

INSTALLATION PROCEDURE

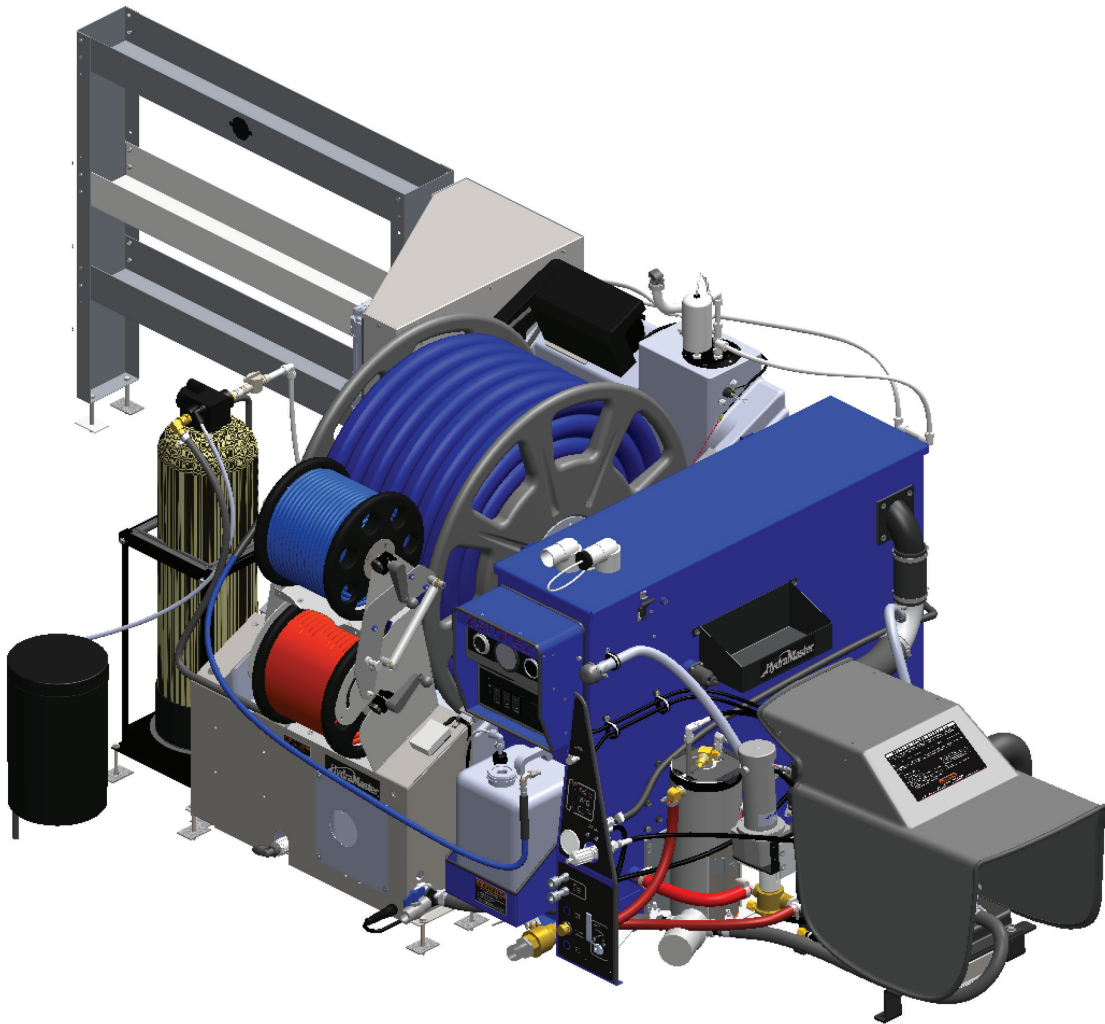
Installing a Zerorez EWS into a 2010-2014 Chevy Van

Part Numbers Affected: Various

Date Changes Take Affect: 2014

*****COMPLETELY READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION!*****

This document is a guide for installing a Zerorez CDS 4.8/EWS configuration (P/N 750-001-003 or P/N 750-001-006).



UPON RECEIVING THE ZR EWS SYSTEM

Open the crates and packaging carefully and examine all components. In the event that damage does occur during shipping, it is the responsibility of the customer to immediately notify the carrier and to file a damage claim.

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Table 1 and Table 2 are lists of assemblies, kits and major components included in the Zerorez CDS 4.8/EWS shipments (P/N 750-001-003 or P/N 750-001-006).

Refer to Table 3 and Table 4 during installation for hose routings and hose part numbers.

Table 1. Parts List for P/N 750-001-006

Part. No.	Description	Qty
000-078-381	Kit CDS Pass Through w/o Hoses	1
000-100-021	Panel Set Rear Door	1
000-163-015	Holder Furn Pad/Snap Block Assembly	1
000-163-038	Shelf 3 Tier Shelf Assembly	1
000-163-050	Shelf Back Door Assembly	1
000-163-053	Pressure Washing Tool	1
000-163-615	Shelf Brine Tank Assembly	1
601-021-722	Assembly HydraCradle ZR EWS Bundle	1
000-052-649	Elbow 3 O.D.	1
000-068-598	Hose 1 1/2 Dump Blue	1
000-078-056	Kit ZR CDS Parts	1
000-078-078	Kit ZR Vac Freeze Guard	1
000-081-057	Decal 3 Color	1
000-164-009	CDS Wheel Chocks	1
601-005-741	Assembly Salsa Heat Exchanger	1
601-050-702	Assembly Chevy ZR	1
000-068-187	Hose Assembly 3 I.D. Nitrile X 30" Lg	1
000-068-200	Hose Assembly 3 I.D. EPDM X 6" Lg	1
000-068-884	Hose 30 X 13 Wire Reinforced	1

These accessories are included with the parts in Table 1 if you order P/N 750-001-003.

Table 2. Additional Parts in P/N 750-001-003

Part. No.	Description	Qty
000-068-065	Hose, 2" X 50 ft Vacuum	5
000-068-826	Hose, 1/4" X 250 ft Solution	1
000-163-054	Wand, 2" Evolution	1

Table 3. CDS Hose Routings

Part Number	Description	From	To
000-068-878	Hose, 1/2" I.D. Rubber - 8 ft Long	Back of HydraCradle	Pressure Regulator
000-068-644	Hose, 3/8" X 49 1/2" Teflon w/ JIC Ends	Water Pump	Coolant Heat Exchanger
000-068-385	Hose, 3/4" I.D. Green Stripe Bulk	Coolant Heat Exchanger	Engine Water Pump Hose
000-068-802	Hose, 3/8" X 42" Teflon w/JIC Ends	Pressure Regulator	Salsa Heat Exchanger
000-068-802	Hose, 3/8" X 42" Teflon w/JIC Ends	Coolant Heat Exchanger	Salsa Heat Exchanger
000-068-884	Hose, Blower-Recovery Tank 4.8 - 3" I.D. Reinforced	Blower	Yaw Sensor Elbow
000-068-200	Hose 3" I.D. EPDM	Yaw Sensor Elbow	Recovery Tank
000-068-828	Hose, 1" I.D. Vac	Yaw Sensor	Filter, Front of CDS
000-068-828	Hose, 1" I.D. Vac	Yaw Sensor	Yaw Sensor Fitting on Elbow
000-068-528	Hose, 1" I.D. Red 200 psi	APO	Recovery Tank
000-068-069	Hose, 3/4" I.D. Parker GST II	APO	Bottom of Instrument Panel
000-068-1044	Hose, 1" X 41" Lg Suction	Water Pump	Inline Strainer
000-068-1043	Hose, 1" X 24" Lg Suction	Inline Strainer	Front of HydraCradle
000-068-385	Hose, 3/4" I.D. Green Stripe Bulk	Bottom of Instrument Panel	Radiator
000-068-644	Hose, 3/8" X 49 1/2" Teflon w/ JIC Ends	Water Pump	Pressure Regulator
000-068-254	Hose, 1/4" X 8 ft Blue with 1/4" Inserts Each	HydraCradle	Front of Instrument Panel
000-068-385	Hose, 3/4" I.D. Green Stripe Bulk	Coolant Heat Exchanger	Bottom of Instrument Panel

Table 4. ZR-EWS Tube Routings List

Part Number	From	To	Tube Diameter
000-068-956	Water Softener	Power Cabinet	1/2"
000-068-957	Power Cabinet	Electrode Stack	1/2"
000-068-957	Power Cabinet	Electrode Stack	1/2"
000-068-958	Electrode Stack	Safety Float	1/2"
000-068-956	Electrode Stack	Drain Tee	1/2"
000-068-956	Safety Float	Drain Tee	1/2"
000-068-956	Drain Tee	Drain Elbow	1/2"
000-068-959	Drain Elbow	Atmosphere	1/2"
000-068-960	Tee	Tee	1/2"
000-068-961	Salt Feeder	Power Cabinet	1/4"

Figure 1 shows these major components:

1. Yaw Sensor Cooling Assembly
2. Power Pack (Pump and Blower) Assembly with APO (APO is offered as an option)
3. Salsa Heat Exchanger (hidden from view in Figure 1)
4. Zerorez CDS 4.8 Tank Assembly, which includes the instrumentation panel
5. Coolant Heat Exchanger Assembly
6. 125 Gallon Fresh Water Tank with integrated multi-reel system
7. Pass Through Assembly (not shown in Figure 1)
8. Empowered Water System (EWS)
9. Water Softener Assembly
10. 3 Tier Stainless Steel Shelf

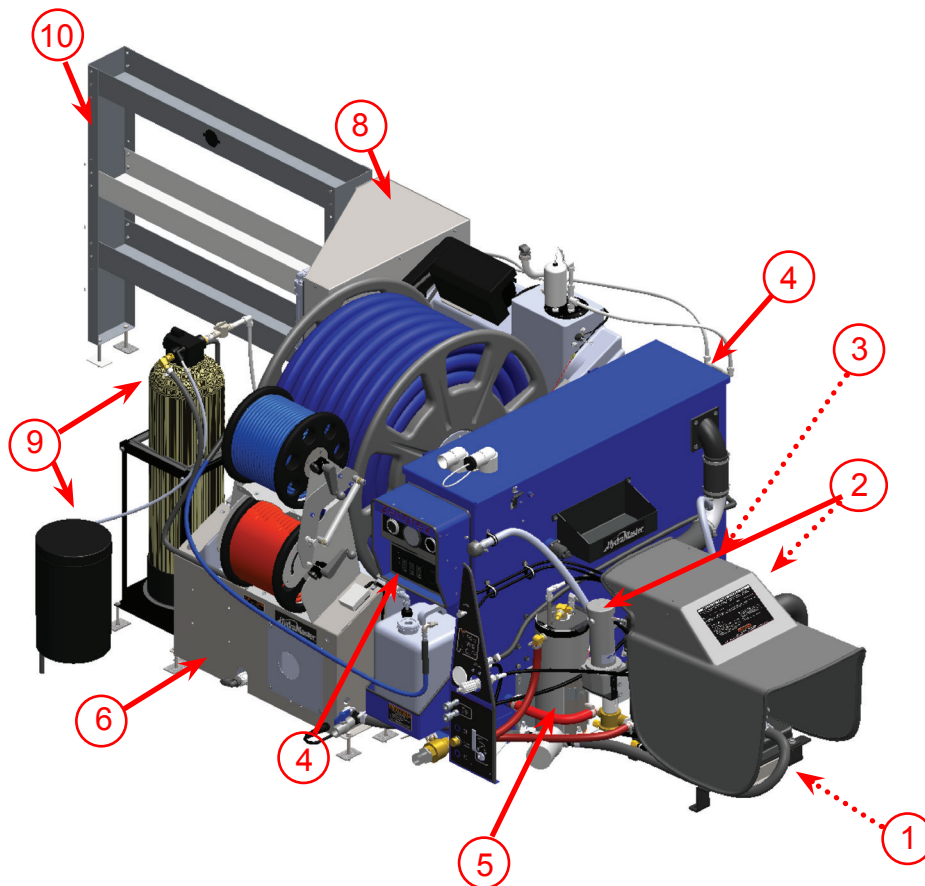


Figure 1. Zerorez CDS 4.8 EWS

⚠ WARNING

To prevent serious personal injury, ensure that the major components of the ZR EWS CDS 4.8 are well secured to the floor of the vehicle with the hardware supplied.

NOTICE

This is the suggested order in which assemblies and kits should be installed: **PLEASE INSTALL THE YAW SENSOR COOLING ASSEMBLY FIRST.**

1. Yaw Sensor Cooling Kit
2. Front End Clutch Assembly
3. 3 Speed Throttle Control Kit
4. Power Pack Assembly
5. Optional Dura-Flow APO Assembly
6. Recovery Tank Assembly
7. Salsa Assembly
8. Coolant Heat Exchanger Assembly
9. Silencer Assembly
10. Finish Kit
11. HydraCradle Tank with Garden Hose Reel
12. Solution Hose Reel
13. EWS Air Vent
14. EWS Safety Shutoff Cover and Hoses
15. EWS Shelf with Electrical Box and Cell
16. Water Softener Assembly
17. 3 Tier Stainless Steel Shelf
18. Rear Door Kits
19. Pass Through Assembly

NOTICE

The recommended location of the 3 Tier Stainless Steel is as shown in Figure 1.

NOTICE

Prior to installing any assembly or drilling holes, dry fit all assemblies first to ensure a proper fit.

NOTICE

After the CDS ZR EWS has been completely installed, follow the set up and calibration procedure starting on page 93 of this document.

INSTALLATION GUIDELINES

- Quality of the fit and finish of the CDS system depends solely on the installer. While HydraMaster provides all parts and instructions necessary, it is up to the installer to use their own craftsmanship to provide a clean, safe and quality installation that the customer will be satisfied with. Please follow sound, standard shop practices.
- In some cases, due to prior vehicle modifications, it may be necessary to modify the vehicle to continue installation.
- **Dry fit all equipment before securing.**
- During installation, make sure that the Recovery Tank lid clears the van's ceiling.
- When installing the Solution Hose Reel onto the HydraCradle Tank, make sure that the van's doors will close after the Solution Hose Reel has been installed.
- Always verify clearances before drilling holes through floor or anywhere else on the van.
- All hoses and wires that are installed or re-routed during the installation must be secured away from all rotating parts, sharp edges, and excessively hot areas.
- Torque all nuts and bolts as noted.
- For best performance, use a high amp output alternator.

TOOL LIST

Tools and other items you will need include:

3-1/4" Hole Saw	Dex-cool Antifreeze
4 1/2" Hole Saw with jobber length pilot drill bit (minimum of 6" long)	
Wire Strippers/Crimpers/Cutters	Common Metric & Standard Drivers, Nut Drivers; Wrenches/sockets
Reciprocating Saw	Drill ; Long 3/8" Drill Bit; #16 or #17 Bit; can also use 11/64" Bit; 13/64" Bit
Ratchet	Torque Wrench
Die Grinder	Razor Utility Knife
Tape Measure	Clear 100% Silicon Sealant (temperature range -60 to +300 degrees F, cured)
Loctite® 242 or equivalent; Loctite 545	White chalk/marker
Pipe Thread Sealant (temperature range - up to +500 degrees F)	Box Knife or Hose Cutter
Personal protective equipment (PPE) such as gloves, safety glasses and shoes, and earplugs or muffs.	

PREPPING VEHICLE FOR INSTALLATION

1. Open hood and disconnect negative battery cable at the battery.
2. Disconnect the wiring plug at the air cleaner, then remove air cleaner and tube assembly down to the throttle body. Use a shop rag to cover the intake of the throttle body.
3. Remove radiator over-flow container.
4. Remove the main engine drive belt. If van is equipped with air conditioning, the compressor is driven by a separate belt and does not need to be removed.
5. Drain the radiator coolant as follows:
 - a. One method for recapturing the antifreeze is to insert a hose barb into the water pump hose to drain the coolant. This can be done by cutting a small 'x' in the 3/4" water pump hose approximately 2.5" from the water pump housing. It is located on the passenger side of the water pump and thermostat housing (see Figure 2).

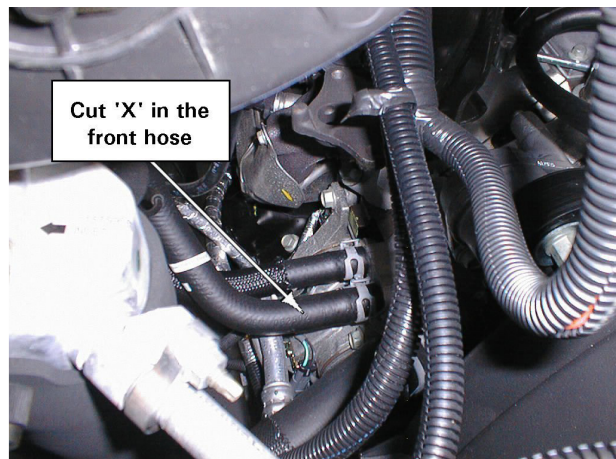


Figure 2. Cut Small 'x' in Water Pump Hose

- b. Insert a barbed fitting with a hose attached so the coolant can now be drained into a proper container.
- c. Once the coolant has drained, the hose can be cut in half. The $\frac{3}{4}$ " plastic tee can be installed as described later in these instructions.
- d. The other option is to cut the hose in half (at 2.5") and let the antifreeze drain. **HydraMaster does not recommend this especially on A/C equipped vans. Coolant will drain straight on top of the air compressor clutch and wiring, and then on to the cross member and the floor, making the coolant unusable.**

NOTICE

Use Dex-cool Red GM antifreeze or equivalent.

⚠ WARNING

WHEN DISPOSING OF USED ANTIFREEZE COOLANT: Follow local laws and regulation. 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

ANTIFREEZE IS HARMFUL OR FATAL IF SWALLOWED. Do not drink antifreeze coolant or solution. If swallowed, induce vomiting immediately. Call a physician or local poison control hotline 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.

6. Remove both driver and passenger seats. Remember to unplug and unfasten the seat belt sensor wires.
7. Remove the dog house engine cowling.
8. Remove the cup holder assembly from the engine cowling.

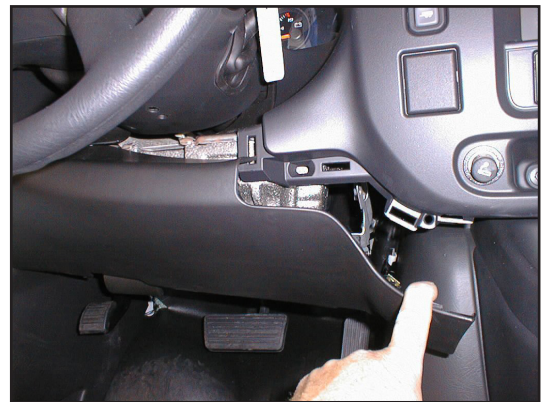


Figure 3. Remove Plastic Dash Covers

NOTICE

The cup holder assembly will not be reused.

9. Carefully remove the plastic dash covers on the driver and passenger sides (see Figure 3). Remove the two bolts on the underside of each side, then remove the top portion by carefully pulling straight out. The dash cover on the driver side needs to be modified for clearance of the CDS cowling.
10. Remove the engine cowling.

NOTICE

Set cowling aside for now. It will need to be modified later during the installation.

11. Carefully remove the floor mat. DO NOT disconnect any of the underlying wires or cables. Pay special attention to the areas around the air pressure bag sensor, lying directly behind the van electrical fuse box (which was under the driver's seat).
12. Locate the yaw sensor cover in the center of the floor, immediately behind the dog house, and between the seats.
13. Remove the clear plastic cover that is over the top of the yaw sensor (see Figure 4 and Figure 5). This plastic cover will not be re-installed.
14. Apply high heat silicone sealant to the bottom flanges of the new yaw sensor cover that is supplied with the kit.
15. Position the new cover over the yaw sensor, making sure that it fits. Also, be sure the wires pass through the slot in the side of the cover (see Figure 7).

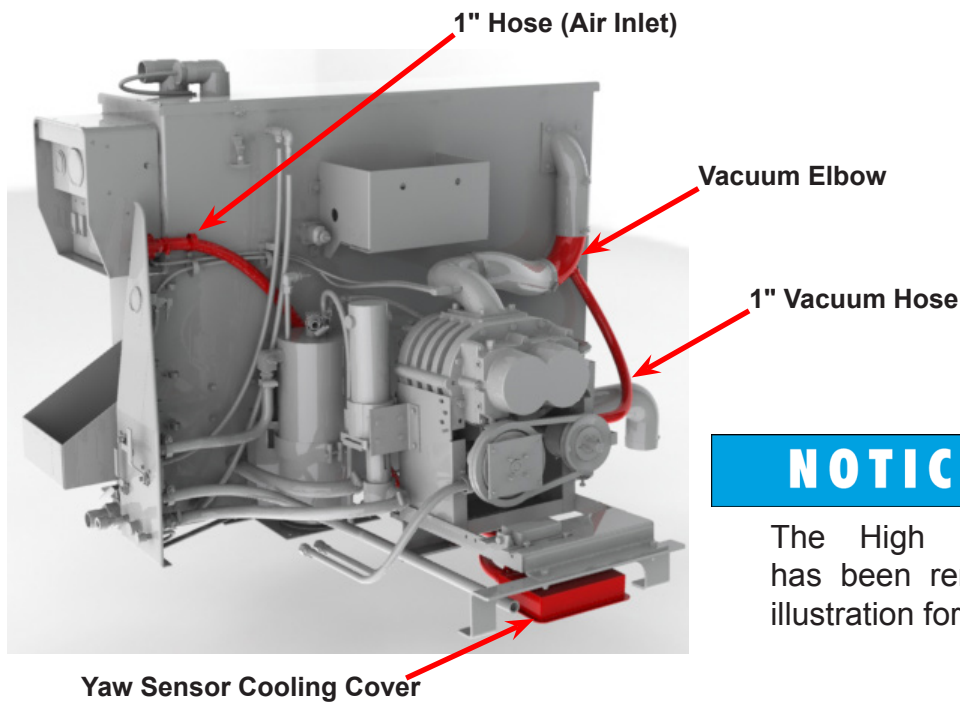


Figure 4. Remove the Original Clear Plastic Cover

INSTALLING YAW SENSOR COOLING KIT

Parts included in the Yaw Sensor Cooling kit are listed here.

Part No.	Description	Qty
000-033-029	Clamp, Size #12 Hose	4
000-033-053	Clamp, 1-1/2" Cushion Loop	1
000-041-312	Weldment, Yaw Sensor Cooling	1
000-049-020	Filter Screw - Medium	1
000-052-034	Elbow, Vacuum	1
000-052-908	Insert, 3/4 X 1 Hose	1
000-068-828	Hose 1 Vacuum X 84 L	1
000-068-829	Hose 1 Vacuum X 72 L	1
000-143-112	Screw, 10-24 X 1/2" Self-Tapping Pan Head-Phillips	2
000-162-003	Tie Wrap, 8" Nylon	4



NOTICE

The High Pressure Pump has been removed from this illustration for clarity.

