



CDS xDrive Owner's Manual

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Table Of Contents

GENERAL INFORMATION	SECTION 1
CDS xDrive Unit Overview.....	1-2
Contact Information	1-3
Warnings, Cautions and Notices	1-4
Responsibilities.....	1-9
Machine Specifications.....	1-10
Local Water Precautions.....	1-12
Waste Water Disposal Advisory	1-15
CHEMICALS AND CLEANING	SECTION 2
Cleaning Precautions.....	2-2
Cleaning Stroke Procedure.....	2-2
Preparing the Carpet	2-5
Overwetting.....	2-6
Severe Cleaning	2-7
OPERATING INSTRUCTIONS	SECTION 3
Before Operating the CDS xDrive.....	3-1
CDS xDrive Start Up.....	3-3
CDS xDrive Shut Down	3-5
FREEZE GUARD	SECTION 4
Draining the CDS xDrive.....	4-3
Freeze Protecting Pump In System.....	4-4
WATER AND CHEMICAL SYSTEM	SECTION 5
Water and Chemical Flow Operation.....	5-1
Chemical System Maintenance	5-2
Water Flow Diagram	5-3
WATER PUMP MAINTENANCE	SECTION 6
Daily Maintenance	6-1
Periodic Maintenance	6-2

VACUUM BLOWER SYSTEM..... SECTION 7

Recovery Tank Inlet Filter	7-2
Vacuum Blower Lubrication	7-3

ELECTRICAL SYSTEM..... SECTION 8

Electrical Schematic	8-2
Wiring Diagrams	8-3
Capacitors.....	8-6

ASSEMBLIES AND PARTS LISTS..... SECTION 9

Package - CDS xDrive Parts List.....	9-1
Assembly - Console Parts List.....	9-4
Power Pack Assembly Parts List	9-6
Frame Assembly Parts List	9-9
Blower Assembly Parts List	9-13
Heat Sink Assembly Parts List.....	9-15
Instrument Panel Assembly Parts List	9-17
Hi-Psi Manifold Assembly Parts List	9-19
Bypass Valve Assembly Parts List.....	9-20
Dash Panel Assembly Parts List.....	9-21
Pump Assembly Parts List.....	9-23
Blower HX Assembly Parts List	9-25
Top Cover Assembly Parts List.....	9-27
Right Cover Assembly Parts List	9-28
Recovery Tank Assembly Parts List.....	9-29
Heat Exchanger Parts List	9-31
Water Box Assembly Parts List.....	9-32
Tank Cover Assembly Parts List	9-34
Vacuum Relief Valve Assembly Parts List	9-35
Capacitor Assembly Parts List.....	9-36

TROUBLESHOOTING SECTION 10

System Troubleshooting	10-2
Controller Codes.....	10-9
Chemical System Troubleshooting	10-12
Water Pump System Troubleshooting	10-14
Vacuum Blower Troubleshooting	10-17
Heating System Troubleshooting.....	10-18

MACHINE MAINTENANCE	SECTION 11
Operational Maintenance.....	11-1
Appearance Maintenance.....	11-2
Long-Term Maintenance Schedule	11-3
HOW TO ORDER PARTS	SECTION 12
Warranty Parts Orders.....	12-1
Parts Orders	12-1
Emergencies.....	12-1
WARRANTY INFORMATION.....	SECTION 13
Blower	13-1
High Pressure Water Pump	13-1
Vacuum Tank	12-1
Chemical System.....	13-1
Control Panel	13-1
Vacuum and Solution Hoses	13-2
Cleaning Wand and Tool.....	13-2
Water Heating System.....	13-2
Hard Water Deposits	13-2
Warranty Procedure.....	13-2
For Your Reference:.....	13-2

1 - General Information

The CDS xDrive is HydraMaster's newest, most technologically advanced carpet cleaning and hard surface cleaning machine. This electrically powered system has been designed to fit into a compact, modular configuration, providing not only high performance but ease of installation and simpler maintenance.

The CDS xDrive features:

- a HydraMaster-exclusive generator located in the van's front end
- a power pack assembly that includes a HydraMaster-exclusive motor, which drives the Gardner Denver 408 Tri-Flow® blower, and the General Pump® high pressure water pump
- two pack programmable electronic controllers - one dedicated to the generator and one dedicated to the blower
- a 52V ultracapacitor pack



It is the purpose of this manual to help you properly understand, maintain and service your CDS xDrive. Follow the directions carefully and you will be rewarded with years of profitable, trouble-free operation.

This Owner's Manual contains operation instructions as well as information required for proper maintenance of the CDS xDrive.

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 CDS xDrive. Truckmount System, paying special attention to all **Warnings and Cautions**.

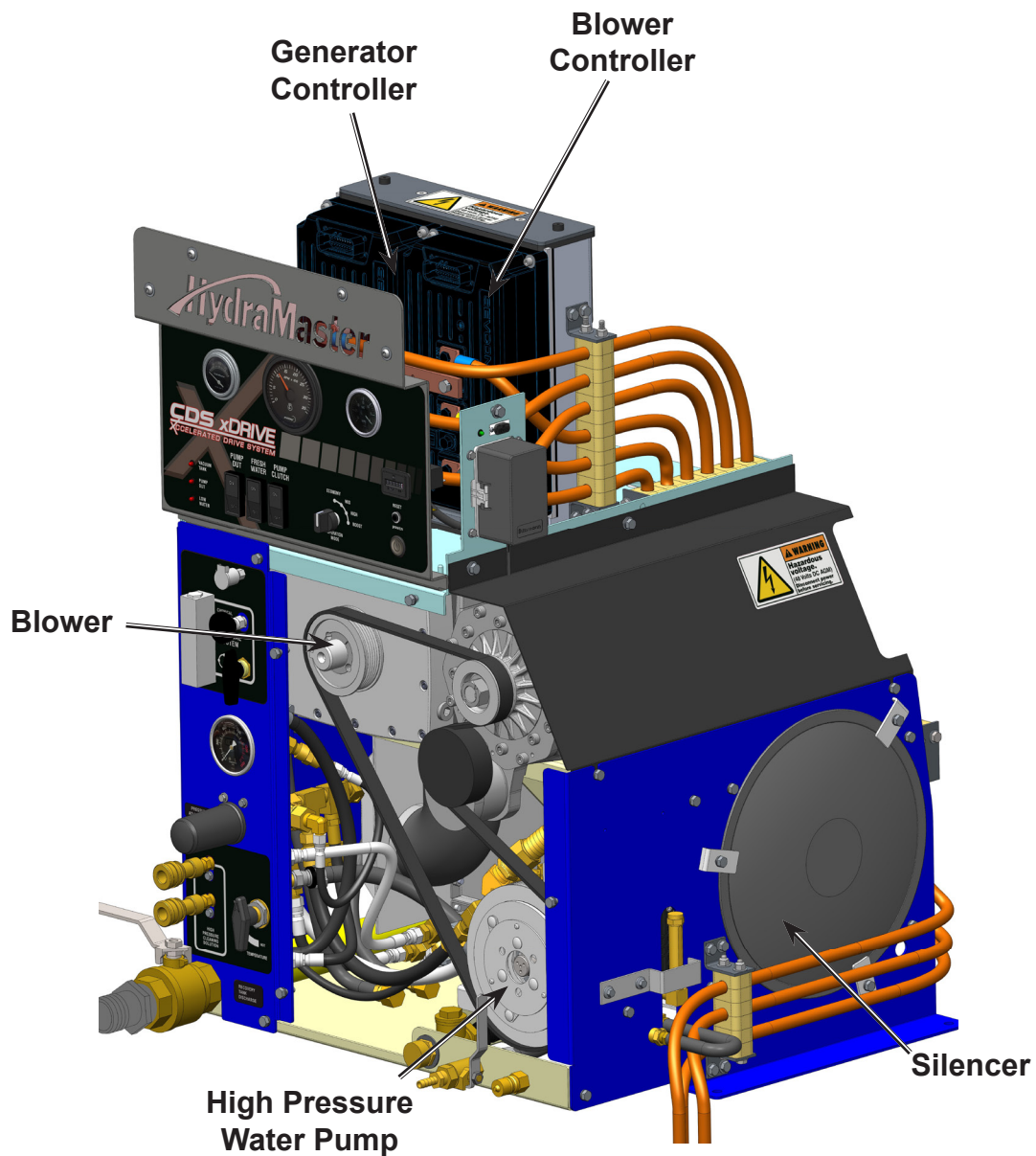


Figure 1-1. CDS xDrive Unit Showing Location of Power Pack, Silencer and Controllers.

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 (800) 426-1301 FAX : (800) 426-4225	Technical Support techsupport@hydramaster.com
	Customer Service/Parts 800) 426-1301 FAX : (800) 426-4225	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.

⚠ 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

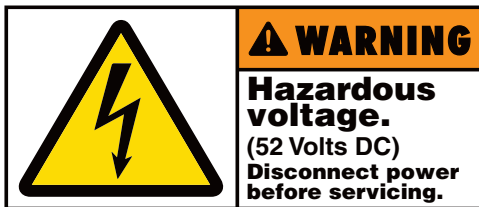
ENGINE EXHAUST: The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

⚠ WARNING

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

⚠ WARNING

*Do not attempt to service capacitor pack.
Severe bodily injury may result.*



CAUTION

The use of some chemicals through your machine can seriously damage the internal plumbing, high-pressure pump, chemical pump and heat exchanger. These harmful chemicals include concentrated acid 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.

CAUTION

Do not attempt to open the controller as there are no serviceable components. Opening the controller will invalidate the warranty.

CAUTION

Do not mechanically modify the controller in any way as unexpected damage may occur. Mechanically modifying the controller will invalidate the warranty.

CAUTION

Do not use any other form of fasteners other than those supplied with the controller without contacting HydraMaster for advice. Use of inappropriate fasteners or torques could damage the controller.

RESPONSIBILITIES

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 receipt of vehicle and communication with the transport company. The sales representative is also responsible for training you in its operation, maintenance and precautions.

Installation Verification

- The correct installation of the unit and recovery tank in your vehicle and the securing of 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.

MACHINE SPECIFICATIONS

Frame and Recovery Tank	26.25"W x 40.75"H x 68.25"L	
Total Weight	775 lbs	
Construction	Marine aluminum with epoxy finish	
	Chassis galvanized steel	
Power Pack	Vacuum Blower	Gardner Denver 408 TriFlow
	Water Pump	General Pump
Drive System	3 Phase PMAC Generator	
	3 Phase Motor	
	(2) PMAC Motor Controllers	
	52 V capacitor pack	
Chemical System	Last-step chemical injection, meter controlled	
Heating System	3- Zone	
Instruments		
	Electronic tachometer, 0-3,500 rpm	
	Water temperature gauge, 0-320 degrees F	
	Vacuum gauge, 0-30" hg	
	Hour meter, machine run-time	
	Electronic circuit protection breaker, resettable	
	Machine status indicator lamps	
	Chemical flowmeter, 0-10 gph	
	Solution pressure gauge, liquid filled, 0-2,000 psi	
	Water pressure adjustment	
	Blower lubrication port	
	High pressure solution outlets, quick-disconnects	
	Fresh water inlet fitting, quick-disconnect	
	Water box drain valve	
	Chemical controls	
Recovery Tank	100 gallon aluminum	
Cleaning Tool/ Wand	One HydraMaster Evolution wand	

High Pressure Hose	1/4" high temperature, lined, vinyl covered
	Hose rated to 2,200 psi, 250 degrees F
Other Standard Equipment	Runtime hour meter
	Chemical flow meter (0-10 GPM)
	Chemical flow control valve
	Vacuum gauge (0"-30" Hg)
	Solution pressure gauge (0-2,000 PSI)
	Solution pressure adjustment
	Pre-wired pump-in switch
	Pre-wired APO Switch/APO outlet
	Fresh water inlet
	Water system drain valve
	Blower tachometer (0-3,500 RPM)
	Electronic throttle control
	Electrical circuit protection (resettable)
	Solution pump switch
	4 speed control
	CDS Power Transfer package
	Top-mounted gauge cluster & control console
	Dual wand solution connections
	Dual wand vacuum connections
	Freeze guard system
	Safety wheel chocks
	10 ft x 1 1/2" whip line
	10 ft x 1 1/2" drain line
	150 feet High Performance Solution/Vacuum Hoses
	Garden Hose
	Chemical jug holder
	2.5 gallon chemical jug
	Operation & maintenance manual
	Embroidered HydraMaster jacket
	Van decal
	3 Year Warranty

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 1-2, 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.

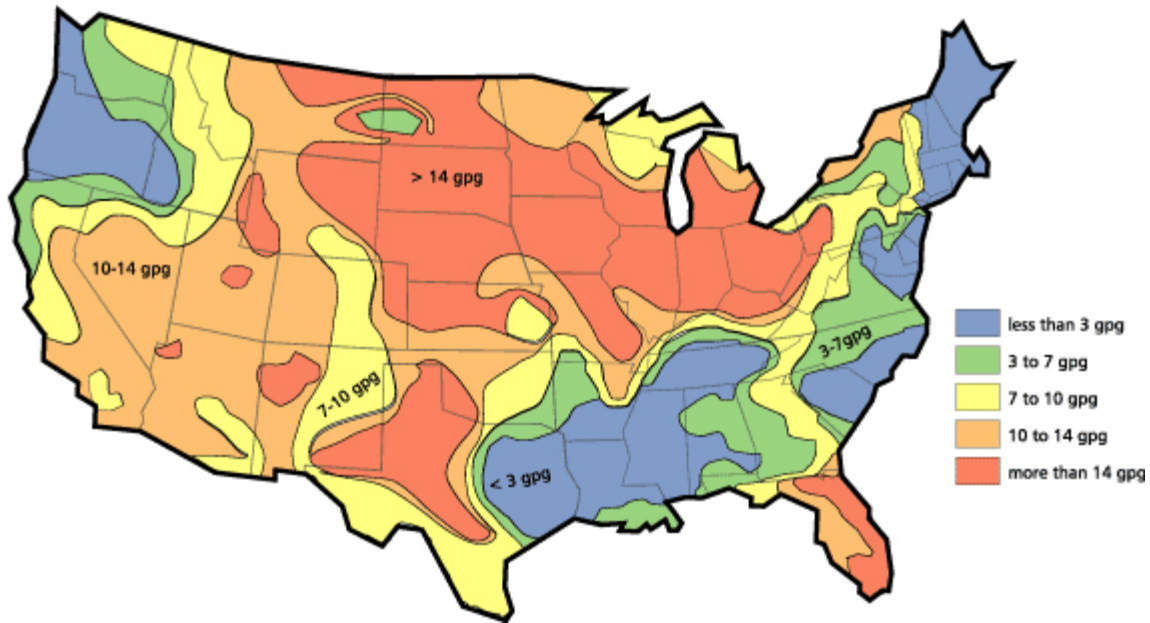


Figure 1-2. Hard Water Map of Mainland United States

NOTICE

The map shown in Figure 1-2 is provided for general reference only. Water hardness in your geographical location should be confirmed by testing.

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 xDrive machines in areas exceeding 3.0 grains per gallon.

Failure to use a water softener in these areas will invalidate the machine's warranty. Referring to the hard water area map shown Figure 1-2, 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.

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 xDrive with a waster water disposal system. These systems are designed to remove waste water from the extractor’s recovery system and actively pump the water through hoses to a suitable disposal drain.

HydraMaster makes an automatic waster water disposal system (AWDS) 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.

BATTERY RESET FOR FORD TRANSIT VAN

If the battery has been disconnected or a new battery has been installed, some system settings must be reset after the battery is reconnected.

Refer to the Ford Transit Owner’s Manual for instructions for battery reset conditions.

2 - Chemicals and Cleaning

The CDS xDrive 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.

HydraMaster strongly recommends attending an Institute of Inspection, Cleaning and Restoration Certification (IICRC) approved school as soon as possible and to always follow the IICRC guidelines when cleaning.

This section of the manual contains the following information:

- Cleaning Precautions
- Cleaning Stroke Procedure
- Overwetting
- Cleaning Tool Tips

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).

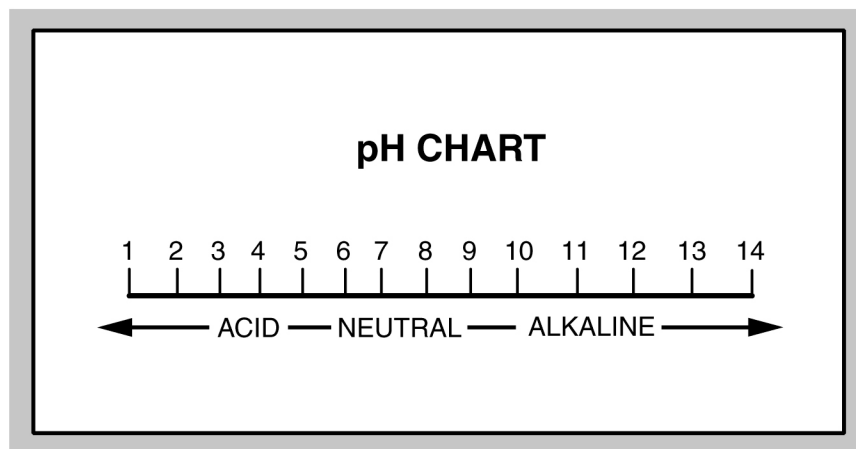


Figure 2-1. pH Chart

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.

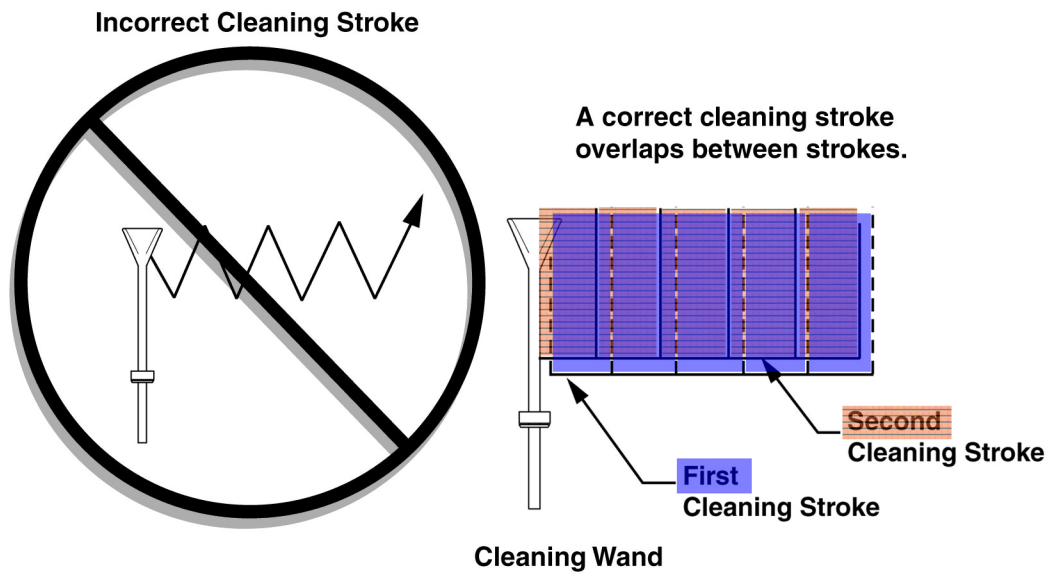


Figure 2-2. Cleaning Stroke Procedure

CAUTION

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

PRECAUTIONS

The use of some chemicals (such as concentrated acids and/or solvents) in your truckmount can seriously damage the internal plumbing and high pressure pump.

HydraMaster strongly recommends purchasing a water softener to prevent the buildup of scale and hard water deposits in your truckmount.

HydraMaster recommends only the use of chemicals containing rust and corrosion inhibitors and water softening agents to prevent chemical buildup which may lead to component failure and warranty invalidation.

CAUTION

Increased demand for a neutralizing rinse results in the need for special care when using these acid based chemicals in your truckmount. The adverse side of using these products is the corrosive effects the acid can have on metals, including fittings, pumps, heat exchangers, etc.

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

PREPARING THE CARPET FOR EXTRACTION

Pre-Vacuum the Carpet

Whether you instruct the customer to pre-vacuum or you offer it as part of your service, proper vacuuming will make your job easier with superior end results. The more time spent removing loose particulate soil, the easier it will be to remove the oily soil stuck to the fibers.

Pretreat the Carpet

This process of applying traffic lane type chemicals to the carpet (whether by sprayer or rotary scrubber) is essential prior to extraction with your truckmount.

By applying cleaning agents to the carpet and letting them dwell 10-20 minutes prior to rinsing, you allow the product to dissolve and emulsify the oily, sticky binders holding the soil to the fiber. This will allow more soil to be removed in one or two cleaning passes and help prevent over-wetting.

Remember the solution coming out of your cleaning tool is only in contact with the carpet fiber for a few seconds. Relying on the rinse detergent to do the majority of the cleaning will result in overly long dry times and excess detergent residue left in the carpet.

HydraMaster recommends the use of our pre-sprays: **Fastbreak™** for residential carpet and **Blitz™** for commercial carpet needs.

RINSE AND RECOVER

Whether you are using a wand or a rotary extraction tool, you should clean an area approximately 3 ft. x 3 ft. with the solution valve open then immediately go over that area with vacuum only to remove any excess moisture.

CAUTION

Olefin fiber is becoming more popular, particularly in commercial installations. The process mentioned above can leave excessive residual moisture because olefin fibers will not absorb any of the cleaning solution. You must only apply solution during the backward stroke of the wand so it can be immediately captured by the vacuum head. RX-20® users should follow each pass with a dry pass. Failure to follow this procedure will cause solution to flow to the back of the carpet along with some of the soil. This, along with any soil imbedded in the backing, will be wicked to the surface of the fibers as the carpet dries.

HydraMaster recommends the following rinse aids: Alkaline - **HydraDri Powder™** or **HydraCleanLiquid™**. Acid - **Clear Water Rinse™**.

NOTICE

For more information about HydraMaster's complete chemical product line, visit this webpage:
<http://hydramaster.com/Products/Chemicals.aspx>

OVERWETTING

Overwetting is an annoyance to all concerned. Extended drying times will leave the customer with a negative impression of both the cleaning company and the process used.

There are several factors that will cause over-wetting:

1. Too few vacuum strokes.
2. Clogged vacuum blower filter or Recovery Tank lid not sealing properly.
3. Recovery Tank drain valve left partially open.
4. Obstructed, cut or kinked vacuum hoses.
5. Obstructed vacuum hoses while cleaning a heavily foam-saturated carpet (it is recommended to use a crystal type defoamer distributed evenly over the carpet).

STREAKING

Streaks in the carpet can appear in both clean or dirty areas and normally appear in heavily soiled, light colored carpets.

Possible reasons of streaking may include:

1. Clogged or improperly angled spray nozzles.
2. Spray nozzles that overlap, concentrating the solution.
3. A partially clogged vacuum head.
4. Inconsistent solution temperature.

SEVERE CLEANING SITUATIONS

When your truckmount is used for hard-surface cleaning or pressure washing, some jobs may involve severe cleaning situations. In these cases, certain precautions will need to be taken in order to ensure that the recovery tank and various internal components are not damaged

The following are examples of severe cleaning situations. (This list is not intended to be complete.)

- Concrete stripping
- Parking lot cleaning
- Extremely greasy floors
- Cleaning that results in the recovery of extensive particulate residue
- Cleaning that results in extensive foam production

When your truckmount is used in severe cleaning situations:

- A pre-filter must be used on the vacuum hose. A fine-mesh filter (i.e. nylon) should be installed into the pre-filter. Contact your distributor for more information.
- The recovery tank should be inspected and cleaned daily.
- The recovery tank inlet filter screen should be rinsed after every job.
- The rectangular blower filter should be rinsed after every job.
- Special care should be taken to clean debris from the recovery tank float switches; they should be inspected daily to ensure that they are fully operational.
- Any cleaning job that induces excessive foam production should be halted until an approved de-foaming agent can be added to the tank.

CAUTION

Failure to follow these recommendations may lead to component failure and warranty invalidation.

CAUTION

Use of the vacuum recovery system when stripping or otherwise removing wax from floors is specifically excluded as an approved use of the truckmount. Failure to follow this exclusion may lead to component failure and will invalidate your warranty.

CAUTION

Use of the vacuum recovery system for “dry cleaning”, without corresponding solution application (i.e. duct cleaning), is specifically excluded as an approved use of the truckmount. Failure to follow this exclusion may lead to component failure and will invalidate your warranty.

CAUTION

If concentrated acids or solvents are used to pre-treat surfaces before power washing, do not recover them through the vacuum system. Failure to follow this exclusion may lead to component failure and will invalidate your warranty.

CLEANING TOOL TIPS

Wands

With a wand, keep cleaning strokes short, front to back, and run a “dry pass”.

After pulling the wand for a strip of 3 or 4 ft long with the solution trigger activated, go back up to the top of the stroke, and make a “dry “ pass [i.e. no solution flowing]. This gives the wand a second chance to pick up the solution on the carpet.

If you do not run a dry pass, the carpet can take longer to dry, and, possibly, the pad under the carpet can become saturated.

Be aware of the carpet seams; try to use strokes that are parallel with the seam. Avoid pulling the wand across the seam. Every stroke can peel the seam connection and pull the carpet off the floor.

Also, tilt the wand handle down [head up] to move the tool forward, and away from you, on the carpet. This means less pull on the carpet and less work for you.

3 - Operating Instructions

This section of the manual contains the following instructions:

- Before Operating the CDS xDrive
- CDS xDrive Start Up
- CDS xDrive Shut Down

BEFORE OPERATING THE CDS XDRIVE

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

WARNING

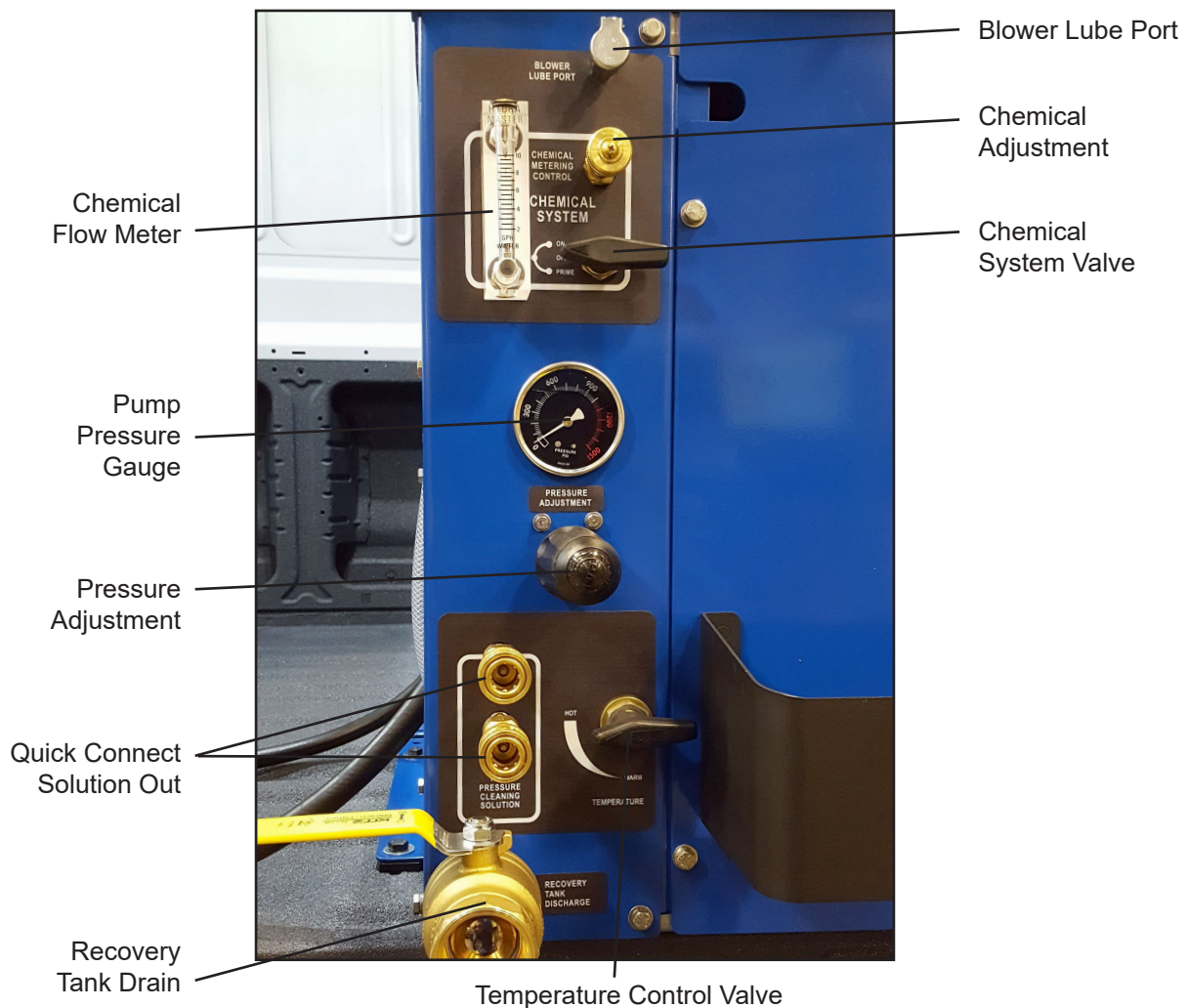
The vehicle in which the CDS xDrive operates generates toxic fumes. Position the vehicle so that the fumes will be directed away from the job site. Do not park where exhaust fumes can enter a building through open doors, windows, air conditioning units or kitchen fans.

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 2.5 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.

CDS XDRIVE UPPER DASH



CDS XDRIVE LOWER DASH



CDS xDRIVE START-UP

1. Make sure the vehicle's gear select lever is in the Park position and the parking brake is set. Also make sure all vehicle accessories are turned off (A/C, fan).

NOTICE

The CDS xDrive will not operate correctly without parking brake engaged.

2. Start the vehicle's engine.
3. Ensure the capacitor voltage is above 32v
4. Turn ON the POWER switch.
5. Select the motor speed - Economy, Mid, High, Boost
(Allow the unit to achieve operating RPM).
6. Turn ON the PUMP CLUTCH switch. Adjust cleaning pressure to desired level.

NOTICE

CDS xDrive Flood restoration work

When using equipment for flood damage, leave the pump clutch off. This will reduce the engine power load and save on fuel consumption.

7. Turn ON the FRESH WATER switch (if fresh water tank is included).
8. Turn the heat control valve to 'MAX' adjust temperature to desired level.
9. 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 knob to the desired level.

10. Optional: Turn the Pump Out switch 'ON' if using the Automatic Pump-Out feature.

NOTICE

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

11. 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 xDrive POWER switch off and empty the recovery tank. Then, turn the unit back on and continue to clean.

CDS xDRIVE 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 7 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, turn off CDS xDrive power switch.
9. Drain the recovery tank.

NOTICE

If your CDS xDrive is equipped with an automatic Pump Out, first connect a garden hose to the outlet on the front of the machine. The CDS xDrive must be 'ON' for APO to operate.

If your CDS xDrive is not equipped without an automatic Pump Out, drain the recovery tank through the recovery tank discharge valve.

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.

10. After the recovery tank is drained, lift the recovery tank lid and remove the filter basket.
11. Clean out any accumulated debris.
12. Rinse and re-install.
13. Check the pleated blower filter.
14. Clean out any accumulated debris.
15. Rinse and re-install.
16. Recommend leaving the tank lid open overnight for air circulation in the waste tank.

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.

4 - Freeze Guard

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

CAUTION

If freeze damage does occur to the engine and generator, those components can lock up and require replacement. Also, seals can fail, resulting in broken hoses and water leakage.

BE SURE YOUR MACHINE IS PROTECTED!

Freezing will cause component damage and void warranty.

This section of the manual includes information concerning:

- Draining the CDS xDrive
- Freeze Protecting Pump In System

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.

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.

CAUTION

If the coolant mix in the engine incorrect (too much - too little), damage to the engine and generator can result which is not covered by warranty. Make sure that the coolant mix ratio is correct.

DRAINING THE CDS xDRIVE

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.

FREEZE PROTECTING FRESH WATER PUMP IN SYSTEM

1. Drain the fresh water tank.
2. Open water box drain valve.
3. Turn on the fresh water tank pump and run for 1 - 2 minutes until all the water is purged from the hose.

CAUTION

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

5 - Water and Chemical System

The CDS xDrive 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

WATER AND CHEMICAL FLOW OPERATION

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

- Water is fed into the CDS xDrive 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.

