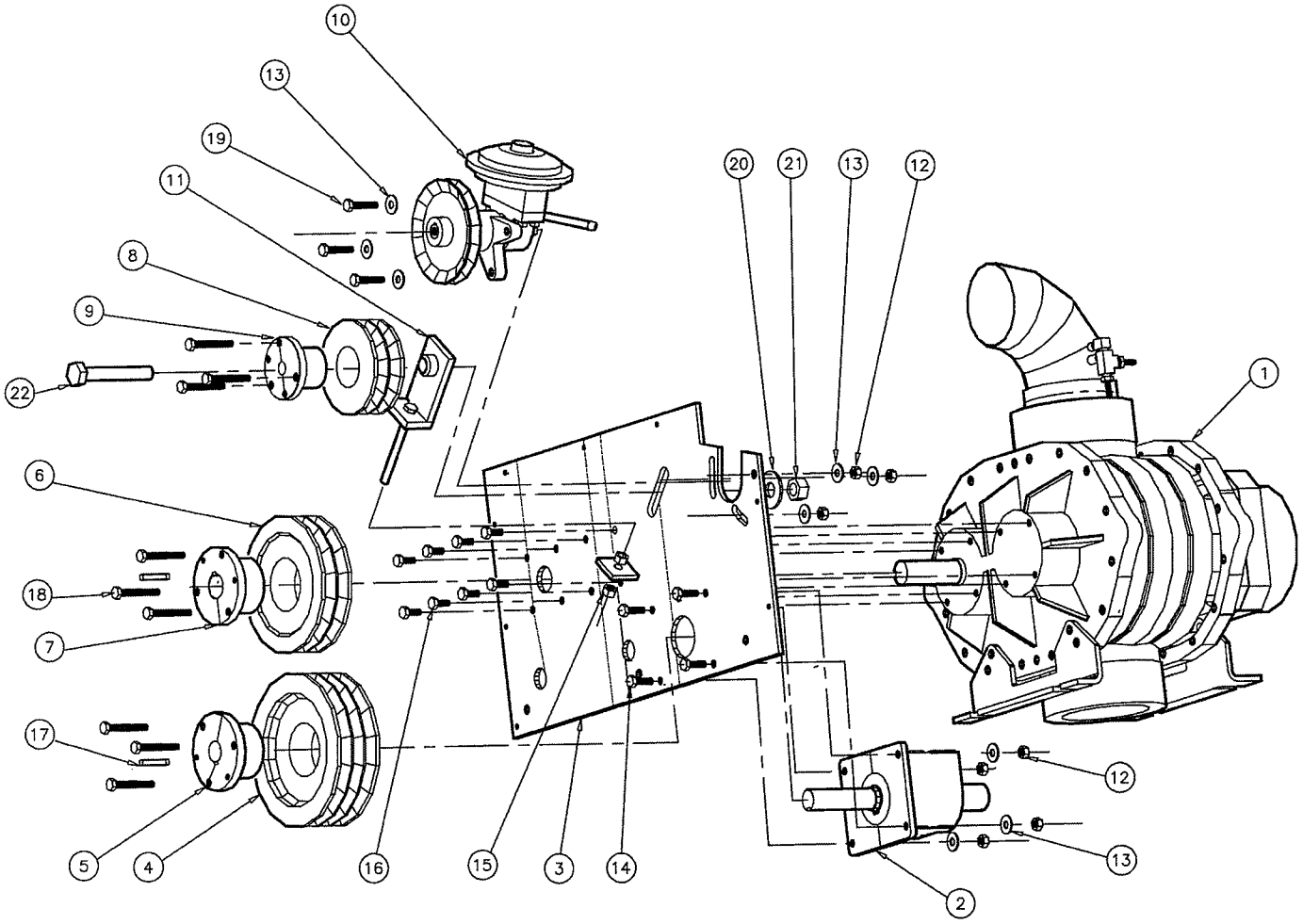
Figure 1-26 **Air Pump Assembly**
C3908 Rev B



Air Pump Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	111-081	Air Pump, Modified	1
2	109-042	Pulley, Air Pump	1
3	—	Deleted	-
4	174-004	Washer, $^{5}/_{16}$" Flat	1
5	143-020	Screw, Hex Head Cap, $^{3}/_{8}$" x 1.50 LG	4
6	—	Deleted	-
7	174-032	Washer, $^{3}/_{8}$" Flat	6
8	094-014	Hex Nut, $^{3}/_{8}$"-16UNC	3
9	—	Deleted	-
10	154-078	Spacer, Air Pump Shaft , Inner	1

Figure 1-27 **Drive Plate Assembly**
D4055 Rev –



Drive Plate Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	—	Blower Assembly	1
2	—	Drive Housing Assembly	1
3	105-127	Drive Plate	1
4	109-033	Pulley, 3 Groove 'B' Hub	1
5	020-016	Bushing, 1" Bore 'B' Hub	1
6	109-034	Pulley, 2 Groove 'B' Hub	1
7	020-024	Bushing, 1-1/8" Bore, 'B' Hub	1
8	109-062	Pulley, 2 Groove Idler	1
9	020-033	Bushing, Idler	1
10	—	Air Pump Assembly	1
11	015-525	Bracket, Idler Adjustment	1
12	094-012	Nut, 5/16-18 Hex	7
13	174-004	Washer, 5/16" Flat	14
14	143-013	Cap Screw Hex Head 5/16-18 x 1	4
15	094-014	Nut, 3/8-16 Hex	2
16	143-012	Cap Screw Hex Head 5/16-18 x 3/4	8
17	—	¼ Square Keystock x 1	2
18	—	Cap Screw Hex Head, included with bushings	9
19	143-015	Cap Screw Hex Head 5/16-18 x 1.50	3
20	174-034	Washer, .688 ID x 1.50 OD	1
21	—	Nut, 5/8-11 included with bushing	1
22	141-030	Axle, Idler Bushing	1

Figure 1-15 **Lower Panel Assembly**

To Be Added

Lower Panel Assembly Parts List – To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-16 **Mix Tank Assembly**

To Be Added

Mix Tank Assembly Parts List – To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-17 **Recovery Tank Assembly**

To Be Added

Recovery Tank Assembly Parts List – To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

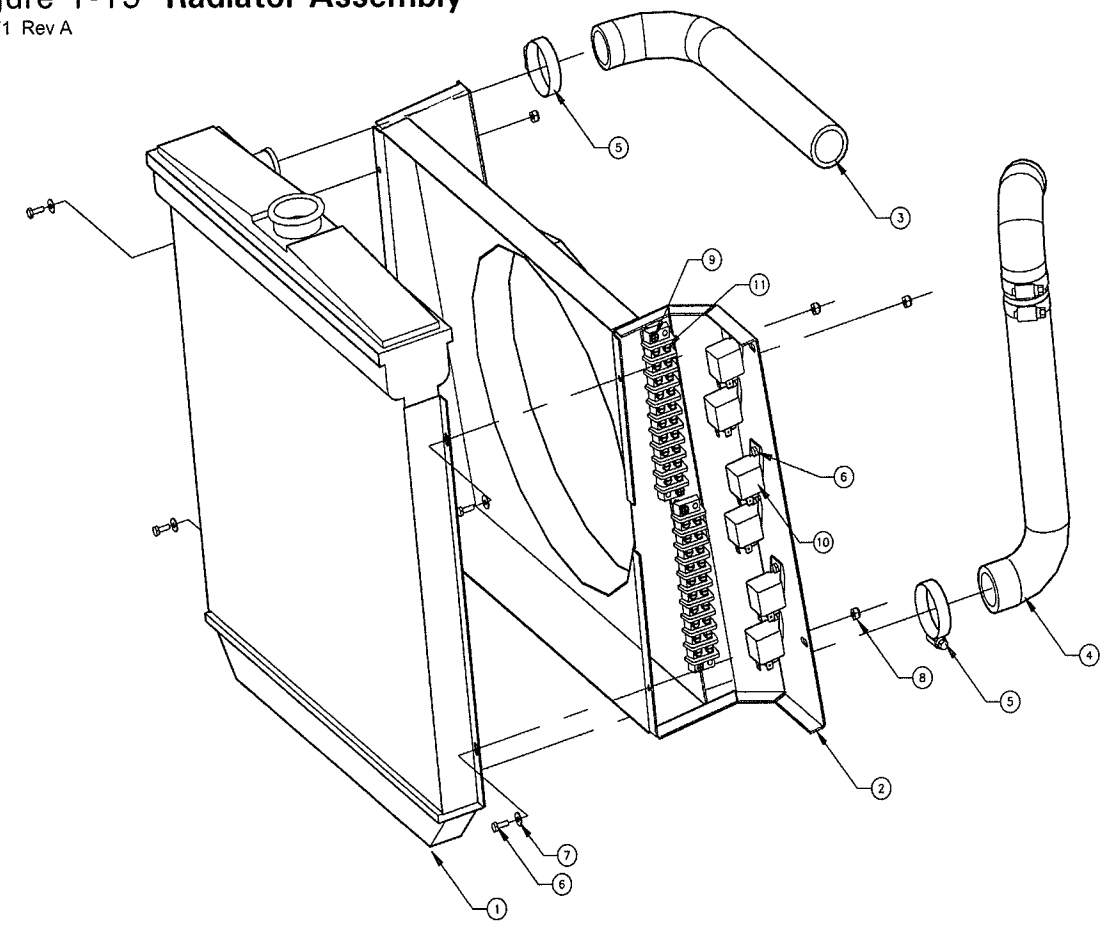
Figure 1-18 **Dual Inlet Lid Assembly**

To Be Added

Dual Inlet Lid Assembly Parts List – To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-19 **Radiator Assembly**
C3371 Rev A



Radiator Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	115-006	Radiator, Ford	1
2	041-303	Cover, Engine Cooling Fan Shroud	1
3	068-559	Hose, 1.25 x 90' Preformed	1
4	068-560	Hose, 1.50 x 90' Preformed	1
5	033-007	Clamp, #28 Hose	2
6	143-126	Hex Head Machine Screw, #10-24UNC x ½" LG	10
7	174-001	Washer, #10 Flat	4
8	094-034	Nut, #10-24 Hylock	4
9	143-062	Screw, Phillips Head Machine	4
10	157-022	Relay	6
11	012-010	Terminal Strip	2

Figure 20 **Air Duct Assembly**

To Be Added

Air Duct Assembly Parts List – To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-21 **Quad Heat Exchanger Assembly and Parts List**

To Be Added

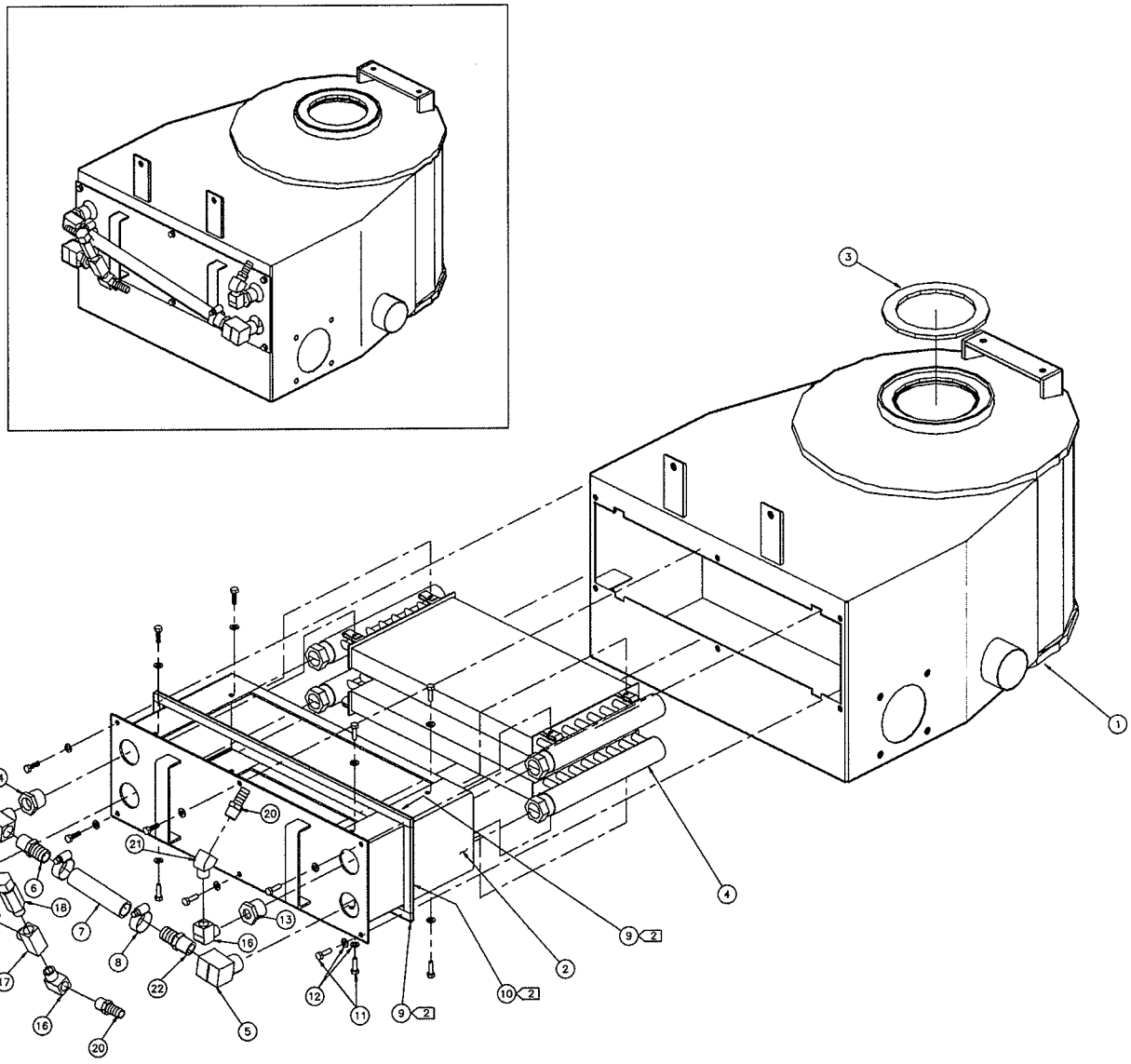
ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-22 **Water to Water HX Assembly and Parts List**

To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-23 **Silencer/Radiator Assembly**
3382 Rev –



Silencer/Radiator Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	093-051	Silencer,CF 5.0 Primary	1
2	015-501	Bracket, Radiator Box	1
3	057-040	Gasket, Silicone Blower Ring	1
4	115-005	Radiator, Internal Finned	2
5	052-340	Elbow, ¾" Street	2
6	052-129	Insert, #812	1
7	068-459	Hose, ¾" Gates Green Stripe	1
8	033-008	Clamp, #20 S Stl.	2
9	057-026	Gasket, 0.25 THK x 20.25 LG	2
10	057-026	Gasket, 0.25 THK x 5.50 LG	2
11	143-001	Screw, ¼" – 20UNC x 0.75 LG	14
12	174-019	Washer, ¼" Lock	14
13	052-259	Bushing, ¾" x $^{3}/_{8}$" NPT	2
14	052-411	Bushing, ¾" x ½" NPT	1
15	052-087	Elbow, ½" Street	1
16	052-086	Elbow, $^{3}/_{8}$" Street	2
17	052-447	$^{3}/_{8}$" Male Brass Tee	1
18	169-011	Hi Temp Control Valve	1
19	052-099	Insert #26	1
20	052-105	Insert #68	2
21	052-083	Elbow, $^{3}/_{8}$-45° Street	1
22	052-338	Insert # 1212	1