Figure 5. Major Parts of Yaw Sensor Cooling Kit Shown in Darker Color

1. With either the #16 or #17 drill bit, drill two holes into the sheet metal floor, using the two holes from the cover as a reference (see Figure 6).
2. Bolt the cover to the floor with the two supplied self-tapping screws.

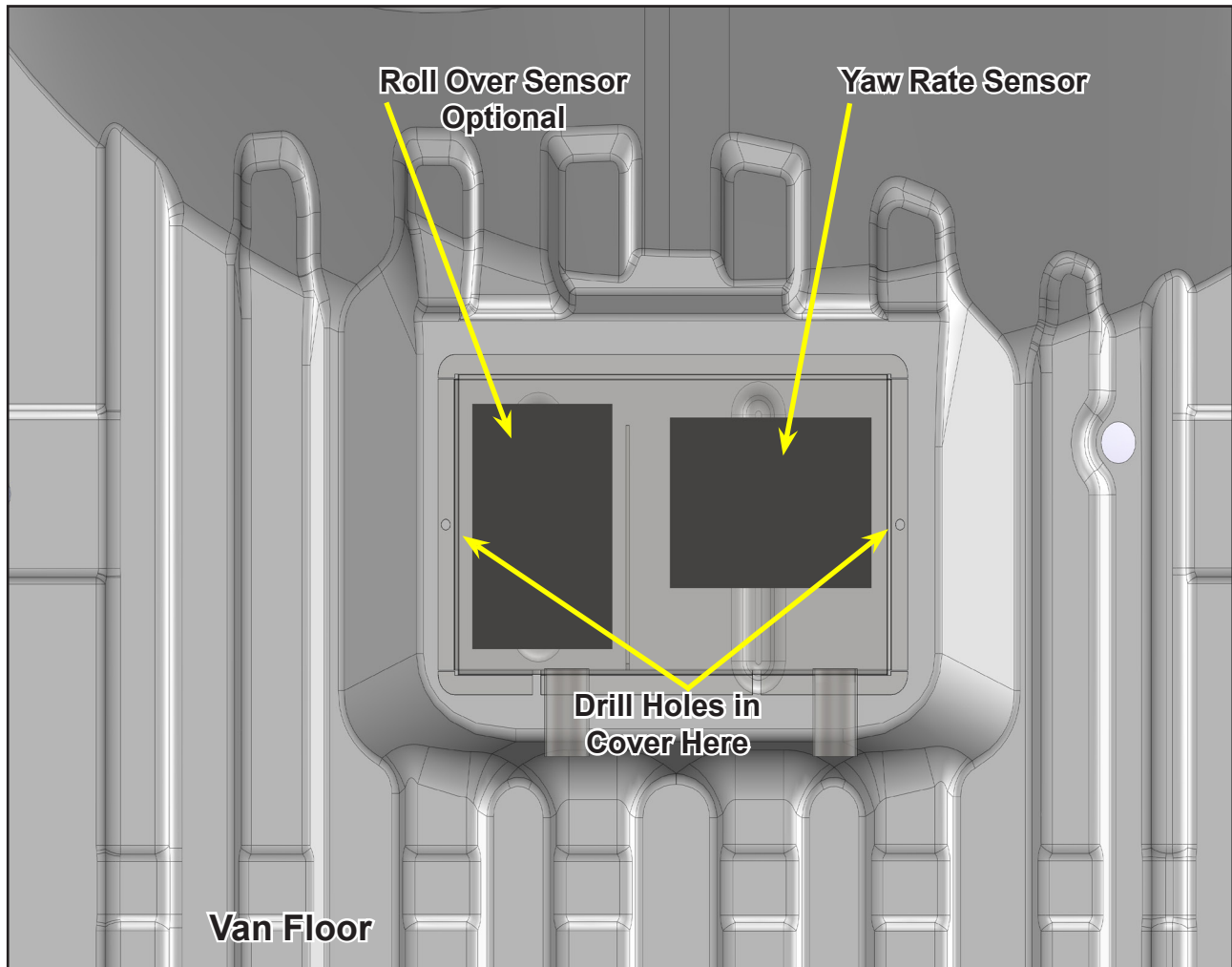


Figure 6. Top Down View of Van Floor - Mount New Cover Over Yaw Sensor

CAUTION

It is important to seal the cover to the van floor to ensure proper air and water protection for the yaw sensor.

3. Wrap the yaw sensor wires with electrical tape where the wires will pass through the cover.
4. Place a generous amount of silicone around the taped wires that pass through the side of the cover surface (see Figure 7).

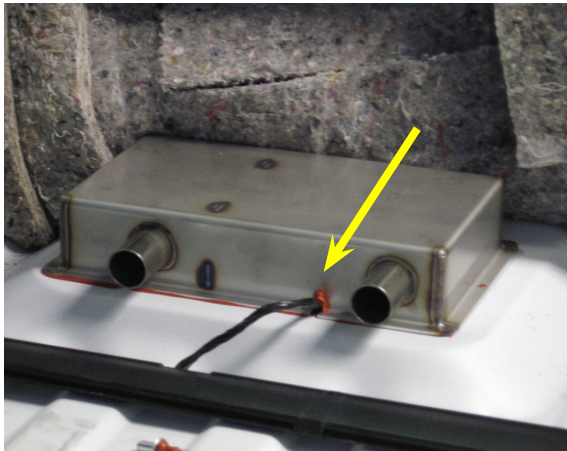


Figure 7. Apply Silicone Around Wires

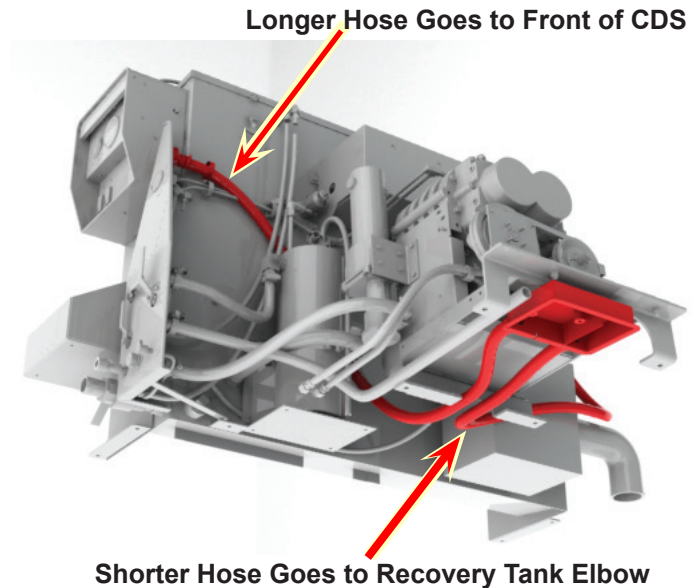


Figure 8. Underside View of Kit's Hose Configuration

CAUTION

Insufficient protection of the wires can result in damage to vehicle electronics.

5. Connect the two 1" flex hoses to the new cover over the yaw sensor (see Figure 8). Use the provided hose clamps to secure the hoses.

NOTICE

The longer hose will run from the passenger side of the cover to the front of the CDS unit, which will be pointing out of the passenger's side cargo door. The shorter hose will run from the driver's side port of the cover to the Recovery Tank elbow joining the Recovery Tank to the Blower.

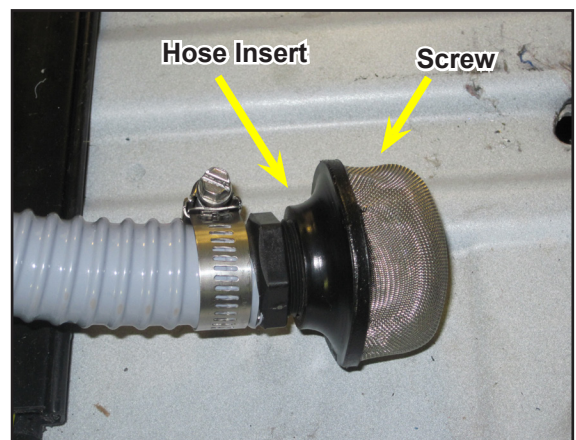


Figure 9. Install Hose Insert and Filter Screw on Longer (Passenger-Side) Hose

6. Install the hose insert and filter screen onto the end of the longer hose (see Figure 9).

7. Cut off the batting in a swath as wide as the cover of the yaw sensor and the entire length, front to back, of the mat (see Figure 10). This will allow the routing of the 1" hose under the Blower for proper cooling of the yaw sensor.



Figure 10. Remove Batting from Floor Mat

CAUTION

When removing the batting, DO NOT cut the van floor mat. This will ruin the water seal value of the mat and put the sensor and all underlying electrical components, including the air bag sensor, in serious risk of failure from a leaking pump or accident.

8. Replace the van floor mat being sure to route the two 1" diameter hoses side-by-side and straight back toward the cargo area of the van (see Figure 11).
9. Continue with the CDS installation.



Figure 11. Route Hoses Straight Back Toward Cargo Area

The final assembly will have a 1" diameter hose attached to the Blower elbow and a 1" diameter hose routed toward the front of the CDS side panel (see Figure 5).

Secure the hose away from all rotating pulleys and off the Blower using the nylon tie wraps and clamps as necessary.

NOTICE

The Blower Power Pack frame spacers allow routing of the two 1" hoses under the Power Pack, up to the Recovery Tank and behind the front panel of the CDS.

INSTALLING FRONT END CLUTCH ASSEMBLY

⚠ WARNING

Ensure that the negative battery cable is disconnected. If it is not disconnected, personal injury or death could result from electrical shock.

1. Locate the engine alternator.

NOTICE

The alternator will need to be removed and installed on the clutch bracket provided. Moving the alternator over to the right provides room for the clutch and drive shaft assembly. The two small wires (gray and orange) with the wiring plug need to be extended along with the battery lead cable.

2. At the rear of the alternator, the wires and cable must be extended. First unplug the wiring connector and then remove the battery cable. Modify the harness and cable as follows:
 - a. First remove the tape and plastic split loom back to expose gray and orange wires. Cut the wires approximately 2" from the plug and install the orange and gray extension wires with the pink butt connectors provided in the kit. The extended wires can be routed inside the main Chevy wire harness that runs forward (see Figure 12).
 - b. Second remove the 6-gauge red battery cable by pulling the boot back and then loosen the nut to remove the cable.
3. Remove the 2 bolts that mount the alternator.
4. Remove the alternator from the bracket.
5. Assemble the alternator into the clutch housing using the hardware provided. The clutch housing is designed to accommodate either a standard or heavy-duty alternator.

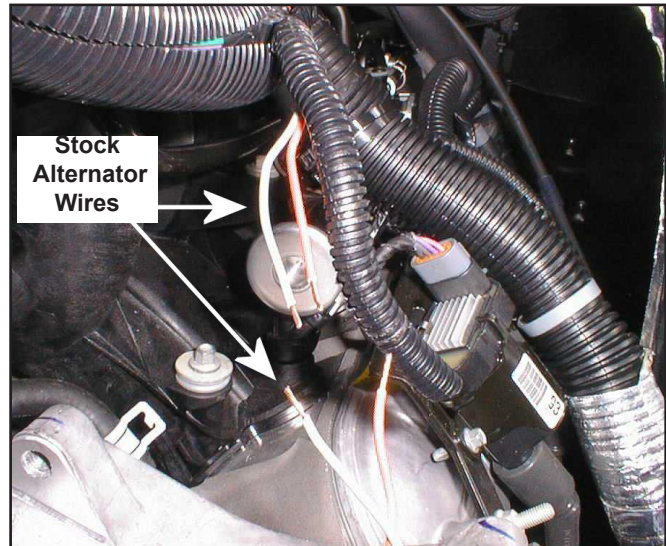


Figure 12. Routing Extended Wires

6. Move the 2 brackets to the appropriate set of holes depending on which alternator you are using. The bottom 4 holes are for the standard alternator and the top 4 holes are for the hi amp alternator. The alternator will need to be rotated so that the stud is on the bottom (see Figure 13).
7. Use Loctite 242 on the 4 screws that secure the brackets to the clutch housing.
8. Torque alternator bolts to 30 ft lbs.
9. Attach the new battery cable extension lead provided in this kit to the back of the alternator (see Figure 14). The end with the red boot will attach to the alternator stud (see Figure 13).
10. Before you install the clutch and alternator assembly, secure the engine wiring harness that is located directly behind the stock alternator location so that the harness will clear the drive shaft.
11. Remove the plastic clamp used to secure harness to the intake. This allows the drive shaft knuckle clearance.
12. Cable tie the harness to allow the shaft knuckle to clear the harness.

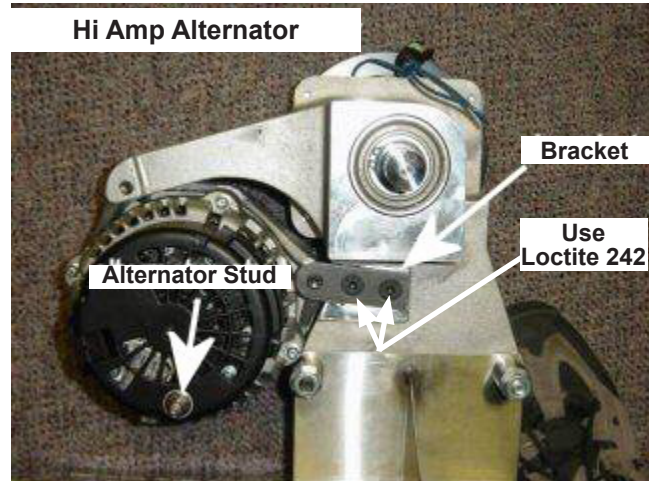


Figure 13. Rotate Alternator

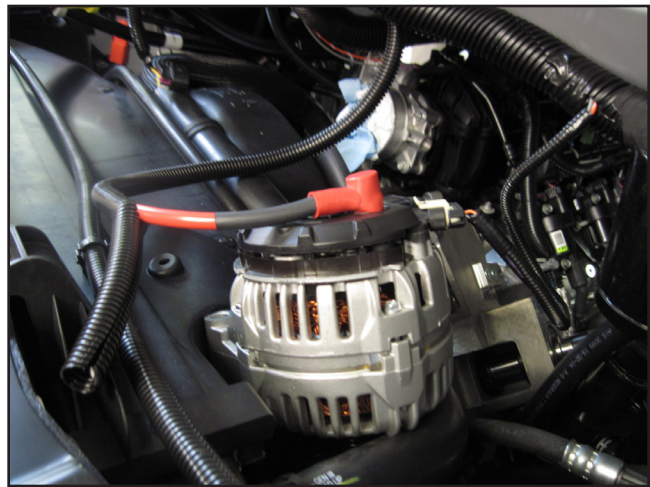


Figure 14. Attach New Battery Cable

CAUTION

Failure to do this may cause serious damage to the equipment.

CAUTION

Do not attach the harness to the fuel rail. Doing so could cause the fuel injectors to leak.

13. Secure the breather, located at the rear of the driver's side valve cover, to the metal tubes just below it with the provided tie wraps.

14. Install the clutch and alternator bracket as one unit. You will need to grind off the corner of the stock bracket in order for the assembly to fit. Use the supplied 10mm x 90mm Allen head screw on the right side and use the supplied modified bolt on the left side. The modified bolt has the head shaved down to allow clearance for the new drive belt. Tighten the bolts evenly and torque to 30 ft lbs.
 - a. Large case alternator will need to have a small portion of the bracket additionally ground down for clearance. Alternator and factory alternator bracket should NOT touch after installing HydraMaster clutch housing into alternator bracket.

⚠ WARNING

Wear Personal Protective Equipment (PPE) such as safety glasses and earplugs before performing the next step. Failure to do so could result in personal injury.

- b. See the following figures to gauge the grinding of alternator bracket.
 1. Remove the top right corner of the bracket as shown in Figure 15.
 2. Mark the corner 1-1/8" in length and 3/8" deep as shown in Figure 16.
- c. Use a die grinder with a cut off wheel. Cut 3/8" into the bracket after marked on both ends of measured area. Hog out remaining material as shown in Figure 17.
- d. Use a 0.025" feeler gauge to verify the alternator/bracket clearance.



Figure 15. Remove Top Right Corner of Bracket

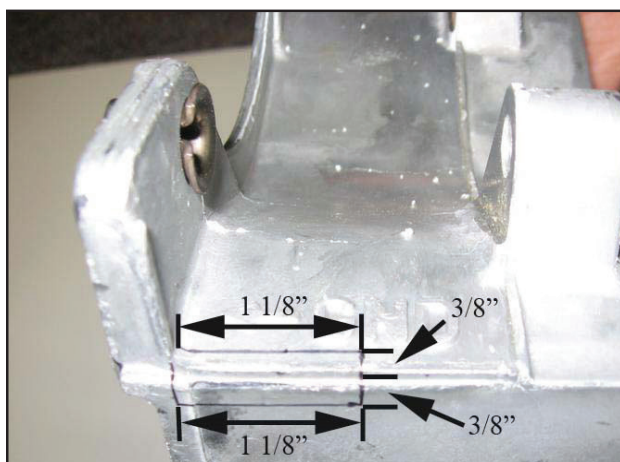


Figure 16. Mark Corner

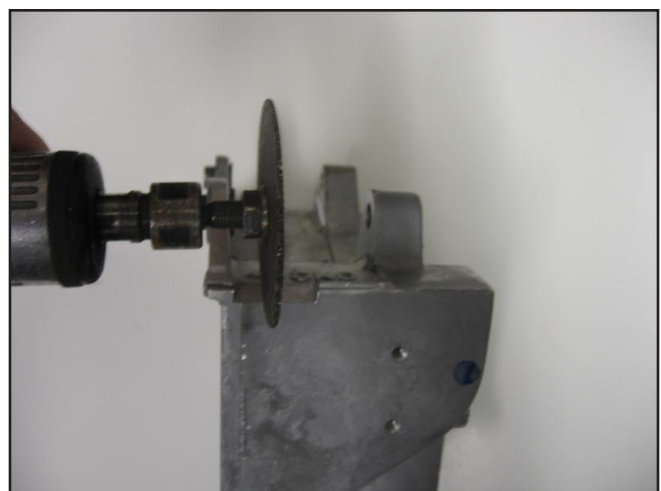


Figure 17. Use Die Grinder to Cut into Bracket

NOTICE

Verify that the van throttle cable is not pinched behind the alternator; the cable should be routed next to the alternator.

15. Install the new drive belt using the routing diagram in Figure 18.
16. Install the safety ring (fly strap) to the back of the driver side head (see Figure 19). Use the original bolt in back of head and the provided 10mm bolt for mounting. Leave the top of the safety ring off until the drive shaft has been installed.
17. Install the drive shaft onto the back of the clutch. The spline end of the drive shaft will face the Blower Power Pack. Slide the yoke of the drive shaft onto the clutch shaft. The end of the clutch shaft needs to be flush with the inside of the yoke. Torque bolts to 35 ft lbs.
18. Temporarily rest the drive shaft on the safety ring until the Blower Power Pack is installed.
19. Install the top of the safety ring and secure using supplied bolts and nut.

NOTICE

With the drive shaft attached to the clutch and resting in the center of the safety ring, check all clearances of the wire harness, breather tubes, throttle cable or anything that may rub on the drive shaft. Secure as necessary.

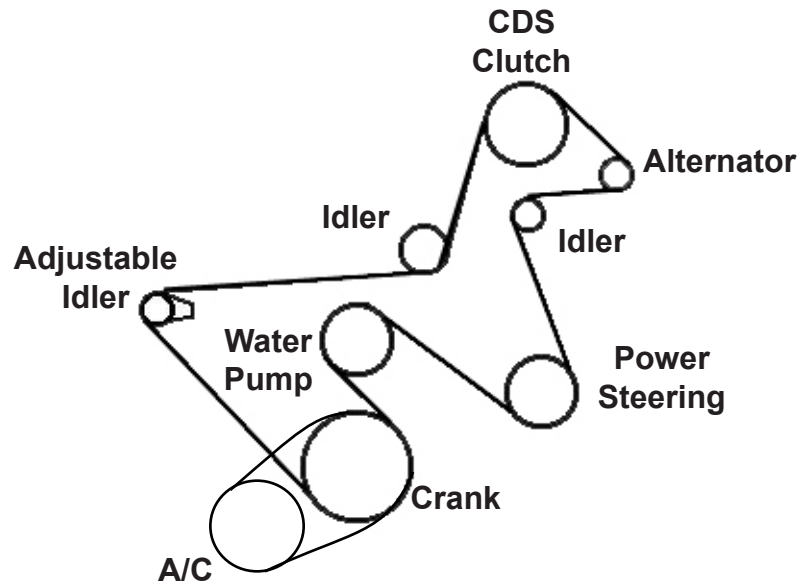


Figure 18. Routing Diagram for New Drive Belt



Figure 19. Install Safety Ring

20. Install the coolant hoses as follows:
 - a. Locate the 1-3/8" upper radiator hose and cut in half just before the end of the fan shroud. Install the provided aluminum tee and clamps facing the passenger side.
 - b. Install the provided 3/4" tee into the 3/4" lower hose coming off the water pump (the same hose from which the coolant was drained).
 - c. Cut the hose in half and install the tee. The tee needs to be pointing up and slightly towards the front of the van (see Figure 20).
 - d. Leave the provided 3/4" green stripe hose in its full length.
 - e. Feed the two ends, from the passenger compartment, over the passenger valve cover to the front of the van and attach to the tees.
 - f. Carefully route the hoses away from any moving parts, sharp edges or hot parts.
 - g. Secure the hoses with provided clamps (see Figure 21 on the following page).

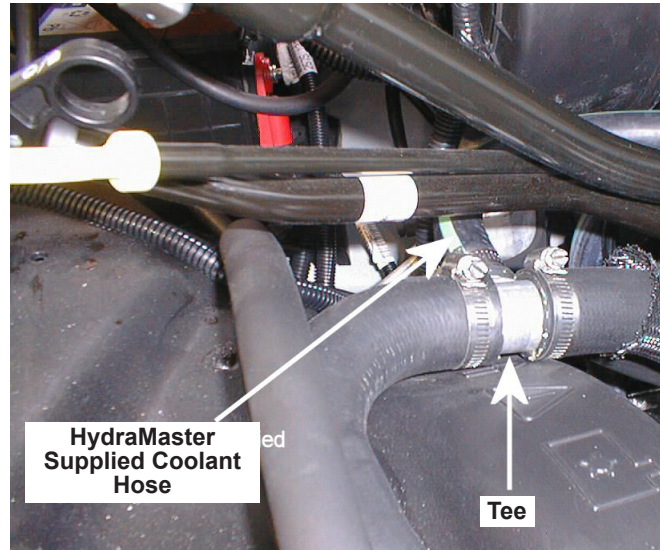


Figure 20. Cut Hose in Half and Install Tee

CAUTION

Improper installation of the coolant hoses may result in engine damage.