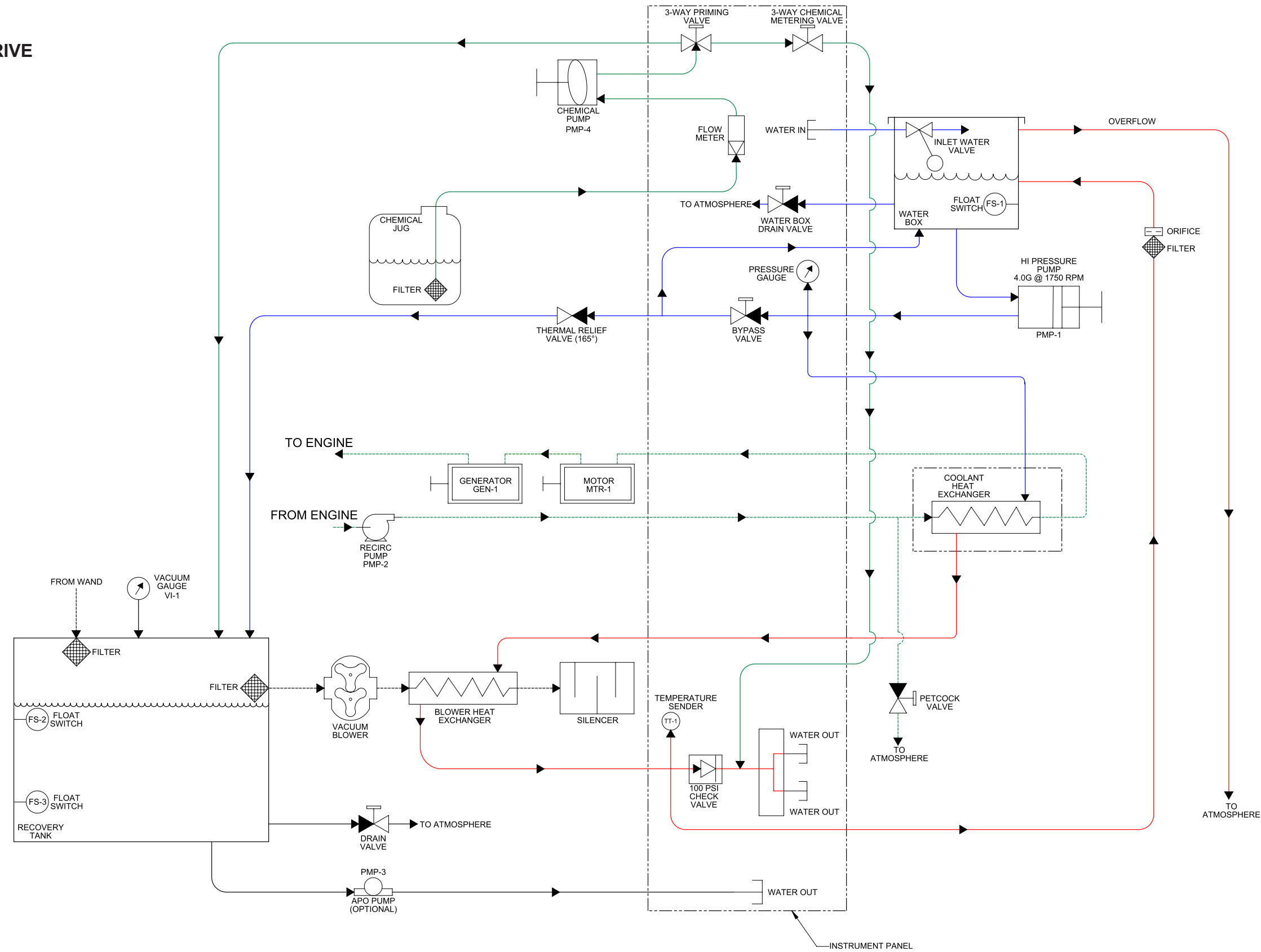
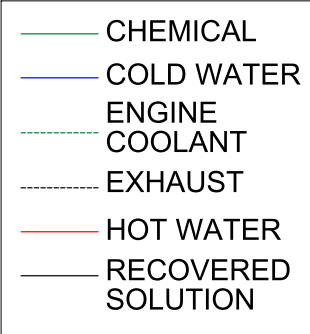
CHEMICAL SYSTEM MAINTENANCE

The chemical lines may need to be flushed with vinegar periodically to prevent abnormal chemical build-up.

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.

Figure 5-1. FLOW DIAGRAM - CDS xDRIVE
000-179-052 Rev B



6 - Water Pump Maintenance

The CDS xDrive 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

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 xDrive 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.

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 11).

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.

7 - Vacuum Blower System

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

- Recovery Tank Inlet Filter
- Vacuum Blower Lubrication

The positive displacement 408 TriFlow® Rotary Tri-Lobe blower is compact in design while providing high throughput and low noise.

The blower's dual splash lubrication system has independent oil sumps which prevent cross contamination and allow the blower to operate safely on an incline or a decline.



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 and bearings.

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 xDrive 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.*

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 CleanMaster's DeFoam as directed. (Part# 950-177)

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

Because the CDS xDrive is very demanding of the vacuum blower, the vacuum blower should be maintained as recommended in the Maintenance section of this manual.

NOTICE

The vacuum blower manufacturer recommends the use of AEON® PD lubricant.

The oil should be drained, flushed and replaced every 500 hours. Locate the blower drain hoses inside the lower left hand panel of the CDS unit.

To drain the lubricant:

Position a drain pan to capture the oil. Remove cap from end of hose fitting and drain into oil pan.

To replace the lubricant:

To refill the blower, remove the plug from the top left side of the blower. Using a flexible funnel/bottle with hose, refill the blower with oil through this port. Watch oil sight glasses at bottom of the gear case. When oil is visible in the sight glasses, stop filling. Replace oil fill plugs.

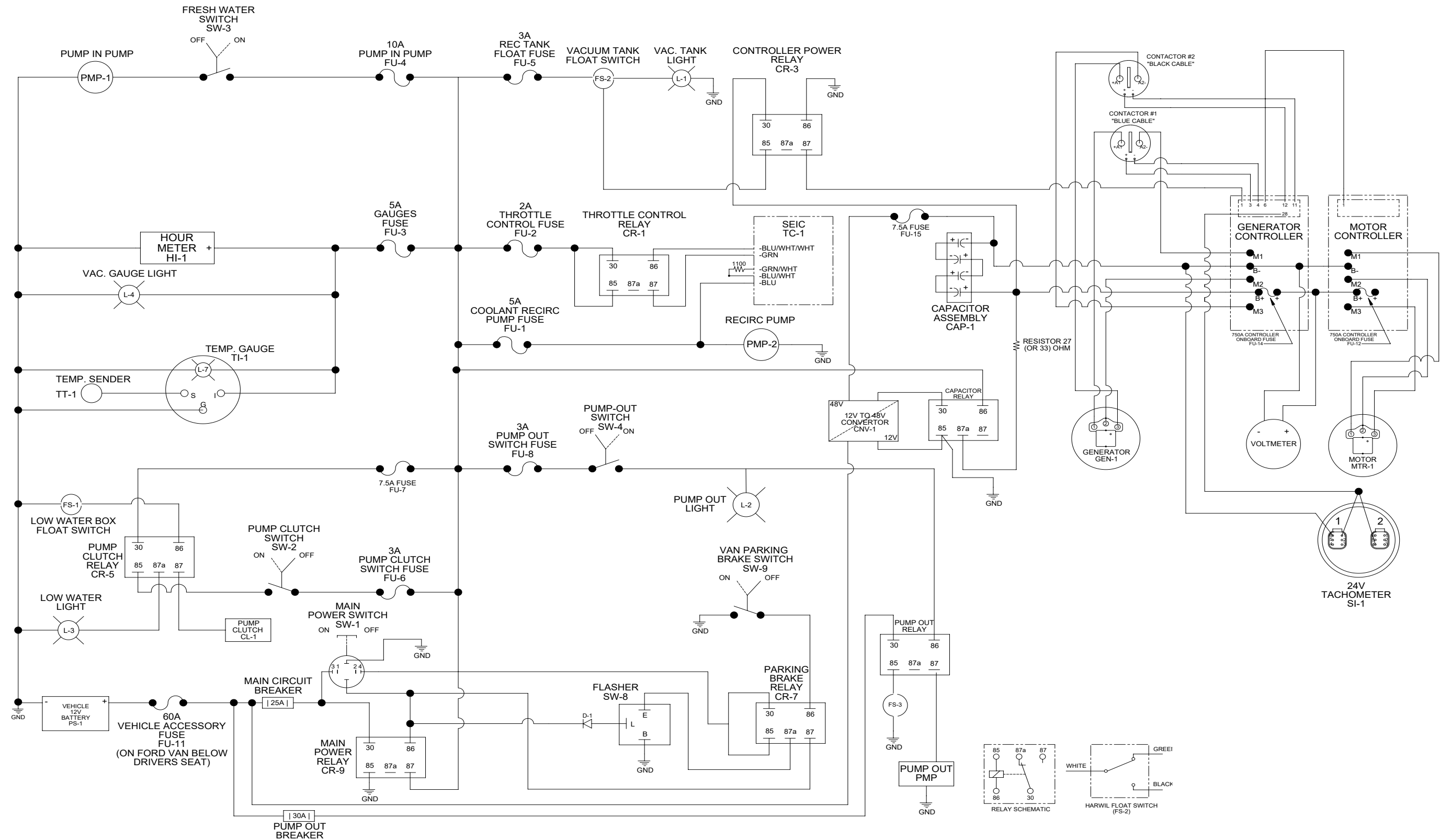
8 - Electrical System

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

The drive system operates on 48 VDC which is provided by the capacitor pack located behind the motor controllers, under the console top cover.

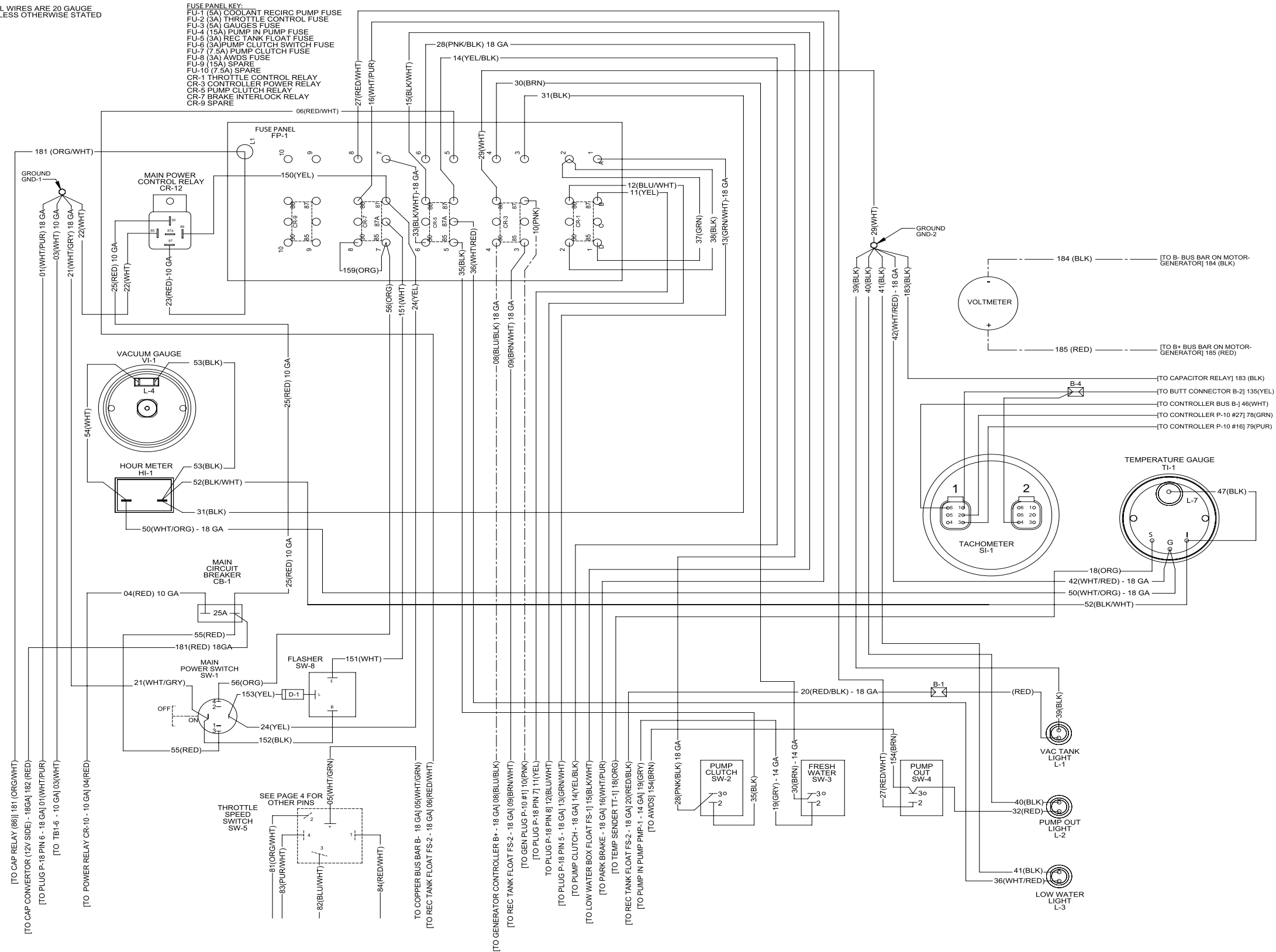
Dash controls, gauges, switches and clutches operate on 12 VDC supplied by vehicle.

To diagnose electrical system problems - see troubleshooting section.



FUSE PANEL KEY:

- FU-1 (5A) COOLANT RECIRC PUMP FUSE
- FU-2 (3A) THROTTLE CONTROL FUSE
- FU-3 (5A) GAUGES FUSE
- FU-4 (15A) PUMP CLUTCH FUSE
- FU-5 (3A) REC TANK K ROAT FUSE
- FU-6 (3A) PUMP CLUTCH SWITCH FUSE
- FU-7 (7.5A) PUMP CLUTCH FUSE
- FU-8 (3A) AWDS FUSE
- FU-9 (16A) SPARE
- FU-10 (7.5A) SPARE
- CR-1 THROTTLE CONTROL RELAY
- CR-3 CONTROLLER POWER RELAY
- CR-5 PUMP CLUTCH RELAY
- CR-7 BRAKE INTERLOCK RELAY
- CR-9 SPARE



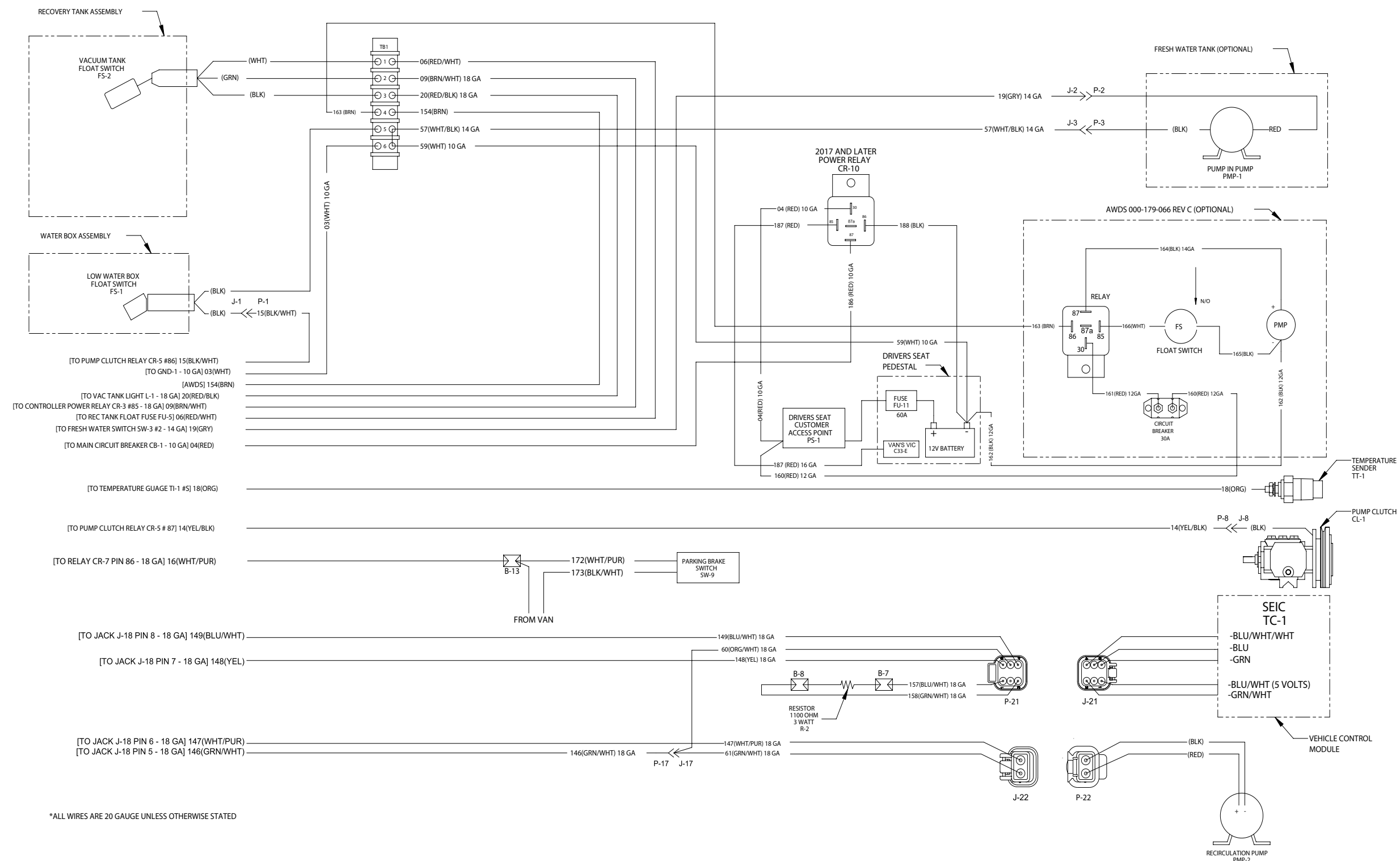
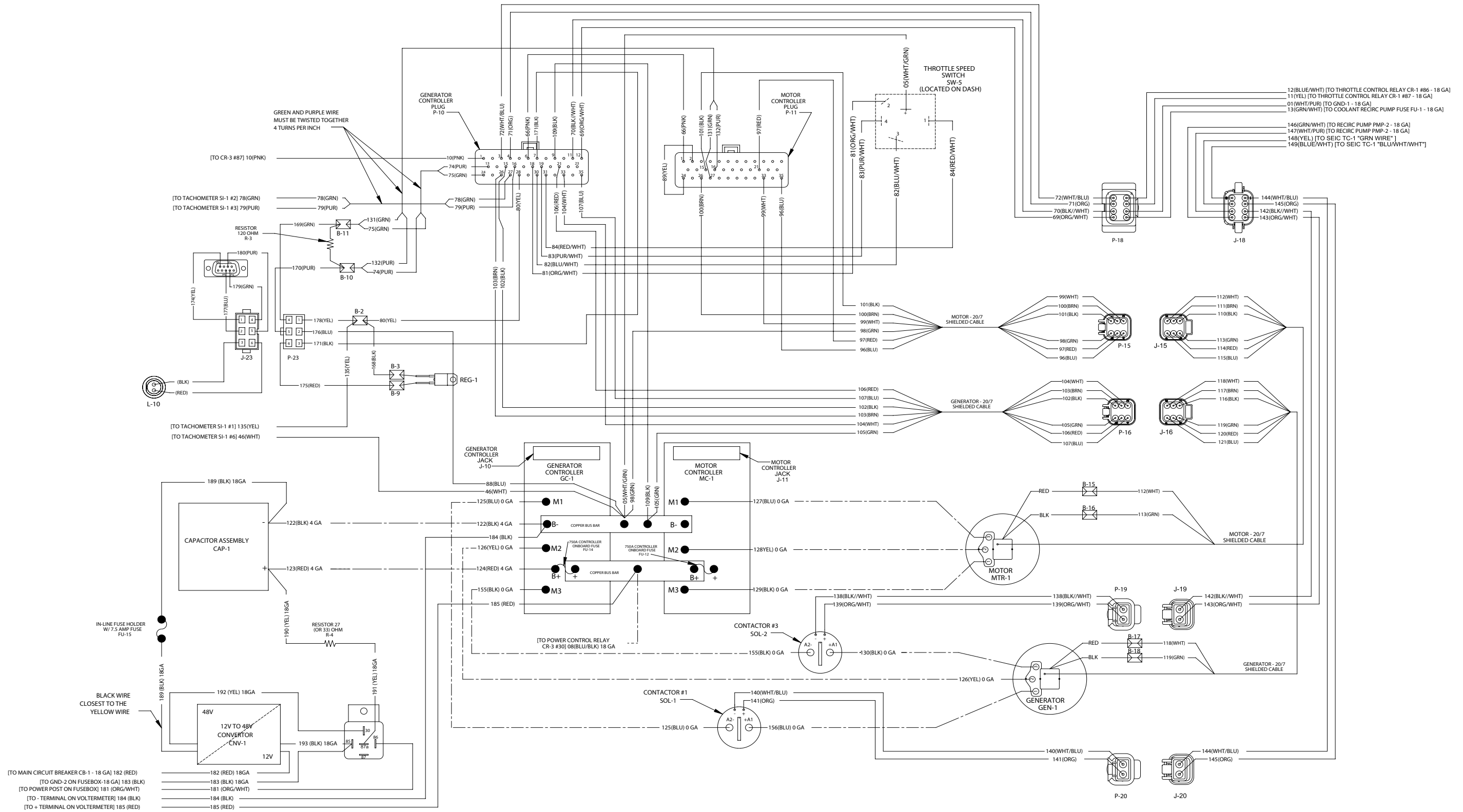


Figure 8-4. Wiring Diagram
000-179-051 Rev G - View 3 of 3



8 - Electrical System Capacitors



LOCATION

The capacitor pack is located under the top cover, behind the motor controllers.

FUNCTION

The capacitor pack provides voltage to the controllers to initiate function. The capacitors must be charged to at least 32V to start the controllers. The capacitors also smooth out the voltage from the generator during normal operation

FEATURES

- Four 16v 58Farad modules
- One 12v to 48v converter used as charger
- One 100w 27ohm resistor
- One 7.5amp fuse
- One 12v relay

DESIGN

The capacitor modules are connected in series for a total bank rating of 64v at 14Farads. The capacitors are charged from the vehicle 12v battery. Charging begins when the vehicle ignition is turned on. Charging is stopped when the xDrive machine is started. A 7.5amp fuse is placed in the negative charging line to prevent damage to the converter due to short circuit conditions

TESTING

Any time work or testing is to be done on the capacitor pack it must be fully discharged prior to initiating work.

Determine capacitor voltage:

View the voltage meter on the dash of the xDrive to determine voltage of the capacitor pack. The meter does not read below 5Vdc. If there is no reading on the gauge use a multi meter to verify the voltage between the red and black cables attached to the B+ and B- controller bus bars. Voltage should be below 2Vdc before any work is performed.

Discharge procedure:

Connect a discharge resistor between the B+ and B- bus bars on the motor controllers. View the voltage on the xDrive dash or using a multimeter. Discharge the voltage below 2Vdc before initiating any work.

CHARGING

The capacitors are charged whenever the vehicle ignition is on and the machine is off. A 12v to 48v converter is used to boost the 12v from the van battery up to 48v so that the controllers can be started. The charging circuit also has a 7.5amp fuse connected to the negative side of the capacitor pack and a 100w 27ohm resistor connected to the positive side of the capacitor pack. The resistor and the fuse protect the system from excessive current flow and accidental discharge.

ELECTRICAL SAFETY

⚠ WARNING

Insulate metallic tools. Using non insulated tools may cause a short circuit, and the heat or sparks generated could result in burns, damage to the battery, or ignite an explosion..

⚠ WARNING

Remove watches, rings or other metal objects before servicing.

⚠ WARNING

Use tools with insulated handles to prevent inadvertent shorts..

⚠ WARNING

Wear rubber gloves and boots..

⚠ WARNING

Do not lay tools or metal parts on top of batteries..

⚠ WARNING

Verify circuit polarities before making connections..

⚠ WARNING

Disconnect charging source and load before connecting or disconnecting terminals.

CAUTION

Take safety measure such as wearing rubber gloves for insulation when handling a voltage of 45V or higher. Operating without safety measures may result in electrical shock to the operator..

CAUTION

When fastening bolts and nuts on capacitors, observe the torque values specified. Failure to observe fastener torque values may result in sparks, or damage to the battery terminals.

CAUTION

Do not connect the (+) and (-) terminals of the capacitor to each other with a metallic material such as a wire, tool, jewelry, etc. Failure to observe these precautions may result in bodily injury, or damage to the capacitors.

CAUTION

Installation and servicing of capacitors should be performed by personnel knowledgeable about capacitor systems and the required precautions. Keep unauthorized personnel away from the capacitors.

CAUTION

Regularly check the capacitors for any sign of irregularities in appearance. If there is any damage to the capacitor case/cover such as cracks, deformation or leakage, replace the capacitor with a new one.

CAUTION

If any corrosion of the terminals, leakage or deformation of the case is found, do not use the system and turn off the power supply. If a capacitor with irregular or substandard performance is used there is also a potential for electrical shock.

DISPOSAL

CAUTION

Dispose of capacitors through channels in accordance with local, state and federal regulations.

Ultracapacitors are composed of aluminum, carbon, paper and an organic electrolyte. Ultracapacitors contain no heavy metals or toxic materials hazardous to the environment. Municipalities differ in how materials are classified for disposal. An MSDS for Acetonitrile, a Product Information Sheet and a shipping guidelines document are available to aid in determining regional or local classification and disposal requirements. In general, packaging material is recyclable. The remaining materials can be incinerated at high temperatures.

Do not dispose of module in trash. Dispose of according to local regulations.

STORAGE

The discharged module can be stored in the original package in a dry place. Discharge a used module prior to stock or shipment. A shorting wire across the terminals is strongly recommended to maintain a short circuit after having discharged the module

SAFETY PRECAUTIONS - GENERAL

CAUTION

Remove all jewelry (i.e. rings, watches, chains, etc.)

CAUTION

Keep sparks, flames and smoking materials away from the capacitors

CAUTION

Never lay tools or other metallic objects on the capacitors

Individual capacitors are low voltage devices. They are capable of delivering extremely high currents especially in short circuit situations. Handling of capacitors should be done in an uncharged state.

The packaging for the ultracapacitors is completely sealed. The devices do not contain re-sealable venting. Failure for the ultracapacitors can occur in over voltage situations. Operation in excess of the rated voltage, electrolyte decomposition will occur. The higher the current the more accelerated this decomposition may occur.

If product is found to be leaking (identified by a white salt crystal formation on product) the capacitor should be removed from the system. A leaking capacitor will eventually increase in resistance or could cause long term corrosion of interconnects. Incidental contact with the salt residue is not harmful although should not be ingested. Take normal precautions after contact which includes washing hands. Refer to the acetonitril MSDS for more information.

In the event the packaging is compromised either by puncturing or crushing a very limited amount of electrolyte fluid will be released. The amount of fluid will generally be limited to a few milliliters. An open or compromised package should be immediately removed from the system and placed in a well-ventilated area. The electrolyte has a high vapor pressure and quickly evaporates. The electrolyte is classified as flammable and should be handled with normal considerations for flammable materials. Full information regarding flammability rating and handling is provided in the acetonitril MSDS.

You should be trained in handling, installing, operating and maintaining capacitors before you work on any capacitor system.

You must understand the risk of working with capacitors and be prepared and equipped to take the necessary safety precautions. If not, contact HydraMaster customer service.

SAFETY EQUIPMENT

When working with any capacitor system, be sure to have the necessary tools and safety equipment, including but not limited to:

- Insulated tools
- Rubber gloves
- Fire extinguisher
- Rubber apron
- Safety goggles
- Acid spill cleanup kit
- Face shield
- Emergency eye wash
- Shower, if available

Using the correct tools and wearing the proper safety equipment will help prevent injury should an accident occur.

SAFETY PROCEDURES

ELECTRICAL SHOCK AND BURNS

Multi-cell capacitor systems can attain high voltage and/or currents. Do not touch uninsulated connectors or terminals. To prevent serious electrical burns and shock, use extreme caution when working with the system.

CAUTION

Always wear protective clothing and use nonconductive or insulated safety tools when working with any capacitor system.

CAUTION

Remove all jewelry that could produce a short circuit. Eliminate any potential of sparks, flames or arcing..

Before working on the system:

1. Disconnect all loads and power sources to the capacitor. Use appropriate lockout/tagout procedures.
2. If working on an assembled capacitor system, sectionalize (interrupt the capacitor sections) into safe working voltage levels.
3. Check the capacitor system grounding. Grounding of a capacitor system is not recommended. However, grounding of the work surface is recommended.

9 - Assemblies and Parts Lists

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

- PACKAGE - CDS XDRIVE
- ASSEMBLY - CONSOLE
- ASSEMBLY - POWER PACK
- ASSEMBLY - FRAME
- ASSEMBLY - BLOWER
- ASSEMBLY - CONTROLLER HEAT SINK
- ASSEMBLY - INSTRUMENT
- ASSEMBLY - HI-PSI MANIFOLD
- ASSEMBLY - BYPASS VALVE
- ASSEMBLY - DASH PANEL
- ASSEMBLY - HIGH PRESSURE PUMP
- ASSEMBLY - BLOWER HEAT EXCHANGER
- ASSEMBLY - TOP COVER
- ASSEMBLY - RIGHT COVER
- ASSEMBLY - RECOVERY TANK
- ASSEMBLY - COOLANT HEAT EXCHANGER
- ASSEMBLY - WATER BOX
- ASSEMBLY - REC TANK COVER
- ASSEMBLY - VACUUM RELIEF VALVE
- ASSEMBLY - CAPACITOR PACK
- ASSEMBLY - CONTACTOR BOX

NOTICE

When ordering parts for assemblies, first refer to the appropriate assembly listed here and then find the part number listed on that specific page. In most cases, you do not have to order the entire assembly to get a part.

If you have an electronic copy of this manual, you can search for the part number by pressing the **CTRL** key and the **F** key at the same time. This will “pop up” the Find window on your monitor. Type the part number, including dashes, into the Find window and press the **Enter** key.