Figure 1-24 **Preheater HX Assembly and Parts List**

To Be Added

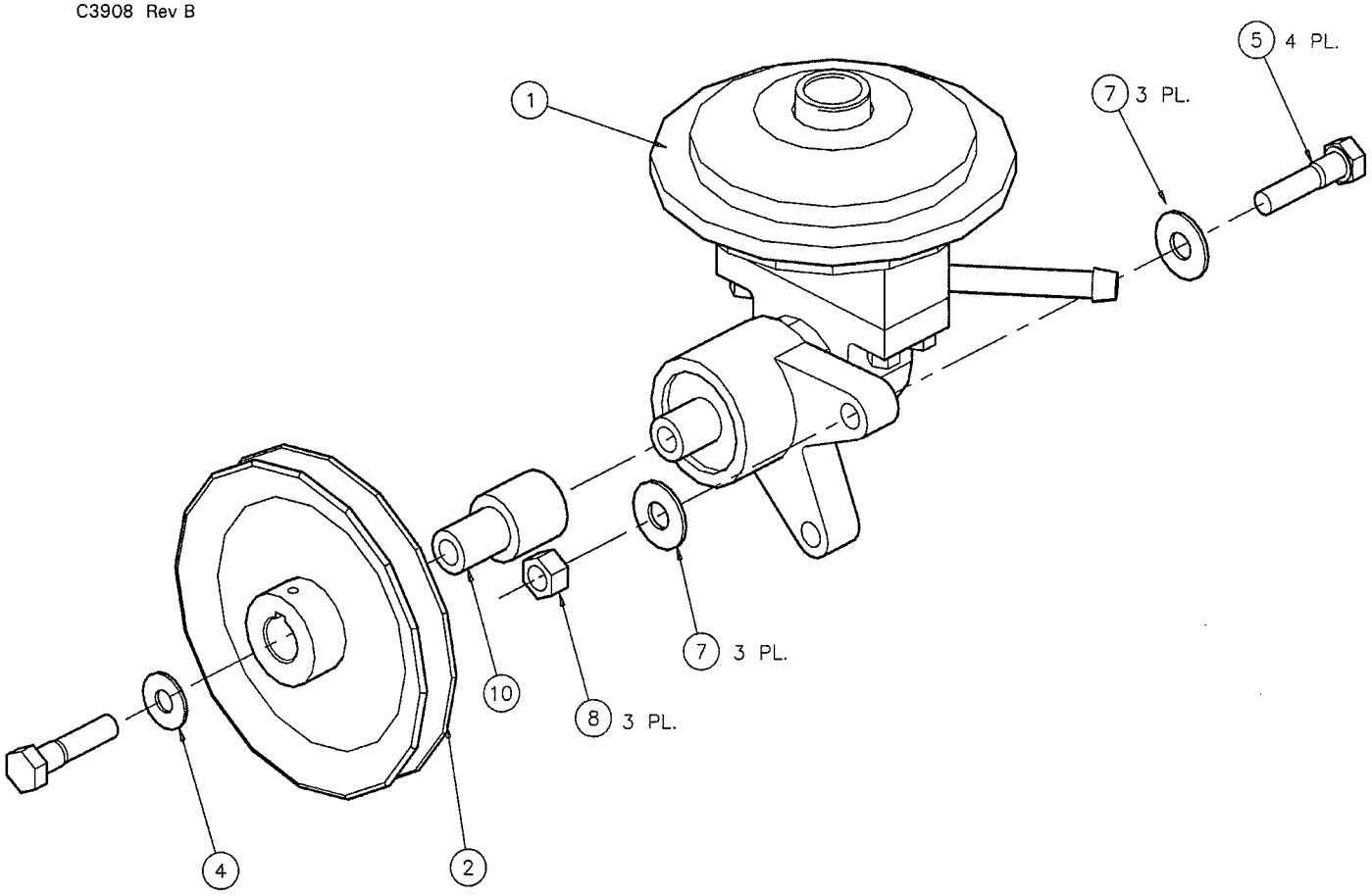
ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-25 **By-Pass HX Assembly and Parts List**

To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-26 **Air Pump Assembly**
C3908 Rev B



Air Pump Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	111-081	Air Pump, Modified	1
2	109-042	Pulley, Air Pump	1
3	—	Deleted	-
4	174-004	Washer, $^{5}/_{16}$" Flat	1
5	143-020	Screw, Hex Head Cap, $^{3}/_{8}$" x 1.50 LG	4
6	—	Deleted	-
7	174-032	Washer, $^{3}/_{8}$" Flat	6
8	094-014	Hex Nut, $^{3}/_{8}$"-16UNC	3
9	—	Deleted	-
10	154-078	Spacer, Air Pump Shaft , Inner	1

Figure 1-27 **Fuel Line Hose Assembly and Parts List -**

To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-28 **Machine Assemblies with L-Tank**

To Be Added

Figure 1-29 **Machine Assemblies with L-Tank**

To Be Added

Figure 1-30 **Machine Assemblies with L-Tank**

To Be Added

Figure 1-31 **Machine Assemblies with L-Tank**

To Be Added

Machine Assemblies with L-Tank Parts List - To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-32 **L-Mount Recovery Tank Assembly**

To Be Added

L-Mount Recovery Tank Assembly Parts List - To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Figure 1-33 **By-Pass Valve Assembly and Parts List**

To Be Added

ITEM	PART NO.	DESCRIPTION	QTY

Cleaning and Chemicals

MAXX 550
Section 2-1

Your mobile carpet cleaning plant has been engineered using the latest and most sophisticated technology available to produce the finest carpet cleaning results possible. Despite this, however, it remains only a tool of the carpet cleaning trade, and it can produce only as good a job as the person operating it.

PRECAUTIONS

There are no short cuts to good carpet cleaning. It requires time, cleaning knowledge and the use of good chemicals. Therefore, the manufacturer recommends the use of spotting agents and traffic lane cleaners, as required, prior to the actual cleaning of carpeting.

The use of some chemicals through your mobile carpet cleaning plant can seriously damage the internal plumbing, high pressure pump and heater. These harmful chemicals include concentrated acid (see the pH chart at the end of this section), solvents, and some paint, oil, and grease removers with a high concentration of solvents.

The manufacturer recommends only the use of chemicals containing rust and corrosion inhibitors and water softening agents to prevent chemical build-up which may lead to component failure and warranty invalidation.

♦ CAUTION ♦

The increased demand for "clear water" rinsing results in the need for special care when using these acid based chemicals in your equipment. The

negative side of these products is the corrosive effects the acid can have on metals, including swivels, pumps, heat exchangers, etc.

HydraMaster's ***ClearWater Rinse*** has been formulated to protect vital components. HydraMaster will not warranty parts that have been damaged from using unprotected acid products that have obviously caused failures.

CLEANING STROKE PROCEDURE

Purpose: To eliminate excess moisture remaining in the carpet fiber and the sawtooth appearance which results from diagonal movement of the cleaning tool on all types of carpet.

Procedure: Always move the cleaning tool in smooth, forward and backward strokes. Apply slight pressure to the forward stroke while the solution is injected into the carpet. When extracting (drying), apply firm pressure on the forward stroke to ensure a positive "lock" for the vacuum and minimize the "hopping" effect resulting on carpet that is not smooth. During the forward and reverse strokes, movement to the right or left should only be accomplished at the extreme rear of the stroke. Overlapping is also important to ensure even application of solution and prevent saturation when cleaning wand is stopped twice at the same point at the rear of the cleaning stroke. This is illustrated at the end of this section.

Failure to adopt this procedure can result in increased chance of "clean streaks," fiber shrinkage, brown-out and longer drying periods.

OVER-WETTING

Over-wetting is annoying to all concerned, and sometimes leaves a bad impression of the cleaning process used.

These are Several Areas That Will Cause Over-wetting

1. Too few vacuum strokes or improper saw-tooth vacuum strokes as shown in the following illustration.
2. Obstructed, cut or kinked hoses.
3. Vacuum tank drain valve left partially open.
4. Clogged vacuum blower filter or vacuum tank lid not sealing properly.
5. Cleaning a heavily foam-saturated carpet without defoamer. (We recommend crystal type.)

Figure 2-1

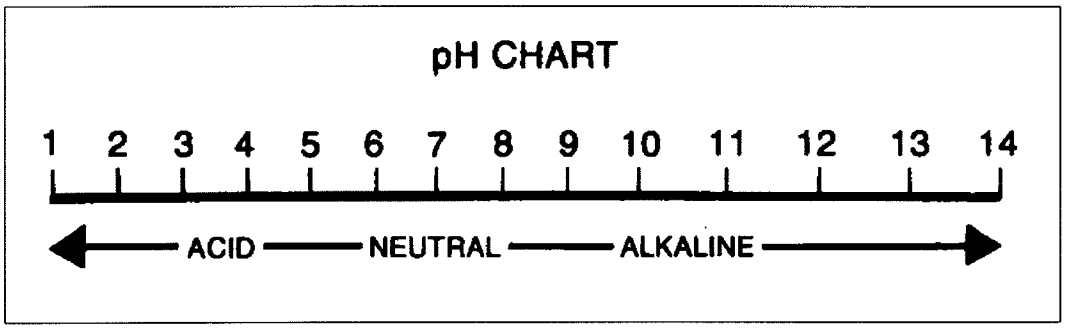
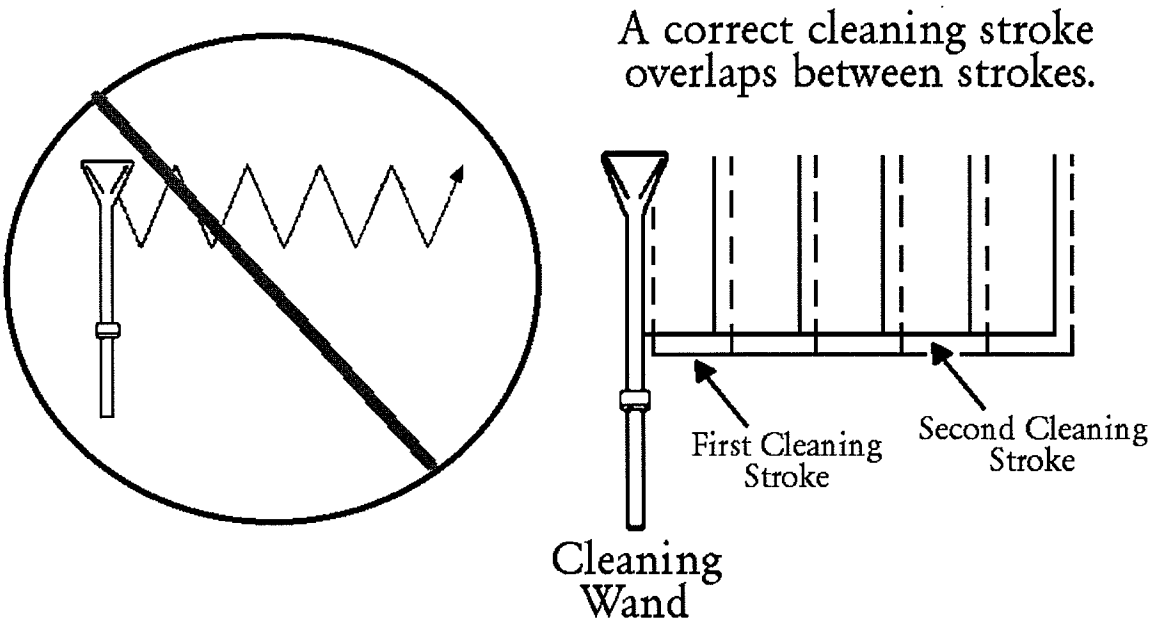


Figure 2-2: **Cleaning Stroke Procedure**



Operating Instructions

MAXX 550
Section 3-1

START UP

1. Perform daily/periodic maintenance as specified in this Owner Manual.

2. Connect all required hoses.

3. Connect the cleaning tool to the length of hose required to perform the cleaning.

♦ CAUTION ♦

Mix tank must be full prior to ignition. **NOTE:** The engine may be started without water in the machine if the diverter valve is engaged.

4. Start engine. Engine must be started in the idle throttle position **only**. Idle RPM is approximately 1100.

5. Spray the wand to void all air from the system. When the mix tank begins a fill cycle, the chemical flowmeter may be adjusted to your desired setting. Set your cleaning pressure at 300 PSI.
6. **NOTE:** A chemical flowmeter set at 5 GPH is a 1 to 30 mix ratio and 10 GPH is a 1 to 15 ratio. When the flowmeter is set at 10 GPH, you will be using what most chemical manufacturers recommend at 5 GPH.

7. Set the machine to the mid (1800 RPM) or high (2200 RPM) throttle position and run the machine for several minutes under load (8 to 10" HG) until your desired temperature is achieved.

8. Commence cleaning operation.

OPERATING MODES

The MAXX 550 machine utilizes a series of 6 heat exchangers in order to achieve a total typical performance of 230° F. In order to control this substantial heat rise, a two-stage control system is necessary. The heat can be adjusted by an adjustable heat dial located on the dash. The operation of the unit is as follows:

1. Normal Cleaning Mode:
   The operating temperature of the MAXX 550 will range from 220°F to 240°F with an incoming water temperature of 57° F, 100 feet of hose, pressure on the gauge reading 300 PSI and a number 6 jet running 10 seconds ON and 10 seconds OFF.

2. Adjustable Cleaning Temperature Mode:
   The temperature can be adjusted at any RPM, by simply turning the temperature control knob to the desired temperature.
   NOTE: Lower temperatures can be better achieved when the throttle is set to Mid RPM. Substantially lower temperatures can be achieved by running in the divert mode.

SHUT DOWN

1. Flush clear water through the chemical system for 10 seconds. Turn off chemical flowmeter.

2. Cool the machine by lowering the adjustable thermostat to the warm position and spraying the cleaning wand into the vacuum hose for three to five minutes. The chemical will be flushed from the unit, hoses and cleaning tool.
   NOTE: If the machine is not properly cooled, the mix tank can overflow.

3. Remove the vacuum hose.

4. At this time, the blower should be lubricated with an oil based lubricant.
   NOTE: If freeze guarding is necessary, perform the freeze guard procedure at this time.
5. Lower the engine RPMs to idle.

