



Clutch Drive System 4.8 Owner's Manual

HydraMaster
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CDS 4.8™

1 - General Information

The Clutch Drive System (CDS) 4.8 Truckmounts are highly engineered carpet cleaning machines developed, designed and manufactured by HydraMaster Corporation. The systems utilize the most current technology available in water heating and water recovery systems.

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.

This Owner's Manual contains installation and operation instructions as well as information required for proper maintenance, adjustment and repair of the CDS 4.8. Component troubleshooting guides have also been included for your convenience.

It is imperative that no section be overlooked when preparing for operation of this equipment. Please read this Owner's Manual to familiarize yourself with the operation of the 4.8. Truckmount Systems, paying special attention to all **Warnings and Cautions**.

This section of the manual contains the following helpful information:

- Contact Information
- Warnings, Cautions And Notices
- Machine Specifications
- Responsibilities
- Battery Relearn for Ford Van
(Excerpt from Ford Econoline Owner's Guide)
- Local Water Precautions
- Waste Water Disposal Advisory

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CONTACT INFORMATION

If you have any questions regarding the operation, maintenance or repair of this machine, please contact your local distributor.

To find a local distributor, please visit our website at <http://hydramaster.com/HowToBuy/DealerLocator.aspx>

If your question cannot be resolved by your distributor or by the information within this manual, you may contact HydraMaster direct using the following phone numbers.

HOURS	TELEPHONE NUMBERS	E-MAIL ADDRESSES
Monday-Friday 7:00 a.m. to 5:00 p.m. Pacific Time	Technical Support (425) 775-7275 FAX : (800) 426-4225	Technical Support techsupport@hydramaster.com
	Customer Service/Parts (425) 775-7276 FAX: (425) 771-7156	Customer Service/Parts parts@hydramaster.com

When calling your distributor, be sure to reference the serial number and date of purchase.

FOR YOUR REFERENCE:

Serial No. _____

Date of Purchase: _____

Purchased From (Distributor): _____

WARNINGS, CAUTIONS AND NOTICES

WARNING

HydraMaster uses this WARNING symbol throughout the manual to warn of possible injury or death.

CAUTION

This CAUTION symbol is used to warn of possible equipment damage.

NOTICE

This NOTICE symbol indicates that federal or state regulatory laws may apply, and also emphasizes supplemental information.

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Warnings and Cautions specific to the CDS 4.8 include:

⚠ 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 the engine or the exhaust.

⚠ 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. Do not allow any open flames 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

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

CAUTION

The use of some chemicals through your mobile carpet cleaning plant can seriously damage the internal plumbing, high-pressure pump, chemical pump and heat exchangers. These harmful chemicals include concentrated acid (see the pH chart in Figure 2-1), solvents (including d-Limonene), and some paint, oil and grease removers with a high concentration of solvents.

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.

CAUTION

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

CAUTION

ACID RINSE AGENTS: Some acid rinse products can cause damage to internal machine components. Failure to take appropriate measures to prevent acidic corrosion can result in system failure and loss of warranty on affected parts.

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 at 3.0 grains or more per gallon, use a water softening system.

CAUTION

FREEZE PROTECTION: Failure to take appropriate measures to prevent equipment damage due to freezing can result in system failure and loss of warranty on affected parts. Placing an electric heater in the vehicle or parking the vehicle indoors will help ensure against freezing, but should not be the primary method of freeze protection.

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MACHINE SPECIFICATIONS

Frame		23" W x 41.5" H x 61.0" L
Weight		650 lbs (tank and console only)
Construction	Tank	Marine aluminum with baked-on epoxy finish
		Chassis painted steel
		Cowling, fiberglass
Power Transfer	Electric clutch-driven shaft, key activated	
Vacuum Blower	4007 Tuthill/M-D Tri-Lobe	
Water Pump	Plunger pump, 4.0 gpm (at high speed), 1,200 operating psi, electric clutch control	
Chemical System	Last-step chemical injection, meter controlled	
Heating System	Engine heat recovery, multi-parallel heat exchanger system, optional Salsa heat package	
Instruments		
	Main Panel	Electronic tachometer, 0-3,500 rpm
		Water temperature gauge, 0-320 degrees F
		Vacuum gauge, 0-30" hg
		Hour meter, machine run-time
		Keyed ignition, start/stop
		Electronic circuit protection breaker, resettable
		Machine status indicator lamps
		Chemical flowmeter, 0-10 gph
		Solution pressure gauge, liquid filled, 0-1,500 psi
	Side Panel	Water pressure adjustment
		Blower lubrication port
		Solution temperature control selector
		High pressure solution outlets, quick-disconnect
		Fresh water inlet fitting, quick-disconnect
		Water box drain valve
		Chemical controls

Recovery Tank	100 gallon aluminum
Cleaning Tool/ Wand	Stainless steel
	Replacement grip
	Rebuildable solution valve
High Pressure Hose	1/4" high temperature, lined, vinyl covered
	Hose rated to 2,200 psi, 250 degrees F
Standard Equipment	Power transfer package
	Component power pack
	Equipment cowling
	Vacuum recovery tank
	Control console
	Dual tool/wand hook-up
	HydraMaster heat exchanger system
	Freeze guard system
	Wheel chock set
	Carpet tool/wand
	150 ft x 1/4" solution hose
	150 ft, 2" vacuum hose
	10 ft. 1 1/2" whip hose
	50 ft, fresh water hose (garden hose)
	10 ft, 1 1/2" drain line
	5 gallon chemical jug
	Chemical jug holder
	Van finish package
	Van decal package
	Monogrammed jacket
	Owner's Manual (on cd)
	Owner's Guide (paper copy)

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RESPONSIBILITIES

Prior to the arrival of the unit, the van that it will be installed in should be delivered to the installer.

Purchaser's Responsibility

If you are the purchaser, it is your responsibility to read the Owner's Manual and to familiarize yourself with the information contained herein, paying special attention to all Warnings and Cautions.

Sales Representative's Responsibility

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 sales representative 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.

Installation

- Correctly installing the unit and recovery tank in your vehicle and securing them with bolts and tie down washers.
- Checking the pump, vacuum blower and engine oil levels prior to starting the unit.
- Starting the unit to check the drive system and see that all other systems function normally.
- Checking all hoses, tools/wands and accessories for correct operation.

Training

- A thorough review of the Owner's Manual with the purchaser.
- Instruction in and familiarization with:
 1. How to correctly start up and shut down the unit
 2. How to correctly clean with the unit
 3. Where and how often to check and change component oil levels
 4. How the unit's systems work, how to troubleshoot the unit
 5. How to do basic repairs
 6. Safety precautions and their importance
 7. How to avoid freezing damage
 8. How to avoid hard water damage
- 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.

BATTERY RELEARN FOR FORD VAN

(Excerpt from Ford Econoline Owner's Guide)

Because your vehicle's engine is electronically controlled by a computer, some control conditions are maintained by power from the battery. When the battery is disconnected or a new battery is installed, the engine must relearn its idle and fuel trim strategy for optimum driveability and performance. Flexible fuel vehicles (FFV) must also relearn the ethanol content of the fuel for optimum driveability and performance.

To begin this process:

1. With the vehicle at a complete stop, set the parking brake.
2. Put the gearshift in P (Park), turn off all accessories and start the engine.
3. Run the engine until it reaches normal operating temperature.
4. Allow the engine to idle for at least one minute.
5. Turn the A/C on and allow the engine to idle for at least one minute.
6. Release the parking brake. With your foot on the brake pedal and with the A/C on, put the vehicle in D (Drive) and allow the engine to idle for at least one minute.
7. Drive the vehicle to complete the relearning process.
 - The vehicle may need to be driven 10 miles (16 km) or more to relearn the idle and fuel trim strategy along with the ethanol content for flexible fuel vehicles.
 - If you do not allow the engine to relearn its idle trim, the idle quality of your vehicle may be adversely affected until the idle trim is eventually relearned.
 - For flexible fuel vehicles, if you are operating on E85, you may experience poor starts or an inability to start the engine and driveability problems until the fuel trim and ethanol content have been relearned.

If the battery has been disconnected or a new battery has been installed, the clock and radio settings must be reset once the battery is reconnected.

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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” (3.0 grains or more per gallon) be fitted with a water softening system, or a properly installed magnetic-type descaler must be used and maintained. Periodic descaling 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 descalers or softeners may require additional periodic use of descaling 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.

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 hard water map, shown in Figure 1-1, defines hard water areas in the lower 48 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.

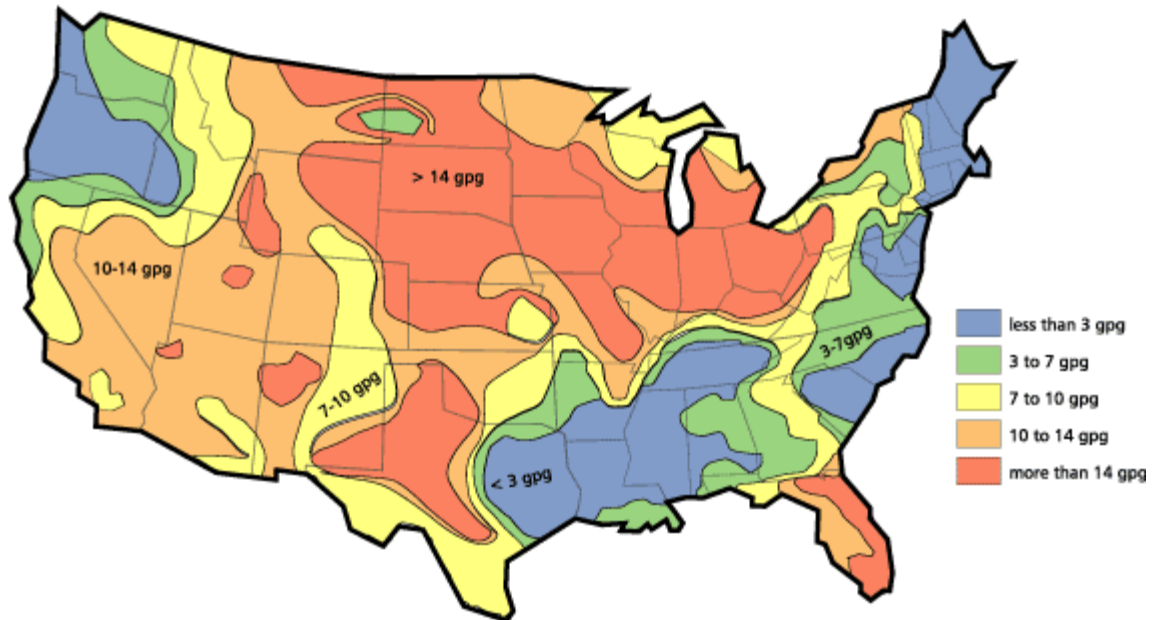


Figure 1-1. Hard Water Map of Mainland United States

NOTICE

The map shown in Figure 1-1 is provided for general reference only. Water hardness in your geographical location should be confirmed by testing.

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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. HydraMaster strongly urges the use of water softener units with the CDS 4.8 machines in areas exceeding 3.0 grains per gallon (see Figure 1-2).

Failure to use a water softener in these areas will invalidate the machine's warranty. Referring to the hard water area map shown Figure 1-1, determine the quality of water in your area and take immediate action if the water hardness exceeds 3.0 grains per gallon.

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.

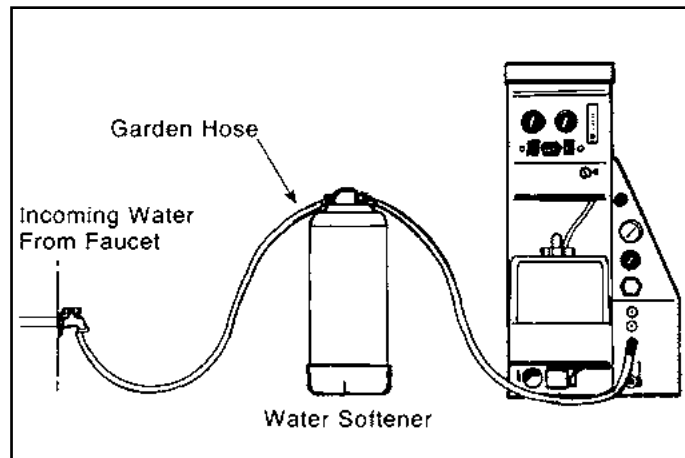


Figure 1-2. Configuration of Water Softener and CDS

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.

The cleaning rinse water, recovered into your unit’s vacuum tank, contains materials such as detergents, and must be safely processed before entering streams, rivers and reservoirs.

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 your CDS with an Automatic Pump-Out System (APO). 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.

HydraMaster makes an APO System which can be ordered with new equipment or installed later.

When properly configured, the systems will continuously monitor the level of waste water and pump it out simultaneously with the cleaning operation. The hidden benefit of this process is that the technician does not have to stop his/her cleaning to empty the recovery tank.

NOTICE

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

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

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2 - Chemicals and Cleaning

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, it remains only a tool of the carpet cleaning trade and can produce only as good a job as the person operating it.

This section of the manual contains the following information:

- Cleaning Precautions
- Cleaning Stroke Procedure
- Overwetting

CAUTION

The use of some chemicals through your mobile carpet cleaning plant can seriously damage the internal plumbing, high-pressure pump, chemical pump and heat exchangers. These harmful chemicals include concentrated acid, solvents (including d-Limonene), and some paint, oil and grease removers with a high concentration of solvents (see pH chart in Figure 2-1).

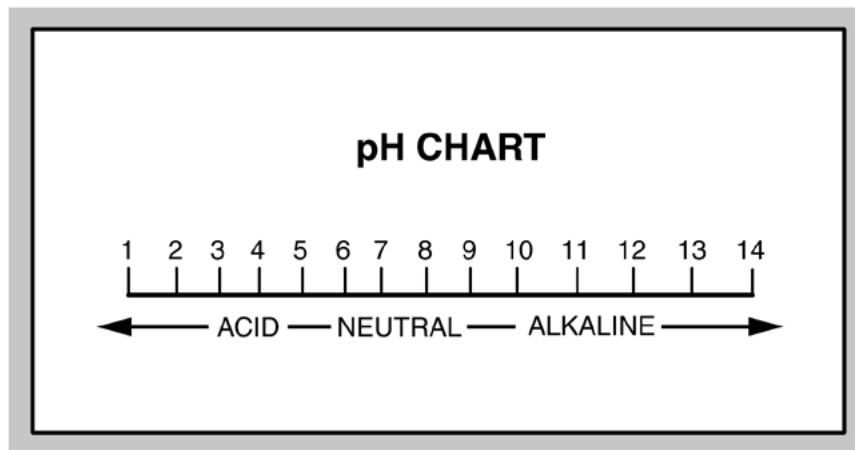


Figure 2-1. pH Chart

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CLEANING 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.

HydraMaster also 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

Some acid rinse products can cause damage to internal machine components. Failure to take appropriate measures to prevent acidic corrosion can result in system failure and loss of warranty on affected parts.

HydraMaster will not warranty parts that have been damaged from using acid products that have obviously caused failures.

Avoid using detergents and chemicals which create foam when those products are agitated because foam passing through the blower could lead to serious mechanical failures. To ensure proper cleaning, use HydraMaster detergents and chemicals which are formulated with built in anti-foaming agents. When cleaning surfaces with excessive foaming residue, use HydraMaster de-foamer products as directed.

CLEANING STROKE PROCEDURE

To eliminate excess moisture remaining in the carpet fiber and eliminate the sawtooth appearance which results from diagonal movement of the cleaning tool, follow these steps.

1. Always move the cleaning tool in smooth, forward and backward stroke
2. Apply slight pressure to the forward stroke while the solution is injected into the carpet.
3. 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.
4. During the forward and reverse strokes, movement to the right or left should only be done at the extreme rear of the stroke.
5. Overlapping is also important to ensure even application of solution and prevent saturation when the cleaning tool is stopped twice at the same point at the rear of the cleaning stroke Figure 2-2.

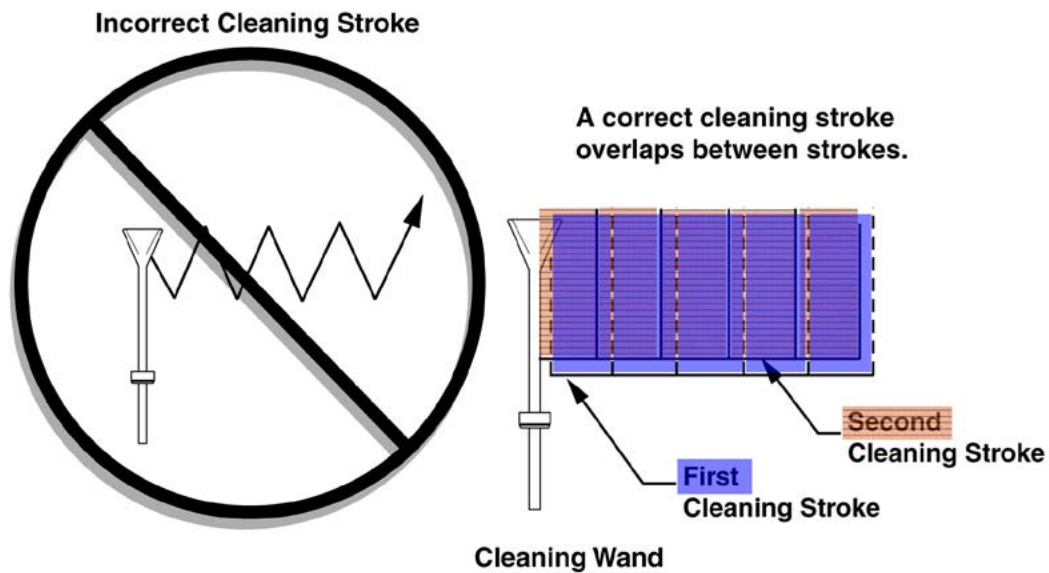


Figure 2-2. Cleaning Stroke Procedure

CAUTION

Failure to adopt the previous procedure can result in increased chance of “clean streaks,” fiber shrinkage, brown-out and longer drying periods.

OVERWETTING

Overwetting is annoying to all concerned, and sometimes leaves the customer with a bad impression of the cleaning process used.

These are several conditions that will cause over-wetting

1. Too few vacuum strokes or improper saw-tooth vacuum strokes as shown in Figure 2-2.
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.

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3 - Operating Instructions

This section of the manual contains the following instructions:

- Before Operating the CDS
- CDS Start Up
- CDS Flood Restoration Work
- CDS Shut Down
- 3 Speed Throttle Control Function

BEFORE OPERATING THE CDS

1. Locate the unit and equipment in a well-ventilated area.

⚠ WARNING

The CDS 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.

2. Check the fuel tank to be certain there is adequate fuel to complete the job.
3. Position the wheel chocks on one of the front tires.
4. If using a water supply hose which has not been used recently or if using a customer's hose, first connect the hose to the faucet and flush out any debris which may be in the hose. Afterwards connect the hose to the unit.
5. Check the chemical jug to see if you have enough concentrated chemical to finish the job. If not, mix and fill a 5 gallon chemical jug.
6. Connect all required hoses.
7. When connecting the pressure hose to the pressure outlet connections at the front of the unit, go to the farthest area to be cleaned and connect to the cleaning tool. This ensures that you have the proper length of hose required to perform the cleaning.

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CDS START UP

1. Make sure the vehicle's gear select lever is in the Park position and the emergency brake is set. Also make sure all accessories are turned off (A/C, fan).
2. Start the vehicle's engine.
3. Turn key on the CDS dash.
4. Select the cleaning speed appropriate for the cleaning job.

NOTICE

Starting in the low position is recommended due to the lower stress on the clutch during start up.

5. Turn on the PUMP CLUTCH switch. Adjust cleaning pressure to desired level.
6. Turn on the PUMP IN switch (if equipped).
7. Turn the heat control valve to 'MAX' only if you will be using water. Do not activate the heat exchanger during flood extraction work.
8. Turn the CHEMICAL SYSTEM valve to the 'PRIME' position to purge any air from the system.

NOTICE

The prime hose is plumbed into the recovery tank. Leaving the valve in the 'PRIME' position will cause excessive chemical usage.

- a. When the chemical begins to flow through the flowmeter, with the flow indicator reading maximum flow and the PRIME line pulsing, turn the CHEMICAL SYSTEM valve to 'ON'. Cap off vacuum if necessary.
 - b. While spraying the solution from the cleaning tool, adjust the chemical flow by turning the CHEMICAL METERING CONTROL to the desired level.
9. Optional: Turn the APO switch 'ON' if using the Automatic Pump-Out feature.

NOTICE

The pump will not engage until the water level rises inside the recovery tank.

10. Now proceed with the cleaning operation.

NOTICE

The machine will automatically shut down when the recovery tank reaches its full capacity due to the float switch located inside the tank. When this occurs, turn the CDS key switch off and empty the recovery tank. Then, turn the unit back on and continue to clean.

CDS FLOOD RESTORATION WORK

When using equipment for flood damage, adjust the high pressure pump to zero. This will reduce the engine power load and save on fuel consumption.

CDS SHUT DOWN

1. Flush clear water through the chemical system for 10 seconds.
2. Open the water box drain and actuate the tool/wand valve to run fresh water through the water box, heat exchangers and cleaning tools.

NOTICE

If freeze guarding is necessary, perform the freeze guard procedure at this time. Draining the water box to ½ full or less is recommended to reduce spillage inside the vehicle.

NOTICE

Rinse the system with vinegar on a weekly basis. Rinse the entire system with descaler each month.

3. Lay vacuum hoses out in order for all moisture to be removed from the hoses. This prevents spillage of any dirty solution in your vehicle when storing the hoses.
4. Disconnect the hoses and put them away.
5. If you are using an outside water source, turn the water supply faucet off. Bleed pressure out of the supply hose by loosening the hose at the water supply. Unhook the water supply hose and store it in the vehicle
6. Allow the unit to run for a few minutes with the vacuum hose disconnected in order to remove all moisture from the vacuum pump.
7. Plug the vacuum inlets. Spray a Hydramaster-recommended lubricant (P/N 000-087-006) into the lube port for about 5 to 10 seconds while the unit is running. This will lubricate the vacuum pump and prevent it from rusting. (The lube port is located on the front panel above the pressure gauge).
8. Remove the inlet plugs, then turn the ignition 'OFF' before draining the recovery tank.
9. Turn the heat control valve to the 'OFF' position. This will help avoid engine overheat problems due to reduced coolant flow through the radiator.

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10. Drain the recovery tank.

NOTICE

If your CDS is equipped with an APO, first connect a garden hose to the outlet on the front of the machine.

If your CDS is equipped without an APO, drain the recovery tank through the tank drain valve (under the chemical jug tray).

NOTICE

Do not dump waste in any area which might violate local, state or federal law. If you have the optional APO system, drain the recovery tank into a sanitary drain system.

11. When the recovery tank is drained, lift the recovery tank lid and remove the filter basket.
12. Clean out any accumulated debris.
13. Rinse and re-install.
14. Check the corrugated blower filter.
15. Clean out any accumulated debris.
16. Rinse and re-install.

NOTICE

When re-installing the blower filter, ensure that it is fully seated against its mount so that debris cannot pass under it and into the blower.

3 SPEED THROTTLE CONTROL FUNCTION

— For GM Vans —

The GM Throttle Controller must meet certain “Chassis Ready” conditions to elevate the engine rpm, which are as follows:

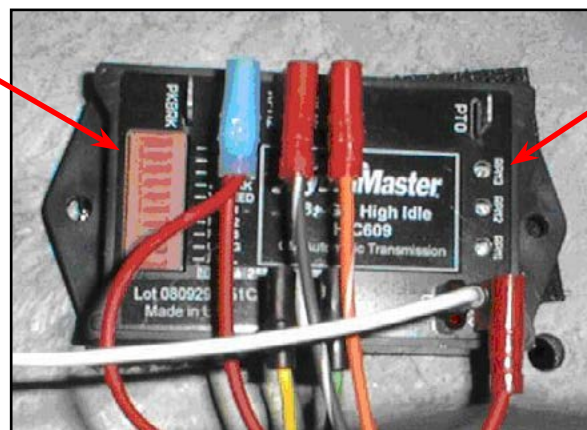
1. Parking Brake is set
2. Gear shift is in “Park”
3. Foot is off Service Brake (brake pedal)
4. Foot is off Accelerator Pedal
5. Vehicle is stationary (no speed)
6. Engine is started and idling
7. The A/C / Heater switch is in off position

NOTICE

The Throttle Controller must be initialized anytime the Data Link Cable (DLC) harness is disconnected from the Data Link Connector. To initialize the system switch ignition key to OFF position, plug in DLC harness, switch the ignition on, and then start the engine. This allows the Throttle Controller to read the PCM engine computer.

On the Throttle Controller, there are LED lights with corresponding labels to provide status and problem detection information (refer to Figure 3-1 and Table 3-1).

LED LIGHTS WITH LABELS



3 TRIM POTS

Figure 3-1. Location of Controller’s LED Lights with Labels and RPM Trim Potentiometers

Table 3-1. GM Throttle Controller LED Functions

LED	STATUS	INDICATION
BUSS	On Solid	Unit ON and functioning (harness connected to data link)
BUSS	Flashing	Unit ON, but a problem was detected
GEAR	On Solid	Transmission in PARK
GEAR	Flashing	Transmission NOT in Park
PK BRK	On Solid	Parking Brake Set
PK BRK	Flashing	Parking Brake is NOT set
SR BRK	On Solid	Service Brake is set (not being used)
SR BRK	Flashing	Service Brake is NOT set
VSPEED	On Solid	Vehicle is stationary
VSPEED	Flashing	Vehicle is moving
RPM1	On Solid	RPM1 mode selected, engine at fast idle
RPM1	Flashing	RPM1 mode selected, engine not at fast idle
RPM2	On Solid	RPM2 mode selected, engine at fast idle
RPM2	Flashing	RPM2 mode selected, engine not at fast idle
RPM3	On Solid	RPM3 mode selected, engine at fast idle
RPM3	Flashing	RPM3 mode selected, engine not at fast idle

NOTICE

On GM gas engine vehicles, the PCM engine computer will cause the engine speed to momentarily drop back to normal idle speed every time the air conditioner pump cycles on or off. Make sure the operator of the CDS understands that the AC / HEAT switch needs to be in the OFF position before activating the CDS unit.

— For Ford Vans —

The Ford 3 Speed Throttle Controller must meet certain “Chassis Ready” conditions to elevate the engine rpm, which are:

1. Parking Brake is set.
2. Gear shift is in “Park”.
3. Foot is off Service Brake (brake pedal).
4. Foot is off Accelerator Pedal.
5. Vehicle is stationary (no speed).
6. Brake light circuit is functional.
7. Engine coolant is above 140° F.
8. Transmission Oil Temperature is below 240° F.
9. Maximum Catalytic Temperature has not been met.

NOTICE

SEIC (Stationary Elevated Idle Control)* will be terminated by a safety condition violation. For instance, the SEIC will be terminated if the service brake is depressed at any time during its operation.

The 3 lights on the Throttle Control assembly indicate the following conditions (refer to Figure 3-2 and Table 3-2):











1. **RED LIGHT:** the Throttle Control assembly is receiving power from the vehicle, but the SEIC process has not been initiated.
2. **YELLOW LIGHT:** all the “Chassis Ready” conditions have been met and the SEIC process has been initiated.
3. **GREEN LIGHT:** the Throttle Control assembly is receiving power from the CDS and the SEIC process is operational.



Figure 3-2. Location of 3 Lights on Throttle Control Assembly

* SEIC is Ford’s onboard computer throttle control strategy.

Table 3-2. Ford Throttle Controller Light Functions

WHEN...	CONTROL LIGHT(S)
1. Van ignition 'ON'	
2. CDS ignition 'OFF'	
1. Van ignition 'ON'	 
2. CDS ignition 'ON'	
3. Recovery tank NOT full	
4. SEIC NOT active	
a. "Chassis ready" conditions HAVE NOT been met	
1. Van ignition 'ON'	 
2. CDS ignition 'ON'	
3. Recovery tank NOT full	
4. SEIC IS active	
a. "Chassis ready" conditions HAVE NOT been violated	
1. Van ignition 'ON'	  
2. CDS ignition 'ON'	
3. Recovery tank NOT full	
4. SEIC IS active	
a. "Chassis ready" conditions HAVE been violated	
1. Van ignition 'ON'	 ^{**}
2. CDS ignition 'ON'	
3. Recovery tank IS full *	
4. SEIC IS active	
a. "Chassis ready" conditions HAVE NOT been violated	
1. Van ignition 'ON'	 ^{**}
2. CDS ignition 'OFF'	
3. Recovery tank NOT full *	
4. SEIC IS active	
a. "Chassis ready" conditions HAVE NOT been violated	

NOTICE

*Turn CDS ignition 'OFF' before draining recovery tank.

NOTICE

**SEIC process will continue until a "chassis ready" condition has been violated. To clear single yellow light conditions, van ignition needs to be turned 'OFF'.

4 - Freeze Guard

When operating the CDS 4.8 during the colder months of the year, ensure that you properly freeze guard the system. No part of the CDS 4.8 System is covered by warranty if machine damage occurs because of freezing.

This section of the manual includes information concerning:

- Draining the CDS
- Freeze Protecting Pump In System

CAUTION

BE SURE YOUR MACHINE IS PROTECTED! Freezing will cause component damage and void warranty.

The following precautions are recommended prior to and during cleaning:

1. Run the machine before leaving for the first job to ensure nothing has frozen the night before, including hoses and tool/wand.
2. Insulate the fresh water (garden) hose from the cold ground by running it through an extra 1½" vacuum hose.
3. Leave vehicle doors closed until you begin cleaning; afterwards, open slightly. If you have selected the CDS Hose Pass Through option, you can operate the CDS with the vehicle doors closed.

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NOTICE

In colder climates, insulating the vehicle walls and floor boards will help protect the unit.

Do not procrastinate during the cleaning operation or the hot water solution line will also freeze on the ground. The solution line should be insulated in extremely cold climates.

Whenever possible, store the van in a heated garage at night or over the weekend. If not possible, place a 1,500 Watt electric heater inside the vehicle, aimed directly at the machine.

⚠ WARNING

Never use a propane heater. It causes excessive moisture on the vehicle ceiling and the possibility of it malfunctioning is therefore higher, which may cause bodily injury. If the machine and vehicle are left outside with a heater, drain water from the machine cleaning tools and hoses because they can be freeze-damaged also.

DRAINING THE CDS

To drain the machine, follow these steps:

1. Before shutting off the machine, remove the chemical line from the chemical jug and place in a mixture of 50/50 antifreeze and water. Turn the CHEMICAL SYSTEM valve to the 'PRIME' position until coolant registers in the flow meter. With the cleaning tool on, allow mixture to fill the remainder of the chemical system.
2. Open the water box drain valve and allow the water to drain thoroughly from the water box.
3. Close the water box drain and fill the water box with 50 / 50 antifreeze and water mixture. Run the unit for 1 minute to circulate the mixture through the machines low-pressure hoses. Spray through the wand or other tool into a suitable container until the water box shut-off switch activates (pump stops). This freeze guards the high-pressure circuit
4. Open the water box drain and drain out the residual fluid into a suitable container. This antifreeze solution may be retained for reuse (attach freeze guard fitting to inlet quick connect and vacuum water out of the inlet line).

NOTICE

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.

CDS 4.8™

FREEZE PROTECTING PUMP IN SYSTEM

1. Drain the fresh water tank.
2. Remove the fresh water (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 until all the water is purged from the hose.

NOTICE

The next time the CDS is used, it may take a few minutes before the water box begins to fill.

5 - Water and Chemical System

The CDS 4.8 / 4.6 high-pressure water and chemical system has been designed to be simple and trouble free.

This section of the manual explains:

- Water and Chemical Flow Operation
- Chemical System Maintenance
- Chemical System Troubleshooting

WATER AND CHEMICAL FLOW OPERATION

The general concept of the water and chemical flow is as follows:

- Water is fed into the CDS under tap pressure to the water box.
- The water is then pumped from the water box through the heating system, mixed with the chemical and then that mixed solution is pumped out to the cleaning tool/wand.
- After the solution is applied to the carpet, it is recovered by the vacuum system and carried back to the recovery tank.

The chemical pump draws the chemical from the inlet filter which is in the chemical container. The chemical solution flows through the flowmeter, indicating the flow of chemical being used in gallons/hour. The chemical then flows through the chemical pump to the chemical selector valve. The CHEMICAL SYSTEM valve can be used to prime the pump (evacuate air from the system), inject chemical into the system or turn the chemical flow off. When the CHEMICAL SYSTEM valve is in the “ON” position, chemical flows through the metering valve, and is injected into the heated water path just prior to its leaving the machine.

The low water float switch in the water box 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 water box would drop, activating the low water float switch, which automatically disengages the system and prevents the water pump from running dry.

The desired chemical injection ratio may be obtained by adjusting the chemical metering valve when spraying of water through the cleaning tool.

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CHEMICAL SYSTEM MAINTENANCE

The chemical lines may need to be flushed with vinegar periodically to prevent abnormal chemical build-up (see page 10-2).

To flush the chemical system:

1. Set the CHEMICAL FLOWMETER to 10 gph.
2. Remove the clear plastic hose from the chemical jug and insert it into a 1-quart container of vinegar.
3. Spray water from the tool/wand until the vinegar is gone.
4. Repeat the process with 1 quart of clear water to void all lines of vinegar.

CHEMICAL SYSTEM TROUBLESHOOTING

1.0. System will not prime

POSSIBLE CAUSE	SOLUTION
1.1. Check valves in chemical pump are faulty.	Remove valves and inspect. Clean or replace as necessary.
1.2. Chemical pump diaphragm is faulty.	Remove and inspect. Replace as necessary.
1.3. Check valve in high pressure pump (the one that the chemical pump attaches to) is faulty.	Remove valve and inspect. Clean or replace as necessary.
1.4. Filter on feed line in chemical jug is clogged.	Inspect and clean.
1.5. Feed line from chemical jug is loose, pinched or cut.	Inspect and repair.
1.6. Three-way prime valve is faulty.	Check valve for leaks between ports. Replace as necessary.

NOTICE

If the chemical system has been run dry, it may be necessary to prime the chemical system to purge all of the air from the system.

2.0. Chemical flow is unstable or low

POSSIBLE CAUSE	SOLUTION
2.1. Air in lines.	Check that all fittings and connections are tight and in good condition. Repair or replace as necessary.
2.2. Filter screen in chemical jug is partially clogged.	Inspect and clean.
2.3. Three-way chemical valve is faulty.	Inspect valve for leaks between ports. Replace as necessary.
2.4. Chemical metering valve is faulty or partially obstructed.	Inspect valve and clean or replace as necessary.
2.5. High pressure check valve is faulty.	Remove and inspect. Clean or replace as necessary.

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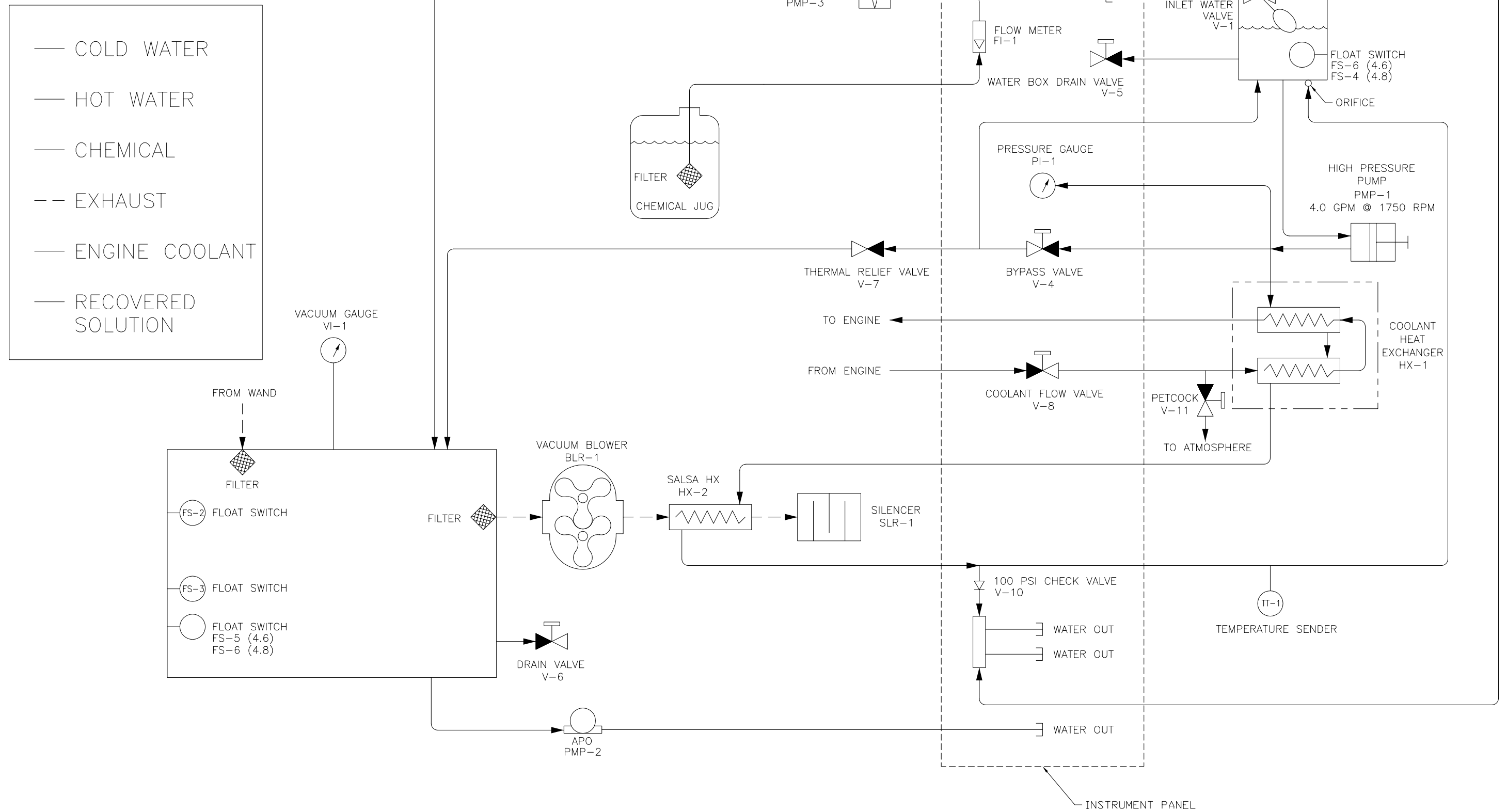
3.0. Chemical jug fills with water

POSSIBLE CAUSE	SOLUTION
3.1. Three-way chemical valve is defective.	Inspect valve for leaks between ports. Replace as necessary.
3.2. Inlet check valve in chemical pump is faulty.	Remove and inspect valve. Clean or replace as necessary.

4.0. Chemical in water box

POSSIBLE CAUSE	SOLUTION
4.1. Chemical pump diaphragm is faulty.	Remove and inspect. Replace as necessary.
4.2. High-pressure check valve is faulty.	Remove and inspect. Clean or replace as necessary.