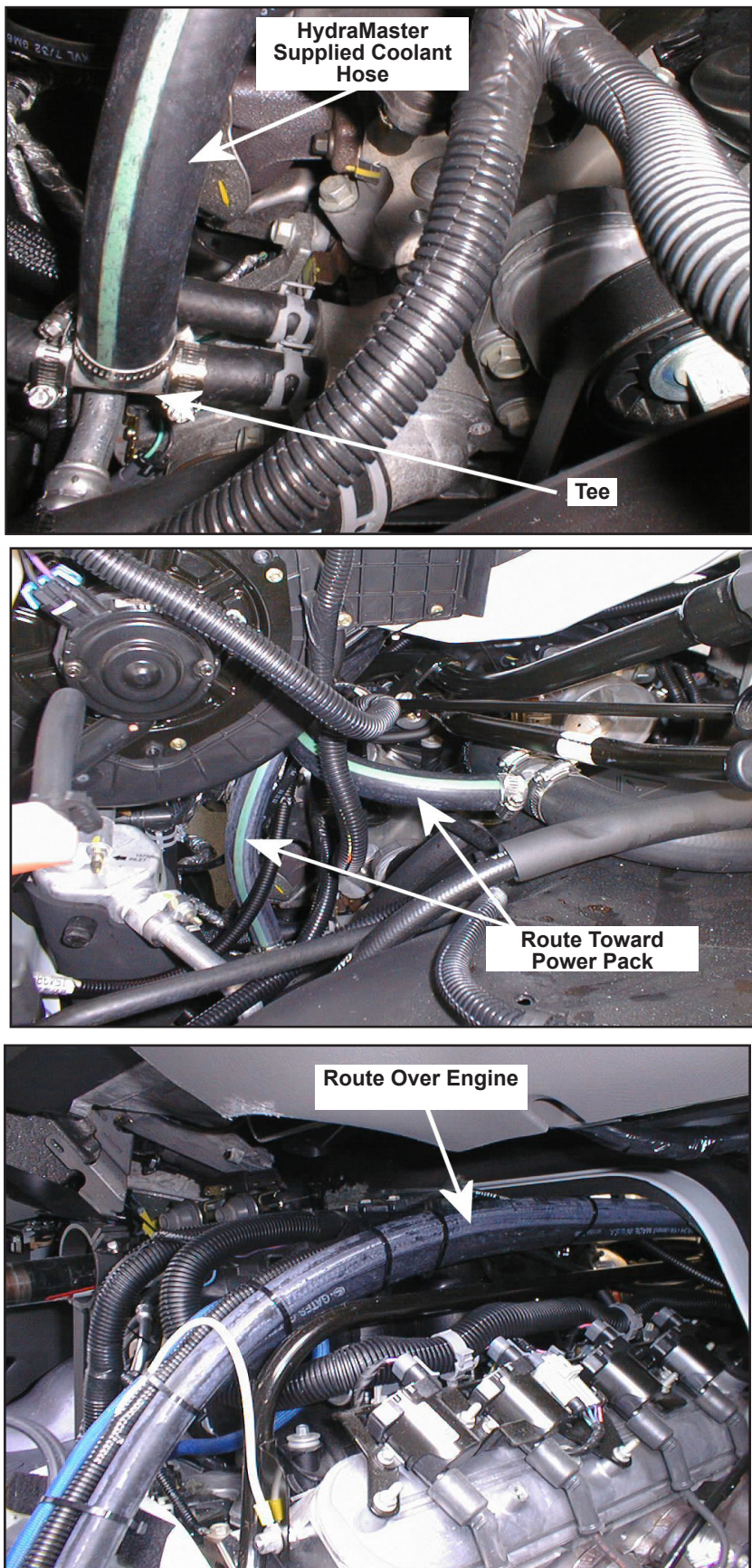


Figure 21. Secure Hoses with Provided Clamps

INSTALLING 3 SPEED THROTTLE CONTROL KIT

Parts in the 3 Speed Throttle Control kit include:

Part No.	Description	Qty
1. Ground Wire		1
000-037-015	Terminal, 5/16" Ring-1	1
000-037-071	Terminal, Fully Insulated	1
000-178-069	Wire, 18 GXL White	0.67 ft
2. 000-074-171	Controller, GM Throttle	1
3. 000-143-546	Screw, #8 Washer Hd	1
4. 000-162-001	Tie Wrap, 4" Nylon	3
5. 000-056-023	Fuse, 2 Amp Mini ATM P	2



Figure 22. Parts in 3 Speed Throttle Control Kit and DLC Harness

CAUTION

Electronic Throttle controllers need a keyed 12V ignition source and vehicle ground to work correctly. Do not apply constant battery voltage. Doing so may cause equipment damage.

Make sure the battery ground cable is disconnected prior to performing any work on vehicle electrical components.

1. Using the provided Velcro, mount the new Throttle Control module under the dash just above the gas pedal (see Figure 23).
2. Connect the Data Link Cable (DLC) harness and the provided wires to the controller as follows (see Figure 23 and Figure 24).

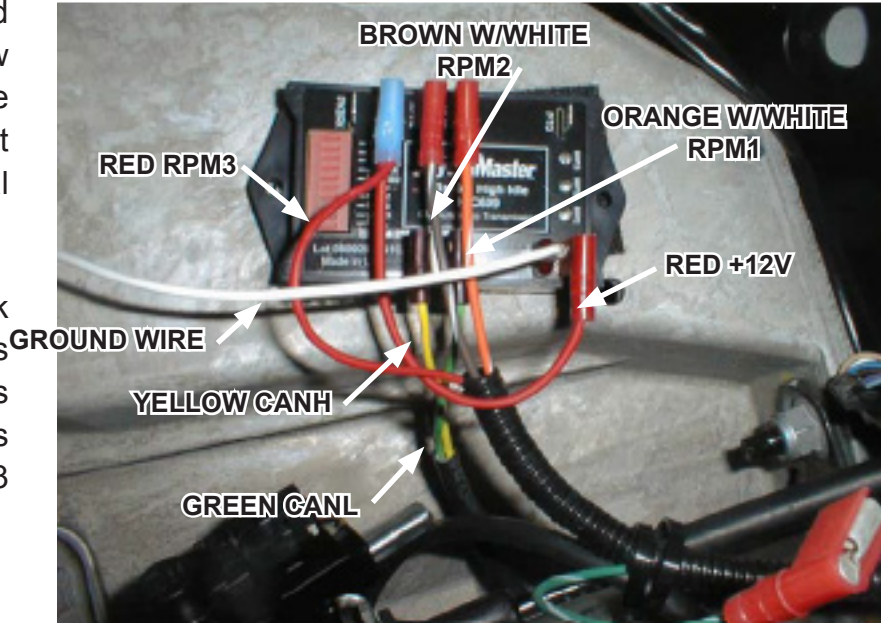


Figure 23. Mount New Throttle Control Module under Dash

Yellow wire to "CANH" terminal
Green wire to "CANL" terminal

Red wire to "12V" terminal
White wire to "GND" terminal
Orange w/ White to RPM 1 (HI = 1,500 rpm)

Brown w/ White to RPM 2 (MID = 1,400 rpm)
Red to RPM 3 (LO = 1,300 rpm)

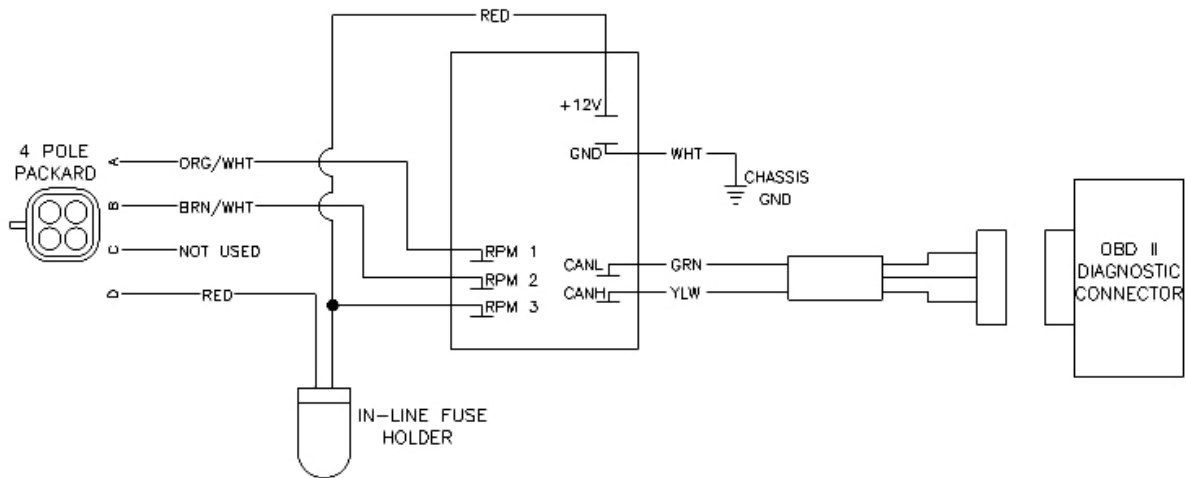


Figure 24. Wiring Diagram for GM 3 Speed Throttle Control

3. Route the DLC harness over the steering column to the Data Link Connector located just above the E-brake pedal. Make sure the harness is routed away from sharp edges and such that it does not come in contact with the driver's feet. Plug the harness in and secure with a wire tie or tape to prevent it from vibrating out over time. See Figure 25.

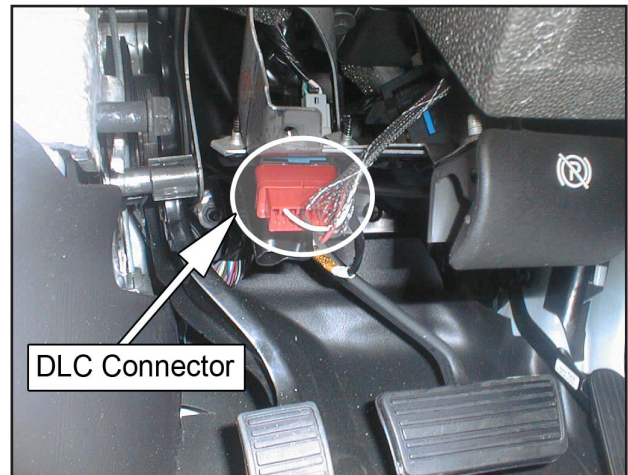


Figure 25. Route DLC Harness over Column to Data Link Connector

4. Connect the provided white wire with terminals to a ground.
5. Check all electrical connections.

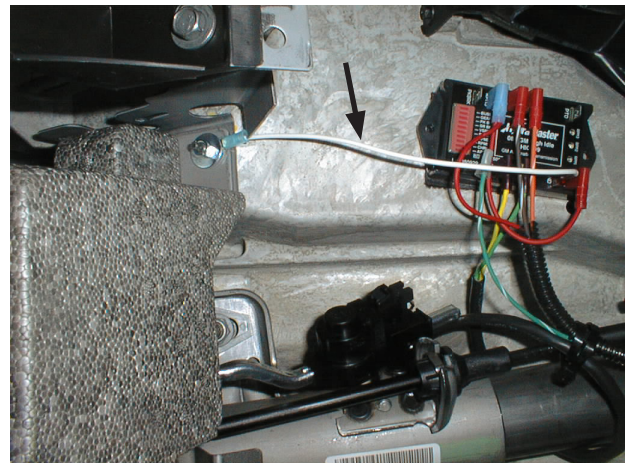


Figure 26. Connect White Wire to Ground

INSTALLING POWER PACK ASSEMBLY

The Power Pack Assembly includes the Frame Assembly, the Blower Assembly and the Water Pump Assembly (see Figure 27).

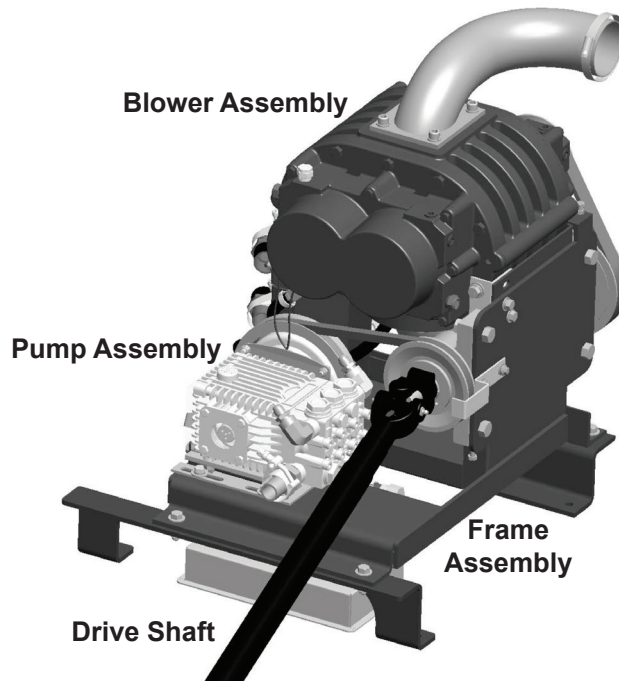


Figure 27. Power Pack with Drive Shaft

NOTICE

Prior to installing any assembly or drilling holes, dry fit the vehicle seats and assemblies to ensure a proper fit.

1. The frame spacer for the Power Pack gets bolted down to the van floor and the Power Pack is bolted to the frame spacer. If there is a need to remove the Power Pack in the future, just unbolt it from the frame spacer.
2. Position the Power Pack with frame spacer (pump towards front of van) between the driver and passenger seat locations (see Figure 28).

NOTICE

No measurements are given here to locate the Power Pack assembly. Side to side measurements will be determined by the position of the drive shaft against the engine and in the safety ring. Front to back location will be determined by the drive shaft length.



Figure 28. Dry Fit Vehicle Seats and Power Pack

NOTICE

The drive shaft spline must be completely compressed before positioning the Power Pack. To do so, take the yoke at the end of the drive shaft and push towards the clutch.

3. Slide Power Pack up to the drive shaft. Hold the drive shaft in line with jack shaft.

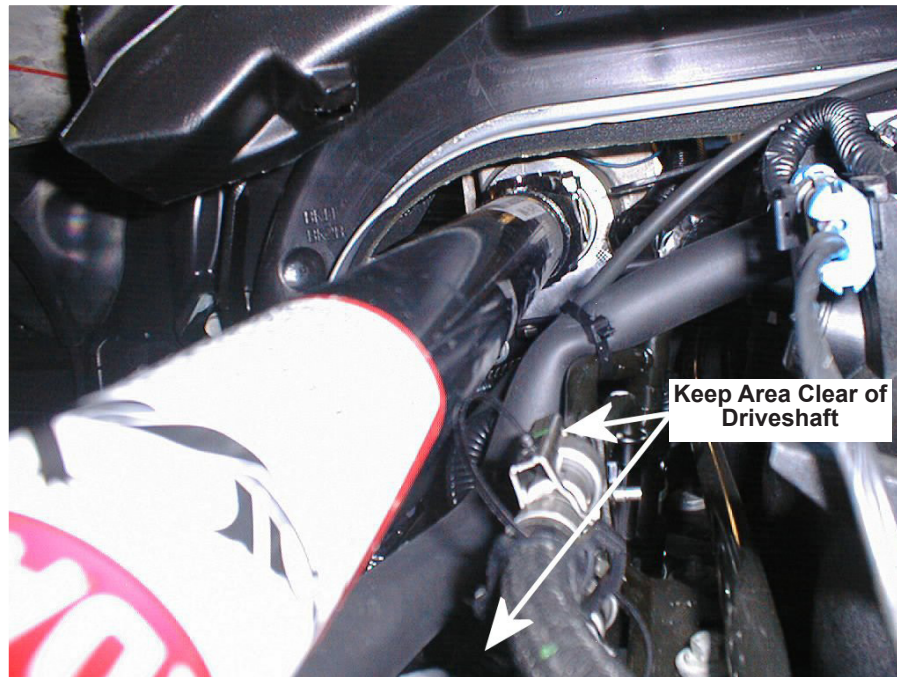


Figure 29. Slide Yoke into Drive Shaft

4. Properly position the Power Pack as follows:
 - a. Front to Back: Leave $\frac{1}{4}$ " between the jack shaft and the drive shaft yoke. This will allow for future removal of the drive shaft. Slide yoke onto jack shaft but do not tighten bolt yet. (See Figure 29)
 - b. Side-to-Side: Position as far as possible to the passenger side so the drive shaft does not contact the engine's wire harness, throttle cable, breather tube or safety ring. Leave $\frac{1}{4}$ " to $\frac{1}{2}$ " between any part of the engine and the drive shaft.
5. With the Power Pack set, place the driver seat in and check clearance. The backrest adjustment may be touching the Power Pack but it should not compress the handle. There should be enough room to slide the Blower cowling between the seat and Power Pack.
6. Adjust the Power Pack as necessary.

NOTICE

Verify that the drive shaft yoke will slide off the jack shaft. Slide the yoke back onto the jack shaft and torque the bolt to 35 ft lbs. The exposed spline of the drive shaft should be no longer than 5”.

7. Dry fit tank, seats and Salsa in an effort to make sure doors close and tank lids open all the way. Blower placement is the key to a good fit and finish.
8. With the Power Pack in place, drill 3/8” holes through the floor using the Blower frame spacer as a template.
9. Bolt the Power Pack down with the provided hardware.

10. Locate the Inline Strainer (P/N 000-049-200 - Figure 30).
11. Route and connect the longer 1" dia. suction hose (P/N 000-068-1044) from the Water Pump to the Strainer. Secure with hose clamps (see Figure 31).
12. Connect the shorter 1" dia. suction hose (P/N 000-068-1043) from the Strainer and secure with a hose clamp.
13. After the Recovery Tank and HydraCradle have been installed, you can attach the other end of the shorter hose to the front of the HydraCradle.

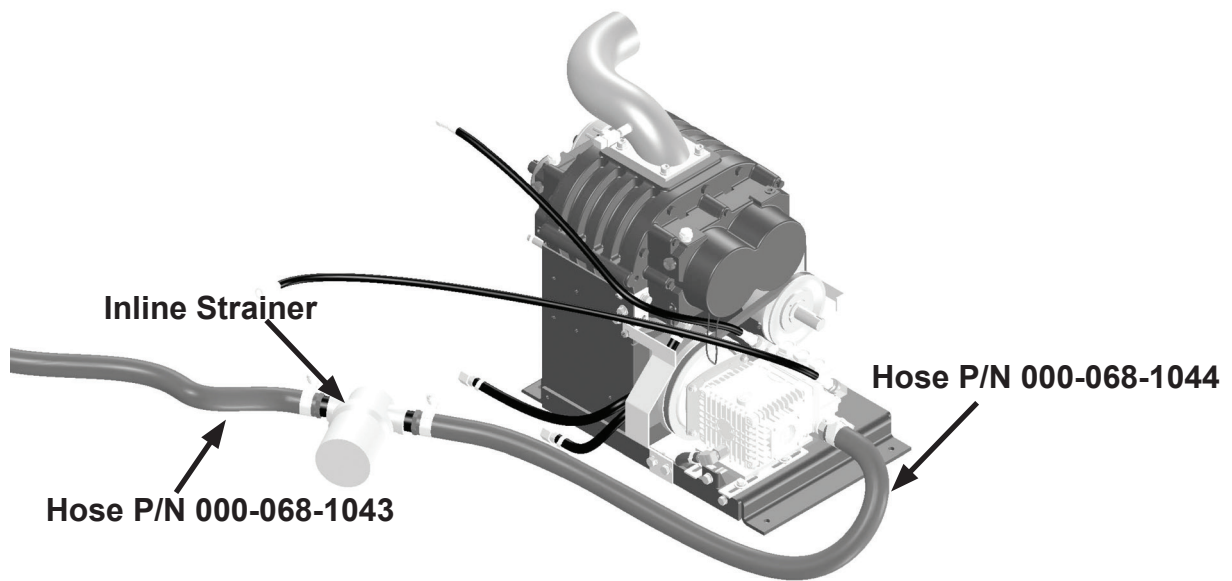


Figure 30. Connect Inline Strainer to Hoses

NOTICE

The Power Pack frame spacers are designed to allow routing of the two 1" hoses under the Power Pack, and routing up to the Recovery Tank and behind the front panel of the CDS (see Figure 31).

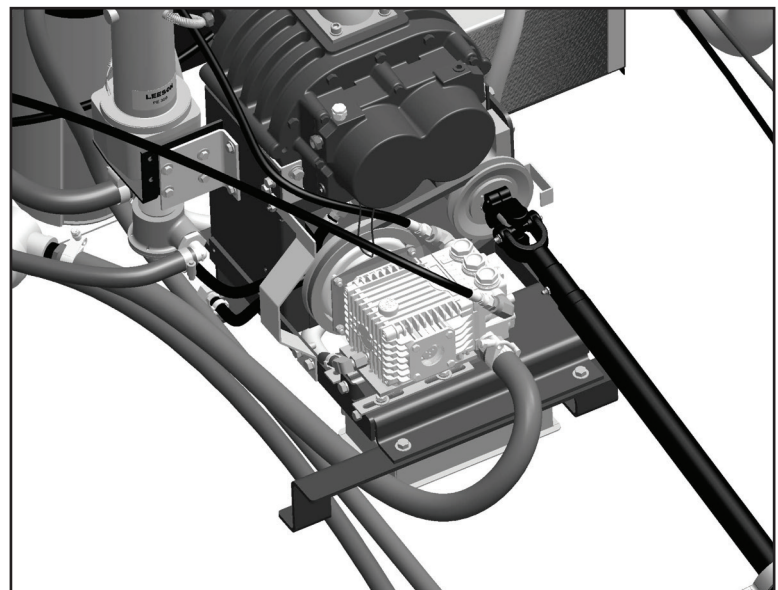


Figure 31. Route and Connect the Longer Hose from the Pump

INSTALLING OPTIONAL DURA-FLOW APO ASSEMBLY

Next, dry fit the Automatic Pump Out (APO) onto the Power Pack Assembly.

1. Secure the APO to the Power Pack Assembly using two 1/4"-20UNC x 0.75" hex head bolts and two 1/4" washers (see Figure 32).