6. Turn the key off.

7. Drain the mix tank.

8. Drain the vacuum tank. The vacuum filter should be cleaned prior to mobilization of the van.

   NOTE: In accordance with the EPA, state and local laws, **do not dispose of waste water into gutters, storm drains, streams, reservoirs, etc.**

Freeze Guard

MAXX 550
Section 4-1

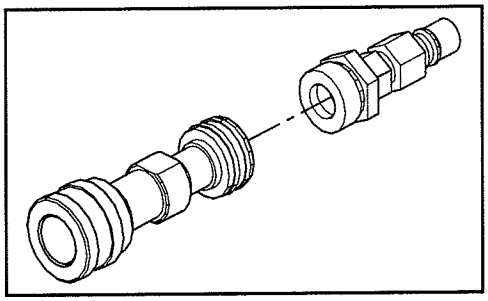
ANTIFREEZE PROCEDURE

1. Begin by attaching your garden hose, or pump-in hose, to the machine. Now, remove the chemical line from the chemical jug and place it in a 50/50 mixture of antifreeze and water. Turn ignition switch on. Open the mix tank drain valve and allow the mix tank to drain to the point that it starts to demand water. Allow the mix tank to draw the antifreeze solution through the chemical flowmeter and the hoses back to the mix tank.

2. Remove the garden hose, or pump-in hose. Now, open the mix tank drain valve and drain all the water from the machine.

3. With the machine drained of water, close the mix tank drain and pour one (1) gallon of 50/50 antifreeze and water mix into the chemical mix tank.

When using the recirculation kit (part no. 078-058), fill a third of the mix tank with a 50/50 antifreeze mix. Verify that the upper float is not lying horizontal, but floats below.



Attach the recirculation fitting provided in the kit to the garden hose quick connect (see illustration to right) and this combination to the front of the machine.

Attach one section of female/female solution hose to the outgoing solution fitting on the front of the machine and the other end to the garden hose and recirculation fitting combination that is attached to the front of the machine (or as many sections as you want, if you wish to freeze guard your hoses).

4. Start the machine and allow it to run for two (2) minutes.

4. Start the machine and allow it to run for two (2) minutes.

5. Remove the garden hose inlet fitting from the end of your garden hose and plug it into the front of the machine. Leave it plugged in until the next time the machine is used.

   With the hoses and wand connected, run the machine and spray the water/antifreeze solution out of the wand until the 'low water' switch in the mix tank shuts the machine off. Your machine is now freeze-protected.

6. Solution hose and wand freeze guard procedure (optional): Attach the solution hoses and wand to the machine. (Dependent upon the amount of hose attached, more antifreeze solution may be needed in the chemical mix tank). With the machine running, spray the wand into a container to recapture the antifreeze solution. Continue to spray the wand until the machine shuts down by itself.

Recovering antifreeze for re-use:

Open the mix tank drain valve and allow the antifreeze solution to drain into a sealable container so that it may be used again. Before cleaning with the machine again, flush the remaining antifreeze solution from the system by spraying water through the hoses and wand until all signs of antifreeze are gone.

♦ CAUTION ♦

One manufacturer of antifreeze cautions:
"WHEN DISPOSING OF USED ANTIFREEZE COOLANT: Follow local laws and regulations. If required, dispose at facilities licensed to accept household hazardous waste. If permitted, dispose in sanitary sewer systems. Do not discard into storm sewers, septic systems, or onto the ground."

♦ WARNING ♦

This warning appears on the label of one brand of antifreeze:

"HARMFUL OR FATAL IF SWALLOWED. Do not drink antifreeze coolant or solution. If swallowed, induce vomiting immediately. Call a physician. Contains Ethylene Glycol which caused birth defects in animal studies. Do not store in open or unlabeled containers.

"KEEP OUT OF REACH OF CHILDREN AND ANIMALS."

FREEZE PROTECTION OF THE PUMP-IN SYSTEM

1. Drain the fresh water tank.

2. Remove the garden hose adapter from the pump-in pump hose and position the hose so it is pointing outside the van.

3. Turn on the pump-in pump and run for 1-2 minutes till all the water is purged from the hose.

NOTE: The next time the unit is used it may take a few minutes before the mix tank begins to fill.

Water and Chemical System

MAXX 550
Section 5-1

This electro-mechanical system has been designed to be simple and trouble free.

WATER AND CHEMICAL FLOW OPERATION

Incoming water flows first through the Solenoid Control Valve and the low pressure Chemical injector which are both mounted on the exterior of the mix tank. As the water passes through the Chemical injector, it is automatically proportioned with a predetermined quantity of detergent. The Mix Tank is equipped with two different float switches, the Water Level Float responds to the level in the tank and will maintain the proper volume of solution to be reserved for the water pump. The secondary, Low Water Float switch is a safety switch that is designed to protect your system from sudden or unexpected loss of water supply. If, for example, the water source at the house were turned off, the water level of the mix tank would drop, activating the secondary switch, which automatically disengages the system and prevents the water pump from running dry.

The desired chemical injection ratio may be obtained by an adjustment of the Chemical Flowmeter during the fill cycle of the mix tank. Water must be flowing into the mix tank in order to adjust the chemical mix. The chemical will flow from the Chemical Jug to the Chemical Flowmeter, then to the Chemical injector where it is proportioned into the Mix Tank at the desired chemical setting.

NOTE: With this unique chemical system, the chemical flow is proportioned only during the filling cycles of the Mix Tank, not during the direct spraying of the wand. Therefore, it is possible that as your wand is spraying, you may have no chemical flow. Also, the converse is true in that you may not be spraying your

wand, but if the mix tank is in a filling cycle, your Chemical Flowmeter may be active at the desired flow rate.

The chemical proportioning system will mix chemical with water at a 1 to 30 ratio when the Flowmeter is set at 5 GPH, or a 1 to 15 ratio when the Flowmeter is set at 10 GPH.

CHEMICAL SYSTEM MAINTENANCE

The chemical lines may need to be flushed with vinegar periodically to prevent abnormal chemical build-up. This flushing may be done by removing the clear plastic hose from the Chemical Jug and inserting it into a one quart container of vinegar. This should be done with the Chemical Flowmeter setting 10 GPH. Simply spray water from the wand until the quart of vinegar is exhausted. Then repeat the process with one quart of clear water to void all lines of vinegar.

Figure 5-1 **Water Flow Diagram - Standard**

D3377 Rev A

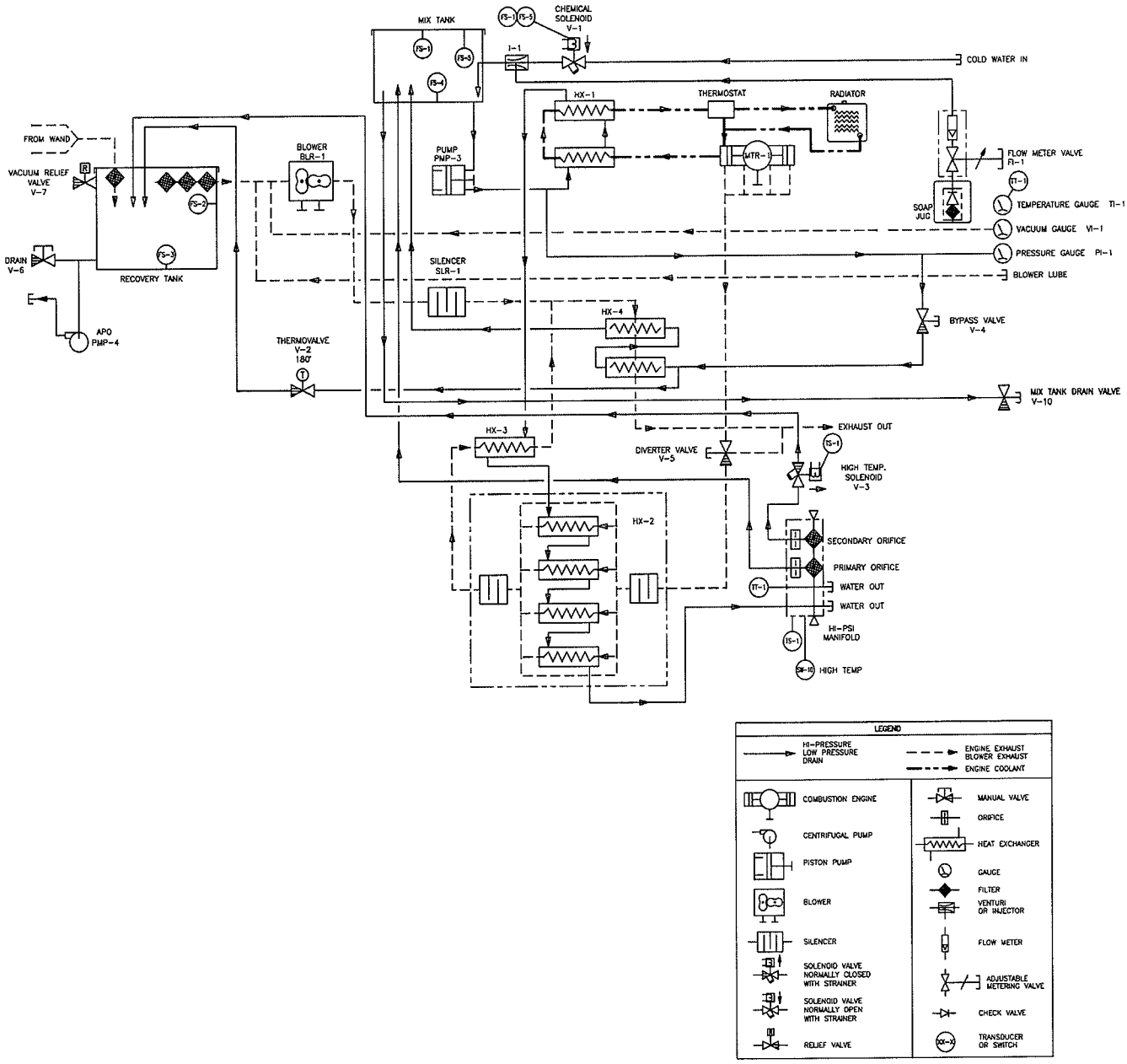


Figure 5-2 **Water Flow Diagram with Pressure Washing Option**

D4285 Rev –

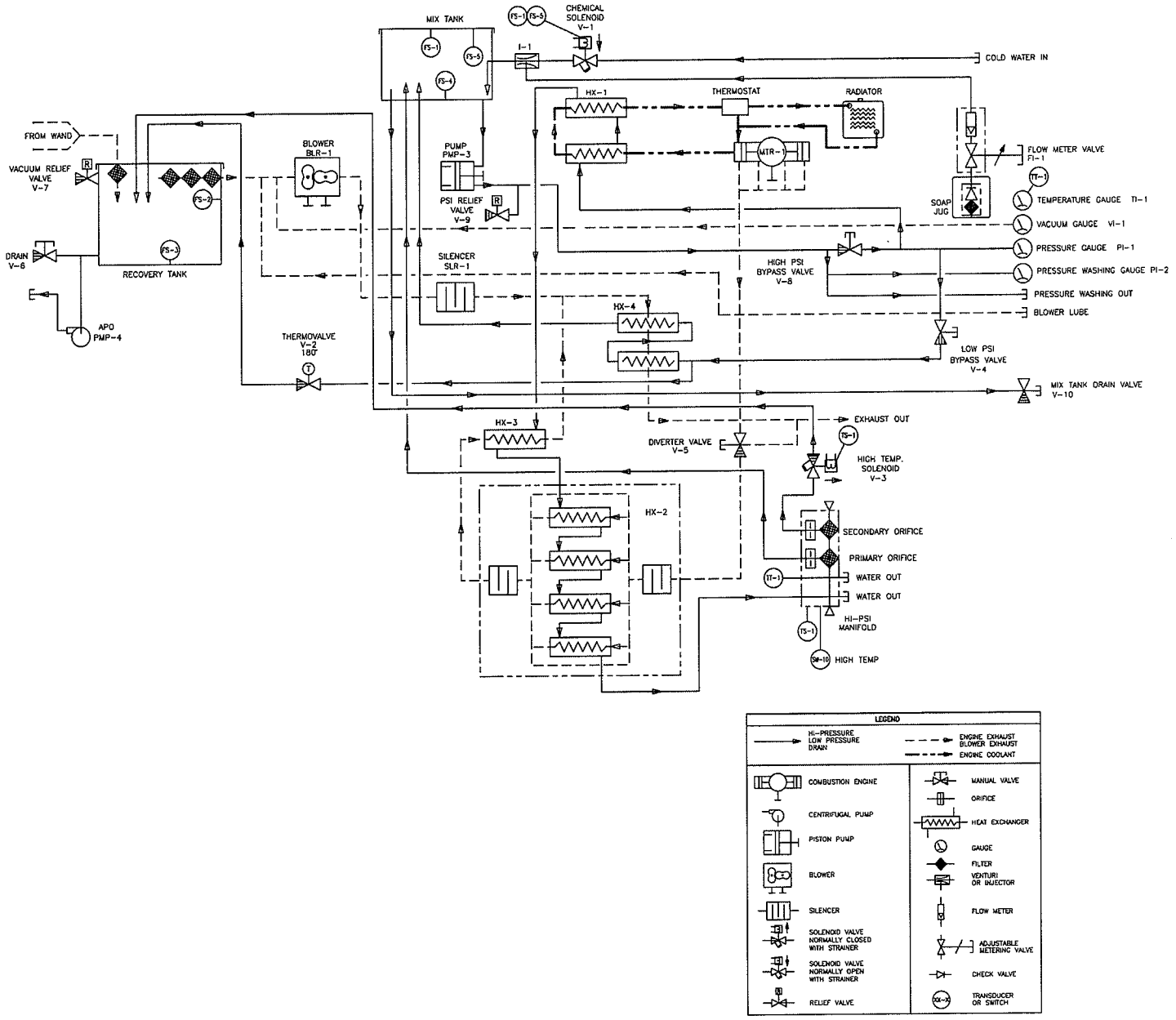
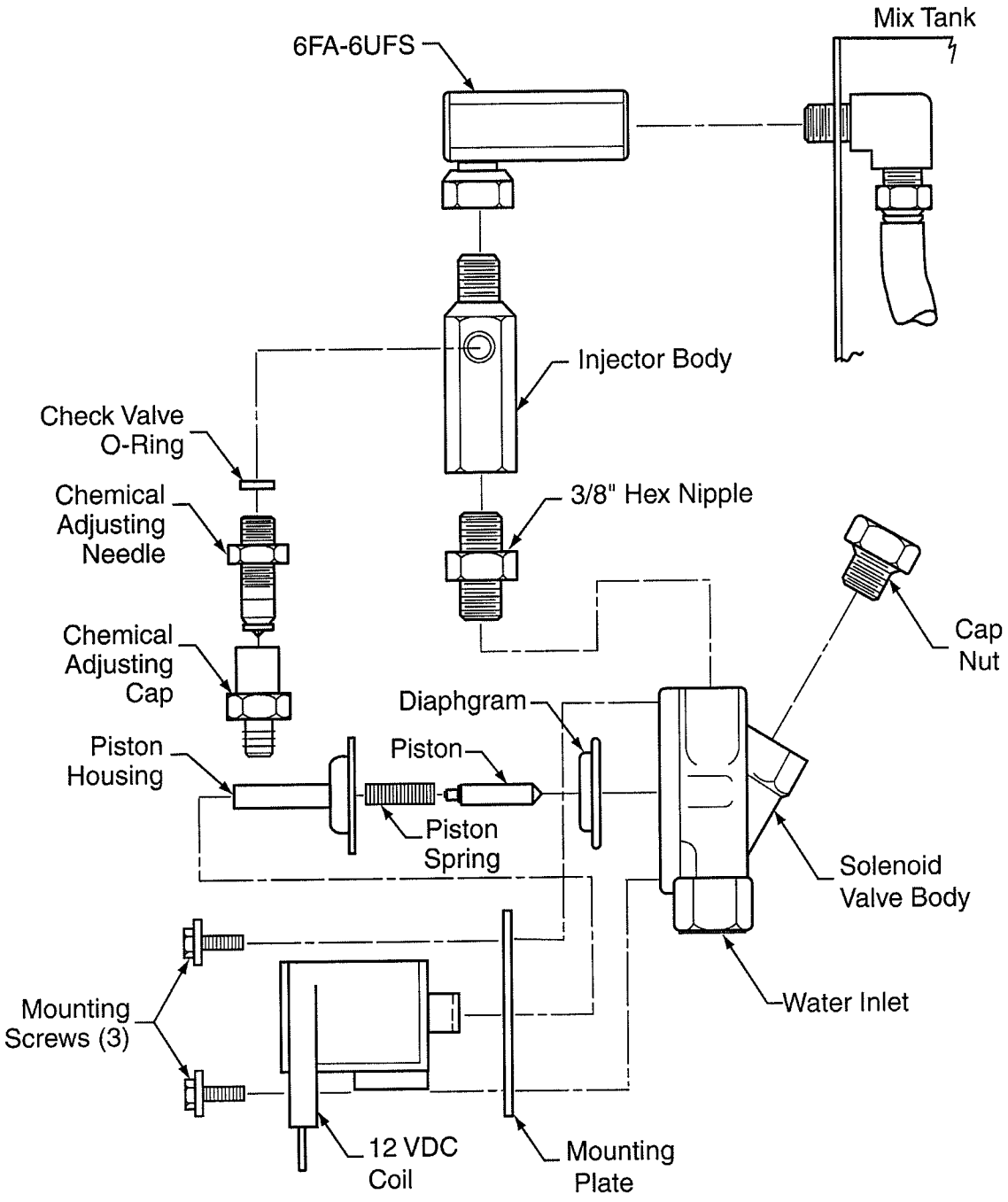