Figure 5-1. CDS Flow Diagram
4002 Rev. D



6 - Water Pump Maintenance

The CDS' water pump features a dynamic low-pressure seal retainer, an innovative intermediate ring, and superior low-pressure and high-pressure seals. With its ceramic plungers and nickel-plated forged brass manifold, this high-temperature pump is ideal for use in carpet cleaning.

You must perform daily and periodic maintenance on the pump to maintain maximum performance of seals and valves.

This section of the manual explains:

- Daily Maintenance
- Periodic Maintenance
- Water Pump Troubleshooting

DAILY MAINTENANCE

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.
2. Use GP series oil.



CAUTION

If the oil becomes discolored and contaminated, one of the oil seals may be damaged. Refer to the Pump Owner's Manual, included with the CDS 4.8 Owner's Manual, for more information.

Do not operate the pump if the crankcase has been contaminated with water; if contamination occurs, component damage can result.

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; if contamination occurs, component damage can result.

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CAUTION

Do not turn the drive shaft while the oil reservoir is empty. This can cause component failure.

CAUTION

Protect the pump from freezing. Failure to do so can result in component failure which will void warranty coverage (see section 12).

PERIODIC MAINTENANCE

Change the oil after the first 50 hours of operation, with the pump stopped and the oil still warm, and after every 300 operating hours or 3 months of operation. When changing the oil, remove the drain plug on the oil drain hose so all oil and accumulated sediment will drain out.

The initial oil change is recommended for no other reason than to eliminate impurities that may be in the oil during the running-in phase. If these impurities are not removed, but are allowed to remain in the oil, they may cause premature wear to the moving parts and the oil seals.

NOTICE

If the pump works in conditions with high humidity and with sharp temperature changes, condensation may appear inside the crankcase. Condensation mixing with the oil can change the oil's properties, which is easy to detect because the oil changes to a white, milky color.

If the pump does not have excessive water leaking from the packings, and the oil becomes milky, the oil has to be changed more frequently.

WATER PUMP TROUBLESHOOTING

1.0. Will not come up to normal cleaning pressure

POSSIBLE CAUSE	SOLUTION
1.1. Pressure adjusting valve is defective or dirty.	Disassemble valve. Repair or replace as necessary.
1.2. Worn seals or valves in pump.	Test pump output volume directly from pump at normal operating rpm. If volume is below manufacturers specifications, replace seals and inspect for defective valves.
1.3. Pump rpm is too low.	Check engine rpm and adjust as necessary. Check for loose pump belt. Adjust tension as necessary.
1.4. Primary system control orifice is missing or loose*.	Remove filter and inspect. Tighten or replace as necessary.
1.5. Primary orifice is worn.*	Measure orifice size and replace as necessary.

*Applies to SALSA option only.

2.0. No pressure reading on PSI gauge

POSSIBLE CAUSE	SOLUTION
2.1. Pump switch is not turned on.	Turn on switch
2.2. No water in water box.	Refer to section 5 of this manual.
2.3. Pump belt is broken.	Replace belt.
2.4. Pump clutch is not activated. There is no water in water box	Check system back to source to locate cause of interruption to water flow.
2.5. Pump clutch is not activated. There is water in the water box.	Check for 12V at clutch. If 12V is present, replace clutch.
	If 12V is not present, check power to the low-water relay. If there is 12V at the relay, check low water switch in water box.
	If low water switch has no continuity when float is up, replace the switch. If switch is good, replace the low water relay.

3.0. PSI gauge reads normal: low pressure from tool/wand

POSSIBLE CAUSE	SOLUTION
3.1. There is a restriction in the cleaning tool/wand.	Inspect tool jet and clean or replace as necessary. Inspect any filters in the cleaning tool and clean or replace as necessary.
3.2. There is a defective quick connect in the system.	Inspect each quick connect and replace as necessary.
3.3. There is a restriction in one of the solution hoses.	Remove quick connects and inspect hoses. Clean or replace as necessary.
3.4. There are hard water deposits restricting the system between the heat exchanger and the high-pressure solution connection at the front of the machine.	Descale the machine. If this doesn't solve the problem, disassemble this portion of the system and locate restriction.

4.0. Pressure pulsation

POSSIBLE CAUSE	SOLUTION
4.1. Water in the water-box is too hot and is approaching boiling point.	Check temperature of water in the water-box.
4.2. There is an air leak between the water box outlet and the pump inlet.	Physically check all hoses and fittings for cuts, breaks, cracks or tightness. Repair as necessary.
4.3. One of the intake or outlet valves in the high-pressure pump is defective or is being held open by debris.	Remove each valve and inspect for correct operation.

5.0. Water box empty or fills slowly

POSSIBLE CAUSE	SOLUTION
5.1. There is a restriction in the water supply system.	Inspect the supply system from the source through the incoming quick connect for kinks, clogs or restricted filters. Clean or repair as necessary.
5.2. The float valve in the water box is defective	Replace.

6.0. Water box overflows

POSSIBLE CAUSE	SOLUTION
6.1. There is either debris caught in the valve or the valve seal is bad.	Replace.
6.2. The float has absorbed water and has lost buoyancy.	Replace.
6.3. The float has come out of adjustment.	Re-adjust float as necessary.

7 - Assemblies and Parts Lists

This section of the manual provides detailed illustrations and parts lists for the following assemblies:

- Recovery Tank Assembly Parts List
- Power Pack Assembly Parts List
- Blower Assembly Parts List
- Pump Assembly Parts List
- Frame Assembly Parts List
- CDS Front End Assembly Parts List - Chevy
- CDS Front End Kit Assembly Parts List - Chevy (P/N 000-078-391)
- CDS Front End Kit Assembly Parts List - Ford (P/N 000-078-392)
- Dash Box Assembly Parts List
- Dash Panel Assembly Parts List
- Dual Heat Exchanger Assembly Parts List
- Instrument Panel Assembly Parts List
- By-Pass Valve Assembly Parts List
- Hi-PSI Manifold Assembly Parts List
- Differential Valve Assembly Parts List
- Recovery Tank Cover Assembly Parts List
- Vacuum Relief Valve Assembly Parts List
- Water Box Assembly Parts List
- Diffuser Filter Assembly Parts List
- Float Valve Assembly Parts List
- Dura-Flow Automatic Pump Out (APO) Assembly Parts List- Production
- Salsa Heat Exchanger Parts List (Chevy)
- Non Salsa Heat Exchanger Parts List
- Yaw Sensor Cooling Kit Parts List
- Horizontal Pump In Tank Assembly Parts List
- 120 Gallon Pump-In Tank Fitting Assembly Parts List
- 85 Gallon Rotomold Fresh Water Tank Assembly Parts List
- Pass Through Assembly Parts List
- Cleaning Wand Valve Assembly Parts List
- Chevy Cowling Assembly Parts List
- Ford Cowling Assembly Parts List

Some of the illustrations in this section reference sealants, thread lockers, adhesive, primer, anti-seize and lubricant specifications that are used in the construction of HydraMaster equipment.

Refer to Figure 7-1 to identify those substances such as A1, A2 and so forth. Equivalent products are acceptable if they meet or exceed current specifications and are approved by HydraMaster.



Figure 7-1. Adhesive and Sealant Material Reference

Figure 7-2. Recovery Tank Assembly - View
601-060-800 Rev. C

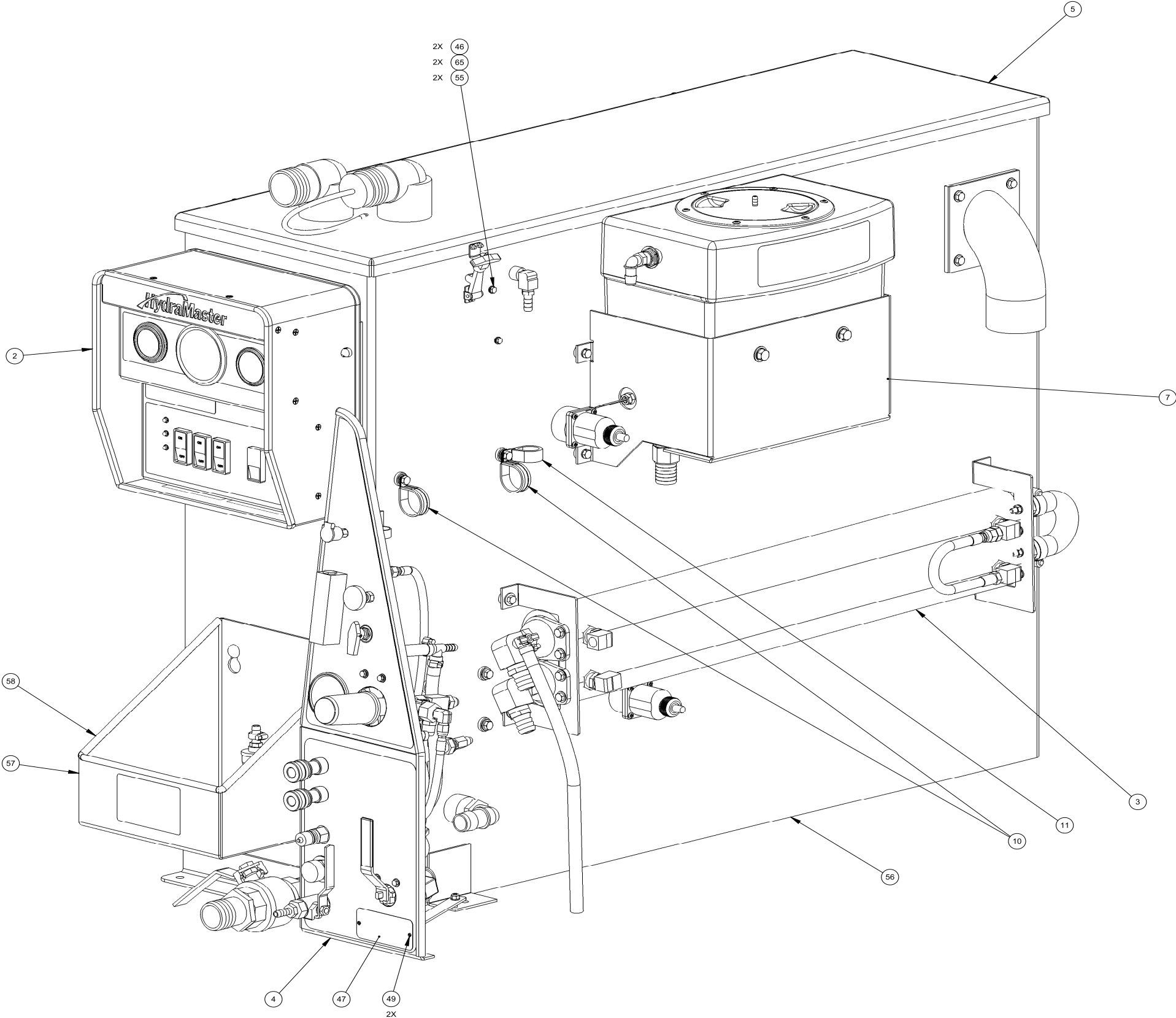


Figure 7-3. Recovery Tank Assembly - View 2 of 3
601-060-800 Rev. C

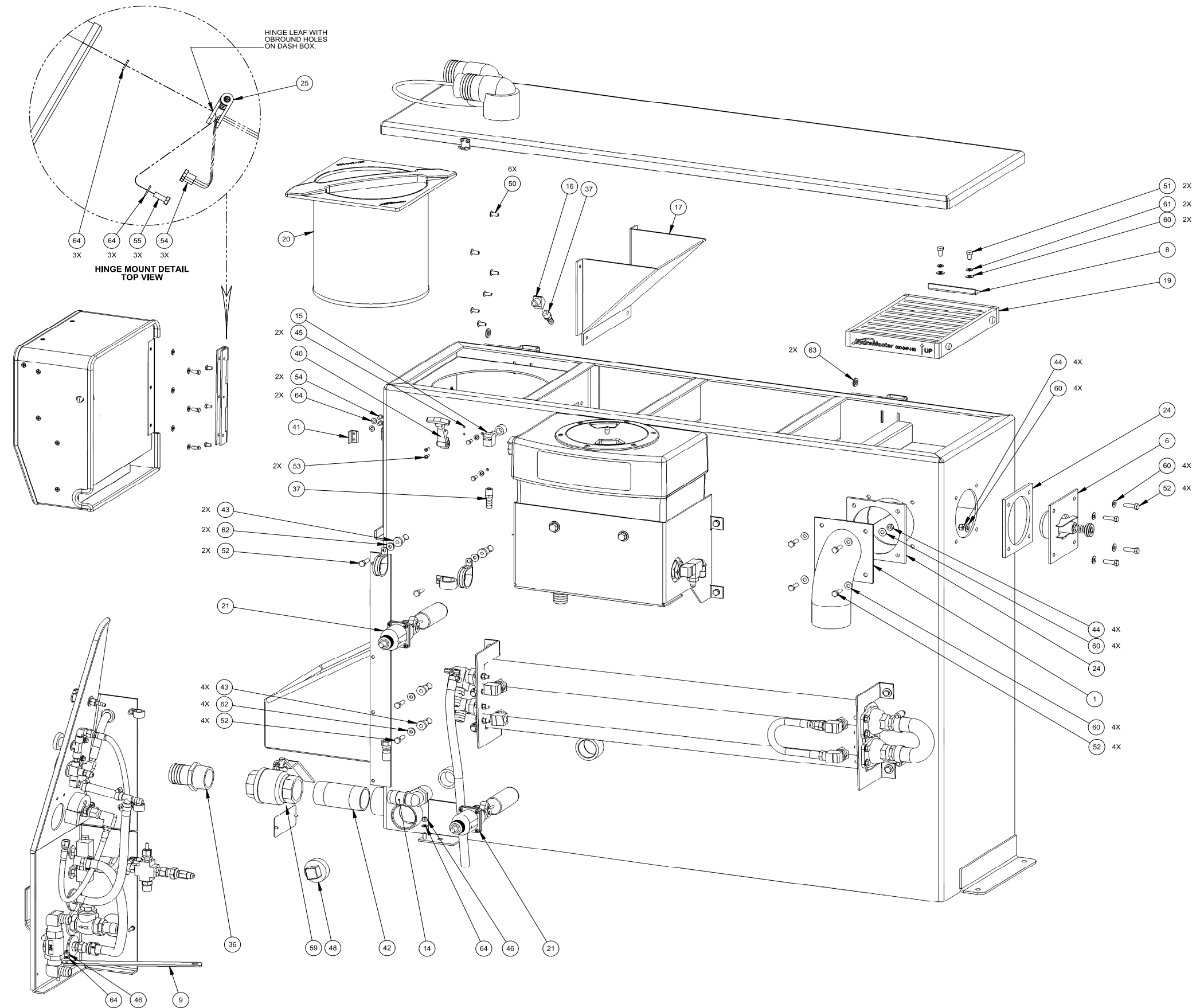
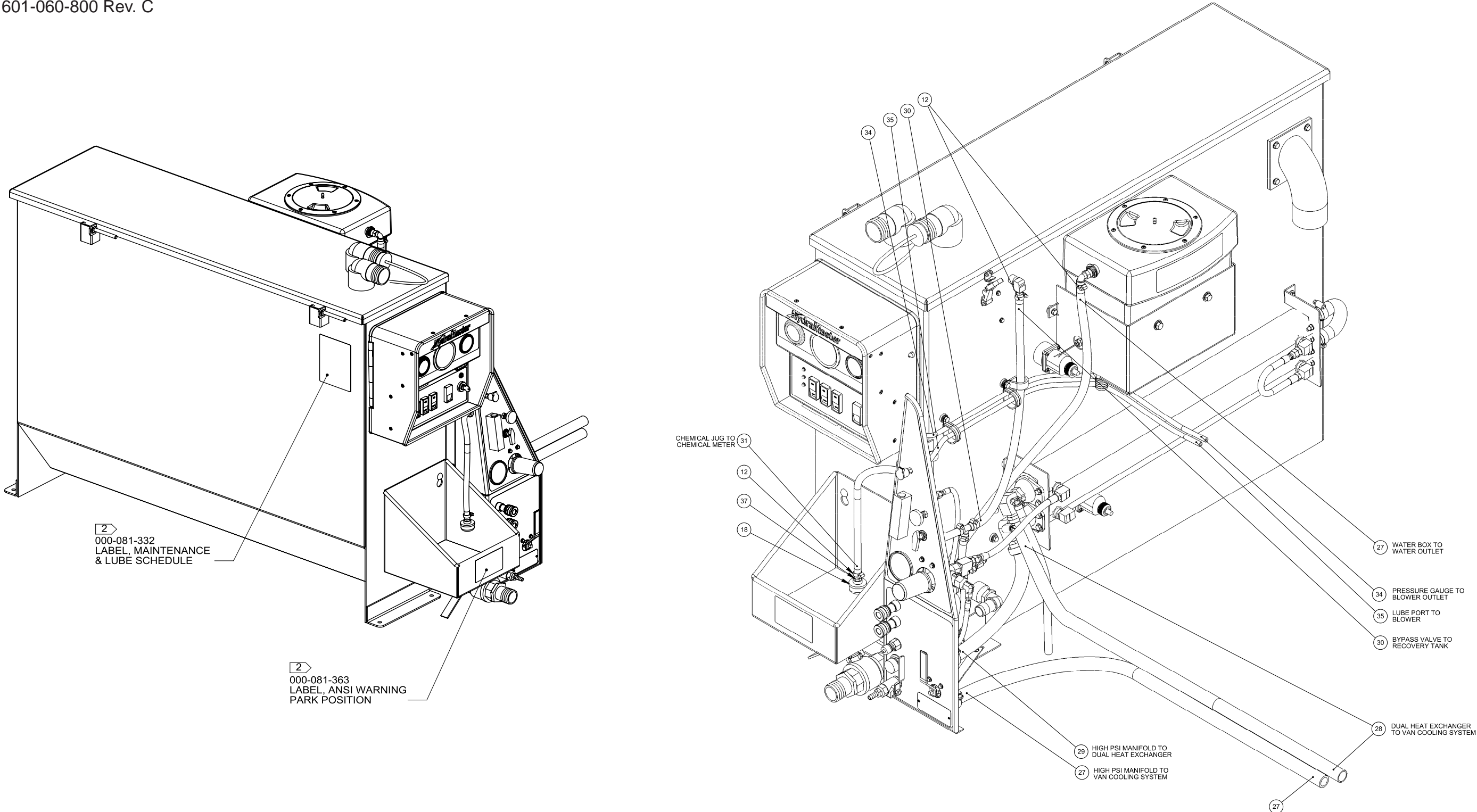


Figure 7-4. Recovery Tank Assembly - View 3 of 3
601-060-800 Rev. C



Recovery Tank Assembly Parts List

Item	Part Number	Description	Qty	Item	Part Number	Description	Qty
1	000-001-135	Adapter, Ø3.0 Tank to X 90 Degree Blower Hose	1	35	000-068-978	Hose, 5/32" I.D. Vacuum X 82" Lg.	1
2	601-018-701	Assembly, Dash Box	1	36	000-052-226	Insert, 1-1/2" NPT X 1-1/2" Barb (Gray)	1
3	601-006-701	Assembly, Dual Heat Exchanger	1	37	000-052-102	Insert, #46 (1/4" NPT X 3/8" Barb)	3
4	601-019-701	Assembly, Instrument Panel	1	38	000-081-252	Label Set, Common	1
5	601-029-701	Assembly, Recovery Tank Cover	1	39	000-081-099	Label Set, Dash Only	1
6	610-026-724	Assembly, Vacuum Relief Valve - URT	1	40	000-086-008	Latch, Bungee	1
7	601-010-701	Assembly, Water Box	1	41	000-086-032	Latch, Dash Strike	1
8	000-015-932	Bracket, Flat Filter Securing - Uncoated	1	42	000-052-921	Nipple, 1-1/2" NPT X 4" Lg. S/S	1
9	000-015-1208	Bracket, Instrument Panel to Vacuum Tank Stabilizer	1	43	000-094-113	Nut, 1/4"-20UNC Neoprene Wellnut	6
10	000-033-057	Clamp, 1" Cushion Loop	1	44	000-094-009	Nut, 1/4"-20UNC Nylock	8
11	000-033-053	Clamp, 1-1/2" Cushion Loop	2	45	000-094-063	Nut, #6-32UNC Nylock	2
12	000-033-005	Clamp, Size #5 Hose	7	46	000-094-034	Nut, #10-24UNC Nylock	4
13	000-033-020	Clamp, Size #16 Hose	4	47	000-105-012	Plate, Machine Serial I.D.	1
14	000-052-085	Elbow, 1/4" NPT Street	1	48	000-106-049	Plug, 1" NPT Black Nylon	1
15	000-052-082	Elbow, 1/4" NPT Street X 45 Degree	1	49	000-106-019	Plug, 1-1/2" NPT	1
16	000-049-154	Filter, Air Deflector, URT - Fabricated	1	50	000-106-046	Plug, 1-1/4" NPT	1
17	000-049-118	Filter, Chemical Inlet High Pressure	1	51	000-140-001	Rivet, Ab4-3A Aluminum Pop 1/8" X 1/4" Lg.	2
18	000-049-153	Filter, Flat - Universal Recovery Tank	1	52	000-140-023	Rivet, Ab8-6A Aluminum Pop	6
19	000-049-152	Filter, Recovery Tank Basket	1	53	000-143-333	Screw, 1/4"-20UNC X 0.50" Lg. Hex Head	2
20	000-157-091	Float, Lever Switch	1	54	000-143-002	Screw, 1/4"-20UNC X 1.00" Lg. Hex Head	14
21	000-057-026	Gasket, 1/2" X 1/4" X 18-1/8" Lg.	0.5	55	000-143-539	Screw, #6-32UNC X 0.50" Lg. Button Head	2
22	000-131-002	Gasket, 1/2" X 1/8" X 100' Lg. Closed Cell	1.5	56	000-143-166	Screw, #10-24UNC X 0.375" Lg. Hex Head	5
23	000-057-206	Gasket, Adapter - URT	2	57	000-143-126	Screw, #10-24UNC X 0.50" Lg. Hex Head	5
24	000-067-031	Hinge, Dash Box	1	58	000-159-130	Tank, 100 Gallon Universal Recovery - Coated	1
25	000-068-991	Hose, 1/2" I.D. Rubber X 42" Lg.	1	59	000-166-002	Tray, Soap Jug - Coated	1
26	000-068-734	Hose, 1/2" X 42.5 Lg w/ 3/8" NPT and 3/8" SAE F Ends	1	60	000-131-131	Trimlok, 3/8 X 1/8 Rubber	1
27	000-068-385	Hose, 3/4" I.D. X 18 ft - Green Stripe - Cut to Fit	1	61	000-169-022	Valve, 1-1/2" Full Port Ball	1
28	000-068-940	Hose, 3/8" I.D. Rubber X 17" Lg.	1	62	000-174-003	Washer, 1/4" Flat	18
29	000-068-1039	Hose, 3/8" I.D. Rubber X 31" Lg.	1	63	000-174-019	Washer, 1/4" Lock	2
30	000-068-196	Hose, 3/8" I.D. X 11" Lg w/ 3/8" MPT and 3/8" JIC End	1	64	000-174-060	Washer, 1/4" Rubber Backed	6
31	000-068-1037	Hose, 3/8" I.D. X 39" Lg., Clr w/Braid	1	65	000-174-029	Washer, 3/8" Rubber Backed	2
32	000-068-092	Hose, 3/8" X 15" Teflon w/ 3/8" JIC End	1	66	000-174-001	Washer, #10 Flat	10
33	000-068-203	Hose, 3/16" X 34" Teflon 1/4" F JIC X 1/4" F JIC	1	67	000-174-036	Washer, #10 Flat Rubber Backed	2
34	000-068-977	Hose, 5/32" I.D. Vacuum X 52" Lg.	1				

Figure 7-5. Power Pack Assembly -
View 1 of 2
601-004-701 Rev. F

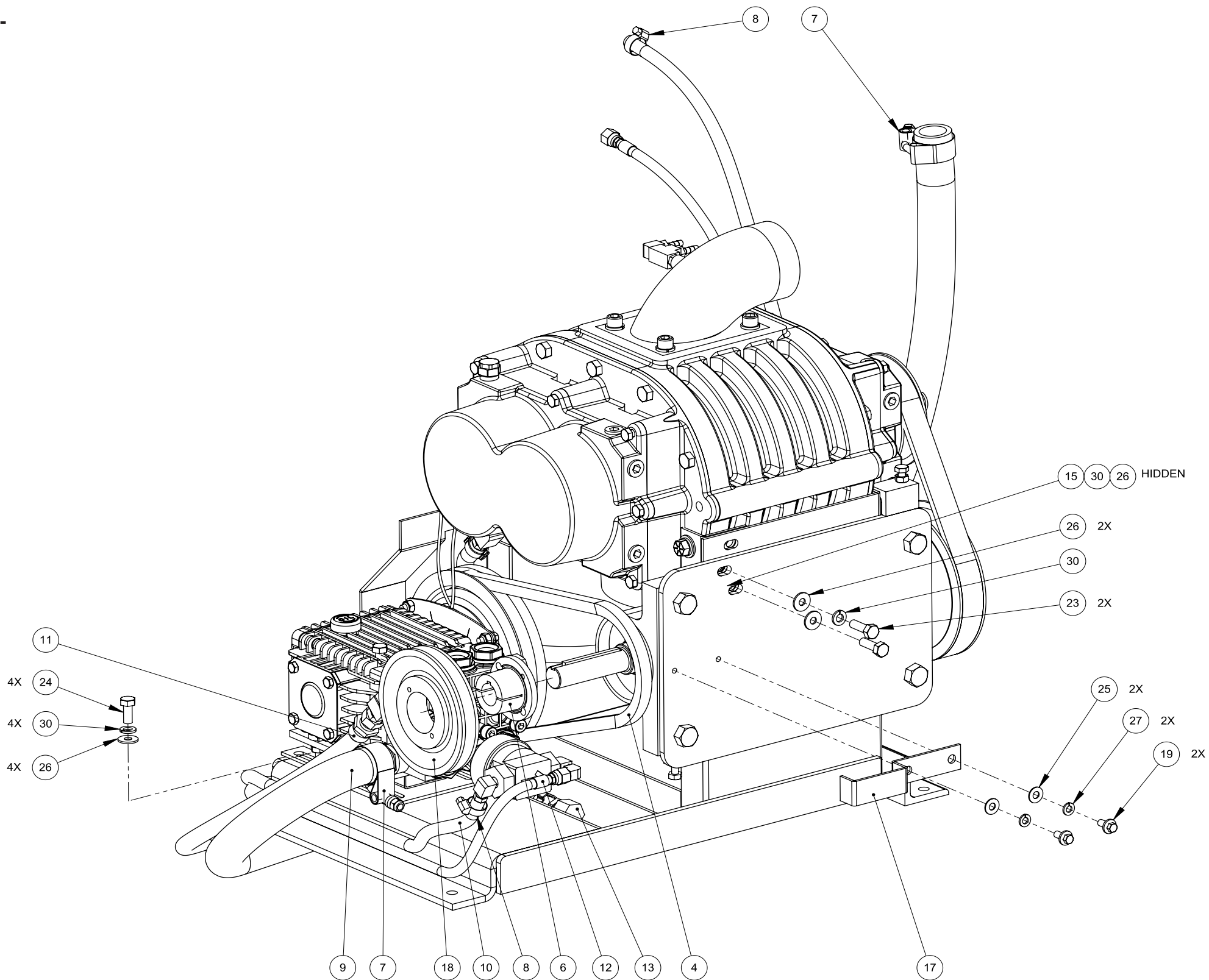
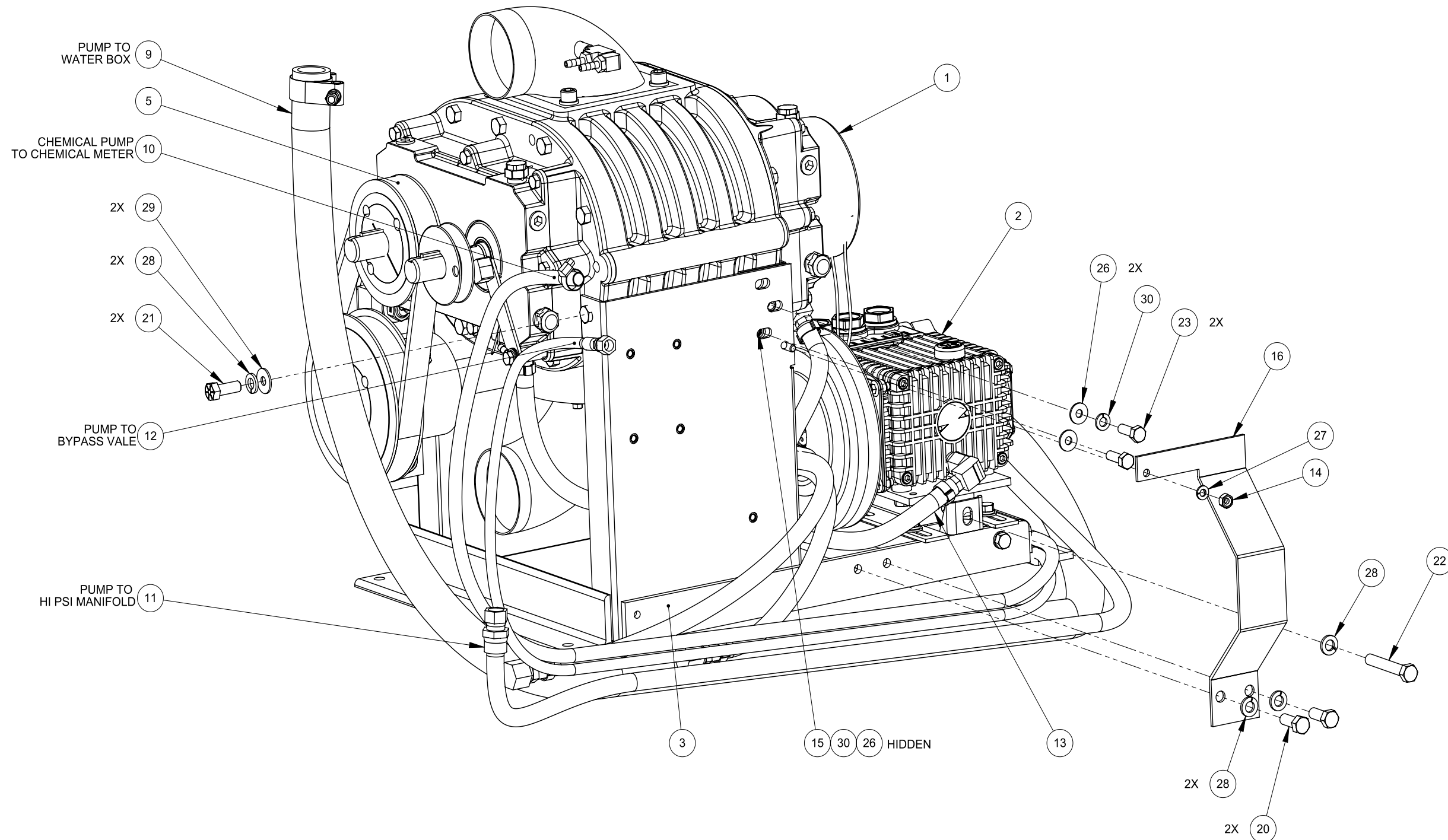


Figure 7-6. Power Pack Assembly
- View 2 of 2
601-004-701 Rev. F

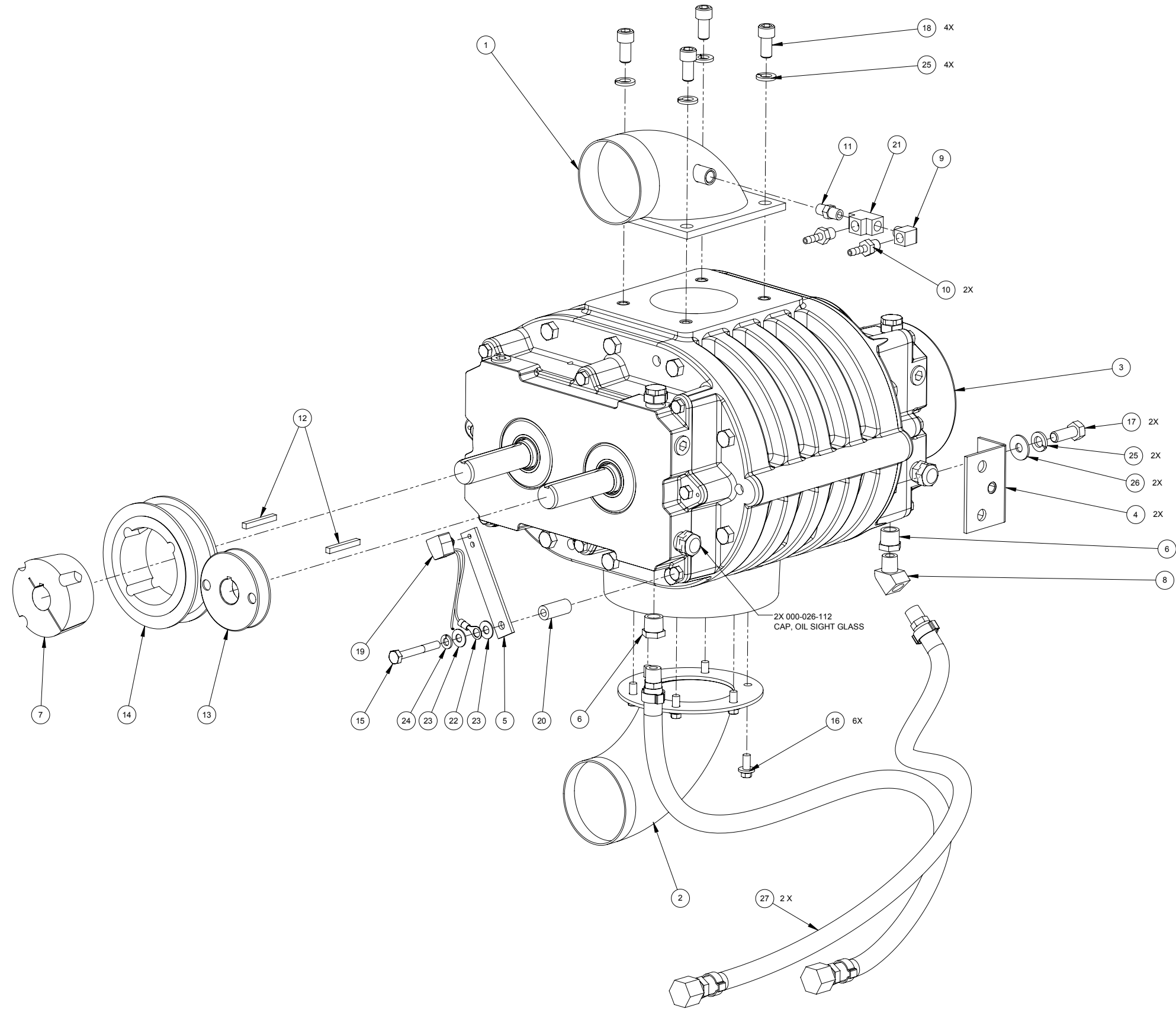


Power Pack Assembly Parts List

Item	Part Number	Description	Qty
1	601-002-701	Assembly, Blower	1
2	601-007-701	Assembly, Pump	1
3	601-001-701	Assembly, Universal CDS Frame	1
4	000-010-065	Belt, #9345 Pump Drive	1
5	000-010-052	Belt, Polychain GT	1
6	000-020-019	Bushing, #H X 7/8" Bore	1
7	000-033-132	Clamp, 1-1/2" T-Bolt	2
8	000-033-005	Clamp, Size #5 Hose	2
9	000-068-777	Hose, 1" X 65" Lg. Suction	1
10	000-068-1038	Hose, 3/8" I.D. High Temp X 72" Lg.	1
11	000-068-588	Hose, 3/8" X 52" Lg. Throb - CDS	1
12	000-068-706	Hose, 3/16" X 70" Lg. Teflon w/ Fem JIC Ends	1
13	000-068-149	Hose, CDS Blower Oil Drain	1
14	000-094-010	Nut, 1/4"-20UNC Hex	1
15	000-094-012	Nut, 5/16-18"UNC Hex	2

Item	Part Number	Description	Qty
16	000-108-065	Protector, Pump Belt Shield - Coated	1
17	000-108-109	Protector, Pump Drive Belt - Coated	1
18	000-109-043	Pulley, AK51H	1
19	000-143-141	Screw, 1/4"-20UNC X 1/2" Lg. Whiz Lock	2
20	000-143-096	Screw, 3/8"-16UNC X 1.00" Lg. Hex Head	2
21	000-143-018	Screw, 3/8"-16UNC X 1" Lg. Hex Head - Grade 8	2
22	000-143-098	Screw, 3/8-16 X 2 1/2" Hex Head	1
23	000-143-013	Screw, 5/16"-18UNC X 1.00" Lg. Hex Head Grade 8	4
24	000-143-012	Screw, 5/16"-18UNC X 3/4" Lg.	4
25	000-174-003	Washer, 1/4" Flat	2
26	000-174-002	Washer, 1/4" Flat	6
27	000-174-019	Washer, 1/4" Lock	3
28	000-174-021	Washer, 3/8" Lock	5
29	000-174-004	Washer, 5/16" Flat, Uss	6
30	000-174-018	Washer, 5/16" Lock	8

Figure 7-7. Blower Assembly
601-002-701 Rev. E



Blower Assembly Parts List

Item	Part Number	Description	Qty
1	000-001-041	ADAPTER, BLOWER INLET - COATED	1
2	000-001-042	ADAPTER, BLOWER OUTLET - COATED	1
3	000-111-147	BLOWER, 4007 DOMINATOR	1
4	000-015-801	BRACKET, BLOWER MOUNTING - COATED	2
5	000-015-930	BRACKET, TACH. MAGNETIC EXTENSION - COATED	1
6	000-052-061	BUSHING, 3/8" NPT x 1/4" FPT	2
7	000-020-020	BUSHING, 7/8" TAPER-LOCK	1
8	000-052-082	ELBOW, 1/4" NPT STREET x 45°	1
9	000-052-084	ELBOW, 1/8" NPT STREET	1
10	000-052-293	INSERT, #23 (1/8" NPT x 3/16" BARB)	2
11	000-052-069	NIPPLE, 1/8" NPT HEX	1
12	000-077-011	KEY, 3/16" X 1 1/2" LONG	2
13	000-109-009	PULLEY, 2 3/4" x 7/8" PUMP DRIVE - MACHINED	1
14	000-109-057	PULLEY, 40 TOOTH GT2 8MX-10S-21 ENGINE & BLOWER	1

Item	Part Number	Description	Qty
15	000-143-373	SCREW, 1/4"-20UNC x 2" LG. HEX HEAD GRADE 5	1
16	000-143-141	SCREW, 1/4"-20UNC x 0.50" LG. WHIZ LOCK	6
17	000-143-018	SCREW, 3/8"-16UNC x 1" LG. HEX HEAD - GRADE 8	2
18	000-143-094-1	SCREW, 3/8"-16UNC x 0.75" LG. SOCKET HEAD	4
19	000-149-010	SENSOR, CDS MAGNETIC TACH	1
20	000-154-153	SPACER, TACH, SENSOR	1
21	000-052-092	TEE, 1/8" FPT	1
22	000-037-015	TERMINAL, 5/16 RING-16 AWG	1
23	000-174-003	WASHER, 1/4" FLAT S/S	2
24	000-174-019	WASHER, 1/4" LOCK	1
25	000-174-021	WASHER, 3/8" LOCK	6
26	000-174-004	WASHER, 5/16" FLAT, USS	2
27	000-068-149	HOSE, CDS BLOWER OIL DRAIN	2

NOTICE

* Order P/N 000-078-925 for the after-market Blower replacement kit.