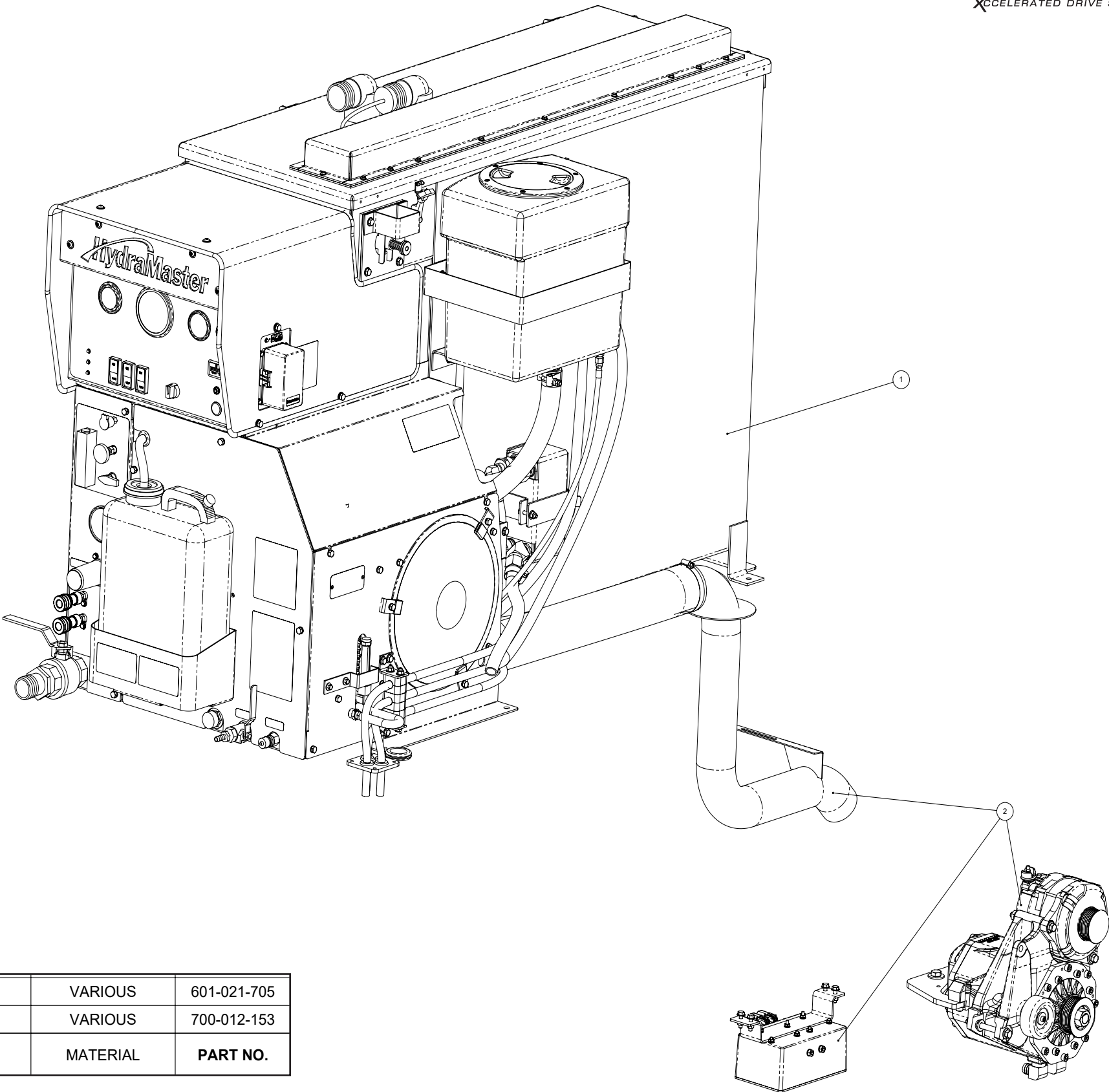
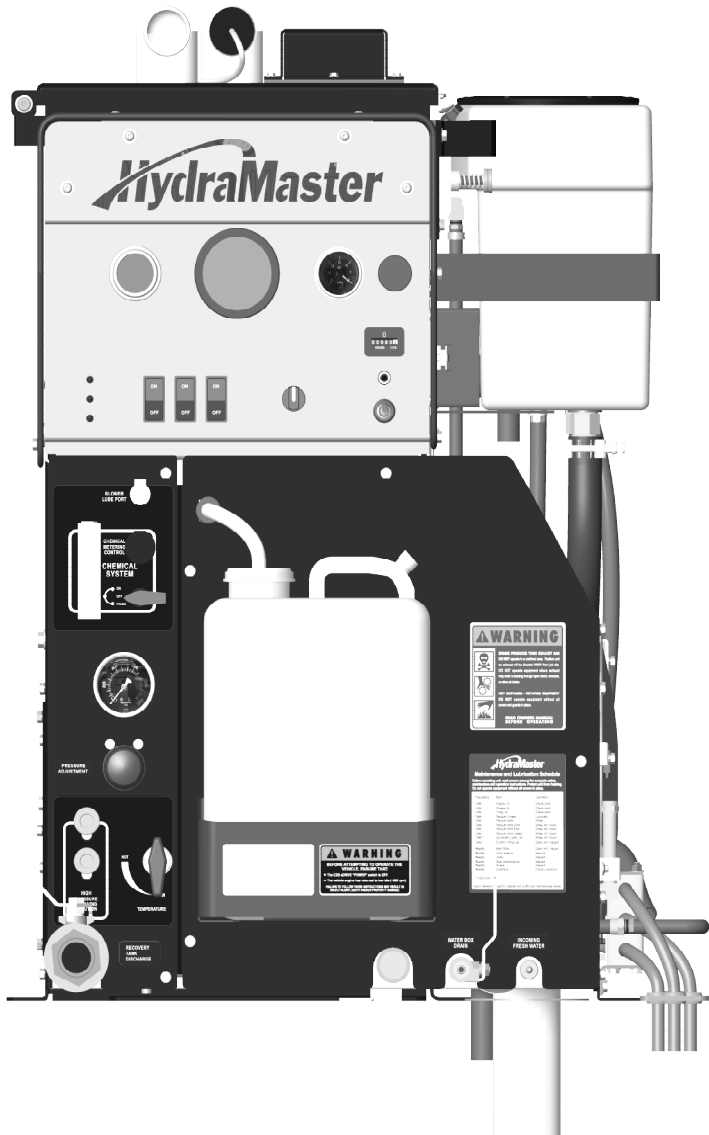
Some of the illustrations in this section reference sealants, thread lockers, adhesive, primer, anti-seize and lubricant specifications that are used in the construction of HydraMaster equipment.

Refer to Figure 9-1 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.

Adhesive Material Production Line Reference Card from ENG-45975 Rev. 0					
<div>A1</div> <div>Silicone RTV</div> 	<div>A2</div> <div>Loctite 567</div> 	<div>A3</div> <div>Loctite 545</div> 	<div>A4</div> <div>Teflon Tape</div> 	<div>E1</div> <div>Loctite 51252 Grease</div> 	
<div>B1</div> <div>Loctite 242</div> 	<div>B2</div> <div>Loctite 262</div> 	<div>B3</div> <div>Loctite 266</div> 	<div>C1</div> <div>Gapper</div> 	<div>D1</div> <div>Loctite 7649</div> 	<div>E2</div> <div>Molykote Anti-Seize</div> 
<div>B4</div> <div>Loctite 222MS</div> 	<div>B5</div> <div>Loctite 425</div> 	<div>E4</div> <div>Super Lube</div> 	<div>E5</div> <div>SKF Anti-Fret</div> 		

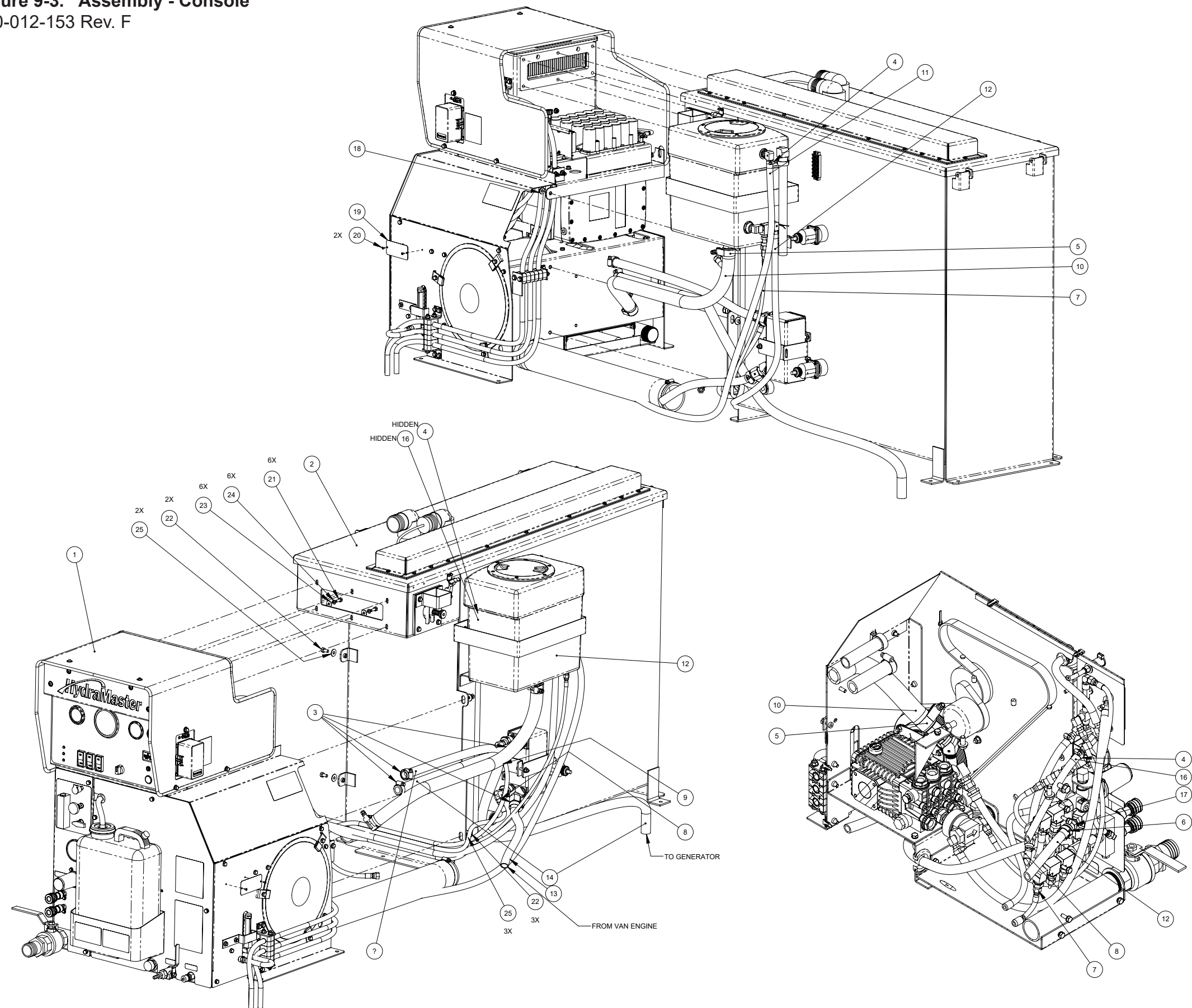
Figure 9-1. Adhesive and Sealant Material Reference

Figure 9-2. Package - CDS xDrive
751-024-705-10 Rev. F



2	1	ASSEMBLY, FRONT END TRANSIT 2016	VARIOUS	601-021-705
1	1	ASSEMBLY, CONSOLE - CDS xDRIVE	VARIOUS	700-012-153
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-3. Assembly - Console
700-012-153 Rev. F



Assembly - Console Parts List

25	5	WASHER, 5/16" FLAT, USS	STEEL	000-174-004
24	6	WASHER, 1/4" LOCK S/S	S. STEEL	000-174-019
23	6	WASHER, 1/4" FLAT	STEEL	000-174-002
22	5	SCREW, 5/16"-18UNC x 5/8" LG. GRD. 5 HEX HEAD	STEEL	000-143-572
21	6	SCREW, 1/4"-20UNC x 0.75" LG. HEX HEAD	S. STEEL	000-143-001
20	2	RIVET, 1/8" X 1/4" LG. POP	ALUMINUM	000-140-015
19	1	PLATE, MACHINE SERIAL I.D.	1100-H14	000-105-012
18	1	NUT, 5/16"-18UNC HEX FLANGE	STEEL	000-094-078
17	1	INSERT, 1/2 HOSE X 3/8 SAE	STEEL	000-052-545
16	1	HOSE, 3/8" HI-TEMP x 76.5" LG. (REC TANK TO CHEMICAL PRIME)	RUBBER	000-068-1062
15	1	HOSE, 3/4" GREENSTRIPE x 20" LG. (MOTOR TO DUAL HX)	RUBBER	000-068-1083
14	1	HOSE, 3/4" GREENSTRIPE x 17.75' LG. (MOTOR TO GENERATOR)	RUBBER	000-068-1066
13	1	HOSE, 3/4" GREENSTRIPE x 15' LG. (VAN ENGINE TO DUAL HX)	RUBBER	000-068-1067
12	1	HOSE, 1/2" RUBBER X 69" LG. (WB TO BYPASS VALVE)	RUBBER	000-068-969
11	1	HOSE, 1/2" RUBBER X 60" LG. (FRESH WATER IN TO WB)	RUBBER	000-068-682
10	1	HOSE, 1" SUCTION X 41" LG. (WB TO PUMP)	VARIOUS	000-068-1044
9	1	HOSE ASSEMBLY, 5/16" TEFLON x 66.5" LG. (DUAL HX TO BLOWER HX)	S. STEEL	000-068-1073
8	1	HOSE ASSEMBLY, 5/16" TEFLON x 59" LG. (DUAL HX TO BYPASS)	S. STEEL	000-068-511
7	1	HOSE ASSEMBLY, 3/16" TEFLON x 61" LG. (WB TO HI-PSI MANIFOLD)	S. STEEL	000-068-337
6	1	CLAMP, 1/2" HOSE-DBLE EAR, OETIKER # 1922	STEEL	000-033-031
5	2	CLAMP, 1-1/2" T-BOLT	S. STEEL	000-033-132
4	5	CLAMP, SIZE #5 HOSE	S. STEEL	000-033-005
3	4	CLAMP, SIZE #12 HOSE	S. STEEL	000-033-029
2	1	ASSEMBLY, RECOVERY TANK	VARIOUS	601-060-705
1	1	ASSEMBLY, POWER PACK - CDS xDRIVE	VARIOUS	601-004-705
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

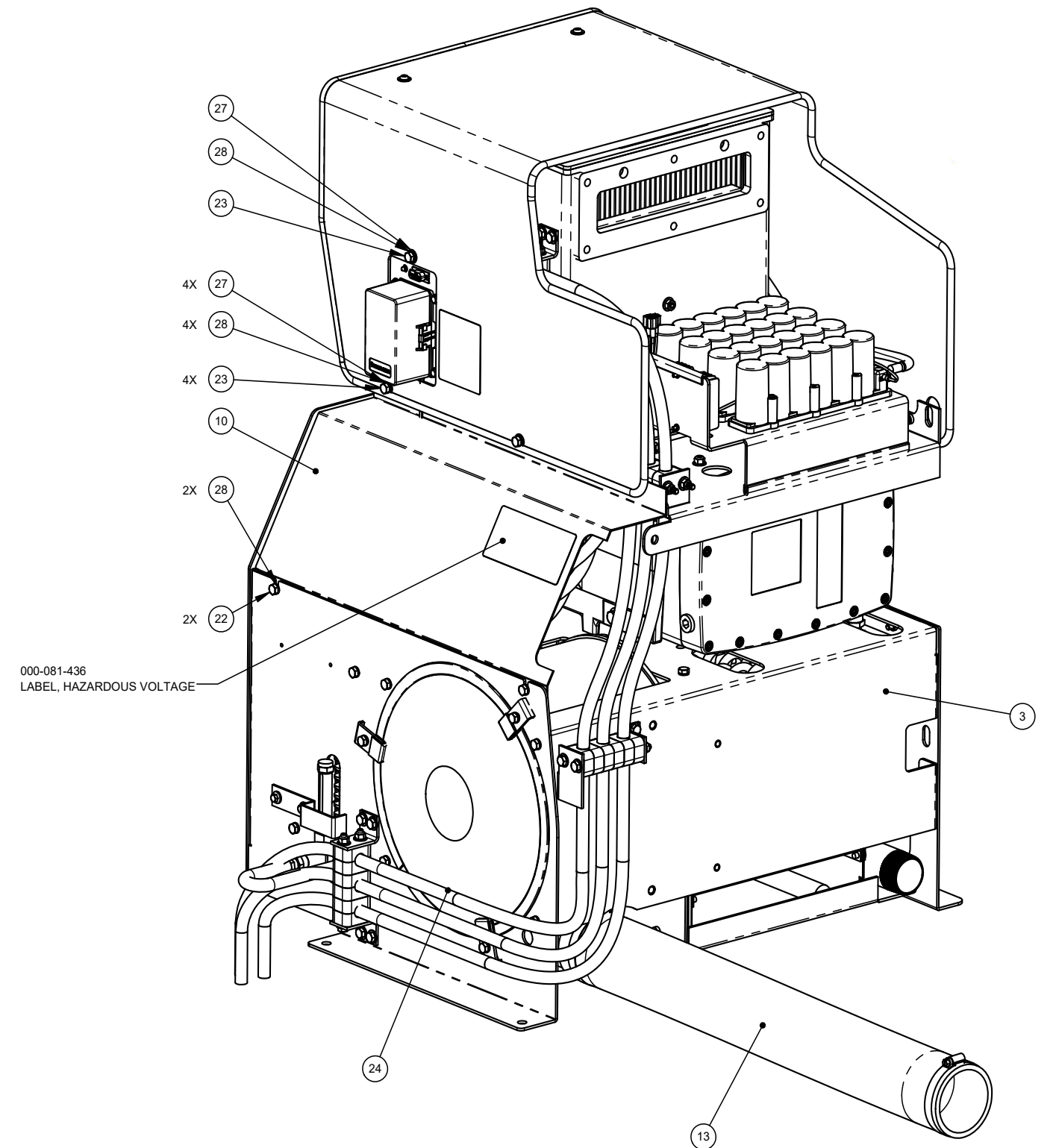
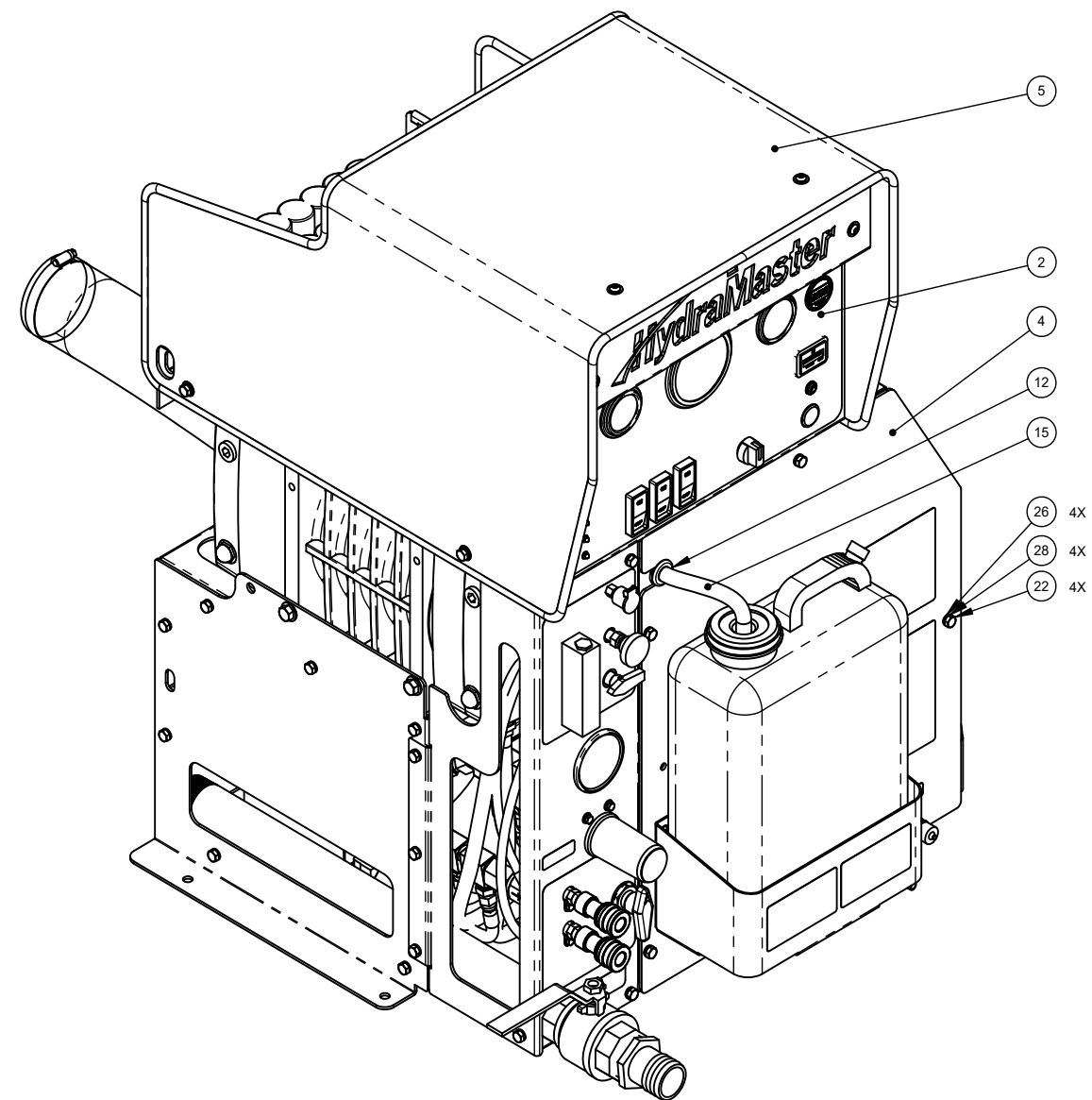
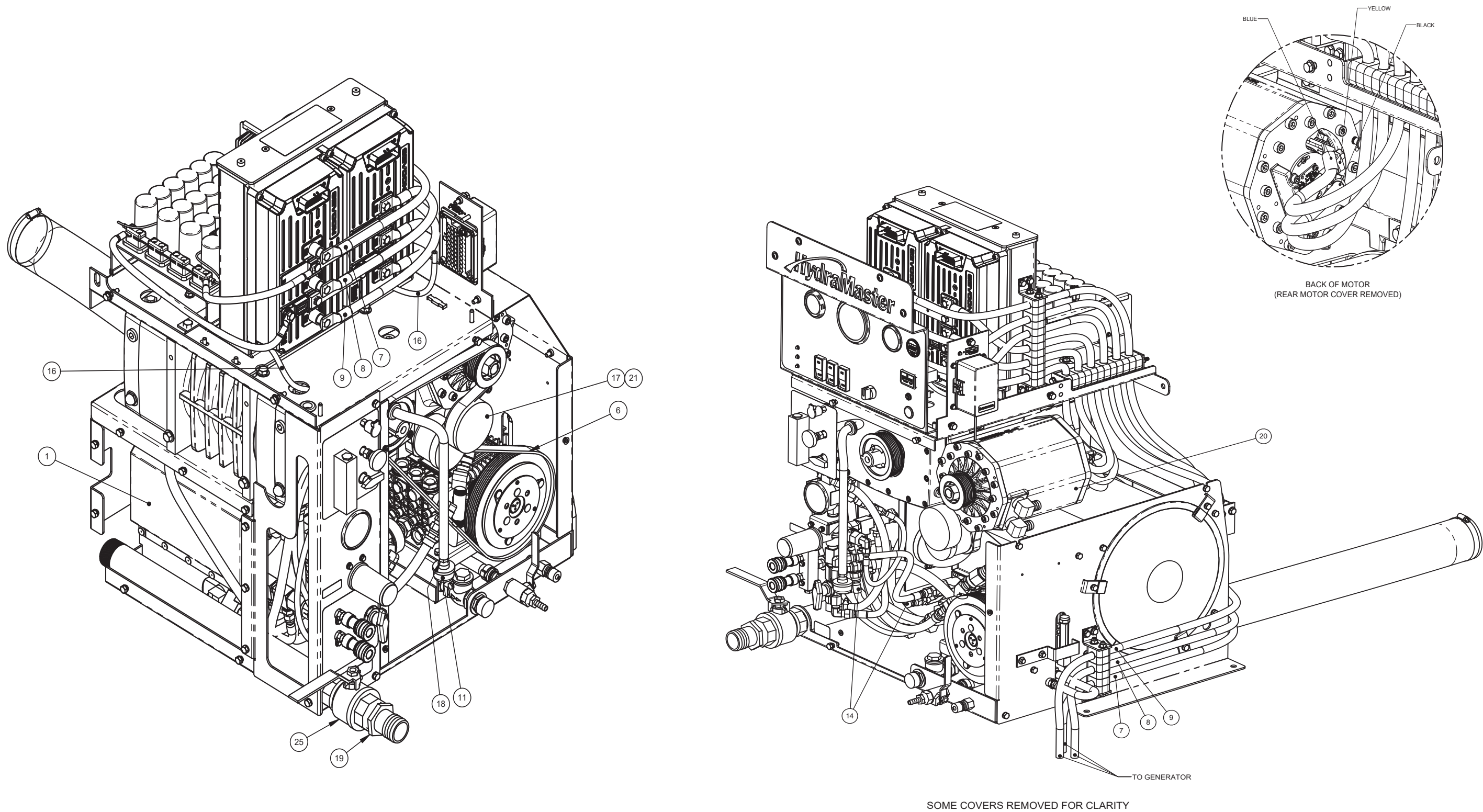


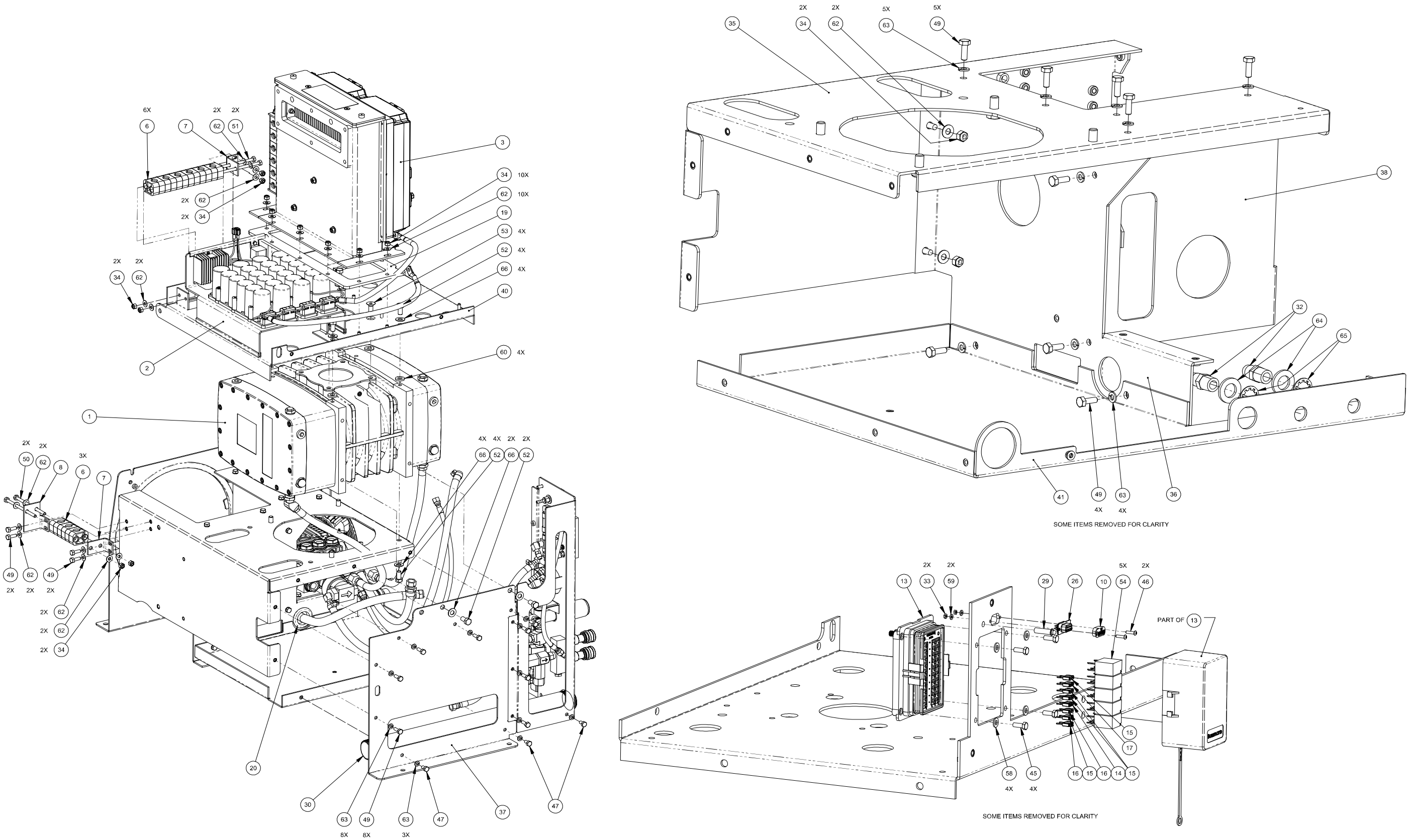
Figure 9-5. Assembly, Power Pack - CDS xDrive
601-004-705 Rev. G

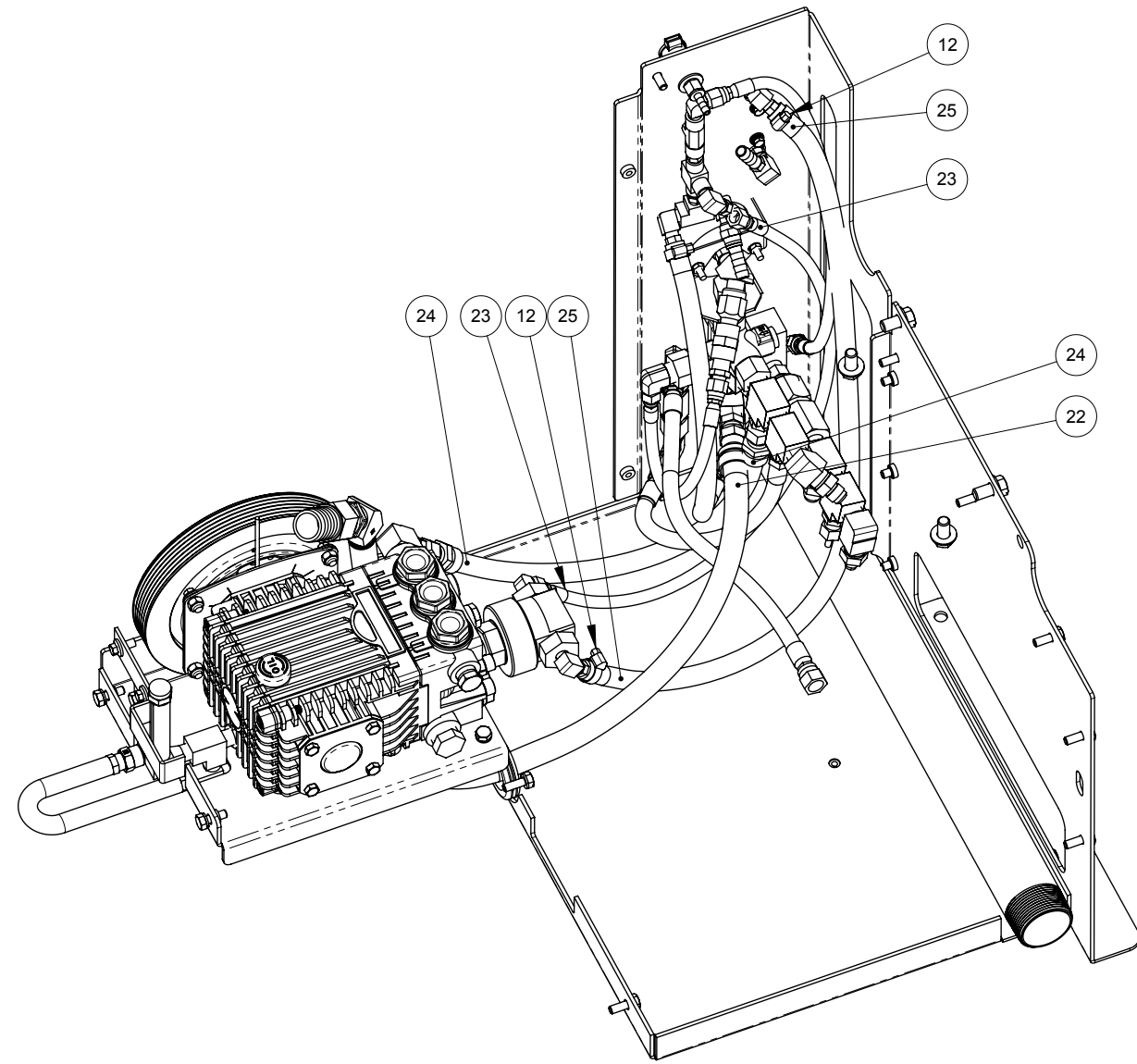


Assembly - Power Pack Parts List

28	11	WASHER, 1/4" LOCK S/S	S. STEEL	000-174-019
27	5	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
26	4	WASHER, #10 FLAT	S. STEEL	000-174-001
25	1	VALVE, 1-1/2" FULL PORT BALL	BRASS	000-169-022
24	1	SILENCER, 3" IN/OUT RH - WELDED	ASTM A463	000-093-167
23	5	SCREW, 1/4"-20UNC x 1.00" LG. HEX HEAD	S. STEEL	000-143-002
22	6	SCREW, 1/4"-20UNC x 0.75" LG. HEX HEAD	STEEL	000-143-001
21	1	NUT, M12 X 1.75 HEX Z/P	STEEL	000-094-130
20	1	MOTOR, W/ CABLES - XDRIVE	VARIOUS	000-091-057
19	1	INSERT, 1-1/2" NPT x 1-1/2" BARB (GREY)	PVC	000-052-226
18	1	INSERT, #46 (1/4" NPT x 3/8" BARB)	BRASS	000-052-102
17	1	IDLER, SPRING - XDRIVE	VARIOUS	000-008-057
16	2	HOSE, 5/32" RUBBER x 12.5" LG.	RUBBER	000-068-314
15	1	HOSE, 3/8" I.D. CLEAR BRAID X 28.5" LG.	VARIOUS	000-068-980
14	1	HOSE ASSEMBLY, 5/16" TEFLON x 7" LG.	S. STEEL	000-068-1072
13	1	HOSE ASSEMBLY, 3" I.D. NITRILE X 30" LG.	VARIOUS	000-068-187
12	1	GROMMET, LARGE WIRING	RUBBER	000-060-002
11	1	FILTER, CHEMICAL INLET HIGH PRESSURE	VARIOUS	000-049-118
10	1	COVER, MOTOR - POWERPACK - COATED	ASTM A1008 CS TYPE B	000-041-888
9	1	CABLE, M3 - CONTROL TO BOX - BLACK	VARIOUS	000-025-084
8	1	CABLE, M2 - CONTROL TO BOX - YELLOW	VARIOUS	000-025-083
7	1	CABLE, M1 - CONTROL TO BOX - BLUE	VARIOUS	000-025-082
6	1	BELT, K060630 - BLOWER DRIVE	VARIOUS	000-010-009
5	1	ASSEMBLY, TOP COVER - POWERPACK	VARIOUS	601-022-705
4	1	ASSEMBLY, RIGHT COVER	VARIOUS	601-024-705
3	1	ASSEMBLY, FRAME - CDS xDRIVE	VARIOUS	601-001-705
2	1	ASSEMBLY, DASH PANEL - CDS xDRIVE	VARIOUS	601-020-705
1	1	ASSEMBLY, BLOWER HEAT EXCHANGER	VARIOUS	601-005-705
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-6. Assembly, Frame - CDS xDrive
601-001-705 Rev. H