Figure 5-3 **Proportioner Diagram**



Chemical Tank Troubleshooting

No.	Problem / Possible Cause	Solution
1.0	**There is a loss of water pressure.**	
1.1	There is a clogged *filter* in the water supply to the pump.	If a filter is present in the water supply line to the pump, remove and discard it.
1.2	The *mix tank water supply hose* is missing. This will cause aeration and turbulence in the tank.	Look inside the mix tank and determine if a water inlet hose is present. If the hose is missing, order a new hose from your HydraMaster distributor and install it.
1.3	Foreign material is blocking the outlet hole for the pump in the bottom of the *mix tank*.	Inspect the outlet hole leading to the pump in the bottom of the mix tank. Remove any foreign material blocking the hole.
1.4	Foreign material is blocking the *water supply hose* leading to the pump from the mix tank.	Remove the water supply hose between the mix tank and the pump. Sight through the hose. Remove any foreign material from the hose. Reattach the hose.
1.5	The *water supply hose* from the mix tank to the pump is kinked or blocked.	Remove the hose and clean it. If it is kinked, order a replacement hose from your HydraMaster distributor.

No.	**Problem / Possible Cause**	**Solution**
1.6	The end of the *mix tank water supply hose* is pointed directly at the pump inlet hole in the bottom of the mix tank.	Inspect the mix tank and determine the orientation of the water hose. If it is pointing directly at the pump inlet hole in the bottom of the tank, reposition the hose to point towards the opposite side of the tank from the inlet.
1.7	The *mix tank supply hose* is blocking the outlet hole leading to the pump in the bottom of the mix tank.	The water inlet hose may have to be shortened or lengthened to avoid blocking the outlet hole.
1.8	There is an air leak in the *water supply hose* from the mix tank to the pump.	Inspect the supply hose for worn or damaged areas. Also check for loose fittings. Replace the hose or fittings if necessary.
1.9	The *water supply hose* from the mix tank to the pump collapses when the machine is running hot.	Allow the machine to reach full water operating temperature (approximately 10 minutes). Inspect the water supply hose between the mix tank and the pump. If the hose appears to be collapsing, remove the hose and order a replacement hose from your HydraMaster distributor. Reinstall the new hose.
1.10	There is foreign material in the inlet or outlet valves of the *pump*.	Inspect the valves and remove any foreign material.
1.11	The controlled *orifice* is oversized due to wear or is leaking around the threads.	Replace the jet and install using a thread sealant sparingly.
1.12	The *by-pass valve* is malfunctioning.	Remove the plunger and lube the "O" rings. Clean the walls of the by-pass valve with a bristle brush and de-scaler. **NOTE**: Use a water resistant high temperature lube.

No.	Problem / Possible Cause	Solution
1.13	The High pressure seals are worn or have been damaged.	Replace High pressure seals.
1.14	The low pressure seals are worn or have been damaged.	Replace Low pressure seals.
1.15	The valves are being held open by debris.	Remove valves and clean. Replace if necessary.
1.16	The valves are not sealing.	Install a valve kit.

No.	Problem / Possible Cause	Solution
2.0	**The water temperature is too low.**	
2.1	The *water dump (high pressure system control) solenoid* is stuck open.	Remove the electrical wires from the solenoid. If the solenoid continues to dump, disassemble and check for residue. Clean and replace the solenoid.
2.2	The *orifice* (spray nozzle) in the cleaning tool is worn, defective, or the wrong size.	Replace or change the orifice size. The Maxx 550 uses a 8006E T-jet.
2.3	The incoming *water supply* is extremely cold.	Keep the incoming water supply hoses away from ice and snow during winter months.
2.4	There is an *exhaust* leak.	Inspect the exhaust system for leaks. Tighten any loose clamp welds or replace any broken parts.
2.5	There is excessive *pressure*.	Adjust the pressure regulator for less pressure.
2.6	A *heat exchanger* is carbon-coated.	For a **copper tube heat exchanger**, carefully unplug the tubes by poking a small rod through them. Then take the heat exchanger to a radiator shop to be boiled out. For the **stainless steel heat exchanger** take the heat exchanger to a radiator shop to be boiled out.
2.7	The 185° *thermovalve* is stuck open due to scale or hard water, or is defective	Test the thermovalve. Replace it if necessary.

No.	**Problem / Possible Cause**	**Solution**
2.8	The adjustable temperature control dial is set too low or malfunctioning.	If returning the temperature control dial to maximum does not work, check the water temperature in the mix tank. At maximum the High temp control light should come on at approximately 220° - 230°. If not, replace the temperature control unit.
2.99	The *temperature gauge* is defective.	Replace the gauge if necessary.
2.10	The *temperature gauge* sending unit is defective.	Replace as necessary.

No.	**Problem / Possible Cause**	**Solution**
3.0	**The water temperature is excessive.**	
3.1	The *filter* in front of the controlled orifice is clogged.	Inspect the filter. Clean it if necessary.
3.2	The controlled *orifice* is clogged.	Inspect the controlled orifice. Clean it if necessary.
3.3	The *high pressure dump solenoid (system control) valve* is not opening.	Short out the dump sensor. If the dump solenoid valve has 12 volts across the terminals and does not open, replace it.
3.4	The 185° *thermovalve* is not working.	The sensor switch is normally open. It closes its hidden contacts at 185° F. Replace it if it is necessary.
3.5	The *engine* speed is too low or too high.	Refer to the Engine Operation and Maintenance manual.
3.6	The *temperature gauge* is defective.	Replace the temperature gauge.
3.7	The thermostat is out of calibration or is defective.	Recalibrate the thermostat or replace as necessary.

No.	**Problem / Possible Cause**	**Solution**
4.0	**There is pressure on the gauge, but no water coming out of the wand.**	
4.1	The *wand jet* is plugged.	Inspect and clean the jet.
4.2	The *quick connect* on one or more of the high pressure hoses is defective.	Remove and clean or replace the defective quick connect(s).
4.3	The *cleaning tool* has a clogged valve.	Remove the valve stem. Clean the valve. Replace the "O" rings and stem if they are bad.
4.4	The high pressure *quick connect* on the front of the machine is clogged.	Remove and clean or replace the quick connect.
4.5	The inner lining on a *hose* is constricted.	Remove the restriction or replace the hose.

No.	**Problem / Possible Cause**	**Solution**
5.0	**The water in the mix tank will not keep up with the wand.**	
5.1	There is dirt in the *solenoid valve* along side of the mix tank.	Take the valve apart and clean it.
5.2	One of the mix tank fill floats are defective.	Check continuity on both of the floats. Replace the float if necessary.
5.3	The *mix tank relay* is bad.	Replace the relay if it is defective.
5.4	The *water supply* is improperly adjusted.	The water supply should be two (2) gallons per minute or more.
5.5	The *water inlet supply hose filter* is clogged or the hose is kinked.	Remove the obstructions.
5.6	There is a problem with the *pump-in pump*.	Check the amount of water the pump-in pump is supplying. It should supply a minimum of 2 GPM if you use one wand or one RX20. It should supply a minimum of 3 GPM if you use two wands.

No.	**Problem / Possible Cause**	**Solution**
6.0	**There is water coming out of the exhaust.**	
6.1	There are small amounts of water usually seen at start up.	This is *normal*! There is no solution! The water is condensation.
6.2	One of the *heat exchangers* is damaged from frozen water.	Determine which heat exchanger is bad. Replace it if it is necessary.
6.3	The *recovery tank* is full.	Empty the tank.
6.4	There is *excessive foam* in the recovery tank.	Apply a powdered or liquid defoamer to counteract this reaction to the excessive chemical in the carpet.
6.5	Blown head gasket.	See Authorized Ford Service Center.

No.	Problem / Possible Cause	Solution
7.0	**The mix tank overflows.**	
7.1	One of the *mix tank fill floats* is malfunctioning.	Check the continuity on both of the floats. Replace the float.
7.2	There is dirt in the *solenoid valve* next to the mix tank.	Remove the solenoid and clean. Replace the solenoid valve if necessary.
7.3	The *chemical relay* is bad.	Check the relay with a volt-OHM meter. With the ignition key turned on, there should be 12 volts between pin 85 and 86. If the voltage is present, check the voltage between ground and pin 87a on the relay. If voltage is present at 87a, replace the relay.

No,	**Problem / Possible Cause**	**Solution**
8.0	**The water pump is pulsing.**	
8.1	The hoses are restricted due to *hard water deposits* and/or *chemical build-up*.	Descale the machine.
8.2	The *throb hose* is hardened due to age or heat and cannot absorb spikes.	Replace the throb hose.
8.3	The *inlet hose* is drawing air.	Reseal the fittings. Tighten the hose clamps. Or replace the hose.
8.4	The hose from the bypass port in the bypass valve is obstructed.	Check the lines from the bypass through the 3" copper heat exchanger to the mix tank for debris. Clean or replace as necessary.
8.5	The *valve spring* is broken.	Replace the valves.

Pump Maintenance

MAXX 550
Section 6-1

DAILY:

1. Check the oil level and the condition of the oil. The oil level should be up to the center of the sight glass on the back of the pump.

   Use a 30 weight, non-detergent oil.

♦ CAUTION ♦

If the oil becomes discolored and contaminated, one of the oil seals may be damaged. Refer to the Service Section.

Do not operate the pump if the crankcase has been contaminated with water.

♦ CAUTION ♦

Do not leave contaminated oil in the pump housing or leave the housing empty. Remove contaminated oil as soon as it is discovered and replace it with clean oil.

PERIODICALLY:

1. Change the oil after the first 100 hours of operation, and every 400 operating hours thereafter. When changing, remove the drain plug on

the oil drain center located on the frame so all oil and accumulated sediment will drain out.

♦ CAUTION ♦

Do not turn the drive shaft while the oil reservoir is empty.

♦ CAUTION ♦

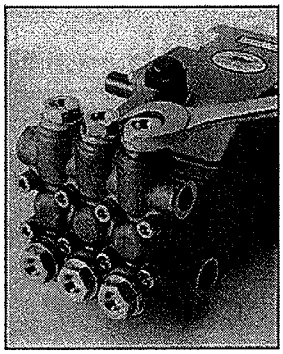
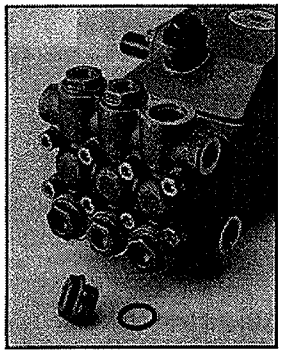
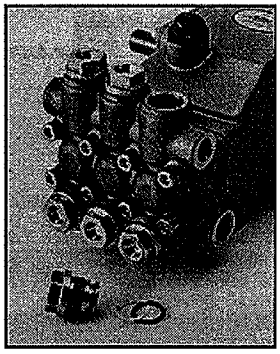
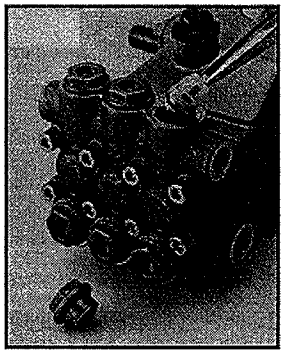
Protect the pump from freezing.

Service

The next few pages explain how to disassemble and inspect all easily-serviceable parts of the pump.

♦ CAUTION ♦

Do not disassemble the hydraulic end unless you are a skilled mechanic. For assistance, contact HydraMaster (425-775-7275) or the distributor in

your area.

1. Servicing the Valves (See illustrations above.)

   A. Remove the hex valve plugs (top—discharge, bottom—inlet).
   B. Unthread the valve plug and examine the o-ring under the plug for cuts or distortion. Replace it if it is worn. Lubricate new o-rings before installing.
   C. Grasp the valve retainer by the tab at the top with needle-nose pliers, then remove the o-ring at the bottom of the valve chamber.
   D. Inspect all valve parts for pitting, gouges, or wear. If wear is excessive, replace valve assembly.
   E. Reinstall valve assemblies:
      1. Using a clean towel, clean the valve chamber.

2. Install the o-ring into the high pressure manifold.
3. Install the valve assemblies into the high pressure manifold (the metal side of the valve faces the manifold).
4. Replace the o-ring on the hex valve plug.
5. Torque the plug to 72 foot pounds.

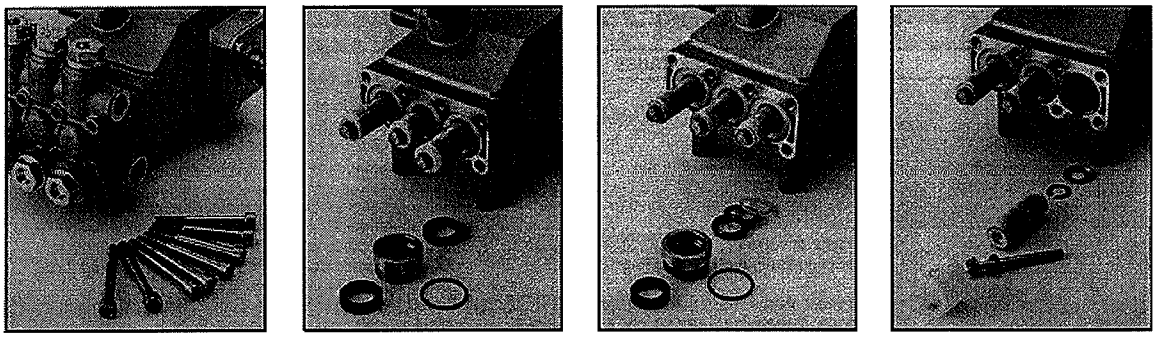
2. Removing the High Pressure Manifold

A. Using an M6 allen wrench, remove all eight of the socket head bolts.
B. Rotate the crankshaft by hand to start separation of the manifold head from the crankshaft.
C. Insert two flat-head screwdrivers on opposite sides to further separate the manifold from the crankshaft.