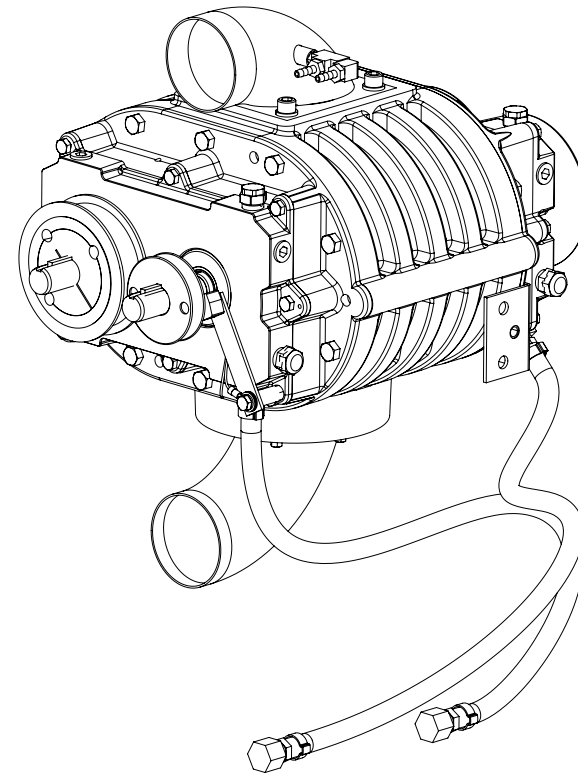


Figure 7-8. Pump Assembly - View 1 of 2
601-007-701 Rev. C

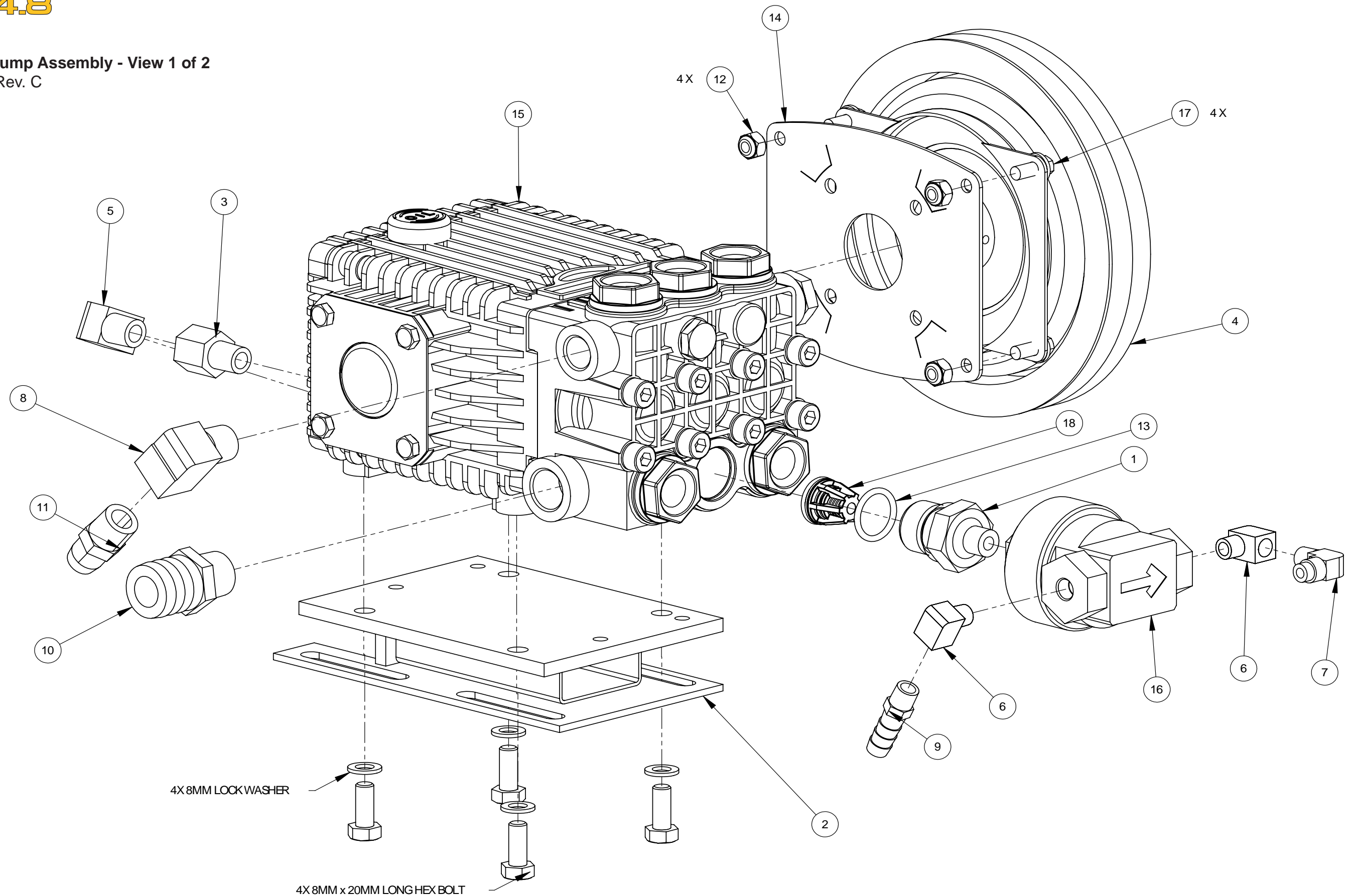
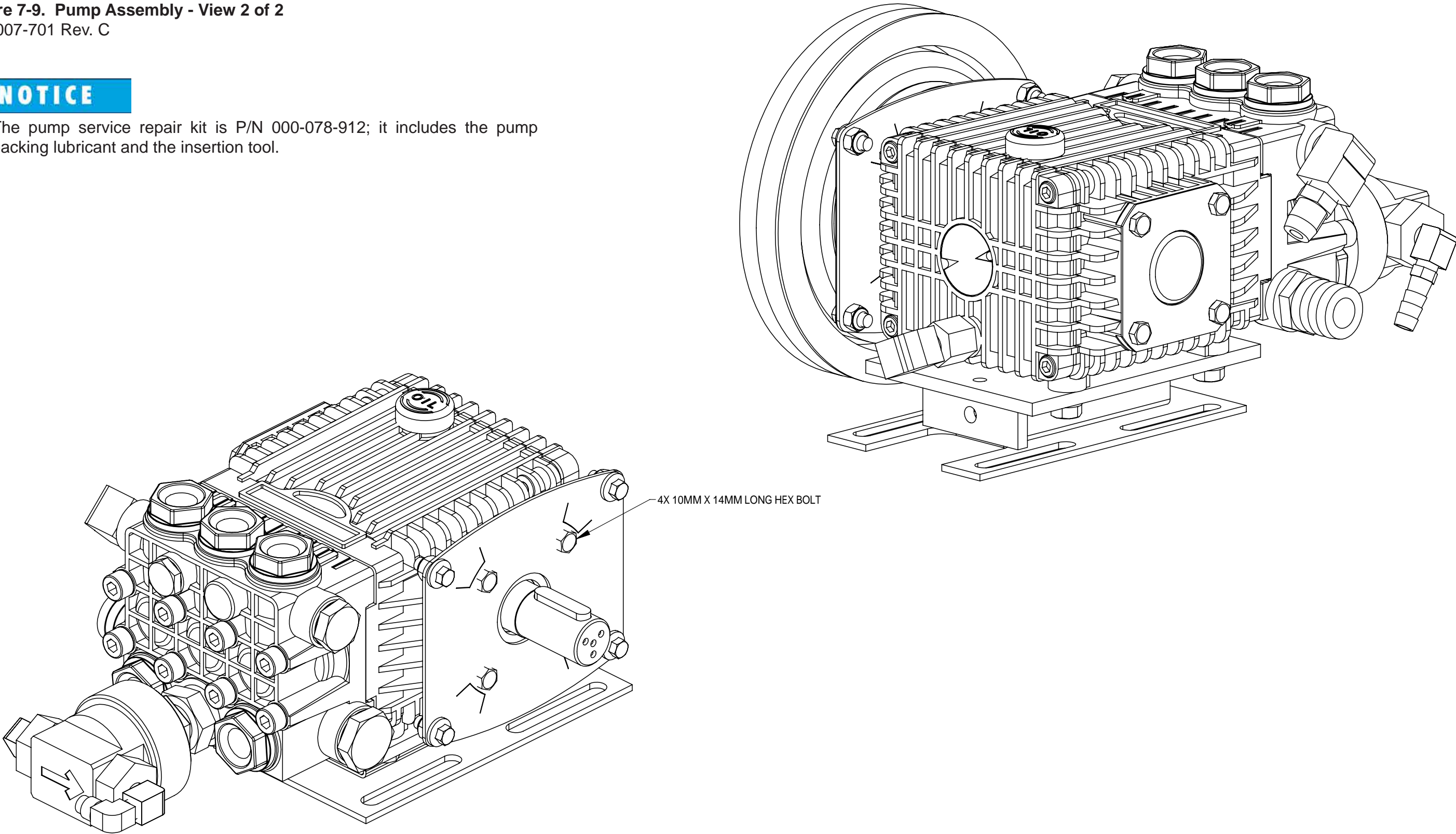


Figure 7-9. Pump Assembly - View 2 of 2
601-007-701 Rev. C

NOTICE

The pump service repair kit is P/N 000-078-912; it includes the pump packing lubricant and the insertion tool.

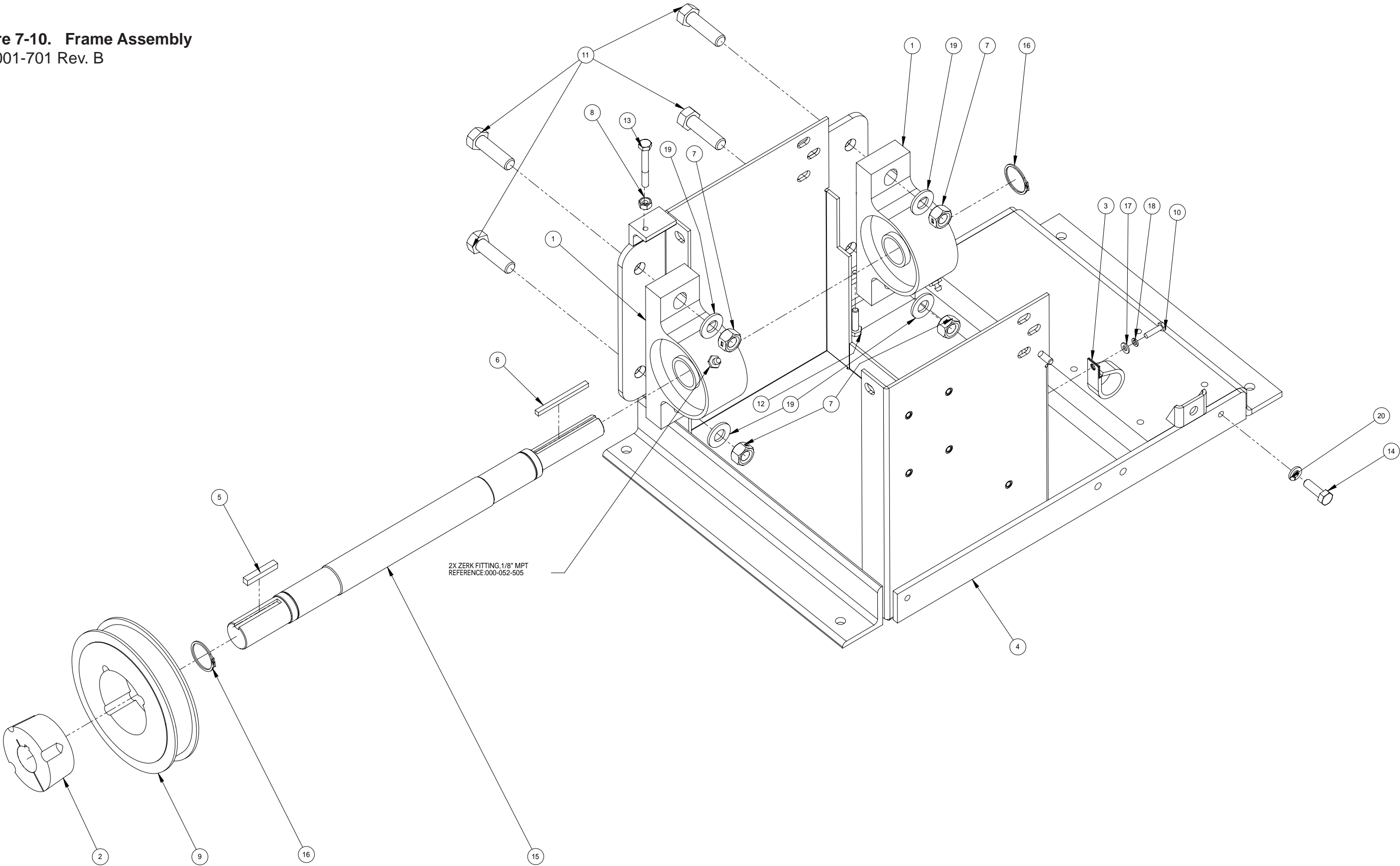


Pump Assembly Parts List

Item	Part Number	Description	Qty
1	000-001-154	Adapter, GP to Chemical Pump S/S 4.0 gallon	1
2	000-015-927	Bracket, Compressor Mount - Coated	1
3	000-052-062	Bushing, 1/4" NPT Male X 1/4" NPT Female	1
4	000-036-008	Clutch, 7" O.D. 24mm Single Groove	1
5	000-052-085	Elbow, 1/4" NPT Street	1
6	000-052-084	Elbow, 1/8" NPT Street	2
7	000-052-531	Elbow, 1/8" NPT X 1/4" SAE	1
8	000-052-086	Elbow, 3/8" NPT Street	1
9	000-052-099	Insert, #26 (1/8" NPT X 3/8" Barb)	1

Item	Part Number	Description	Qty
10	000-052-753	Insert, #816 (1/2" NPT X 1" Barb)	1
11	000-052-128	Nipple, 3/8 MPT X 3/8SAE Flare	1
12	000-094-071	Nut, 1/4"-20UNC Nylock	4
13	000-097-057	O-Ring, Adapter - Chemical Pump	1
14	000-105-550	Plate, Pump Clutch - GP 4.0 gpm	1
15	000-111-188	Pump, 4.0 gpm GP	1
16	000-111-184	Pump, GP Chemical	1
17	000-143-141	Screw, 1/4"-20UNC X 1/2" Lg. Whiz Lock	4
18	000-169-216	Valve, GP Pump Check - Mod. - 4.0 gallon	1

Figure 7-10. Frame Assembly
601-001-701 Rev. B



Frame Assembly Parts List

Item	Part Number	Description	Qty	Item	Part Number	Description	Qty
1	000-008-020	Bearing, Pillow Block - 1-3/16" Bore	2	11	000-143-240	Screw, 1/2"-13UNC X 1.75" Lg. Hex Head - Grade 5	4
2	000-020-026	Bushing, 1-1/8" Taper-Lock	1	12	000-143-002	Screw, 1/4"-20UNC X 1.00" Lg. Hex Head	1
3	000-033-057	Clamp, 1" Cushion Loop	1	13	000-143-548	Screw, 1/4"-20UNC X 2.00" Lg. Hex Head	1
4	000-055-028	Frame, Pump and Blower - Coated	1	14	000-143-013	Screw, 5/16"-18UNC X 1.00" Lg. Hex Head Grade 8	1
5	000-077-010	Key, 1/4" X 1-1/2" Lg. Class 2 Fit	1	15	000-150-040	Shaft, Drive Sprocket	1
6	000-077-012	Key, 3/16" X 2.5" Lg. Class 2 Fit	1	16	000-139-021	Snap Ring, 1-3/16" Shaft	2
7	000-094-037	Nut, 1/2-13UNC 2 Way Locking	4	17	000-174-001	Washer, #10 Flat	1
8	000-094-010	Nut, 1/4"-20UNC Hex	1	18	000-174-014	Washer, #10 Lock	1
9	000-109-058	Pulley, 56 Tooth GT2 8MX-56S-21 Engine and Blower	1	19	000-174-012	Washer, 1/2 SAE H/D	4
10	000-143-132	Screw, #10-24UNC X 0.75" Lg. Hex Head	1	20	000-174-018	Washer, 5/16" Lock	1

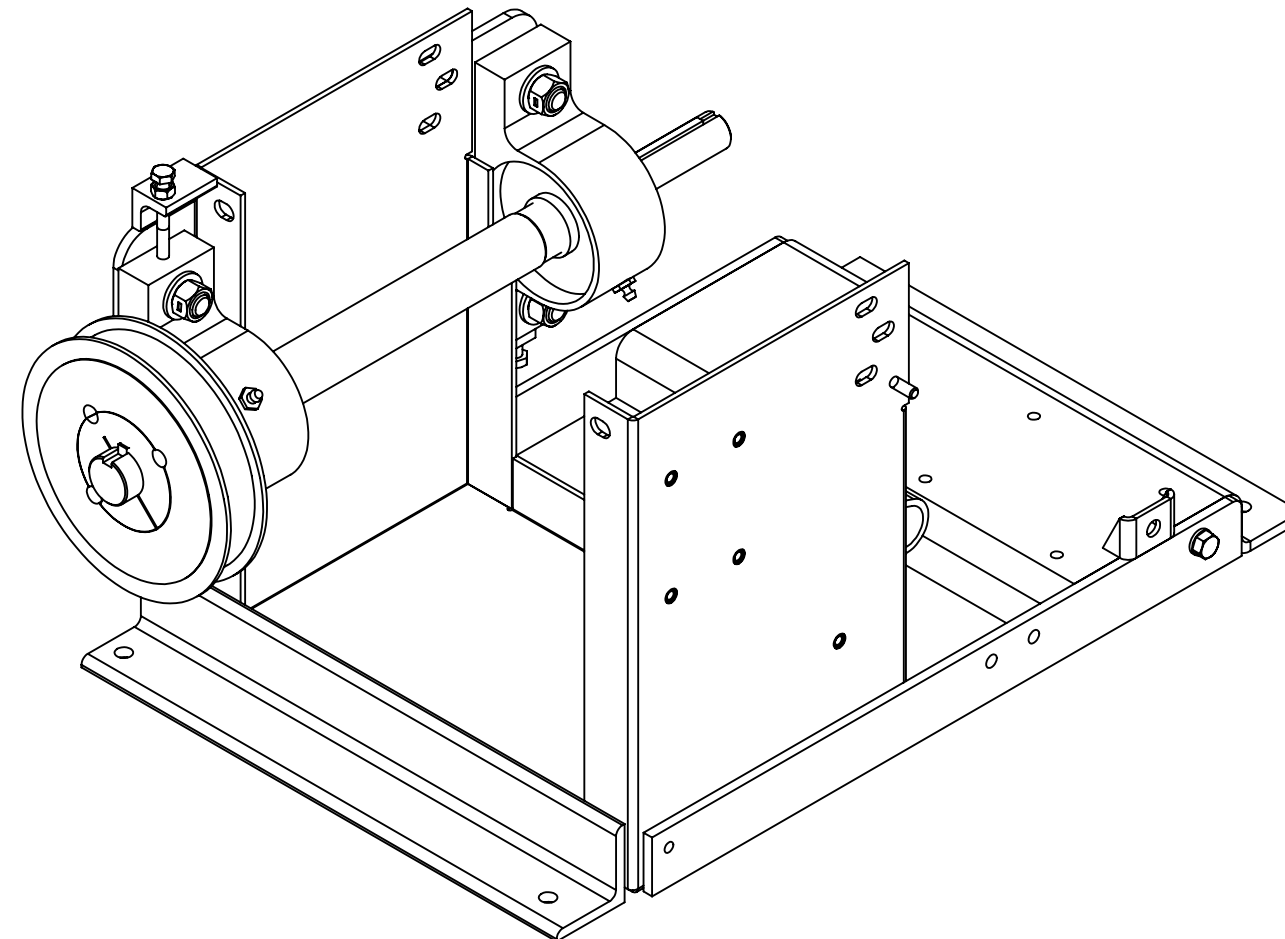
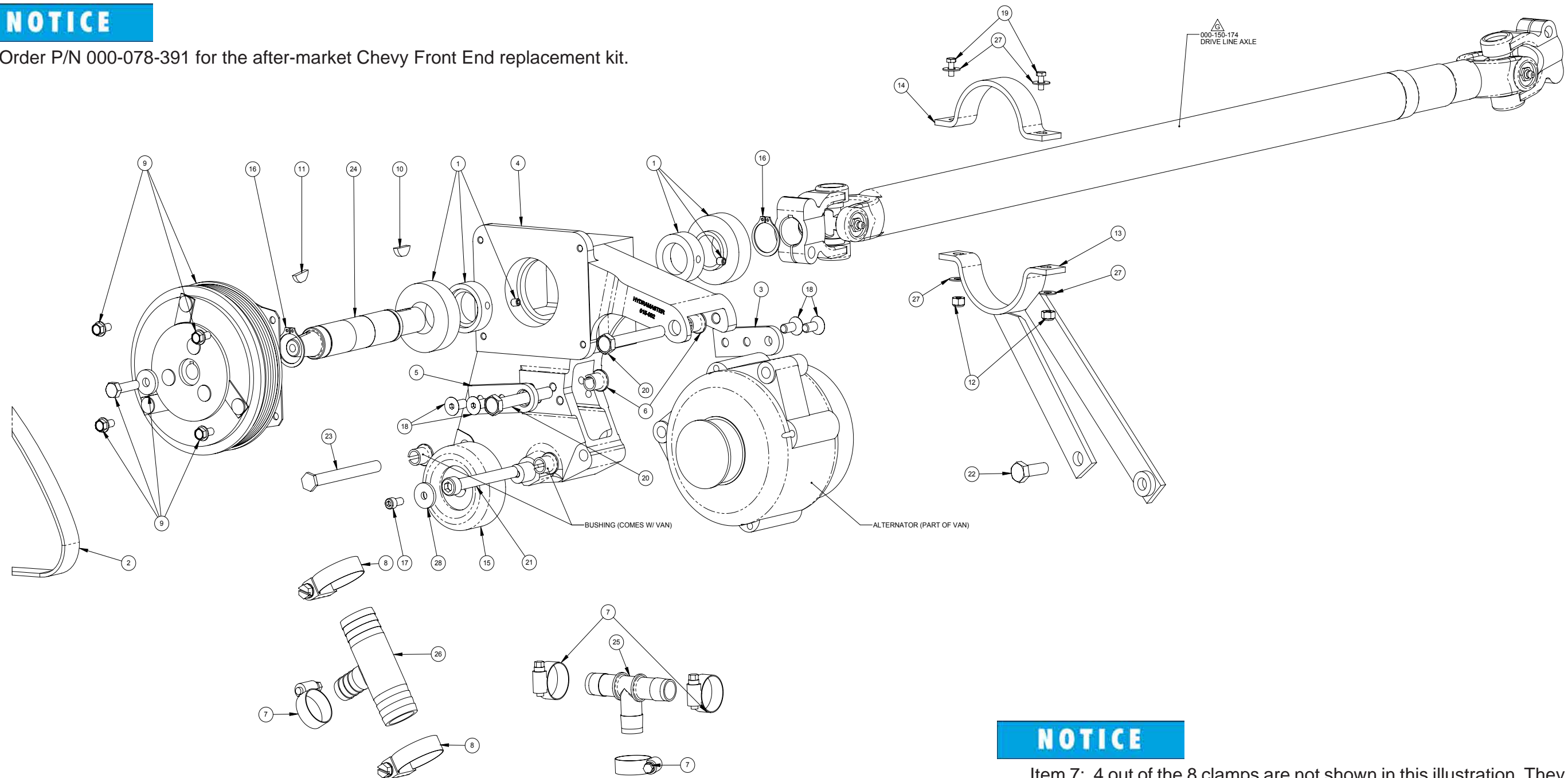


Figure 7-11. CDS Front End Assembly - Chevy
601-021-132 Rev. G

NOTICE

Order P/N 000-078-391 for the after-market Chevy Front End replacement kit.



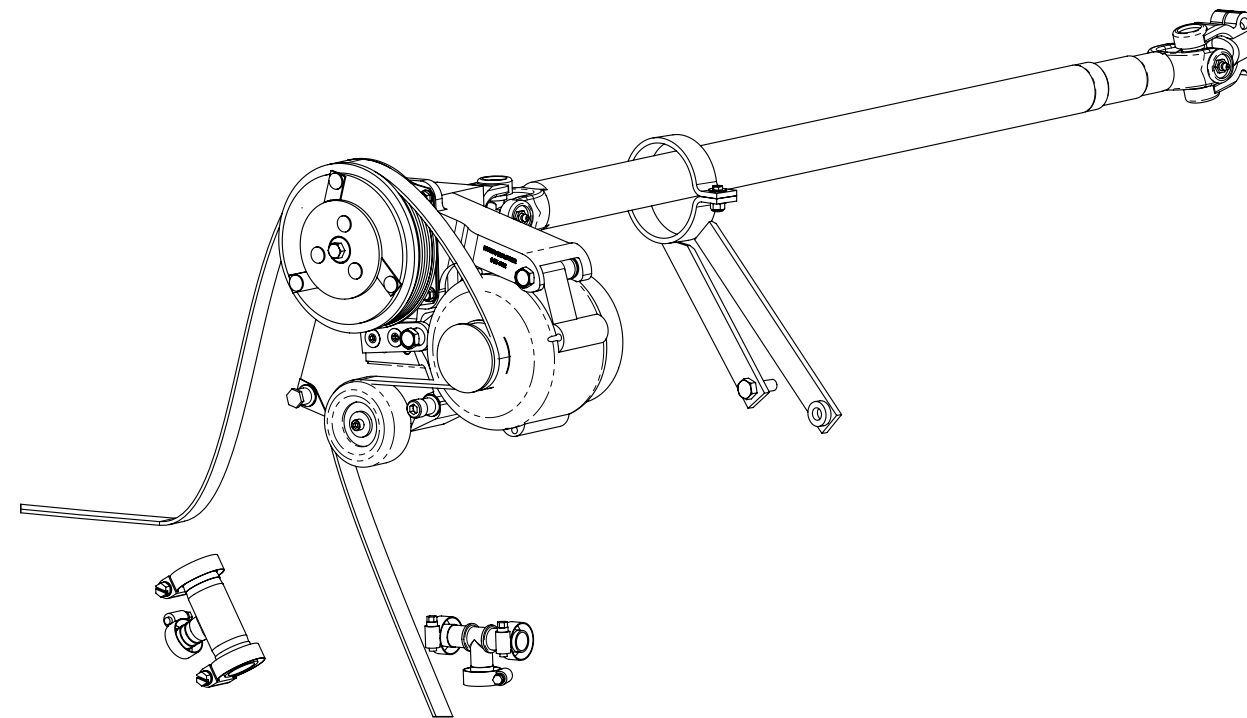
NOTICE

Item 7: 4 out of the 8 clamps are not shown in this illustration. They are used for securing the custom cut green stripe hose in the top level assembly.

CDS Front End Assembly Parts List - Chevy

Item	Part Number	Description	Qty
1	000-008-011	Bearing, CDS Clutch	2
2	000-010-118	Belt, Ch-8 Poly	1
3	000-015-880	Bracket, 2003 Chevy Idler Casting - Rear	1
4	000-015-002	Bracket, CDS Front End Idler Casting	1
5	000-015-879	Bracket, Idler Casting - Front	1
6	000-154-141	Bushing, CDS Idler Casting - Alternator Motor	2
7	000-033-029	Clamp, Size #12 Hose	8
8	000-033-008	Clamp, Size #20 Hose	2
9	000-036-003	Clutch Assy, 6" CDS Poly Groove	1
10	000-077-009	Key, 3/16" X 3/4" Woodruff	1
11	000-077-008	Key, 5/32 X 3/4" Woodruff	1
12	000-094-009	Nut, 1/4"-20UNC Nylock	2
13	000-108-127	Protector, Fly Strap - Coated	1
14	000-108-009	Protector, Fly Strap - Top Clamp - Coated	1
15	000-109-095	Pulley, 76mm CDS Idler - Gates w/ Double Ro	1

Item	Part Number	Description	Qty
16	000-139-005	Ring, CDS Clutch Shaft	2
17	000-143-079	Screw, 1/4"-20UNC X 0.5" Lg. Socket Head	1
18	000-143-562	Screw, 5/16-18UNC X 0.75" Lg. Flat Head Allen	4
19	000-143-126	Screw, #10-24UNC X 0.50" Lg. Hex Head	2
20	000-143-564	Screw, M10 X 1.5 X 80mm Lg. Hex Head	2
21	000-143-563	Screw, M10 X 1.5 X 90mm Lg. Socket Hd	1
22	000-143-078	Screw, M10 X 30mm Lg.	1
23	000-143-558	Screw, M10x1.5 X 90mm Lg. Mod. Thin Head	1
24	000-150-009	Shaft, Electric Clutch	1
25	000-052-717	Tee, 3/4" Barb X 3/4" Barb	1
26	000-052-716	Tee, Upper Coolant	1
27	000-174-003	Washer, 1/4" Flat	4
28	000-174-104	Washer, Chevy CDS Idler Casting	1



CDS Front End Kit Assembly Parts List - Chevy (P/N 000-078-391)

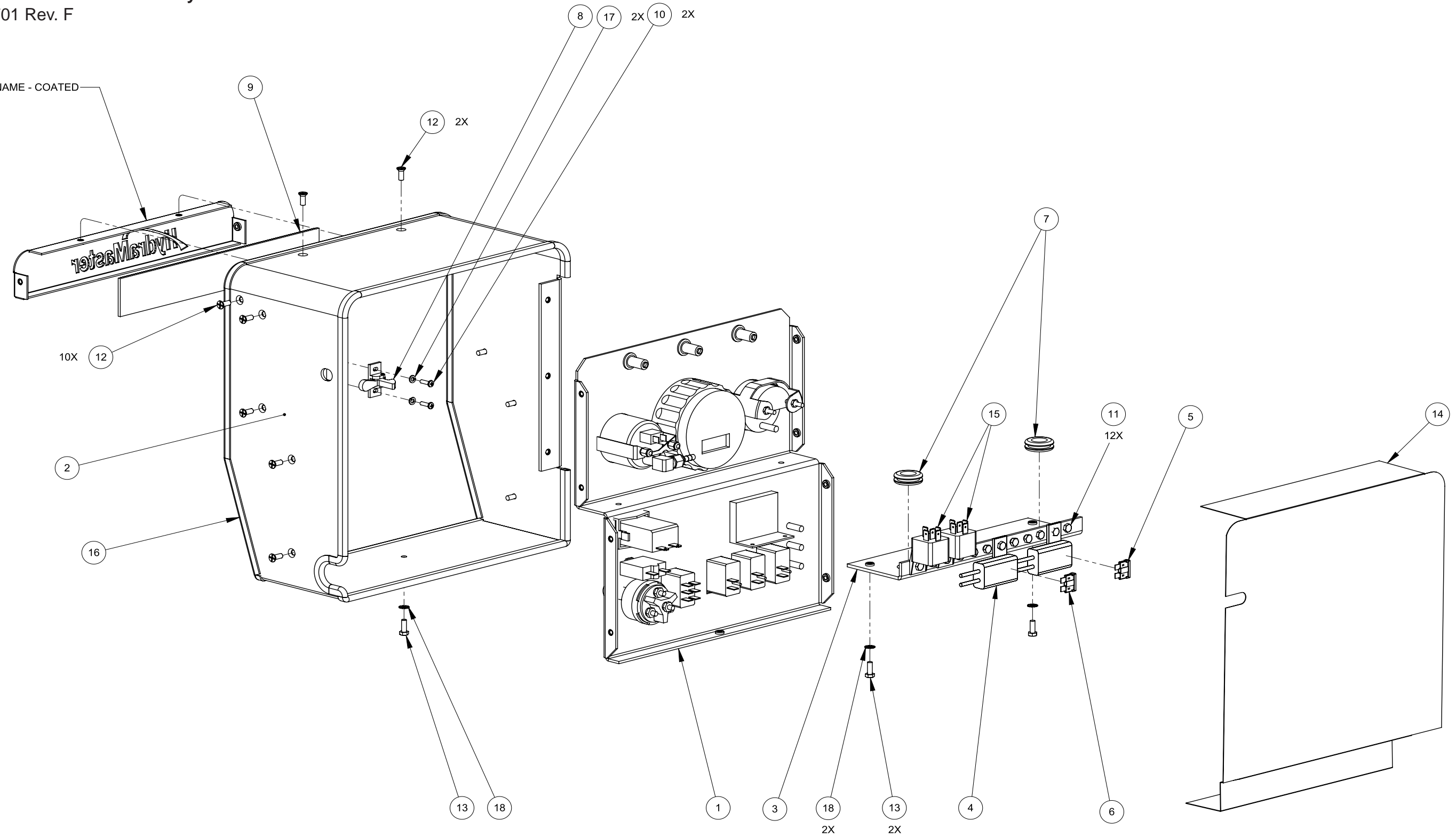
Part Number	Description	Qty	Part Number	Description	Qty
000-008-011	BRG CDS CLUTCH FARM LINE	2	000-108-127	PROTECTOR FLY STRAP COATED GMC	1
000-010-118	BELT 2003 CH 8 POLY	1	000-109-095	PULLEY 76MM CDS IDLER WITH DOU	1
000-015-002	BRKT IDLER CAST CDS FRONT END	1	000-139-005	RING CDS CLUTCH SHAFT	2
000-015-879	BRKT IDLER CASTING FR 2003 CH	1	000-143-078	SCR 10MM X 30MM X 15 HHC	1
000-015-880	BRKT 2003 CHEVY IDLERCASTING R	1	000-143-079	SCR 1/4 20 X 1/2 SS SOCHDCAP	1
000-033-008	CLAMP SIZE 20 HOSE	2	000-143-126	SCREW 10-24 X .50 HHC S/S	2
000-033-029	CLAMP SIZE 12 HOSE	8	000-143-558	SCR 10MM X 15 X 90MM HHCS GR 8	1
000-036-003	CLUTCH ASSY 6 CDS POLY GROOVE	1	000-143-562	SCR 5/16 18 X 3/4 FLATHEAD CAP	4
000-052-716	TEE 1 3/8 X1 3/8 X3/4 UPPER CO	1	000-143-563	SCR M 10 X 15 X 90MM SOCKET HE	1
000-052-717	TEE 3/4 BARB X 3/4 BARB X3/4 B	1	000-143-564	SCR M 10 15 X 80MM HEX HEAD CA	2
000-077-008	KEY 5/32 X 3/4 WOODRUFF	1	000-150-009	SHAFT ELECTRIC CLUTCH CDS	1
000-077-009	KEY 3/16 X 3/4 WOODRUFF	1	000-150-174	DRIVESHAFT UNVRSL 39-44 2014-	1
000-094-009	NUT-1/4-20 S/S NYLOCK	4	000-154-141	SPACER CDS IDLER CASTING ALTER	2
000-094-010	NUT 1/4 20 S/S HEX	2	000-174-003	WASHER - 1/4 ID FLAT S/S	4
000-108-009	PROTECTOR FLYSTRAP TOP CLAMP C	1	000-174-104	WSHR CHEVY CDS IDLER CASTING	1

CDS Front End Kit Assembly Parts List - Ford (P/N 000-078-392)

Part Number	Description	Qty	Part Number	Description	Qty
000-042-058	HSG THERMOSTAT 1999/2000 FORD	1	000-139-005	RING CDS CLUTCH SHAFT	2
000-052-125	INSERT 3/4 X 1 HOSE	1	000-143-013	SCR 5/16 18 X 1 HHC GRADE 8	1
000-052-655	FITTING TEE LOWER RADHOSE	1	000-143-017	SCR 3/8 16 X 3/4 HHC GRADE 8	1
000-052-668	BARB 175 HOSE FABRICATED CDS F	1	000-143-078	SCR 10MM X 30MM X 15 HHC	2
000-052-732	FITTING PCV ELBOWS FABRICATED	1	000-143-096	SCREW 3/8-16 X 1.00 HHC S/S	5
000-077-008	KEY 5/32 X 3/4 WOODRUFF	1	000-143-191	SCR 3/8 16 X 4 1/2 HHC GRADE 8	1
000-077-009	KEY 3/16 X 3/4 WOODRUFF	1	000-143-229	SCR 8MM X 125 X 150MM HHCS	2
000-094-015	NUT 3/8 16 TWO WAY LOCK NUT ZI	2	000-147-102	SEAL O RING 99 00 FORD CDS THE	1
000-094-043	NUT 8 MM HEX	3	000-149-050	THERMOSTAT 2K FORD CDS 205 DEG	1
000-094-066	NUT 6MM X 8 STAND OFF	2	000-150-009	SHAFT ELECTRIC CLUTCH CDS	1
000-094-081	NUT 5/16 18 TWO WAY LOCK NUT Z	1	000-150-174	DRIVESHAFT UNVRSL 39-44 2014-	1
000-105-190	PLATE FUEL LINE SPACER COATED	1	000-174-005	WASHER 3/8 INCH FLAT	1
000-108-009	PROTECTOR FLYSTRAP TOP CLAMP C	1	000-174-022	WSHR 7/16 LOCK	2
000-108-011	PROTECTOR FLYSTRAP COATED 2K F	1	000-174-032	WSHR 3/8 S/S FLAT	7
000-109-044	PULLEY 2000 F 8 CDS IDLER TENS	1	000-174-049	WASHER-5/16 S/S FLAT	6
000-109-121	PULLEY FORD 5.4L	1			

Figure 7-12. Dash Box Assembly
601-018-701 Rev. F

000-105-053
PLATE, DASH NAME - COATED



Dash Box Assembly Parts List

Item	Part Number	Description	Qty
1	601-020-701	ASSEMBLY, DASH PANEL	1
2	000-013-025	BOX, DASH - COATED	1
3	000-015-183	BRACKET, GROUNDING BUS - FABRICATED	1
4	000-056-006	FUSE HOLDER, IN-LINE - WEATHERPROOF	2
5	000-056-010	FUSE, 25 AMP	1
6	000-056-003	FUSE, 15 AMP PLUG IN	1
7	000-060-002	GROMMET, LARGE WIRING	2
8	000-086-104	LATCH, DASH SECURING	1
9	000-084-016	REFLECTOR, 1.625" x 11" NEW HM LOGO	1