SOME ITEMS REMOVED FOR CLARITY

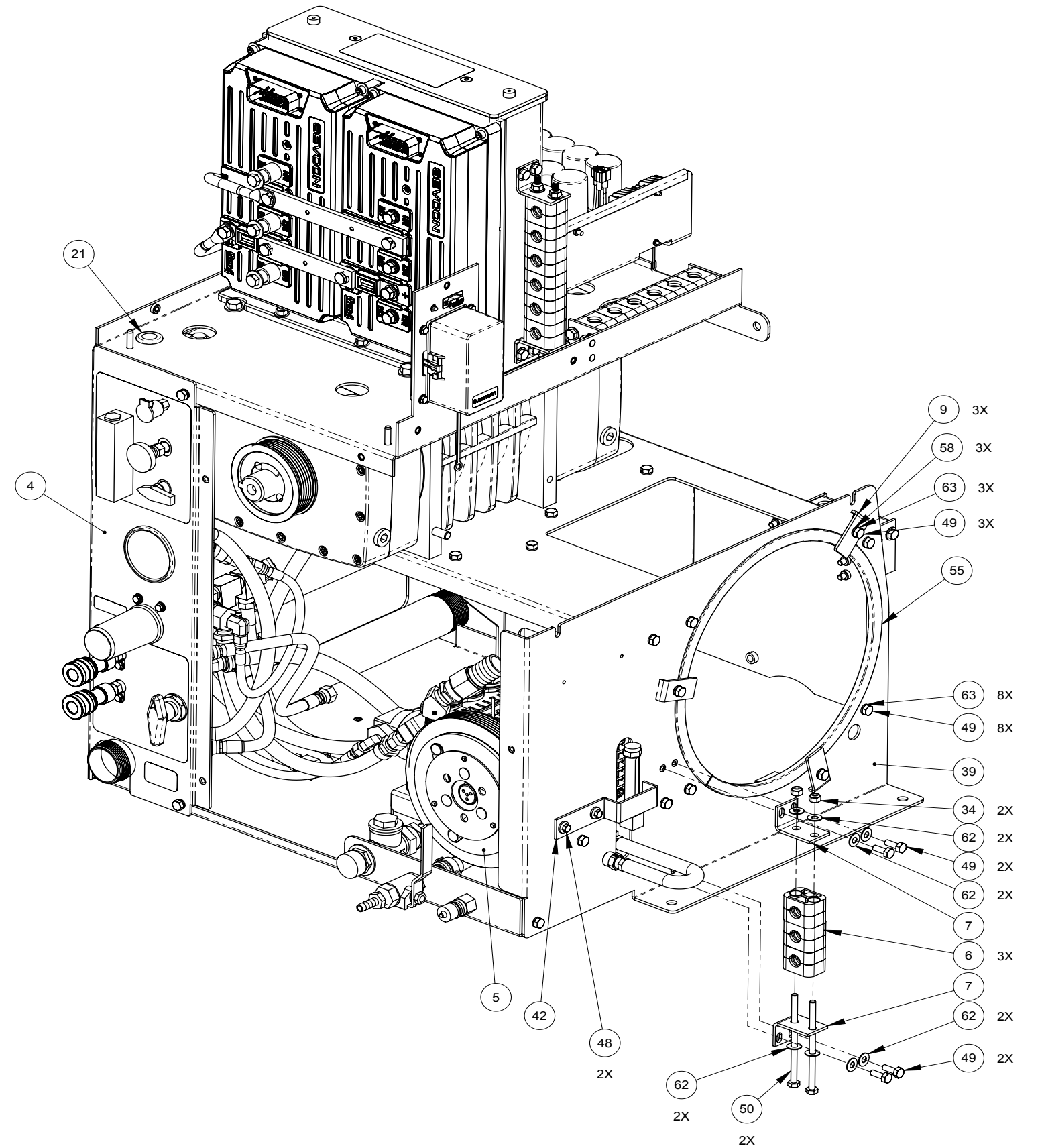
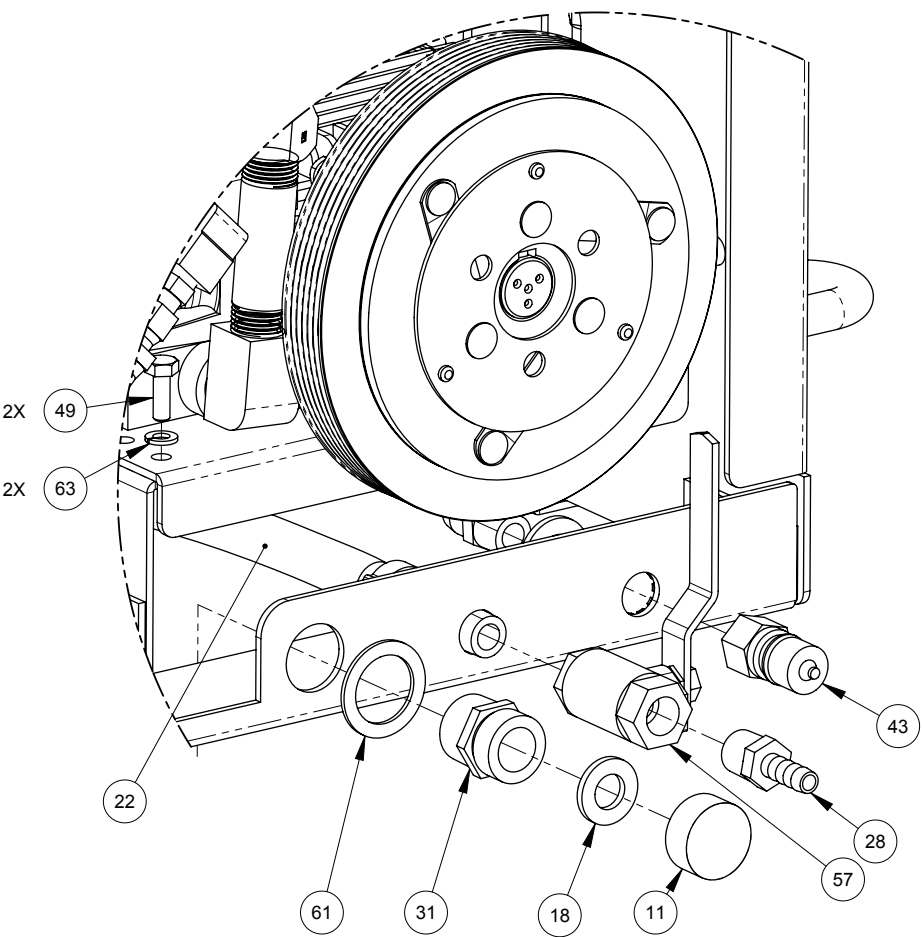
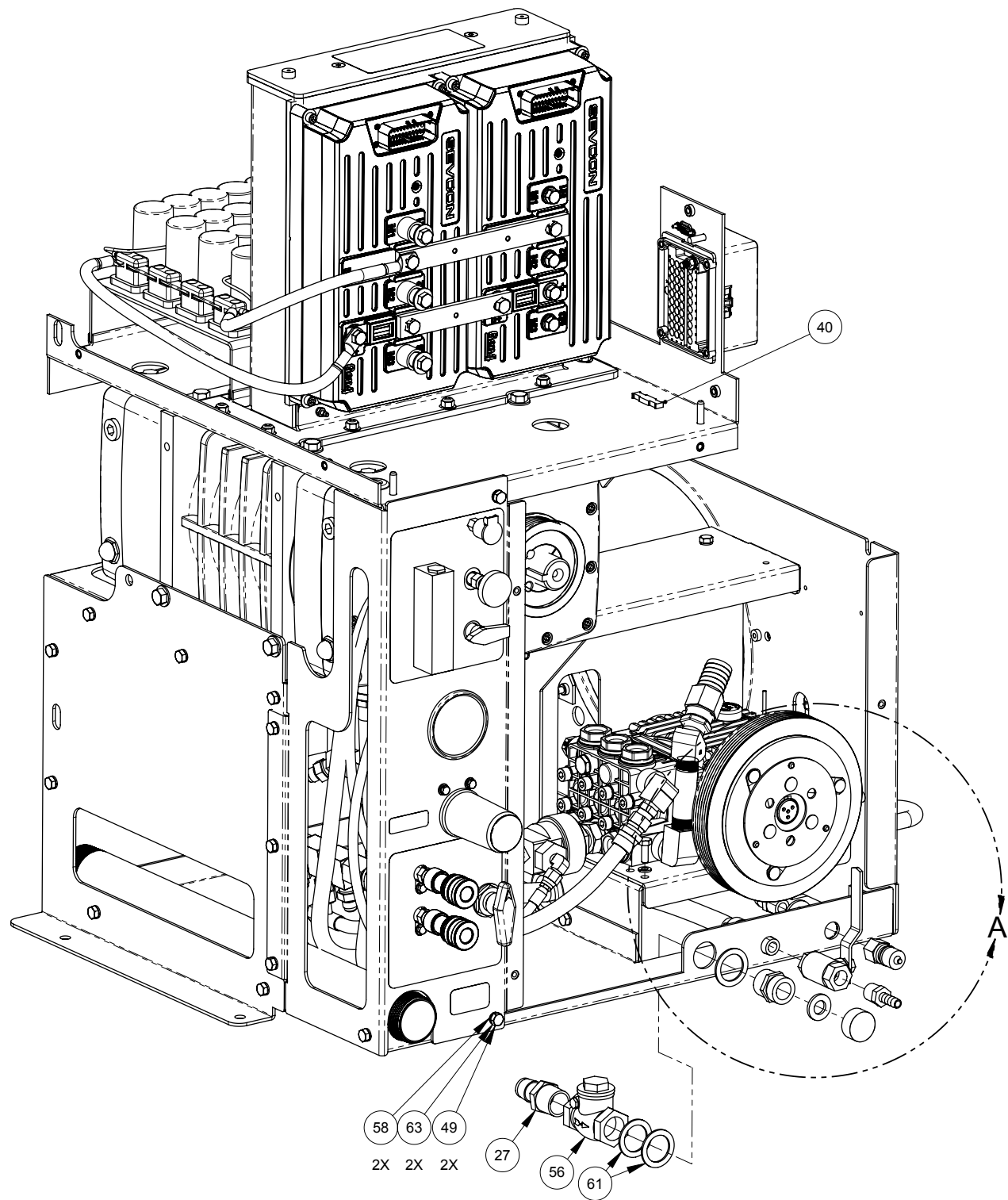


Figure 9-8. Assembly, Frame - CDS xDrive
601-001-705 Rev. H



DETAIL A
SCALE 1 : 2

Frame Assembly Parts List

36	1	PANEL, CENTER RIB	ASTM A653-G90	000-105-736
35	1	PANEL, BLOWER SHELF & BACK	ASTM A653-G90	000-105-734
34	20	NUT, 1/4"-20UNC NYLOCK	S STEEL	000-094-009
33	2	NUT, #4-40UNC HEX	STEEL	000-094-044
32	2	NIPPLE, 3/8" MPT x 3/8" SAE FLARE	BRASS	000-052-128
31	1	NIPPLE, 3/4" NPT x 3/4" MALE GARDEN HOSE	BRASS	000-052-281
30	1	NIPPLE, 1-1/2" NPT x 22" LG. GALV,	STEEL	000-052-933
29	1	LIGHT, GREEN LED INDICATOR MINI	VARIOUS	000-084-010
28	1	INSERT, #66 (3/8" NPT x 3/8" BARB)	BRASS	000-052-104
27	1	INSERT, #1212 (3/4" NPT x 3/4" BARB)	NYLON	000-052-338
26	1	HOUSING, DSUB RECEPTACLE	VARIOUS	000-037-150
25	1	HOSE, 3/8" CLEAR BRAID - FLOW TO PUMP	VARIOUS	000-068-980
24	1	HOSE ASSEMBLY, 3/8" THROB x 17.5" LG.	VARIOUS	000-068-587
23	1	HOSE ASSEMBLY, 3/16" TEFLON x 26" LG.	S. STEEL	000-068-339
22	1	HOSE ASSEMBLY, 1/2" RUBBER X 28" LG.	VARIOUS	000-068-1080
21	1	GROMMET, LARGE WIRING	RUBBER	000-060-002
20	1	GROMMET, 1-5/16" I.D.	RUBBER	000-060-010
19	1	GASKET, HEAT SINK TO PLENUM	NEOPRENE /EPDM/SBR F0	000-057-244
18	1	GASKET, GARDEN HOSE	RUBBER	000-057-055
17	1	FUSE, 7.5A ATM MINI	VARIOUS	000-056-042
16	2	FUSE, 5A ATM MINI	VARIOUS	000-056-041
15	4	FUSE, 3A ATM MINI	VARIOUS	000-056-040
14	1	FUSE, 15A ATM MINI	VARIOUS	000-056-043
13	1	FUSE & RELAY PANEL	VARIOUS	000-056-045
12	2	CLAMP, SIZE #5 HOSE	S. STEEL	000-033-005
11	1	CAP, GARDEN HOSE	BRASS	000-027-014
10	1	CAP, D-SUB CONNECTOR DUST	VARIOUS	000-027-126
9	3	BRACKET, SILENCER SECURING	ASTM A653-G90	000-015-1291
8	1	BRACKET, CABLE CLAMP OFFSET	5052-H32	000-015-1367
7	4	BRACKET, CABLE CLAMP	5052-H32	000-015-1355
6	12	BLOCK, CABLE SUPPORT	SANTOPRENE	000-012-021
5	1	ASSEMBLY, PUMP	VARIOUS	601-007-705
4	1	ASSEMBLY, INSTRUMENT PANEL - CDS xDRIVE	VARIOUS	601-019-705
3	1	ASSEMBLY, HEAT SINK - CDS xDRIVE	VARIOUS	601-032-705
2	1	ASSEMBLY, CAPACITOR - CDS xDRIVE	VARIOUS	601-033-705
1	1	ASSEMBLY, BLOWER - CDS xDRIVE	VARIOUS	601-002-705
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

66	10	WASHER, 3/8" FLAT Z/P	STEEL	000-174-005
65	2	WASHER, 16MM INTERNAL TOOTH	S. STEEL	000-174-203
64	2	WASHER, 16MM FLAT S/S	S. STEEL	000-174-202
63	35	WASHER, 1/4" LOCK S/S	S. STEEL	000-174-019
62	34	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
61	3	WASHER, 1.5" O.D. x 1.073" I.D. x 0.075" THK.	S. STEEL	000-174-063
60	4	WASHER, 0.41" ID x 0.81" O.D. x 0.125 THK.	STEEL	000-174-196
59	2	WASHER, #4 FLAT	S. STEEL	000-174-182
58	9	WASHER, #10 FLAT	S. STEEL	000-174-001
57	1	VALVE, 3/8" NPT FULL PORT BALL	ALUMINUM BRONZE	000-169-064
56	1	VALVE, 3/4" FPT SWING CHECK	BRASS	000-169-009
55	3.5	TRIMLOK,	VARIOUS	000-131-027
54	5	SWITCH, RELAY 35A SPDT MICRO	VARIOUS	000-157-050
53	4	SCREW, 3/8"-16UNC x 1.00" LG FLAT HEAD SOCKET	STEEL	000-143-711
52	10	SCREW, 3/8"-16UNC x 0.75" LG. HEX HEAD GRD. 8	STEEL	000-143-017
51	2	SCREW, 1/4"-20UNC x 8.5" LG. HEX HEAD Z/P	STEEL	000-143-742
50	4	SCREW, 1/4"-20UNC x 4.50" LG. HEX HEAD	S. STEEL	000-143-610
49	40	SCREW, 1/4"-20UNC x 0.75" LG. HEX HEAD	S. STEEL	000-143-001
48	2	SCREW, 1/4"-20UNC x 0.50" LG. WHIZ LOCK	S. STEEL	000-143-141
47	3	SCREW, 1/4"-20UNC x 0.50" LG. S/S HEX HEAD	S. STEEL	000-143-333
46	2	SCREW, #4-40UNC X 7/16" LG. SS BUTTON HEAD	S. STEEL	000-143-351
45	4	SCREW, #10-32UNF x 0.50" LG. HEX HEAD	STEEL	000-143-327
44	1	RETAINER,WIRE LOOM	NYLON	000-138-005
43	1	QUICK CONNECT, 660 3/8" BRASS W/ EPDM O-RING	BRASS	000-052-052
42	1	PROTECTOR, PUMP DRIVE BELT - COATED	ASTM A1008 CS TYPE B	000-108-109
41	1	PLATE, BOTTOM & FRONT TIE	ASTM A653-G90	000-105-735
40	1	PLATE, BLOWER INLET	5052-H32	000-105-733
39	1	PANEL, RIGHT - POWERPACK - COATED	ASTM A1008 CS TYPE B	000-100-359
38	1	PANEL, PUMP BACK	ASTM A653-G90	000-105-737
37	1	PANEL, LEFT - POWERPACK - COATED	ASTM A1008 CS TYPE B	000-100-357

Figure 9-9. Assembly, Blower - CDS xDrive
601-002-705 Rev. F

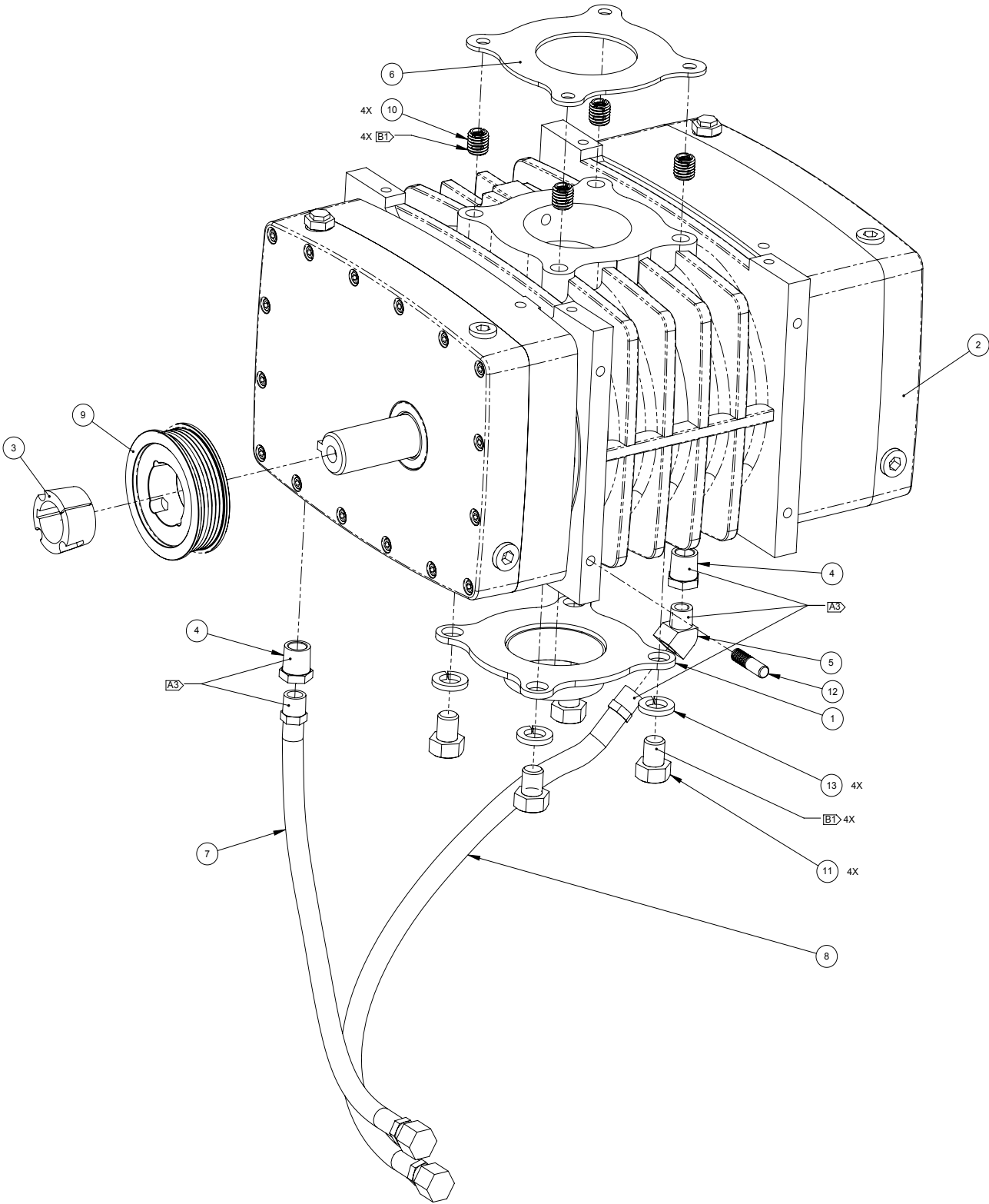
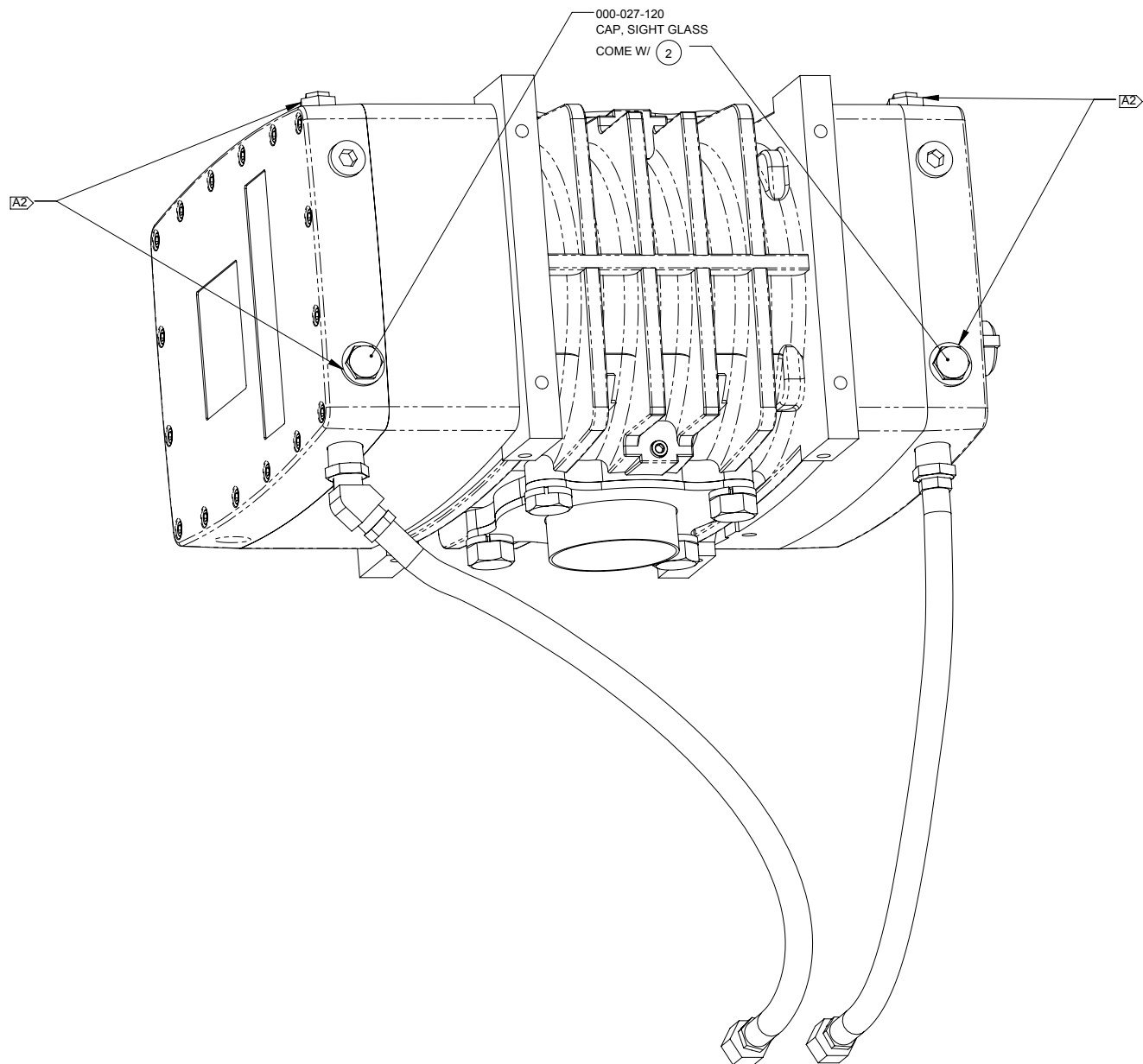


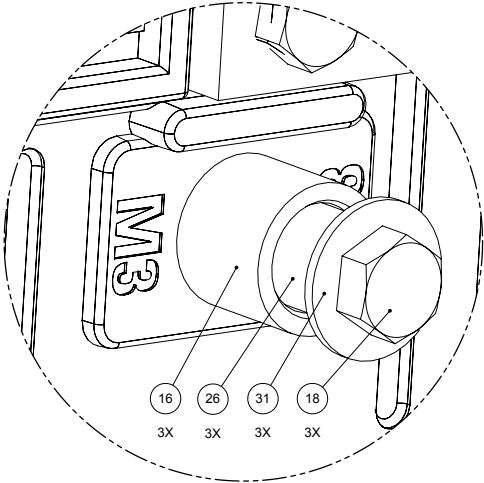
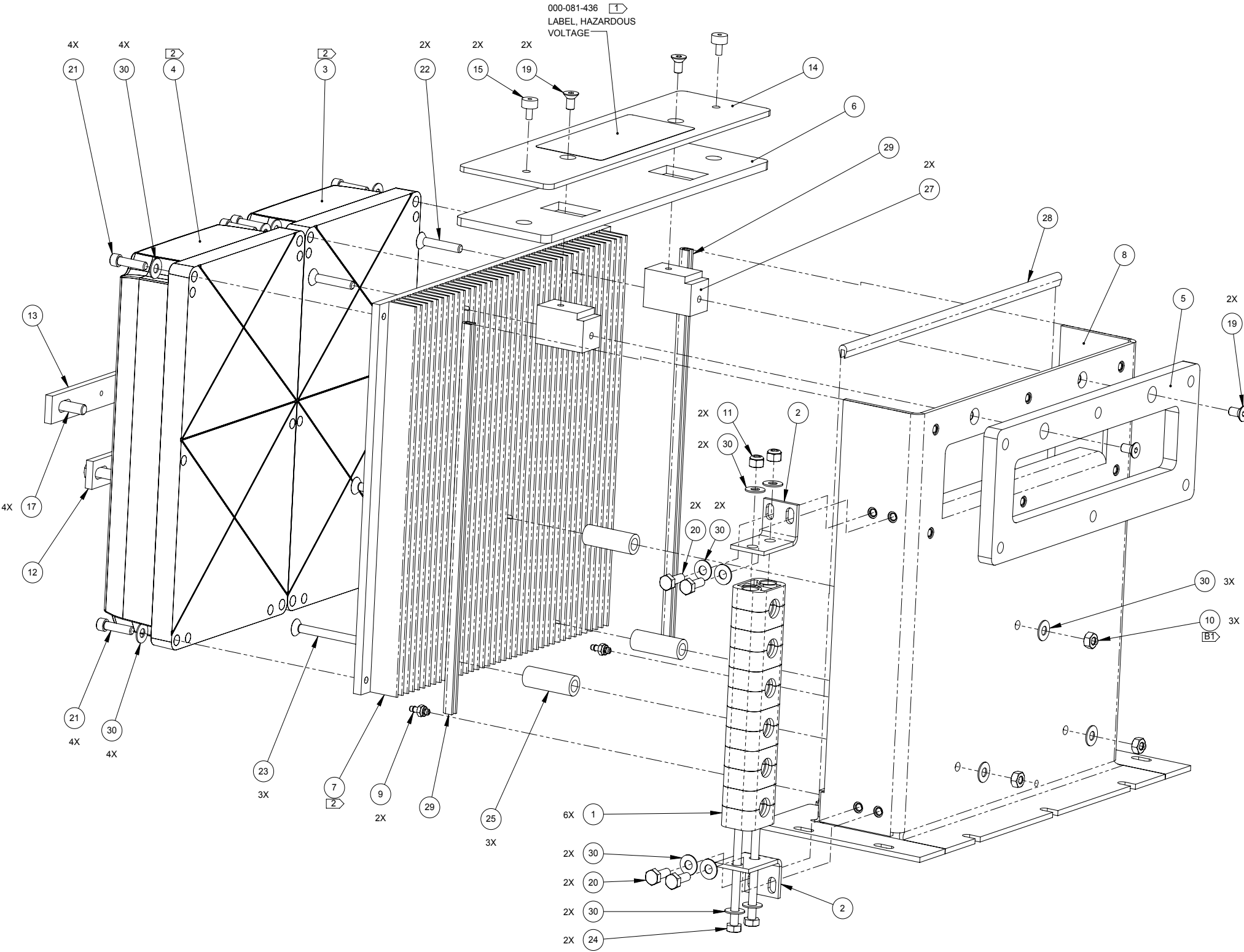
Figure 9-10. Assembly, Blower - CDS xDrive
601-002-705 Rev. F



Blower Assembly Parts List

13	4	WASHER, 5/8" LOCK Z/P	STEEL	000-174-197
12	1	STUD, 3/8"-16UNC X 1.50" LG. Z/P	STEEL	000-156-045
11	4	SCREW, 5/8"-11UNC x 0.75" LG. HEX HEAD GRD 5 Z/P	STEEL	000-143-722
10	4	SCREW, INSERT 3/8"-16UNC ID X 5/8"-11UNC OD	STEEL	000-143-723
9	1	PULLEY, BLOWER - COATED	AISI 12L14	000-109-134
8	1	HOSE ASSEMBLY, 3/8" I.D. x 28" LG. DRAIN	VARIOUS	000-068-1075
7	1	HOSE ASSEMBLY, 3/8" I.D. x 21" LG. DRAIN	VARIOUS	000-068-1074
6	1	GASKET, BLOWER TO FRAME	SILICONE 1365 90A DUROMETER	000-057-246
5	1	ELBOW, 3/8" NPT STREET x 45°	BRASS	000-052-083
4	2	BUSHING, 1/2 M X 3/8 F	BRASS	000-052-064
3	1	BUSHING, 1-1/4" TAPERLOCK 1210	STEEL	000-020-075
2	1	BLOWER, GD 408 TRIFLOW	STEEL	000-111-218
1	1	ADAPTER GD BLOWER OUT - COATED	STEEL	000-001-866
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

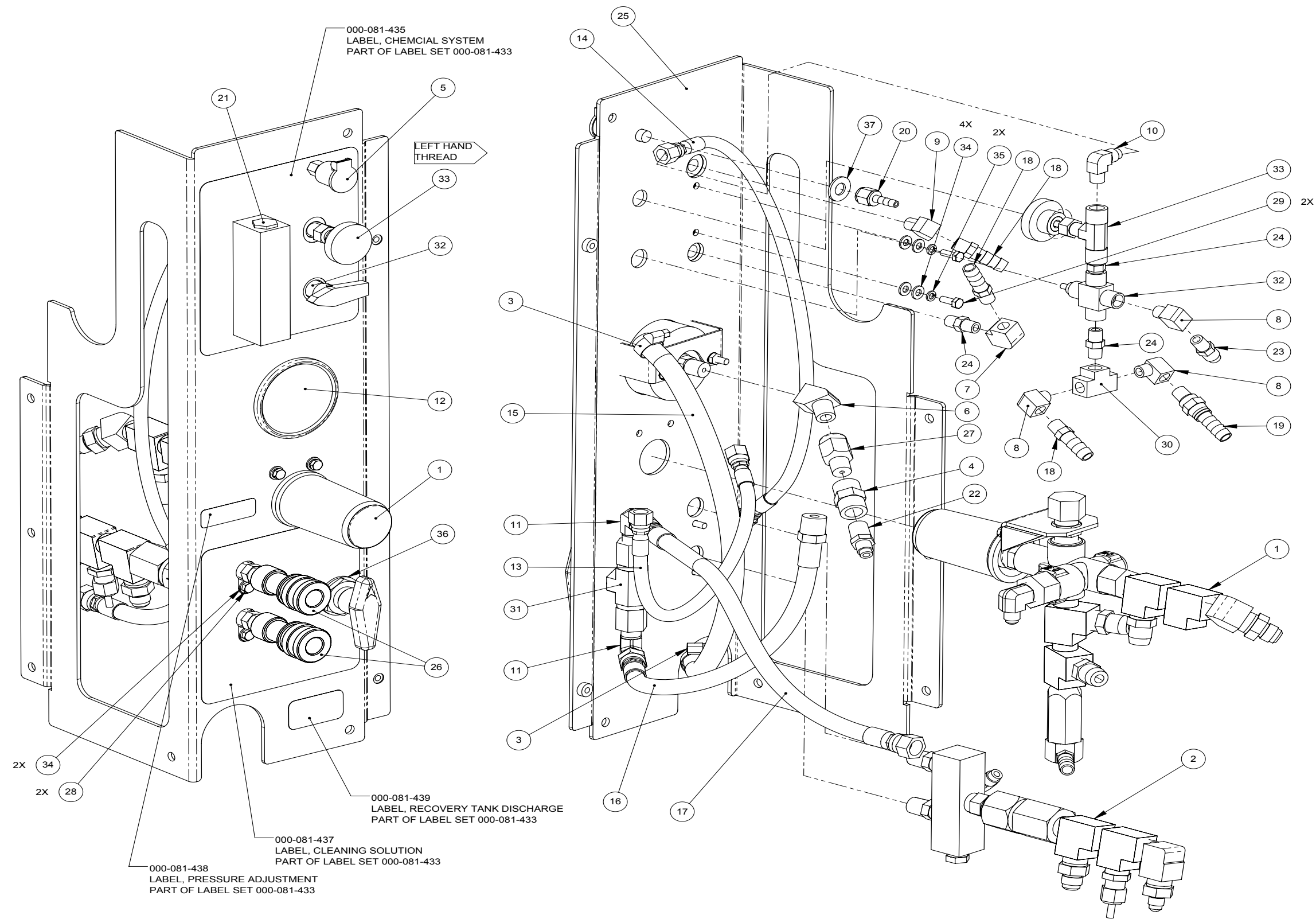
Figure 9-11. Assembly, Heat Sink - CDS xDrive
601-032-705 Rev. F