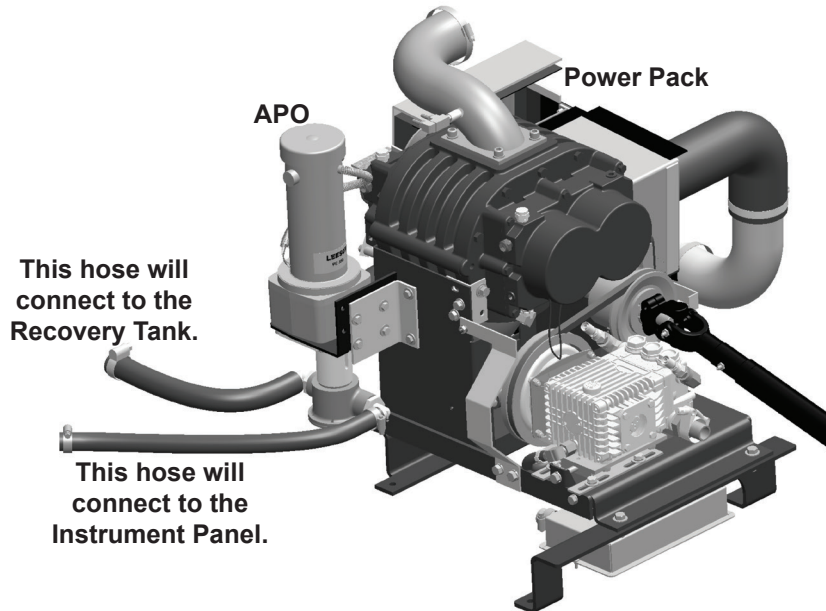


Figure 32. Install APO onto Power Pack

2. Locate the two hoses for the APO (see Figure 32).
3. Later, you will connect one hose to the APO inlet from the connector located near the bottom of the Recovery Tank and then secure the hose on both ends by tightening the hose clamps.
4. You will then attach the other hose from the APO outlet to the bottom of the instrument panel and secure both ends of the hose by tightening the hose clamps.
5. Locate the red wire within the split loom (wiring harness). Connect it to the inline fuse (with the fuse). Connect the fuse to the red APO motor wire (see Figure 33).
6. Route the black APO wire to the ground lug on the Power Pack, under the Pressure Pump.

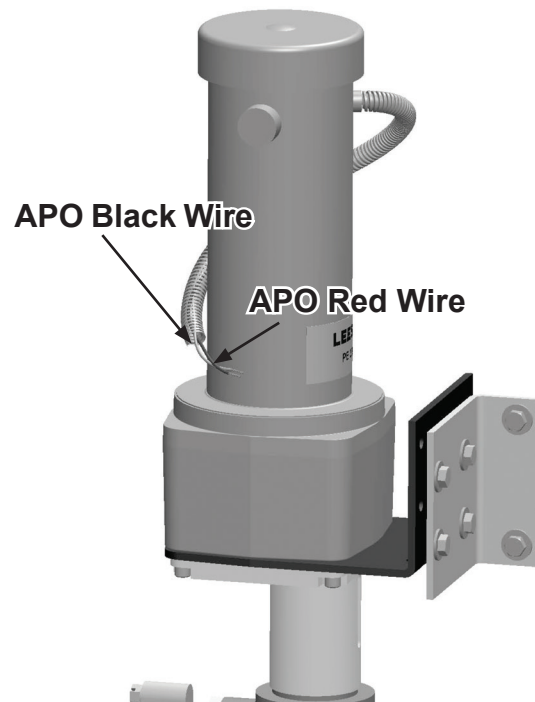


Figure 33. Connect Fuse to Red APO Wire; Route Black APO Wire to Ground Lug on Power Pack

INSTALLING RECOVERY TANK ASSEMBLY

⚠ WARNING

Use extreme caution when loading the Recovery Tank into the van. Always seek the assistance of a second person. If you attempt to load the Recovery Tank by yourself, personal injury could result.

1. Remove the Recovery Tank from the pallet and load it into the van. The Recovery Tank placement will be determined by dry fitting. The flex hose allows you to attach the Tank to the Blower without clearance issues.

NOTICE

After dry fitting the Recovery Tank, make sure that the Recovery Tank lid can be fully opened and does not interfere with the van ceiling.

2. Mark the positions of the 4 Recovery Tank bracket holes (see Figure 34).
3. Drill the 4 holes through the van floor.
4. Use the 4 bolts from the kit to secure the Recovery Tank to the floor.



Figure 34. Mark Hole Locations for Recovery Tank

5. Connect these hoses and elbow as shown in Figure 35.
 1. P/N 000-052-649 Elbow
 2. P/N 000-068-200 Hose
 3. P/N 000-068-884 Hose
6. Attach a 1" diameter hose from the Yaw Sensor Cover to the Blower elbow.
7. Route the other 1" diameter hose from the Yaw Sensor Cover toward the front of the CDS side panel (see Figure 35).
8. Secure the hoses away from all rotating pulleys and off the Blower using the nylon tie wraps and clamps as necessary.

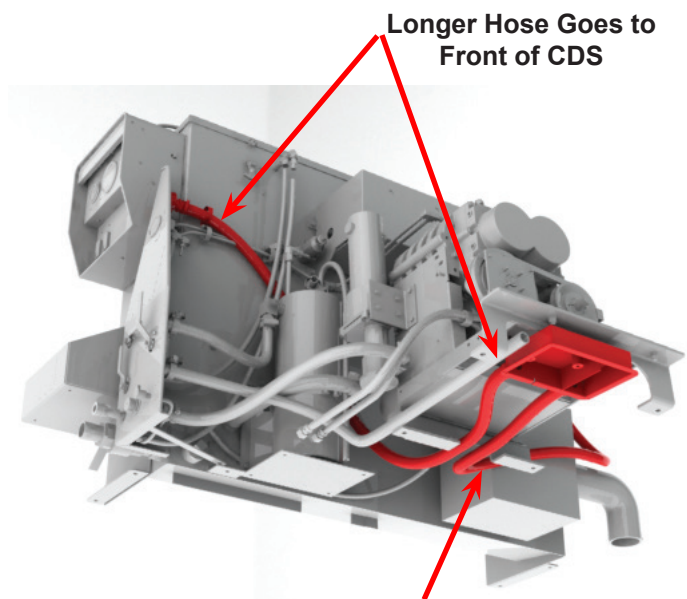
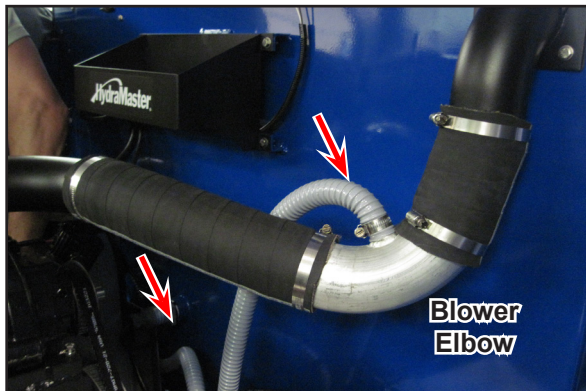
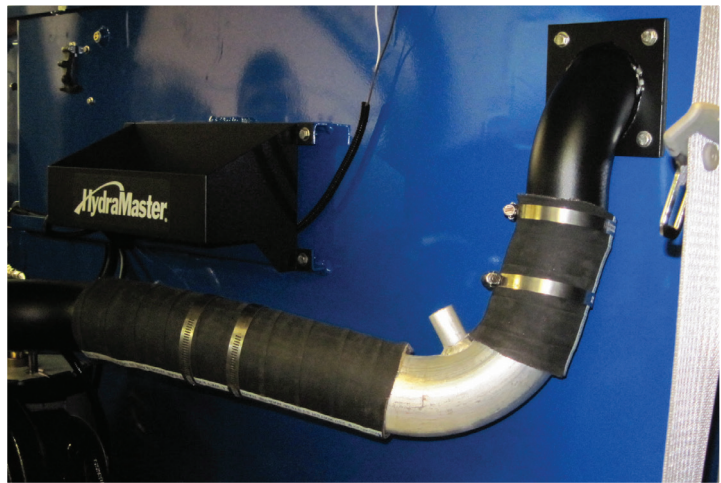
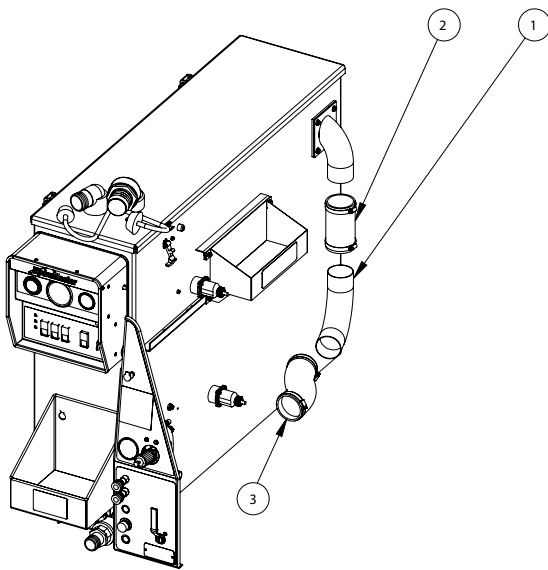


Figure 35. Install Hoses and Elbow onto Recovery Tank; Attach Smaller Hoses onto Blower Elbow and CDS Side Panel

INSTALLING SALSA ASSEMBLY

NOTICE

Dry fit the Salsa Heat Exchanger behind the driver's seat location. Mark the location on the van's floor where the 3" diameter rubber hose (P/N 000-052-674) will be inserted (see Figure 36).

1. Pilot drill a hole. With a circular saw, cut a 3 1/2" diameter hole into the van floor at the marked location, behind the driver's seat position.

CAUTION

Many vans have critical components mounted directly below the van floor. Be careful when cutting through the van floor to avoid damaging components and causing potential equipment failure.

2. Connect the 3" diameter rubber hose (P/N 000-052-674) on the outlet weldment of the Salsa, and route it through the hole in the van floor. Secure the hose to the Salsa outlet with a hose clamp (see Figure 36).

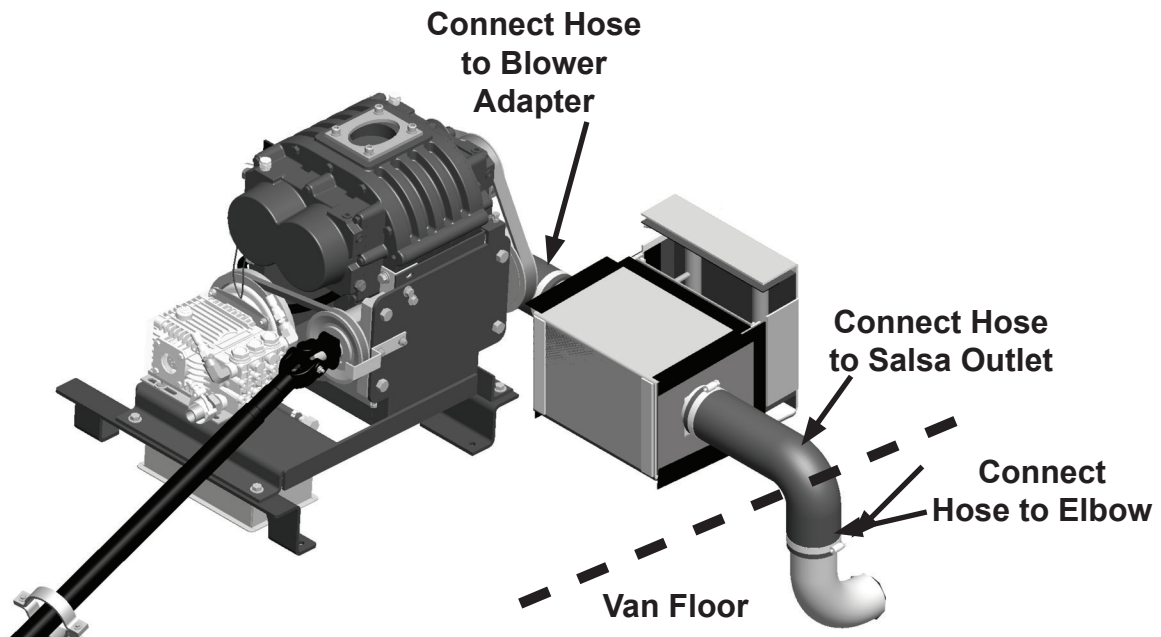


Figure 36. Connect Salsa's Rubber Hoses and Elbow

3. From under the van's floor, slip fit the 3" aluminum elbow (P/N 000-052-649) into the rubber hose protruding through the floor. Secure the elbow to the hose with a hose clamp (see Figure 36).
4. Connect the other 3" diameter rubber hose (P/N 000-052-674) to the Salsa inlet; route and connect the hose to the Blower outlet adapter, and secure with hose clamps on both ends.

5. Connect two 3/8" Teflon® hoses with JIC ends to the elbow on the Salsa (see Figure 37).
6. Route and connect the innermost hose to the pressure regulator on the rear of the instrument panel.
7. The other 3/8" hose connected to the outermost elbow on the Salsa will be connected to the Coolant Heat Exchanger (see page 35).

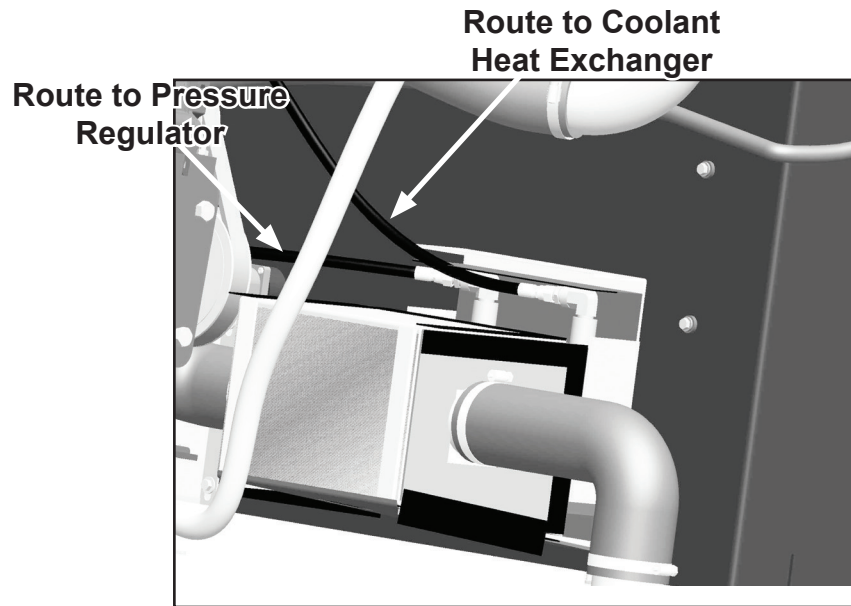


Figure 37. Connect 3/8" Teflon Hoses and Route

INSTALLING COOLANT HEAT EXCHANGER ASSEMBLY

1. Dry fit the Coolant Heat Exchanger with Bracket on the floor of the van next to the CDS as shown in Figure 38.

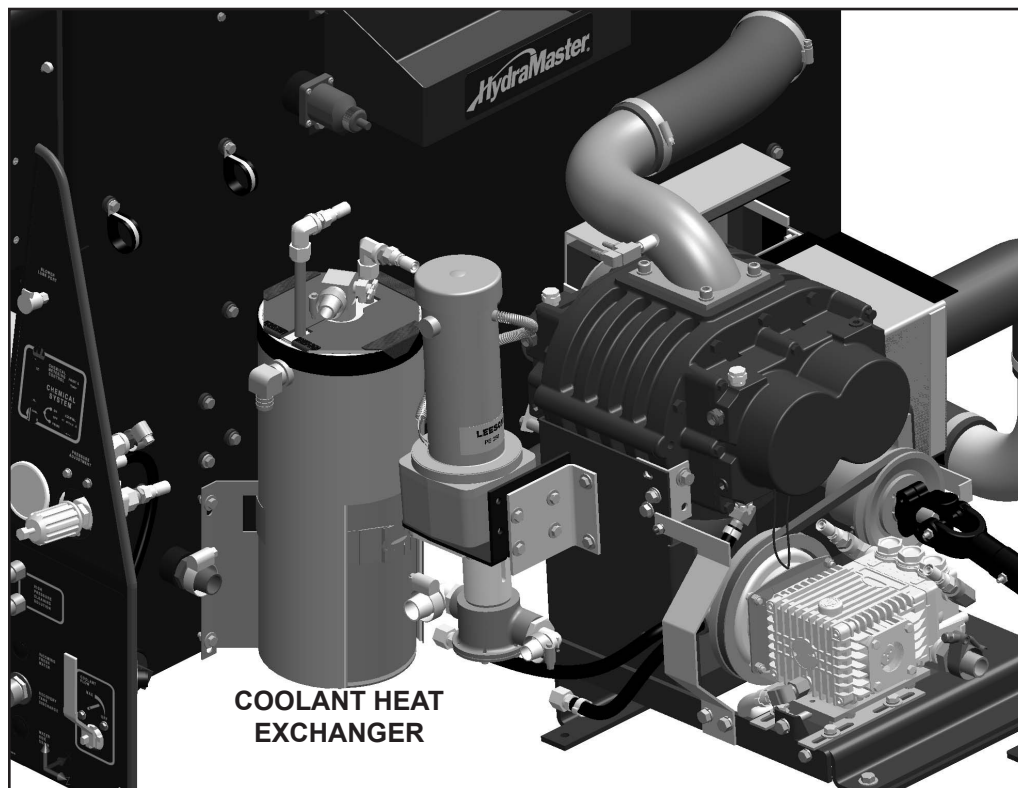


Figure 38. Dry Fit Coolant Heat Exchanger Assembly

2. Mark the location of the 4 holes of the Coolant Heat Exchanger/Bracket (see Figure 39).
3. Check the underside of the van to ensure that there is nothing in the way before installing the Coolant Heat Exchanger.
4. Drill 4 holes as marked and secure the Heat Exchanger/Bracket to the floor with four 1/4"-20 x 1" long self tapping screws.



Figure 39. Mark Location of Bracket's 4 Holes

5. Connect hoses from/to the Coolant Heat Exchanger (see Figure 40).

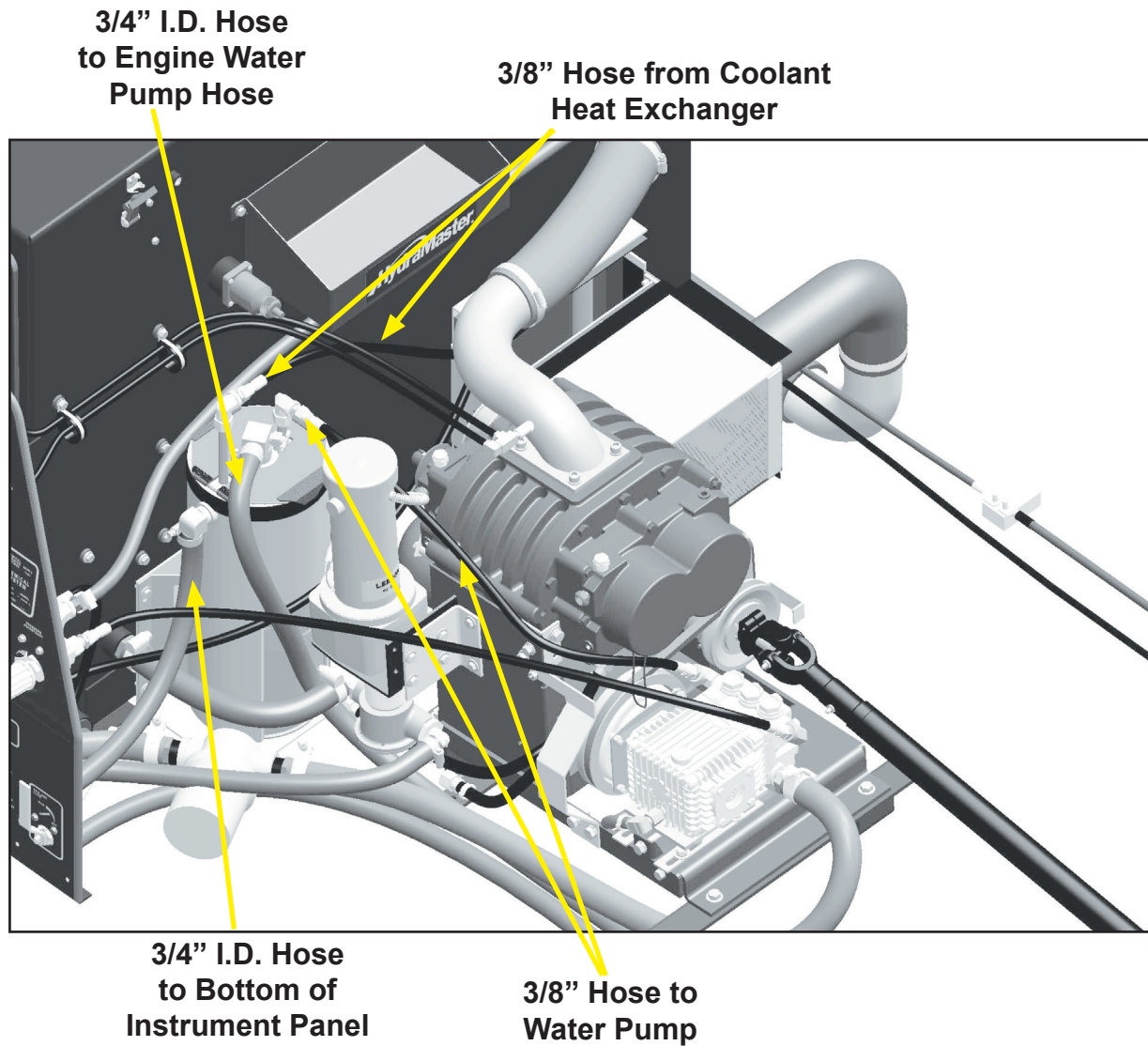


Figure 40. Connect Hoses from/to Coolant Heat Exchanger

INSTALLING SILENCER ASSEMBLY

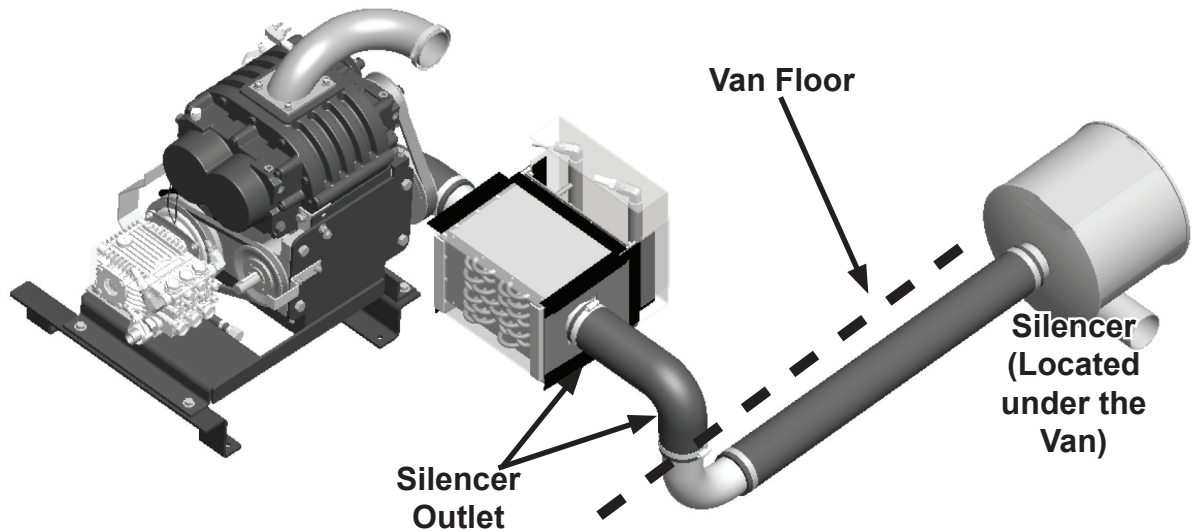


Figure 41. Attach Long End of Elbow to Salsa Inlet

1. Install the Silencer under the van. Depending on the van model, the Silencer may span the “rib” of the floor or bolt directly to the van floor.
2. Direct the 3” aluminum elbow towards the Silencer outlet (see Figure 41).
3. Tighten the clamp and measure the distance between the elbow and the inlet.
4. Cut the 3” hose provided and install.