Item	Part Number	Description	Qty
10	000-143-046	SCREW, #6-32 x .500" LG. PHP	2
11	000-143-166	SCREW, #10-24UNC x 0.375" LG. HEX HEAD	12
12	000-143-114	SCREW, #10-24UNC x 0.50" LG. FLAT HEAD PHILLIPS	12
13	000-143-126	SCREW, #10-24UNC x 0.50" LG. HEX HEAD	3
14	000-108-013	SHIELD, DRIP - DASH	1
15	000-157-022	SWITCH, RELAY	2
16	000-131-027	TRIMLOK, 1/8" I.D. x 3/8" x 105" LG	1
17	000-174-043	WASHER, #6 LOCK	2
18	000-174-015	WASHER, #10 OUTSIDE STAR	3

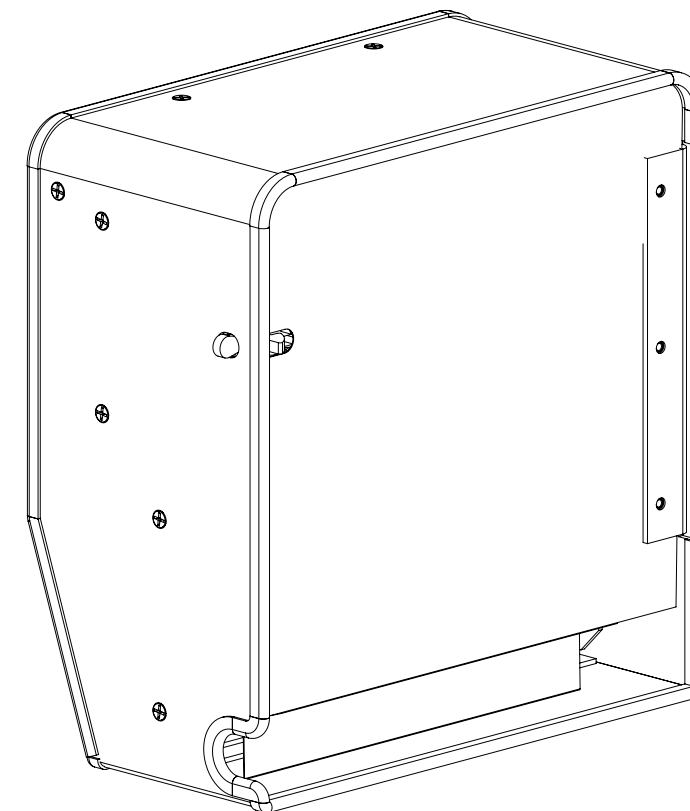
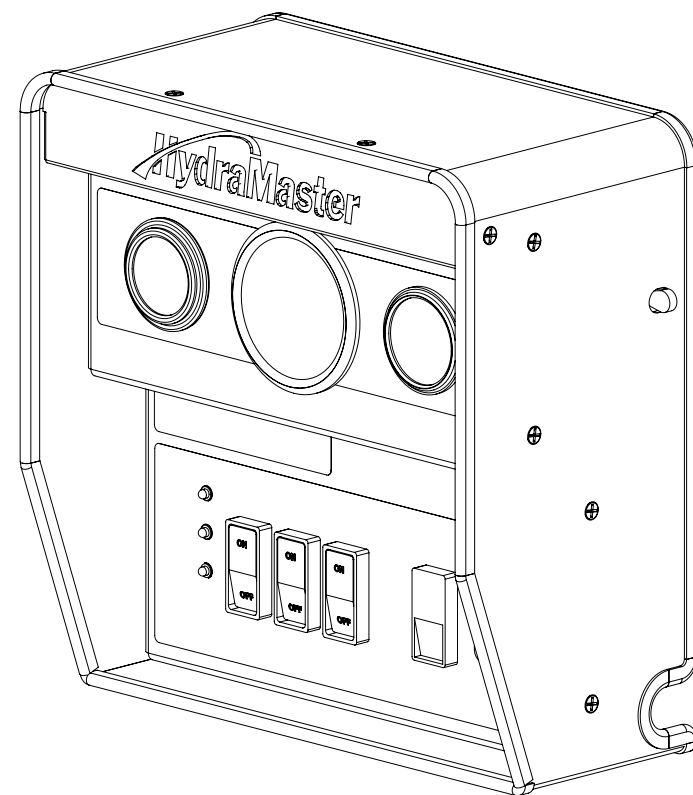
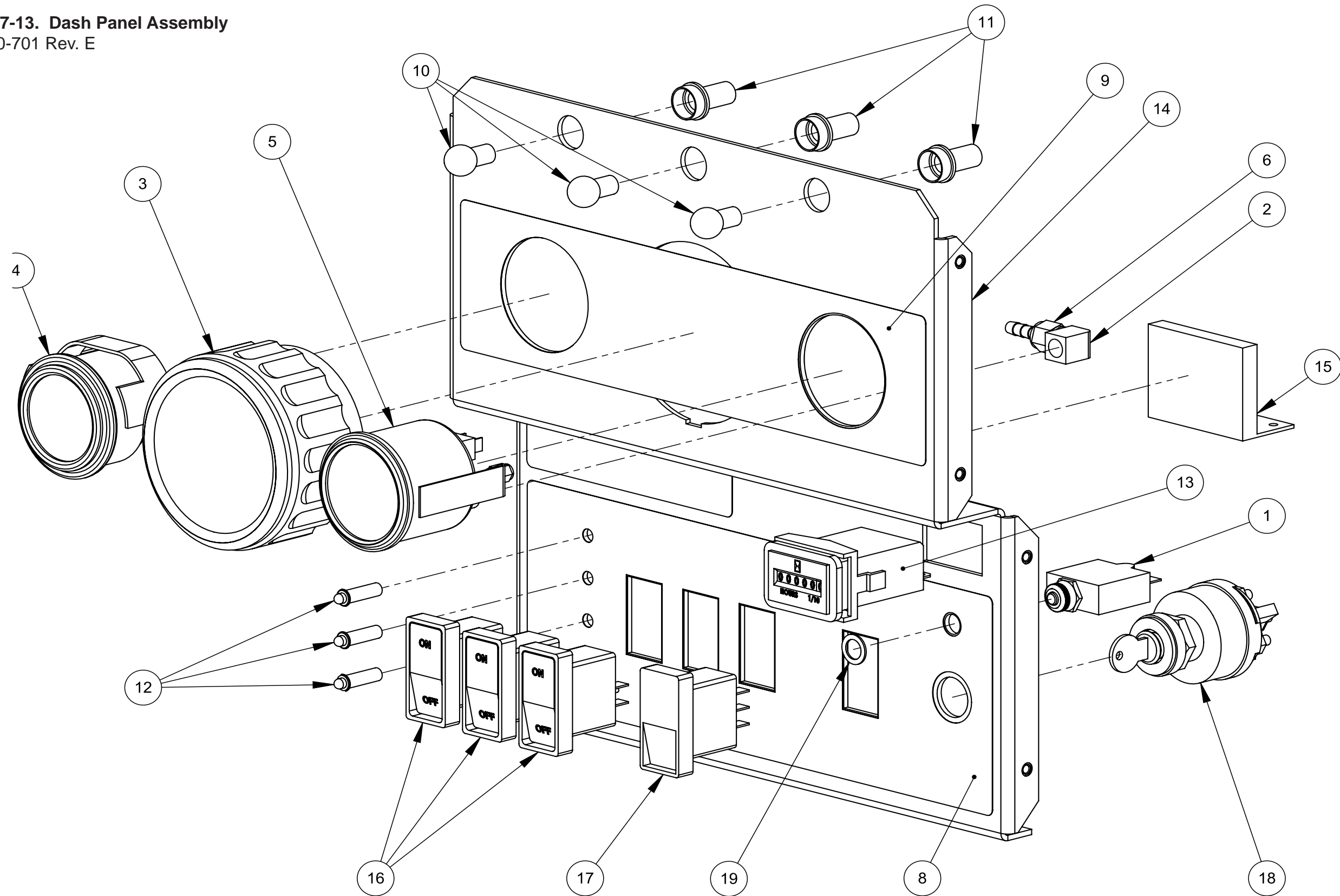


Figure 7-13. Dash Panel Assembly
601-020-701 Rev. E



Dash Panel Assembly Parts List

Item	Part Number	Description	Qty
1	000-018-004	BREAKER, 25 AMP CIRCUIT	1
2	000-052-084	ELBOW, 1/8" NPT STREET	1
3	000-074-034	GAUGE, TACH. MAG PICK UP 3-3/8" DIAL CHEV 03+	1
4	000-074-016	GAUGE, TEMPERATURE	1
5	000-074-006	GAUGE, VACUUM	1
6	000-052-096	INSERT, #F23 (1/8" FPT x 3/16" BARB)	1
7	000-081-356	LABEL, DASH NAME - CDS 4.8	1
8	000-081-353	LABEL, LOWER DASH	1
9	000-081-354	LABEL, UPPER DASH	1
10	000-084-004	LAMP, REPLACEMENT GAUGE	3

Item	Part Number	Description	Qty
11	000-084-009	LAMP, SOCKET - DASHBOARD	3
12	000-084-011	LIGHT, RED LED INDICATOR MINI	3
13	000-074-170	METER, RECTANGULAR W/O BEZEL	1
14	000-100-071	PANEL, DASH - COATED	1
15	000-157-166	RELAY, THROTTLE CONTROL DELAY	1
16	000-157-040	SWITCH, 20 AMP ROCKER	3
17	000-157-131	SWITCH, 3 WAY SPEED CONTROL	1
18	000-157-008	SWITCH, IGNITION	1
19	000-174-052	WASHER, 3/8" FLAT	1

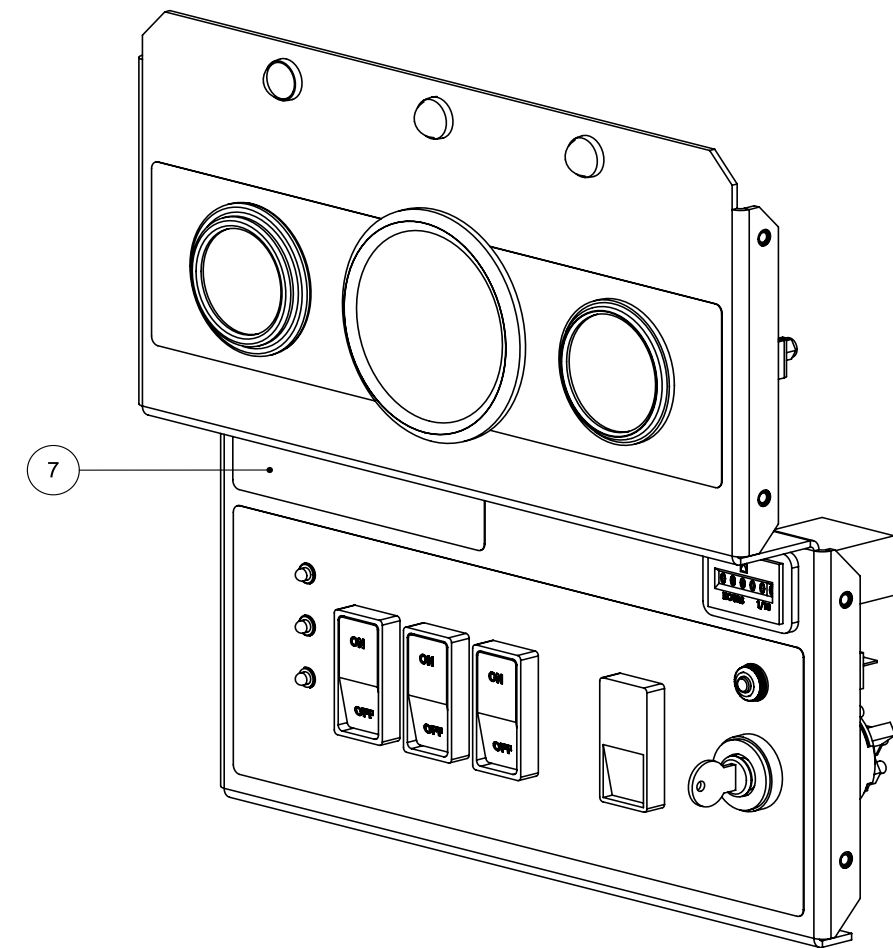
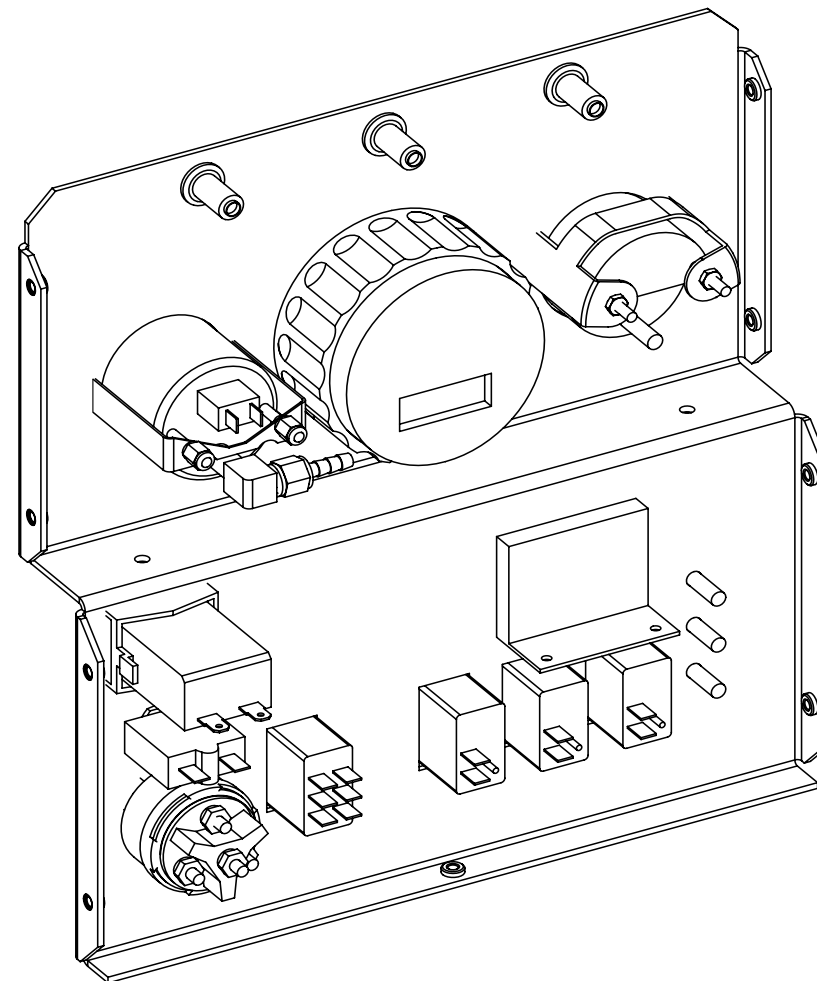
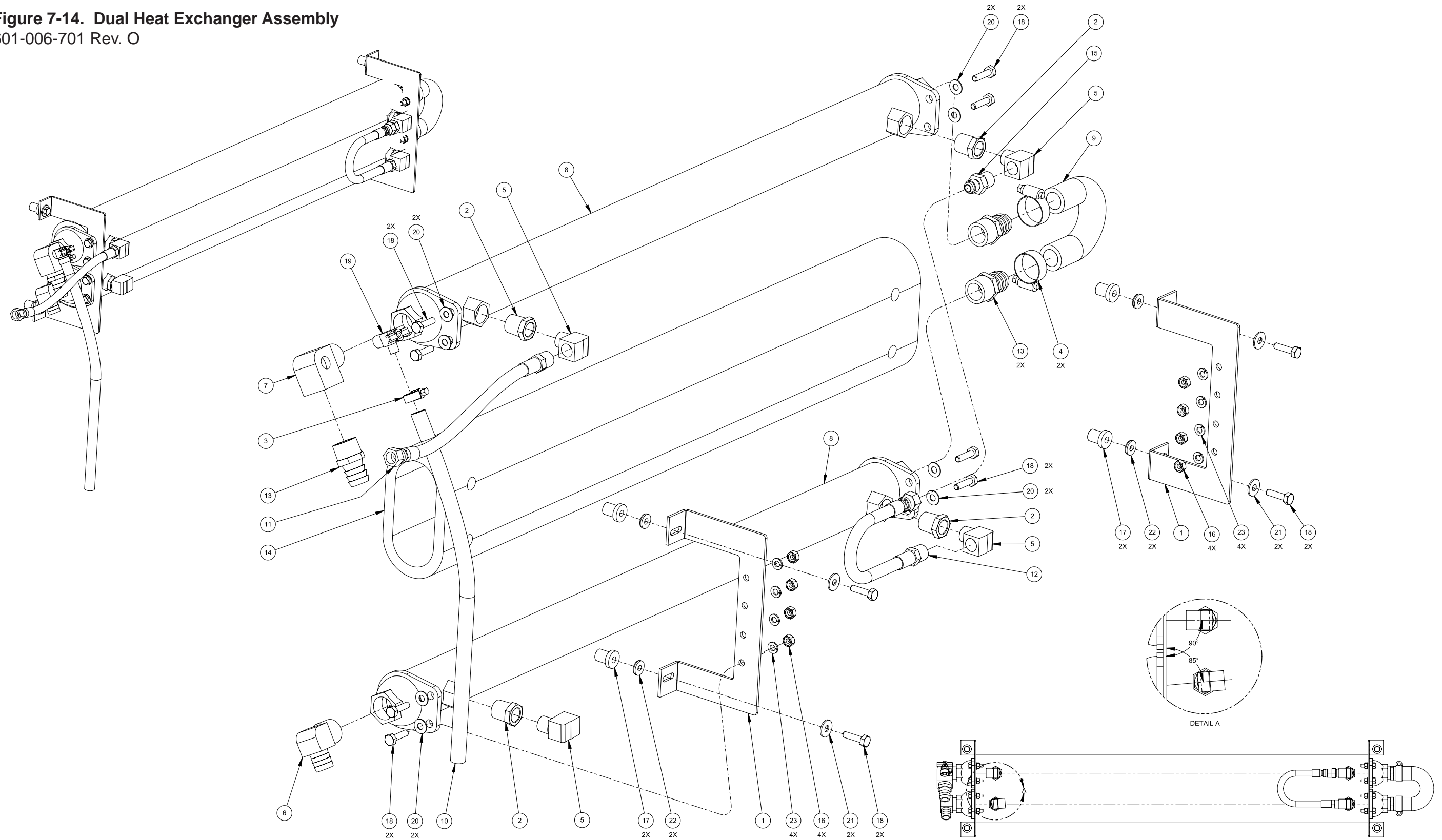


Figure 7-14. Dual Heat Exchanger Assembly
601-006-701 Rev. O



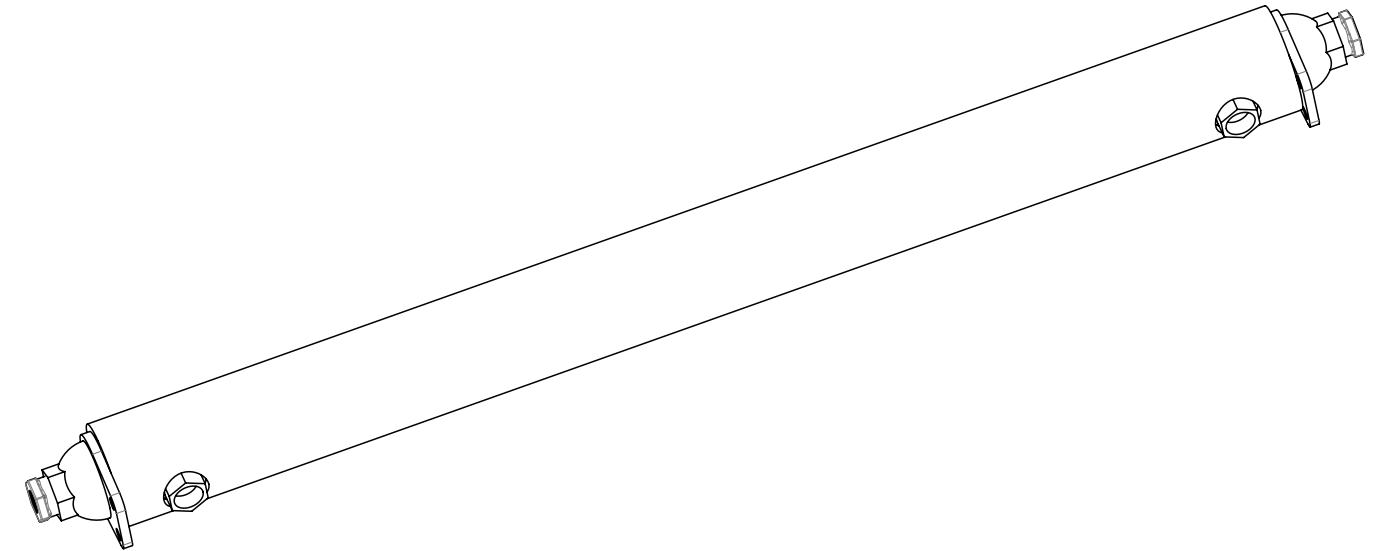
Dual Heat Exchanger Assembly Parts List

Item	Part Number	Description	Qty
1	000-015-1159	BRACKET, HEAT EXCHANGER MOUNTING - COATED	2
2	000-052-064	BUSHING, 1/2 M X 3/8 F	4
3	000-033-003	CLAMP, SIZE #4 MINI HOSE	1
4	000-033-029	CLAMP, SIZE #12 HOSE	2
5	000-052-086	ELBOW, 3/8" NPT STREET	4
6	000-052-589	ELBOW, 3/4" NPT X 3/4" BARB	1
7	000-052-733	FITTING, 3/4" NPT STREET ELBOW - MODIFIED	1
8	000-038-046	HEAT EXCHANGER, WATER TO WATER HI-PSI 2"x36" 1" NPT ENDS	2
9	000-068-066	HOSE, 3/4" I.D w/ 180~ BEND FOR HX	1
10	000-068-091	HOSE, 3/8" I.D. CLEAR - BULK	1
11	000-068-070	HOSE, 3/8" I.D. X 11" LG w/ 3/8" MPT & 3/8" JIC END	1
12	000-068-196	HOSE, 3/8" x 12" LG. TEFLON w/ JIC ENDS	1
13	000-052-602	INSERT, #1212 BRASS	3
14	000-131-042	INSULATION, 4-1/8" x 1/2"	1
15	000-052-528	NIPPLE, 3/8" M JIC x 3/8" NPT	1
16	000-094-010	NUT, 1/4"-20UNC HEX S/S	8
17	000-094-113	NUT, 1/4"-20UNC NEOPRENE WELLNUT	4
18	000-143-002	SCREW, 1/4"-20UNC x 1.00" LG. HEX HEAD	12
19	000-169-205	VALVE,PETCOCK 90 DEG	1
20	000-174-003	WASHER, 1/4" FLAT S/S	8
21	000-174-002	WASHER, 1/4" FLAT	4
22	000-174-060	WASHER, 1/4" FLAT RUBBER BACKED	4
23	000-174-019	WASHER, 1/4" LOCK	8

NOTICE

* Use P/N 000-038-015 for Product Support (see Figure 7-15).

Figure 7-15. CDS Heat Exchanger Core Assembly - Product Support
000-038-015 Rev. B



NOTICE

Order two P/N 000-038-015 when replacing original P/N 000-038-046 and P/N 000-131-042.

Figure 7-16. Instrument Panel Assembly - View 1 of 2
601-019-701 Rev. G

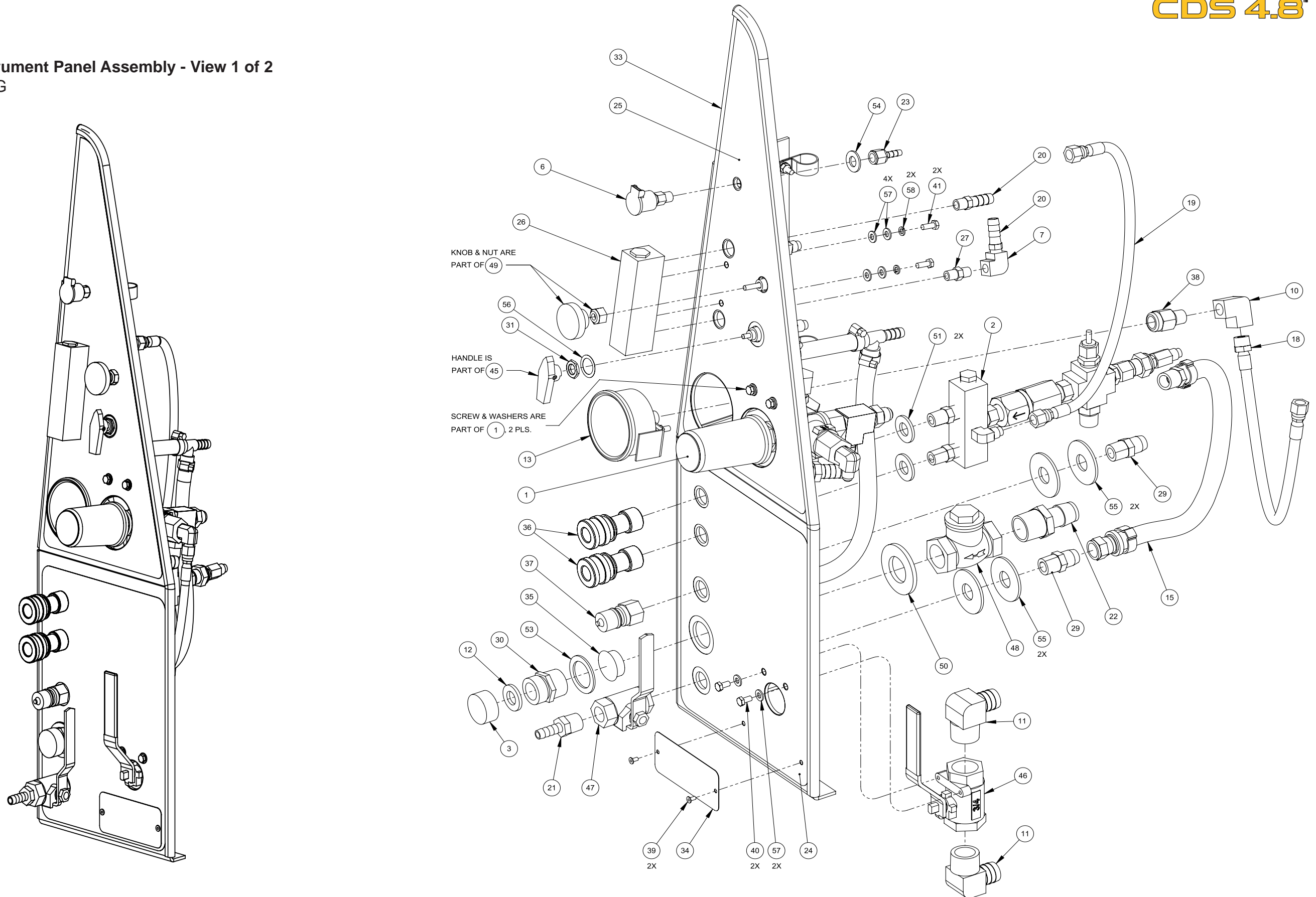


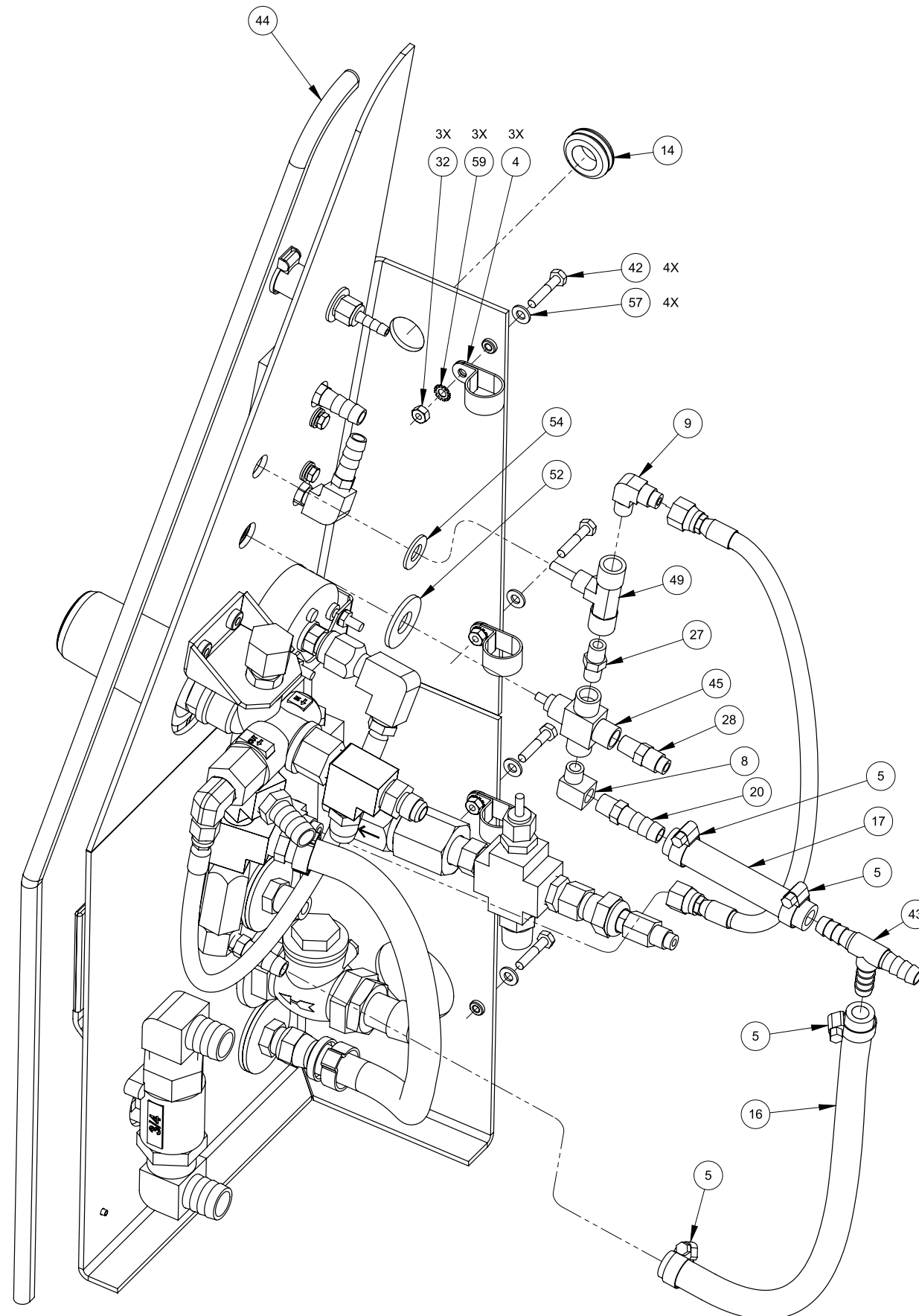
Figure 7-17. Instrument Panel Assembly - View 2 of 2
601-019-701 Rev. G

NOTICE

Apply hydraulic sealant to all pipe threads.

All these items - 3, 12, 22, 30, 48 and 50 - replace item 35 when the APO, P/N 000-079-097, is installed.

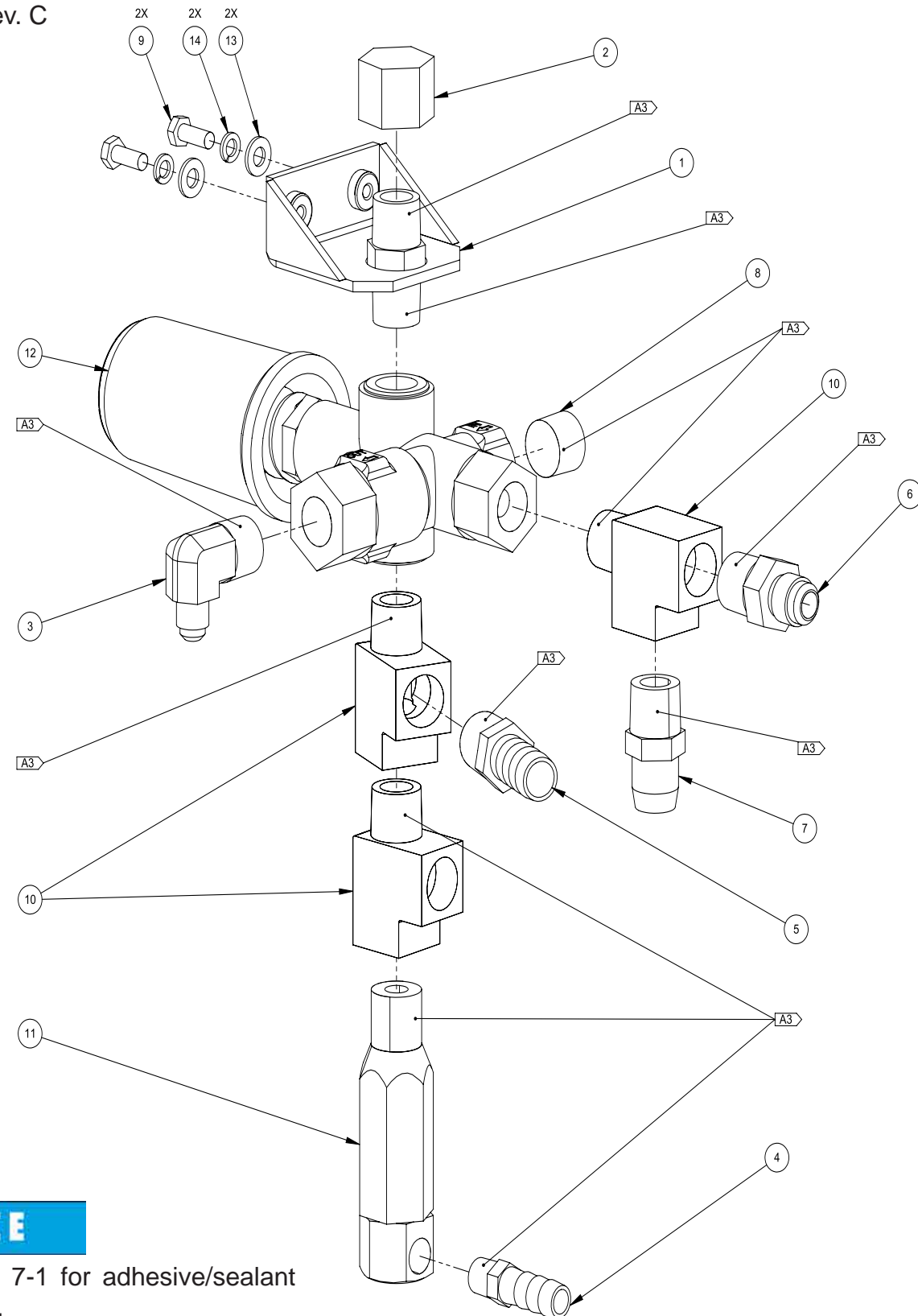
Items 24 and 25 are part of label set P/N 000-081-252.