♦ CAUTION ♦

To avoid damage to either plunger or seal, keep the manifold properly aligned with the ceramic plungers when removing it.

D. Remove the seal retainer from the manifold and inspect for wear.
E. Examine the ceramic plunger for cracks or scoring (refer to *Servicing the Plungers* for replacement).



Servicing the Low Pressure Seals and High Pressure Seals (See illustrations above.)

F. Remove the low pressure seal from the seal retainer using a 90°pick tool.
G. Remove the high pressure seal from the manifold.
H. Inspect the low pressure seal and high pressure seal for wear and replace if necessary.
I. Reinstall the low pressure seal:
    1. Install the low pressure seal into the seal retainers with the garter spring down.
J. Reinstall the high pressure seal:
    1. Lubricate the seal chamber in the manifold.
    2. Carefully square the high pressure seal into position by hand with the grooved side down (metal back facing out).
    3. Examine the seal retainer's o-ring and replace if worn. Lubricate the new o-ring before installing.
    4. Next, press the seal retainers into the manifold until completely seated.

3. Servicing the Plungers (See illustrations above step 3.)

A. Using a hex tool, loosen the plunger retainer about three to four turns. Push the plunger back to separate it from the retainer and finish unthreading the plunger retainer by hand.

B. Unthread the plunger retainer with sealing washer.
C. Remove the ceramic plunger, keyhole washer and barrier slinger from the plunger rod.
D. Reinstall the ceramic plungers:
   1. Examine the sealing washer on the plunger retainer and replace it if it is cut or worn. Lubricate the new sealing washer for ease of installation and to avoid damage.
   2. Apply Loctite 242™ to the threads of the plunger retainer and press it into the ceramic plunger. Thread hand tight, then torque the bolt to 4.4 foot pounds.
   3. Install the seal retainer with holes to the top and bottom, and forward.

4. Reinstall High Pressure Manifold

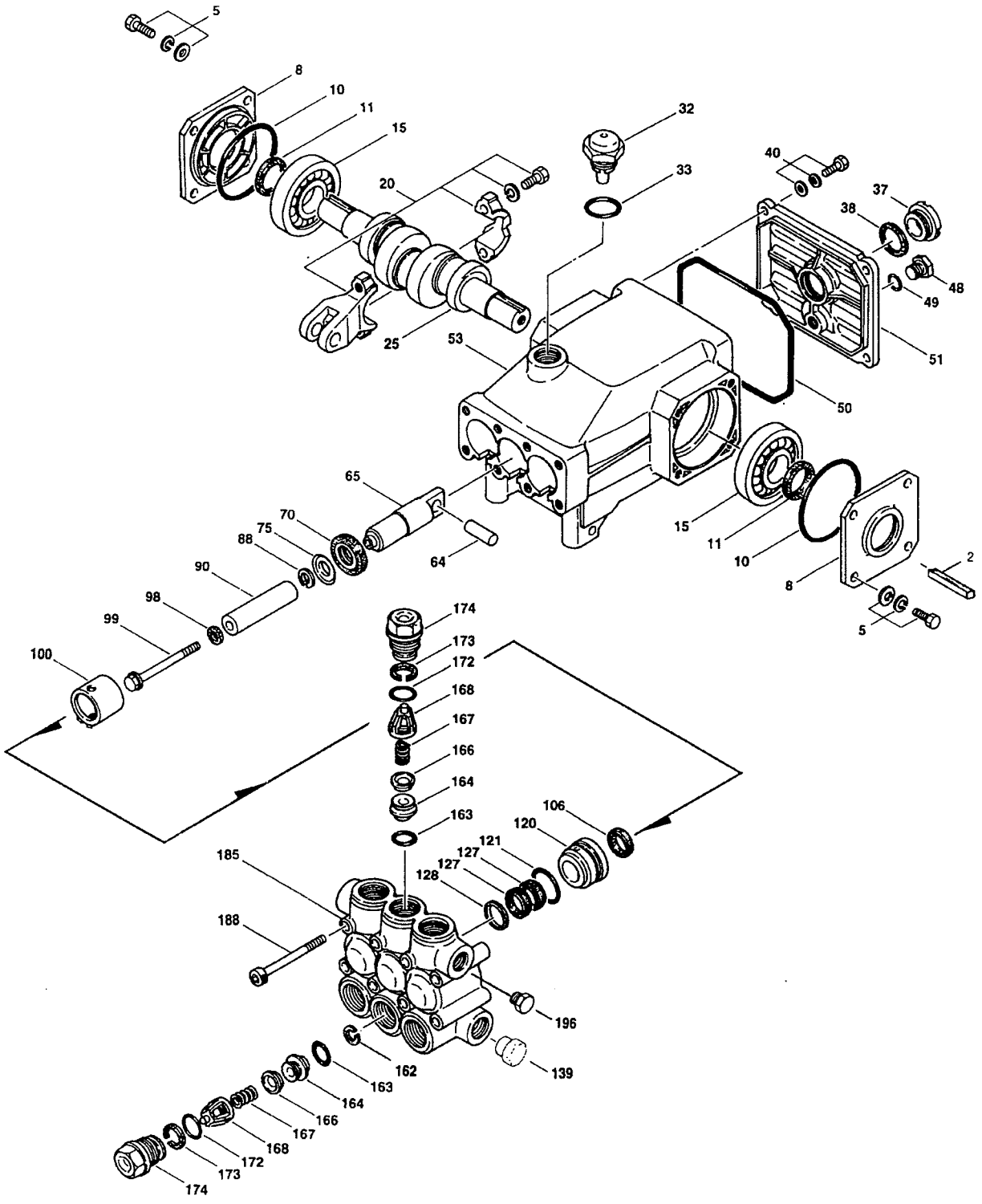
A. Slip the seal retainer over the ceramic plungers with the holes to the top and bottom and forward.
B. Turn the shaft by hand to line up the plungers so that the end plungers are parallel.
C. Lightly lubricate the plungers and carefully slide the manifold head onto the plungers while supporting it from the underside to avoid damaging the plungers.
D. Reinstall the socket head bolts and torque to 4.4 foot pounds.

5. Servicing the Crankcase

A. While manifold, plungers, and seal retainers are removed, examine the crankcase seals for wear.
B. Rotate the crankshaft oil seal externally for drying, cracking or leaking.
C. Consult your HydraMaster distributor if crankcase servicing is necessary.

Torque Chart				
		Torque		
Pump Item	Thread	Inch Pounds	Foot Pounds	Nm
Plunger Retainer	M6	55	4.4	6.2
Manifold Bolt	M6	55	4.4	6.2
Valve Plugs	M22	870	72.3	100.0
Bearing Case Screws	M6	50	4.0	6.0
Crankcase Cover	M6	50	4.0	6.0
Bubble Oil Gauge	M28	45	3.6	5.0
Mounting Bolts	M8	115	9.4	13.0

Figure 6-1: **Cat Pump**



Cat Pump Parts List

ITEM	PART NO.	DESCRIPTION	QTY
2	30057	Key (M6)	1
5	96031	Screw, Sems HHC, Bearing Cover (M8x16)	8
8	46910	Cover, Bearing	2
10	14028	O-Ring, Bearing Cover	1
11	43222	Seal, Oil, Crankshaft	2
15	14480	Bearing	2
20	46743	Rod, Connecting Assembly	3
25	46928	Crankshaft, Dual End	1
32	46798	Cap, Oil Filler, Domed	1
33	14179	O-Ring, Oil Filler Cap	1
37	43987	Gauge, Oil, Bubble	1
38	44428	Gasket, Flat, Oil Gauge	1
40	92519	Screw, Sems, HHC (M6x16)	4
48	25625	Plug, Drain	1
49	23170	O-Ring, Drain Plug	1
50	46940	Cover, Crankcase	1
51	14044	O-Ring, Crankcase Cover	1
53	46912	Crankcase	1
64	46746	Pin, Plunger Rod	3
65	46747	Rod, Plunger	3
70	46838	Seal, Oil, Crankcase	3
75	43900	Slinger, Barrier	3
88	45697	Washer, Keyhole (M18)	3
90	46893	Plunger (M50)	3
98	46730	Washer, Seal	3
99	46729	Retainer, Plunger w/ Stud (M7)	3
100	46749	Retainer seal	3
106	43243	Seal, LPS w/ Spring	3
120	46896	Case, Seal – Press-in-style	3
121	13978	O-Ring, Seal Case	3
127	44549	V-Packing	6
128	44548	Adapter, Male	3
139	22179	Plug, Inlet ½"	6
163	17547	O-Ring, Seat	6
163	11685	O-Ring, Seat	6
162		Back-up Ring, Seat	6

ITEM	PART NO.	DESCRIPTION	QTY
164	46658	Seat	6
166	46429	Valve	6
167	43750	Spring	6
168	46583	Retainer, Spring	6
172	26996	O-Ring, Valve Plug	6
173	48365	Back-up Ring, Valve Plug	6
174	45900	Plug, Valve	6
185	46895	Manifold, Head	1
188	87872	Bolt, HSH (M8x70) Manifold Head	8
196	22187	Plug, Discharge 3/8"	1
299	814844	Complete Head	1
300	33630	Seal Kit	1
310	33060	Valve Kit	2

Pump Troubleshooting

Cavitation

- Inadequate fluid supply because of:
- -Inlet line collapsed or clogged
- -Air leak in inlet line
- -Worn or damaged inlet hose
- Fluid too hot for inlet suction piping system.
- Air entrained in fluid piping system.
- Aeration and turbulence in supply tank.
- Inlet suction vacuum too high.
- High pressure seals worn.

Symptoms of Cavitation:

-Excessive pump valve noise (chattering)
-Premature failure of spring or retainer
-Volume or pressure drop
-Rough-running pump.

Drop in Volume or Pressure

- Air leak in suction piping.
- Clogged suction line.
- Pressure gauge inoperative or not registering accurate.
- Suction line inlet above fluid level in tank.
- Inadequate fluid supply.
- Pump not operating at proper RPM.
- Worn pump valve parts.
- Foreign material in inlet or outlet valves.
- Worn low pressure seals.
- Cavitation.
- Belt slippage.

Water Pulsations

- Foreign object lodged in pump valve.
- Air in suction line.
- Valve spring broken.
- Cavitation.
- Aeration or turbulence in supply tank.
- Stuck inlet or discharge valve.

Valve Wear

- Normal wear.

Loss of Oil

- External seepage.
- Frozen pump.
- Worn crankshaft seal.
- Oil drain piping or fill cap loose.

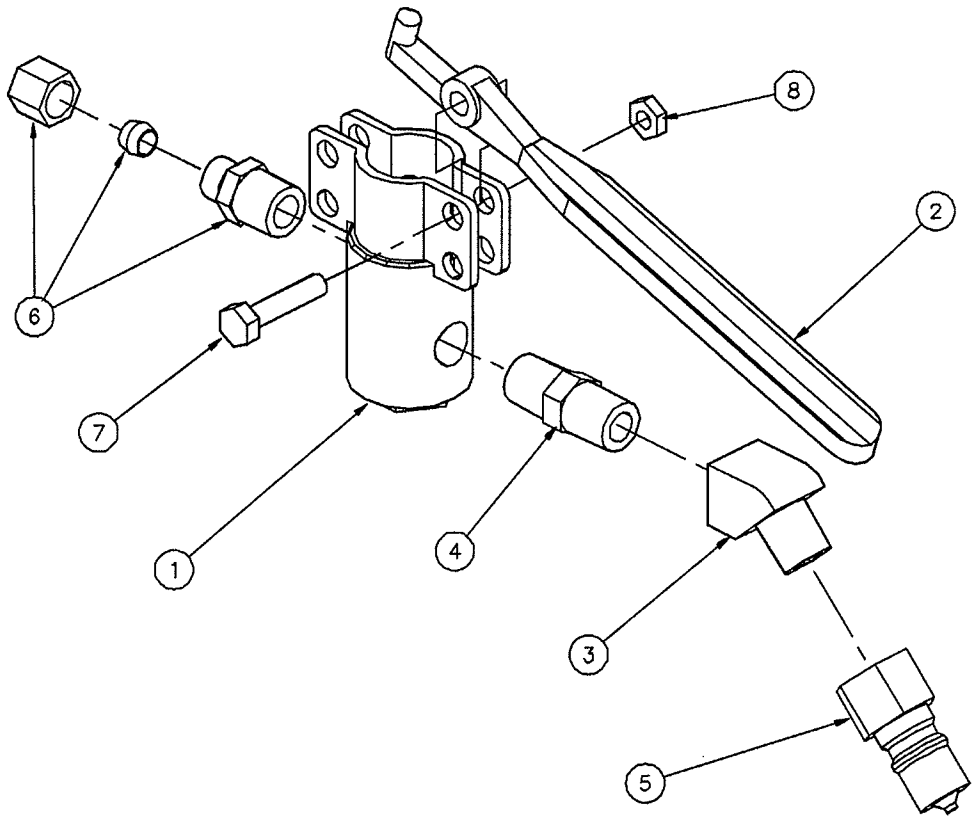
Premature Failure of Valves or Seals

- Excessive cavitation.
- Foreign object in the pump.
- Pump running too fast.
- Valve or seal material incompatible with fluid being pumped.
- Excessive inlet pressure.
- Scored plungers.
- Running pump dry for excessive periods of time.
- Excessive temperatures of fluid being pumped.