Heat Sink Assembly Parts List

30	19	WASHER, 1/4" FLAT S/S	STEEL	000-174-003
29	2.04'	TRIMLOK, 5/8" X 1/8" SLOT RUBBER	VARIOUS	000-131-021
28	1.04'	TRIMLOK, 3/8" X 1/8" RUBBER EDGE	RUBBER	000-131-131
27	2	SPACER, HEAT SINK ATTACHMENT	6061-T6	000-154-210
26	3	SPACER, 1.1 LG CABLE	COPPER	000-154-213
25	3	SPACER, Ø3/8" I.D. x 1.75" LG.	6061-T1	000-154-215
24	2	SCREW, 1/4"-20UNC x 8.5" LG. HEX HEAD Z/P	STEEL	000-143-742
23	3	SCREW, 1/4"-20UNC x 3.5" LG. FLAT HEAD	STEEL	000-143-726
22	2	SCREW, 1/4"-20UNC x 1.50" LG. FLAT HEAD SOCKET	S. STEEL	000-143-709
21	8	SCREW, 1/4"-20UNC x 1.00" LG. SOCKET HEAD	S.STEEL	000-143-080
20	4	SCREW, 1/4"-20UNC x 0.75" LG. HEX HEAD	S. STEEL	000-143-001
19	4	SCREW, 1/4"-20UNC x 0.50" LG, FLAT HEAD	S. STEEL	000-143-596
18	3	SCREW, M8 x 45mm LG. HEX HEAD GRD. 10.9	STEEL	000-143-184
17	4	SCREW, M8 x 25MM HEX HEAD GRD 10.9	STEEL	000-143-187
16	3	PROTECTOR, PASS THRU STUD	VIRGIN PTFE	000-108-198
15	2	PROTECTOR, 5/8" BUMPER	VARIOUS	000-108-115
14	1	PLATE, TOP - HEAT SINK	5052-H32	000-105-742
13	1	PLATE, BUS BAR - 8.0" LG.	ASTM B512 / B187	000-105-754
12	1	PLATE, BUS BAR - 5.25" LG.	ASTM B512 / B187	000-105-753
11	2	NUT, 1/4"-20UNC NYLOCK	S STEEL	000-094-009
10	3	NUT, 1/4"-20UNC HEX S/S	S. STEEL	000-094-010
9	2	INSERT, #10-32UNF X 5/32" BARB	S. STEEL	000-052-938
8	1	HOUSING, HEAT SINK - WELDMENT	5052-H32	000-042-099
7	1	HEAT SINK	6061-T6	000-038-083
6	1	GASKET, TOP - HEAT SINK	NEOPRENE /EPDM/SBR F0	000-057-243
5	1	GASKET, HEAT SINK DUCT	NEOPRENE /EPDM/SBR F0	000-057-245
4	1	CONTROLLER, XDRIVE - MOTOR - PRODUCT SUPPORT	VARIOUS	000-074-182
3	1	CONTROLLER, XDRIVE - GENERATOR - PRODUCT SUPPORT	VARIOUS	000-074-181
2	2	BRACKET, CABLE CLAMP	5052-H32	000-015-1355
1	6	BLOCK, CABLE SUPPORT	SANTOPRENE	000-012-021
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-12. Assembly, Instrument Panel - CDS xDrive
601-019-705 Rev. G



Intrument Panel Assembly Parts List

37	1	WASHER, 3/8" FLAT Z/P	STEEL	000-174-005
36	1	WASHER, 3/4" FLAT - BRASS	BRASS	000-174-027
35	2	WASHER, #10 LOCK	S. STEEL	000-174-014
34	6	WASHER, #10 FLAT	S. STEEL	000-174-001
33	1	VALVE, CHEMICAL METERING	S.STEEL	000-169-160
32	1	VALVE, 3-WAY BALL O-RING STYLE	BRASS	000-169-0171
31	1	VALVE, 2 WAY CHEM PUMP	BRASS	000-169-176
30	1	TEE, 1/8" FPT	BRASS	000-052-092
29	2	SCREW, #10-32UNF x 0.50" LG. HEX HEAD	STEEL	000-143-327
28	2	SCREW, #10-24UNC x 0.50" LG. HEX HEAD	S. STEEL	000-143-126
27	1	REGULATOR, HI PSI SNUBBER	BRASS	000-135-052
26	2	QUICK CONNECT, 440 FEMALE w/ EPDM O-RING	BRASS	000-052-051
25	1	PANEL, INSTRUMENT - COATED	ASTM A1008 CS TYPE B	000-100-353
24	3	NIPPLE, 1/8" NPT HEX	BRASS	000-052-069
23	1	NIPPLE, 1/4" SAE x 1/8" NPT	BRASS	000-052-530
22	1	NIPPLE, 1/4" SAE x 1/4" NPT	BRASS	000-052-527
21	1	METER, CHEMICAL FLOW RAW	ACRYLIC	000-074-030
20	1	INSERT, #F23 (1/8" FPT x 3/16" BARB)	BRASS	000-052-096
19	1	INSERT, #26 w/ SWIVEL - BRASS	BRASS	000-052-939
18	3	INSERT, #26 (1/8" NPT x 3/8" BARB)	BRASS	000-052-099
17	1	HOSE, 5/16" TEFLON x 18" LG.	S. STEEL	000-068-1048
16	1	HOSE, 5/16" TEFLON x 15" LG. M-F JIC ENDS	S. STEEL	000-068-092
15	1	HOSE, 3/8" I.D. HI TEMP RUBBER x 21" LG.	RUBBER	000-068-1061
14	1	HOSE ASSEMBLY, 3/16" PTFE (TEFLON) x 18.25" LG.	S. STEEL	000-068-518
13	1	HOSE ASSEMBLY, 3/16" TEFLON x 16.75" LG.	S. STEEL	000-068-1071
12	1	GAUGE, PRESSURE 0 -1500 PSI, UPC #401406.	VARIOUS	000-074-007
11	2	ELBOW, 3/8" JIC x 1/4" NPT	BRASS	000-052-751
10	1	ELBOW, 1/8" NPT x 1/4" SAE	BRASS	000-052-531
9	1	ELBOW, 1/8" NPT X 45° STREET	BRASS	000-052-078
8	3	ELBOW, 1/8" NPT STREET	BRASS	000-052-084
7	1	ELBOW, 1/8" NPT FEMALE	BRASS	000-052-089
6	1	ELBOW, 1/4" NPT STREET x 45°	BRASS	000-052-082
5	1	CUP, GRAVITY FEED OIL BLOWER LUBE PORT	S.STEEL	000-052-272
4	1	COUPLER, 1/4" FPT	BRASS	000-052-311
3	2	CLAMP, SIZE #5 HOSE	S. STEEL	000-033-005
2	1	ASSEMBLY, HI-PSI MANIFOLD	BRASS	601-008-705
1	1	ASSEMBLY, BY-PASS VALVE	VARIOUS	601-009-705
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-13. Assembly, Hi-PSI Manifold - CDS xDrive
601-008-705 Rev. D

HI-PSI Manifold Assembly Parts List

12	1	VALVE, DIFFERENTIAL	VARIOUS	000-169-236
11	2	TEE, 3/8" NPT MALE STREET	BRASS	000-052-023
10	1	SENDER, TEMPERATURE	BRASS	000-149-039
9	1	PLUG, 1/4" NPT HEX	BRASS	000-106-002
8	1	NIPPLE, 3/8" NPT x 1/4" M SAE	BRASS	000-052-662
7	1	NIPPLE, 3/8" NPT HEX	BRASS	000-052-074
6	1	NIPPLE, 3/8" M JIC x 3/8" NPT	BRASS	000-052-528
5	2	NIPPLE, 1/4" NPT HEX	BRASS	000-052-071
4	1	MANIFOLD, HIGH PRESSURE	UNS C36000 / ASTM B16 H02	000-090-008
3	1	ELBOW, 3/8" NPT STREET	BRASS	000-052-086
2	1	ELBOW, 1/8" NPT x 1/4" SAE	BRASS	000-052-531
1	1	BUSHING, 3/8" NPT x 1/4" FPT	BRASS	000-052-061
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

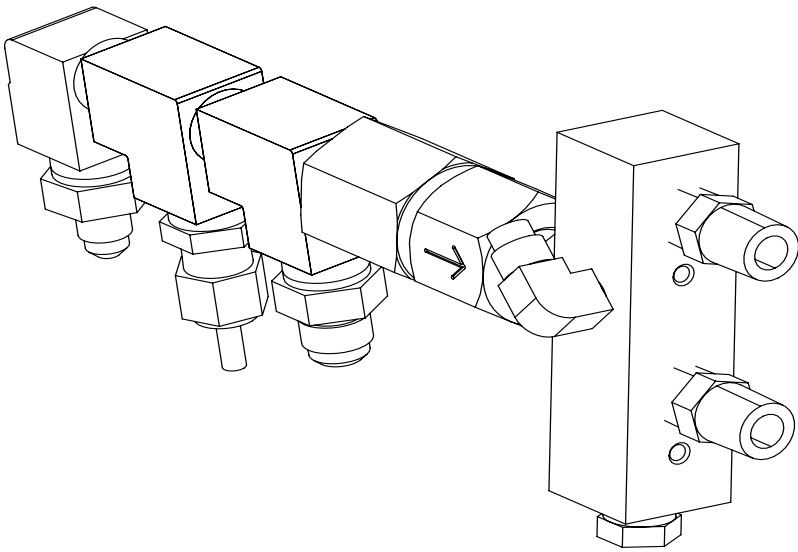
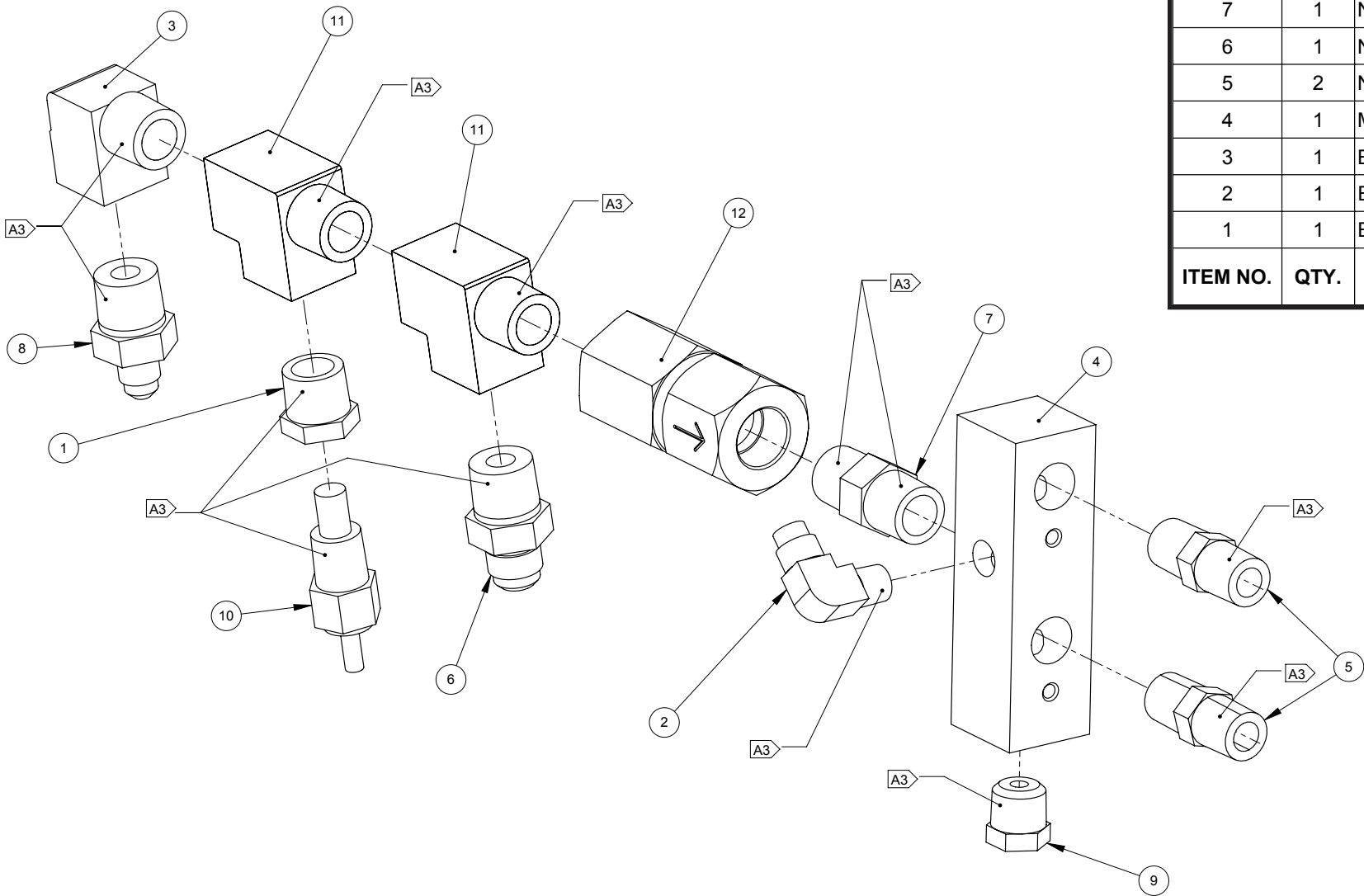


Figure 9-14. Assembly, Bypass Valve - CDS xDrive
601-009-705 Rev. A

Bypass Valve Assembly Parts List

14	2	WASHER, #10 LOCK	S. STEEL	000-174-014
13	2	WASHER, #10 FLAT	STEEL	000-174-001
12	1	VALVE, PRESSURE REGULATOR-MODIFIED	VARIOUS	000-169-351
11	1	VALVE, 165° F THERMAL	VARIOUS	000-169-027
10	4	TEE, 3/8" NPT MALE STREET	BRASS	000-052-023
9	2	SCREW, #10-24UNC x 0.50" LG. HEX HEAD	S. STEEL	000-143-126
8	1	PLUG, 3/8" NPT ALLEN HEAD	BRASS	000-106-008
7	3	NIPPLE, 3/8" MPT x 3/8" SAE FLARE	BRASS	000-052-128
6	1	NIPPLE, 3/8" M JIC x 3/8" NPT	BRASS	000-052-528
5	1	INSERT, #26 (1/8" NPT x 3/8" BARB)	BRASS	000-052-099
4	1	ELBOW, 3/8" NPT STREET x 45°	BRASS	000-052-083
3	1	ELBOW, 1/4" SAE x 3/8" MPT x 90°	BRASS	000-052-764
2	1	CAP, 3/8" BRASS PIPE	BRASS	000-027-008
1	1	BRACKET, BY-PASS VALVE MOUNT - WELDMENT	AISI 304 2B	000-015-515
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

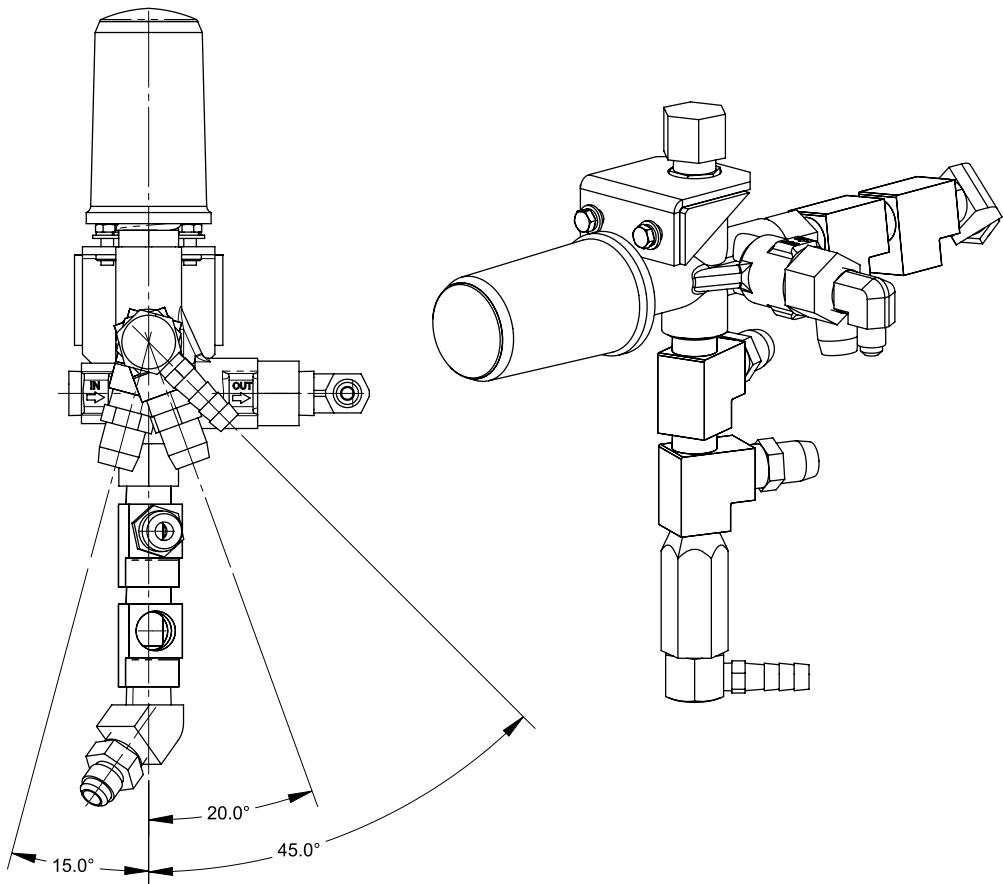
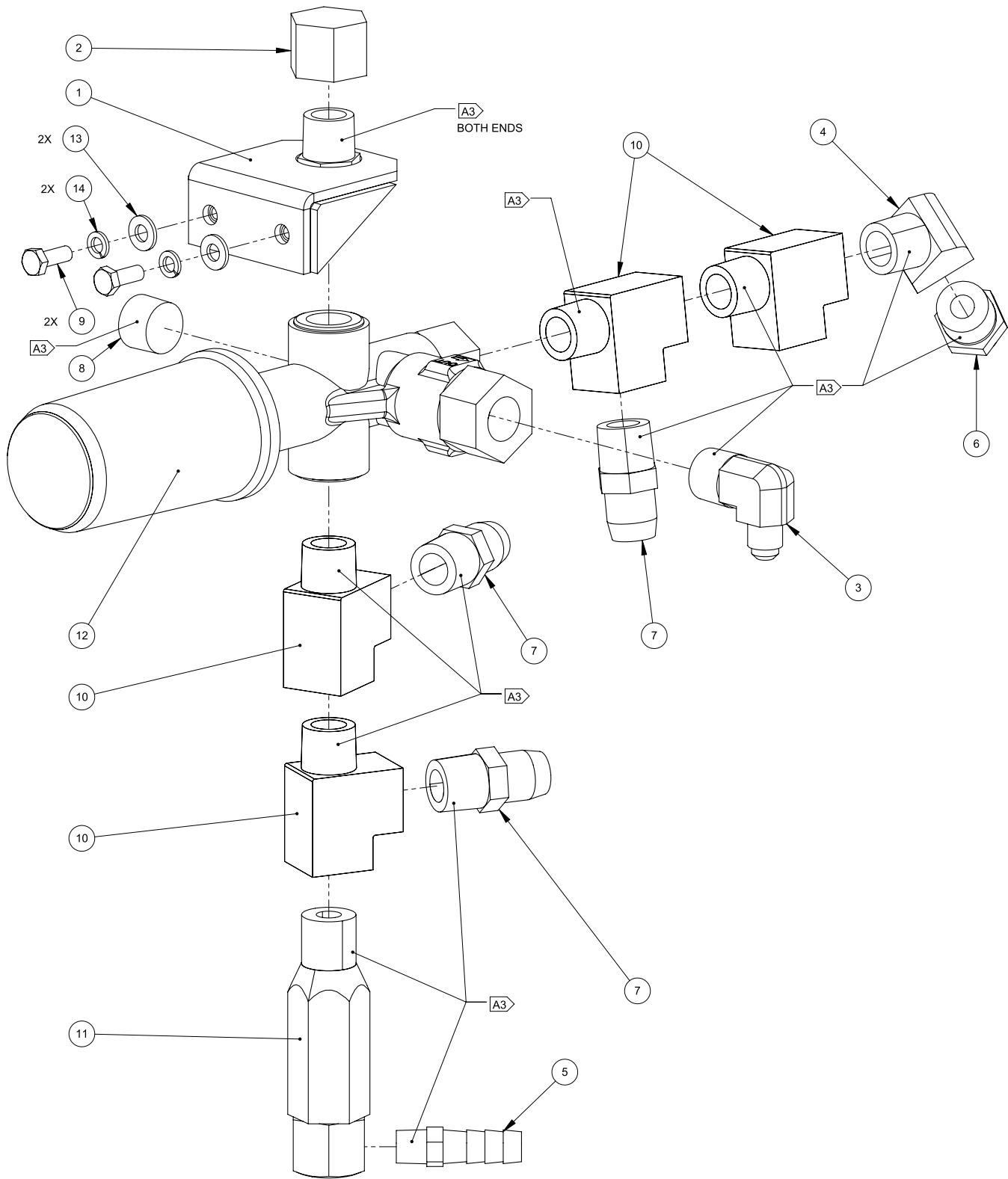
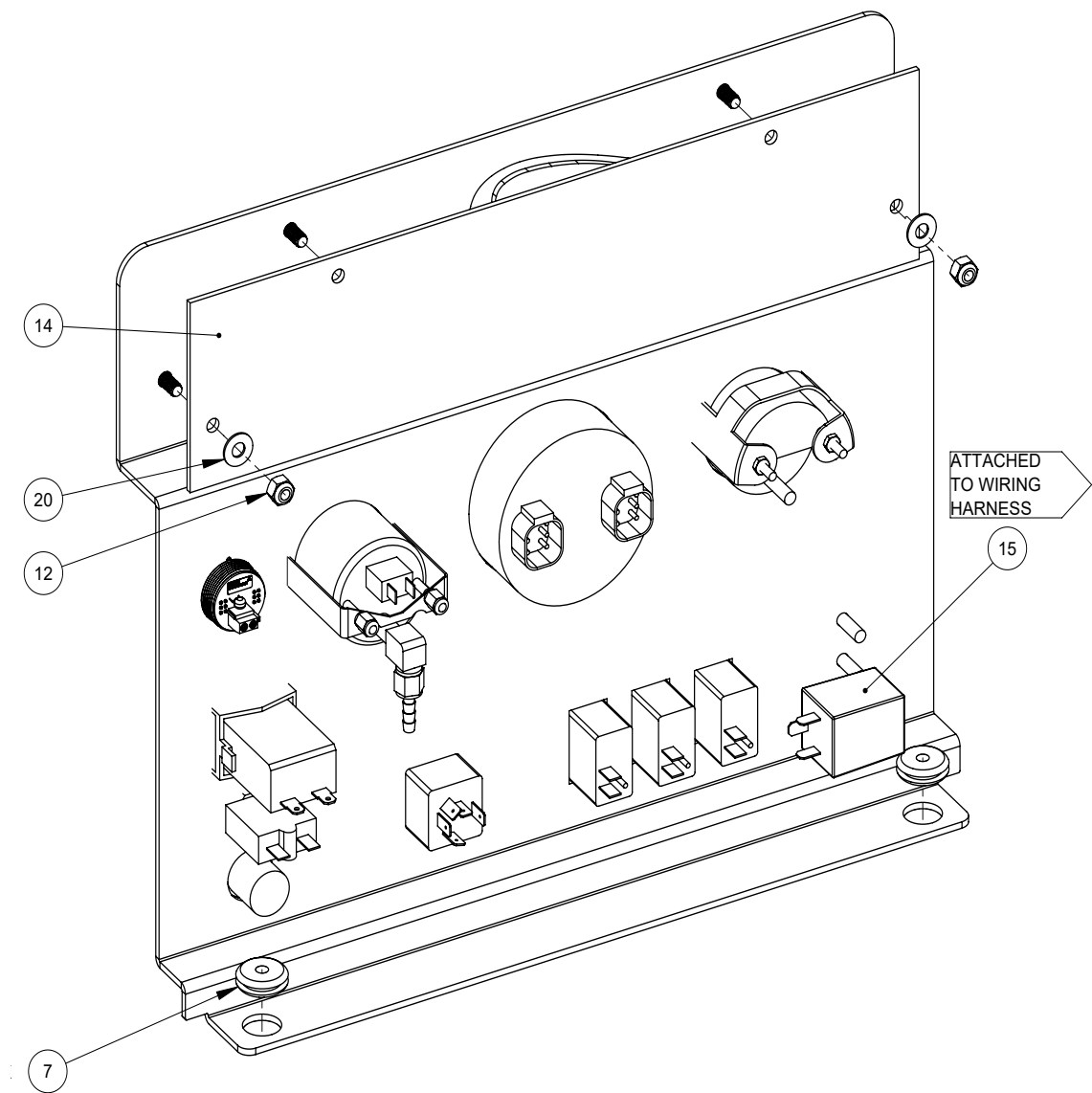
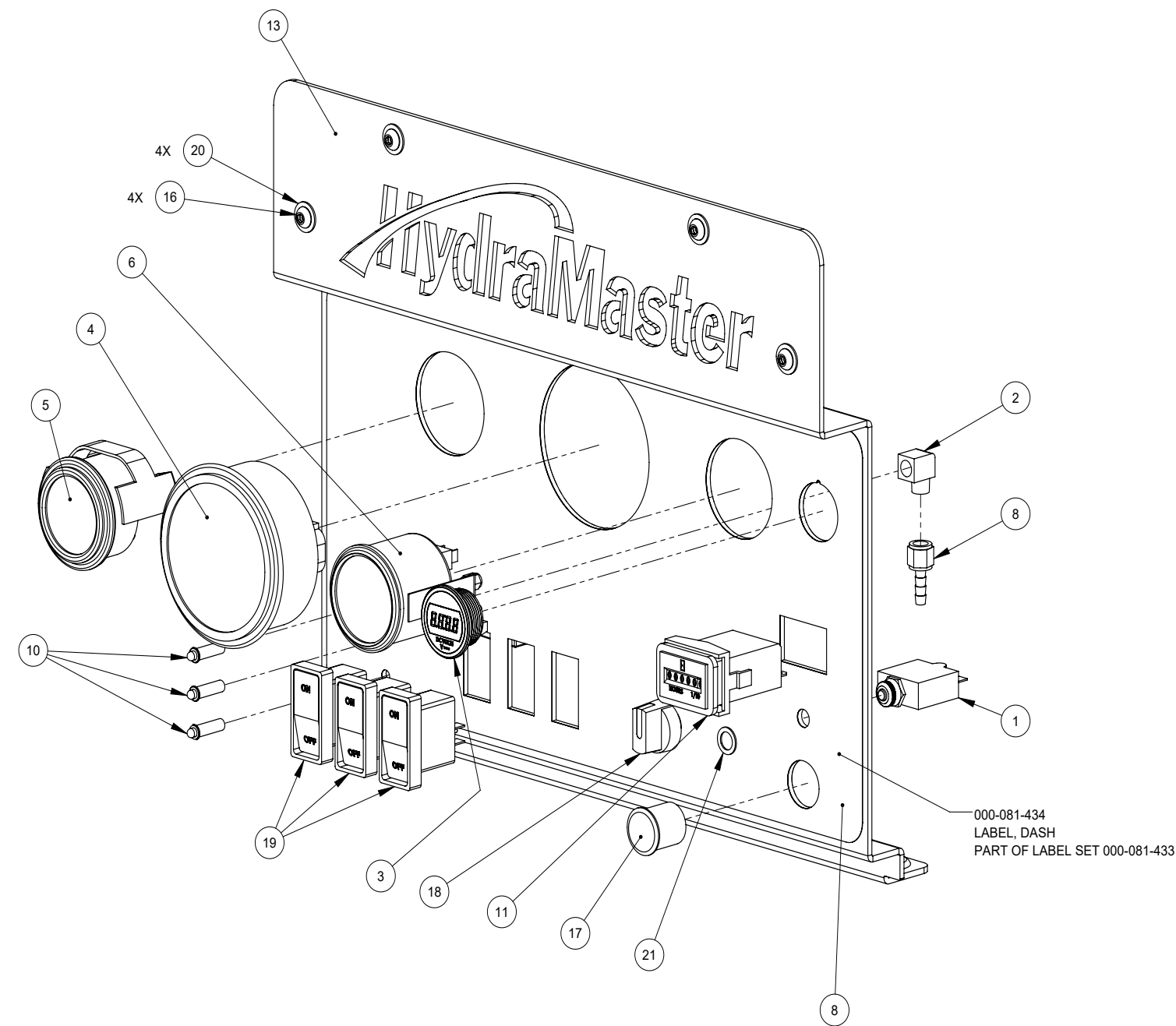


Figure 9-15. Assembly, Dash Panel - CDS xDrive
601-020-705 Rev. H



Dash Panel Assembly Parts List

21	1	WASHER, 3/8" FLAT	NYLON	000-174-052
20	6	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
19	3	SWITCH, 20 AMP ROCKER	VARIOUS	000-157-040
18	1	SWITCH, ROTARY, 4 POSITION	VARIOUS	000-157-060
17	1	SWITCH, PUSH BUTTON IGNITION	VARIOUS	000-157-168
16	4	SCREW, 1/4"-20UNC X 0.625" LG. SHCS BUTTON	STEEL	000-143-206
15	1	RELAY, 12V FLASHER	VARIOUS	000-157-048
14	1	REFLECTOR, 3.75" X 16" LG.	VARIOUS	000-084-020
13	1	PANEL, DASH - COATED	5052-H32	000-100-351
12	2	NUT, 1/4"-20UNC NYLOCK	S STEEL	000-094-009
11	1	METER, RECTANGULAR W/O BEZEL	VARIOUS	000-074-170
10	3	LIGHT, RED LED INDICATOR MINI	VARIOUS	000-084-011
9	1	LABEL SET, CDS XDRIVE	POLYCARBONATE	000-081-433
8	1	INSERT, #F23 (1/8" FPT x 3/16" BARB)	BRASS	000-052-096
7	2	GROMMET, 3/4" ID X 1/8" GROOVE - BUNA	BUNA-N	000-060-020
6	1	GAUGE, VACUUM 10-30" - Ø2-1/16" CHROME BEZEL	VARIOUS	000-074-006
5	1	GAUGE, TEMPERATURE	VARIOUS	000-074-016
4	1	GAUGE, TACH - CAN BUS	VARIOUS	000-074-177
3	1	GAUGE, DC VOLT MONITOR	VARIOUS	000-074-185
2	1	ELBOW, 1/8" NPT STREET	BRASS	000-052-084
1	1	BREAKER, 25 AMP CIRCUIT	VARIOUS	000-018-004
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.