Instrument Panel Assembly Parts List

Item	Part Number	Description	Qty	Item	Part Number	Description	Qty
1	601-009-701	Assembly, By-Pass Valve	1	31	000-094-098	Nut, 7/16"-24UNF - 2 Way Metering Valve	1
2	601-008-701	Assembly, Hi-PSI Manifold	1	32	000-094-004	Nut, #10-24UNC Hex	3
3	000-027-014	Cap, Garden Hose	1	33	000-100-168	Panel, Instrument - Coated	1
4	000-033-023	Clamp, 3/4" Nylon Hose	3	34	000-105-012	Plate, Machine Serial I.D.	1
5	000-033-005	Clamp, Size #5 Hose	4	35	000-106-029	Plug, 1" Hole	1
6	000-052-272	Cup, Gravity Feed Oil Blower Lube Port	1	36	000-052-051	Quick Connect, 440 Female w/ EPDM O-Ring	2
7	000-052-089	Elbow, 1/8" NPT Female	1	37	000-052-052	Quick Connect, 660 3/8" Brass w/ EPDM O-Ring	1
8	000-052-084	Elbow, 1/8" NPT Street	1	38	000-135-052	Regulator, Hi-PSI Snubber	1
9	000-052-531	Elbow, 1/8" NPT X 1/4" SAE	1	39	000-140-015	Rivet, 1/8" X 1/4" Lg. Pop	2
10	000-052-088	Elbow, 1/4" FPT X FPT	1	40	000-143-166	Screw, #10-24UNC X 0.375" Lg. Hex Head	2
11	000-052-589	Elbow, 3/4" NPT X 3/4" Barb	2	41	000-143-327	Screw, #10-32UNF X 0.50" Lg. Hex Head	2
12	000-057-055	Gasket, Garden Hose	1	42	000-143-134	Screw, #10-24UNC X 1" Lg. Hex Head S/S	4
13	000-074-007	Gauge, Pressure 0 -1,500 psi	1	43	000-052-022	Tee, 3/8" Insert	1
14	000-060-002	Grommet, Large Wiring	1	44	000-131-027	Trimlok, 1/8" X 3/16" Lg.	1
15	000-068-757	Hose, 1/2" X 20.5" Lg. Rubber w/ 3/8" NPT X 3/8" S	1	45	000-169-017	Valve, 3-Way Ball O-Ring Style	1
16	000-068-017	Hose, 3/8" Bulk	1	46	000-169-201	Valve, 3/4" Heater Panel Mount	1
17	000-068-017	Hose, 3/8" Bulk	1	47	000-169-064	Valve, 3/8" NPT Full Port Ball	1
18	000-068-491	Hose, 3/16" X 10" Lg. Teflon 1/4" NPT X 1/4" JIC F	1	48	000-169-009	Valve, 3/4" FPT Swing Check	1
19	000-068-518	Hose, 3/16" X 18.25" Lg. Teflon w/F JIC Ends	1	49	000-169-160	Valve, Chemical Metering	1
20	000-052-099	Insert, #26 (1/8" NPT X 3/8" Barb)	3	50	000-174-050	Washer, 1" Flat	1
21	000-052-104	Insert, #66 (3/8" NPT X 3/8" Barb)	1	51	000-174-012	Washer, 1/2 SAE H/D	2
22	000-052-338	Insert, #1212 (3/4" NPT X 3/4" Barb)	1	52	000-174-007	Washer, 1/2" Flat	1
23	000-052-096	Insert, #F23 (1/8" FPT X 3/16" Barb)	1	53	000-174-063	Washer, 1.5" O.D. X 1.073" I.D. X 0.075" Thk.	1
24	000-081-376	Label, Lower Instrument Panel	1	54	000-174-005	Washer, 3/8" Flat	2
25	000-081-375	Label, Upper Instrument Panel	1	55	000-174-008	Washer, 5/8" Flat	4
26	000-074-030	Meter, Chemical Flow Raw	1	56	000-174-030	Washer, 5/8" I.D. X 7/8" Od X 0.010" Thk	1
27	000-052-069	Nipple, 1/8" NPT Hex	2	57	000-174-001	Washer, #10 Flat	10
28	000-052-530	Nipple, 1/4" SAE X 1/8" NPT	1	58	000-174-014	Washer, #10 Lock	2
29	000-052-128	Nipple, 3/8" MPT X 3/8" SAE Flare	2	59	000-174-015	Washer, #10 Outside Star	3
30	000-052-281	Nipple, 3/4" NPT X 3/4" Male Garden Hose	1				

Figure 7-18. By-Pass Valve Assembly
601-009-701 Rev. C

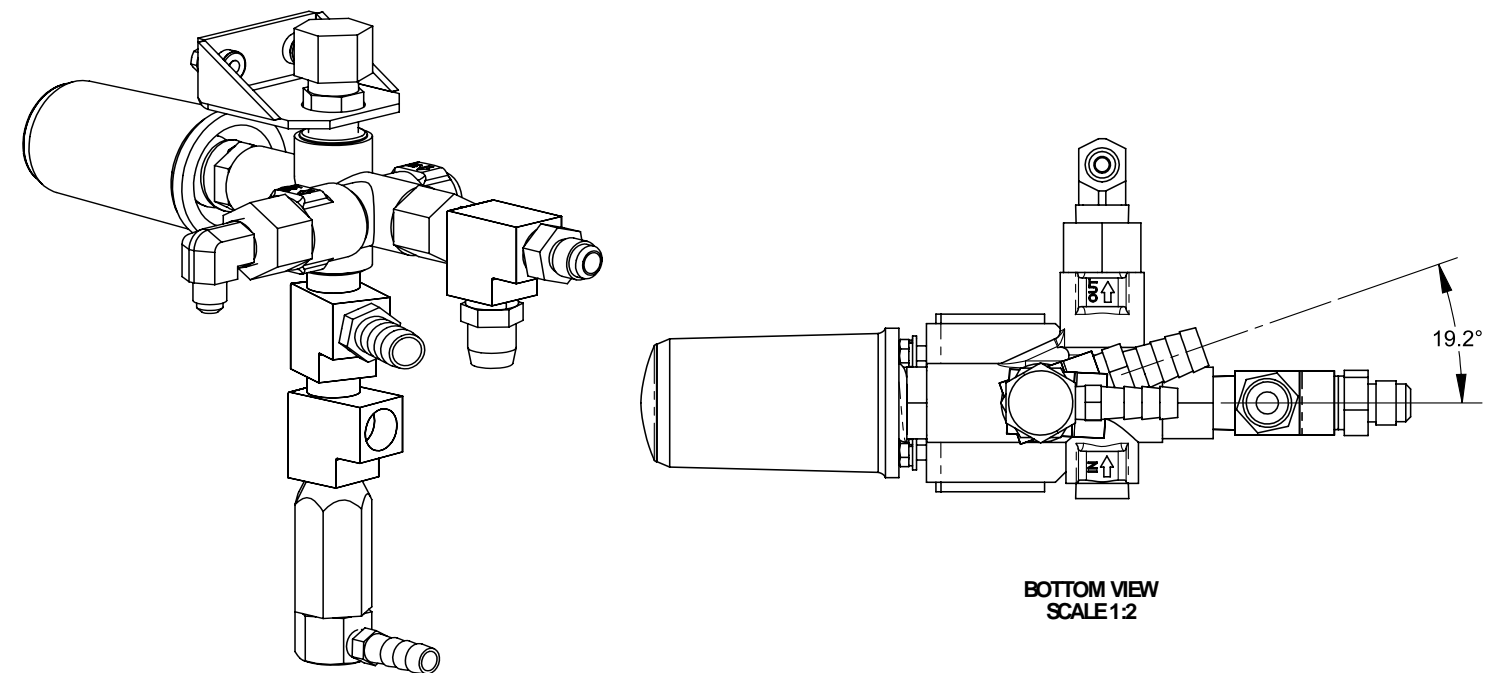


By-Pass Valve Assembly Parts List

Item	Part Number	Description	Qty
1	000-015-515	Bracket, By-Pass Valve Mount - Weldment	1
2	000-027-008	Cap, 3/8" Brass Pipe	1
3	000-052-764	Elbow, 1/4" SAE X 3/8" MPT X 90 Degree	1
4	000-052-099	Insert, #26 (1/8" NPT X 3/8" Barb)	1
5	000-052-105	Insert, #68 (3/8" NPT X 1/2" Barb)	1
6	000-052-528	Nipple, 3/8" M JIC X 3/8" NPT	1
7	000-052-128	Nipple, 3/8" MPT X 3/8" SAE Flare	1
8	000-106-008	Plug, 3/8" NPT Allen Head	1
9	000-143-126	Screw, #10-24UNC X 0.50" Lg. Hex Head	2
10	000-052-023	Tee, 3/8" NPT Male Street	3
11	000-169-027	Valve, 165 Degrees F Thermal	1
12	000-169-351	Valve, Pressure Regulator-Modified *	1
13	000-174-014	Washer, #10 Lock	2

NOTICE

* Order P/N 000-078-582 for the valve repair kit.

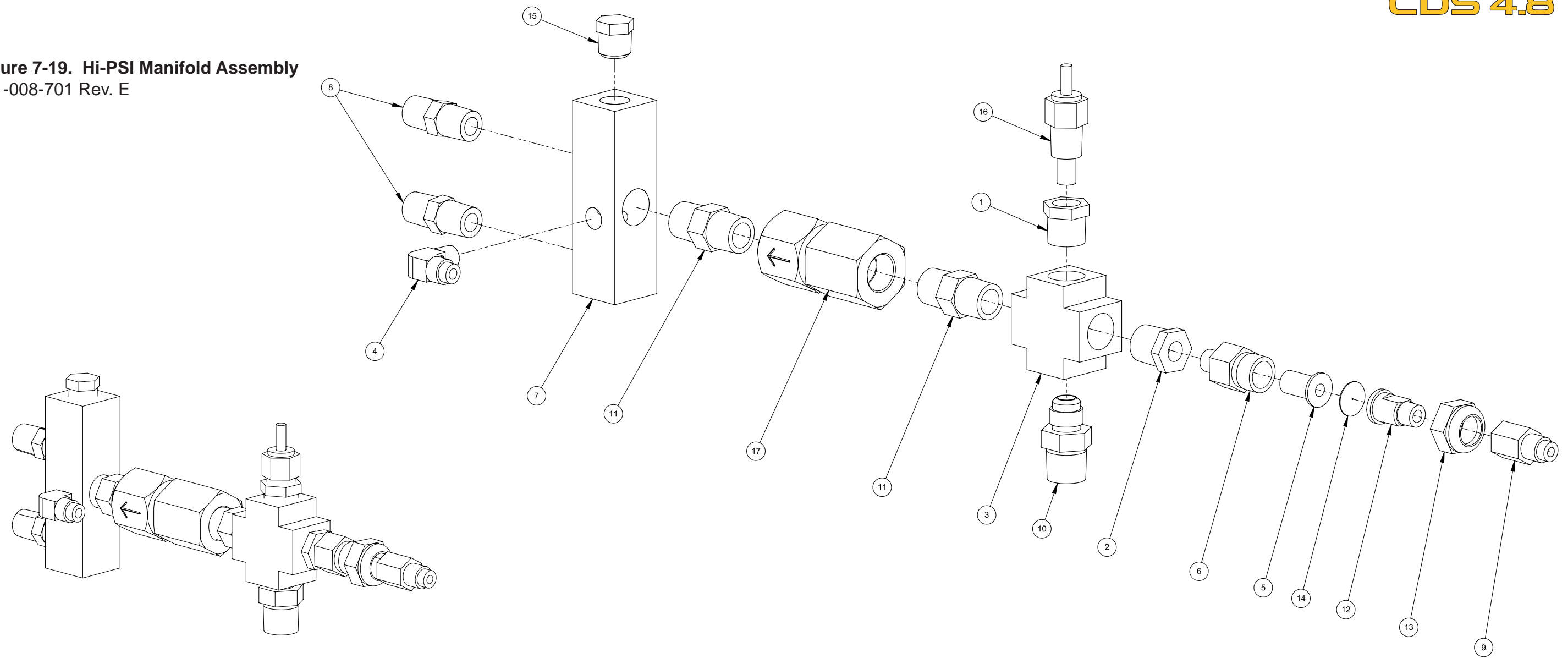


BOTTOM VIEW
SCALE 1:2

NOTICE

See Figure 7-1 for adhesive/sealant information.

Figure 7-19. Hi-PSI Manifold Assembly
601-008-701 Rev. E

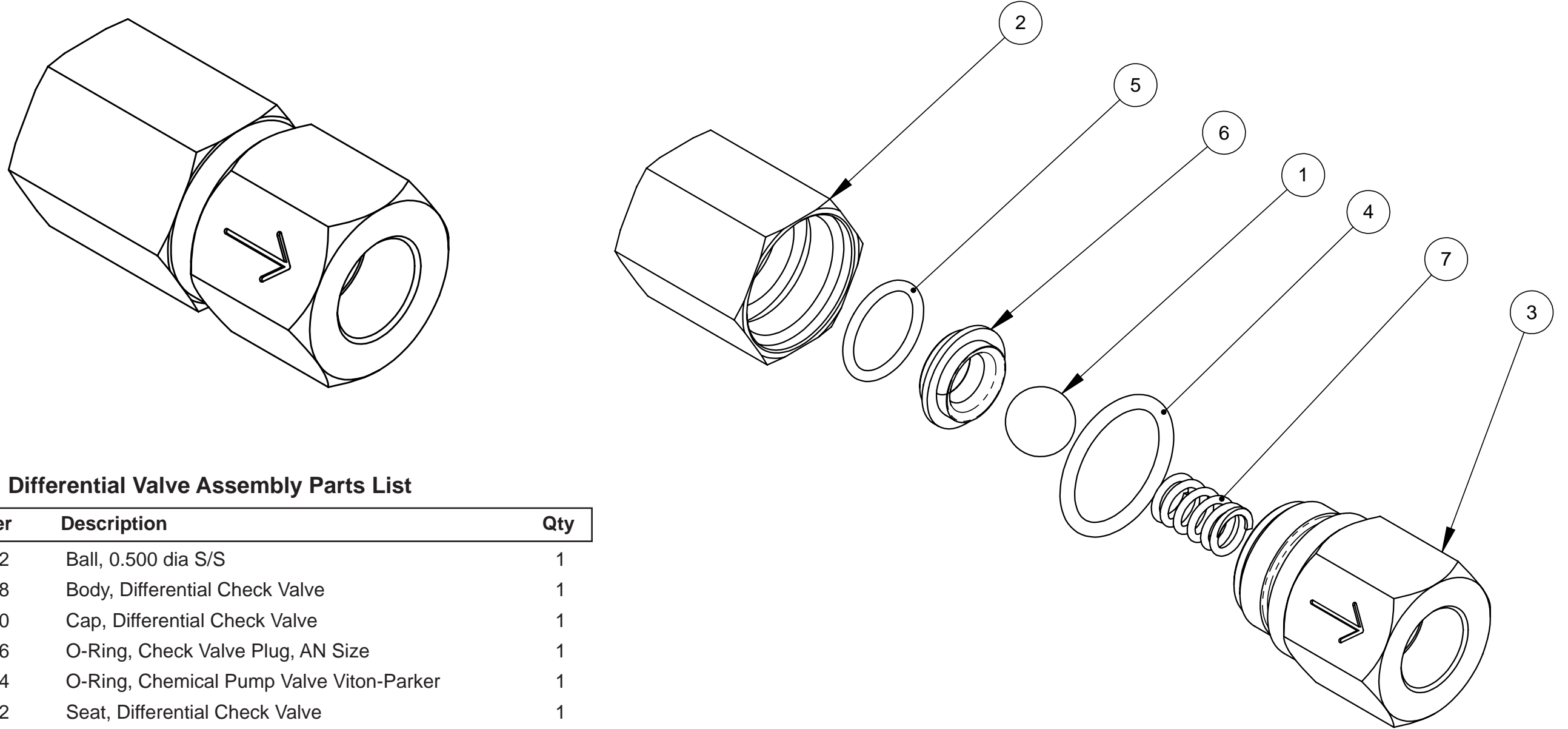


Hi-PSI Manifold Assembly Parts List

Item	Part Number	Description	Qty
1	000-052-061	Bushing, 3/8" NPT X 1/4" FPT	1
2	000-052-060	Bushing, 3/8" NPT X 1/8" FPT	1
3	000-052-113	Cross, 3/8" FPT	1
4	000-052-531	Elbow, 1/8" NPT X 1/4" SAE	1
5	000-049-052	Filter Cartridge, 1/4" Brass	1
6	000-052-153	Housing, Stabilizer Nozzle	1
7	000-090-008	Manifold, High Pressure	1
8	000-052-071	Nipple, 1/4" NPT Hex	2
9	000-052-586	Nipple, 1/8" FPT X 1/4" SAE	1

Item	Part Number	Description	Qty
10	000-052-528	Nipple, 3/8" M JIC X 3/8" NPT	1
11	000-052-074	Nipple, 3/8" NPT Hex	2
12	000-052-582	Nipple, Tee Jet Style Collar X 1/8" NPT	1
13	000-094-028	Nut, Brass Jet Assembly	1
14	000-180-009	Orifice, 0.027" Plate	1
15	000-106-002	Plug, 1/4" NPT Hex	1
16	000-149-039	Sender, Temperature	1
17	000-169-236	Valve, Differential	1

Figure 7-20. Differential Valve Assembly
000-169-236 Rev. B



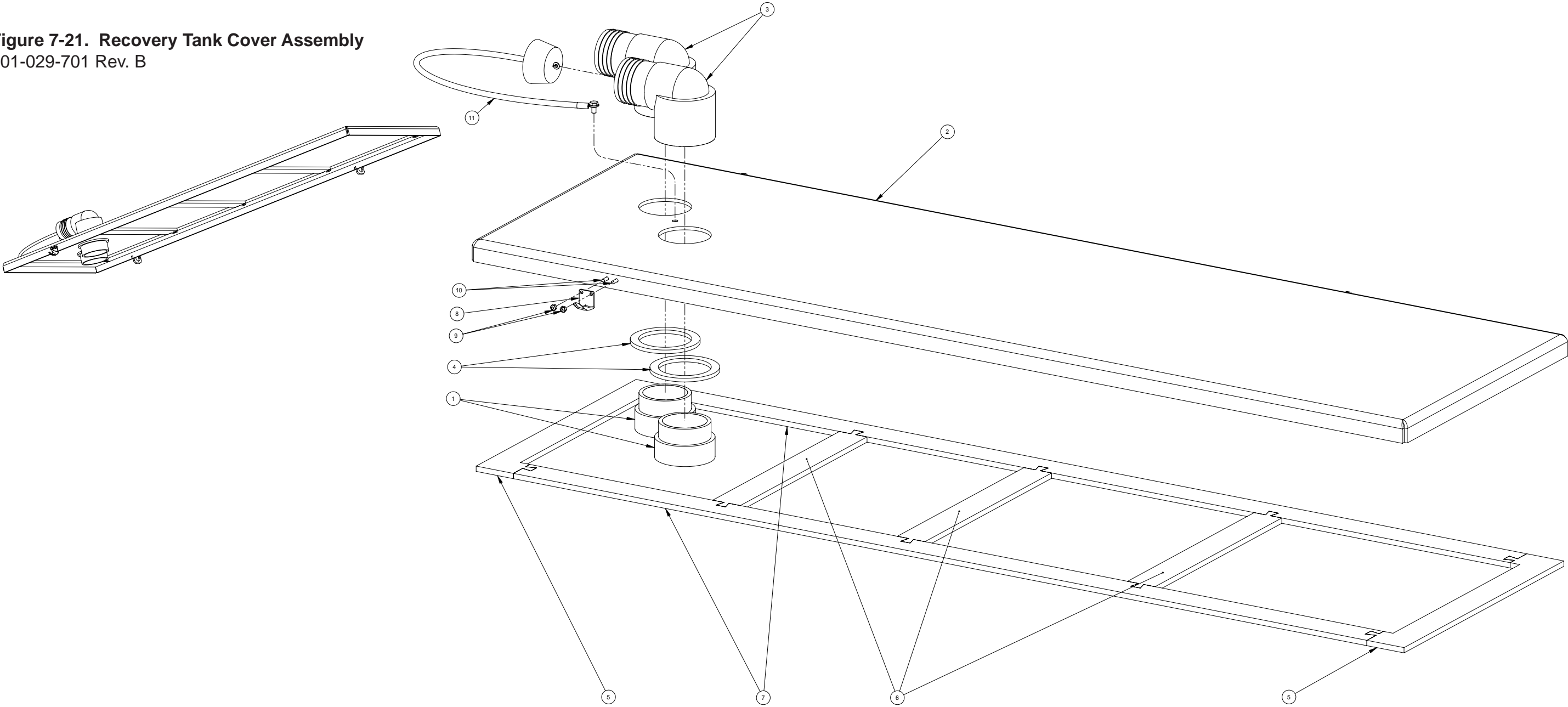
Differential Valve Assembly Parts List

Item	Part Number	Description	Qty
1	000-005-012	Ball, 0.500 dia S/S	1
2	000-107-258	Body, Differential Check Valve	1
3	000-106-180	Cap, Differential Check Valve	1
4	000-097-056	O-Ring, Check Valve Plug, AN Size	1
5	000-097-054	O-Ring, Chemical Pump Valve Viton-Parker	1
6	000-148-012	Seat, Differential Check Valve	1
7	000-155-106	Spring, Differential Check Valve	1

NOTICE

Apply O-ring grease or equivalent to items 5 and 4 prior to installation.

Figure 7-21. Recovery Tank Cover Assembly
601-029-701 Rev. B

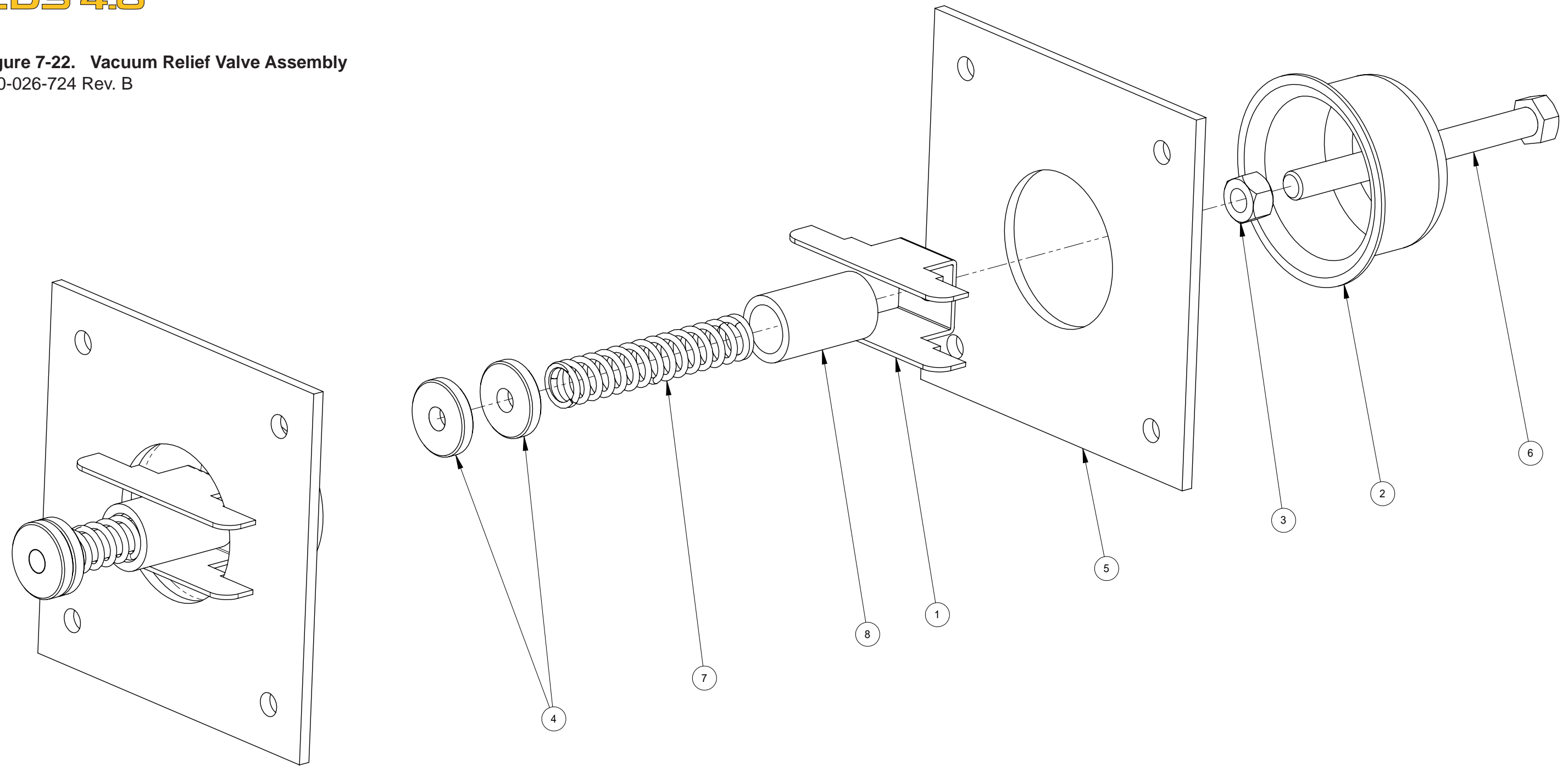


Recovery Tank Cover Assembly Parts List

Item	Part Number	Description	Qty
1	000-052-219	Adapter, 2" NPT X 2" F Slip	2
2	000-041-447	Cover, 100 Gal. Universal Recovery Tank - Coated	1
3	000-052-222	Elbow, 2" Barb X 2" FPT	2
4	000-057-015	Gasket, 1-1/2" Bulkhead Fitting	2
5	000-057-202	Gasket, End - Rec. Tank Cover	2
6	000-057-203	Gasket, Middle - Rec. Tank Cover	3

Item	Part Number	Description	Qty
7	000-057-205	Gasket, Side - Rec. Tank Cover	2
8	000-086-008	Latch, Bungee - Strike (Part of Tank Assembly)	1
9	000-094-063	Nut, #6-32UNC Nylock	2
10	000-143-539	Screw, #6-32UNC X 0.50" Lg. Button Head	2
11	000-078-039	Vacuum Inlet Stopper	1

Figure 7-22. Vacuum Relief Valve Assembly
610-026-724 Rev. B



Vacuum Relief Valve Assembly Parts List

Item	Part Number	Description	Qty
1	000-015-182	Bracket, Vacuum Relief Valve - Fabricated	1
2	000-027-032	Cap, Spun Vacuum Relief Valve	1
3	000-094-101	Nut, 3/8"-16UNC Hex Jam	1
4	000-094-077	Nut, 3/8"-16UNC X 1.00" O.D. Knurled	2

Item	Part Number	Description	Qty
5	000-105-332	Plate, Vacuum Relief Valve Mounting - Coated	1
6	000-143-198	Screw, 3/8"-16UNC X 4" Lg.HH	1
7	000-155-026	Spring, Vacuum Relief Valve	1
8	000-125-111	Tube, Vacuum Relief Spring Guide	1

Figure 7-23. Water Box Assembly - View 1 of 2
601-010-701 Rev. G

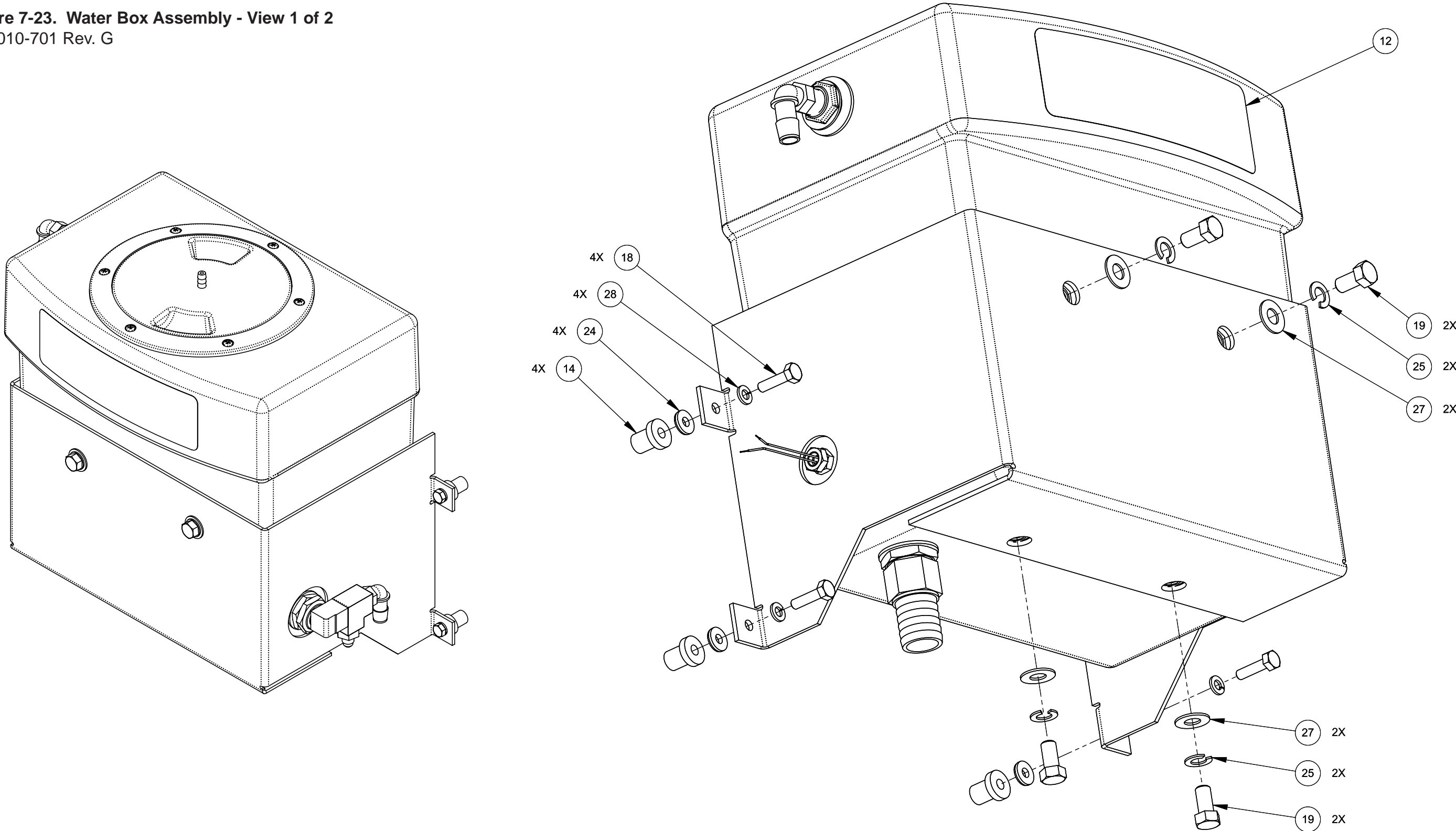
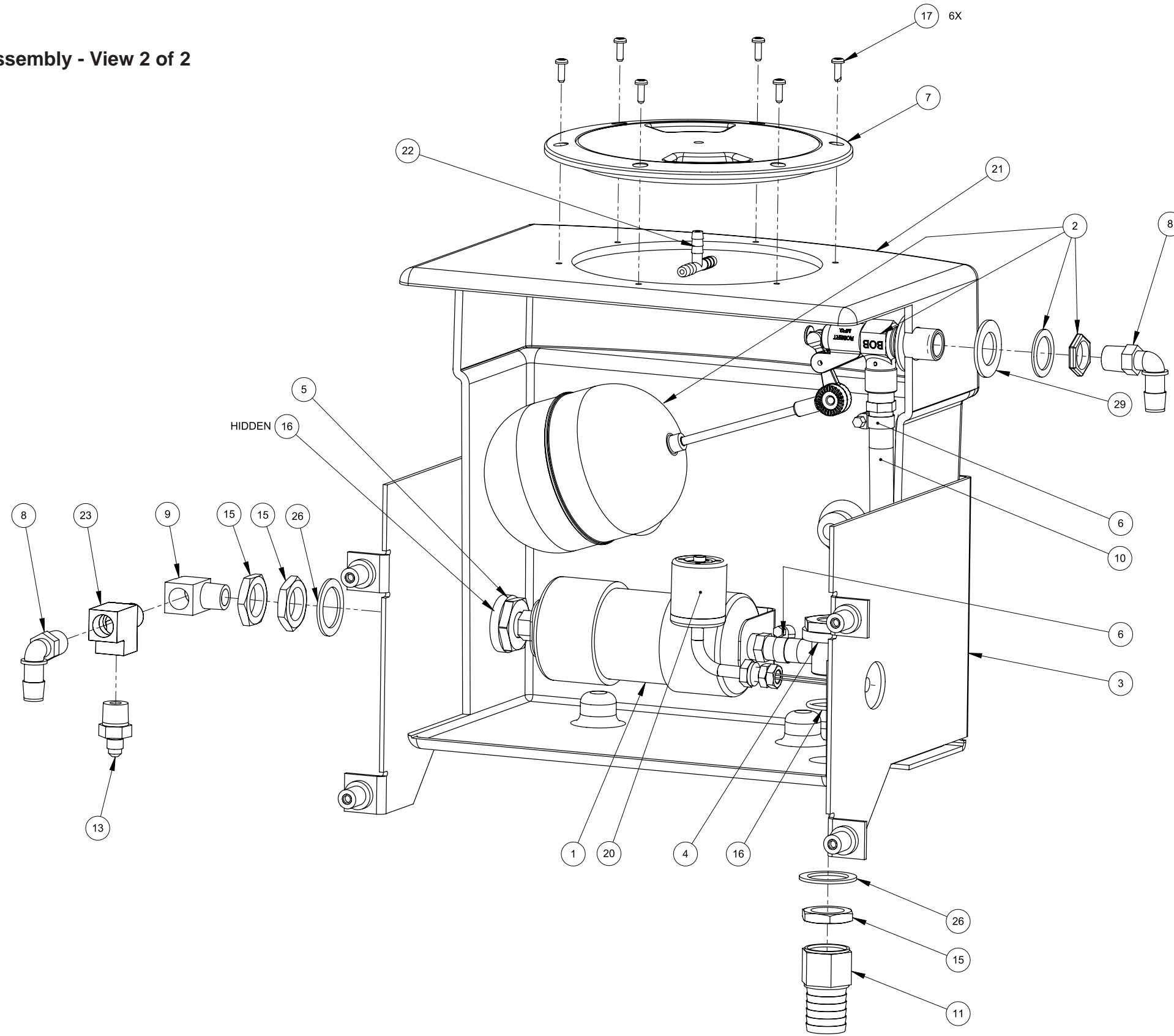


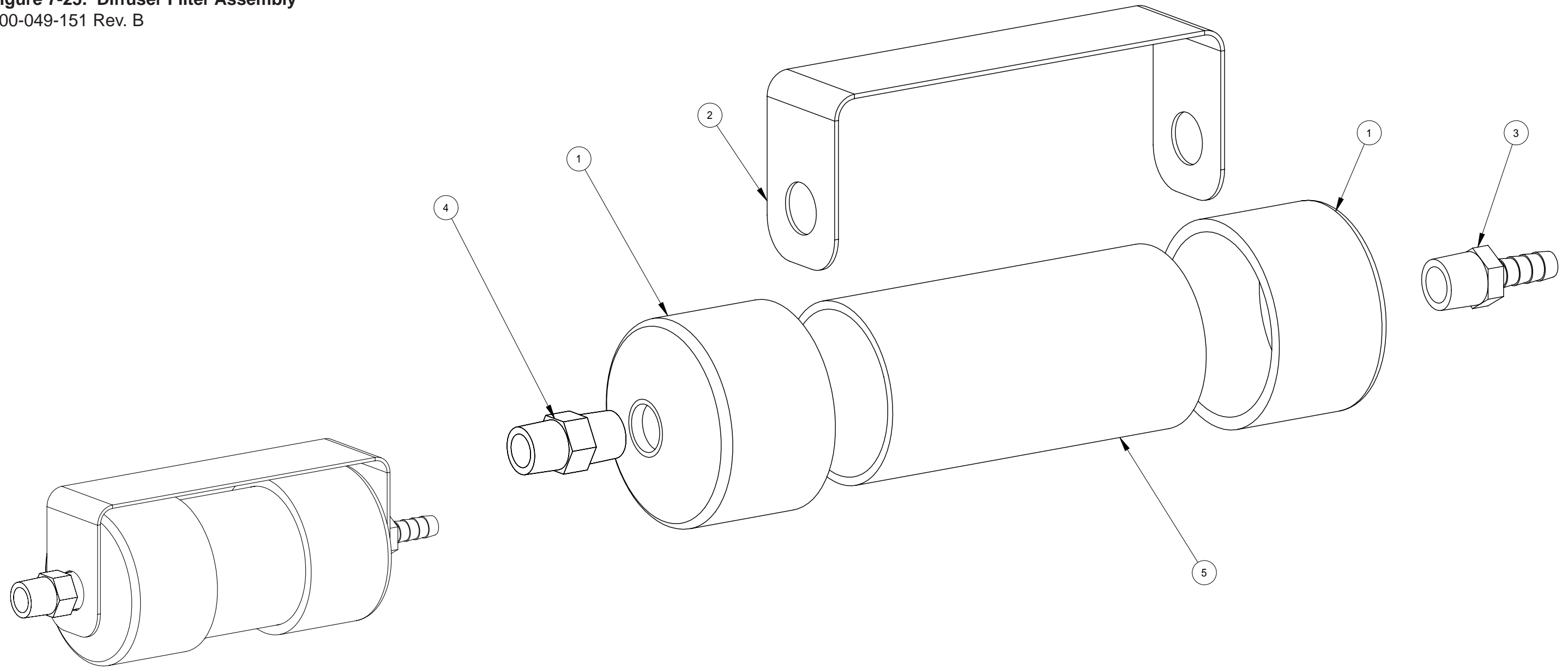
Figure 7-24. Water Box Assembly - View 2 of 2
601-010-701 Rev. G



Water Box Assembly Parts List

Item	Part Number	Description	Qty	Item	Part Number	Description	Qty
1	000-049-151	ASSEMBLY, DIFFUSER FILTER	1	16	000-097-041	O-RING, 1/2" BULK HEAD	2
2	000-169-235	ASSEMBLY, ROBERT FLOAT VALVE	1	17	000-143-314	SCREW, #8 x 1/2" LG. PAN HEAD	6
3	000-015-938	BRACKET, WATER BOX MOUNTING - COATED	1	18	000-143-002	SCREW, 1/4"-20UNC x 1.00" LG. HEX HEAD	4
4	000-052-728	BULKHEAD, 1/2" FPT	1	19	000-143-017	SCREW, 3/8"-16UNC x 0.75" LG. HEX HEAD GRD. 8	4
5	000-052-660	BULKHEAD, 3/8" FPT x 3/8" FPT	1	20	000-157-0801	SWITCH, w/PROTECTOR, POLYPROPELENE BARREL - NC	1
6	000-033-003	CLAMP, SIZE #4 MINI HOSE	2	21	000-159-107	TANK, POLY WATER BOX - MODIFIED	1
7	000-041-005	COVER, 6" ACCESS	1	22	000-052-156	TEE, 1/4" PLASTIC	1
8	000-052-355	ELBOW, 3/8" NPT x 1/2" HOSE	2	23	000-052-023	TEE, 3/8" NPT MALE STREET	1
9	000-052-086	ELBOW, 3/8" NPT STREET	1	24	000-174-060	WASHER, 1/4" FLAT RUBBER BACKED	4
10	000-068-326	HOSE, 3/8" I.D. CLEAR w/ BRAID SOLUTION	1	25	000-174-057	WASHER, 3/8" LOCK	4
11	000-052-754	INSERT, #F1216 (3/4" FPT x 1" BARB)	1	26	000-174-063	WASHER, 1.5" O.D. x 1.073" I.D. x 0.075" THK.	2
12	000-081-335	LABEL, WATER BOX	1	27	000-174-032	WASHER, 3/8" FLAT	4
13	000-052-662	NIPPLE, 3/8" NPT x 1/4" M SAE	1	28	000-174-017	WASHER, 1/4" LOCK	4
14	000-094-113	NUT, 1/4"-20UNC NEOPRENE WELLNUT	4	29	000-174-028	WASHER, 7/8" I.D. x 1.50" O.D. x 0.090" THK.	2
15	000-094-097	NUT, 1"-14UNS BRASS	3				

Figure 7-25. Diffuser Filter Assembly
000-049-151 Rev. B

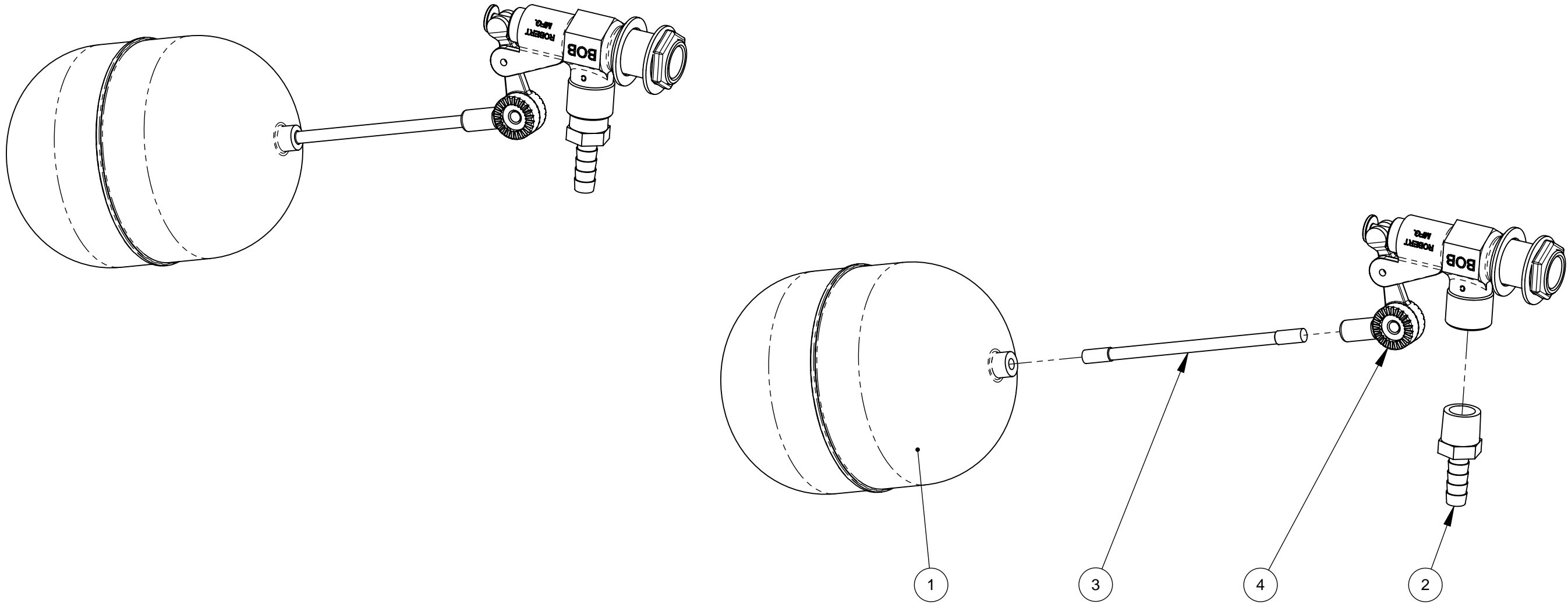


Diffuser Filter Assembly Parts List

Item	Part Number	Description	Qty
1	000-027-115	Cap, 2" PVC Modified for Diffuser	2
2	000-033-131	Clamp, Diffuser	1
3	000-052-104	Insert, #66 (3/8" NPT X 3/8" Barb)	1