Cleaning Wand Parts

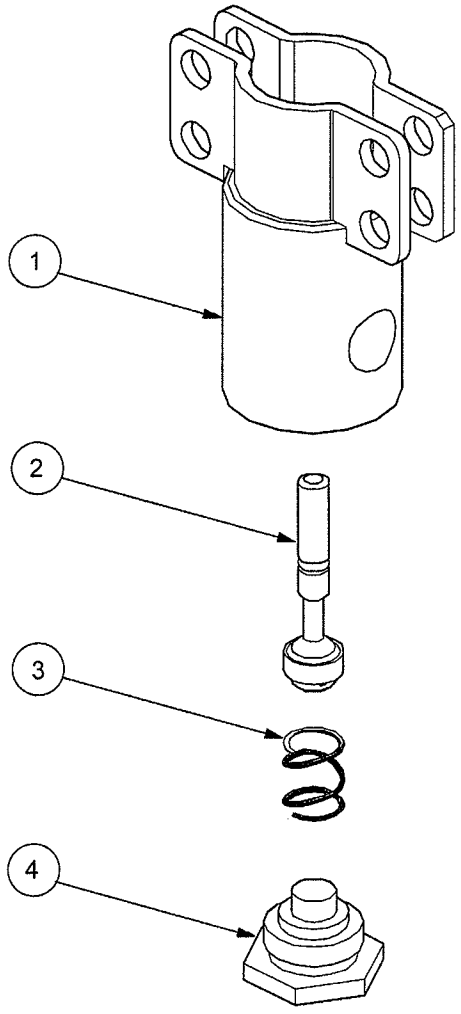
MAXX 550
Section 7-1

Figure 1-1: **Valve Assembly**
C3652 Rev -



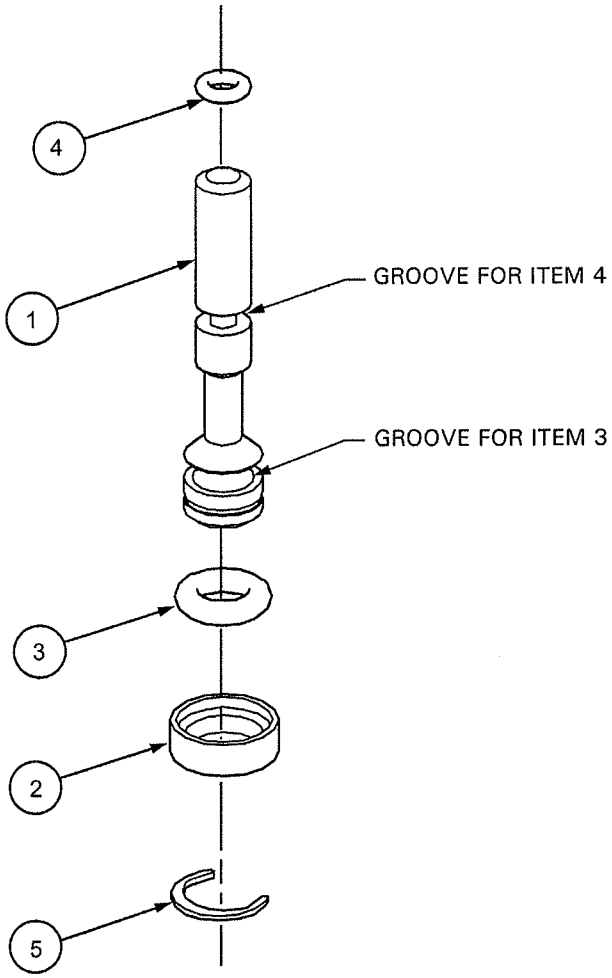
ITEM	PART NO.	DESCRIPTION	QTY
1	169-058	Valve, s/s HM Solution	1
2	167-013	Trigger, Hydra Hoe Valve - Brass	1
3	052-082	Elbow, ¼" Brass 45 Street	1
4	052-095	Nipple, ¼" s/s Hex	1
5	052-050	Quick Connect, 440 M with Viton	1
6	052-152	Compression, ¼" Male Hydra Hoe Fitting	1
7	143-002	Screw, ¼ - 20 x 1" HHC s/s	1
8	094-009	Nut, ¼ - 20 s/s Nylock	1

Figure 7-2: **Solution Valve Assembly**
B1234 Rev A



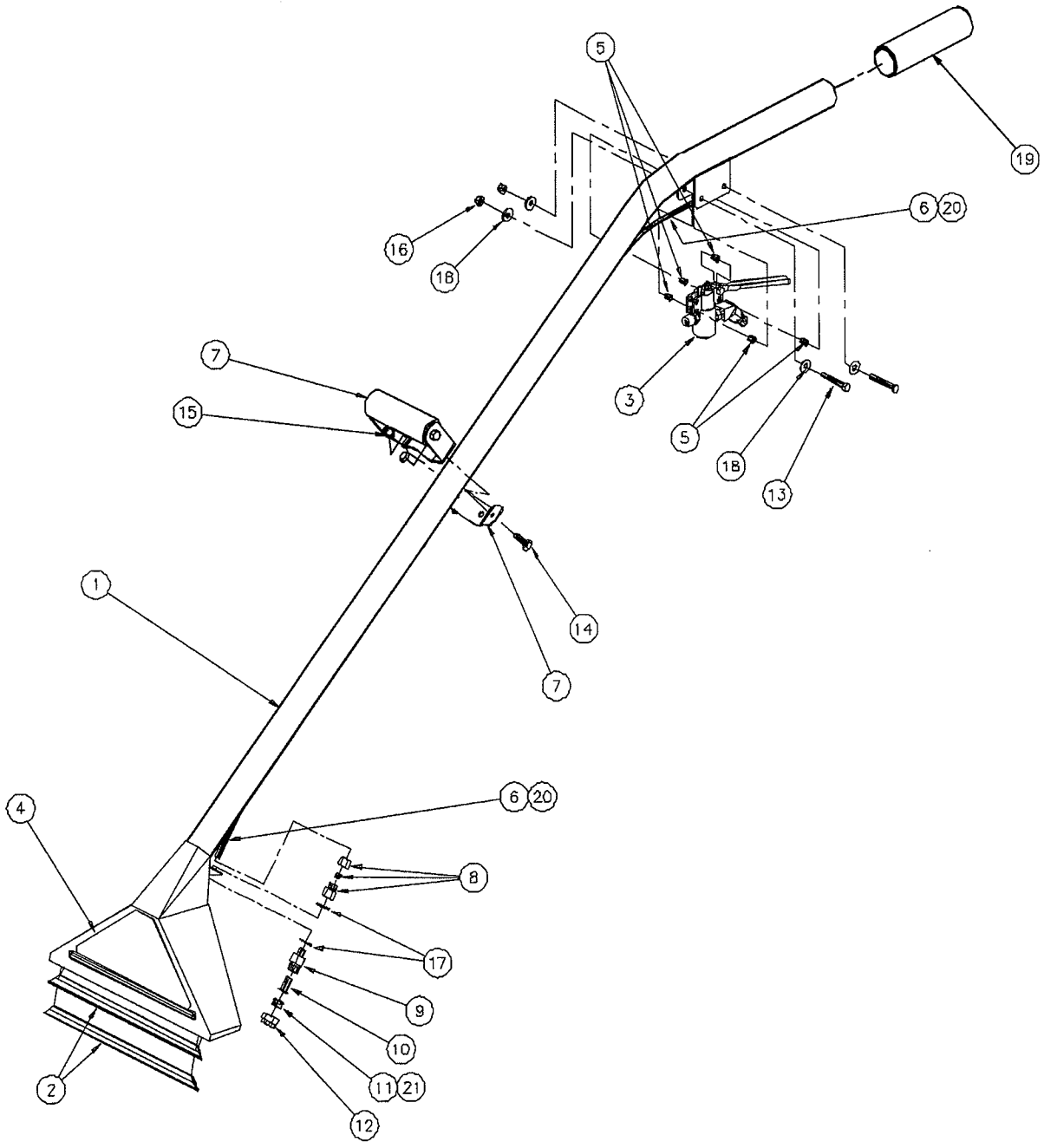
ITEM	PART NO.	DESCRIPTION	QTY
1	600-012-001	Valve Body Sub Assembly	1
2	600-012-002	Valve Stem Sub Assembly	1
3	155-003	Spring, HM Solution Valve	1
4	027-001	Cap, Brass	1

Figure 1-3: **Valve Stem Assembly**
B3743 Rev -



ITEM	PART NO.	DESCRIPTION	QTY
1	107-129	Plunger, HM Solution Valve	1
2	139-003	Ring Keeper, HM Solution Valve	1
3	097-010	O-Ring, HM Valve Plunger - Large	1
4	097-022	O-Ring, Solution Valve Flow Meter - Small	1
5	139-004	Ring, Solution Valve Stem Snap	1

Figure 1-4: **Hydra Hoe Wand Assembly**
C2660 Rev -



Hydra Hoe Wand Assembly Parts List

ITEM	PART NO.	DESCRIPTION	QTY
1	173-001	Wand Kit, 12" s/s Truckmount	1
2	082-004	Lips, 12" s/s HM Wand (2 Pieces)	1
3	169-055	Valve Assembly, s/s Hydra Hoe with Trigger	1
4	081-015	Label, "HydraMaster" Wand	1
5	154-001	Spacer, ¼ x 5/16 s/s Solution Valve	5
6	168-001	Tube, Hydra Hoe Solution - ¼" OD s/s	1
7	061-006	Handle, Pressure Guide	1
8	052-151	Compression, ⅛" Female Hydra Hoe Fitting	1
9	052-153	Housing, Brass Stabilizer Wand Nozzle Fitting	1
10	186-001	Stabilizer - Jet Assembly Group	1
11	076-005	Jet, #6 s/s Hydra Hoe	1
12	094-028	Nut, Brass Jet Assembly Group	1
13	143-005	Screw, ¼ - 20 x 1¾" HHC	2
14	143-012	Screw, 5/16 - 18 x ¾" HHC s/s	2
15	094-035	Nut, 5/16 - 18 s/s Nylock Half	2
16	094-009	Nut, ¼ - 20 s/s Nylock	2
17	174-032	Washer, ⅜ s/s Flat	2
18	174-003	Washer, ¼" s/s Flat	4
19	061-007	Handle Grip Hydra Hoe	1
20	063-003	Harness Wrap, High Temp. ¼" - Gray	4
21	076-045	Jet, 8004E s/s T	1

Vacuum System

MAXX 550
Section 8-1

The vacuum blower in this machine is a positive displacement lobe type. The performance and life of this unit is greatly dependent on the care and proper maintenance it receives.

Because of the close tolerances between the lobes and housing of the vacuum blower, solid objects entering the inlet will damage the internal lobes, gears, bearings or drive system.

To prevent this, a stainless steel filter screen has been placed at the vacuum inlet inside the vacuum recovery tank. This stainless steel screens are inserted into individual slots and should be removed for cleaning weekly.

♦CAUTION ♦

When machine is being run for test purposes and the vacuum inlet on top of the machine is open, caution should be used.

To protect the vacuum blower from overloading and damaging itself, there is a vacuum relief system installed on the vac tank. When the vacuum tank inlet is completely sealed off, a maximum of 12 HG will be attained. At the end of each day, an oil based lubricant should be sprayed into the blower lubrication port before shutting down the machine. If you fail to lubricate the vacuum blower daily, rust deposits and moisture will decrease the life of the vacuum blower.

♦ CAUTION ♦

Foam passing through the blower could lead to serious problems. Therefore, it is important to keep the vacuum tank foam free.

Read the vacuum blower manual carefully for proper oil change and grease application. The maintenance log may differ slightly from the manual, but the truck-mounted carpet cleaning machine application is very demanding of the vacuum blower and therefore it should be maintained more regularly.

♦ CAUTION ♦

The vacuum tank is protected from overflowing by a vacuum tank float kill switch. The switch is not activated by foam, only by liquid.

VACUUM TANK FILTER BASKET

HydraMaster filter baskets are designed to trap lint, sand and dirt that would normally collect at the bottom of your vacuum tank. The basket should be emptied at the end of each job.

Blower Troubleshooting

No.	Problem / Possible Cause	Solution
1.0	**There is no vacuum or a loss of vacuum.**	
1.1	The *stainless steel filter* is clogged.	Clean or replace the filter.
1.2	The *filter basket* is full.	Clean the filter basket.
1.3	The *vacuum tank dump valve* is "open" or defective.	If water drips from the valve when the machine is not running, the valve will cause a vacuum loss when the machine is running. Replace it if it is defective.
1.4	The *vacuum hose* is plugged.	Remove the obstruction by reversing the vacuum hose.
1.5	There is a restriction in the *cleaning tool*.	Remove the obstruction.
1.6	The *vacuum tank seal* is defective.	Replace the seal.
1.7	The *hose* from the blower to the recovery tank is kinked or has collapsed inside.	Replace or reshape the hose. **NOTE**: A special reinforced hose is required for replacement.
1.8	There is a hole in the *recovery tank*.	Inspect the tank for leaks using smoke and weld the tank if it is required.
1.9	There is a hole in the *vacuum hose*.	Repair or replace the hose.
1.10	The *vacuum release* is loose.	Readjust the vacuum release.
1.11	The *engine speed* is too low.	Adjust the speed.

No.	**Problem / Possible Cause**	**Solution**
1.12	The *vacuum blower's* end plates or lobes are worn.	Replace the worn components. **NOTE:** This must be accomplished by a qualified technician.
1.13	There are *vacuum leaks* around the top collector box.	A vacuum leak can usually be detected by spraying a mist of WD40 or blowing smoke towards the leak. The mist or smoke will be sucked into the leak. When you see the leak, repair it.

No.	Problem / Possible Cause	Solution
2.0	**The blower is noisy.**	
2.1	There is an *exhaust* leak between the blower and the silencer.	Inspect the fittings to determine where the air leak is. Repair as necessary.
2.2	The *blower* is out of oil or the gears may be bad. **NOTE:** Permanent damage may result from a lack of lubrication.	Add oil. If the noise continues, replace the gears or blower. **NOTE:** Replacement of the gears must be accomplished by a qualified technician.
2.3	The *silencer* is bad.	Inspect it for an external hole. Repair or replace the silencer.
2.4	The *lobes* are hitting.	Replace the blower.
2.5	The *engine* is running at the wrong speed. This is noticeable because the blower noise increases with speed.	Adjust the engine to run at the proper speed.
2.6	The *bearings* are worn.	Remove and replace the bearings as required. **NOTE:** This process must be accomplished by a qualified technician.

No.	**Problem / Possible Cause**	**Solution**
3.0	**The blower will not turn.**	
3.1	The *lobes* are locked up because of rust, burnt chemical foam, or a sugar-like substance has been vacuumed up from the carpet.	a. Most *burnt foam* and *rust* can be removed by soaking the lobes with liquid wrench. After soaking the lobes, with the machine running, pour a half gallon of hot water into the top of the blower. Then spray WD40 or Pennz Lube into the top of the blower to displace the water. b. Any *sugar-like substances* can be removed by soaking the lobes with hot water.
3.2	There is debris in the *blower*.	Remove the debris. A stainless steel filter is provided at the vacuum inlet in the vacuum tank to prevent this problem.
3.3	The blower has broken *gears* or shattered *lobes*.	Rebuild or replace the blower. **NOTE:** Rebuilding the blower must be accomplished by a qualified technician.

No.	**Problem / Possible Cause**	**Solution**
4.0	**The shaft turns, but the lobes do not.**	
4.1	The *shaft* is broken inside the blower.	Replace the blower.

Engine Troubleshooting

MAXX 550
Section 9-1

No.	**Problem** / **Possible Cause**	**Solution**
1.0	**The engine will not turn over.**	
1.1	The *circuit breaker* on the control panel is tripped.	Press the reset button. Inspect the unit to determine the cause of the tripped circuit breaker. Repair as required.
1.2	The *battery cable* is loose or the terminals corroded.	Clean and tighten the battery terminal connections.
1.3	The *battery* is dead.	Recharge or replace the battery.
1.4	There is a problem with the *fuse link*.	Check the link. If it is defective, replace it.
1.5	There is a problem with the *starter solenoid*.	With the ignition switch in the "Start" position, check the following on the solenoid. Check for +12 volts on: a) the small terminal with the blue wire from the ignition switch, b) the large terminal with the cable from the battery, and c) the large terminal with the cable going to the starter. If the voltage is present on the first two checkpoints, but not on the large terminal going to the starter, replace the solenoid.
1.6	The *ignition switch* is defective.	Test the switch for entering voltage. If there is voltage entering the switch but not exiting the center post when the switch is fully engaged, then replace it.
1.7	The *vacuum blower* is seized.	Refer to The Blower, Chapter 10.