Figure 9-16. Assembly, Pump - CDS xDrive
601-007-705 Rev. C

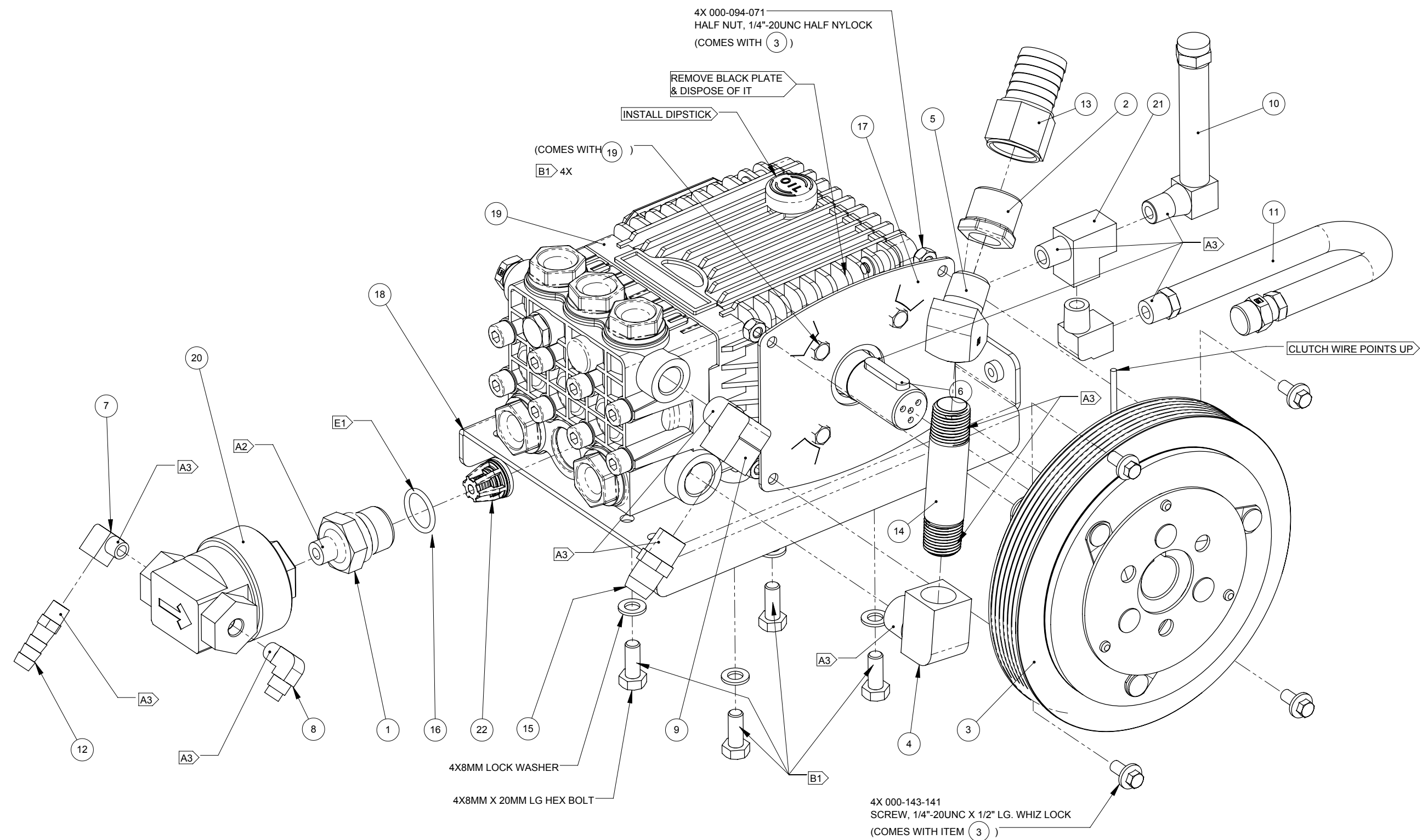
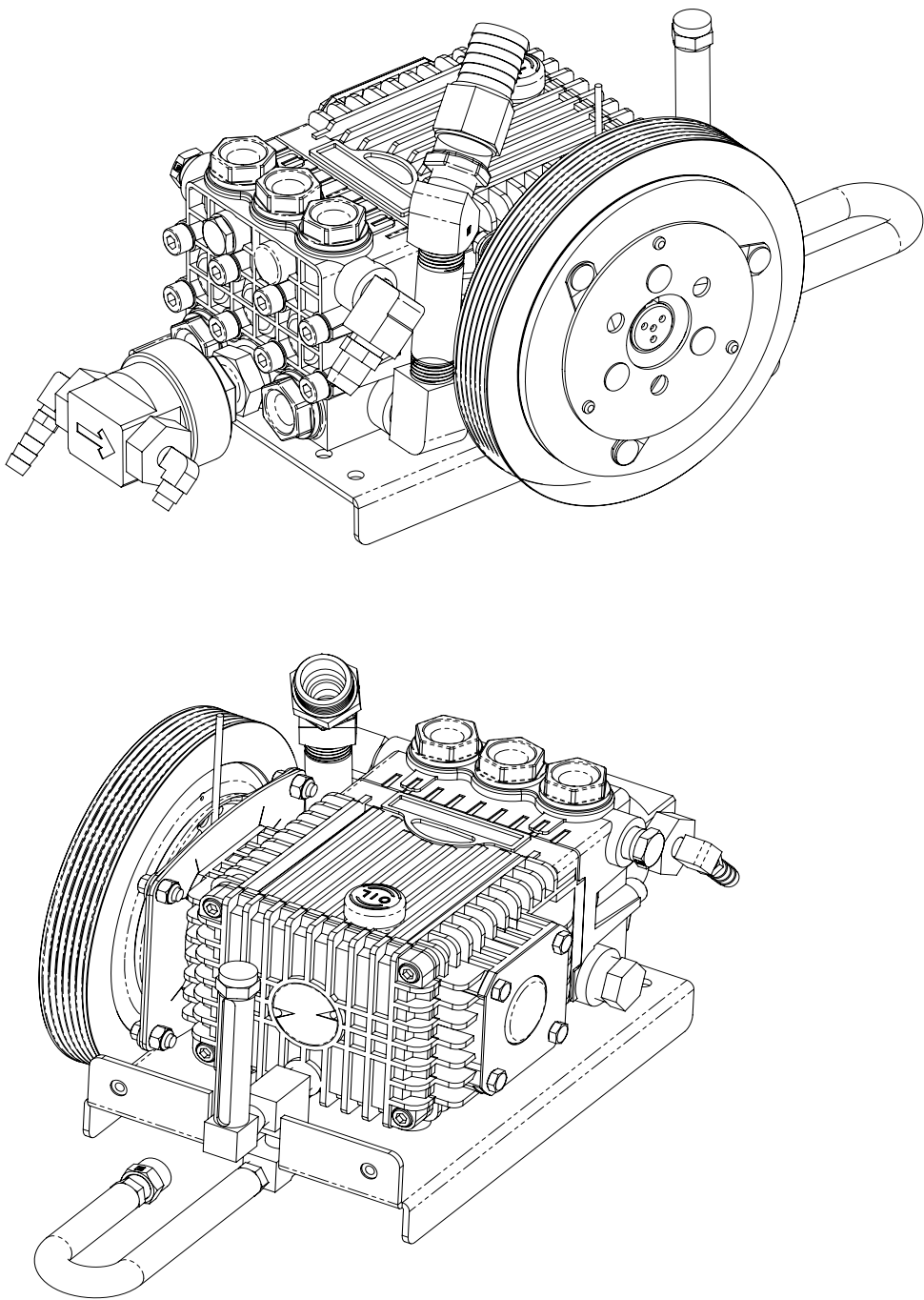


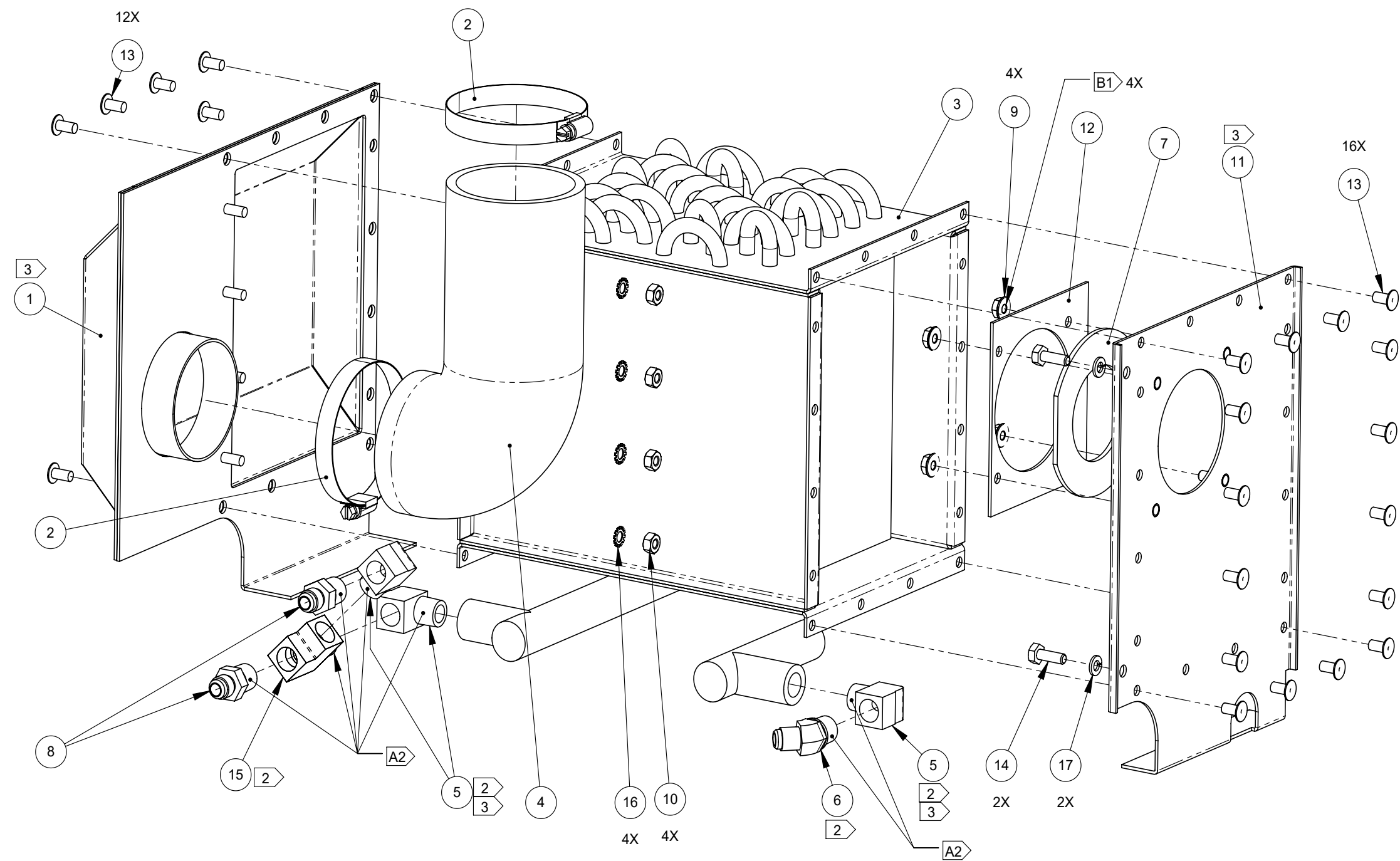
Figure 9-17. Assembly, Pump - CDS xDrive
601-007-705 Rev. C



Pump Assembly Parts List

22	1	VALVE, GP PUMP CHECK - MOD. - 4.0 GALLON	VARIOUS	000-169-216
21	1	TEE, 1/4" NPT BRANCH M-F-F	BRASS	000-052-090
20	1	PUMP, GP CHEMICAL	AISI 303	000-111-184
19	1	PUMP, 4.0 GMP GP	VARIOUS	000-111-188
18	1	PLATE, PUMP MOUNT	ASTM A653-G90	000-105-738
17	1	PLATE, PUMP CLUTCH - GP 4.0 GPM	STEEL	000-105-550
16	1	O-RING, ADAPTER - CHEMICAL PUMP	RUBBER	000-097-057
15	1	NIPPLE, 3/8" MPT x 3/8" SAE FLARE	BRASS	000-052-128
14	1	NIPPLE, 1/2" NPT x 3.5" LG.	BRASS	000-052-932
13	1	INSERT, #F1216 (3/4" FPT x 1" BARB)	BRASS	000-052-754
12	1	INSERT, #26 (1/8" NPT x 3/8" BARB)	BRASS	000-052-099
11	1	HOSE ASSEMBLY, 3/8" X 17" LG. DRAIN	VARIOUS	000-068-794
10	1	GAUGE, OIL SIGHT 1/4" NPT ELBOW	BRASS	000-074-184
9	1	ELBOW, 3/8" NPT STREET	BRASS	000-052-086
8	1	ELBOW, 1/8" NPT x 1/4" SAE	BRASS	000-052-531
7	1	ELBOW, 1/8" NPT STREET	BRASS	000-052-084
6	1	ELBOW, 1/4" NPT STREET	BRASS	000-052-085
5	1	ELBOW, 1/2" NPT STREET x 45°	BRASS	000-052-081
4	1	ELBOW, 1/2" NPT STREET	BRASS	000-052-087
3	1	CLUTCH, 7.315OD 24MM SERPINTINE	VARIOUS	000-036-011
2	1	BUSHING, 3/4" MPT X 1/2" FPT	BRASS	000-052-411
1	1	ADAPTER, GP TO CHEM PUMP S/S 4.0 GALLON	S. STEEL	000-001-154
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-18. Assembly, Blower HX - CDS xDrive
601-005-705 Rev. D



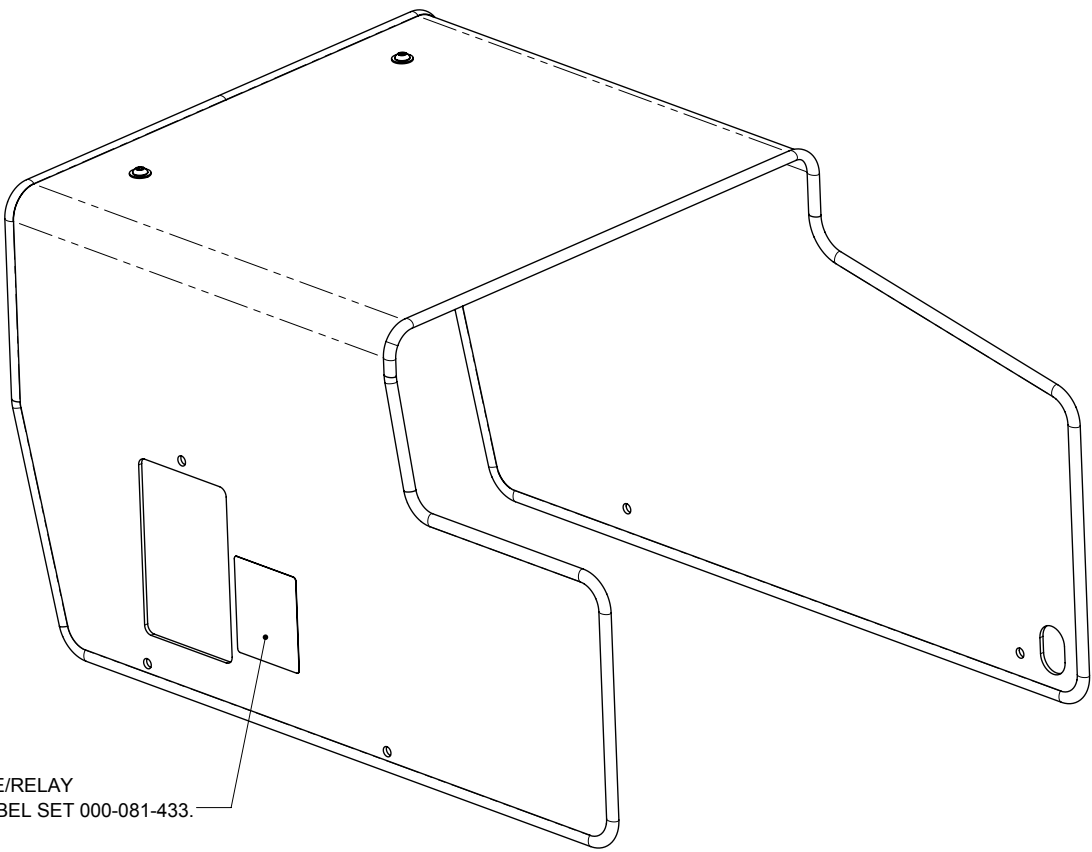
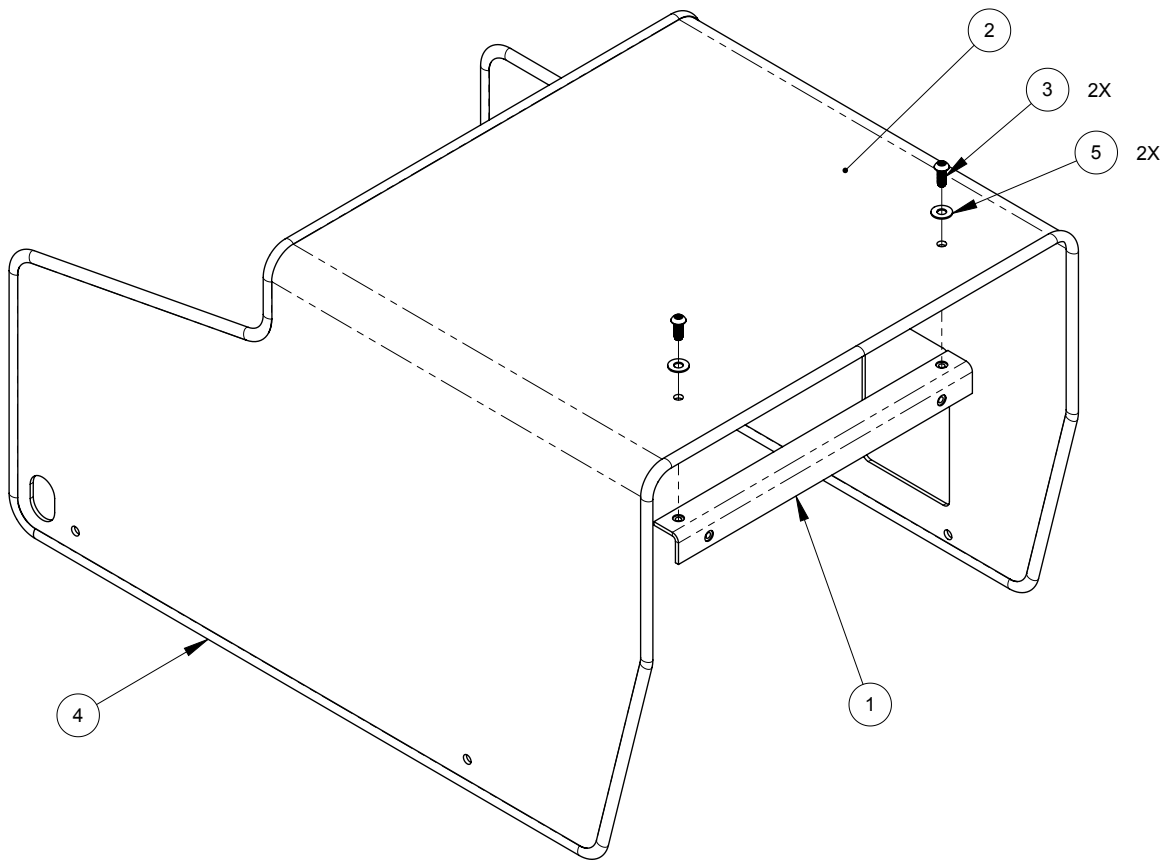
Blower HX Assembly Parts List

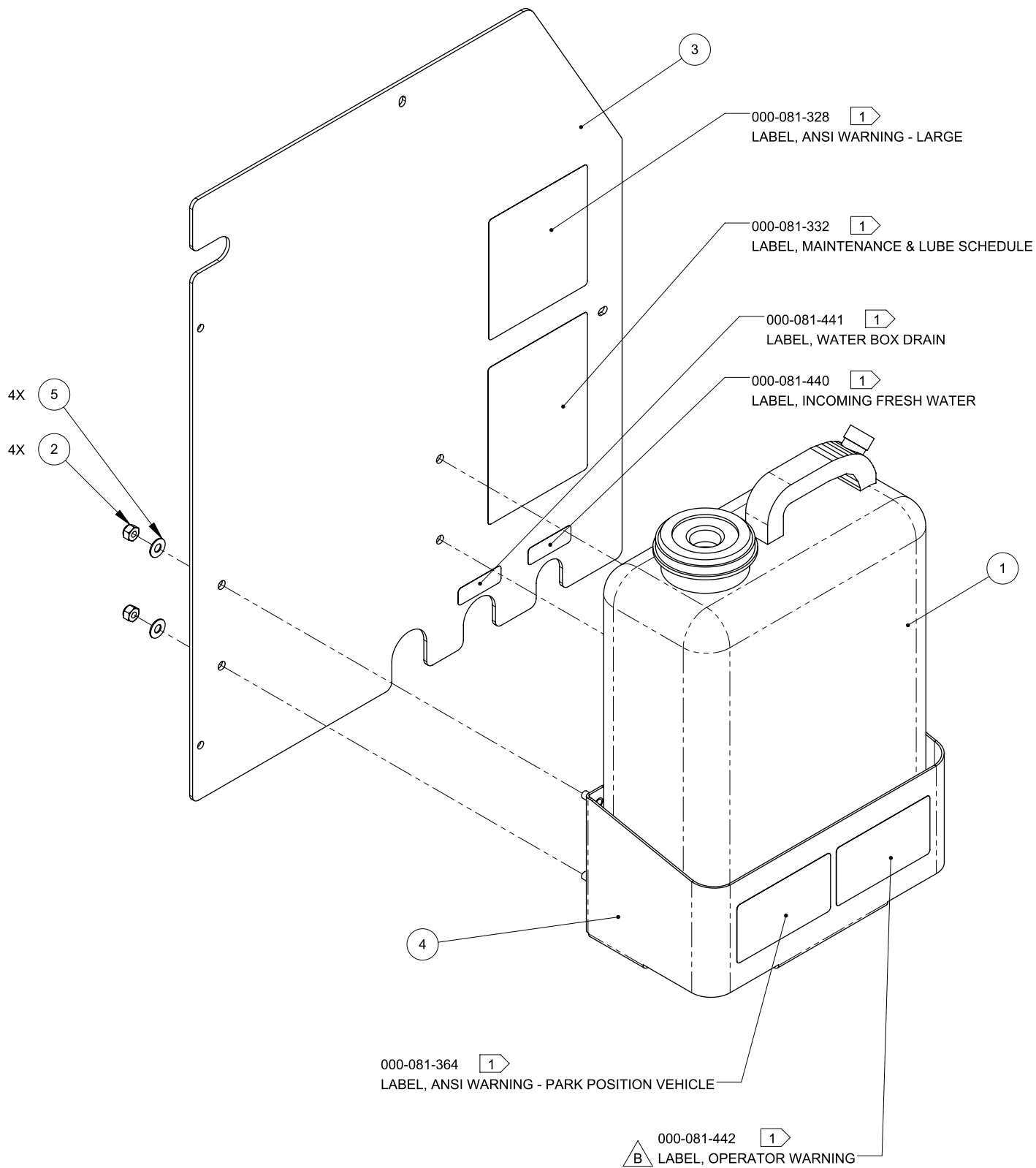
17	2	WASHER, 1/4" LOCK S/S	S. STEEL	000-174-019
16	4	WASHER, 1/4" EXTERNAL STAR	STEEL	000-174-039
15	1	TEE, 3/8" NPT MALE STREET	BRASS	000-052-023
14	2	SCREW, 1/4"-20UNC x 0.75" LG. HEX HEAD	S. STEEL	000-143-001
13	28	RIVET, 1/4" BLIND x 0.50" LG.	ALUMINUM	000-140-021
12	1	PLATE, SILENCER SEAL RETAINER	ASTM A653-G90	000-105-744
11	1	PLATE, SALSA INTERFACE - FABRICATED	ASTM A653-G90	000-105-743
10	4	NUT, 1/4"-20UNC HEX Z/P	STEEL	000-094-008
9	4	NUT, 1/4"-20UNC HEX FLANGE	STEEL	000-094-007
8	2	NIPPLE, 3/8" M JIC x 3/8" NPT	BRASS	000-052-528
7	1	GASKET, HEAT EXCHANGER OUTLET	SILICONE 1365 90A DUROMETER	000-057-247
6	1	ELBOW, 3/8" NPT x 3/8" M JIC x 37°	BRASS	000-052-779
5	3	ELBOW, 3/8" NPT STREET	BRASS	000-052-086
4	1	ELBOW, 3" RUBBER EXHAUST - MODIFIED	RUBBER	000-052-934
3	1	CORE, BLOWER HEAT EXCHANGER	VARIOUS	000-038-053
2	2	CLAMP, SIZE #48 HOSE (3")	S.STEEL	000-033-013
1	1	BOX, INLET PLENUM - WELDMENT	ASTM A653-G90	000-013-124
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-20. Assembly, Top Cover - CDS xDrive
601-022-705 Rev. C

Top Cover Assembly Parts List

5	2	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
4	13'	TRIMLOK,	VARIOUS	000-131-027
3	2	SCREW, 1/4"-20UNC X 0.625" LG. SHCS BUTTON	STEEL	000-143-206
2	1	COVER, TOP - POWERPACK - COATED	5052-H32	000-041-886
1	1	BRACKET, DASH SUPPORT	5052-H32	000-015-1360
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.





Right Cover Assembly Parts List

ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.
5	4	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
4	1	TRAY, SOAP JUG - COATED	ASTM A1008 CS TYPE B	000-166-076
3	1	PANEL, FRONT - POWERPACK - COATED	5052-H32	000-100-355
2	4	NUT, 1/4"-20UNC NYLOCK	S STEEL	000-094-009
1	1	JUG, 2.5 GALLON RECTANGLE - HDPE	HDPE	000-159-262



Figure 9-21. Assembly, Recovery Tank - CDS xDrive
601-060-705 Rev. C

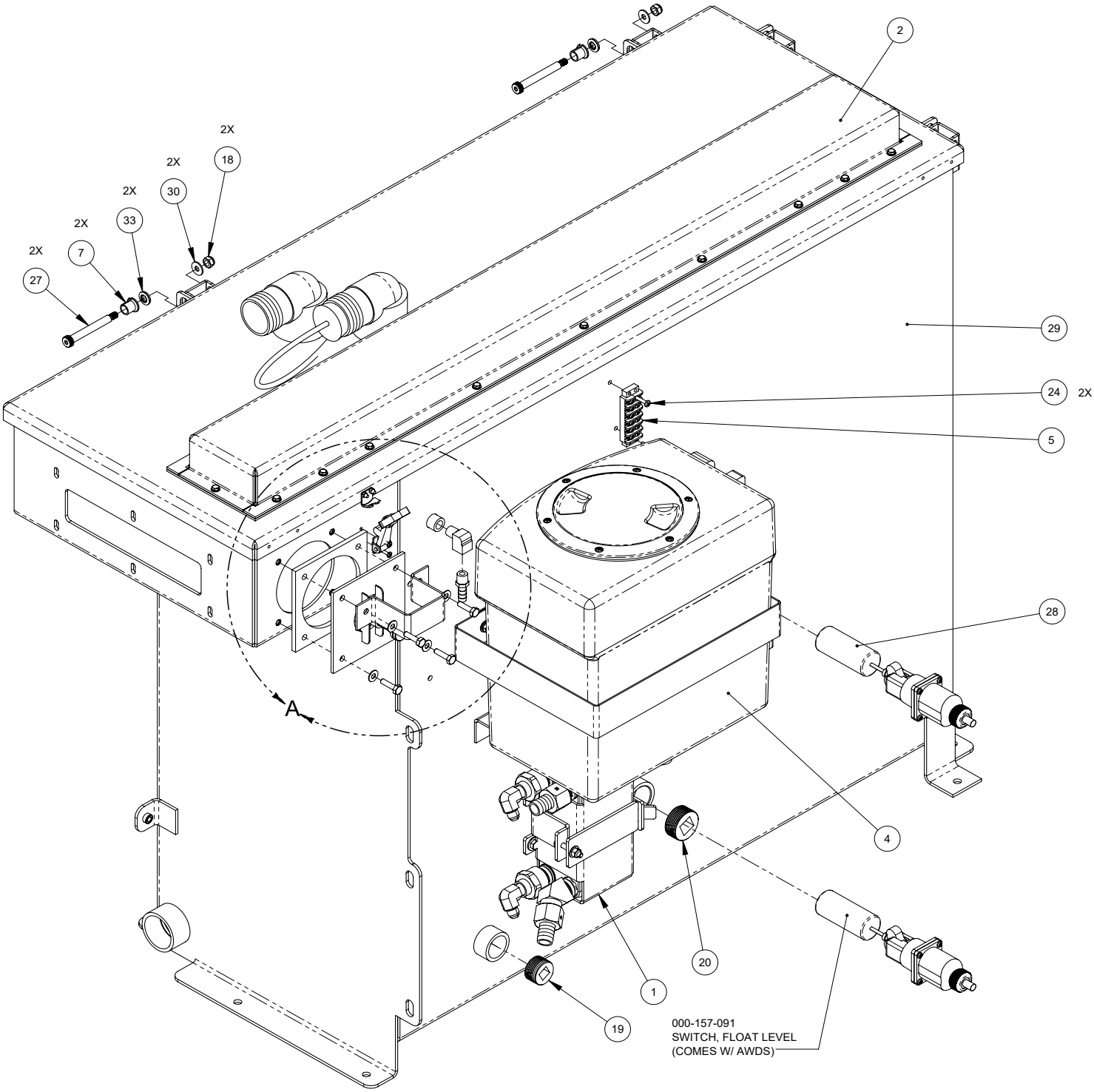
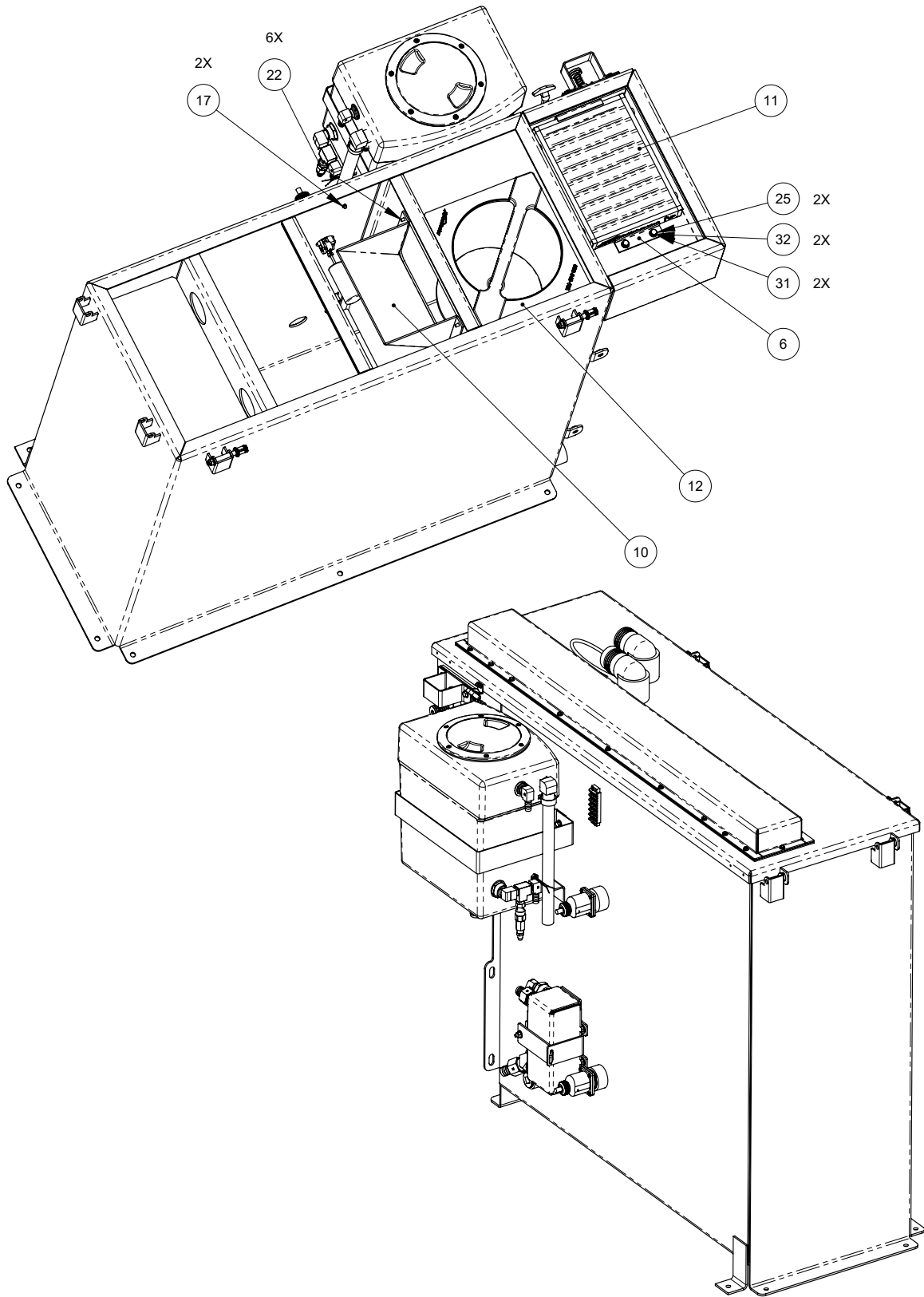