INSTALLING FINISH KIT

To extend the alternator main battery charge cable, a 150 Amp terminal post, self-tapping screws and a 4 gauge battery extension cable is provided in the Finish Kit.

1. Mount the terminal block to the firewall. This eliminates the need to cut off the original ring connector or splice the wire (see Figure 42 for mounting).

NOTICE

Proper routing of this cable is critical.

2. The extended wire plug for the back of the alternator needs to be plugged in and the exposed wires covered with the provided ¼" split loom.

NOTICE

Verify that the pink butt connectors are properly secured to the wires.

3. Use the provided 1-½" cushion clamp and self-tapping screw to hold the main wire harness away from the CDS clutch (see Figure 43).

NOTICE

The doghouse and cowling are included in the Finish Kit and can be installed at the end of the CDS/EWS installation. See page 89 for instructions.

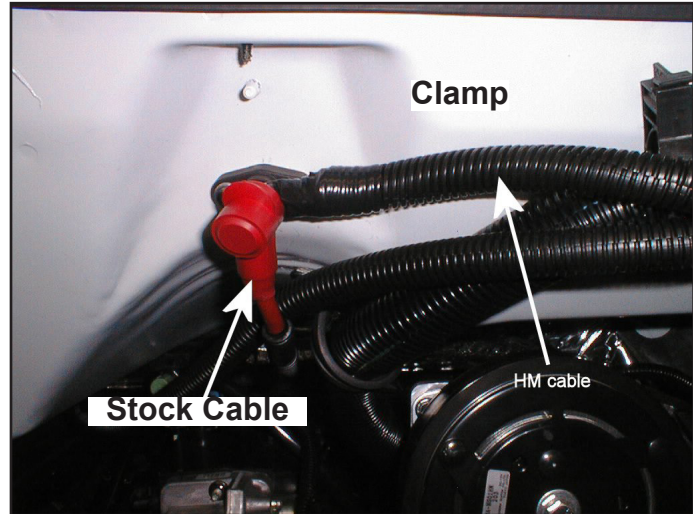


Figure 42. Mount Terminal Block to Firewall

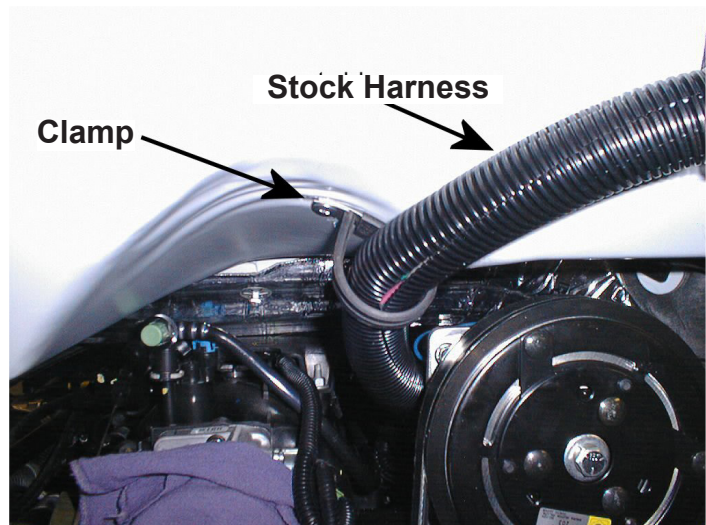


Figure 43. Hold Main Wire Harness Away from CDS Clutch

INSTALLING THE WIRE HARNESS

Harness wire colors and functions are:

Red	-	Main power (10 gauge)
White	-	Main ground (10 gauge)
Red	-	For APO if selected (16 gauge)
Green	-	Tachometer pick up on Blower
Black	-	Clutch, CDS
Blue	-	Pump clutch 4.8

1. Route the nonplugged end of the throttle cable from the CDS unit under the Power Pack and toward the steering column (see Figure 44).
2. Locate the fuse panel and remove the top lid from the fuse panel.
3. Secure the fuse holder (containing the 2 Amp fuse) to the lid of the fuse panel with the provided self-tapping screw (refer to Figure 45). Note that the fuse holder is part of the throttle cable (see Figure 44).
4. Route the 3 Speed Throttle Cable under the driver's side floor mat to the controller (refer to Figure 46). Tie wrap or tape to the transmission shift cable, routing it up, under the dash.
5. Locate the 4 pole throttle control plug in the CDS wiring harness and connect the Throttle Control Harness to the plug. Refer to Figure 47.
6. Plug the main harness into the vacuum tank (behind the side dash panel).

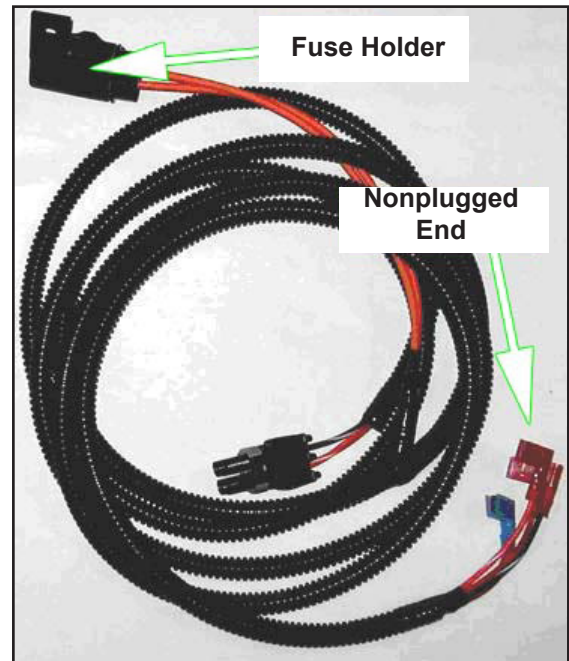


Figure 44. Fuse Holder and Nonplugged End of Throttle Cable

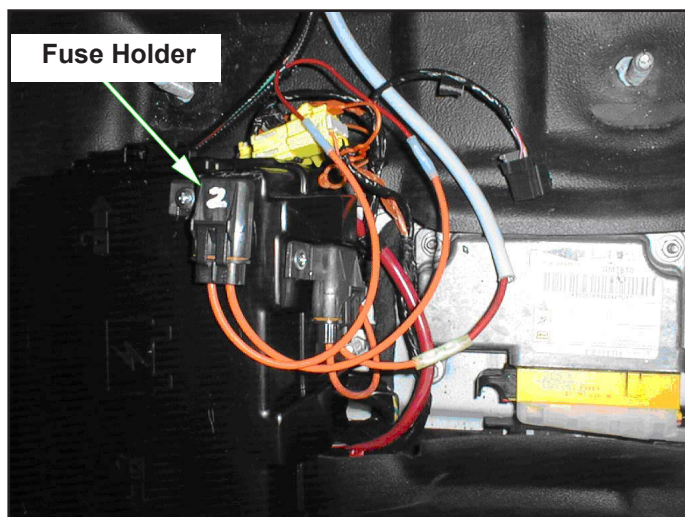


Figure 45. Secure Fuse Holder

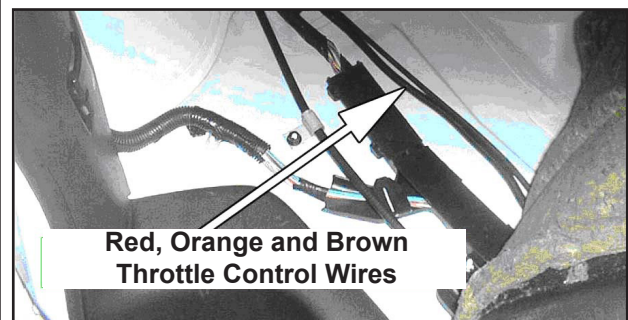


Figure 46. Route Throttle Cable to Controller

7. Route main harness towards the passenger side of the Power Pack.
8. At the first "Y" in the harness, route the red wire along the Blower frame spacer to underneath the driver seat.

NOTICE

The red wire connects to the provided inline fuse. The fuse connects to the power source under the seat. The fuse holder mounts to the top of the fuse box. Figure 48 shows the Power Pack bracket orientation.

NOTICE

When re-installing the driver's seat, take care not to crush or pinch the wires.

9. Route the rest of the harness along the side of the Power Pack.
 - a. The green wire attaches to the tachometer magnetic pickup (white wire, back side of Blower). The tachometer uses a single magnet on pulley.
 - b. The white wires exiting the harness connect to the side of the Power Pack and provide a ground.
 - c. The blue wire connects to the pump clutch on CDS 4.8 models.
10. Continue routing the harness up over the passenger side of the engine, along with the coolant hoses. The single white wire attaches to the back of the engine head. Use the stud that mounts the transmission fill tube.
11. Finally, route the rest of the harness up and over the air cleaner. The black wire attaches to the CDS clutch.

NOTICE

Make sure you keep the black wire away from the rotating clutch.

12. Cover all the exposed wires with the provided ¼" split loom for a clean, finished look.

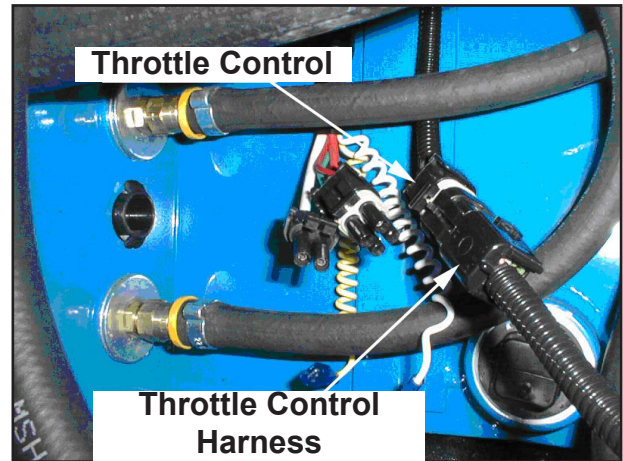


Figure 47. Connect Throttle Control Harness to 4 Pole Plug

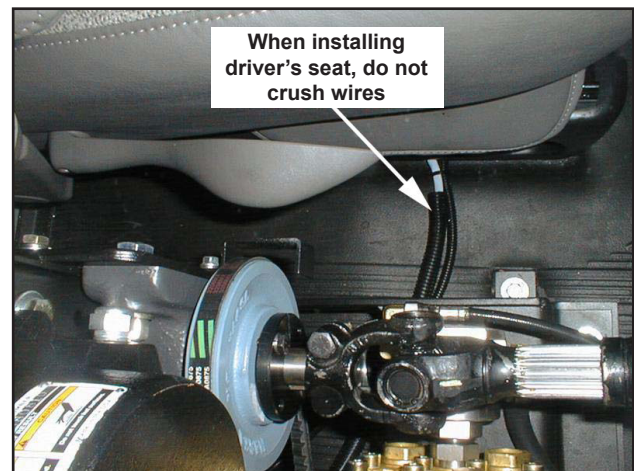


Figure 48. Power Pack Bracket Orientation

INSTALLING HYDRACRADLE TANK

Prior to loading the HydraCradle Tank into the van, you may find it more convenient to install the Garden Hose Reel (P/N 000-163-614 found in Kit P/N 000-079-008).

1. After receiving the palletized HydraCradle Tank, move it to the outside rear of the van, using a forklift.
2. Remove the packing and wrapping material.

Smaller components and fastening hardware are located in plastic bags which are attached to the tank.

Installing Garden Hose Reel

NOTICE

The Garden Hose Reel (P/N 000-163-614 found in Kit P/N 000-079-008, page 51) is shipped with a wood brace installed to ensure the bracket does not incur damage during shipping.

1. Remove the Garden Hose Reel from its box and remove all shipping material. Locate the screws, washers, rubber bumper mounts and handle
2. Remove the two screws that secure the wood brace, and discard the brace and screws (see Figure 49).
3. Position the Garden Reel onto the HydraCradle Tank as shown in Figure 50, aligning the tank's mounting holes with the holes on the Hose Reel bracket
4. Locate the fastening hardware found in the Garden Hose Reel's attached plastic bag.
5. Apply Loctite® #242 to the four 1/4"-20UNC X 0.50" Lg. Hex Head screws and tighten the screws (see Figure 50).
6. Apply Loctite 242 to the threads of the 2 rubber bumper mounts and install the mounts as indicated in Figure 51.
7. Install the 3/8" coupler and the 3/4" bushing (see Figure 51).



Figure 49. Remove Two Screws Securing Wood Brace

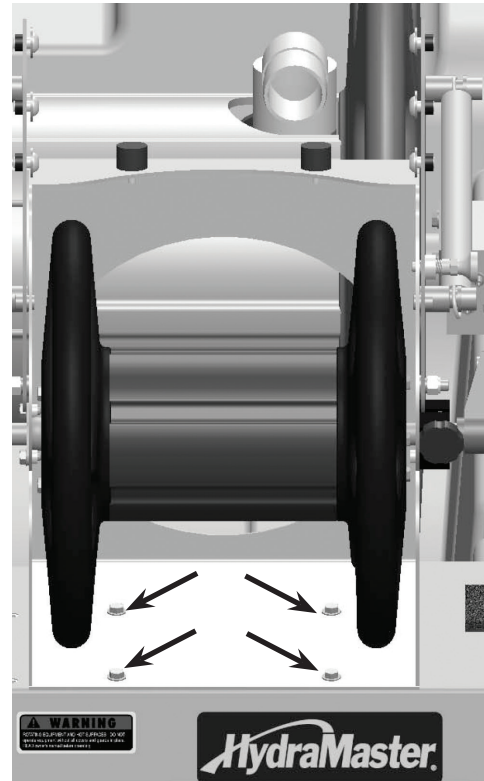


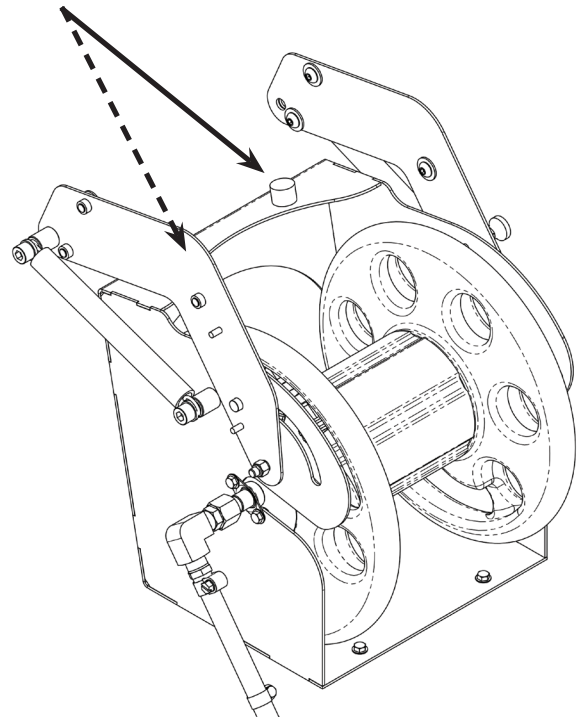
Figure 50. Align Mounting Holes

NOTICE

The Reel bracket and the Solution Hose Reel will be attached to the Garden Hose Reel after the HydraCradle Tank has been dry fitted and positioned. See page 44.

Set aside the button head screws and 3/8" washers from the Garden Hose Reel kit which will be used to secure the Solution Hose Reel bracket to the Garden Hose Reel.

Rubber Bumper Mounts (P/N 000-092-031)



Install Coupler
and Garden Hose
Bushing

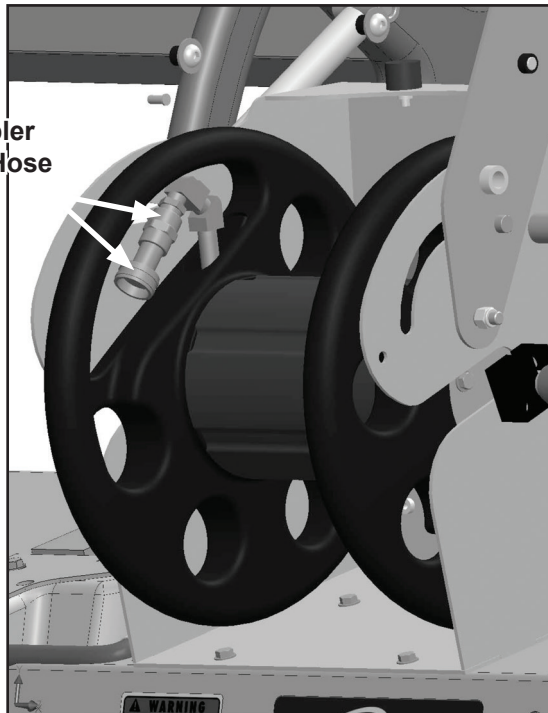


Figure 51. Install Bumper Mounts, Coupler and Bushing

INSTALLING SOLUTION HOSE REEL

Locate the Solution Hose Reel (P/N 000-163-611) and the bracket. The handle and fastening hardware are located in the attached plastic bag (see Figure 52).

1. Insert and secure the Solution Hose Reel bracket onto the Garden Hose Reel, aligning the 3 holes on the bracket with the 3 holes on the Garden Hose Reel, (see Figure 53). Ensure that the curved cut out on the bracket is facing forward (see Figure 53). A
2. Apply Loctite 242 to the 6 button head screws (see page 42).
3. Lift the Solution Hose Reel onto the Solution Hose Reel bracket with the fastening hardware.
4. Secure each side of the Solution Hose Reel bracket to each side of the Garden Hose Reel bracket with the washers and the button head screws.
5. Locate the swivel, bushing and handle in one of the plastic bags (see Figure 52).



Figure 52. Solution Hose Reel, Bracket, Handle and Fastening Hardware

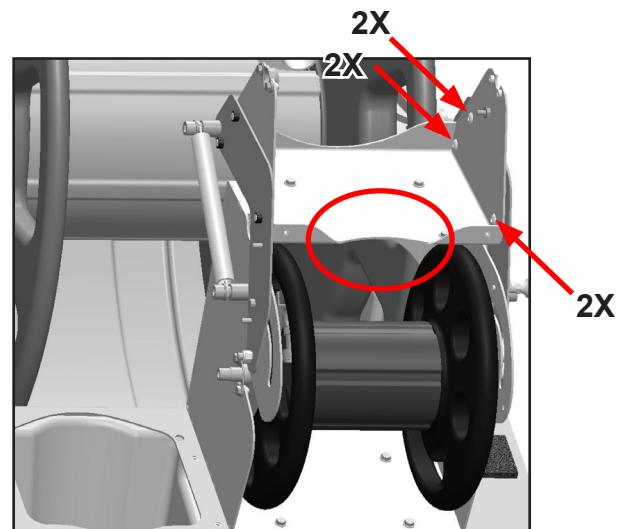


Figure 53. Insert Bracket onto Garden Reel (Curved Cut Out Faces Forward)

6. Attach the Solution Hose Reel handle (see Figure 54).
7. Attach the Garden Hose Reel handle (see Figure 55).
8. Attach the swivel to the Solution Hose Reel (see Figure 54).

NOTICE

Apply pipe thread sealant on the threads of the reel, bushing and the Solution Hose.

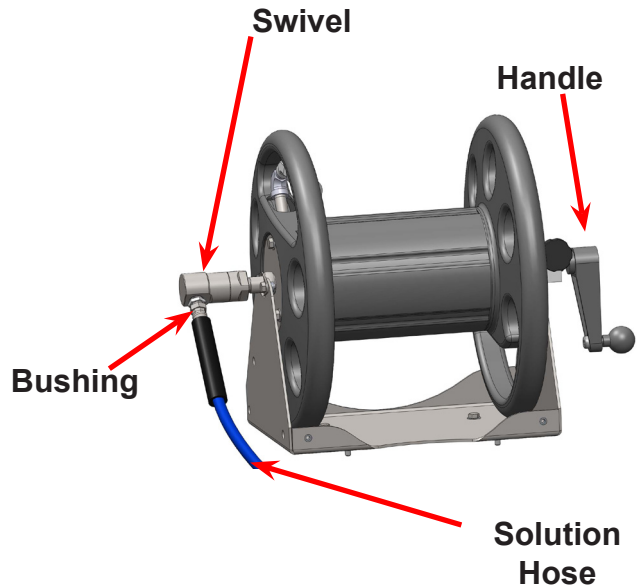


Figure 54. Attach Swivel, Bushing and Handle onto Hose Reel

9. Install the bushing onto the swivel (see Figure 54).
10. After installation is complete, you can connect one end of the Solution Hose into the swivel and the other end onto the front of the Instrument Panel (see Figure 55).
11. You can then connect the black hose P/N 000-068-994 (located in the Live Garden Fittings Kit, P/N 000-078-606) from the Garden Hose Reel to the Water Softener (see Figure 55).

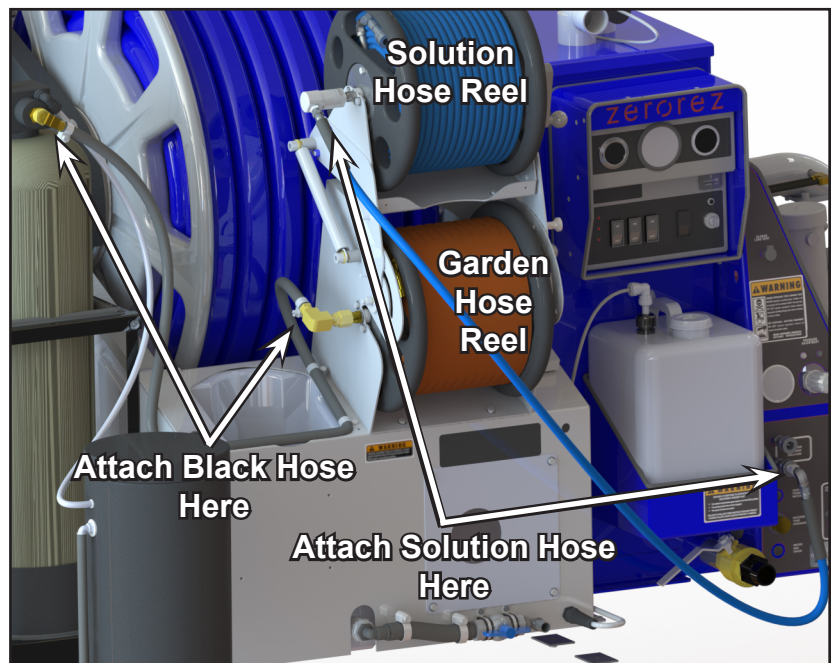
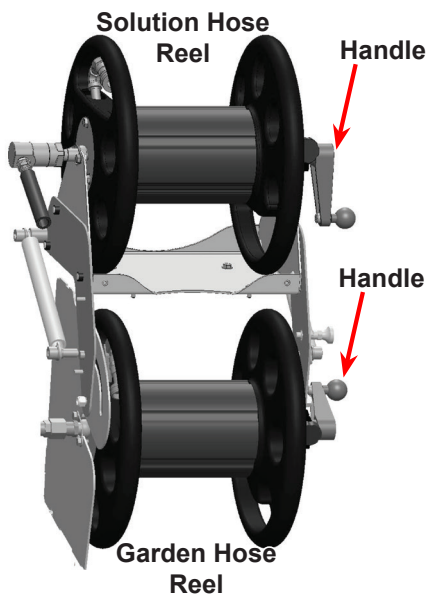


Figure 55. Connect Solution and Garden Hoses after Completing Installation

Loading HydraCradle Tank into Van

⚠ WARNING

Use extreme caution when loading the HydraCradle Tank into the van. Always seek the assistance of a second person. If you attempt to load the HydraCradle Tank by yourself, personal injury could result.