No.	**Problem** / **Possible Cause**	**Solution**
1.8	The *starter motor* is defective.	Remove the belt(s) from the engine. Check to see if the engine will turn over manually. Check that the engine is grounded to the minus side of the battery. With the ignition key in the start position, check the starter motor for +12 volts. If all of the above conditions are met and the starter will not turn, replace it.
1.9	The *engine* is malfunctioning.	Refer to the Ford Engine Operation and Maintenance manual included in your owner's manual or see the local Ford engine repair facility.
1.10	The *ground cable* on the block of the motor has fallen or broken off.	Reattach the cable.

No.	Problem / Possible Cause	Solution
2.0	**The starter turns the engine over, however the engine will not start. (There is no spark♦.)**	♦ Check for spark at the spark plugs. If there is no spark, examine the troubleshooting guide below. However if there is a spark, see troubleshooting problem number 3 on the following page for possible fuel problems.
2.1	A *spark plug wire* is bad.	While the engine is turning over with the starter, make a visual check to identify a bad spark plug wire. In a dark, well ventilated garage start the engine and look at the plug wires. If there is a break in the wire you will see arcing or sparking at the damaged area. If you notice arcing, replace the wire.
2.2	A *spark plug* is faulty.	Check for worn, fouled or improperly gapped spark plugs. Replace if necessary. **CAUTION**: Allow the engine to cool completely before attempting to remove the plugs.
2.3	The *coil* is faulty.	See the engine owner's manual and replace the coil if necessary.
2.4	The *Electronic Spark Control* is Malfunctioning.	Refer to the Ford Engine Operation and Maintenance manual included in your owner's manual.
2.5	The vacuum tank is full or the float switch is defective.	Empty recovery tank. Replace switch as necessary.
2.6	The *High Temperature Switch* has activated or is defective.	Refer to Section 5-12. Replace switch as necessary.

No.	Problem / Possible Cause	Solution
2.7	The *Oil Pressure Switch* has activated or is defective.	Check engine oil pressure. Replace switch as necessary.
2.8	The *Lower Float* has activated or is defective.	Check the water source to the machine. Refer to Section 5-14 Replace switch as necessary.

No.	Problem / Possible Cause	Solution
3.0	**The starter turns the engine over, however the engine will not start. (There is no gas♦.)**	♦ Check for spark at the spark plugs. If there is no spark, see troubleshooting problem number 2 on the previous page. However if there is a spark, examine the following troubleshooting guide for possible fuel problems.
3.1	The *lower float in the chemical mix tank* is defective or the mix tank is empty.	Refer to section 5-14. Replace the defective float as necessary.
3.2	The chemical mix tank is out of water caused by a defective *upper float in the mix tank*.	When the float is down, the circuit is open. When the float is up, the circuit is closed. Replace the float if it is defective.
3.3	The chemical mix tank is out of water caused by a dirty or defective *solenoid valve* along side of the mix tank.	The solenoid valve is normally closed and should open with 12 volts across its terminals. Remove any foreign matter from inside the valve. Replace the valve if it is defective.
3.4	The chemical mix tank is out of water caused by a defective *chemical relay*.	At the Diagnostic Center remove the wire going to terminal 17a. Turn the ignition switch on and check for +12 volts on terminal 16. If no voltage is present, replace the relay.
3.5	The *fuel pump* is defective.	Remove the fuel line from the engine and place it in a container to see if the fuel is being pumped when the ignition is on. Replace the fuel pump if it is defective.
3.6	There is a poor *battery ground* to the fuel pump.	Repair the loose ground connection.

No.	**Problem / Possible Cause**	**Solution**
3.7	The *fuel pump* is sucking air between the gas tank and the inlet side of the fuel pump.	Examine the gas inlet side of the fuel pump. Tighten any loose fittings or clamps. Replace any ruptured hose.
3.8	The *fuel filter* is clogged.	Inspect the filter. Replace if necessary.
3.9	The *quick connect* in the fuel line is clogged.	Clean or replace the quick connect.
3.10	The *carburetor solenoid* is defective.	Check for 12 volts at the solenoid valve. It the solenoid valve is not opening with 12 volots going to it, the valve must be replaced
3.11	There is *valve train* damage.	See an Authorized Ford Service Station.

No.	Problem / Possible Cause	Solution
4.0	**The engine runs poorly or dies after running for awhile.**	
4.1	The *lower float in the mix tank* is bad.	Replace the lower float as necessary.
4.2	The *fuel pump* is defective.	Remove the fuel line from the engine and place it in a container to see if the fuel is being pumped when the ignition is turned on. Replace the fuel pump if it is defective.
4.3	The *air or gas filter* is clogged.	Inspect both filters. Replace the clogged one.
4.4	There is a poor *battery ground* to the fuel pump.	Inspect the electrical grounds. Repair any loose ground connections.
4.5	The *fuel pump* is sucking air between the gas tank and the fuel pump.	Examine the pump's gas inlet side. Tighten any loose fittings or clamps. Replace ruptured hoses.
4.6	A clogged *heat exchanger* is causing back pressure. The engine will spit gas from the carburetor and run slow.	Remove the hose from the blower silencer to the copper heat exchanger. If the engine runs better then remove and clean the debris from the copper heat exchanger. If the engine still runs badly then remove the brass plugs from the top of the stainless steel heat exchangers. If the engine runs better then clean the debris from the copper heat exchanger that is attached to the stainless steel exchangers.

No.	**Problem / Possible Cause**	**Solution**
4.7	There is excessive *engine load*.	Clean and adjust the recovery tank relief valve. Adjust for 12 inches of lift under a full load.
4.8	The engine overheats from a *clogged radiator*.	Flush the radiator. Use compressed air to remove debris from the fins.
4.9	The engine overheats from carbon build up in the *combustion chamber*.	Refer to a local Ford engine dealer.
4.10	The engine overheats from too much oil in the *crankcase*.	Check the oil level and correct if necessary.
4.11	The engine overheats from low or no water in the *radiator*.	Refill the radiator. Check for leaks. Tighten any loose fittings or clamps. Replace any ruptured hose.
4.12	The *engine* is malfunctioning.	Refer to the Ford Engine Operation and Maintenance manual included in your owner's manual, or see a local Kawasaki engine repair facility.
4.13	**On duel tank Fords**, the engine is pulling through the '*Tank Switching Valve*'.	Do not try to pull gas from both gas tanks.
4.14	A *spark plug* is faulty.	Check for worn, fouled or improperly gapped spark plugs. Replace if necessary. **CAUTION**: Allow the engine to cool completely before attempting to remove the plugs.

No.	**Problem / Possible Cause**	**Solution**
4.15	A *spark plug wire* is faulty.	While the engine is turning over with the starter, make a visual check to identify any bad spark plug wire. In a dark, well ventilated garage start the engine and look at the plug wires. If there is a break in the wire you will see arcing or sparking at the damaged area. If you notice arcing, replace the wire.
4.16	A *PCV valve* is defective.	Check the PCV valve, replace as necessary
4.17	The *ESC Control* is failing due to internal or radiant heat.	Replace ESC.

Electrical System

MAXX 550
Section 10-1

The MAXX 550 electrical system has been specifically designed with the technician in mind. Often the most difficult problem to trace is an electrical failure.

The MAXX 550 utilizes a wiring diagnostic center which allows the technician or mechanic to trace all the electrical circuits from the front of the machine.

The entire electrical system operates on 12 volts DC which is provided by a battery. Battery levels are sustained by a belt driven alternator on the front of the engine.

♦ CAUTION ♦

When a new battery is installed, check that it is properly charged before installation or damage to the charging regulator may occur.

Figure 10-1 **Wiring Schematic**

D3375 Rev A

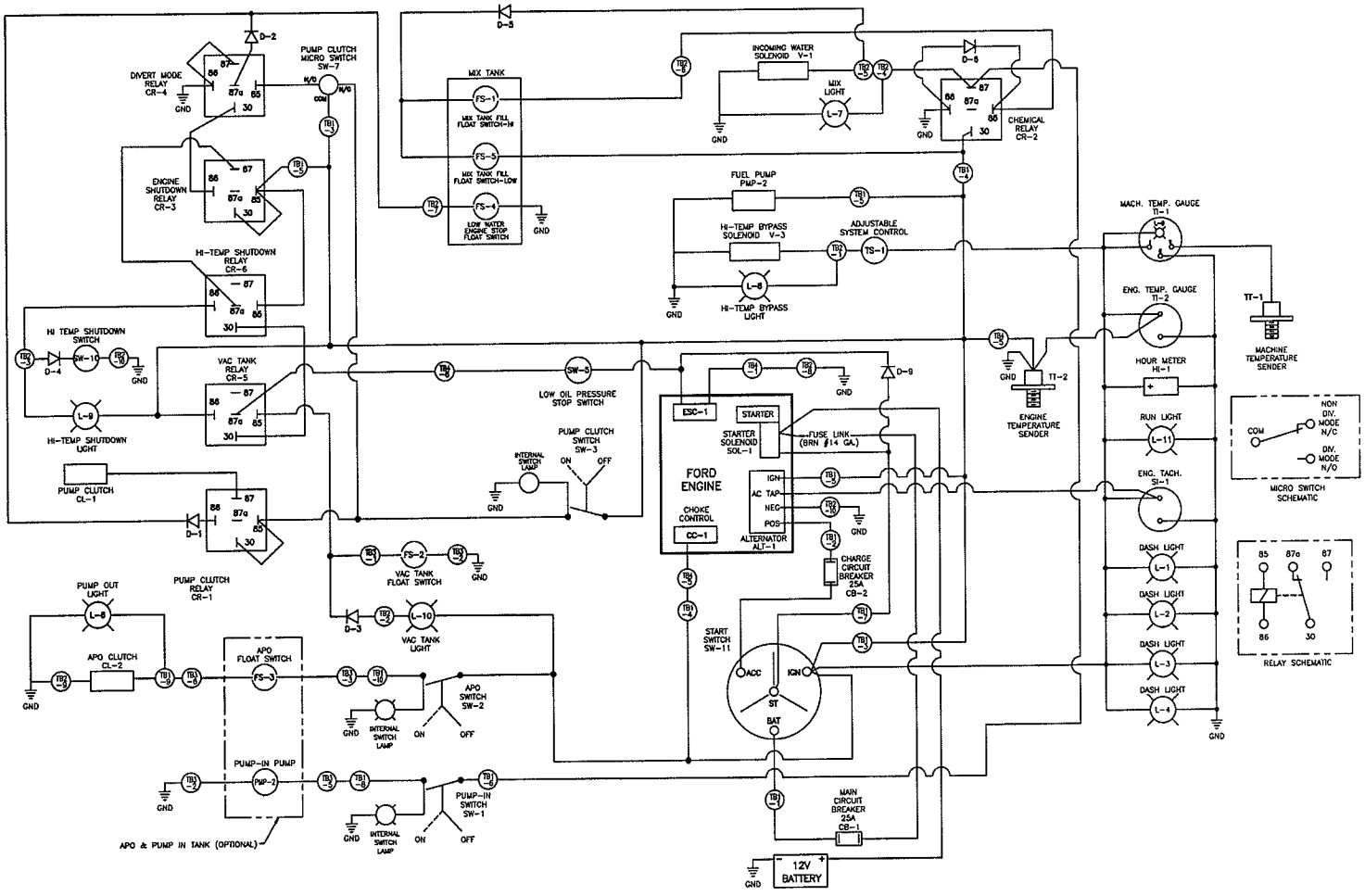
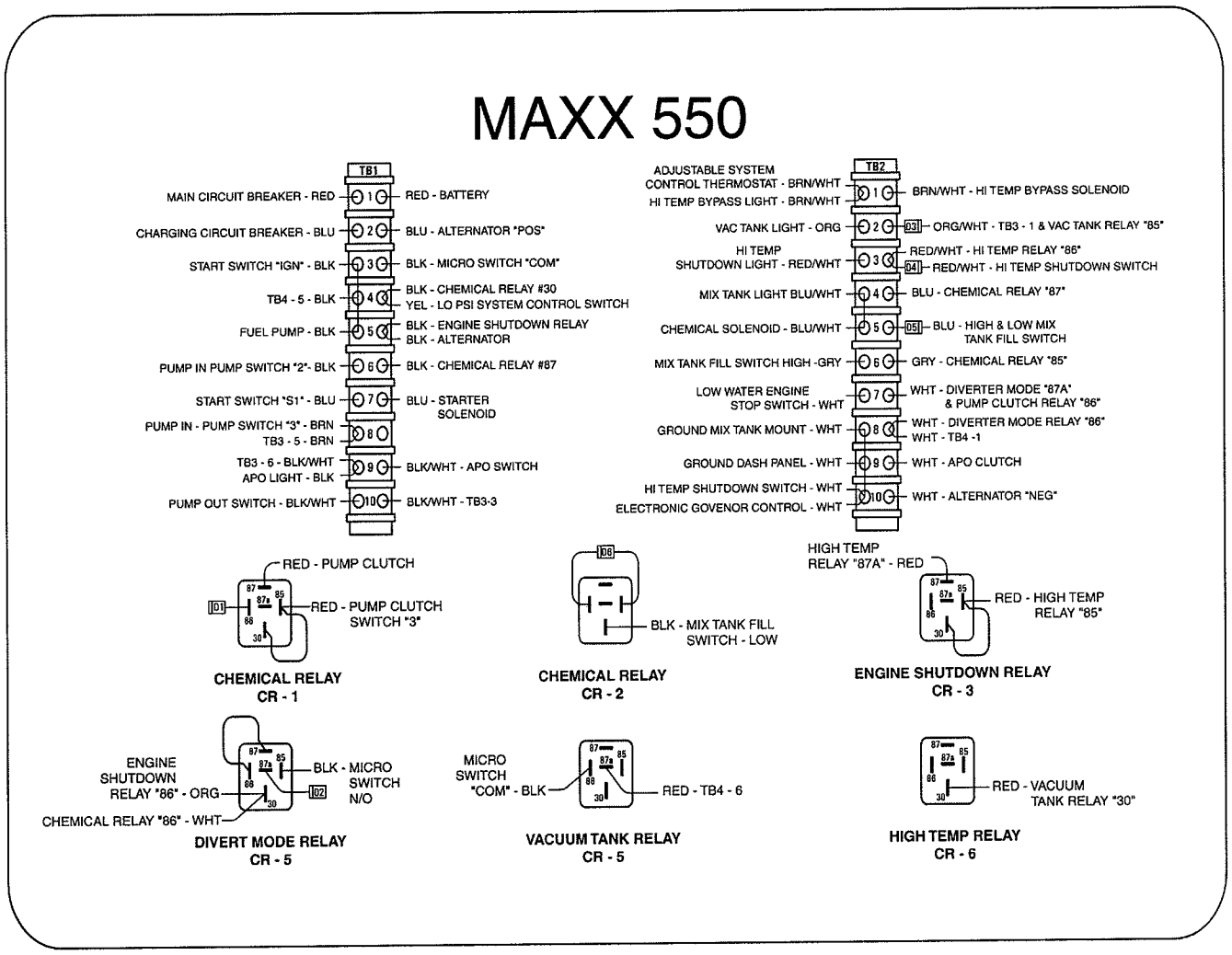


Figure 10-2: **MAXX 550 Diagnostic Center**
C4228 Rev A



NOTE: The numbers above correspond to the circled numbers on the wiring diagram.