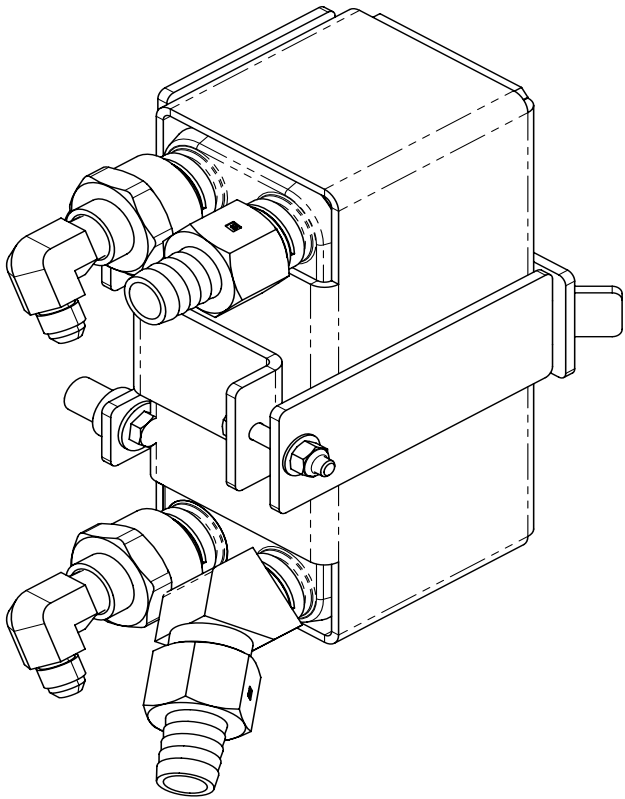
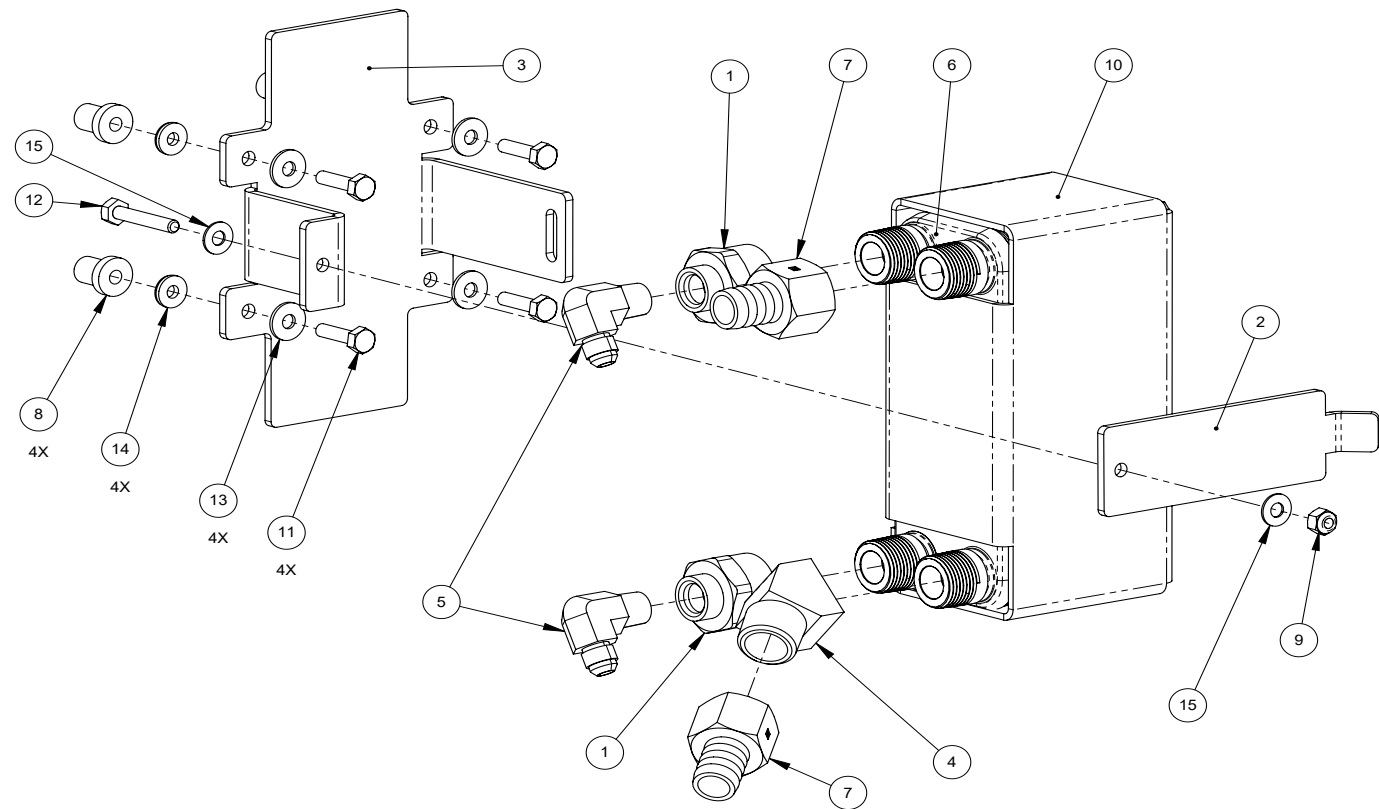
Figure 9-22. Assembly, Recovery Tank - CDS xDrive
601-060-705 Rev. C



Recovery Tank Assembly Parts List

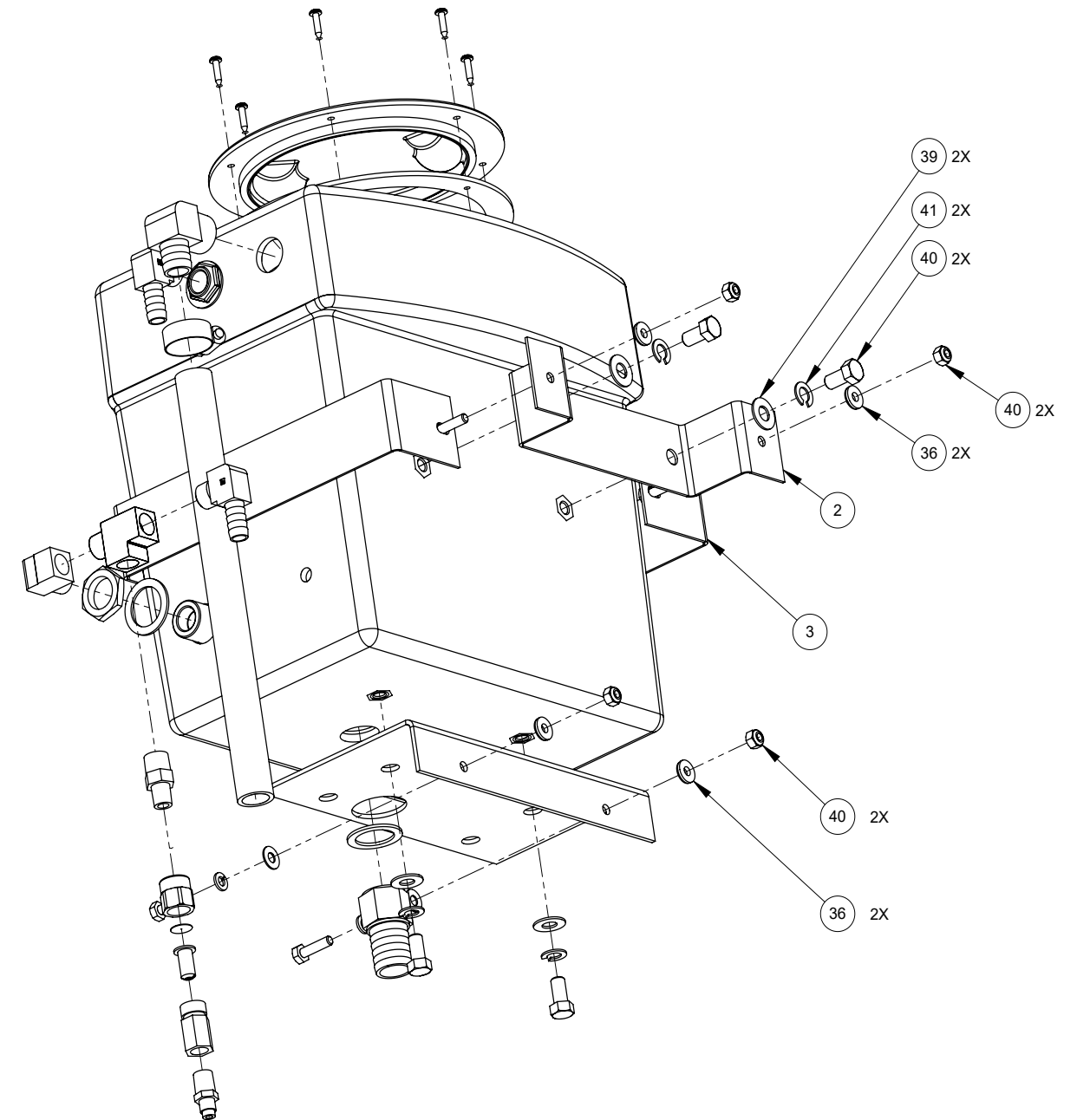
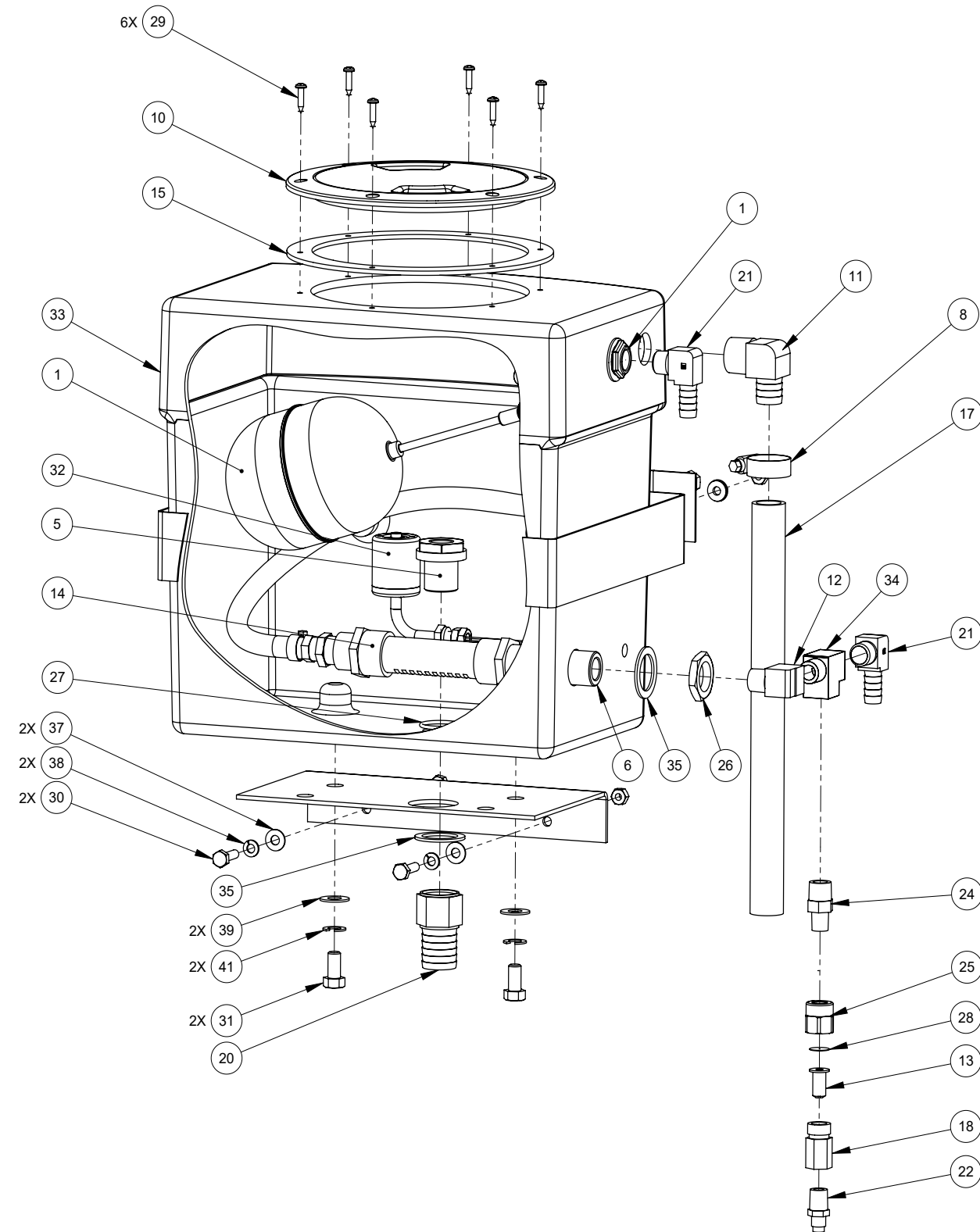
33	2	WASHER, 3/8" FLAT RUBBER BACKED	S. STEEL	000-174-029
32	2	WASHER, 1/4" LOCK S/S	S. STEEL	000-174-019
31	6	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
30	2	WASHER, 1/4" FLAT	STEEL	000-174-002
29	1	TANK, RECOVERY - COATED CDS xDRIVE	ALUMINUM	000-159-261
28	1	SWITCH, FLOAT LEVER	VARIOUS	000-157-091
27	2	SCREW, 3/8" X 2.75" LG. SHOULDER X 5/16"-18UNC	S. STEEL	000-143-759
26	4	SCREW, 1/4"-20UNC x 1.00" LG. HEX HEAD	S. STEEL	000-143-002
25	2	SCREW, 1/4"-20UNC x 0.50" LG. S/S HEX HEAD	S. STEEL	000-143-333
24	2	SCREW, #8-32UNC x 0.75" LG. BINDER HEAD	S. STEEL	000-143-051
23	2	SCREW, #6-32UNC x 0.50" LG. BUTTON HEAD	S. STEEL	000-143-539
22	6	RIVET, AB8-6A ALUMINUM POP	ALUMINUM	000-140-023
21	1	PROTECTOR, VACUUM RELIEF - COATED	VARIOUS	000-108-179
20	1	PLUG, 1-1/4" NPT BRONZE	BRONZE	000-106-046
19	1	PLUG, 1" NPT BRONZE	BRONZE	000-106-049
18	2	NUT, 5/16"-18UNC HEX NYLOCK	18-8 S. STEEL	000-094-038
17	2	NUT, #8-32UNC HEX NYLOCK	AISI 304	000-094-059
16	2	NUT, #6-32UNC HEX NYLOCK	S. STEEL	000-094-063
15	1	LATCH, BUNGEE	VARIOUS	000-086-008
14	2	INSERT, #46 (1/4" NPT x 3/8" BARB)	BRASS	000-052-102
13	1	GASKET, ADAPTER - URT	RUBBER	000-057-206
12	1	FILTER, RECOVERY TANK BASKET	VARIOUS	000-049-152
11	1	FILTER, FLAT - UNIVERSAL RECOVERY TANK	VARIOUS	000-049-153
10	1	FILTER, AIR DEFLECTOR, URT - FABRICATED	5052-H32	000-049-154
9	1	ELBOW, 1/4" NPT STREET x 45°	BRASS	000-052-082
8	1	ELBOW, 1/4" NPT STREET	BRASS	000-052-085
7	2	BUSHING, CDS IDLER CASTING - ALTERNATOR MOTOR	SPRING ST	000-154-141
6	1	BRACKET, FLAT FILTER SECURING - UNCOATED	5052-H32	000-015-932
5	1	BLOCK, 6 POST TERMINAL	VARIOUS	000-012-002
4	1	ASSEMBLY, WATER BOX - CDS xDRIVE	VARIOUS	601-010-705
3	1	ASSEMBLY, VACUUM RELIEF VALVE - URT	VARIOUS	610-026-724
2	1	ASSEMBLY, COVER - RECOVERY TANK	VARIOUS	601-029-705
1	1	ASSEMBLY, ALFA LAVAL AXP14 - HX	VARIOUS	601-006-706
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-23. Assembly, Heat Exchanger - CDS xDrive
601-006-706 Rev. A



15	2	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
14	4	WASHER, 1/4" FLAT RUBBER BACKED	18-8 S. STEEL	000-174-060
13	4	WASHER, 1/4" FLAT	STEEL	000-174-002
12	1	SCREW, 1/4"-20UNC x 1.50" LG. HEX HEAD	S. STEEL	000-143-004
11	4	SCREW, 1/4"-20UNC x 1.00" LG. HEX HEAD	S. STEEL	000-143-002
10	1	PROTECTOR ALFA AXP14 HX	GRISWOLD NATURAL RUBBER 3120 (R012)	000-108-225
9	1	NUT, 1/4"-20UNC NYLOCK	S STEEL	000-094-009
8	4	NUT, 1/4"-20UNC NEOPRENE WELLNUT	NEOPRENE	000-094-113
7	2	INSERT, #F1212 BRASS	BRASS	000-052-950
6	1	HEAT EXCHANGER, ALFA APX14	S. STEEL	000-038-091
5	2	ELBOW, 3/8 NPT x 3/8 JIC	BRASS	000-052-766
4	1	ELBOW, 3/4" NPT X 45°	BRASS	000-052-384
3	1	BRACKET, ALFA LAVAL APX14 MOUNT - XD	5052-H32	000-015-1389
2	1	BRACKET, ALFA LAVAL APX14 HOLD DOWN - XD	5052-H32	000-015-1390
1	2	ADAPTER, 3/4" FPT x 3/8" FPT BRASS	BRASS	000-052-951
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

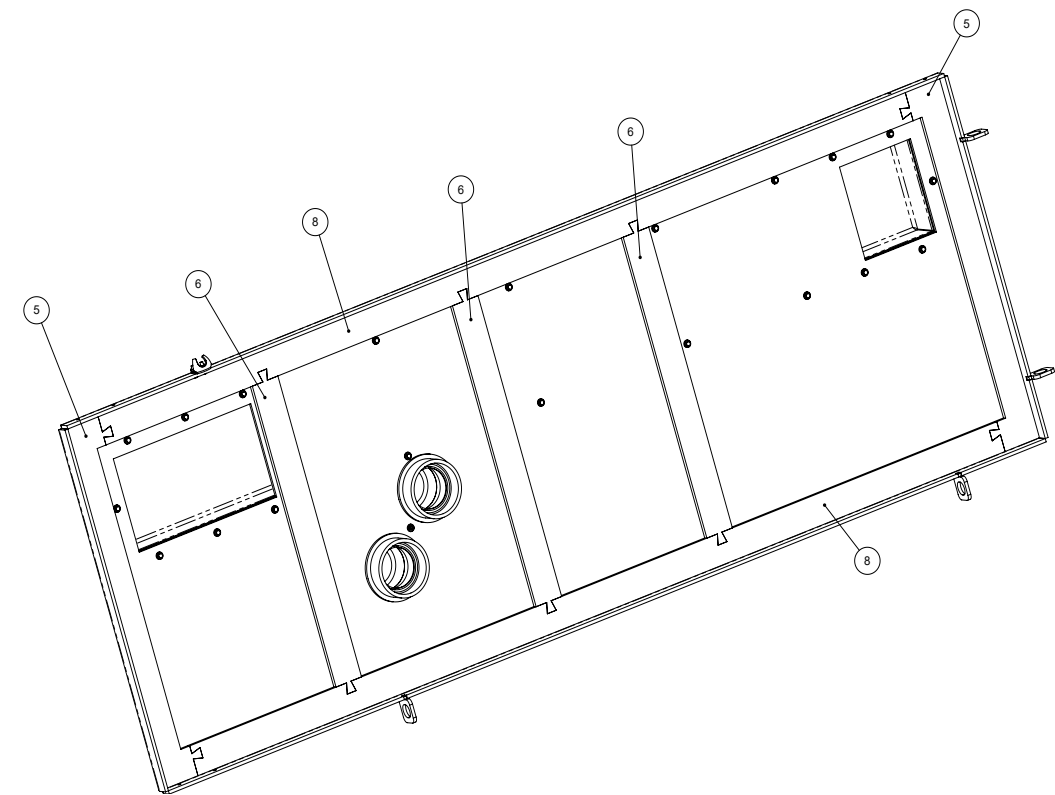
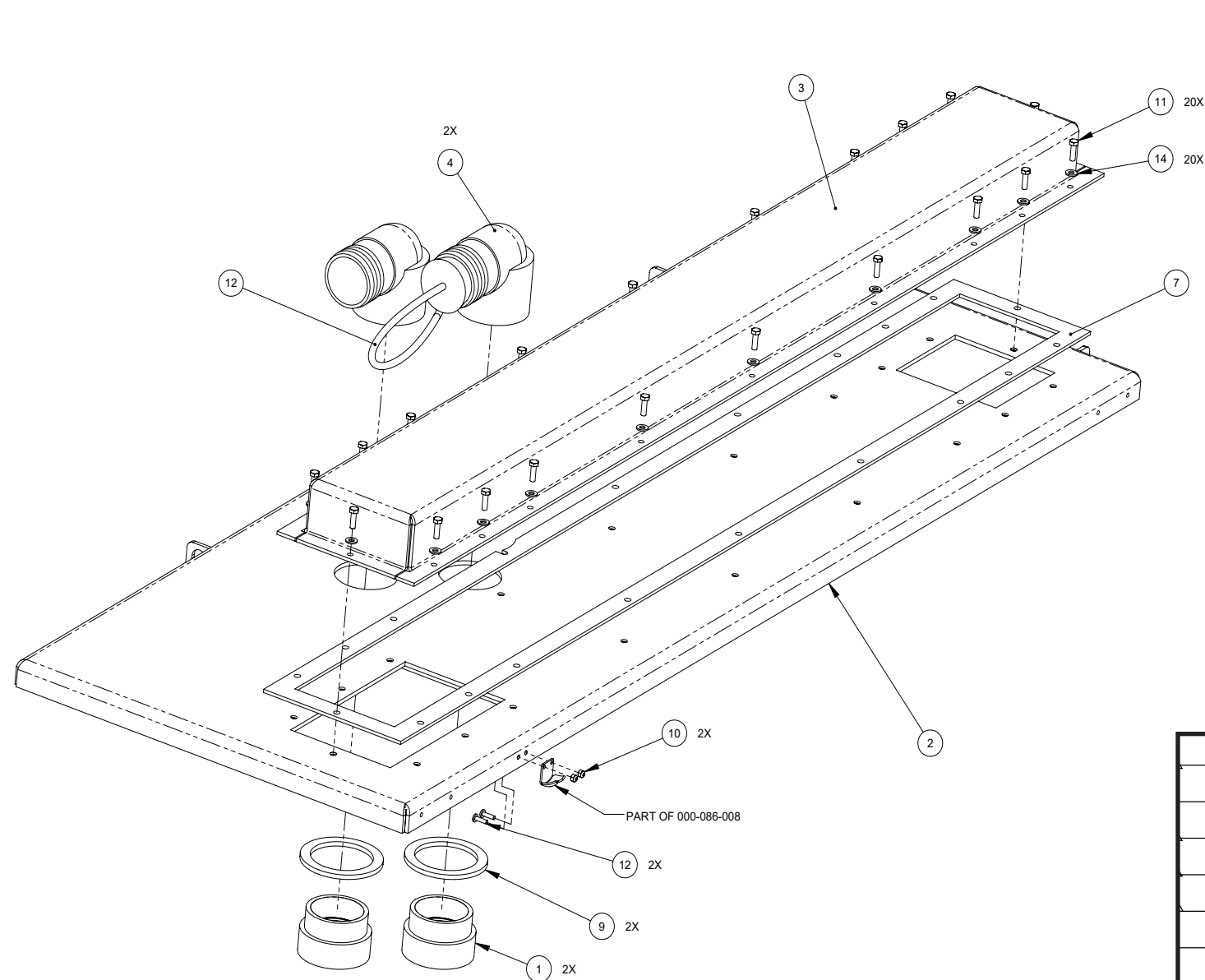
Figure 9-24. Assembly, Water Box - CDS xDrive
601-010-705 Rev. I



Water Box Assembly Parts List

23	1	NIPPLE, 3/8" NPT x 1/2" NPT	BRASS	000-052-075
22	1	NIPPLE, 1/4" SAE x 1/4" NPT	BRASS	000-052-527
21	2	INSERT, 3/8" NPT X 1/2" BARB X 90° BRASS	BRASS	000-052-956
20	1	INSERT, #F1216 (3/4" FPT x 1" BARB)	BRASS	000-052-754
19	1	INSERT, #66 (3/8" NPT x 3/8" BARB)	BRASS	000-052-104
18	1	HOUSING, 1/4" FPT FILTER - BRASS	BRASS	000-052-943
17	1	HOSE, 3/4" I.D. GREEN STRIPE X 58" LG	RUBBER	000-068-405
16	1	HOSE, 3/8" I.D. CLEAR w/ BRAID x 22.5" LG.	VARIOUS	000-068-1063
15	1	GASKET - 6 IN. COVER LID - CELLULAR SILICONE	HT-820-FIRM CELLULAR SILICONE	000-057-270
14	1	FILTER, DIFFUSER ASSEMBLY	PVC	000-049-176
13	1	FILTER CARTRIDGE, 1/4" BRASS	BRASS	000-049-052
12	1	ELBOW, 3/8" NPT STREET	BRASS	000-052-086
11	1	ELBOW, 3/4" NPT X 3/4" BARB	BRASS	000-052-589
10	1	COVER, 6" ACCESS	POLYPROPYLENE	000-041-005
9	2	CLAMP, SIZE #5 HOSE	S. STEEL	000-033-005
8	1	CLAMP, SIZE #12 HOSE	S. STEEL	000-033-029
7	1	BUSHING, 1/2 M X 3/8 F	BRASS	000-052-064
6	1	BULKHEAD, 3/8" FPT x 3/8" FPT	BRASS	000-052-660
5	1	BULKHEAD, 1/2" FPT	UNS C36000 / ASTM B16 H02	000-052-728
4	1	BRACKET, WATER BOX SUPPORT LOWER - COATED	ASTM A1008 CS TYPE B	000-015-1366
3	1	BRACKET, WATER BOX MOUNT OUTER - COATED	ASTM A1008 CS TYPE B	000-015-1364
2	1	BRACKET, WATER BOX MOUNT INNER - COATED	ASTM A1008 CS TYPE B	000-015-1362
1	1	ASSEMBLY, ROBERT FLOAT VALVE	VARIOUS	000-169-235
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

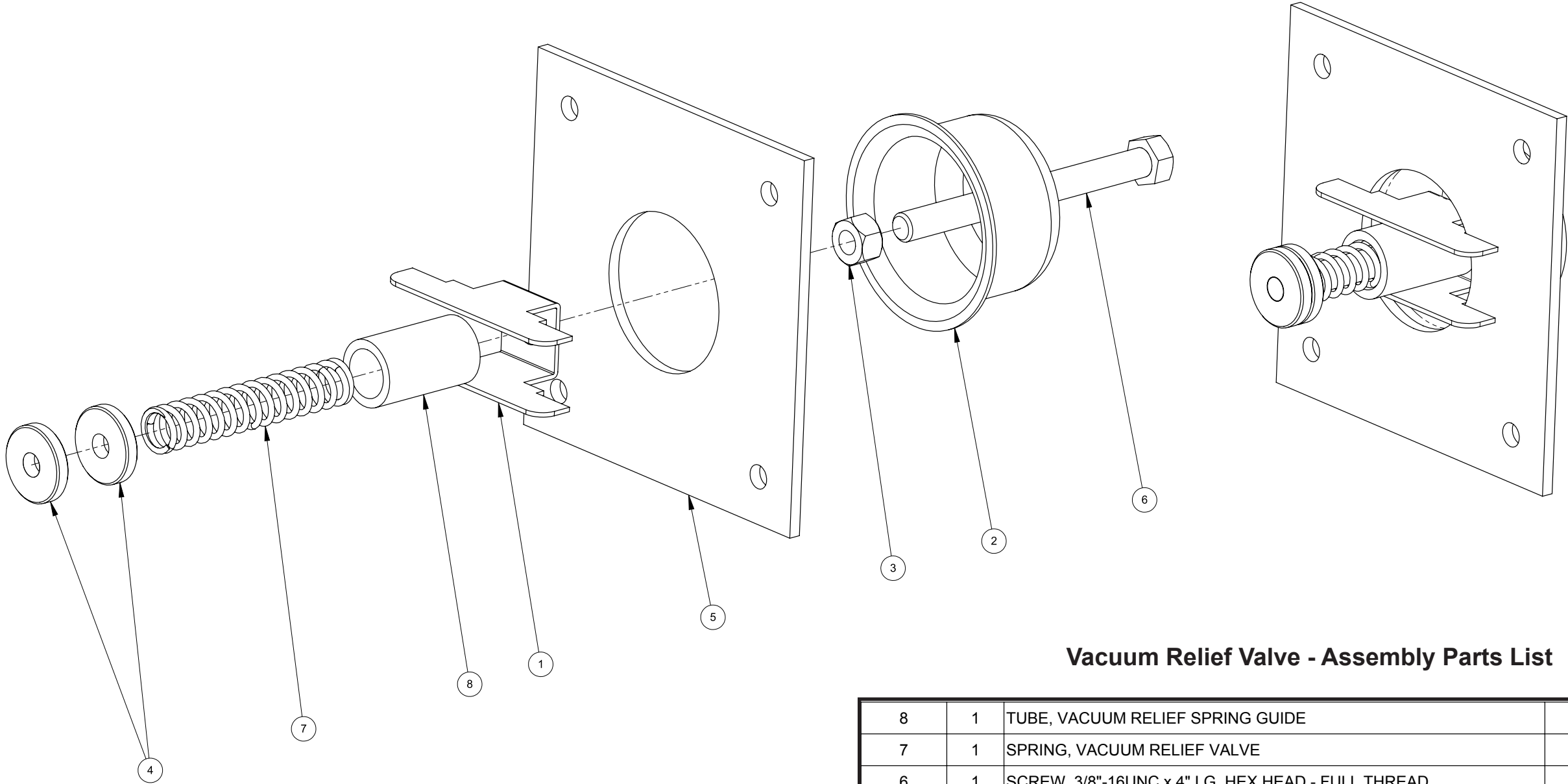
41	4	WASHER, 3/8" LOCK	S. STEEL	000-174-057
40	7	WASHER, 3/8" FLAT	AISI 304	000-174-032
39	3	WASHER, 3/8" FLAT	AISI 304	000-174-032
38	4	WASHER, 1/4" LOCK	STEEL	000-174-017
37	4	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
36	4	WASHER, 1/4" FLAT RUBBER BACKED	18-8 S. STEEL	000-174-060
35	2	WASHER, 1.5" O.D. x 1.073" I.D. x 0.075" THK.	S. STEEL	000-174-063
34	1	TEE, 3/8" NPT MALE STREET	BRASS	000-052-023
33	1	TANK, POLY WATER BOX - MODIFIED - xDRIVE	LINEAR LOW DENSITY POLYETHYLENE	000-159-191
32	1	SWITCH, w/PROTECTOR, POLYPROPELENE BARREL - NC	VARIOUS	000-157-0801
31	2	SCREW, 3/8"-16UNC x 0.75" LG. HEX HEAD GRD. 8	STEEL	000-143-017
30	4	SCREW, 1/4"-20UNC x 1.00" LG. HEX HEAD	S. STEEL	000-143-002
29	6	SCREW, #8-15 X 3/4" LG. PAN HEAD SHEET METAL SS	S. STEEL	000-143-739
28	1	ORIFICE, 0.027" PLATE	S. STEEL	000-180-009
27	2	O-RING, 1/2" BULK HEAD	BUNA-N	000-097-041
26	1	NUT, 1"-14UNS BRASS	UNS#36000	000-094-097
25	1	NUT, BRASS JET X 1/4" FNPT	BRASS	000-094-118
24	1	NIPPLE, 3/8" NPT x 1/4" NPT HEX	BRASS	000-052-073



Tank Cover Assembly Parts List

14	20	WASHER, #10 FLAT	S. STEEL	000-174-001
12	1	VACUUM INLET STOPPER	VARIOUS	000-078-039
12	2	SCREW, #6-32UNC x 0.50" LG. BUTTON HEAD	S. STEEL	000-143-539
11	20	SCREW, #10-24UNC X 5/8" LG. HEX HEAD S/S	S. STEEL	000-143-736
10	2	NUT, #6-32UNC HEX NYLOCK	S. STEEL	000-094-063
9	2	GASKET, 1-1/2" BULKHEAD FITTING	VARIOUS	000-057-015
8	2	GASKET, SIDE - REC. TANK COVER	RUBBER	000-057-242
7	1	GASKET, RECOVERY TANK AIR DUCT	NEOPRENE 60 DUROMETER	000-057-248
6	3	GASKET, MIDDLE - REC. TANK COVER	RUBBER	000-057-241
5	2	GASKET, END - REC. TANK COVER	RUBBER	000-057-240
4	2	ELBOW, 2" BARB x 2" FPT	ABS	000-052-222
3	1	COVER, RECOVERY TANK AIR DUCT - COATED	5052-H32	000-041-884
2	1	COVER, RECOVERY TANK - COATED	5052-H32	000-041-732
1	2	ADAPTER, 2" NPT x 2" F SLIP	ABS	000-052-219
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