1. With the assistance of a second person, push the empty tank off of the pallet and into the van, positioning the tank at an angle.
2. Carefully lift the tank from the shorter end of the tank, pivoting the tank's shorter end over the wheel well.
3. Dry fit the HydraCradle Tank, positioning it parallel to the CDS with a minimum of 2" of space between the tank and the CDS (see Figure 56).

NOTICE

While dry fitting the HydraCradle Tank, make sure that there is enough clearance between the Solution Hose Reel and the van doors when they are closed. If the HydraCradle is not positioned correctly, the Solution Hose Reel can prevent the van doors from being fully closed.

4. Referring to Figure 57, and Figure 58, locate the 6 holes in the brackets, at the base of the unit. There are 3 holes on each side of the tank.

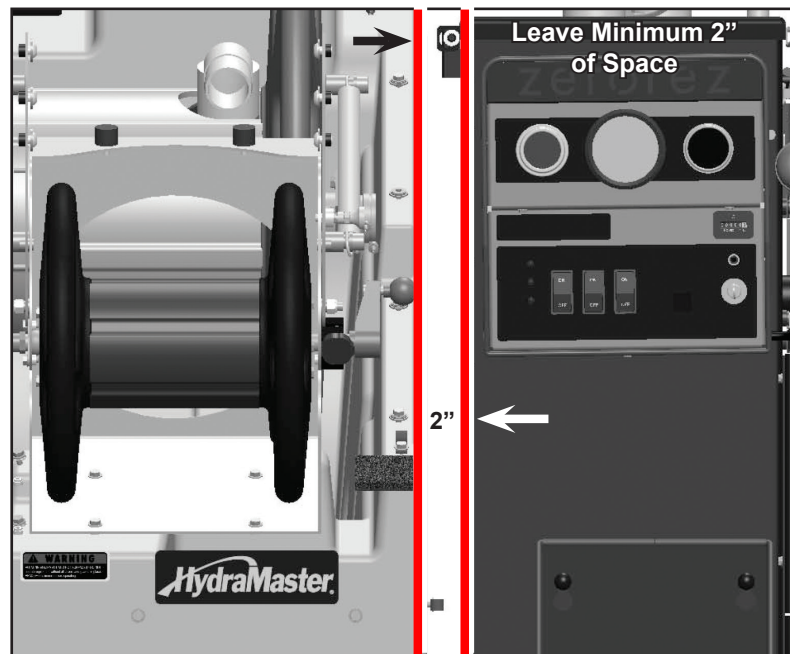


Figure 56. Leave a Minimum of 2" of Space Between Tank and CDS

NOTICE

The corner bracket at the rear of the tank, shown in Figure 57, lets you select 1 of 2 tabs - you only need to use one, not both. To better accommodate the installation, you can cut off the unused tab of the corner bracket.



Figure 57. Drill Only 1 Hole for Corner Bracket



Figure 58. Mounting Holes on Each Side, Indicated by Arrows (See Step 5 before Installing Tank)

3. Mark the location of the 6 holes, checking under the van to ensure that, when you drill through the van floor, you are not drilling through the fuel line or other components.

CAUTION

THROUGH-FLOOR DRILLING: Be careful when drilling holes through the van floor. Many vans have critical components mounted directly below the van floor which could be damaged by a misplaced drill bit.

4. Using a 13/16" drill bit, drill the 6 preselected holes through the van floor (see Figure 58).

NOTICE

Prior to securing the tank to the van floor, you must first loosen the side bracket bolts on the tank as described in the next step.

5. Loosen, but do not remove, the 3 bracket bolts on each side of the HydraCradle Tank before securing the tank to the van floor (see circled bolts in Figure 59).
6. Secure the tank to the van floor with three 3/8" bolts on each side.
7. After tightening the 6 bolts that secure the tank to the floor, tighten the bracket bolts (3 on each side) as indicated in Figure 59.
8. Install and tighten the 6 tie down cleat washers to the underside of the van (see Figure 60).

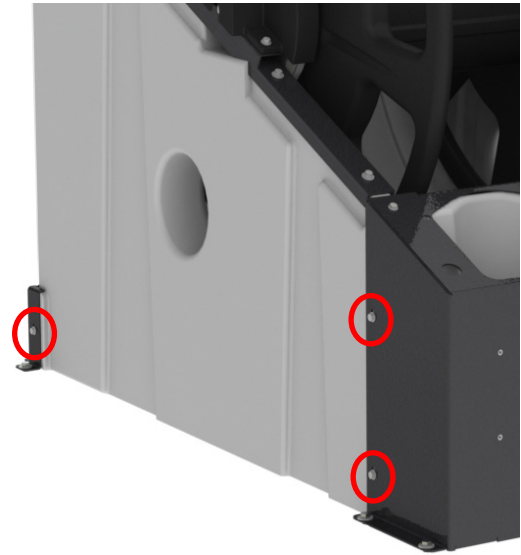


Figure 59. Loosen But Do Not Remove 3 Bracket Bolts

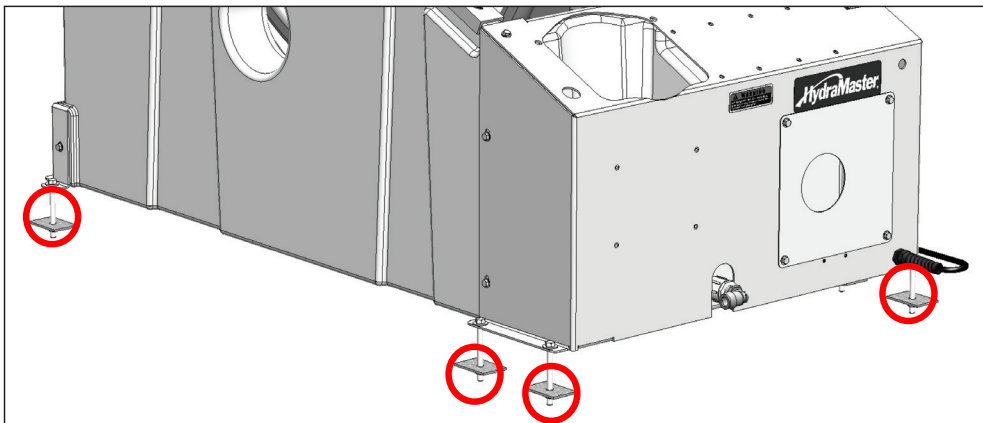


Figure 60. Install and Tighten 6 Tie Down Cleat Washers

Route and Connect Suction Hose and Dump Valve

1. Route the suction hose (P/N 000-068-1043) from the Inline Strainer through the CDS as indicated in Figure 61

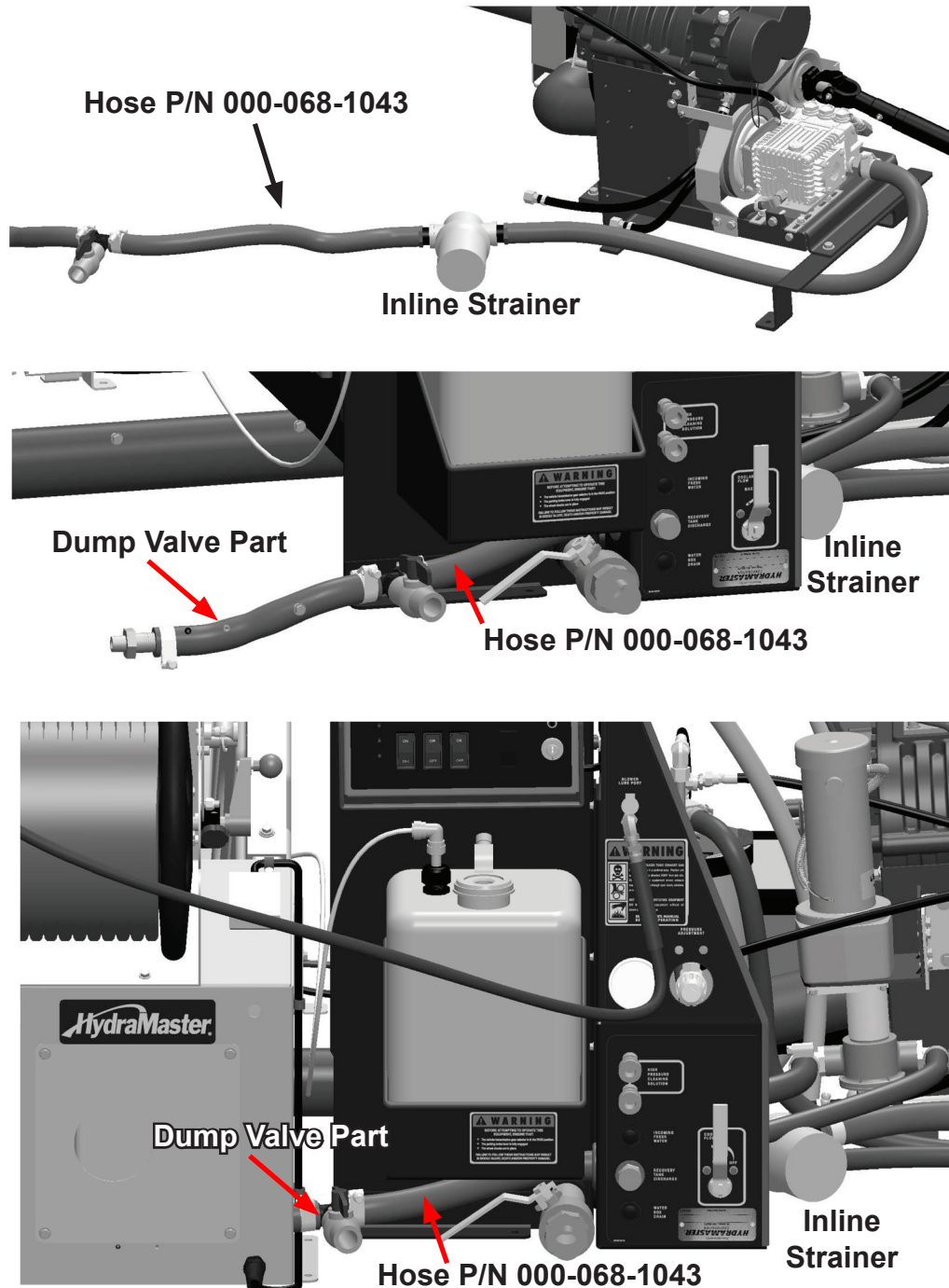


Figure 61. Route and Connect Hose and Dump Valve

2. Connect and secure one end of the Dump Valve to the suction hose with hose clamps (see Figure 61 and Figure 62)

3. Connect and secure the other end of the Dump Valve to the connector inside the HydraCradle with the larger hose clamp.

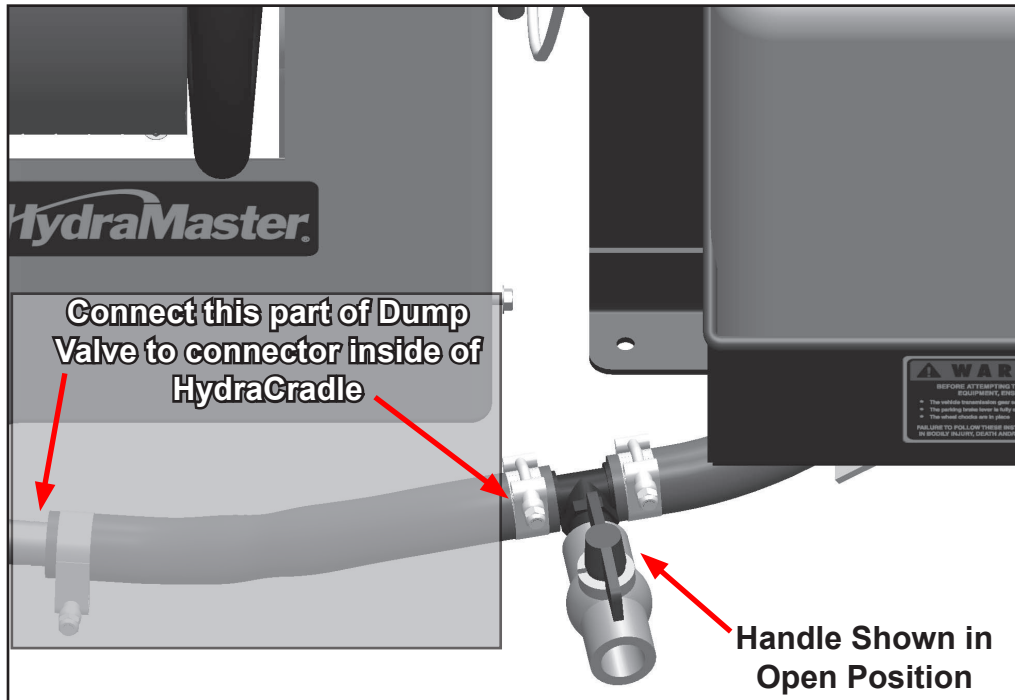


Figure 62. Install Dump Valve Part

4. Insert the adapter (P/N 000-052-236), bushing (P/N 000-052-235) and elbow (P/N 000-052-348) into the front of the HydraCradle as indicated in Figure 63.

CAUTION

The dump valve must be closed prior to starting the CDS/EWS or the high pressure pump may be damaged (see Figure 62).

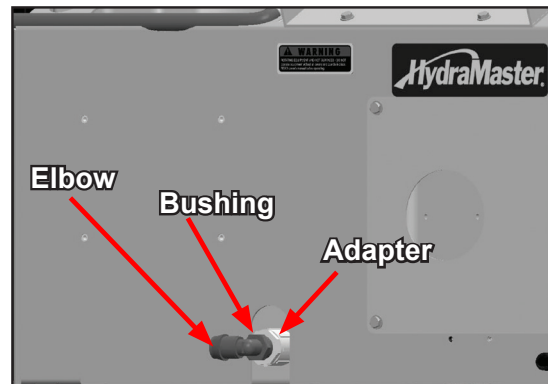


Figure 63. Install Adapter, Bushing and Elbow

5. Locate the fuse holder and fuse (fuse is in plastic bag) attached to the HydraCradle Tank wiring harness (see Figure 64).
6. Remove the 30 Amp fuse from the plastic bag and insert it into the fuse holder.

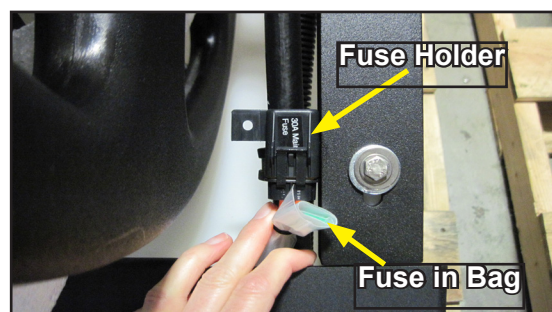


Figure 64. Locate Fuse Holder and 30 Amp Fuse

INSTALLING EWS AND WATER SOFTENER ASSEMBLIES

The EWS System is designed to manufacture and feed catholyte ('B' water) solution on demand when activated within a CDS GMC/Chevy.

The EWS relies on access to a domestic water supply. That input water is combined with a saturated salt solution stored in the vehicle and DC power provided from the battery of the vehicle in order to continuously generate a catholyte ('B' water) and anolyte ('A' water) solution. The 'B' water is stored in the 125 gallon HydraCradle Tank and the residual 'A' water is discharged to a proper disposal system in accordance with EPA regulations.

Table 5. Contents for P/N 000-079-008 (see Figure 67)

Item	Part No.	Description	Qty
1	000-163-095	Shelf Kit EWS (see Figure 68)	1
2	000-163-614	Assembly, Garden Reel, 2nd Reel Option - Live (see Figure 69)	1
3	000-068-161	Hose 3/8 I.D. Garden X 120 ft	1
4	000-079-015	Kit EWS Basic	1
5	000-078-091	Kit ZR-EWS Hardware (see Table 6)	1

Table 6. Contents from Kit P/N 000-078-091

Part No.	Description	Qty
000-015-024	Bracket Shelf Mount	2
000-018-001	Breaker 100 Amp	1
000-033-020	Clamp Size 16 Hose *	2
000-037-010	Lug Copper Cable Ring Term 3/8	2
000-052-009	Fitting Bulkhead Vent *	1
000-052-012	Insert 1210 GFBN *	1
000-052-348	Elbow 3/4 NPT X 1 Hose GFBN	1
000-057-055	Gasket - Garden Hose *	2
000-060-009	Grommet 1/2 I.D. w/ 3/32 Groove	1
000-063-051	Cable Power EWS	1
000-068-296	Hose 5/8 I.D. X 14 Lg *	1
000-094-015	Nut 3/8 16 Two Way Lock Nut	4
000-143-198	Screw 3/8 X 4 S/S HHCS	4
000-174-005	Washer 3/8" Flat	8
600-011-003	Tie Down Cleat Washer Fabricated	4

* See Figure 70

The Water Softener Assembly consists of the 32K Softener Tank, Frame and Brine Tank (see Figure 65).

NOTICE

After installation, remember to seal all holes in the van floor with clear silicon sealant.

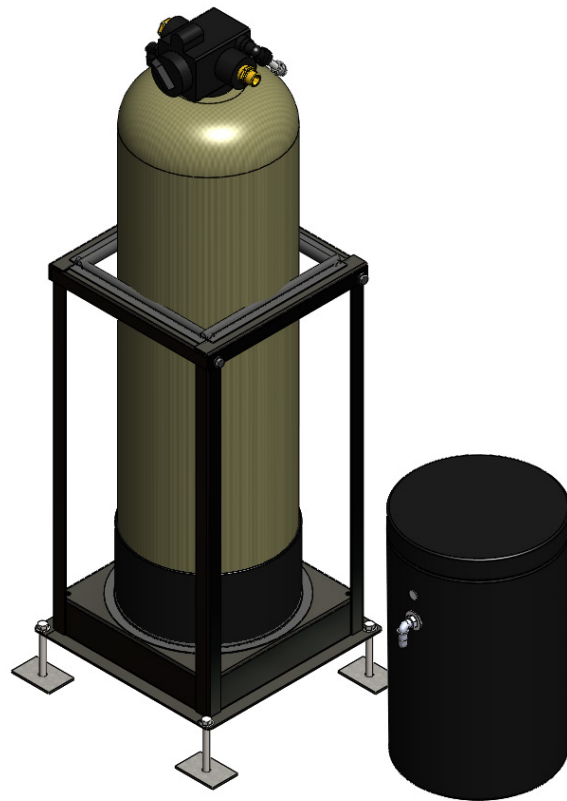
⚠ WARNING

When installing, operating, and maintaining this equipment, keep safety considerations foremost. Use proper tools, protective clothing, and eye protection when working on or installing the equipment.

Follow the instructions in this document and take any additional safety measures appropriate. Be extremely careful in the presence of hazardous substances. The personnel responsible for installation, operation, and maintenance of this equipment must be fully familiar with the contents of this document.

Any servicing of this equipment must be done with the unit fully powered off and disconnected from the power source and all pressure bled from the liquid lines.

Failure to follow these instructions may result in personal injury.



**Figure 65. Fully Assembled Water Softener, Frame and Brine Tank
P/N 000-163-615**

⚠ WARNING

- NO SMOKING ALLOWED WHEN INSTALLING OR OPERATING THIS EQUIPMENT!
- Only a certified technician should install and service the EWS system.
- Modifying the EWS system in any way may cause bodily injury and will void the warranty.
- Do not allow children to operate the EWS system.
- Replace components only with those specified by the manufacturer.
- When installing the system, ensure that power is appropriately connected to the vehicle ignition. The EWS system must never be operated unless the vehicle engine is running.
- Use caution when handling, servicing or operating the Equipment.
- Replace damaged cables immediately.

Failure to follow any of these warnings may result in personal injury.

EWS Pre-Installation Procedures

1. For best performance, use a high amp output alternator.* One may need to be installed.

NOTICE

- * This is not a HydraMaster-stocked part; request this from your distributor if you want this option.
2. Remove the locking screw from the EWS Electrical Box (see Figure 66).



Figure 66. Remove Locking Screw

NOTICE

See Table 5 for item part numbers.

The Water Softener Assembly (P/N 000-163-615) does not come standard with P/N 000-079-008.