Machine Maintenance

MAXX 550
Section 11-1

To avoid costly repairs and down-time, it is imperative to develop and practice good maintenance procedures from the beginning. These procedures fall into daily, weekly, monthly and quarterly increments, and are outlined below. All recommended maintenance must be performed by competent service personnel.

Important: Record the date and machine hours on the maintenance log.

We have provided a maintenance log for your convenience at the end of this section. The symbol means to see this General Maintenance Log for specific maintenance intervals. *Records of maintenance must be kept and copies may be required to be furnished to HydraMaster before the warranty is honored.* It is recommended that you affix a copy of the Log on the vehicle door near your unit for convenience and to serve as a maintenance reminder.

OPERATIONAL MAINTENANCE

DAILY:

1. Visually inspect machine for loose wires, oil leaks, water leaks, etc.
2. Check engine oil level. Add as needed.
3. Inspect garden hose screen. Clean as needed.
4. Inspect recovery tank s/s filter and s/s filter basket for, holes, etc.
5. Clean or repair as needed.
   Lubricate blower with an oil based lubricant through blower inlet.
6. Check coolant. Add as necessary.
7. Inspect fuel, oil, and coolant lines for leakage.
8. Flush clean water through Pump out pump.

WEEKLY:

1. One time change of oil and oil filter ***after first 20 hours*** of use.
2. One time check of the belt tensioning ***after first 25 hours*** of use.
3. Check oil level in blower.
4. Check high pressure pump oil. Add as necessary.
5. Check drive system screws. Tighten as needed.
6. Check water pump, blower, alternator, APO pump, and air pump drive belt for wear.
7. Check pump, blower, alternator, APO pump, and air pump pulleys for wear.
8. Check high pressure water lines for wear or chafing.
9. Check all nuts and bolts. Tighten as needed.
10. Clean foam element in air cleaner.
11. Inspect vacuum relief valve. Clean and lubricate as necessary.
12. Clean vacuum tank thoroughly with high pressure washer.
13. Check wiring for any chafing.
14. Flush water and chemical system with 50/50 white vinegar solution.

MONTHLY:

1. Change engine oil regularly.
2. Clean engine air cleaner filter.
3. Remove pressure By-pass Valve piston plate. Grease plate. Reinstall.
4. Check water level in battery. Clean connections as needed.
5. Clean incoming adapter filter.
6. Clean mix tank solenoid filter.
7. Clean control orifice and secondary orifice filters.
8. Inspect orifice and secondary orifice.
9. Change oil filter every 2 months.
10. Inspect radiator and hoses every 2 months.

11. Check the belt tensioning every 2 months.
    The single belt drive system tension is approx. " deflection with 8 to 9 lbs of force, measured at midspan. The dual belt system tension is approx. " deflection with 4 to 5 lbs of force per belt, measured at midspan.

QUARTERLY:

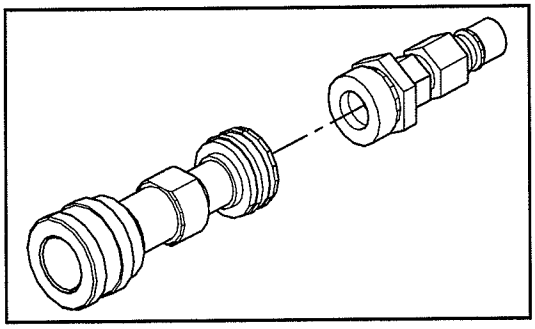
1. Change paper element in air cleaner.
2. Check fuel lines.
3. Clean and gap spark plugs.
4. Change coolant.
5. Grease blower bearing fittings.
6. Grease drive shaft fittings.
7. Change oil in blower.
8. Change oil in pump.

DE-SCALING, As Required

Scale deposits on the interior of the heating system can cause a noticeable loss in heating performance. Deposits of this kind result from hard water deposits, excessive chemical use, improper chemicals, etc. The frequency with which de-scaling procedures are required will vary. If your area has particularly hard water or you see evidence of deposits in the water system, you may have to de-scale monthly.

To de-scale your system, add an appropriate de-scaler chemical to your mix tank. Circulate it through the heating system. Let it stand. Flush and repeat as necessary. Clean all screens and strainers, and check them frequently following de-scaling.
NOTE: If you are using T.M. DeScaler through the flow meter, make sure to run clean water through the flow meter after this procedure.

To de-scale using the recirculation kit, start with an empty mix tank. Fill a third of the mix tank with T.M. DeScaler. Follow the recommendations on the T.M. DeScaler label for proportions. Verify that the upper float is not lying horizontal, but floats below.



Attach the recirculation fitting provided in the kit to the garden hose quick connect (see illustration to right) and this combination to the front of the machine.

Attach one section of female/female solution hose to the outgoing solution fitting on the front of the machine and the other end to the garden hose and recirculation fitting combination that is attached to the front of the machine (or as many sections as you want, if you wish to de-scale your hoses).

Start the machine and allow it to run for three to five minutes. Depress the freeze guard button and hold for 30 seconds. Do not leave the T.M. DeScaler solution in the system. Flush the system with clean water and turn the machine OFF.

OVERALL MACHINE MAINTENANCE

Maintaining the original appearance of your unit is important for two reasons:

1. It represents a big dollar investment for your cleaning business and its appearance should reflect that fact. A dirty machine is not professional.

2. Maintenance, troubleshooting, and repair is much easier to accomplish on a clean, well maintained unit. Regular cleaning of the machine offers you an opportunity to visually inspect all facets of the machine and spot potential problems before they occur.

The following maintenance is recommended by the manufacturer at the frequency indicated.

AFTER EACH JOB:

1. Check recovery tank, stainless steel filter and stainless steel basket as required.

DAILY:

1. Wipe machine down thoroughly with a damp cloth.
2. Flush recovery tank out thoroughly.
3. Remove, thoroughly clean and reinstall stainless steel basket.
4. Remove, thoroughly clean and reinstall stainless steel filter screen in recovery tank.
5. Inspect and clean vacuum slot on cleaning wand.
6. Check wand head for sharp edges that could tear carpet. File down as needed.
7. Clean wand to maintain original appearance.
8. Wipe down vacuum and high pressure hoses as needed.
9. Visually inspect hoses for cuts, etc.

WEEKLY:

1. Wipe down entire unit as needed.
2. Apply good coat of auto wax to all painted surfaces inside and out, and to control panel.
3. Thoroughly clean recovery tank using high pressure hot water (unit with optional high pressure cleaning gun may be used for this).
4. Remove stainless steel filter in recovery tank and thoroughly clean, removing all lint build-up. Inspect for damage and reinstall.

5. Remove stainless steel filter basket in recovery tank and thoroughly clean, removing all lint build-up. Inspect for damage and reinstall.
6. Empty chemical from chemical container. Wash out thoroughly to remove any chemical build-up.
7. Inspect chemical feed line strainer and use 50% white vinegar/water solution to remove any chemical build-up.
8. Thoroughly clean wand and inspect for clogged jet, debris in vacuum slot and leaking fittings at valve.
9. Apply light coat of auto wax to wand.
10. Thoroughly clean vacuum and high pressure hoses including hose cuffs.
11. Inspect for wear or damage to hoses and quick connect fittings.
12. Inspect garden hose connect/adapter screen for debris. Remove and clean thoroughly.
13. Inspect all lines for wear or abrasions that may cause possible leaks.

Maxx 550 GENERAL MAINTENANCE LOG

MAX HRS	DAILY SERVICE	OIL RECOMMENDATIONS						
8	MACHINE general inspection	BLOWER	40 weight non-detergent					
8	ENGINE OIL check	PUMP	5 - 30 weight synthetic motor oil					
8	GARDEN HOSE SCREEN clean	ENGINE	30 weight motor oil					
8	RECOVERY TANK FILTER BAG clean		NOTE: Overhead valve engines can use multi-viscosity oil, but will experience increased oil consumption.					
8	BLOWER INLET spray with lubricant							
8	COOLANT check							
8	FUEL, OIL, COOLANT check for leakage							
	WEEKLY SERVICE		**DATE & HOURS**					
20	OIL change with filter		Break-in. One time only.					
25	BELTS check tension		Break-in. One time only.					
25	BLOWER check oil level							
25	PUMP OIL check							
25	DRIVE SYSTEM tighten screws							
25	BELTS & PULLEYS check for wear							
25	HIGH PRESSURE LINES check for chafing							
25	NUTS & BOLTS check tightness							
25	AIR CLEANER clean foam element							
25	VACUUM RELIEF VALVE inspect, clean, lube							
25	VACUUM TANK clean							
25	WIRING check for chafing							
25	CHEMICAL SYSTEM flush with vinegar							
	MONTHLY SERVICE							
100	ENGINE OIL change							
100	ENGINE AIR CLEANER clean							
100	BY-PASS VALVE grease piston and o-rings							
100	BATTERY WATER LEVELS check							
100	INCOMING ADAPTER FILTER clean							
100	MIX TANK SOLENOID FILTER clean							
100	CONTROL & SEC. ORIFICE FILTERS clean							
100	CONTROL & SECONDARY ORIFICES inspect							
200	OIL FILTER change							
200	RADIATOR inspect unit and hoses							
200	BELTS check tension (see page 11-2)							
	QUARTERLY SERVICE (3 MONTHS)							
300	AIR CLEANER change paper element							
300	FUEL LINES check							
300	SPARK PLUGS clean and gap							
400	COOLANT change							
400	BLOWER grease bearing							
400	BLOWER OIL change							
400	PUMP OIL change							
400	DRIVE SHAFT grease bearing							

For a detailed engine maintenance table, refer to the **Ford VSG-413 Maintenance and Operator's Manual**

How to Order Parts

MAXX 550
Section 12-1

To obtain a proper diagnosis of your malfunction, and to order warranty replacement parts or repairs, it is important that you proceed in the following manner:

WARRANTY PARTS ORDERS

1. Call the local distributor where you purchased your equipment and ask for the Service Department.

2. Have the following information ready:
   A. Equipment Model
   B. Date of Purchase
   C. Hours on the Unit
   D. Unit Serial Number
   E. Description of Malfunction

3. Once it has been determined which parts are needed to correct the problem with your machine, make arrangements with your distributor to either perform the repairs or ship the parts to you.

PARTS ORDERS

Call your local distributor. In most instances, they either stock or have access to parts through a regional service center.

EMERGENCIES

If, for any reason, your distributor is unable to supply you with the necessary parts, they may call us and arrange for expedited shipping.

HydraMaster sells parts only through authorized distributors and service centers.

ONE FINAL NOTE

Any questions you have regarding the warranty program should be directed to the Customer Service Department at (425) 775-7275, 8 a.m. to 5 p.m. Monday through Friday (PST).

We shall always endeavor to be fair in our evaluation of your warranty claim, and shall provide you with a complete analysis of our findings.

HydraMaster warranty covers only defective materials and/or workmanship for the periods listed. **Labor and/or diagnostic reimbursement is specifically excluded.**

Warranty Information

MAXX 550
Section 13-1

To avoid misunderstandings which might occur between machine owners and manufacturer, we are listing causes of component failure that specifically voids warranty coverage. Such causes as listed below shall constitute **abuse or neglect.**

BLOWER: Failure to lubricate impellers daily with an oil based lubricant. Failure to lubricate bearings as recommended in blower manual. Failure to maintain proper oil levels in the blower. Failure to use the correct oil grade and viscosity as recommended in blower manual. Failure to properly maintain blower safeguard systems such as waste tank filter screen, vacuum safety relief valve and waste tank automatic shut-off system. Allowing foam to pass through blower.

HIGH PRESSURE WATER PUMP: Failure to maintain proper oil level as recommended in pump manual. Failure to change oil in pump at recommended intervals. Failure to protect pump against freezing. Failure to maintain pump protection shut-off system. Failure to use water softener in hard water areas. Use of improper chemicals.

VAC TANK: Failure to properly maintain filtering devices in tank. Failure to clean tank as recommended by manufacturer. Failure to maintain vacuum safety release in tank lid. Use of improper chemicals.

CHEMICAL PROPORTIONER: Use of improper chemical. Failure to use water softener in hard water area. Operating machine without proper chemical filter screen. Failure to protect against freezing.

CONTROL PANEL: Failure to protect flowmeter and water pressure gauge against freezing.

VACUUM AND SOLUTION HOSES: Failure to protect hoses against freezing. Failure to protect hoses against burns from engine/blower exhaust. Damage

to hoses from being run over by vehicles. Kinking or cracking from failure to store or unroll hoses correctly. Normal wear and tear from everyday use.

CLEANING WAND: Failure to protect against freezing. Obvious physical abuse of wand.

WATER HEATING SYSTEM: Over pressurization of the system (recommended maximum working pressure - 800 PSI). Failure to protect against freezing.

HARD WATER DEPOSITS: Failure to use or maintain a water softening system or a properly installed magnetic-type de-scaler with machine operating in designated "Hard Water Areas" (3.5 grains or more per gallon).

WARRANTY PROCEDURE

Warranty coverage is available to you ONLY through HydraMaster Corporation, 11015 47th Avenue W, Mukilteo, WA 98275. When warranty parts are needed, write **HydraMaster Warranty Dept.** at the above address, or call the Warranty/Service Dept. at (425) 775-7275. **No collect calls will be accepted.** When calling, be sure to have machine information and serial number ready for the service representative. **Hours of Warranty/Service Dept. are 8:00 am to 5:00 pm Pacific Time.**

IMPORTANT: HydraMaster's warranty policy provides replacement parts without charge for thirty (30) days to customers maintaining current account status. An invoice will be sent to the customer for the amount of the parts sent. The customer's faulty parts **must be** returned for evaluation prior to the expiration of the thirty (30) day period. Upon warranty approval, a credit will be issued the customer for the replacement parts invoice. **Warranty disapproval or failure to return the faulty parts within the thirty (30) day period allowed will result in the customer being charged for the replacement parts sent.**

Accessories

MAXX 550
Section 14-1

Genuine HydraMaster
Accessories & Detergents

This section of your Owners Manual is devoted to Accessories and Detergents which we have found to be helpful and useful. *These products can enhance your cleaning and reduce your labor costs!*

HydraMaster Machine accessories are the most innovative collection available in the cleaning industry. Our patented **RX-20 Rotary Extractors** have changed the shape of steam cleaning. Our hoses and tanks are of the finest quality construction.

SafeClean Detergents have been specially prepared, not only to give you exceptional cleaning, but also to optimize your truckmount's operation and reliability. *Most detergents don't work well under the high heat, high pressure conditions of truckmount use.* **SafeClean** will maintain your machines's water pump and water heating systems at peak efficiency and help ensure fewer breakdowns.

For more information, or to order Genuine
HydraMaster Accessories and Detergents
Call your nearest authorized HydraMaster Distributor.

Product Support Bulletins

MAXX 550
Section 15-1