Item	Part Number	Description	Qty
4	000-052-074	Nipple, 3/8" NPT Hex	1
5	000-125-222	Tube, Diffuser	1

Figure 7-26. Float Valve Assembly
000-169-235 Rev. B



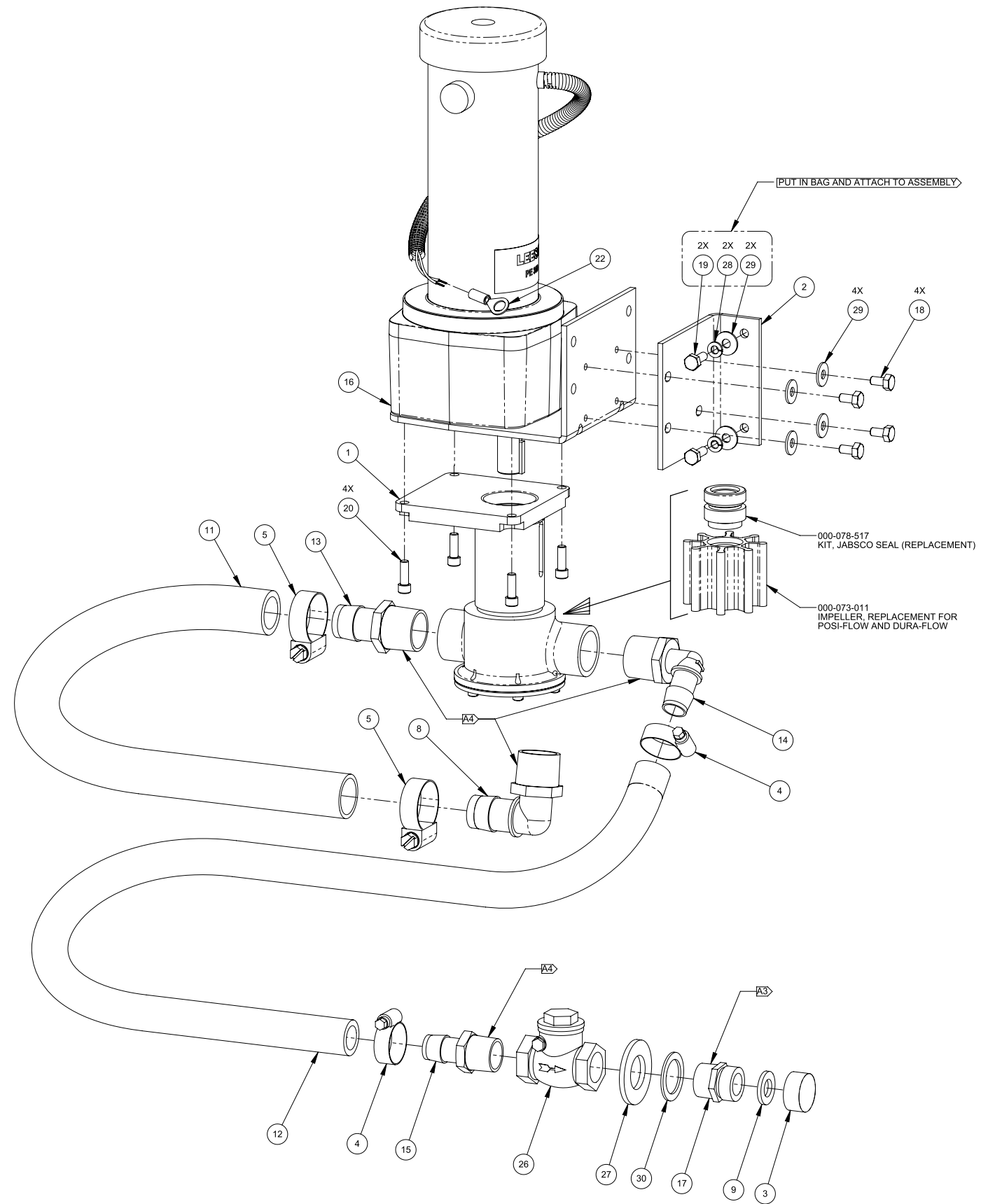
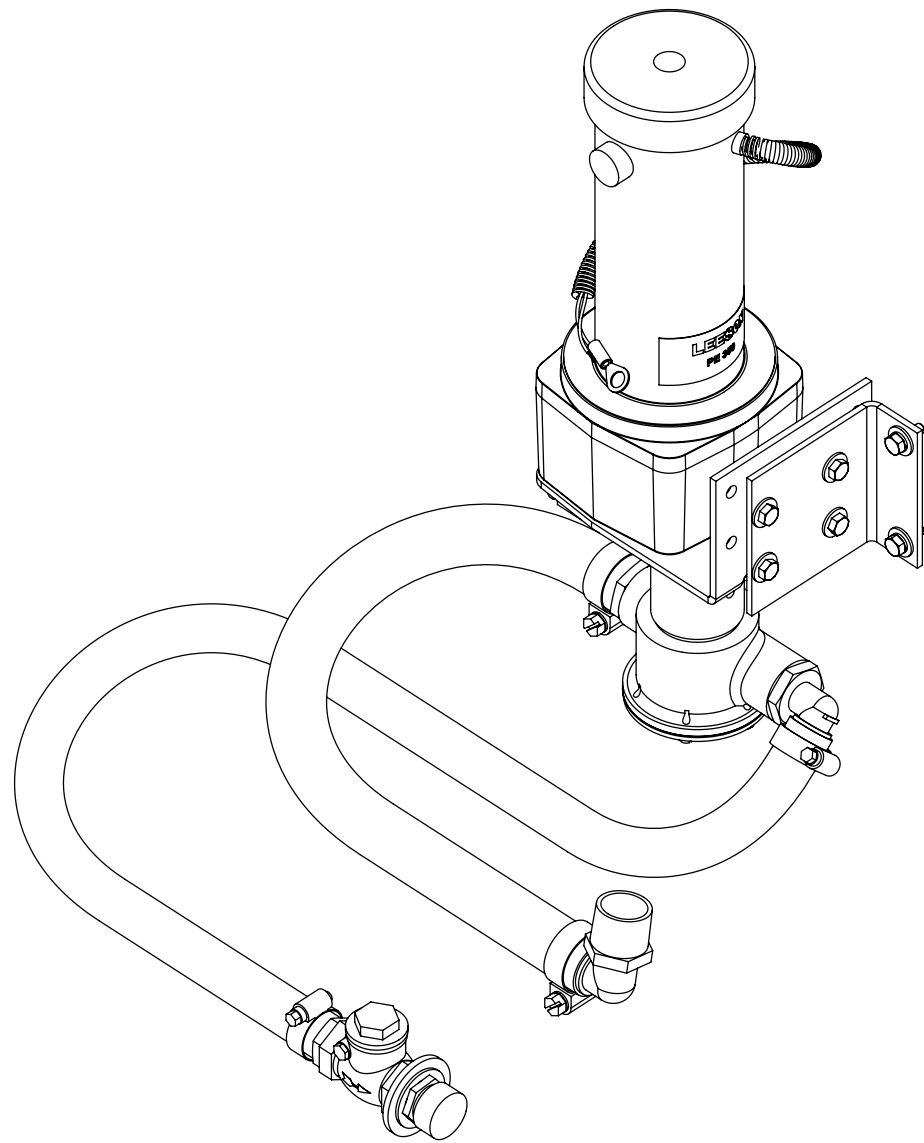
Float Valve Assembly Parts List

Item	Part Number	Description	Qty
1	000-005-013	Float, 4" X 5" Poly	1
2	000-052-104	Insert, #66 (3/8" NPT X 3/8" Barb)	1
3	000-117-031	Rod, 4.5" Valve Stem	1
4	000-169-237	Valve, Body Inlet	1

Figure 7-27. Dura-Flow Automatic Pump Out (APO) - Production Assembly
000-079-097 Rev. G

NOTICE

See Figure 7-1 for adhesive/sealant information.

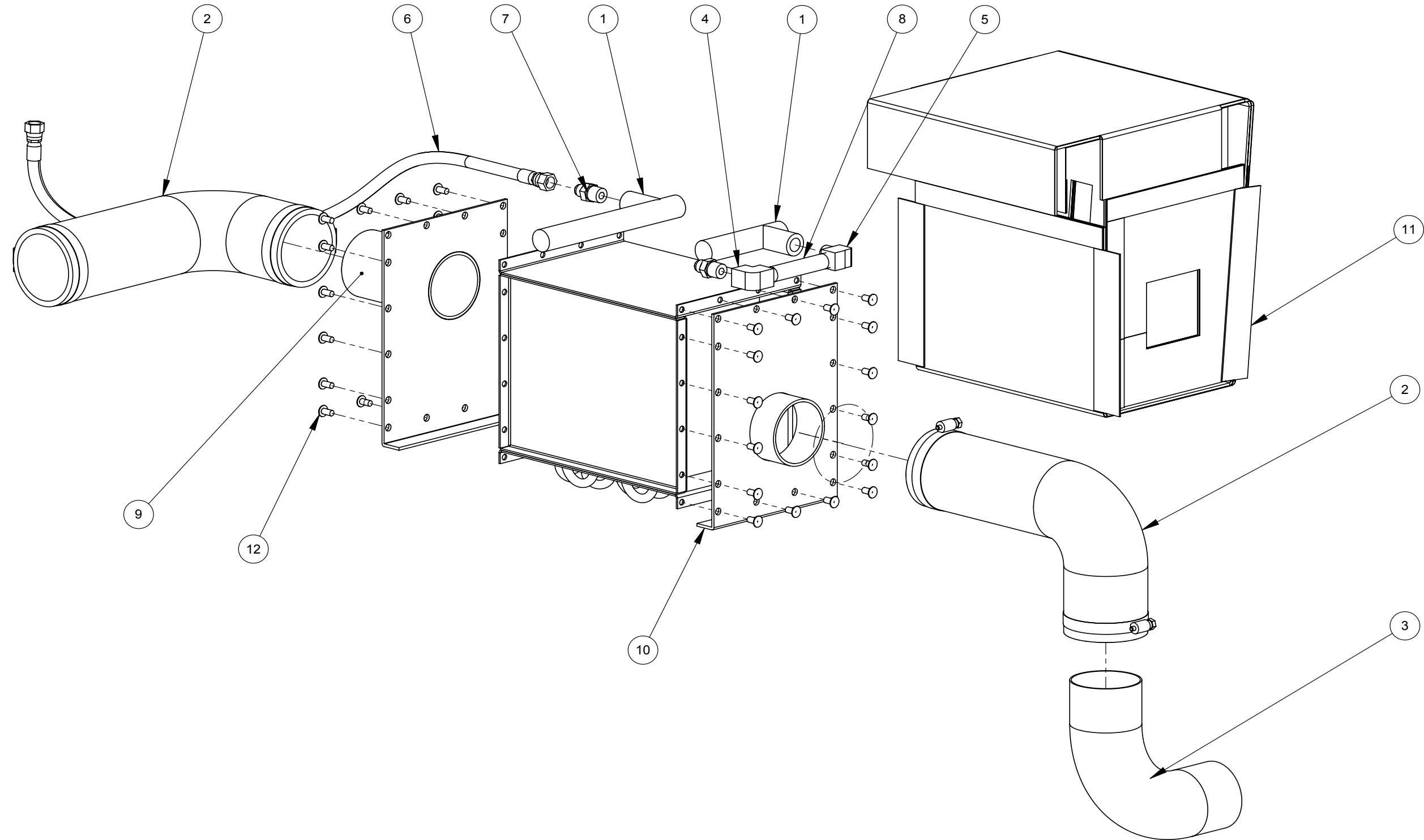


Dura-Flow Automatic Pump Out (APO) Assembly Parts List- Production

Item	Part Number	Description	Qty	Item	Part Number	Description	Qty
1	000-111-169	ASSEMBLY, APO PUMP - JABSCO	1	16	000-091-042	MOTOR, LEESON PE350 SERIES	1
2	000-015-908	BRACKET, DURAFLOW SUPPORT - FABRICATED	1	17	000-052-281	NIPPLE, 3/4" NPT x 3/4" MALE GARDEN HOSE	1
3	000-027-014	CAP, GARDEN HOSE	1	18	000-143-074	SCREW, 1/4"-20UNC x 0.50" LG. HEX	
4	000-033-029	CLAMP, SIZE #12 HOSE	2			HEAD SELF-TAPPING	4
5	000-033-020	CLAMP, SIZE #16 HOSE	2	19	000-143-001	SCREW, 1/4"-20UNC x 0.75" LG. HEX HEAD	2
6	000-037-029	CONNECTOR, BUTT 10/12	1	20	000-143-566	SCREW, 1/4"-28UNF x 0.75" LG. SOCKET HEAD	4
7	000-037-003	CONNECTOR, BUTT 14/16 BLUE	3	21	000-157-091	SWITCH, HARWIL FLOAT - MODIFIED	1
8	000-052-131	ELBOW, 1" NPT x 1" BARB (GLASS FILLED BLACK NYLON)	1	22	000-037-017	TERMINAL, 3/8 STUD, 10GA WIRE, INSULATED	1
9	000-057-055	GASKET, GARDEN HOSE	1	23	000-037-022	TERMINAL, 10 AWG FULLY INSULATED FE	1
10	000-063-021	HARNESS, 1/4 SPLIT WIRE LOOM	2'	24	000-037-023	TERMINAL, 10 AWG FULLY INSULATED MA	1
11	000-068-1028	HOSE, 1" I.D. RUBBER X 16" LG. - RED	1	25	000-162-001	TIE WRAP, 4" NYLON	6
12	000-068-1027	HOSE, 3/4" I.D. EPDM X 36" LG.	1	26	000-169-009	VALVE, 3/4" FPT SWING CHECK	1
13	000-052-758	INSERT, 1" NPT x 1" BARB	1	27	000-174-050	WASHER, 1" FLAT	1
14	000-052-757	INSERT, 1" NPT x 3/4" ELBOW	1	28	000-174-017	WASHER, 1/4" LOCK	2
15	000-052-338	INSERT, #1212 (3/4" NPT x 3/4" BARB)	1	29	000-174-002	WASHER, 1/4" FLAT	6
				30	000-174-063	WASHER, 1.5" O.D. x 1.073" I.D. x 0.075" THK.	1

Figure 7-28. Salsa Heat Exchanger Assembly (Chevy)

000-079-077 Rev. C



Salsa Heat Exchanger Parts List (Chevy)

Item	Part Number	Description	Qty
1	000-038-053	Core, Blower Heat Exchanger	1
2	000-052-674	Elbow, 3" Rubber w/Clamps	2
3	000-052-649	Elbow, 3.00" O.D. X 0.065 Wall 4.500"	1
4	000-052-142	Elbow, 3/8" F X F Brass	1
5	000-052-086	Elbow, 3/8" NPT Street	1
6	000-068-755	Hose, 3/8" X 31" Lg. w/ 3/8" JIC Ends	1
7	000-068-801	Hose, 3/8" X 37" Lg. w/ 3/8" JIC Ends	1
8	000-052-528	Nipple, 3/8" M JIC X 3/8" NPT	2
9	000-052-408	Nipple, 3/8" NPT X 4" Lg.	1
10	000-100-154	Panel, Salsa Inlet - Weldment	1
11	000-100-155	Panel, Salsa Outlet - Weldment	1
12	000-108-140	Protector, Salsa Insulation Set	1
13	000-140-021	Rivet, 1/4" Blind X 0.50" Lg.	32

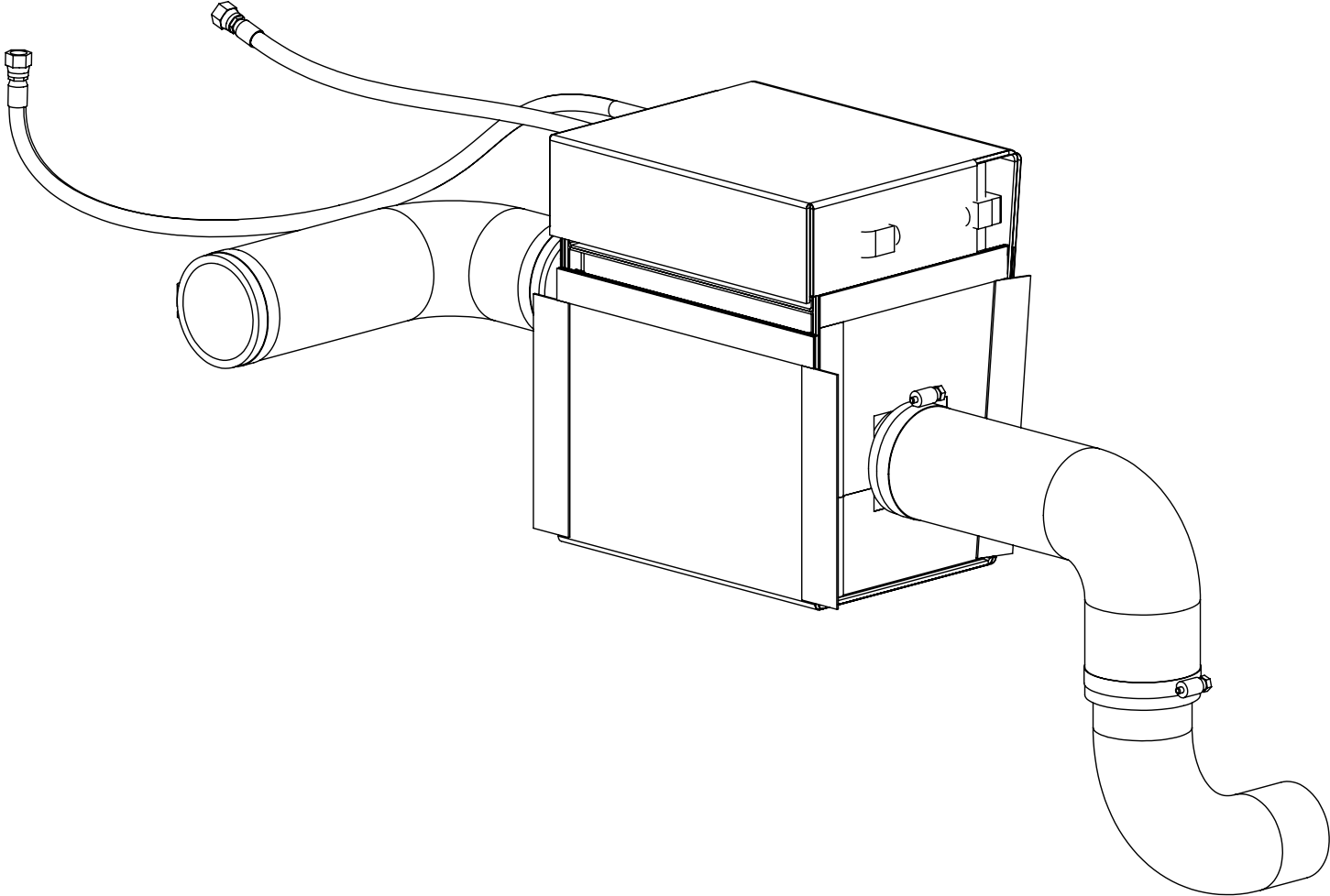
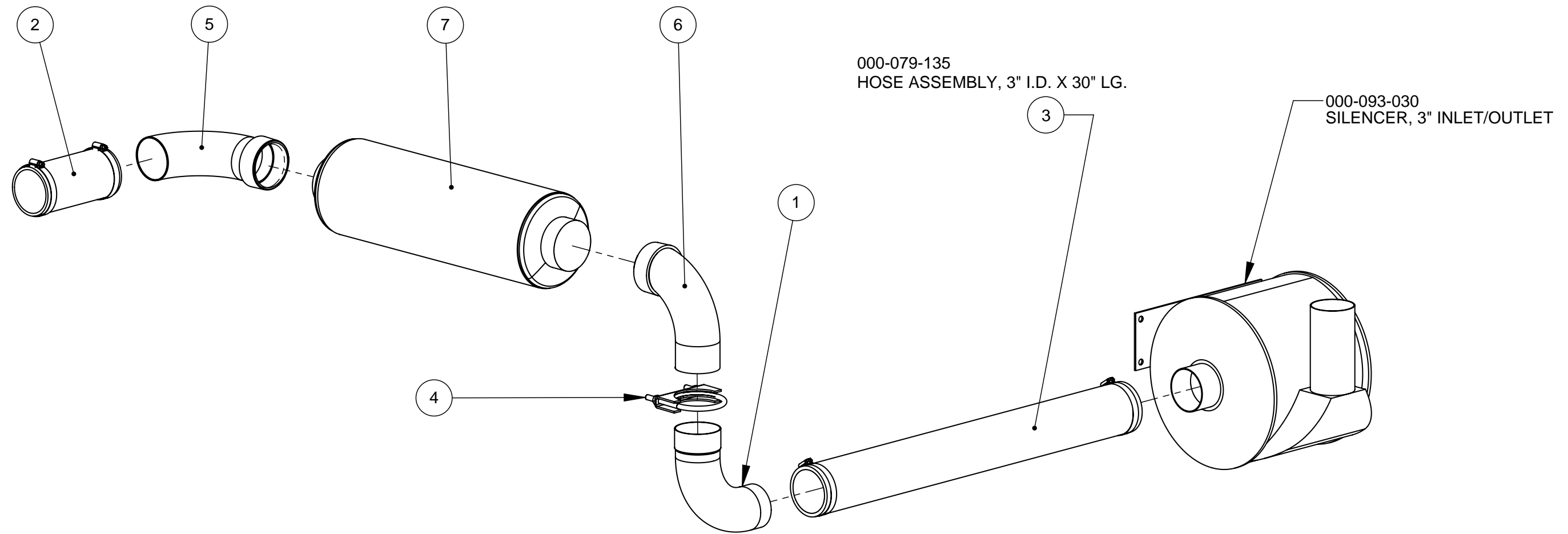


Figure 7-29. Non Salsa Heat Exchanger Assembly

000-079-135 Rev. C

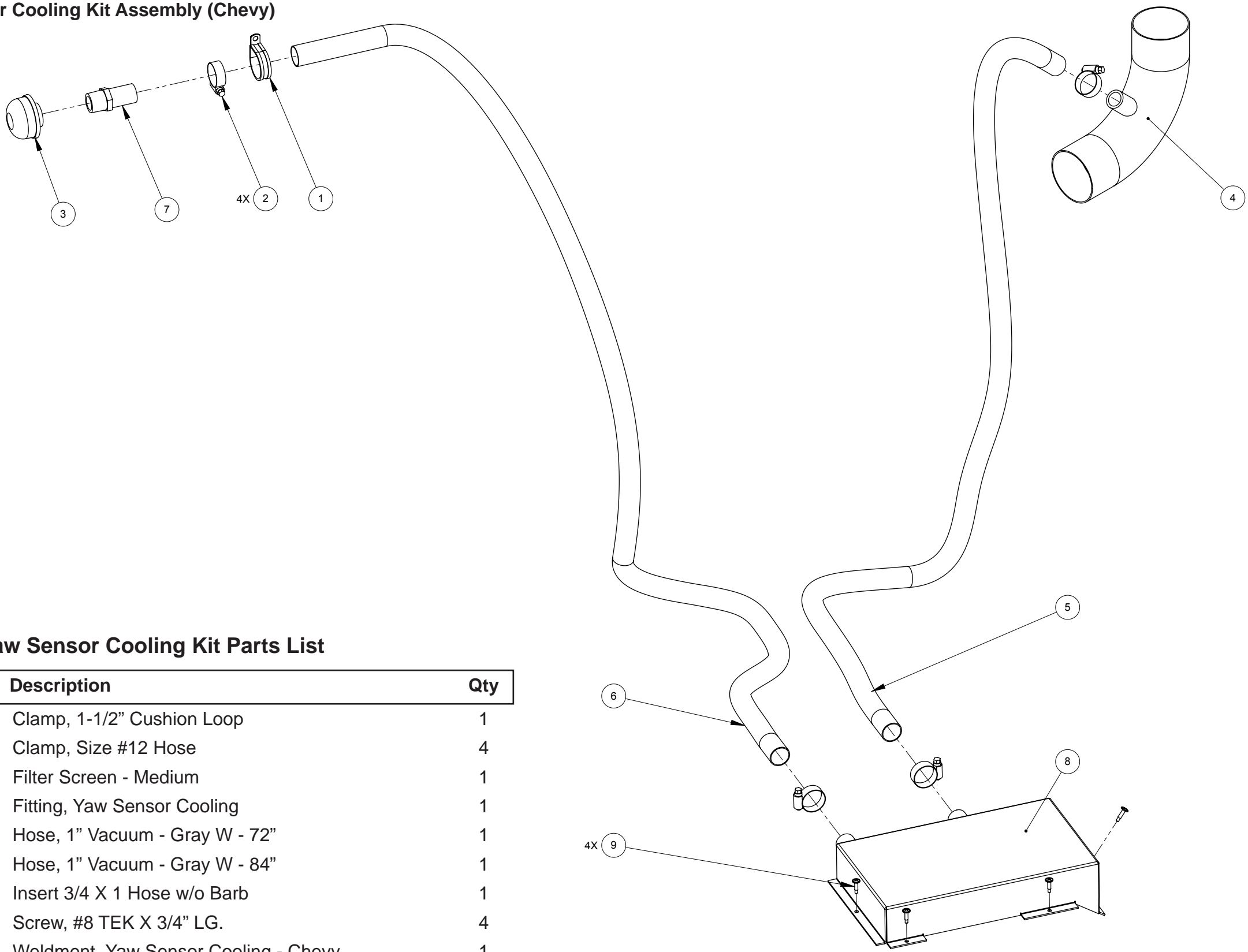


Non Salsa Heat Exchanger Parts List

Item	Part Number	Description	Qty
1	000-001-026	Adapter, Exhaust - Coated	1
2	000-068-617	Hose Assembly, 3" I.D. X 7" Lg.	1
3	000-068-092	Hose Assembly, 5/16" X 15" Teflon w/ 3/8" JIC	1
4	000-033-034	Clamp, 3" Muffler	1

Item	Part Number	Description	Qty
5	000-052-322	Fitting, 3" NPT X 3" Hose 90 Degree Elbow - Coated	1
6	000-052-334	Fitting, Vacuum Blower Inlet - Coated	1
7	000-093-003	Silencer, Hush Kit Muffler	1

Figure 7-30. Yaw Sensor Cooling Kit Assembly (Chevy)
000-079-130 Rev. B



Yaw Sensor Cooling Kit Parts List

Item	Part Number	Description	Qty
1	000-033-053	Clamp, 1-1/2" Cushion Loop	1
2	000-033-029	Clamp, Size #12 Hose	4
3	000-049-020	Filter Screen - Medium	1
4	000-052-034	Fitting, Yaw Sensor Cooling	1
5	000-068-829	Hose, 1" Vacuum - Gray W - 72"	1
6	000-068-828	Hose, 1" Vacuum - Gray W - 84"	1
7	000-052-908	Insert 3/4 X 1 Hose w/o Barb	1
8	000-143-058	Screw, #8 TEK X 3/4" LG.	4
9	000-041-323	Weldment, Yaw Sensor Cooling - Chevy	1

Figure 7-31. Horizontal Pump In Tank Assembly - View 1 of 2
000-079-012 Rev. D

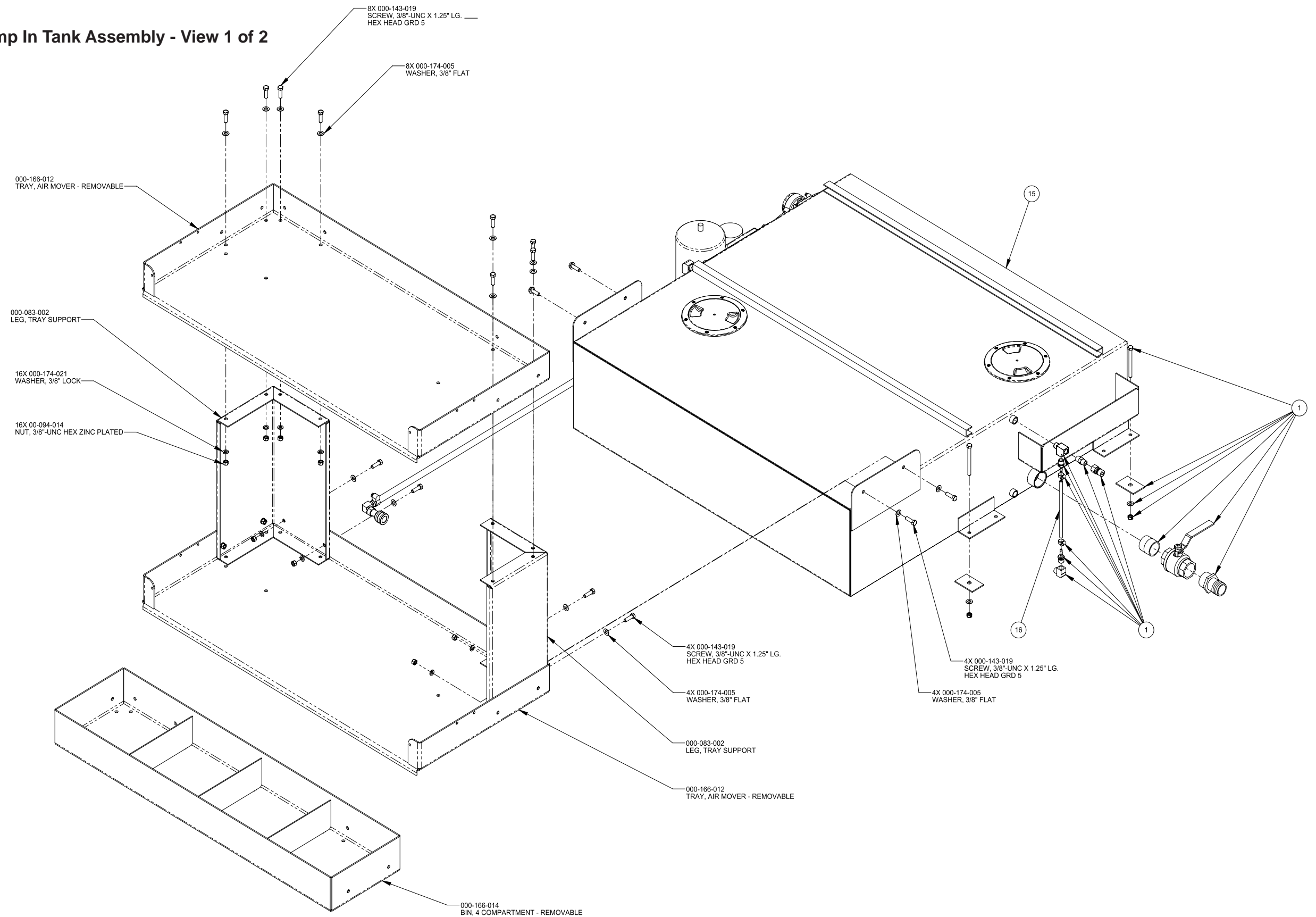
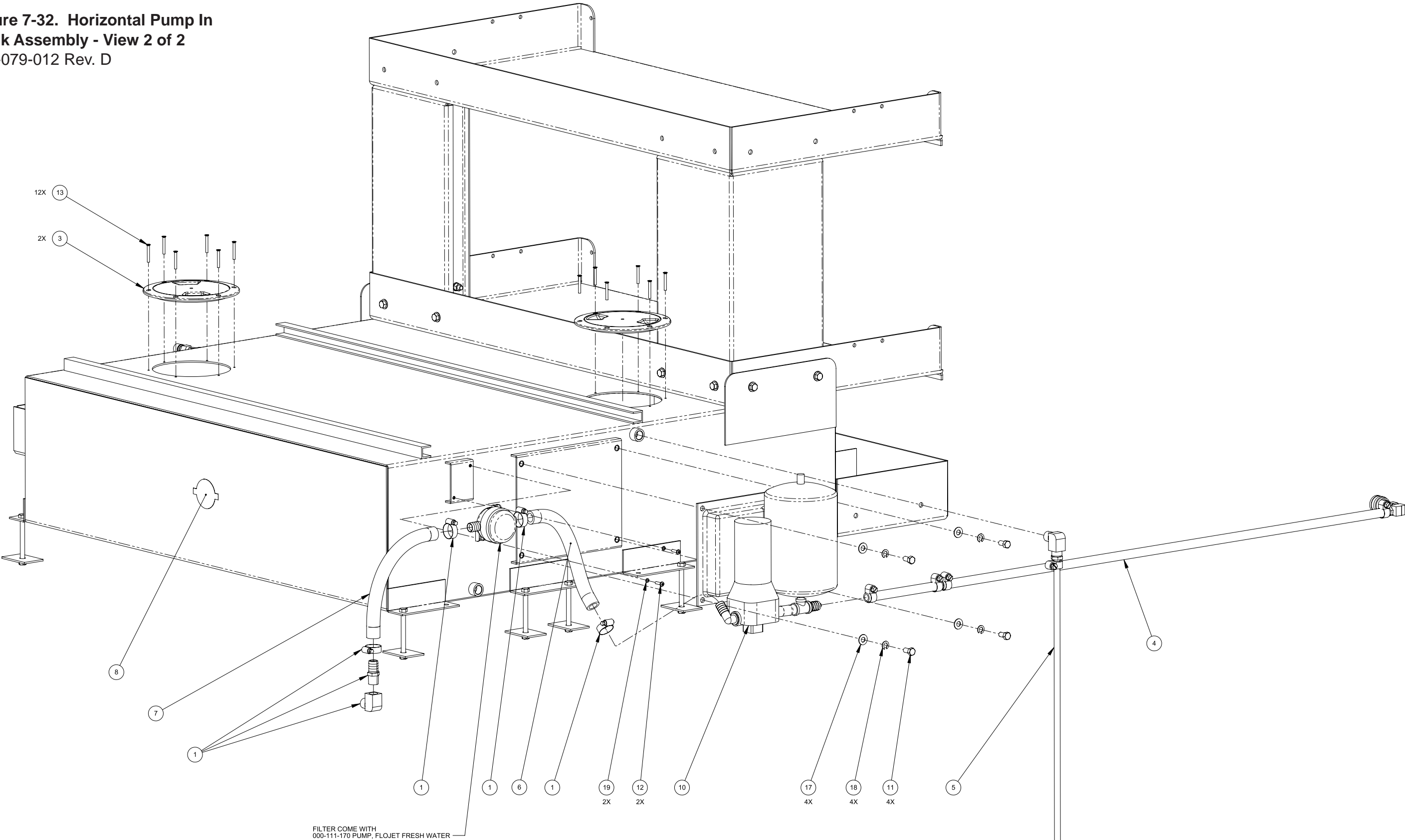


Figure 7-32. Horizontal Pump In Tank Assembly - View 2 of 2
000-079-012 Rev. D



Horizontal Pump In Tank Assembly Parts List

Item	Part Number	Description	Qty
1	000-052-299	Assembly, Fitting - 120 Gallon Pump-In Tank	1
2	000-014-018	Box, Truckmount Pump-In Tank	2
3	000-041-005	Cover, 6" Access	2
4	000-068-124	Hose Assembly, Pump In Discharge	1
5	000-068-165	Hose Assembly, Pump In Overflow	1
6	000-068-1033	Hose, 3/4" I.D. EPDM X 12" Lg.	1
7	000-068-1034	Hose, 3/4" I.D. EPDM X 14" Lg.	1
8	000-081-173	Label	1
9	000-151-005	Pallet, Machine 45 X 72	1
10	000-111-170	Pump, Flojet w/ Bladder 40 psi Fresh Water	1

Item	Part Number	Description	Qty
11	000-143-017-1	Screw, 3/8"-16UNC X 3/4" Lg. Hex Head	4
12	000-143-062	Screw, #10-24UNC . X 0.75" Lg. Pph	2
13	000-143-113	Screw, #10-24UNC X 1 1/2" Lg. Flt Hd Phil	12
14	000-151-003	Steel Banding Clip	6
15	000-159-005	Tank, Weldment - Coated	1
16	000-068-1035	Hose, 1/4" I.D. Pvc X 8" Lg. - Clear	1
17	000-174-032	Washer, 3/8" Flat	4
18	000-174-057	Washer, 3/8" Lock	4
19	000-174-014	Washer, #10 Lock	2