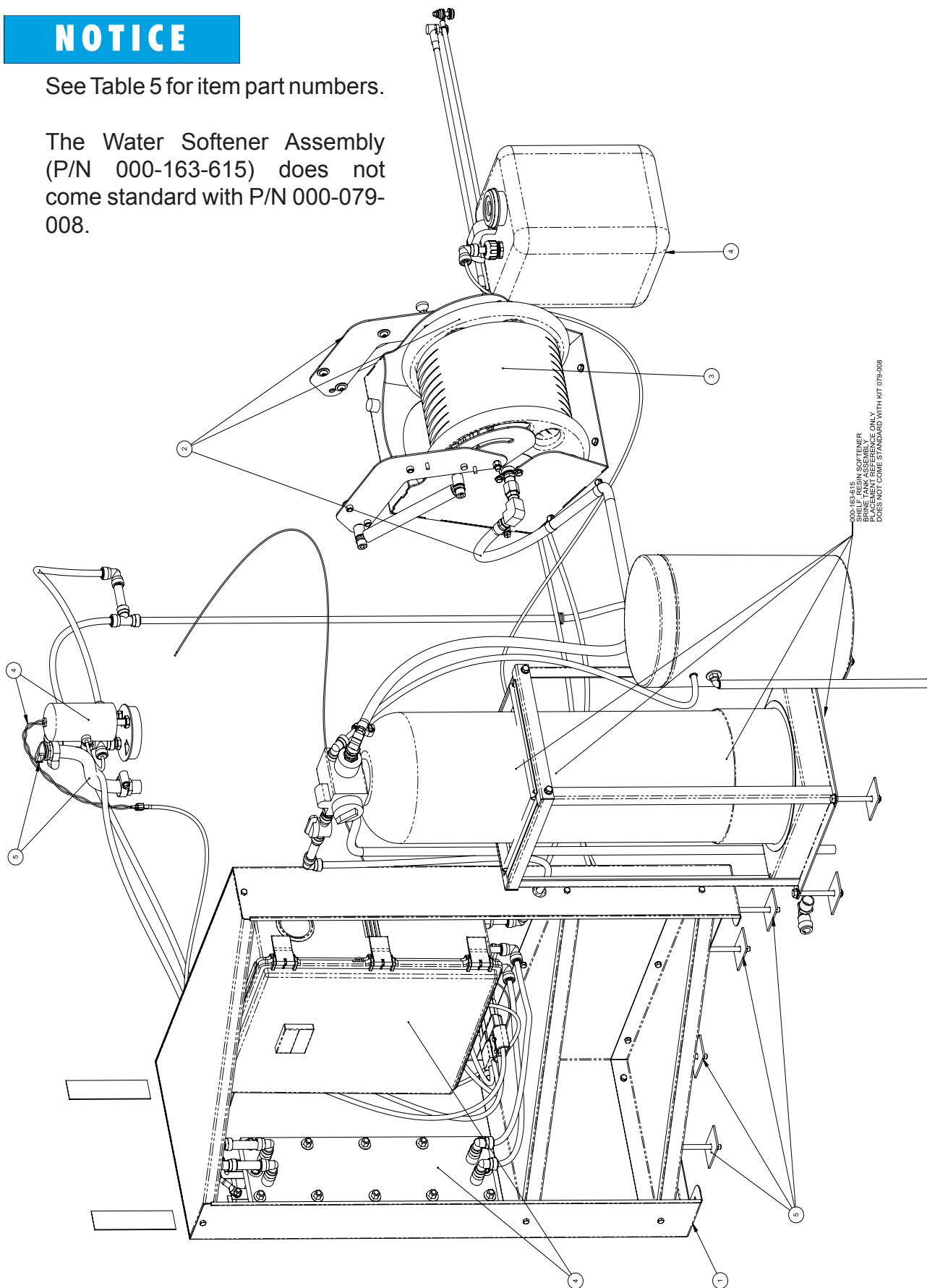


Figure 67. P/N 000-079-008 Configuration

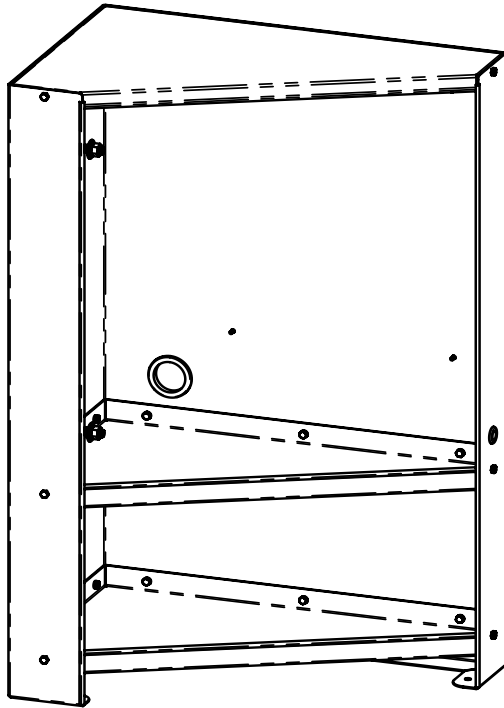


Figure 68. EWS Shelf Kit,
P/N 000-163-095

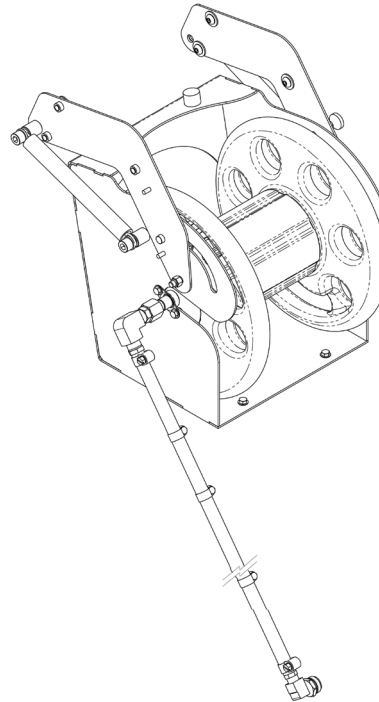


Figure 69. Garden Reel, 2nd
Reel Option - Live, P/N 000-163-
614

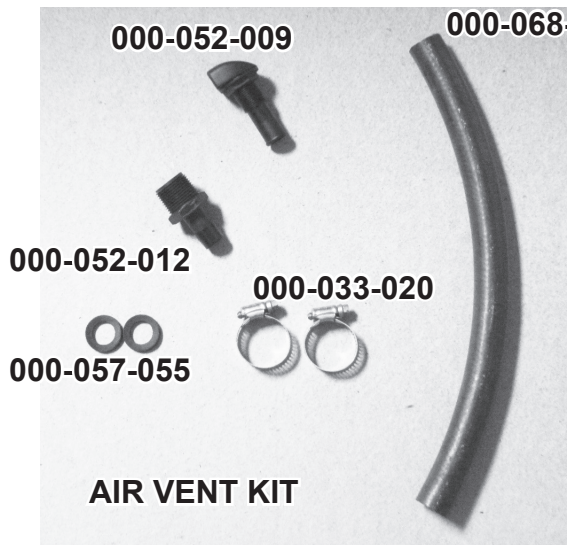


Figure 70. EWS Air Vent Kit

⚠ WARNING

The Air Vent Kit, shown in , MUST be installed as part of the EWS configuration (see page 61). Failure to install this venting kit as directed can result in personal injury or death.

NOTICE

Throughout this EWS installation procedure, refer to Table 7 to measure and cut the hose (shown in Figure 71 and Figure 72) to recommended hose lengths. Please note that the lengths are recommended; your configuration may require slightly different lengths. Always measure twice and cut once.

Table 7. EWS Tube Locations and Recommended Lengths
(see Figure 71 and Figure 72)

Item	Part Number	From	To	Tube Diameter	Tube Length
1	000-068-956	Water Softener	Electrical Box	½"	48"
2	000-068-957	Electrical Box (Attached at Factory)	Cell (Attached at Factory)	½"	28"
3	000-068-957	Electrical Box (Attached at Factory)	Cell (Attached at Factory)	½"	28"
4	000-068-958	Cell ('B' Water)	Safety Shutoff Cover	½"	60"
5	000-068-956	Cell ('A' Water)	Drain Tee	½"	48"
6	000-068-956	Safety Shutoff Cover	Drain Tee	½"	48"
7	000-068-956	Drain Tee	Drain Elbow	½"	48"
8	000-068-959	Drain Elbow	Atmosphere	½"	6"
9	000-068-960	Tee	Tee	½"	2"
10	000-068-961	Salt Feeder	Electrical Box	¼"	336"

NOTICE

Please note that the lengths are recommended; your configuration may require slightly different lengths. Always measure twice and cut once.

NOTICE

See page 103 for Water Softener Regeneration instructions; see page 107 for a list of EWS part numbers; see page 112 for the Maintenance Chart.

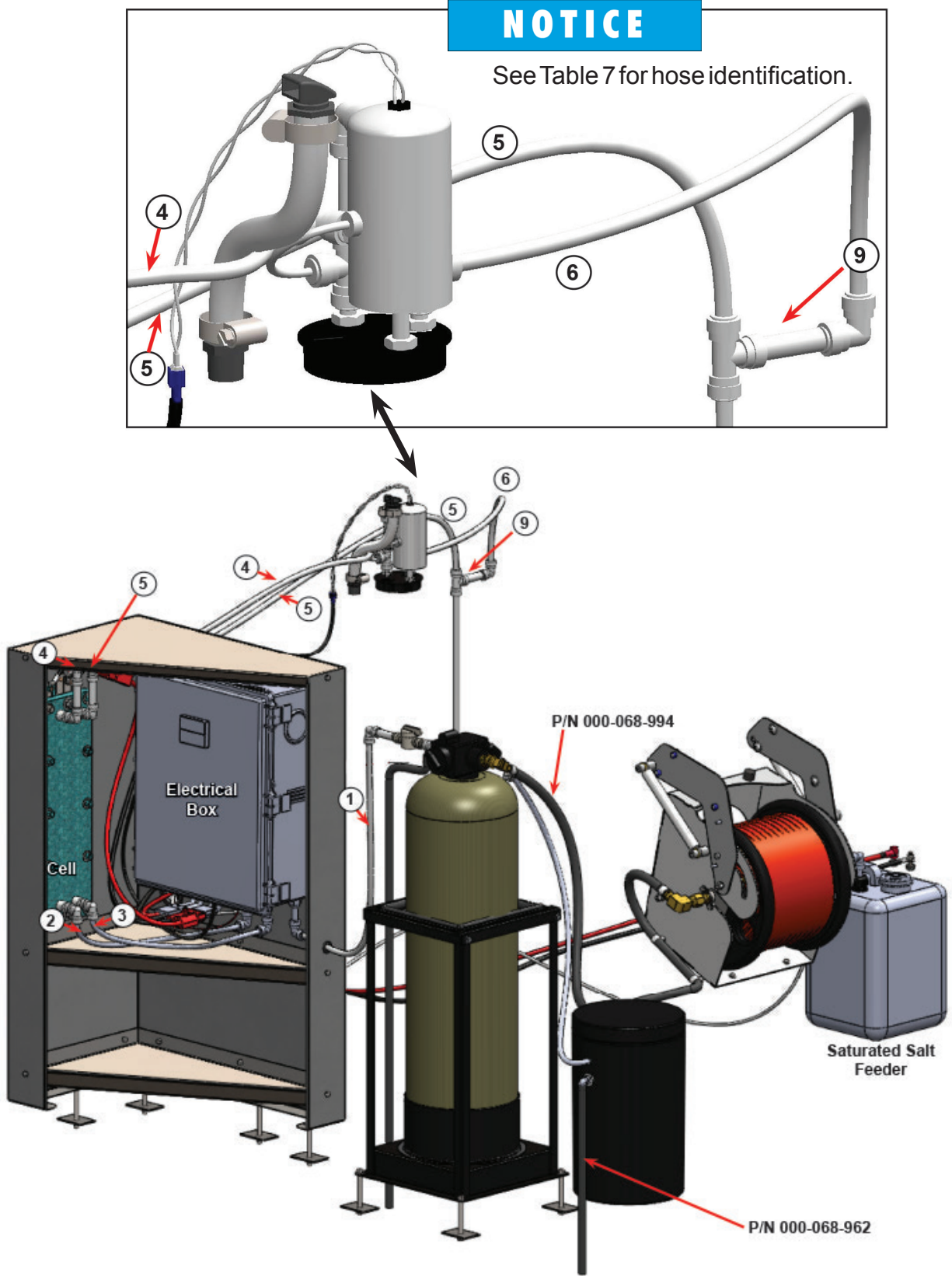


Figure 71. EWS Hose Location and Routing - View 1 of 2 (Some Components Removed from Illustration to Show Hose Routings)

NOTICE

See Table 7 for hose identification.

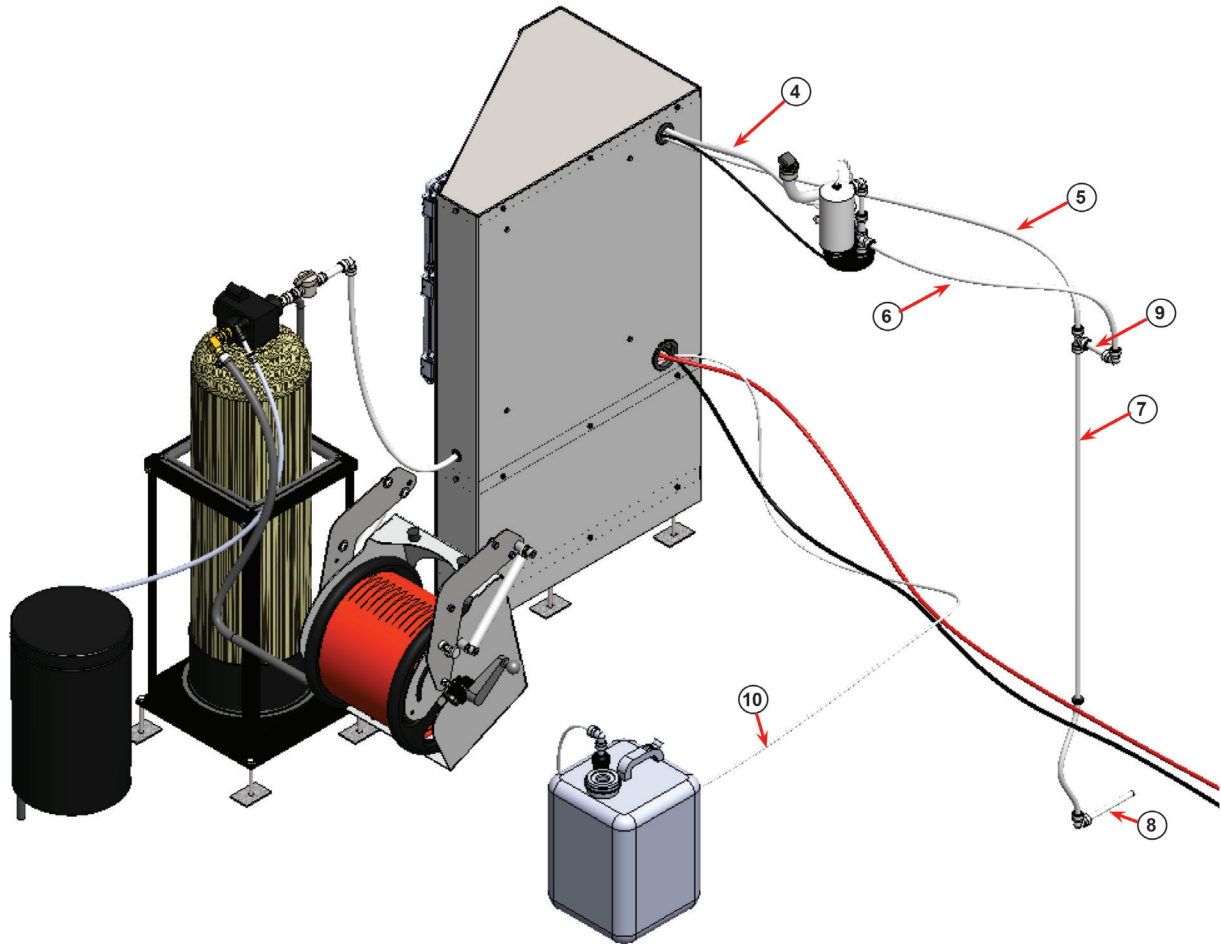


Figure 72. EWS Hose Location and Routing - View 2 of 2 (Some Components Removed from Illustration to Show Hose Routings)

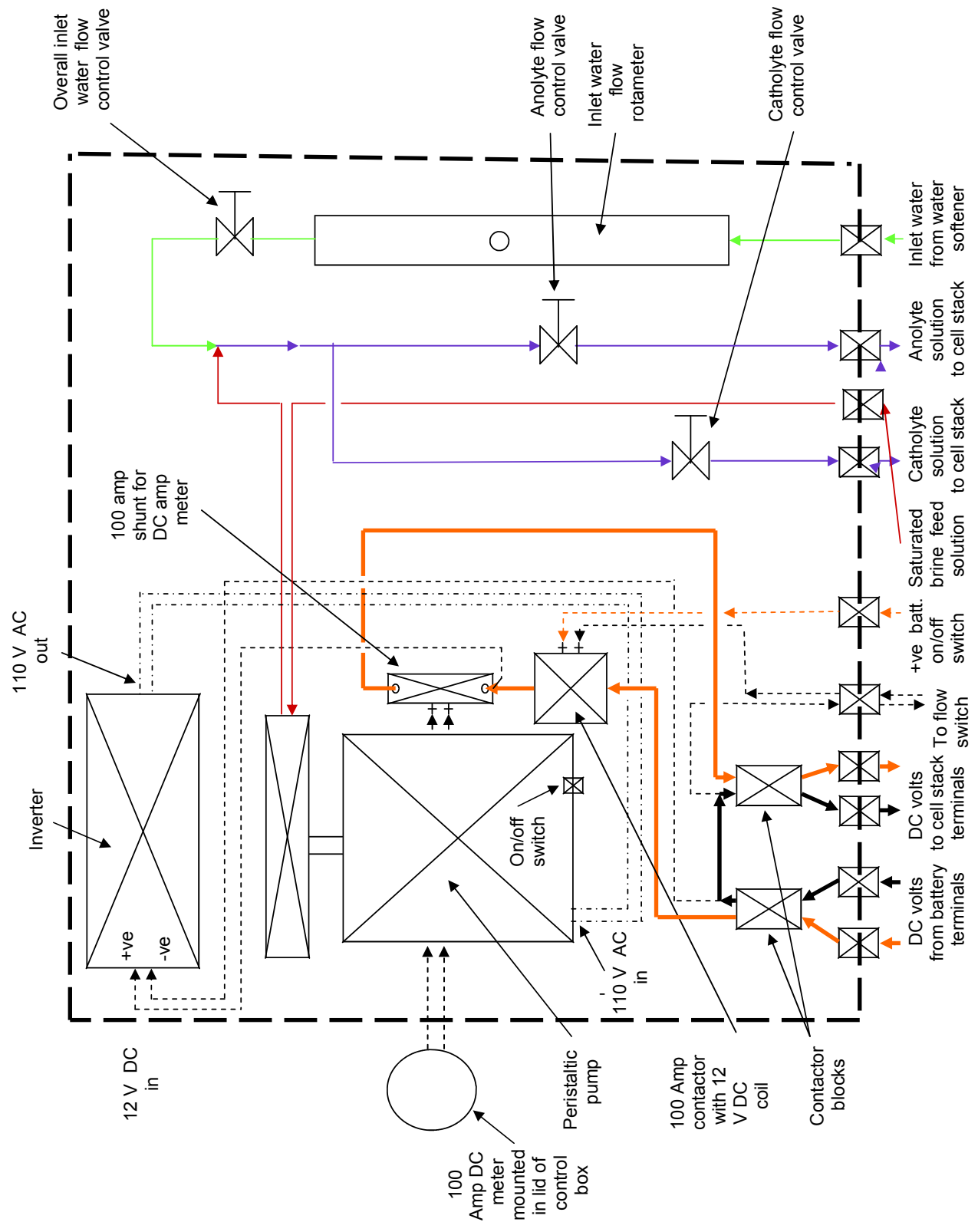


Figure 73. Combined Diagram of EWS DC Power and Liquid Flow

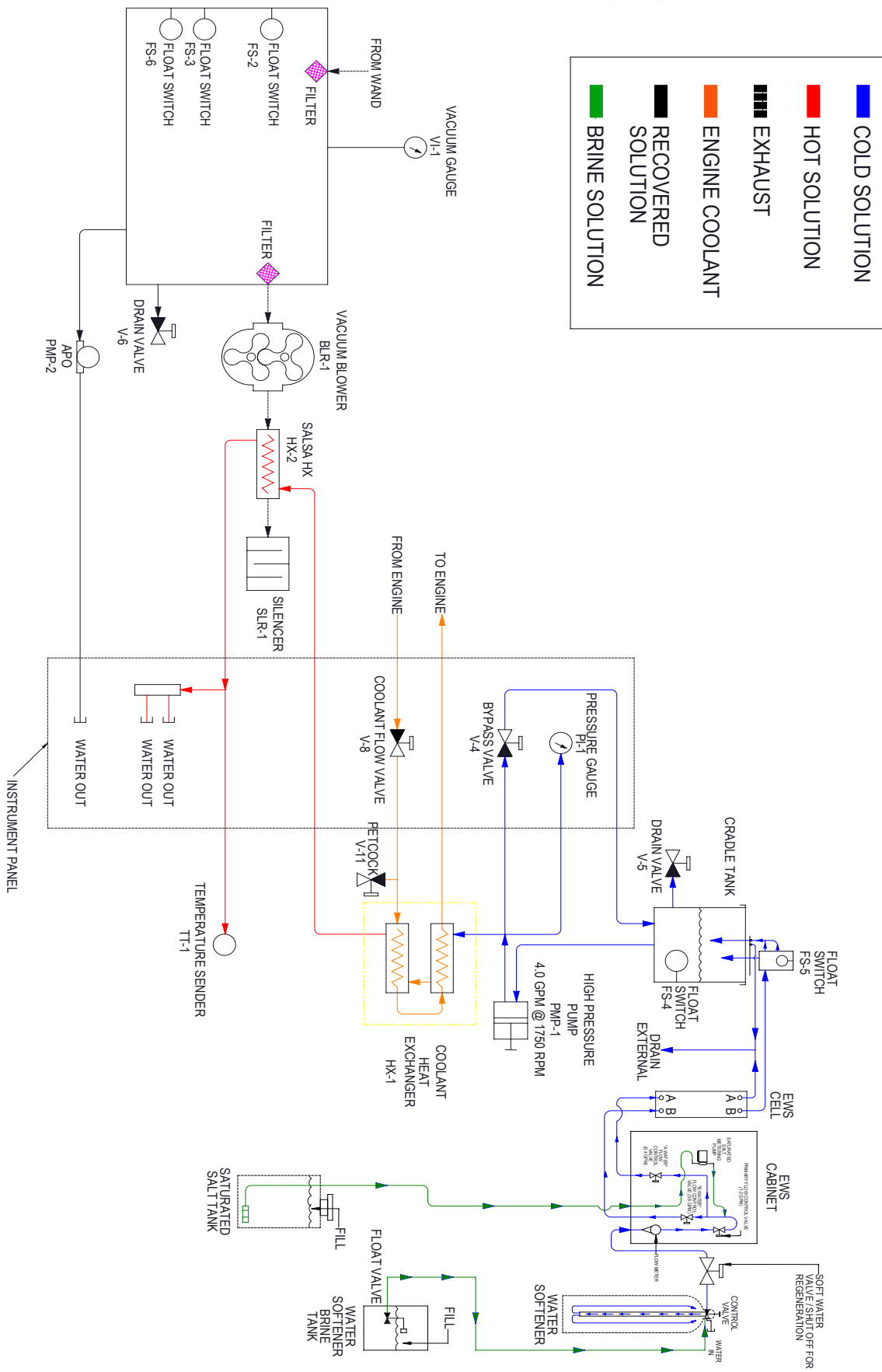


Figure 74. EWS Liquid and Exhaust Flow Diagram

Installing EWS Air Vent

1. Remove the insert on the HydraCradle Tank as shown in Figure 75.

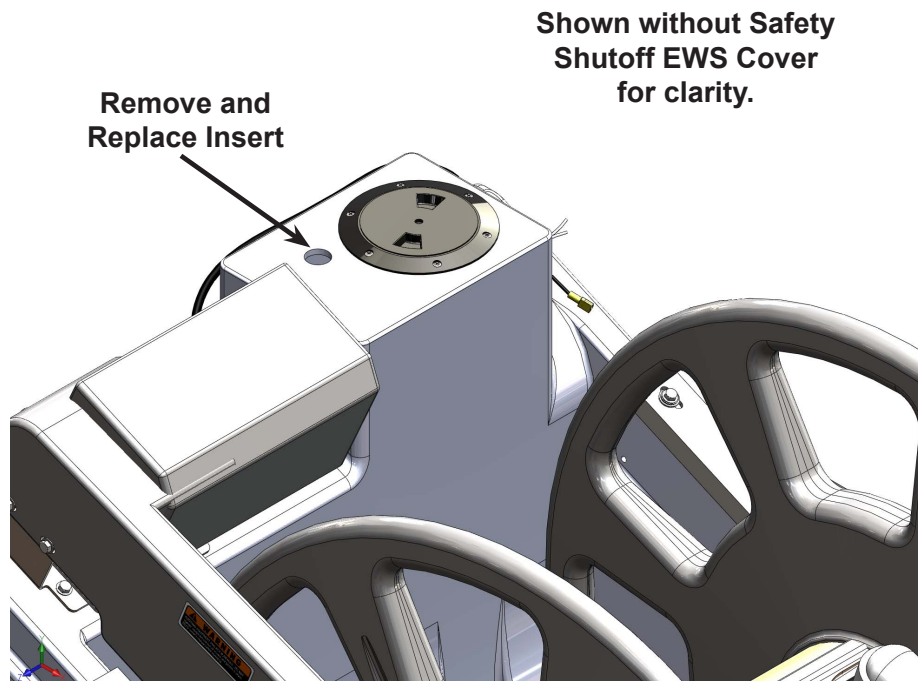


Figure 75. Remove and Discard Original Insert

2. Find the new insert (P/N 000-052-012), provided in the kit. Wrap the new insert threads with Teflon plumbing tape.
3. Place the new insert in the HydraCradle Tank as shown in Figure 75.
4. Drill a $\frac{3}{4}$ " hole on the roof of the van at the approximate location as shown in Figure 76.