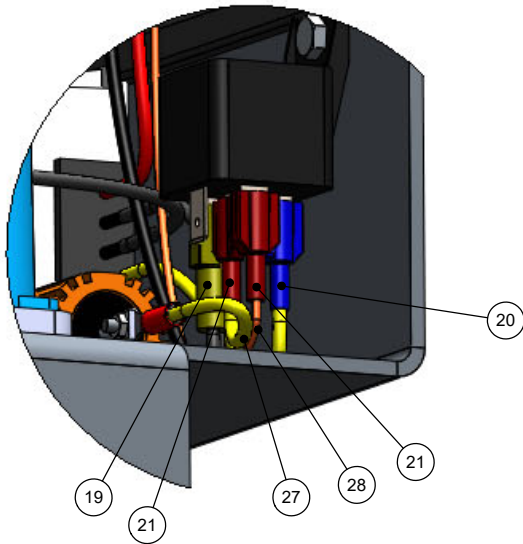
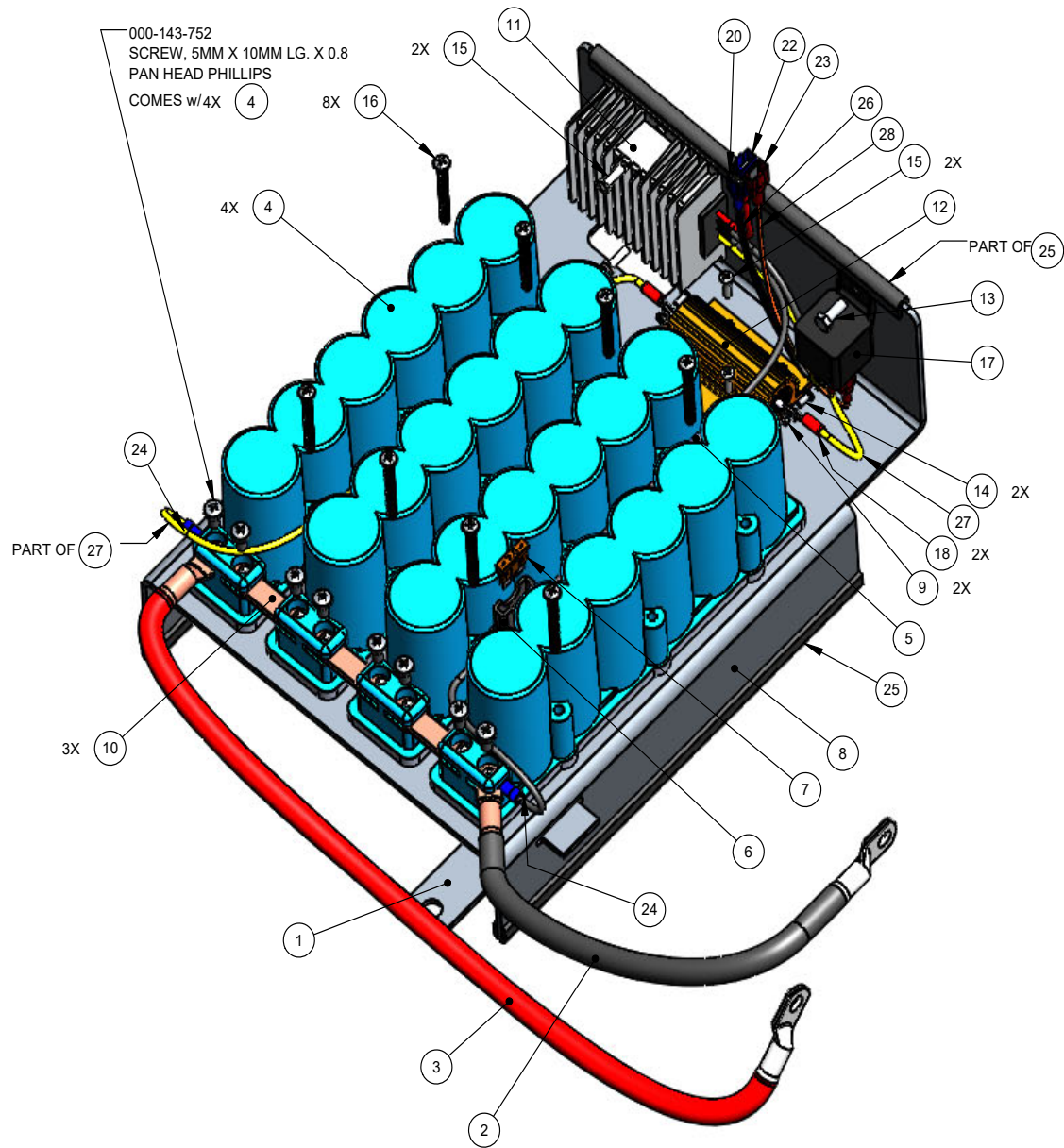
Figure 9-26. Assembly, Vacuum Relief Valve - URT - CDS xDrive
610-026-724 Rev. B



Vacuum Relief Valve - Assembly Parts List

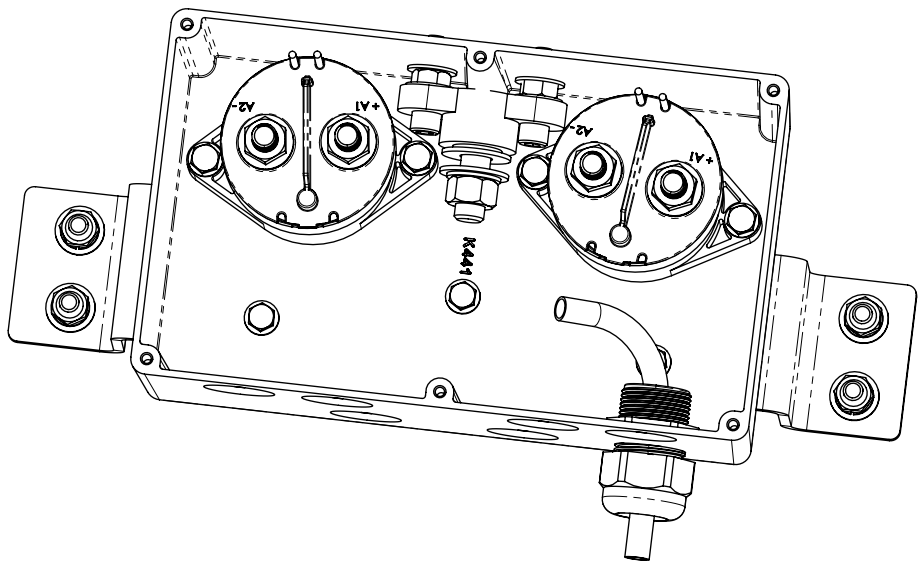
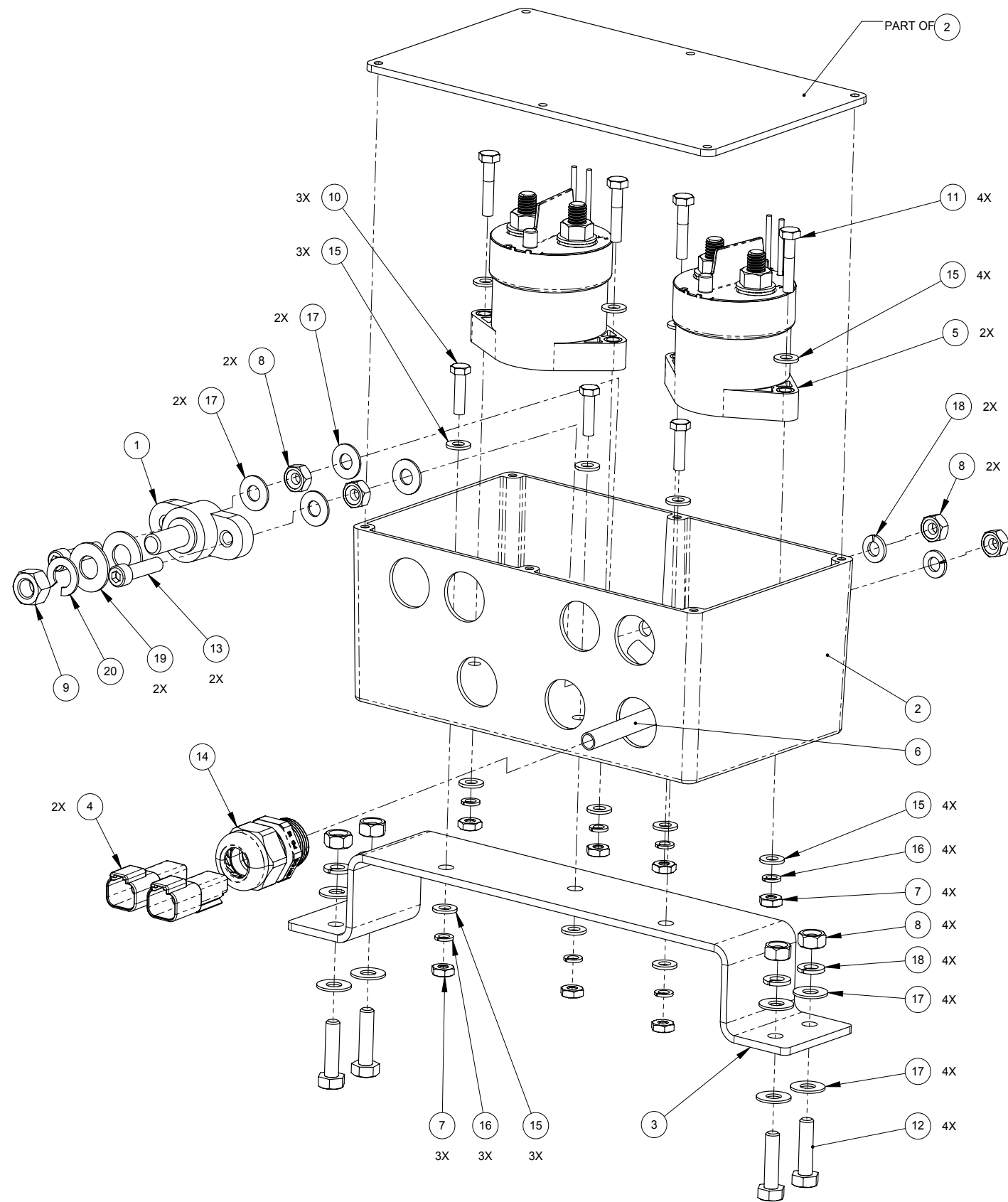
8	1	TUBE, VACUUM RELIEF SPRING GUIDE	AISI 304	000-125-111
7	1	SPRING, VACUUM RELIEF VALVE	AISI 302	000-155-026
6	1	SCREW, 3/8"-16UNC x 4" LG. HEX HEAD - FULL THREAD	S. STEEL	000-143-198
5	1	PLATE, VACUUM RELIEF VALVE MOUNTING - COATED	ALUMINUM	000-105-332
4	2	NUT, 3/8"-16UNC x 1.00" O.D. KNURLED	UNS C36000 / ASTM B16 H02	000-094-077
3	1	NUT, 3/8"-16 UNC HEX JAM	S. STEEL	000-094-101
2	1	CAP, SPUN VACCUM RELIEF VALVE	AISI 304	000-027-032
1	1	BRACKET, VACUUM RELIEF VALVE - FABRICATED	AISI 304 2B	000-015-182
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-27. Assembly, Capacitor - CDS xDrive
601-033-705 Rev. A



28	0.75'	WIRE, 20 TXL ORANGE w/ WHITE STRIPE - BULK (9")	VARIOUS	000-178-140
27	1.56'	WIRE, 18 TXL YELLOW - BULK (4.75" & 14")	VARIOUS	000-178-059
26	0.71'	WIRE, 18 TXL BLACK - BULK (8.5")	VARIOUS	000-178-056
25	2.33'	TRIMLOK, 3/8" X 1/8" RUBBER EDGE (10", 10" & 8")	RUBBER	000-131-131
24	2	TERMINAL, 3/8" RING-16 AWG	VARIOUS	000-037-031
23	1	TERMINAL, FULLY INSULATED MALE, 22-16 GA	VARIOUS	000-037-072
22	1	TERMINAL, FULLY INSULATED MALE, 16-14 GA	VARIOUS	000-037-009
21	2	TERMINAL, FULLY INSULATED FEMALE, 22-16 GA	VARIOUS	000-037-071
20	2	TERMINAL, FULLY INSULATED FEMALE, 16-14 GA	VARIOUS	000-037-012
19	1	TERMINAL, FULLY INSULATED FEMALE, 12-10 GA	VARIOUS	000-037-022
18	2	TERMINAL, #4 RING 18 AWG	VARIOUS	000-037-156
17	1	SWITCH, RELAY 12V	VARIOUS	000-157-022
16	8	SCREW, #8-32UNC X 1.75" LG. PAN HEAD PHILLIPS S/S	S. STEEL	000-143-754
15	4	SCREW, #6-32UNC x 0.50" LG. PHP	S.STEEL	000-143-046
14	2	SCREW, #4-40UNC X 1/4" LG. PAN HEAD PHILLIPS	S. STEEL	000-143-306
13	1	SCREW, #10-24UNC x 0.50" LG. HEX HEAD	S. STEEL	000-143-126
12	1	RESISTOR, XDRIVE CAPACITOR	ALUMINUM	000-135-080
11	1	REGULATOR, CONVERTER 12V TO 48V	ALUMINUM	000-135-081
10	3	PLATE, CAPACITOR BUS BAR	ASTM B187	000-105-796
9	2	NUT, #4-40UNC HEX	STEEL	000-094-044
8	1	MOUNT, CAPACITOR	5052-H32	000-092-059
7	1	FUSE, 7.5 AMP	VARIOUS	000-056-012
6	1	FUSE HOLDER, INLINE 20AMP	RUBBER	000-056-031
5	1	CONNECTOR, 14-16 BUTT	VARIOUS	000-037-003
4	4	CAPACITOR, 16V SMALL CELL MODULE	VARIOUS	000-135-079
3	1	CABLE, CAPACITOR - RED	VARIOUS	000-025-087
2	1	CABLE, CAPACITOR - BLACK	VARIOUS	000-025-086
1	1	BRACKET, CAPACITOR HOLD DOWN	5052-H32	000-015-1385
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

Figure 9-28. Assembly, Contactor box
601-021-140 Rev. A



20	1	WASHER, 3/8" LOCK	S. STEEL	000-174-057
19	2	WASHER, 3/8" FLAT	AISI 304	000-174-032
18	6	WASHER, 1/4" LOCK S/S	S. STEEL	000-174-019
17	12	WASHER, 1/4" FLAT S/S	S. STEEL	000-174-003
16	7	WASHER, #10 LOCK	S. STEEL	000-174-014
15	14	WASHER, #10 FLAT	S. STEEL	000-174-001
14	1	SEAL, 1/0 CABLE	NYLON	000-147-130
13	2	SCREW, 1/4"-20UNC x 1.00" LG. SOCKET HEAD	S.STEEL	000-143-080
12	4	SCREW, 1/4"-20UNC x 1.00" LG. HEX HEAD	S. STEEL	000-143-002
11	4	SCREW, #10-24UNC x 1.00" LG. HEX HEAD S/S	S. STEEL	000-143-134
10	3	SCREW, #10-24UNC x 0.75" LG. HEX HEAD	S. STEEL	000-143-132
9	1	NUT, 3/8"-16UNC HEX S/S	S. STEEL	000-094-116
8	8	NUT, 1/4"-20UNC HEX S/S	S. STEEL	000-094-010
7	7	NUT, #10-24UNC HEX	S. STEEL	000-094-027
6	0.66'	HARNESS, HI-TEMP 1/4" SILICONE	SILICONE	000-063-003
5	2	CONTACTOR, 24V 500 AMP	VARIOUS	000-157-110
4	2	CONNECTOR, DT 2 POLE MALE	VARIOUS	000-037-136
3	1	BRACKET, CONTACTOR BOX MOUNTING - COATED	ASTM A1008 CS TYPE B	000-015-1351
2	1	BOX, CONTACTOR ENCLOSURE	DIE CAST ALUMINUM	000-013-130
1	1	BLOCK, CABLE INSULATING	VARIOUS	000-012-020
ITEM NO.	QTY.	DESCRIPTION	MATERIAL	PART NO.

10 - Troubleshooting

This section covers:

System Troubleshooting

- 1.0 CDS xDrive will not turn on
- 2.0 CDS xDrive shuts off during operation
- 3.0 Van engine will not increase to high idle
- 4.0 Blower will not change speeds
- 5.0 Pump clutch will not come on
- 6.0 Blower will not maintain requested speed
- 7.0 Blower speed reduces after extended operation
- 8.0 Blower shuts off during ramp up
- 9.0 Blown controller fuse
- 10.0 Blown Fuse

Controller Codes

Chemical System Troubleshooting

- 1.0 System will not prime
- 2.0 Chemical flow is unstable or low
- 3.0 Chemical jug fills with water
- 4.0 Chemical in water box

Water Pump Troubleshooting

- 1.0 Will not come up to normal cleaning pressure
- 2.0 No pressure reading on PSI gauge
- 3.0 PSI gauge reads normal; low pressure from tool/wand
- 4.0 Pressure pulsation
- 5.0 Water box empty or fills slowly

Vacuum Blower Troubleshooting

- 1.0 Weak vacuum at tool/wand. Gauge reads normal (10" Hg to 14" Hg)
- 2.0 Vacuum gauge will not come up to 14" Hg
- 3.0 Vacuum gauge reads high with no hoses attached

Heating System Troubleshooting

- 1.0 Vehicle overheats and shuts off CDS xDrive
- 2.0 Vehicle overheats
- 3.0 Unable to achieve normal cleaning temperature
- 4.0 System attains normal heat but drops off sharply

1) CDS xDrive will not turn on

WHERE TO LOOK	EXPLANATION	HOW TO FIX
1.1 Van ignition	The xDrive will not function if the van engine is not running	Start van engine
1.2 Van power fuse	The xDrive draws power from the vans accessory fuse box located below the drivers seat	Check fuse panel below drivers seat for blown fuse. This would indicate a load beyond the rated fuse value, possibly from electrical short in wiring from van battery to CDS xDrive unit or other accessory item drawing power from the same access point.
1.3 Ignition power relay	Van ignition power is used to operate a relay to interrupt the battery power from the van to the xDrive machine. This prevents the machine from being run while the van ignition is off.	Locate the relay below the drivers seat. Check relay for proper function. Replace as necessary.
1.3 Dash circuit breaker	The circuit beaker on the dash of the CDS xDrive protects the wire from the power access point below the passenger seat to the circuit breaker.	Check wire harness from below passenger seat to the dash for damage.
1.4 Start switch	The start switch is powered from the circuit breaker in the dash and provides power to CR-9.	If the start switch does not illuminates when depressed Check power and ground to the start switch. Replace start switch as necessary
		If the start switch does illuminate Check wiring to CR-9 Check CR-9 for proper function Replace CR-9 as necessary
1.5 Dash lights are flashing	The parking brake must be set before the machine can operate correctly.	Set the parking brake

2) CDS xDrive shuts off during operation

WHERE TO LOOK	EXPLANATION	HOW TO FIX
2.1 Recovery tank is full	The upper float switch in the recovery tank shuts the unit off when the water level in the tank gets too high.	Drain recovery tank. Check float switch for correct operation.
2.2 Van engine	The van engine must be running at 2000 rpm for the CDS xDrive to operate correctly	Van engine off Restart the van engine and the xDrive unit
		Van engine at low idle (~600rpm). Check for SEIC violations. Restart xDrive unit.
	The van engine is cooled by two electric fan mounted on the radiator. The fan fuses are located in the engine compartment fuse box. Positions F30 and F31.	Van engine overheated. Examine the fan fuses. Replace with 50amp fuses if blown.
2.3 Controller fault	One of the controllers may experience a situation beyond an operational parameter	Read controller LED flash code (see page 10-10 for flash code definition). Flash codes must be read before the xDrive unit is turned off.

3) Van engine will not increase to high idle

WHERE TO LOOK	EXPLANATION	HOW TO FIX
3.1 Ford SEIC	The van engine rpm will only increase under certain conditions. See owners manual for full description.	Set Parking brake; Check Fuse FU-2, Check SEIC electrical circuit

4) Blower turns but will not change speeds

WHERE TO LOOK	EXPLANATION	HOW TO FIX
4.1 Speed selection switch	The speed selection switch sends a signal to the motor controller to change speeds	Check speed control switch for correct operation
4.2 Faulty electrical connection at speed control switch		Check electrical connections on the back of the speed control switch for integrity
4.3 Faulty electrical connection on controller		1. The speed control wires connect to the generator controller on pins 18, 19, 30 and 31. Check continuity on all wires. 2. The (+) terminal on speed switch attaches to generator controller buss bar (B-)

5) Pump clutch will not come on

WHERE TO LOOK	EXPLANATION	HOW TO FIX
5.1 Water box	The float switch in the water box prevents the high pressure pump from running without water	No water in water box (dash light illuminated) Check incoming water pressure
		Water in the water box (dash light illuminated) Check float switch operation
5.2 Poor connection at pump clutch	The pump clutch is fed power from FU-6 and FU-7 and CR-5	Check crimp terminals on pump clutch wire for integrity
5.3 Failed pump clutch	The pump has a magnetic clutch. Power is delivered through a single electrical wire, and the clutch coil is grounded internally.	Replace as necessary

6) Blower achieves speed but will not maintain requested speed

WHERE TO LOOK	EXPLANATION	HOW TO FIX
6.1 Contactors	The contactors are located in a sealed enclosure below the van radiator. The contactors are in phases 1 (blue) and 3 (black) in order to control the flow of electricity.	With the machine off, unplug one of the contactors at the contactor enclosure. Turn the machine on and listen for the one remaining contactor to close. You should hear an audible click from the contactor box as soon as the machine is started. Repeat the process with the other contactor. Repair as needed.
6.2 Generator	The generator supplies AC voltage to the system and is driven by the van engine. The AC voltage must be balanced between the three phases for the machine to operate correctly.	With the xDrive machine running, check the AC voltage between the three phase cables at the generator controller (M1 to M2; M2 to M3, and M1 to M3). All three phases should be putting out the same AC voltage.
6.3 Phase cables	The phase cables carry power from the generator to the controllers and to the blower motor. The phase cables are the orange fiberglass covered wire.	Check the phase cables along their length for abrasion, damage, or loose connections. Check the phase cables for continuity to chassis ground. Repair or replace as necessary.
6.4 Controller	The controllers regulate the power coming from the generator and supply power to the blower motor	Each controller has an LED on the case. With the xDrive on, read the number of flashes being displayed on each controller and check the error code message page 10-10
6.5 Vacuum level	The vacuum level is controlled by the relief valve behind the passenger seat	Check the vacuum level as shown on the dash gauge. Extended operation at 14" Hg and Boost mode will cause the blower motor controller to reduce the power available to the motor, causing the rpm to drop. Reduce the vacuum load.

7) Blower speed reduces after extended operation

WHERE TO LOOK	EXPLANATION	HOW TO FIX
7.1 Vacuum level	Both the motor control and the generator control are air cooled. They must be kept below a certain temperature in order to deliver full power to the motor driving the blower.	Remove load on blower for several minutes. Reduce blower speed to next lower speed. Open the van doors and allow the interior of the van to cool down.
		Check the vacuum level as shown on the dash gauge. Extended operation at 14" Hg and Boost mode will cause the blower motor controller to reduce the power available to the motor, causing the rpm to drop. Reduce the vacuum load.
7.2 Coolant Pump	Engine coolant is circulated by a booster pump in the engine compartment to cool both the motor and the generator.	Check Fuse FU-1 Check the circulation pump for proper operation

8) Blower shuts off during ramp up

WHERE TO LOOK	EXPLANATION	HOW TO FIX
8.1 Capacitor voltage	The capacitors inside the machine must be charged above 32v in order for the machine to start up properly. The capacitors are charged while the van ignition is on and the xDrive machine is off.	Voltage below 32v Check the voltage on the dash gauge. If the capacitors are not charging above 12v check the capacitor charging circuit.
		Voltage above 68v The controllers cannot operate safely above 68v and will shut down. Turn the machine off and wait for the voltage to return to around 54v before turning the machine back on.
8.2 Controller	The controllers regulate the power coming from the generator and supply power to the blower motor	Each controller has an LED on the case. With the CDS xDrive on, read the number of flashes being displayed on each controller and check the error code message page 10-10

9) Blown controller fuse

WHERE TO LOOK	EXPLANATION	HOW TO FIX
9.1 Controllers	Each controller is protected by a 750amp fuse	Check phase cables and battery cables Repair as necessary Replace Fuse

10) Blown Fuse - CDS xDrive Dash

WHERE TO LOOK	EXPLANATION	HOW TO FIX
FU-1 (5A)	wiring harness from dash to recirculation pump	Check for continuity to ground which may indicate short circuit
FU-2 (3A)	wiring harness from dash to engine SEIC connection	Check for continuity to ground which may indicate short circuit
FU-3 (5A)	dash wiring	Check for continuity to ground which may indicate short circuit
FU-4 (15A)	wiring to Pump in Pump	Check pump for correct operation
	pump in pump	Most pump in pumps are independantly fused. Check fuse at pump. If the pump is getting correct power, replace pump
FU-5 (3A)	wiring harness up to recovery tank float	Check for continuity to ground which may indicate short circuit
	float switch	Check for continuity to ground which may indicate short circuit
FU-6 (3A)	wiring to pump clutch switch	Check for continuity to ground which may indicate short circuit
FU-7 (7.5A)	wiring to Pump clutch	Check for continuity to ground which may indicate short circuit
	pump clutch	An over loaded, over heated, or failed pump clutch may draw too much power and blow the fuse
FU-8 (3A)	wiring to APO switch	Check for continuity to ground which may indicate short circuit
FU-9	Spare	
FU-10	Spare	

CONTROLLER CODES

⚠ WARNING

*Removal of top cover required for reading controller LED codes live electrical wiring may be exposed.
Do not touch any electrical components or wiring.*

WARNING: For informational purpose only. May lead to long term issue. Will not cause shut down.

SEVERE: Will cause shut down. Repairable:

VERY SEVERE: Will cause shut down. May not be repairable.

LED Flashes	Type	Message	Description	Recommended Action
4	Very Severe	Line contactors	Line contactor did not close when coil is energized.	Check line contactor and wiring
			Line contactor closed when coil is deenergized.	
5	Warning	Motor open circuit	Pump motor is not drawing sufficient current	Check pump motor is connected
	Severe		Motor terminal is open circuit or disconnected from controller	Check motor wiring. Check controller condition
6	Warning	Analogue output	Contactor driver over current	Ensure contactor doesn't exceed maximum current and check contactor wiring
			Contactor driver over temperature	
			Contactor driver over current	
			Contactor driver over temperature	
	Very Severe		Contactor driver not working	Internal hardware fault
			Internal hardware failsafe circuitry not working	
			Contactor driver not working	
			Contactor driver short circuit detected	
	Contactor driver unable to achieve current target in current mode	Ensure contactor driver current target is within range		

CONTROLLER CODES

Controller Codes

LED Flashes	Type	Message	Description	Recommended Action
7	Warning	Battery or Capacitor Voltage	Motor control has entered low voltage cutback region.	This is normal
			Motor control has entered high voltage cutback region.	
	Severe		Battery voltage has dropped below critical level	Check battery voltage
	Very Severe		Capacitor voltage did not rise above 5V at power up	Check cables from battery to controllers for loose or damaged connections.
8	Warning	Temperature	Low heatsink temperature has reduced power to motor	Allow controller to warm up to normal operating temperature.
			High heatsink temperature has reduced power to motor	
	Very Severe		Controller heat sink has reached critical high temperature, and has shut down.	
	Warning		High measured or estimated motor temperature has reduced power to motor	Allow motor to cool down to normal operating temperature.
			Low Measured temperature has reached -30deg	Check motor thermistor connection or allow motor to warm up.
10	Warning	Controller State	Controller is in pre-operational state	If configured and ready for use, change state to operational.
11	Warning	Encoder	Encoder is not aligned properly.	Ensure encoder offset is correctly set or re-align encoder
			SinCos Encoder Values are heading towards a voltage rail or converging together.	Thermal or mechanical variation is causing the sincos encoder to deviate from the cold factory commissioned values.
	Very Severe		Encoder input wire-off is detected.	Check encoder wiring
			Motor current exceeded controller rated maximum	Check motor configuration and wiring
			Encoder is not aligned properly.	Ensure encoder offset is correctly set or re-align encoder

CONTROLLER CODES

LED Flashes	Type	Message	Description	Recommended Action
12	Severe	CAN communication	Internal software fault	Internal software fault
	Very Severe		Internal CANbus fault	Check CANbus wiring
			CANbus fault condition detected on multinode system.	
			CANbus fault condition detected on multinode system.	
			CANopen slave has not transmitted boot up message at power up	
			Heartbeat not received within configured time out (0x1016)	Check status of all nodes on CANbus.
			CANopen slave has changed to unexpected state	
			Motor slave in wrong state	Check status of all nodes on CANbus controlling motor slaves. Check local motor slaves on master. Ensure configuration is correct.
13	Severe	Internal Fault	Internal software fault	Internal software fault
14	Warning	24v supply	Circuit below 24 volts	Check battery voltage
		CAN Emergency message	EMCY message received from non-Sevcon node and anonymous EMCY level is set to 1.	Check status of non-Sevcon nodes on CANbus
	EMCY message received from non-Sevcon node and anonymous EMCY level is set to 2.			
	EMCY message received from non-Sevcon node and anonymous EMCY level is set to 3.			

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.

CHEMICAL SYSTEM TROUBLESHOOTING

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.

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 Primary system control orifice is missing or loose.	Remove filter and inspect. Tighten or replace as necessary.
1.4 Primary orifice is worn.	Measure orifice size and replace as necessary.

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.	<ol style="list-style-type: none"> 1. Check for 12V at clutch. If 12V is present, replace clutch. 2. 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. 3. If low water switch has no continuity when float is up, replace the switch. If switch is good, replace the low water relay.

WATER PUMP TROUBLESHOOTING

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.

WATER PUMP TROUBLESHOOTING

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.

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 xDrive's dash. 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.

HEATING SYSTEM TROUBLESHOOTING

1.0 Vehicle overheats while the CDS xDrive is in operation

Refer to vehicle dealer for diagnosis and repair.

POSSIBLE CAUSE	SOLUTION
1.1 Blown fan fuse	Locate fuses F30 and F31 in engine compartment fuse box. Check for blown fuses - replace as necessary.

2.0 Vehicle overheats while driving

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, 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.

HEATING SYSTEM TROUBLESHOOTING

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 11-2).

Miscellaneous

1.0 Vehicle radiator overflows 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 - 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

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 vehicles "special operating conditions" 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.

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 (<i>Replace with genuine Ford part</i>)	2,000 / 24
Vehicle engine accessory drive belt	2,000 / 24
CDS xDrive blower silencer and exhaust plumbing	4,000 / 48
CDS xDrive and vehicle heater hoses	4,000 / 48
CDS xDrive wire harness	4,000 / 48

12 - 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 (800) 426-1301, 8 a.m. to 5 p.m. Monday through Friday (PT).

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.

13 - Warranty Information

To avoid misunderstandings which might occur between machine owners and the manufacturer, we are listing causes of component failure that specifically void 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 oil level as recommended in pump manual.
- Failure to change oil 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.

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.

CLEANING WAND AND TOOL

- Freeze damage
- Improper maintenance
- Improper use

WATER HEATING SYSTEM

- Over-pressurization
- Freeze damage

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 (800) 426-1301 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® STANDARD CDS xDRIVE 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 to HydraMaster within 30 days of purchase.** The warranty coverage period is specified below.

GROUP	Parts^{1,2}	Labor²
Frame	3 Years	3 Years
Covers	3 Years	3 Years
Vacuum Recovery Tank (Structural only)	3 Years	3 Years
Vacuum Pump – see Note 3	3 Years	3 Years
Chemical Systems	3 Years	3 Years
Hoses, Internal Machine	3 Years	3 Years
Hoses, External Machine	3 Years	3 Years
Valve, High pressure bypass	3 Years	3 Years
Water Heating System	3 Years	3 Years
Pump, High pressure water	3 Years	3 Years
Belts	3 Years	3 Years
Fittings, internal machine	3 Years	3 Years
Filter Screens	3 Years	3 Years
Gauges	3 Years	3 Years
Electrical Components	3 Years	3 Years
Accessories and Fresh Water Tanks	1 Year	1 Year
Replacement Parts- see Note 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 chemical, 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 OR 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.

14 - 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, visit our website at: <http://www.hydramaster.com/>

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