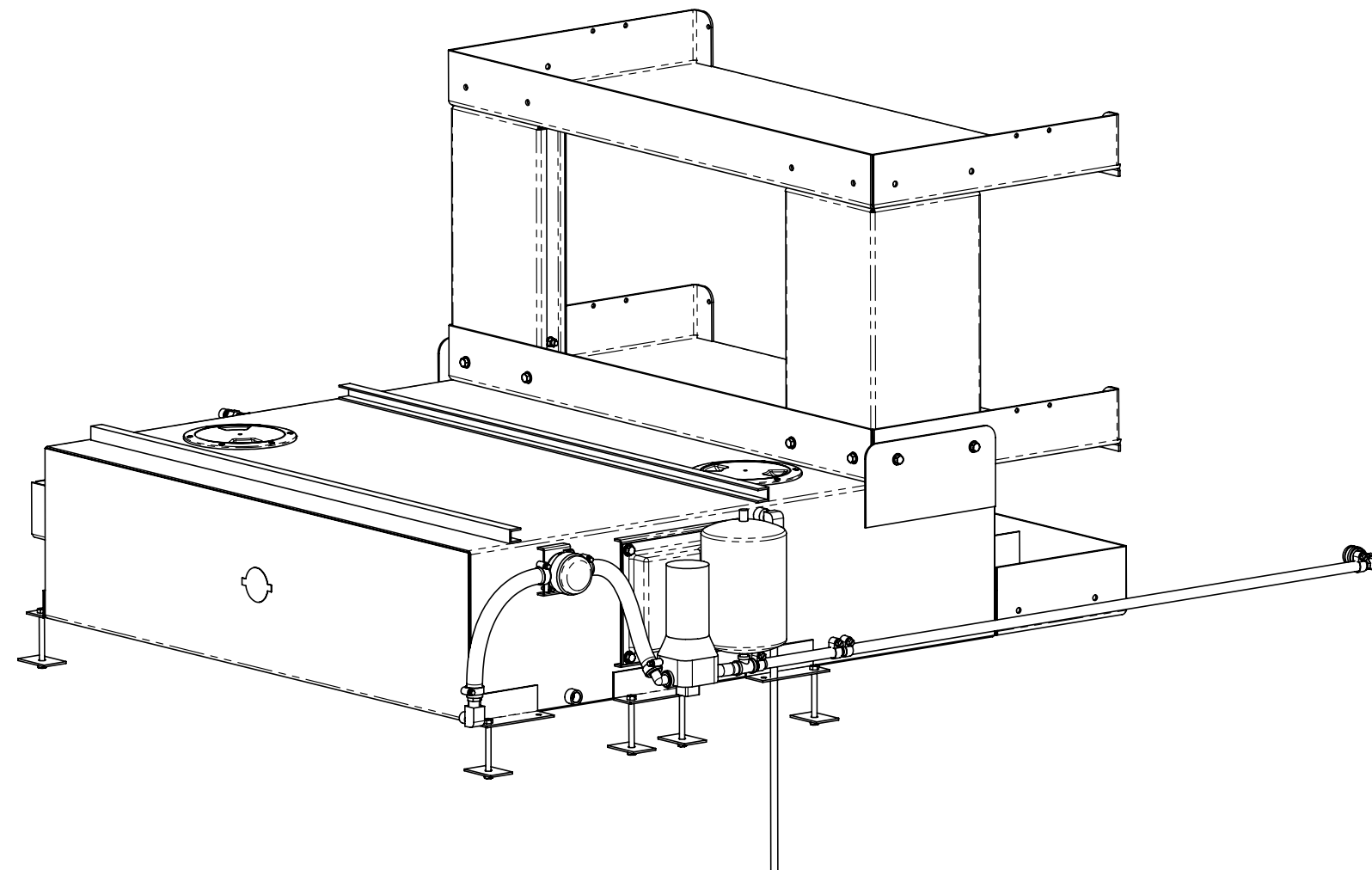
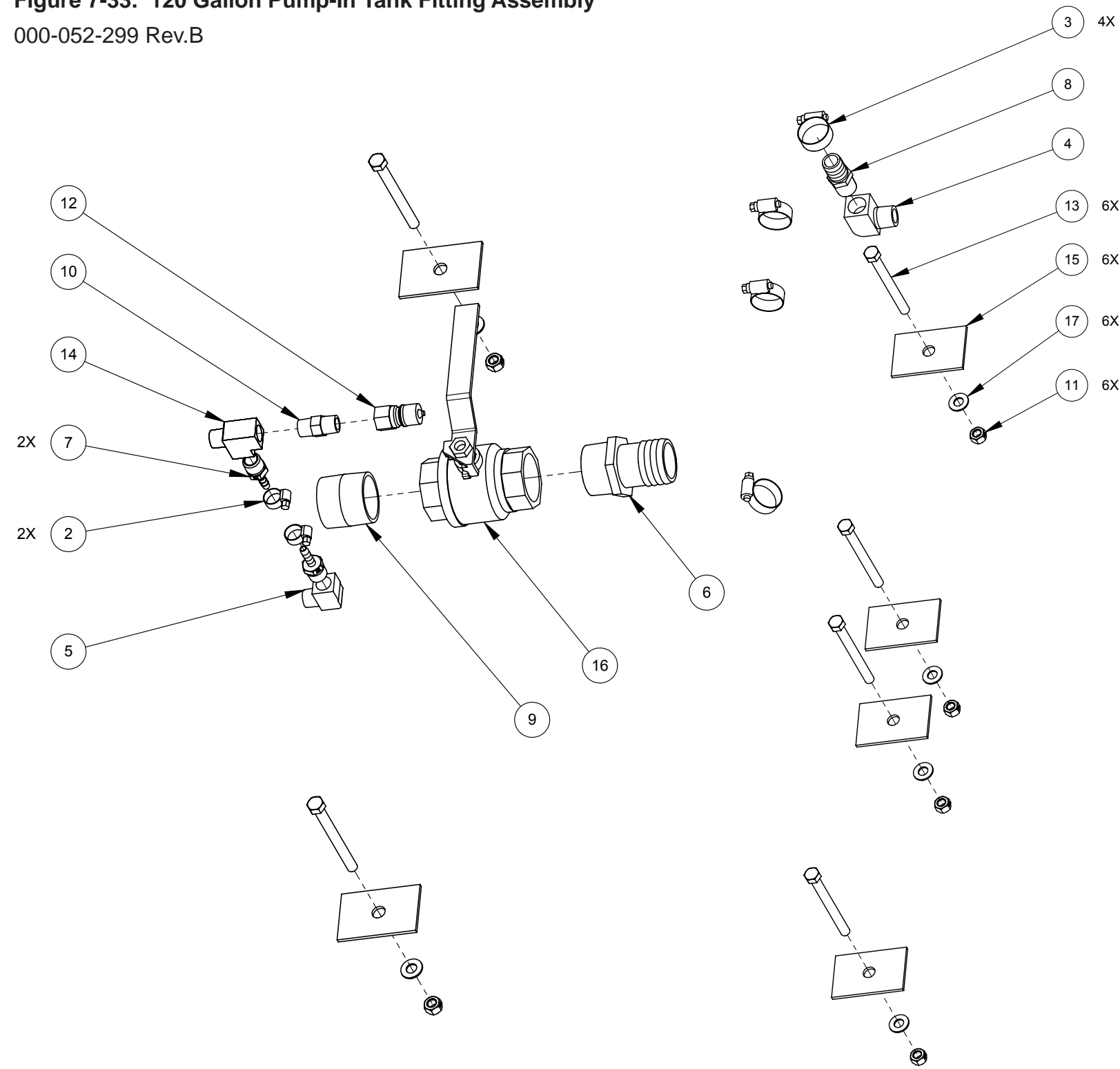


Figure 7-33. 120 Gallon Pump-In Tank Fitting Assembly
000-052-299 Rev.B



120 Gallon Pump-In Tank Fitting Assembly Parts List

Item	Part Number	Description	Qty
1	000-014-102	6 X 6 Zip Lock Bag	1
2	000-033-003	Clamp, Size #4 Mini Hose	2
3	000-033-029	Clamp, Size #12 Hose	4
4	000-052-087	Elbow, 1/2" NPT Street	1
5	000-052-086	Elbow, 3/8" NPT Street	1
6	000-052-226	Insert, 1-1/2" NPT X 1-1/2" Barb (Gray)	1
7	000-052-103	Insert, #64 (3/8" NPT X 1/4" Barb)	2
8	000-052-129	Insert, #812, 1/2NPT X 3/4 Hose	1
9	000-052-182	Nipple, 1-1/2" NPT Close	1
10	000-052-074	Nipple, 3/8" NPT Hex	1
11	000-094-015	Nut, 3/8"-16UNC Hex 2-Way Locking	6
12	000-052-052	Quick Connect, 660 3/8" Brass w/ EPDM O-Ring	1
13	000-143-198	Screw, 3/8"-16UNC X 4" Lg. Hex Head - Full Thread	6
14	000-052-023	Tee, 3/8" NPT Male Street	1
15	600-011-003	Tie Down Cleat Washer - Fabricated	6
16	000-169-022	Valve, 1-1/2" Full Port Ball	1
17	000-174-005	Washer, 3/8" Flat	6

Figure 7-34. 85 Gallon Rotomold Fresh Water Tank Assembly - View 1 of 2
000-159-118 Rev. G

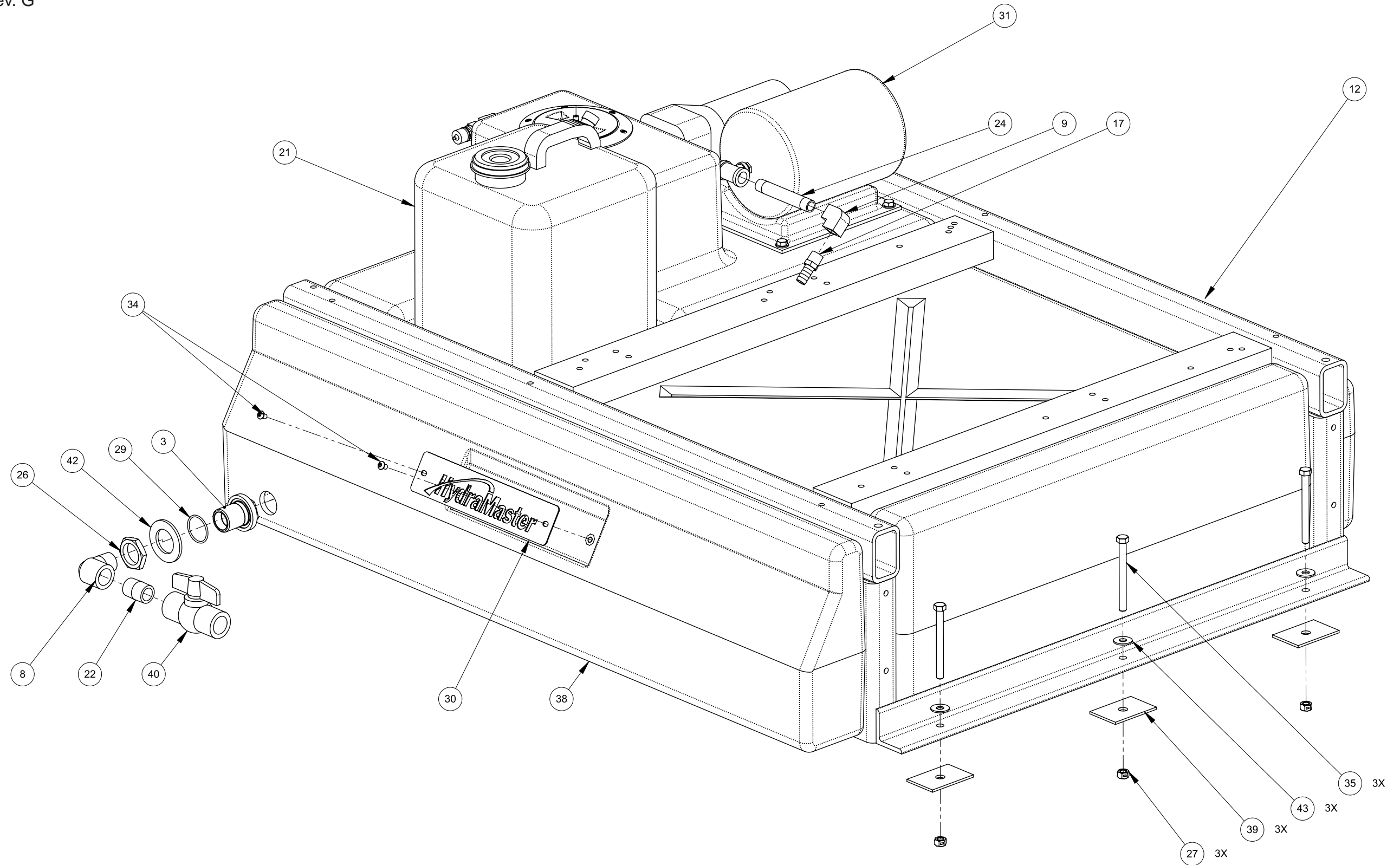
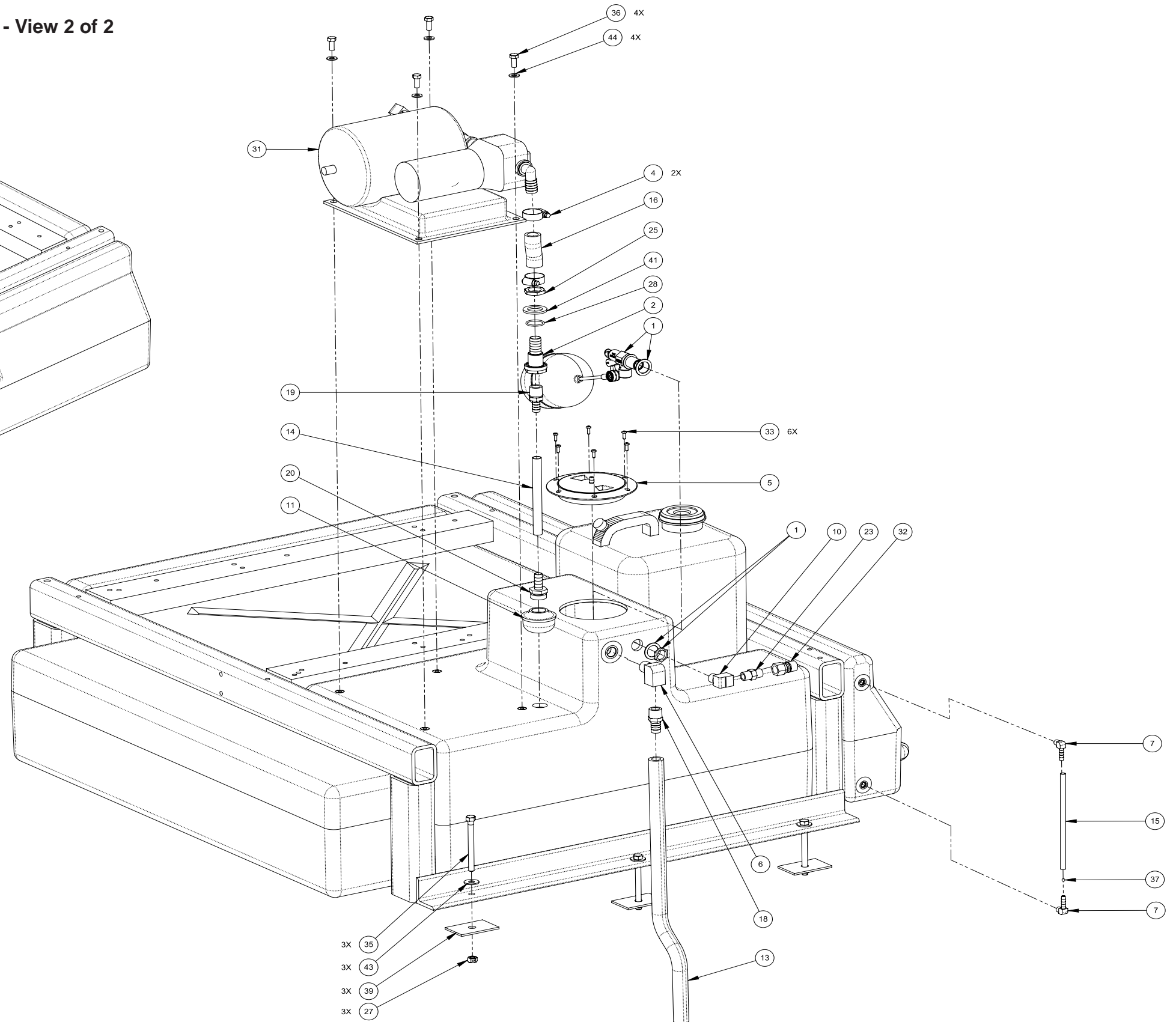
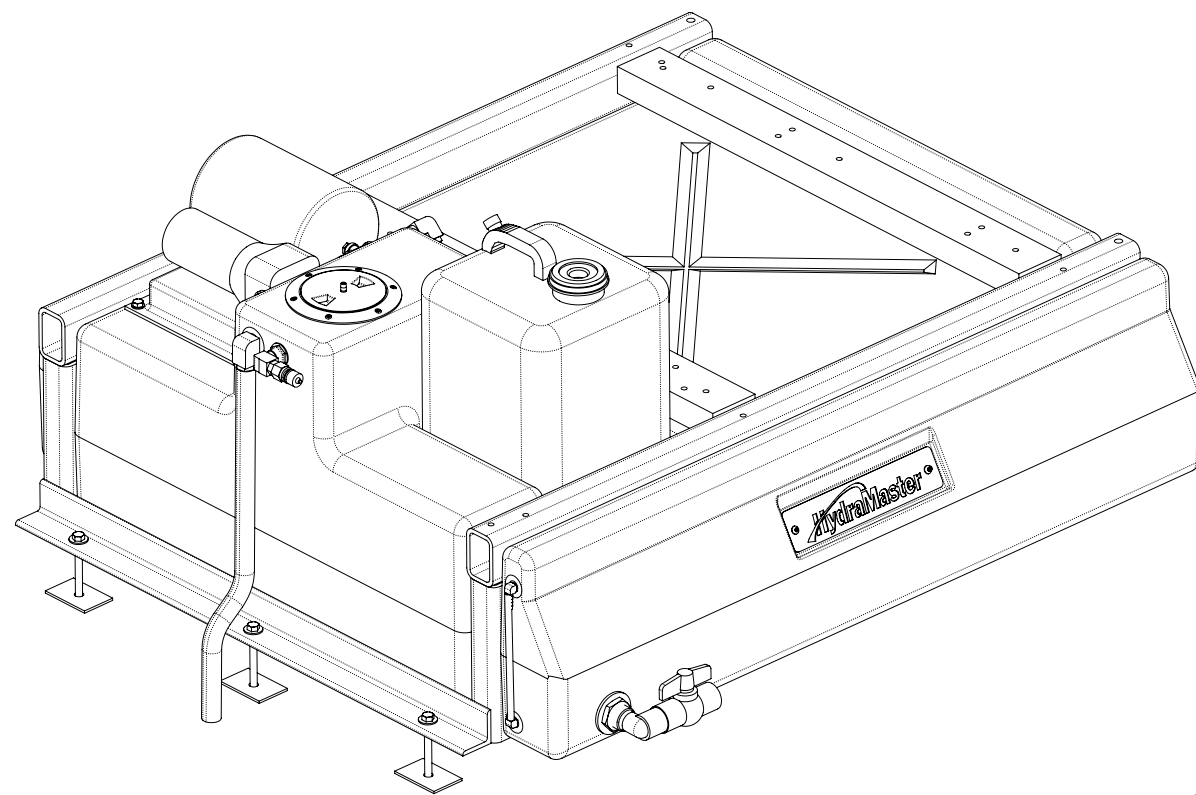


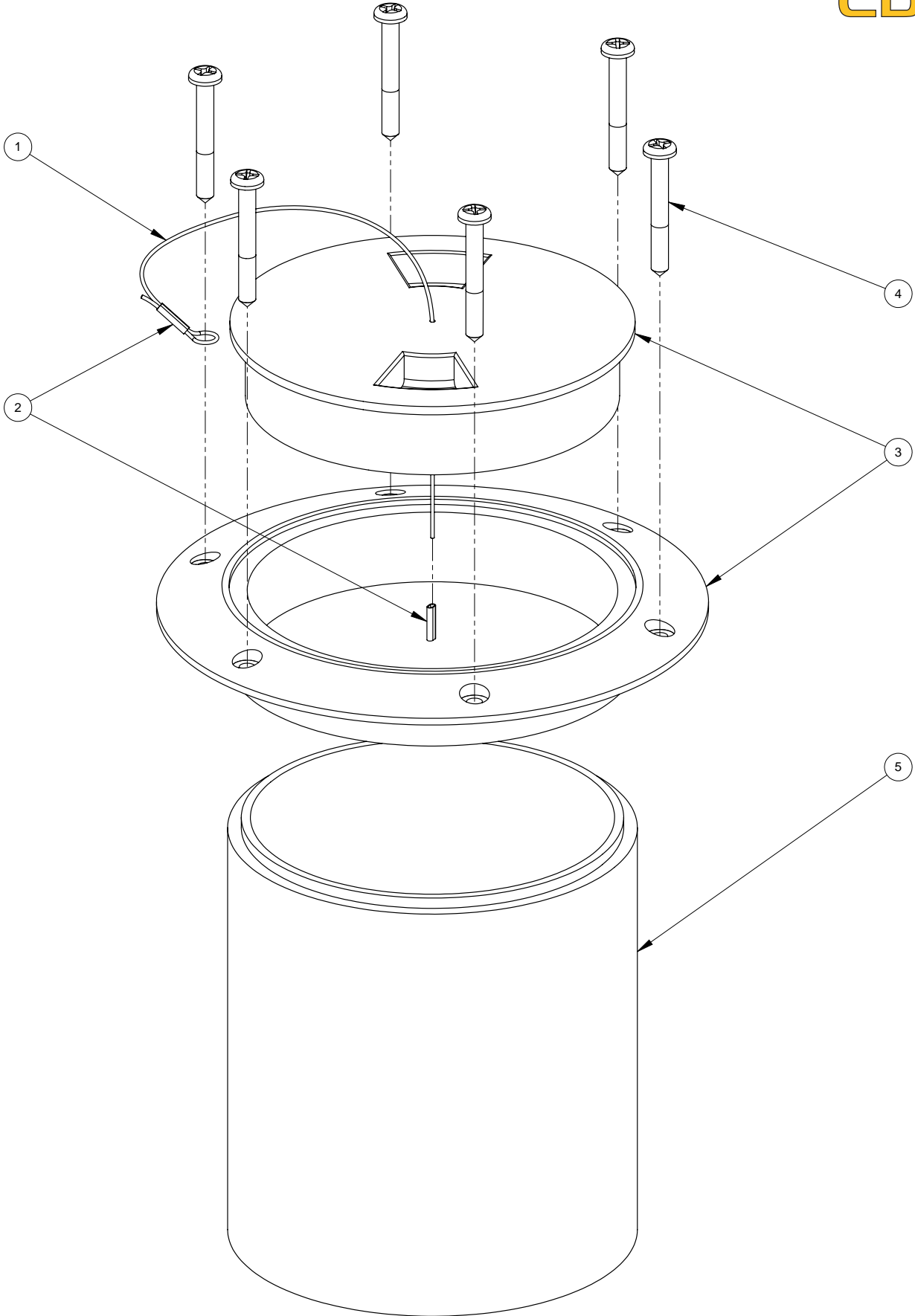
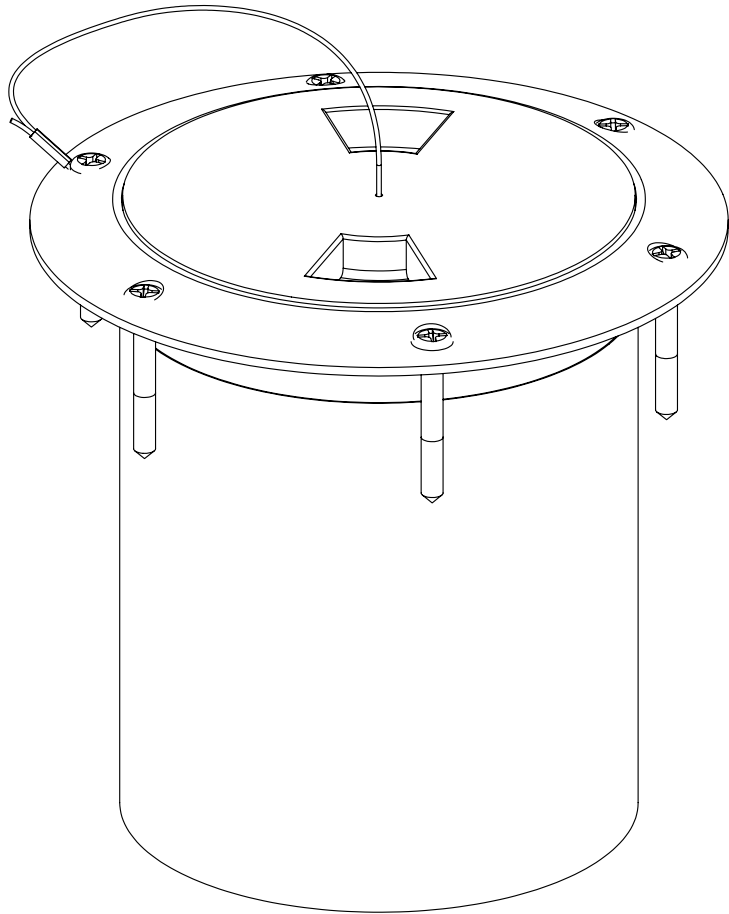
Figure 7-35. 85 Gallon Rotomold Fresh Water Tank Assembly - View 2 of 2
000-159-118 Rev. G



85 Gallon Rotomold Fresh Water Tank Assembly Parts List

Item	Part Number	Description	Qty	Item	Part Number	Description	Qty
1	000-169-235	Assembly, Float Valve	1	23	000-052-074	Nipple, 3/8" NPT Hex	1
2	000-052-785	Bulkhead, 1/2" FPT X 3/4" Barb	1	24	000-052-408	Nipple, 3/8" NPT X 4" Lg.	1
3	000-052-786	Bulkhead, 3/4" FPT	1	25	000-094-097	Nut, 1"-14UNS Brass	1
4	000-033-029	Clamp, Size #12 Hose	2	26	000-094-121	Nut, 1-5/16"-12UN Brass	1
5	000-041-004	Cover, Poly Tank Modified, w/Vent	1	27	000-094-015	Nut, 3/8"-16UNC Hex 2-Way Locking	6
6	000-052-087	Elbow, 1/2" NPT Street	1	28	000-097-072	O-Ring, 1.06" I.D. X 3/32" Width	1
7	000-052-253	Elbow, 1/8" NPT X 1/4" Barb	2	29	000-097-073	O-Ring, 1.375 I.D. X 3/32" Width	1
8	000-052-726	Elbow, 3/4" Street (Gray)	1	30	000-105-313	Plate, Name	
9	000-052-142	Elbow, 3/8" F X F Brass	1	31	000-111-170	Pump, Flojet w/ Bladder 40 psi Fresh Water	1
10	000-052-086	Elbow, 3/8" NPT Street	1	32	000-052-052	Quick Connect, 660 3/8" Brass w/ EPDM O-Ring	1
11	000-049-020	Filter Screen - Medium	1	33	000-143-314	Screw, #8 X 1/2" Lg. Pan Head	6
12	000-055-169	Frame - Coated	1	34	000-143-565	Screw, 1/4" 20UNC X 0.375" Lg. Button Head Socket	2
13	000-068-020	Hose, .625" I.D. - Green Stripe	1	35	000-143-198	Screw, 3/8"-16UNC X 4" Lg. Hex Head - Full Thread	6
14	000-068-018	Hose, 1/2" I.D. Bulk	1	36	000-143-012	Screw, 5/16"-18UNC X 3/4" Lg.	4
15	000-068-025	Hose, 1/4" I.D. Clear	1	37	000-005-008	Sight Float Bead, 5mm Red Wally Whale	1
16	000-068-069	Hose, 3/4" I.D. Blue - Bulk	1	38	000-159-116	Tank, 85 Gallon Rotomold Fresh Water	1
17	000-052-105	Insert, #68 (3/8" NPT X 1/2" Barb)	1	39	600-011-003	Tie Down Cleat Washer - Fabricated	6
18	000-052-130	Insert, #810 (1/2" NPT X 5/8" Barb)	1	40	000-169-202	Valve, 3/4" FPT Ball Valve	1
19	000-052-107	Insert, #88 (1/2" NPT X 1/2" Barb)	1	41	000-174-173	Washer, 1" I.D. X 1.60 O.D. X 0.135" Thk.	1
20	000-052-160	Insert, 3/4" M Garden X 1/2" Barb	1	42	000-174-174	Washer, 1.375" I.D.	1
21	000-159-016	Jug, 5 Gallon Plastic Chemical - Standard	1	43	000-174-005	Washer, 3/8" Flat	6
22	000-052-326	Nipple, 3/4" NPT Close	1	44	000-174-049	Washer, 5/16" Flat	4

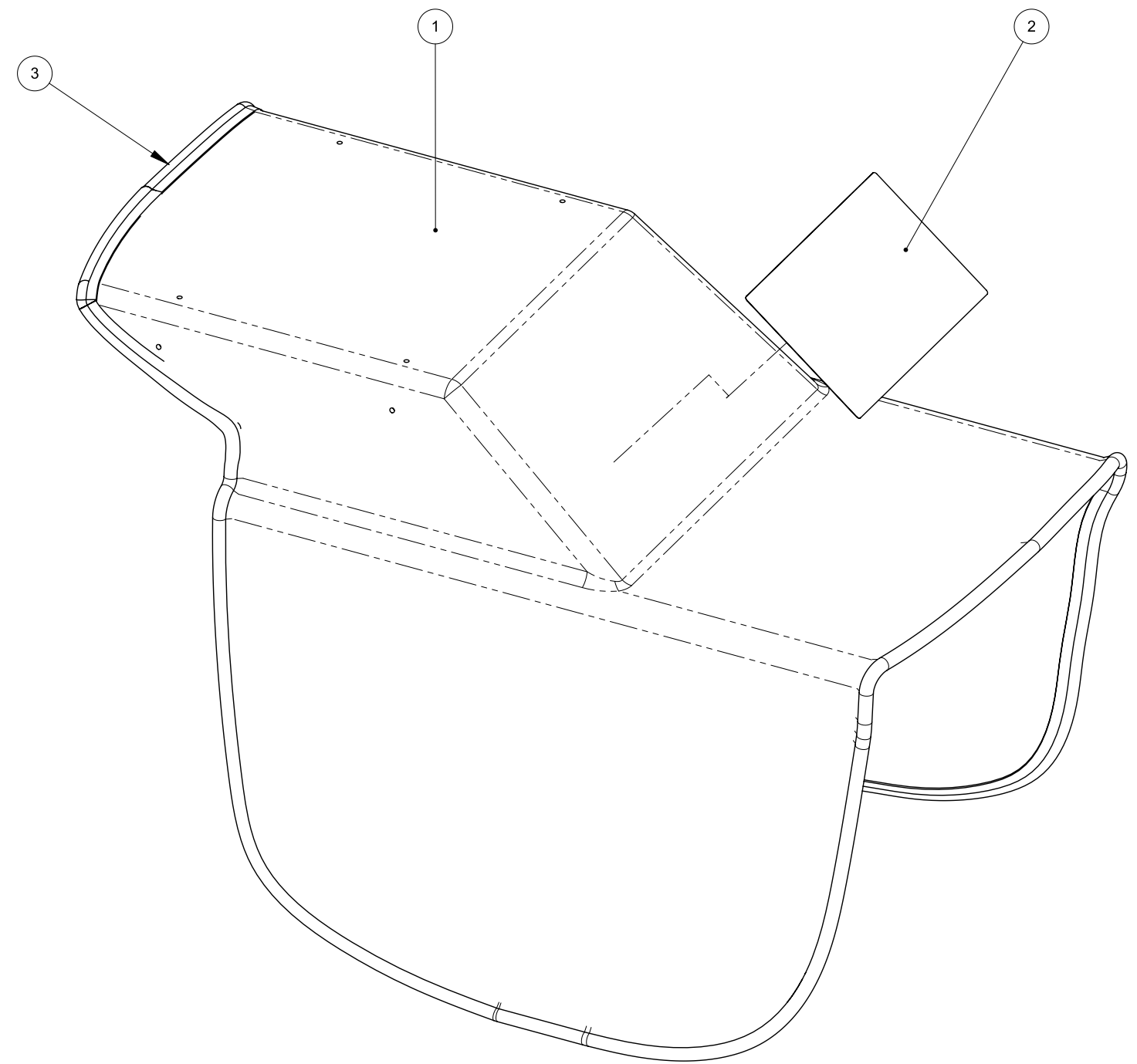
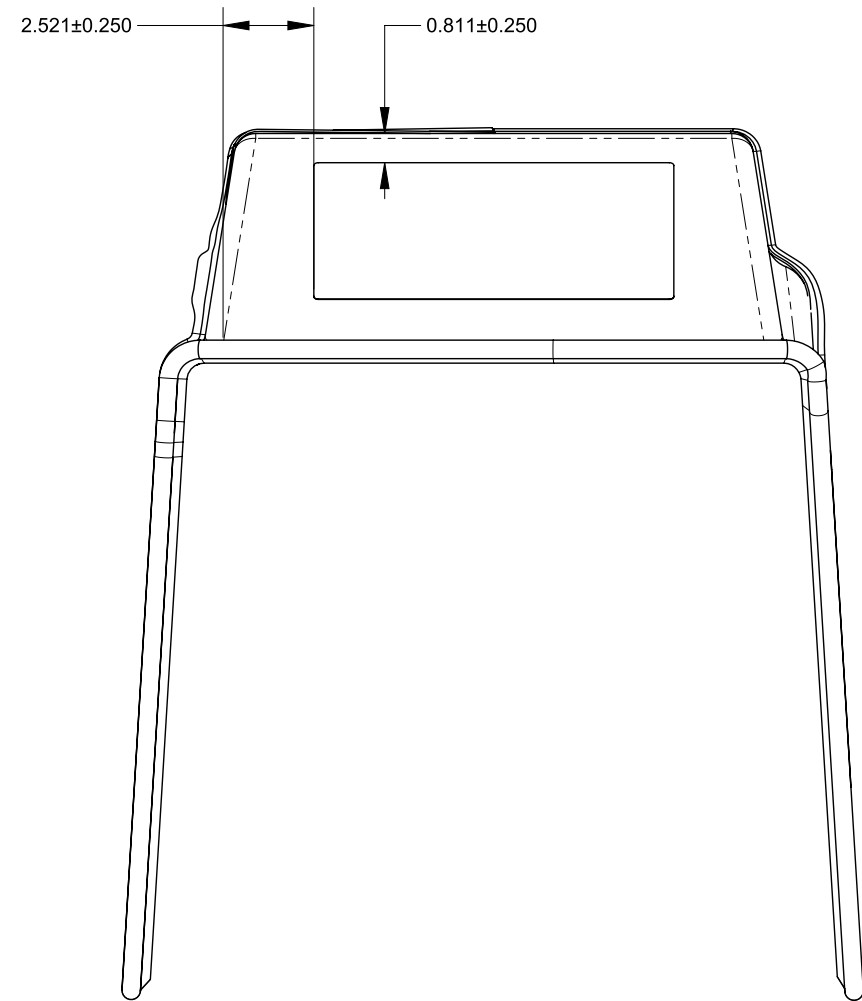
Figure 7-36. Pass Through Assembly
000-078-381 Rev. C



Pass Through Assembly Parts List

Item	Part Number	Description	Qty
1	000-025-008	Cable, 150 lb Test S/S	1
2	000-033-032	Clamp, Throttle Cable	2
3	000-041-200	Cover, 4" Round Abs-Mod. - Pass Through	1
4	000-143-537	Screw, #10 X 1.5" Lg. Pan Head Sheet Metal	6
5	000-125-182	Tube, Pass Through	1

Figure 7-37. Chevy Cowling Assembly
601-020-008 Rev. A



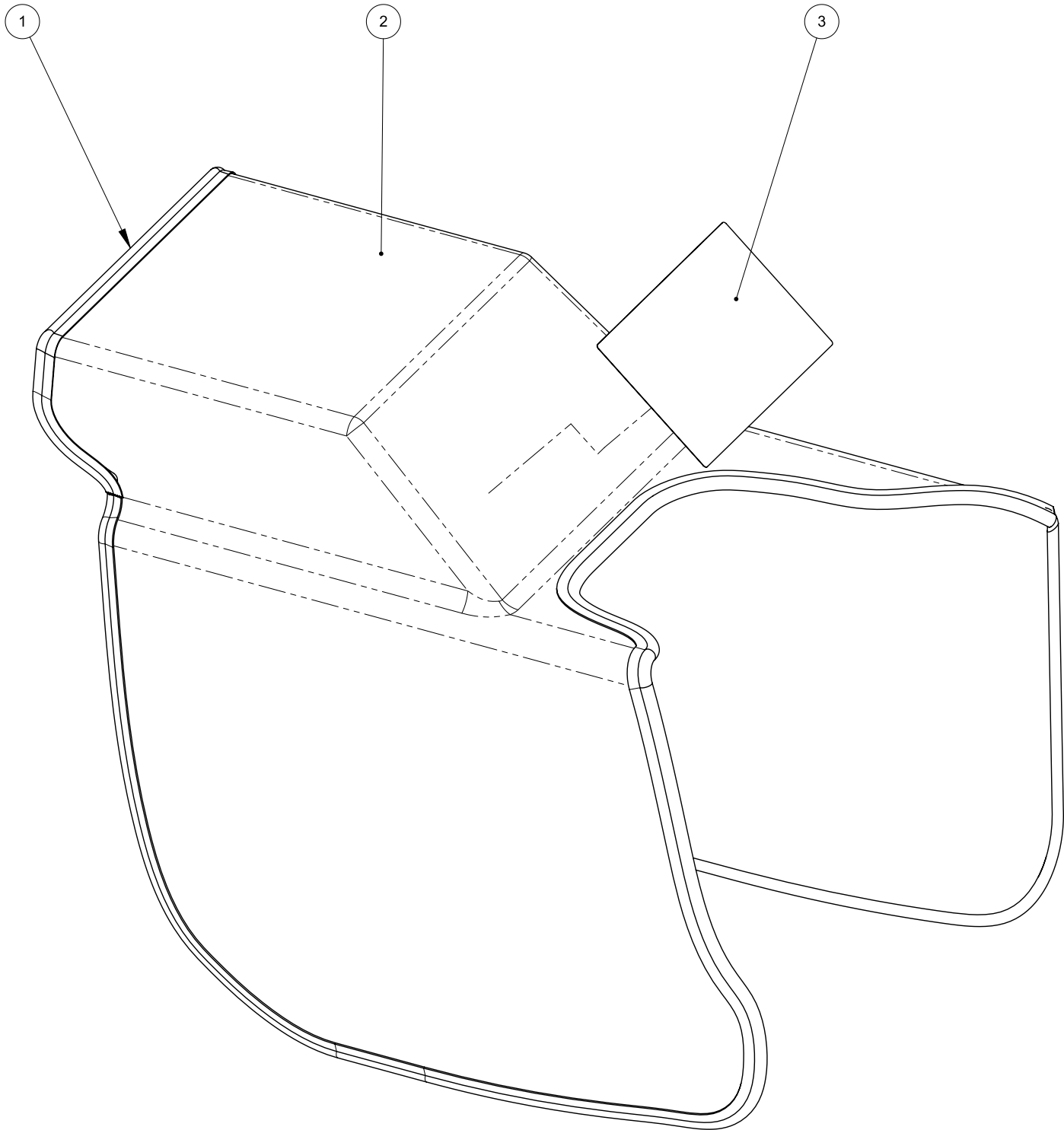
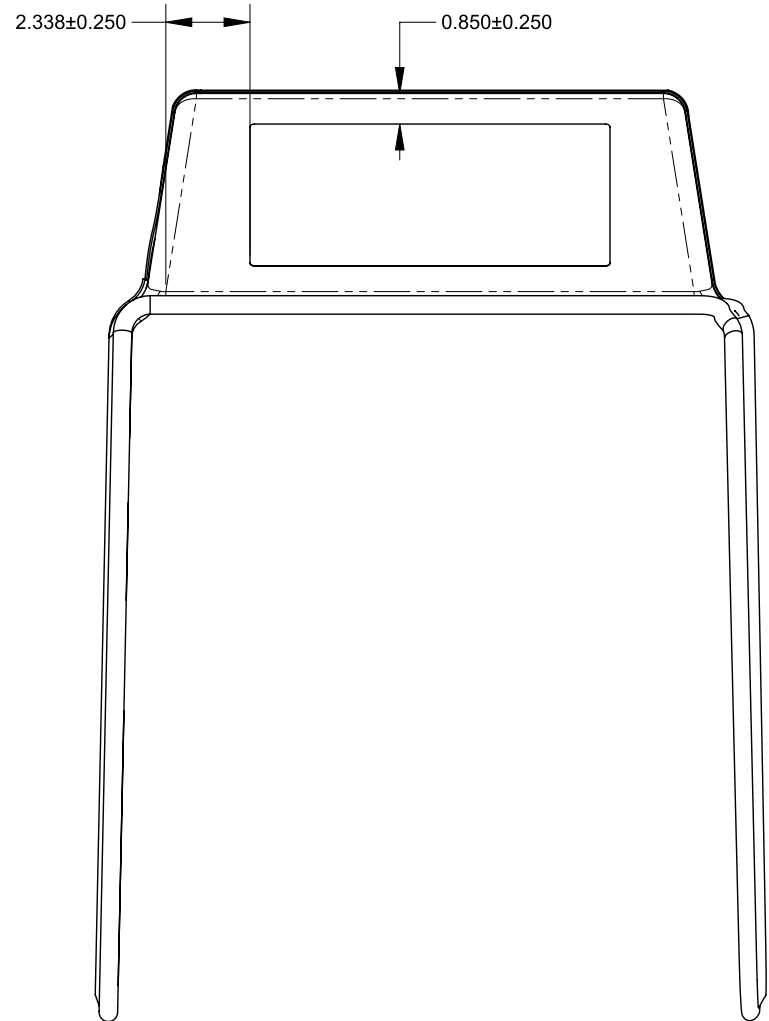
Chevy Cowling Assembly Parts List

Item	Part Number	Description	Qty
1	000-041-139	Cowling, Chevy	1
2	000-081-403	Label, Driveline Lubrication Procedure and Specification	1
3	000-131-060	Trimlok, 3/4" Bulb	1 ft

NOTICE

Figure 7-37 shows cowling before being modified during final installation.

Figure 7-38. Ford Cowling Assembly
601-020-001 Rev. A



Ford Cowling Assembly Parts List

Item	Part Number	Description	Qty
1	111-111-111	Trimlok, 3/4" Bulb	1
2	000-041-069	Cowling, Ford	1
3	000-081-403	Label, Driveline Lubrication Procedure and Specification	1

Table 7-3. Hose Routings

Part Number	Description	From	To
000-068-092	Hose, 3/8" X 15" Teflon w/ 3/8" JIC End	Dual Heat Exchanger	By-Pass Valve
000-068-1037	Hose, 3/8" I.D. X 39" Lg., Clr w/Braid	Chemical Jug	Chemical Meter
000-068-1039	Hose, 3/8" I.D. Rubber X 31" Lg.	By-Pass Valve	Recovery Tank
000-068-196	Hose, 3/8" I.D. X 11" Lg w/ 3/8" MPT and 3/8" JIC End	By-Pass Valve	Dual Heat Exchanger
000-068-203	Hose, 3/16" X 34" Teflon 1/4" F JIC X 1/4" F JIC	Water Box	Hi-PSI Manifold
000-068-385	Hose, 3/4" I.D. X 18 ft - Green Stripe - Cut to Fit	Dual Heat Exchanger	Van Cooling System
000-068-734	Hose, 1/2" X 42.5 Lg w/ 3/8" NPT and 3/8" SAE F Ends	Water Box	Water Outlet
000-068-940	Hose, 3/8" I.D. Rubber X 17" Lg.	Hi-PSI Manifold	Dual Heat Exchanger
000-068-977	Hose, 5/32" I.D. Vacuum X 52" Lg.	Pressure Gauge	Blower Outlet
000-068-978	Hose, 5/32" I.D. Vacuum X 82" Lg.	Lube Port	Blower
000-068-991	Hose, 1/2" I.D. Rubber X 42" Lg.	Water Box	By-Pass Valve

9 - Electrical System

Because the most difficult problem to trace in any system is often an electrical failure, HydraMaster has designed the CDS' electrical system with the technician in mind.

This section of the manual includes CDS troubleshooting guides as well as wiring schematics and diagrams.

The entire electrical system operates on 12V DC which is provided by the vehicle's battery.

CAUTION

To avoid equipment damage, it is very important to tie up any loose wires or hoses near the drive shaft area. Tie wraps are sufficient for wires and small hoses.

When securing large hoses or wiring harnesses in the area of the drive shaft, tie down the components with a hose clamp, with a clear vinyl hose inserted onto the clamp. On some installations, if the fuel injector wires are not properly secured, the wires could rub against the CDS drive shaft causing a short in the electrical system of the van.

CDS 4.8™

TROUBLESHOOTING

1.0. CDS will not turn on

Possible Cause	Solution
1.1. The main power fuse has blown.	Remove CDS cowling and engine cover and check all wiring from the power source back to the CDS console for damage. Replace fuse only after locating the problem that caused the fuse to blow. If unable to locate problem, refer to qualified service technician.
1.2. The plug-in connection at the base of the recovery tank is corroded.	Clean and seal connection to protect it from moisture.
1.3. The main circuit breaker has blown on the CDS dash.	Reset breaker and look for loose connections or damaged wires. Check all wires from the control panel forward to the front of the vehicle. If no problem is found but the breaker still trips refer to qualified service technician.

2.0. CDS shuts off while in use

Possible Cause	Solution
2.1. Recovery tank is full.	Empty tank and restart machine.
2.2. Recovery tank float switch is dirty or defective.	Inspect float to see if the triangle mark on the float is facing up. If it is, and the float slides freely on the post, replace the float assembly.
2.3. The vehicle gear selector has moved.	Inspect the gear selector to be sure it is in the proper position. If selector has moved, refer to qualified service technician.

⚠ WARNING

If vehicle gear selector has moved, refer to qualified service technician - it needs to be repaired immediately. This is a dangerous condition and can cause death or injury.

8 - Vacuum Blower System

This section of the manual covers the CDS' vacuum blower system and includes information on:

- Recovery Tank Inlet Filter
- Vacuum Blower Lubrication
- Vacuum Blower Troubleshooting

The vacuum blower, featuring tri-lobe rotors, is designed for maximum positive displacement and manufactured using special porting technology to significantly reduce noise.

Lubrication for both the gear end and drive end of the blower is provided by full oil splash. Unlike grease lubrication, oil-splash lubrication provides for longer bearing and seal life through improved heat dissipation.

At the gear end, the timing gear teeth are lubricated by submersion in oil with the gear teeth serving as oil slingers. At the drive end, the bearings are also lubricated by submersion in oil with oil slingers attached on the shafts.

The performance and life of the vacuum blower is greatly dependent on the care and proper maintenance it receives.

Because of the close tolerances between the 3 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 from happening, a stainless steel filter screen has been placed at the vacuum blower intake inside the vacuum recovery tank. This stainless steel filter system should be removed for cleaning on a daily basis.

⚠ WARNING

Use caution when the CDS is being run for test purposes and the vacuum inlet is open. Unregulated vacuum may cause injury if body parts come in contact with the open vacuum inlet.

CDS 4.8™

CAUTION

To protect the vacuum blower from overloading and damaging itself, there is a vacuum relief system installed on the vacuum recovery tank. When the recovery tank inlet is completely sealed off, a maximum of 14" Hg will be attained. At the end of each day, spray the HydraMaster-recommended lubricant (P/N 000-087-006) into the blower lubrication port before shutting down the machine. If you fail to lubricate the vacuum blower on a daily basis, rust deposits and moisture can form and 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 recovery tank foam free. When cleaning surfaces with excessive foaming residue, use HydraMaster's Defoamer as directed.

NOTICE

The recovery tank is protected from excessive water level overflowing by a recovery tank float kill switch. The switch is not activated by foam, only by liquid.

RECOVERY TANK INLET FILTER

HydraMaster inlet filter screens are designed to trap lint, hair and large objects that would normally collect at the bottom of your recovery tank. Clean the screen at the end of each job to eliminate build-up of debris in the tank.

VACUUM BLOWER LUBRICATION

Read the vacuum blower Owner's Manual for proper oil changing instructions. (A digital copy of the vacuum blower Owner's Manual can be found on the CD which is shipped with each CDS 4.8 Owner's Guide.) Because the CDS is very demanding of the vacuum blower, the vacuum blower should be maintained as recommended in the vacuum blower Owner's Manual.

NOTICE

The vacuum blower manufacturer recommends the use of PneuLube™ (ISO 100) as a lubricant at temperatures ranging from 0 degrees to 120 degrees F.

Remember to:

1. Remove fill plugs or breathers from both gear end and drive end plates.
2. SLOWLY pour oil through fill until oil appears in the oil sight glass. Bring oil level to center of sight glass.
3. Verify oil level is at proper level in BOTH gear end and drive end sight glasses.
4. Replace fill plugs or breathers that were removed in step 1.
5. Add fresh oil as required to maintain proper level.

The oil should be drained, flushed and replaced every 250 hours. The oil drain hose is connected under the head plate; at the end of the oil drain hose is a cap.

VACUUM BLOWER TROUBLESHOOTING

1.0. Weak vacuum at tool/wand. Gauge reads normal (10” Hg to 14” Hg)

POSSIBLE CAUSE	SOLUTION
1.1. Clogged hoses or tool/wand tube.	Disconnect hoses and carefully check for an obstruction.
1.2. Excessive length of hoses connected to machine.	Make sure machine is rated for the conditions under which it is being operated.
1.3. Clogged heat exchanger restricts vacuum.	See qualified service technician.

2.0. Vacuum gauge will not come up to 14” Hg

POSSIBLE CAUSE	SOLUTION
2.1. There is an air leak somewhere in the vacuum system.	Check vacuum relief valve for proper adjustment. Check all hoses for cuts and breaks. Check recovery tank lid gasket. Make sure the recovery tank drain valve is fully closed.
2.2. The vacuum gauge is defective.	Test and replace as necessary.
2.3. Vacuum blower is turning too slowly.	Check blower rpm at tachometer on the CDS’ dash. Blower rpm should be 2 times the tachometer rpm. See the throttle control kit instructions for further troubleshooting assistance.

3.0. Vacuum gauge reads high with no hoses attached

POSSIBLE CAUSE	SOLUTION
3.1. Filter in recovery tank is clogged.	Remove and clean or replace as necessary.
3.2. Hose from recovery tank to blower is collapsed internally	Inspect and replace as necessary.

Figure 9-1. Electrical Schematic
000-179-061 Rev A

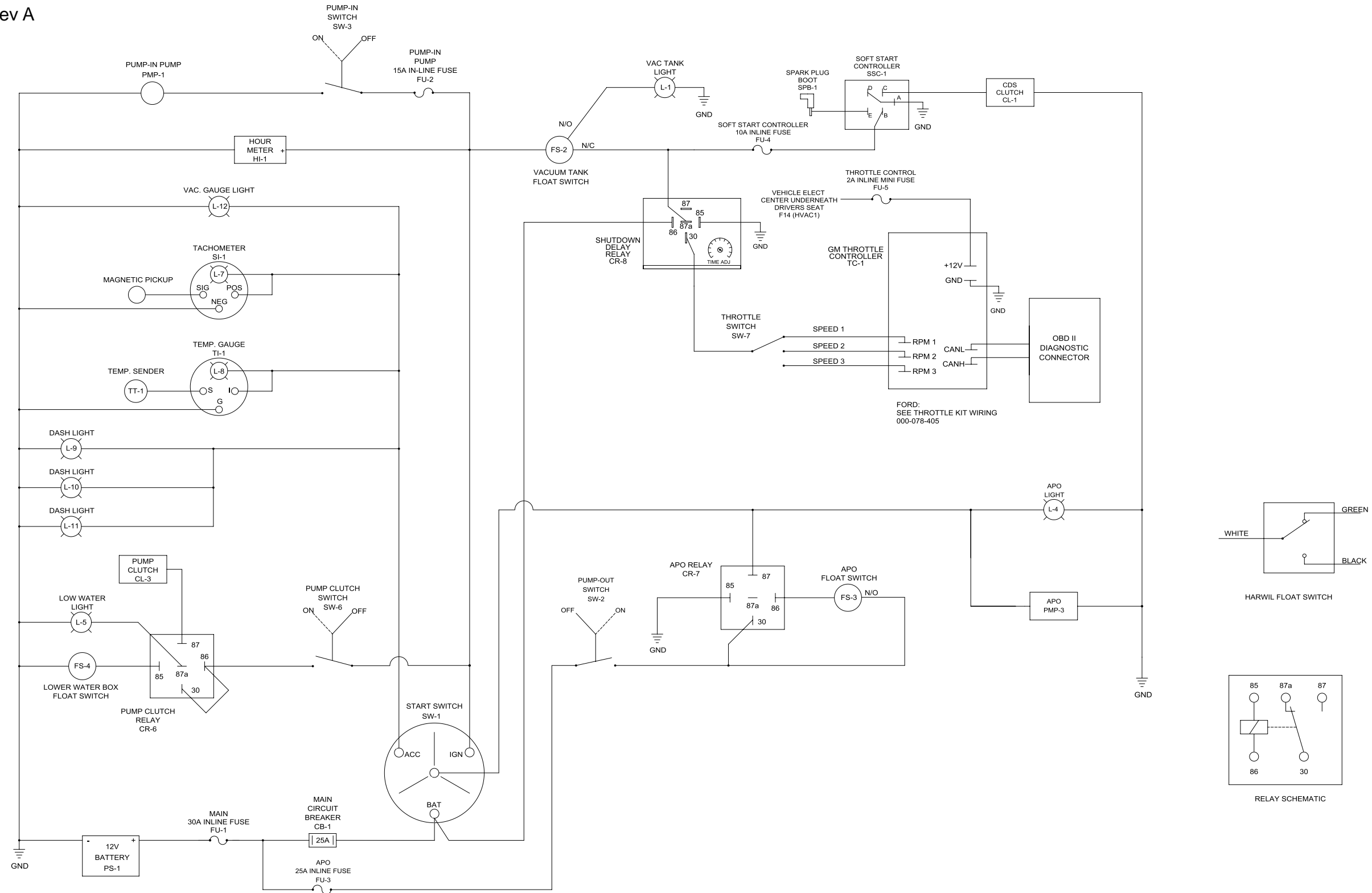
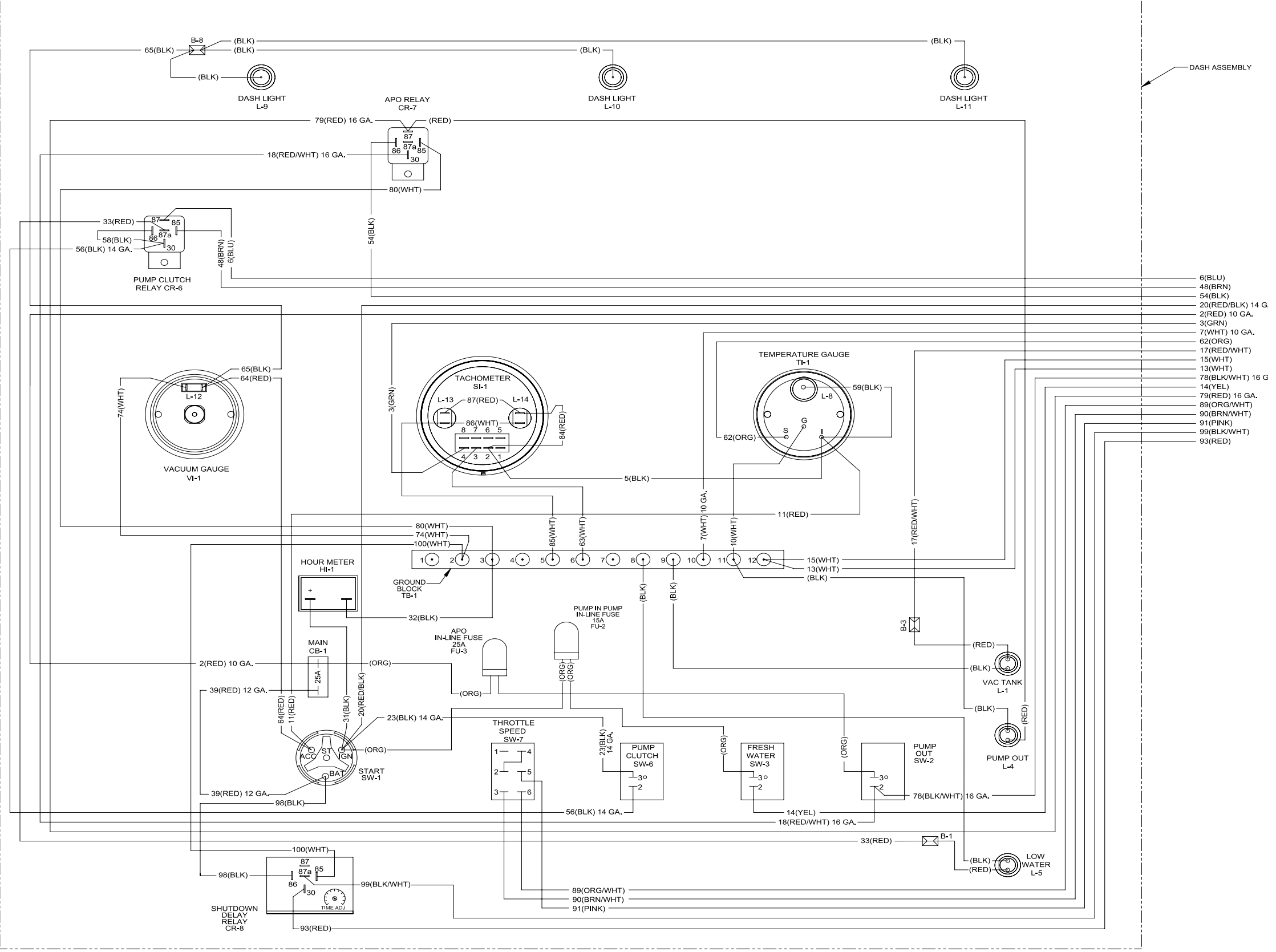
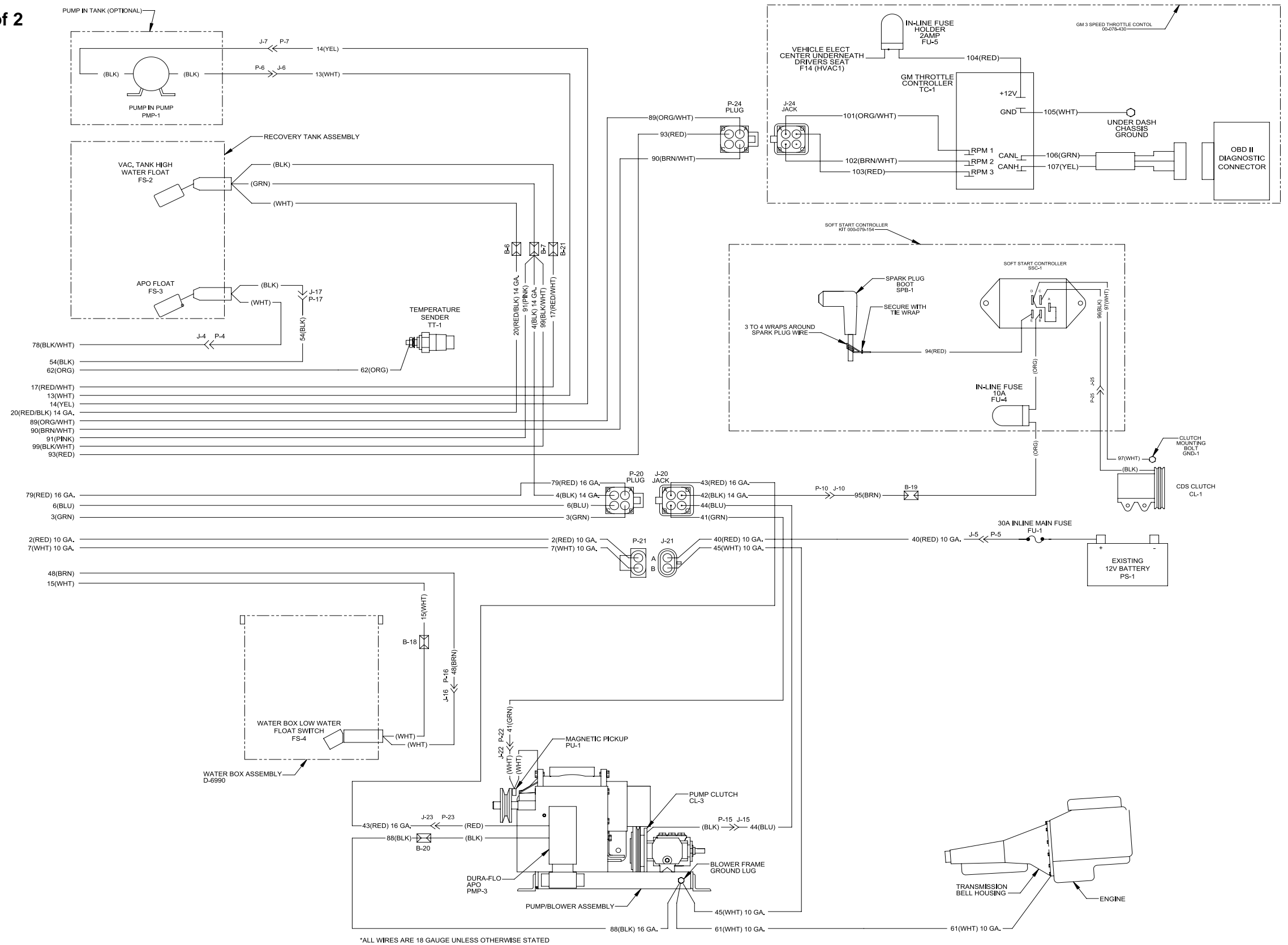


Figure 9-2. Wiring Diagram
- View 1 of 2
 000-179-060 Rev A



*ALL WIRES ARE 18 GAUGE UNLESS OTHERWISE STATED

Figure 9-3. Wiring Diagram - View 2 of 2
000-179-060 Rev A



10 - Machine Maintenance

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 in this section. All recommended maintenance must be performed by competent service personnel.

This section covers:

- Operational Maintenance
- Appearance Maintenance
- Long-Term Maintenance Schedule
- Drive Shaft Maintenance
- Troubleshooting

NOTICE

Record the date and machine hours on the maintenance log provided for your convenience in the Owner's Guide. 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

This section contains recommendations for maintenance that will affect the service life of your unit.

NOTICE

HydraMaster recommends that you follow the vehicle maintenance schedule as stated by the manufacturer. All HydraMaster references to vehicle maintenance serve as general vehicle service reminders. If there are any questions regarding servicing of your vehicle, please contact your local vehicle dealership.

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Daily

- Check engine oil level.
- Empty recovery tank inlet filter.
- Inspect and clean garden hose screen.
- Visually inspect machine for loose wires, oil leaks, water leaks, etc.
- Inspect recovery tank stainless steel filter for clogging or damage; clean, repair or replace as needed.
- Inspect and clean the vacuum slot on the cleaning wand. Watch for sharp edges that may tear the carpet; remove any sharp edges as required.
- Lubricate blower with a HydraMaster-recommended spray lubricant (P/N 000-087-006) through blower lube port.
- Park the vehicle inside or turn on heater during freezing weather.

Weekly

- Check around vehicle and CDS unit for any evidence of oil/fluid leaks.

⚠ WARNING

Grease, oil, antifreeze, and debris build-up near hot equipment, such as the vehicle engine exhaust system or the CDS blower exhaust system, can present a fire hazard and can cause death or bodily injury.

Vehicle engine exhaust system or the CDS blower exhaust system, can present a fire hazard and can cause death or bodily injury.

- Clean and inspect float switches.
- Flush water and chemical system with 50/50 white vinegar solution.
- Change pump oil after first 50 hours; every 300 hours thereafter.
- Check pump oil. Add as necessary.
- Check pump drive belt for wear.
- Check pump pulleys for wear.
- Check CDS blower mounting fasteners, drive shaft clamping collar fasteners, and CDS front end component fasteners, tighten as needed.
- Check internal machine high pressure water lines for wear or chafing.
- Remove and clean chemical container.
- Clean and inspect recovery tank inlet filter.
- Inspect and clean vacuum relief valve.

- Inspect all external solution hoses, vacuum hoses, and quick connects for wear or damage that may cause premature failure, replace as needed.
- Clean recovery tank thoroughly with high pressure washer.
- Check vehicle engine rpm on CDS tachometer:
 - Speed 1 = 1,500
 - Speed 2 = 1,400
 - Speed 3 = 1,300

Monthly

- Check engine air cleaner filter. Clean as necessary.
- Check blower drive belt.
- Clean and inspect battery connections as needed.
- Change blower oil after first 100 hours.

Quarterly

- Check chemical pump, chemical pump valves and diaphragm.
- Change oil in blower every 400 - 500 hours.
- Change oil in pump every 300 hours. Replace pump drive belt (P/N 000-010-065) every 300 hours.
- Check the CDS wiring harness for any chafing or wear, especially in the vehicle engine compartment or near any rotating parts.
- Check the vehicle wiring harness for any chafing or wear, especially in the vehicle engine compartment or near any rotating parts.
- Grease the power pack pillow block bearings.

Every 500 Hours

- Grease drive shaft U-joints, splines and zerks.
- Clean and inspect Salsa Heat exchanger (if equipped).

Yearly

- Give van complete vehicle service.
- Flush the van's cooling system. Add new anti-freeze.
- Change the van's transmission fluid.

Change engine oil and filter after every 2,000 miles.

NOTICE

Refer to the Interval Hours Maintenance chart in the Owner's Guide.

CDS 4.8™

Perform Descaling 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 or improper chemicals. The frequency with which descaling 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 descale monthly.

To descale your system:

1. Add an appropriate descaler chemical to your water box.
2. Circulate it through the heating system. Let it stand.
3. Flush and repeat as necessary.
4. Clean all screens and strainers, and check them frequently following descaling.

NOTICE

If you are circulating a descaler through the flowmeter, make sure to run clean water through the flowmeter after you perform this procedure.

APPEARANCE 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 does not look 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 parts of the machine and spot potential problems before they occur.

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

Daily

- Wipe machine down thoroughly with a damp cloth.
- Flush recovery tank out thoroughly.
- Clean wand to maintain original appearance.
- Wipe down vacuum and high pressure hoses as needed.
- Visually inspect hoses for cuts, etc.

Weekly

- Wipe down entire unit as needed.
- Apply good coat of auto wax to all painted surfaces inside and out.
- Thoroughly clean wand and inspect for clogged jet, debris in vacuum slot and leaking fittings at valve.
- Apply light coat of auto wax to wand. Thoroughly clean vacuum and high pressure hoses including hose cuffs.

LONG-TERM MAINTENANCE SCHEDULE

The following components or systems should be serviced or replaced at the specified intervals.

Component	Interval (Machine hours / months of service)
High pressure water pump rebuild	2,000 / 24
Vehicle engine thermostat	2,000 / 24
Vehicle engine accessory drive belt	2,000 / 24
CDS clutch	3,000 / 36
CDS drive shaft	3,000 / 36
CDS blower silencer and exhaust plumbing	4,000 / 48
CDS and vehicle heater hoses	4,000 / 48
CDS wire harness	4,000 / 48
CDS clutch housing drive bearings	4,000 / 48

CDS 4.8™

DRIVE SHAFT MAINTENANCE

Every 500 operating hours, apply lubricant to the drive shaft's zerk fittings at clutch and blower flange U-joints (see Figure 10-1).

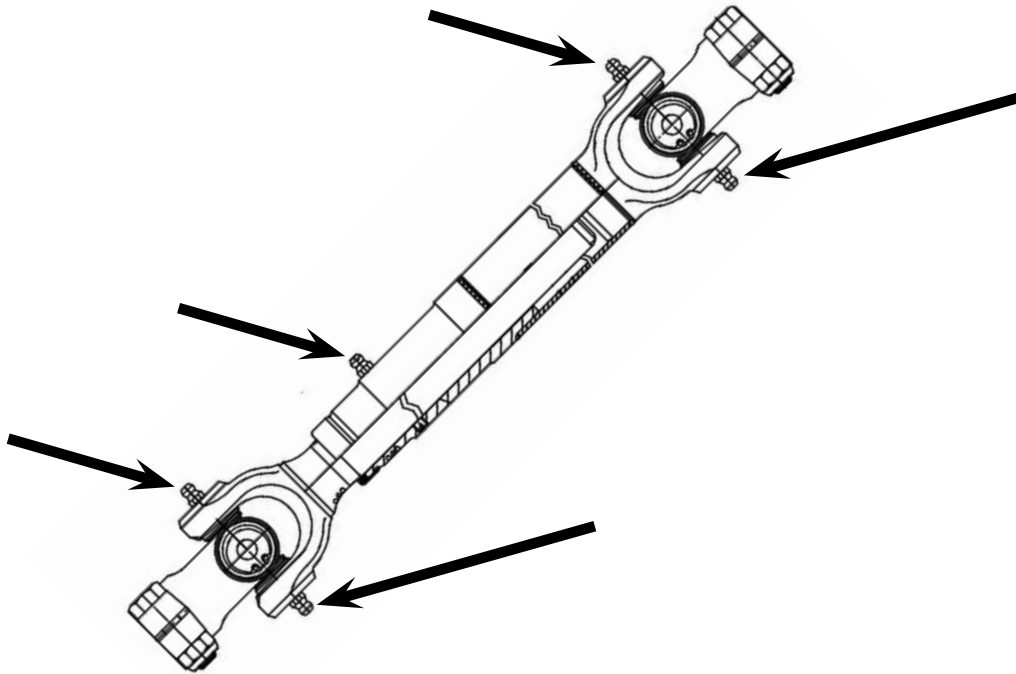


Figure 10-1. Zerk Fittings on Drive Shaft (Chevy and Ford)

The drive shaft splines should also be lubricated with a bearing grease with an application temperature range of -4° F to $+347^{\circ}$ F; the drive shaft manufacturer recommends Mobil Delvac Xtreme Service™ grease as the lubricant.

TROUBLESHOOTING

HEATING SYSTEM

1.0. Vehicle overheats and shuts off CDS

Refer to vehicle dealer for diagnosis and repair.

2.0. Vehicle overheats

POSSIBLE CAUSE	SOLUTION
2.1. Faulty thermostat in vehicle.	Refer to dealer
2.2. Faulty water pump on vehicle	Refer to dealer
2.3. Faulty radiator (plugged) limited water flow	Refer to dealer
2.4. Faulty fan clutch, limited air-flow.	Refer to dealer

3.0. Unable to achieve normal cleaning temperature

POSSIBLE CAUSE	SOLUTION
3.1. There is hard water or chemical build-up in the heat exchangers.	This will not allow the heat to transfer properly. Descale and flush as necessary.
3.2. Cleaning solution flow is too great.	Measure flow at tool.
	3.2.1. The jet in the cleaning tool is too large or worn out. Test the tool for water flow and replace or repair jet as necessary.
	3.2.2. Cleaning solution pressure is too high. Adjust pressure to normal. Inspect pressure gauge for accurate reading.
3.3. The system thermal valve is stuck open.	Remove recovery tank lid and check for premature flow from thermal valve hose at tank. The machine must be at or below normal operating temperature for this test. Replace or repair as necessary.
3.4. The CDS is being operated at too low rpm or too low vacuum setting.	The system must be at full operating rpm and full vacuum load to achieve full operating temperature. These values must be set per manufacture's specifications. Adjust vacuum or rpm as necessary.

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4.0. System attains normal heat but drops off sharply

POSSIBLE CAUSE	SOLUTION
4.1. Solution flow at cleaning tool is too high. Orifice in tool is too large or worn out.	Test flow of tool. Repair or replace as necessary.
4.2. The rpm of machine is set too low.	Adjust as necessary.
4.3. Recirculation orifice plugged, giving incorrect reading at gauge.	Clean filter screen and inspect orifice. Clean or replace as necessary.
4.4. Cleaning solution pressure is too high.	Adjust pressure to normal. Inspect pressure gauge for accurate reading.
4.5. Hard water deposits are in the system.	Descale system as directed in this Owner's Manual (see page 10-4).

Miscellaneous

1.0. Vehicle radiator overflows into coolant overflow container while machine is in use.

POSSIBLE CAUSE	SOLUTION
1.1. Internal leak in coolant heat exchanger.	Pressure test each heat exchanger separately to determine which heat exchanger is faulty. This process requires heated water and high pressure to simulate the same conditions that are causing the leak. Refer to qualified service technician if necessary.

11 - How to Order Parts

To order warranty replacement parts or repairs, it is important that you read this section which includes:

- Warranty Parts Orders
- Parts Orders
- Emergencies

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. 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. Diagnostic reimbursement is specifically excluded.

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12 - Warranty Information

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

BLOWER

- Failure to lubricate impellers daily with an oil-based lubricant, to lubricate bearings, to maintain proper oil levels, or 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.

VACUUM 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.
- Use of improper chemicals.

CHEMICAL SYSTEM

- 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.

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VACUUM AND SOLUTION HOSES

- Failure to protect hoses against freezing.
- Failure to protect hoses against burns from engine and 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 AND TOOL

- Failure to protect against freezing.
- Obvious physical abuse of wand or tool.

WATER HEATING SYSTEM

- Over-pressurization of the system (recommended maximum working pressure - 1,200 psi).
- Failure to protect against freezing.

HARD WATER DEPOSITS

- Failure to use or maintain a water softening system or a properly installed magnetic-type descaler, whichever might be necessary, with machines operating in designated "Hard Water Areas" (3.5 grains or more per gallon).

WARRANTY PROCEDURE

Warranty coverage is available to you through your local distributor.

If you have moved to a new area or have purchased a used machine and need information regarding your local distributor, call HydraMaster at (425) 775-7272 or email us at: custsvc@hydramaster.com.

When calling your distributor, be sure to have the machine's information; model and serial number, ready for the service representative.

FOR YOUR REFERENCE:

Model No. _____

Serial No. _____

Date of Purchase: _____

Purchased From (Distributor): _____

HYDRAMASTER® LIMITED WARRANTY

HydraMaster warrants to the original end user, each new machine, new accessories and genuine replacement parts against defects in material and workmanship under normal use and service. Our obligation under this warranty is limited to repair or replacement of the defective item at our factory or by an Authorized Service Center. Warranty coverage shall begin on the date of purchase by the original end user (as evidenced by your invoice from the factory or Authorized Dealer) or six (6) months from the date the machine was shipped from the factory whichever is earlier. The warranty registration card must be completed and returned within 30 days of purchase. The warranty coverage period is specified below.

GROUP	Parts^{1,2}	Labor²
Frame	3 Years	2 Years
Covers	3 Years	2 Years
Vacuum Recovery Tank (Structural only)	3 Years	2 Years
Vacuum Pump	See Note 3	2 Years
Chemical Systems	2 Years	2 Years
Hoses, Internal Machine	2 Years	2 Years
Hoses, External Machine	2 Years	2 Years
Valve, High pressure bypass	2 Years	2 Years
Water Heating System	2 Years	2 Years
Pump, High pressure water	See Note 3	2 Years
Belts	2 Years	2 Years
Fittings, internal machine	2 Years	2 Years
Filter Screens	2 Years	2 Years
Gauges	2 Years	2 Years
Electrical Components	2 Years	2 Years
Engine	See Note 3	2 Years
Accessories and Fresh Water Tanks	1 Year	1 Year
Replacement Parts ⁴	90 Days	NA
NOTES:		
1-Parts repaired or replaced are guaranteed for the remainder of the original machine warranty period.		
2-Coverage only applicable to products sold and used in the United States and Canada.		
3-As provided by the original Manufacturer.		
4-Applies to replacement parts only after machine warranty coverage has expired.		

This warranty shall not apply to repairs resulting from accidents or misuse, damage in transit, overloading the capacity of the machine, failure due to lack of proper maintenance or care as described in the operating and maintenance instructions. Freezing of any water or chemical related component will VOID all warranties on water or chemical related components, internal or external. Corrosion, deposits and/or build-up in the water, chemical, recovery or heating systems due to hardness in the water used or chemicals which result in deposits, will VOID all warranties on affected components. The use or application of any chemicals including but not limited to acids or solvents, which results in damage to metal, rubber, plastic, or painted parts will VOID all warranties on those parts. Minor adjustments, such as tightening of screws or bolts not connected with the replacement of parts, are not covered. Replacement of expendable wear items including but not limited to paint, labels and other cosmetic parts are also not covered. Repairs or alterations by an organization other than the factory or an Authorized Service Center are not covered and will void any HydraMaster warranty as to the parts or systems repaired or altered by a non-authorized organization.

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION OF THE LIMITED WARRANTIES STATED WITHIN. NO OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS MADE EXCEPT AS EXPRESSLY STATED HEREIN. ANY STATUTORY IMPLIED WARRANTIES, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, THAT ARE IMPOSED BY LAW DESPITE THE EXPRESS LIMITATION OF WARRANTIES ABOVE, ARE EXPRESSLY LIMITED TO THE DURATION OF THE WRITTEN WARRANTY. BUYER UNDERSTANDS, ACKNOWLEDGES AND AGREES THAT THE REMEDIES PROVIDED UNDER THIS LIMITED WARRANTY ARE THE SOLE AND EXCLUSIVE REMEDIES AVAILABLE TO THE BUYER. HYDRAMASTER WILL NOT BE LIABLE FOR ANY OTHER OR ADDITIONAL DAMAGES, INCLUDING BUT NOT LIMITED TO INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE FURNISHING, PERFORMANCE, USE OF OR INABILITY TO USE THE MACHINE. ANY EXTENSIONS OF OR MODIFICATIONS MADE TO THIS WARRANTY BY A DEALER/DISTRIBUTOR OF HYDRAMASTER ARE THE SOLE RESPONSIBILITY OF THE DEALER/DISTRIBUTOR.

HydraMaster will pay all freight and transportation charges within the United States, via normal ground shipping means, for replacement of parts covered under this warranty. All material must be properly authorized by HydraMaster prior to being returned. When returning, please provide an explanation of the problem and include the serial number of the machine as well as the name of the selling organization. All defective material must be returned to HydraMaster within 60 days of authorization. The Technical Service department of the authorized Dealer Service Center or the factory will investigate and then contact you.

Transportation of hazardous waste or contaminated equipment is subject to various laws and regulations. In returning machines, parts, or accessories under this limited warranty, the end user must certify in writing that the machines, parts or accessories being returned have not been used for handling, clean up, or disposal of hazardous waste or hazardous materials including but not limited to such things as asbestos, anthrax etc. or if the machines, parts or accessories being returned have been used for handling, clean up, or disposal of hazardous waste or hazardous materials, then the end user must have the machines, parts or accessories decontaminated by licensed and qualified decontamination professionals and provide written certification of this decontamination signed by the decontamination professionals. These machines, parts or accessories are to be returned only to the local HydraMaster Authorized Service Center for Warranty service along with decontamination certification.

HydraMaster reserves the right to change its warranty policy without notice.

HydraMaster is a Nilfisk-Advance, Inc. brand.

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13 - Accessories and Chemical Solutions

HydraMaster's machine accessories are the most innovative collection available in the cleaning industry. For example, our RX-20 Rotary Extractors have changed the shape of steam cleaning. In addition, our hoses, reels and tanks are of the finest quality construction.

Our carpet care and hard floor care chemical solutions have been specially prepared, not only to give you exceptional cleaning, but also to optimize your truckmount's operation and reliability. HydraMaster's chemical solutions will help maintain your machine's water pump and water heating systems at peak efficiency and also help ensure fewer breakdowns.

HydraMaster's full line of machine accessories and chemicals can enhance cleaning performance while reducing your labor costs, and include:

- Upholstery Tools
- Wands
- Vacuum Hoses
- Tanks
- Van Accessories
- Hose Reels
- Carpet Care Detergents
- Rinse Agents
- Pre-Sprays
- Hard Floor Care Detergents
- De-Foamers and Descalers
- Deodorizers and Disinfectants
- Spotting Agents

For more information, refer to the following pages or visit our website at www.hydramaster.com.

To order genuine HydraMaster accessories and chemical solutions, call your nearest authorized HydraMaster Distributor.

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