Figure 76. Drill $\frac{3}{4}$ " Hole into Roof of Van

5. Unfasten the large plastic nut from the Filter Vent, remove and retain (see Figure 77).

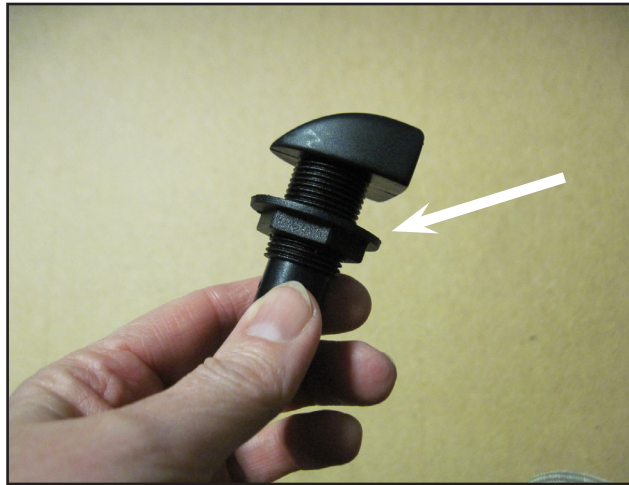


Figure 77. Remove Plastic Nut from Filter Vent

6. Insert the Filter Vent (P/N 000-052-009) from the top of the van into the drilled hole, and position the outlet towards the back of the van (see Figure 78).

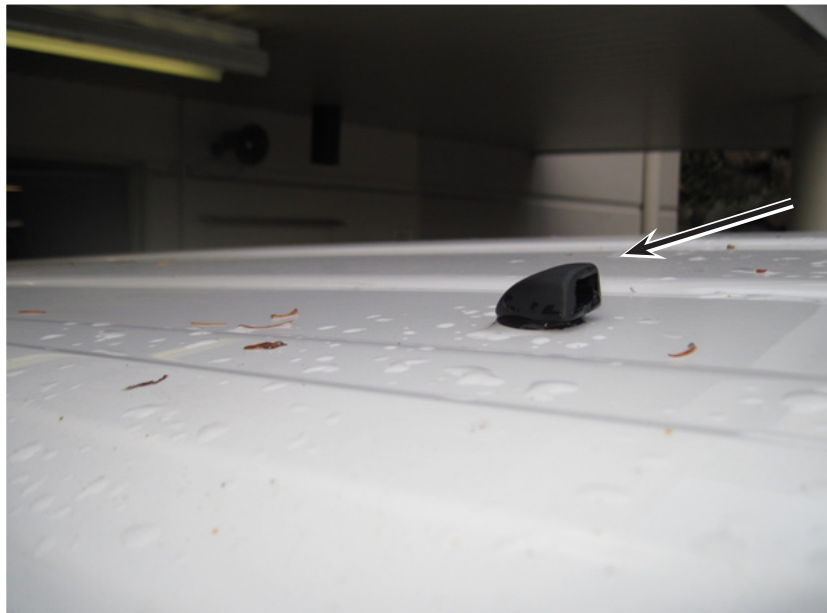


Figure 78. Insert Filter Vent from Top of Van

⚠ WARNING

The Air Vent Kit **MUST** be installed as part of the EWS configuration. Failure to install this venting kit as directed can result in personal injury or death.

7. Attach the Filter Vent assembly as shown in Figure 79.

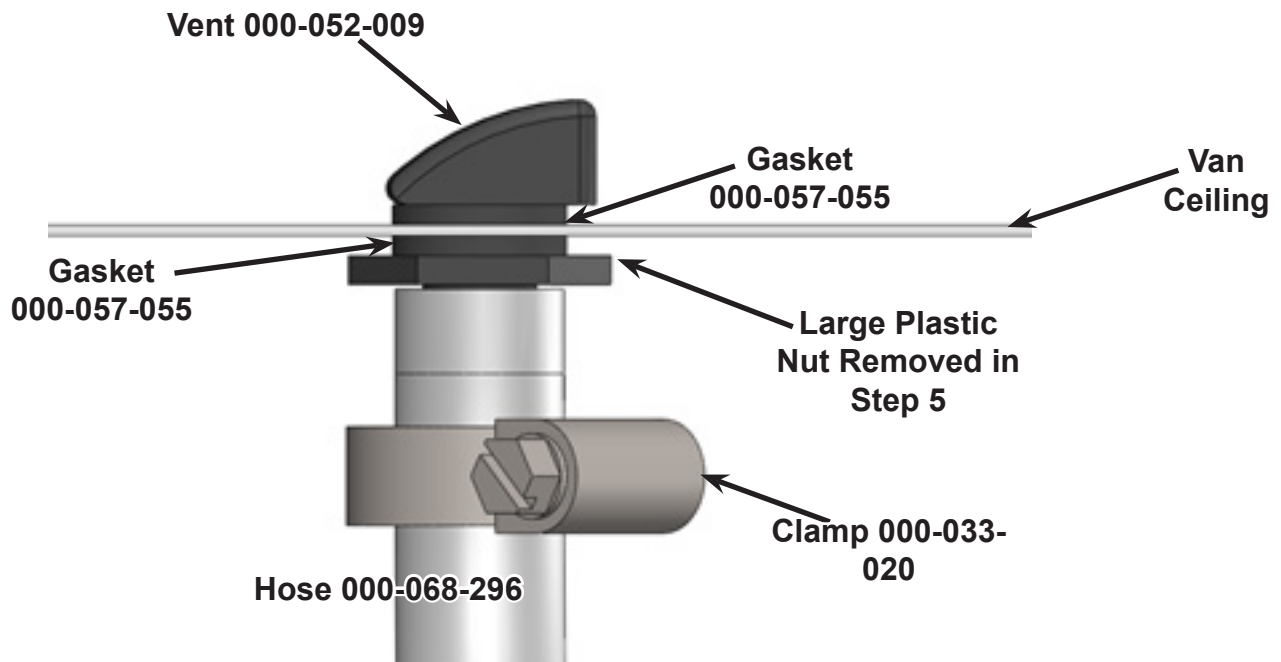


Figure 79. Side View of Filter Vent Assembly

8. Attach the provided hose and clamps as shown in Figure 76.
9. Make sure there are no kinks in the hose.

Continue on to the next section.

Installing EWS Safety Shutoff Cover and Tubes

1. Replace the HydraCradle Tank lid with the Safety Shutoff EWS Cover and bulkhead which is included in the kit's contents (see Figure 80).

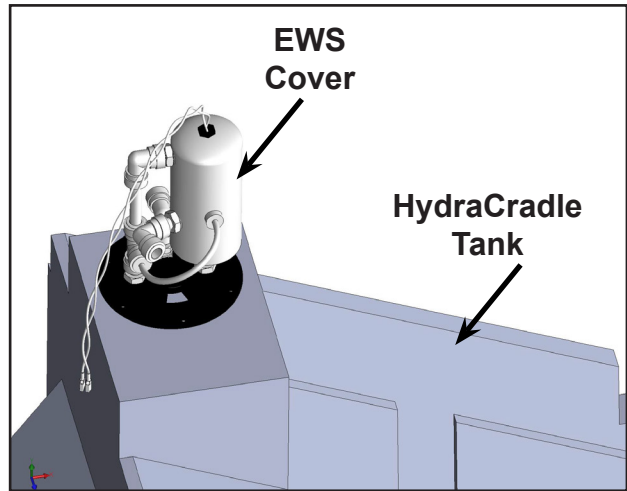
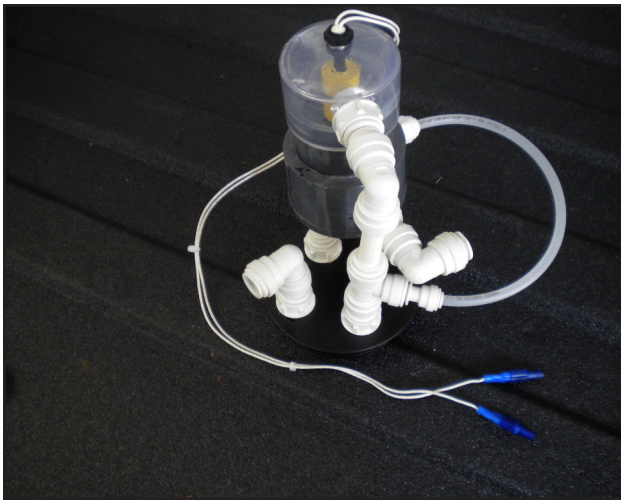


Figure 80. Replace HydraCradle Tank Lid with Safety Shutoff EWS Cover

2. Route 'A' Tube from the rear of the EWS Shelf to behind the HydraCradle (see Figure 81).
3. Route 'B' Tube from the rear of the EWS Shelf to the EWS Cover and connect to the elbow on the EWS Cover as shown in Figure 81.

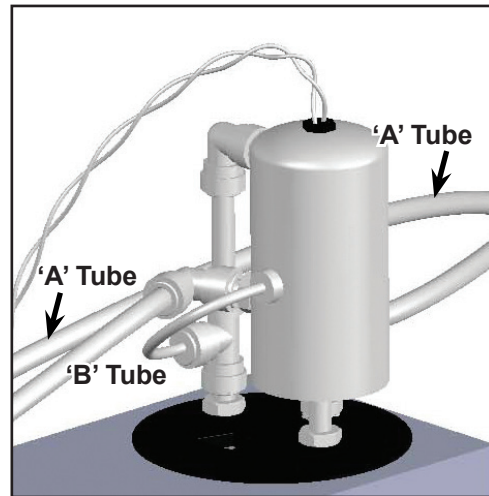
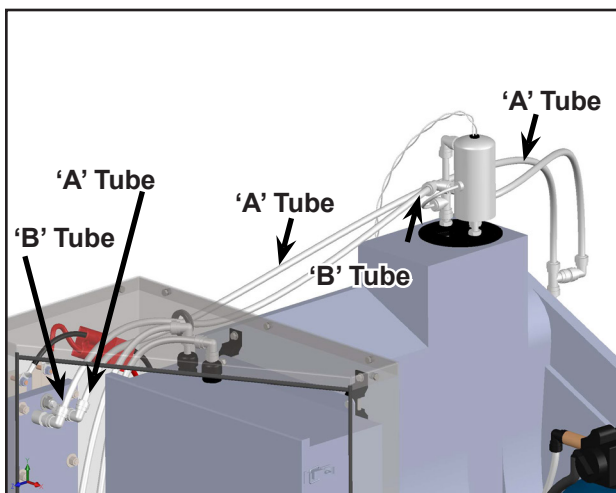


Figure 81. Attach 'B' Tube to Cover

4. Drill a 7/8" diameter hole in the van floor to the side of the HydraCradle Tank, near the driver's seat.

NOTICE

Refer to Table 7 for recommended tubing lengths for the next step.

5. Measure and cut additional pieces of tubes shown in Figure 82 (also see Table 7). These tubes are for overflow drainage.
6. Attach the combined drain tee and drain elbow to the tubes as shown in Figure 82.
7. Route Tube 8 toward the van floor (see step 4, page 64).
8. Attach the grommet and insert the tube through the van floor (see Figure 82).

NOTICE

Remember to seal the holes in the van floor with silicon sealant.

9. Under the van, attach an elbow and an insert to the end of Tube 8 and then attach Tube 9 perpendicularly as shown in Figure 82.

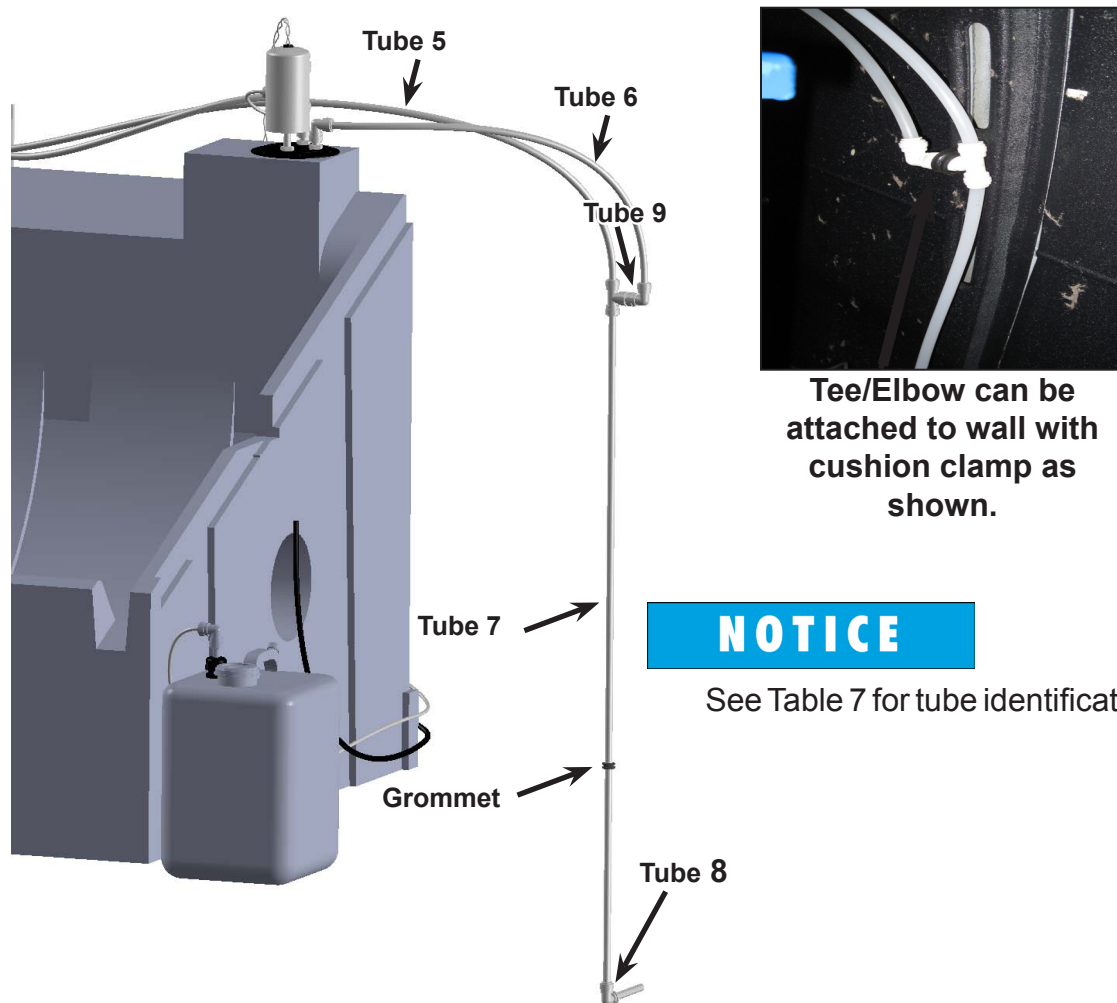
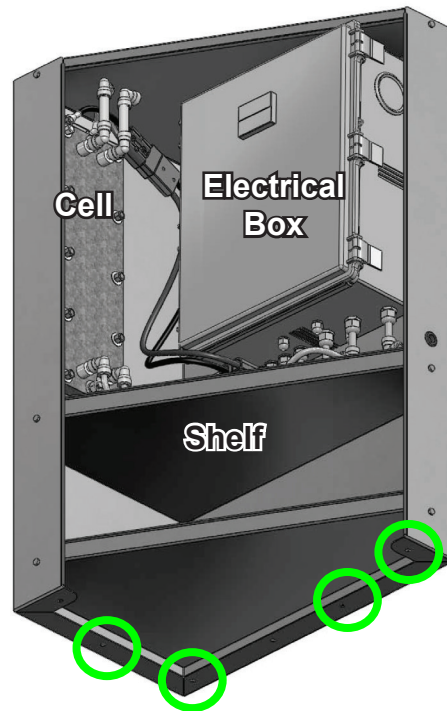


Figure 82. Attach Drainage Tube to Tee/Elbows

Installing EWS Shelf with Electrical Box and Cell

1. Locate and dry fit the assembled EWS Shelf with Electrical Box and Cell next to the driver's side wall and to the side of the HydraCradle Tank (see Figure 83).



Mark 4 Hole Locations on Van Floor

Figure 83. Locate and Dry Fit EWS Shelf

NOTICE

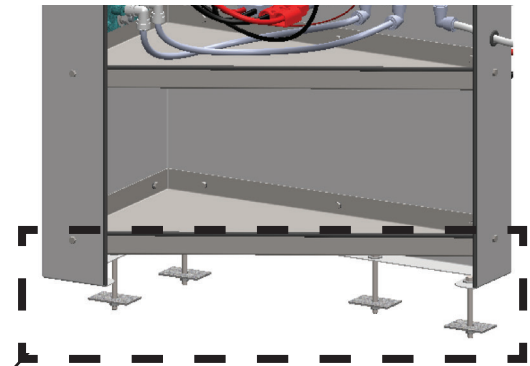
Prior to installing any assembly or drilling any holes, dry fit the unit to ensure a proper fit.

2. With the white chalk, mark the 4 hole locations on the van's floor (see Figure 83). This is where you will drill bolt holes, explained in step 5.
3. Be sure to check underneath the van for bolt clearance.
4. Remove and retain the fastening hardware from the bottom tray of the EWS Shelf (see Figure 83 and Figure 84) and then remove the tray. The tray will be re-installed in step 7.

CAUTION

Many vehicles have critical components mounted directly below the floor that can easily be damaged. Before drilling holes in the floor of the vehicle inspect the underside of the vehicle for critical components. Failure to do so may result in damage to the vehicle.

5. Drill the four 3/8" diameter holes through the van floor.
6. Bolt the EWS Shelf to the van floor with the provided hardware (see Figure 83 and Figure 84).



EWS Shelf Hardware Stackup

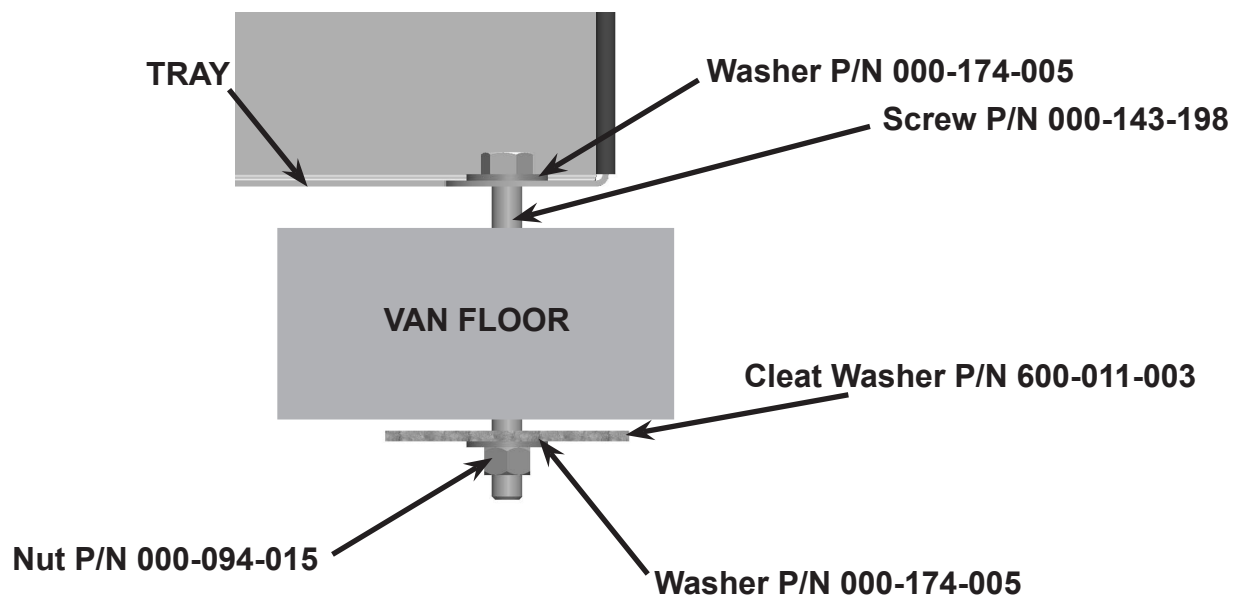


Figure 84. Bolt EWS Shelf to Floor with Hardware

7. Re-attach the bottom tray to the EWS Shelf (see Figure 83 and Figure 84) with the fastening hardware which was removed in step 4.
8. Optional: Drill the appropriate number of holes through the provided brackets (P/N 000-015-024) to attach the EWS Shelf to the side wall of the van.

NOTICE

Regular faucet water is input into the EWS Water Softener Assembly where it is conditioned. It then flows to the EWS Electrical Box/Cell Assembly where the conditioned water becomes empowered water. The empowered water ('B' water in 'B' hose) then flows from the Cell to the 125 gallon HydraCradle for storage and later usage.

NOTICE

Refer to Table 7 on page 56 for recommended hose lengths for the next steps.

9. Connect one ½" diameter tube from the Water Softener to the bottom of the EWS Electrical Box (Figure 85).

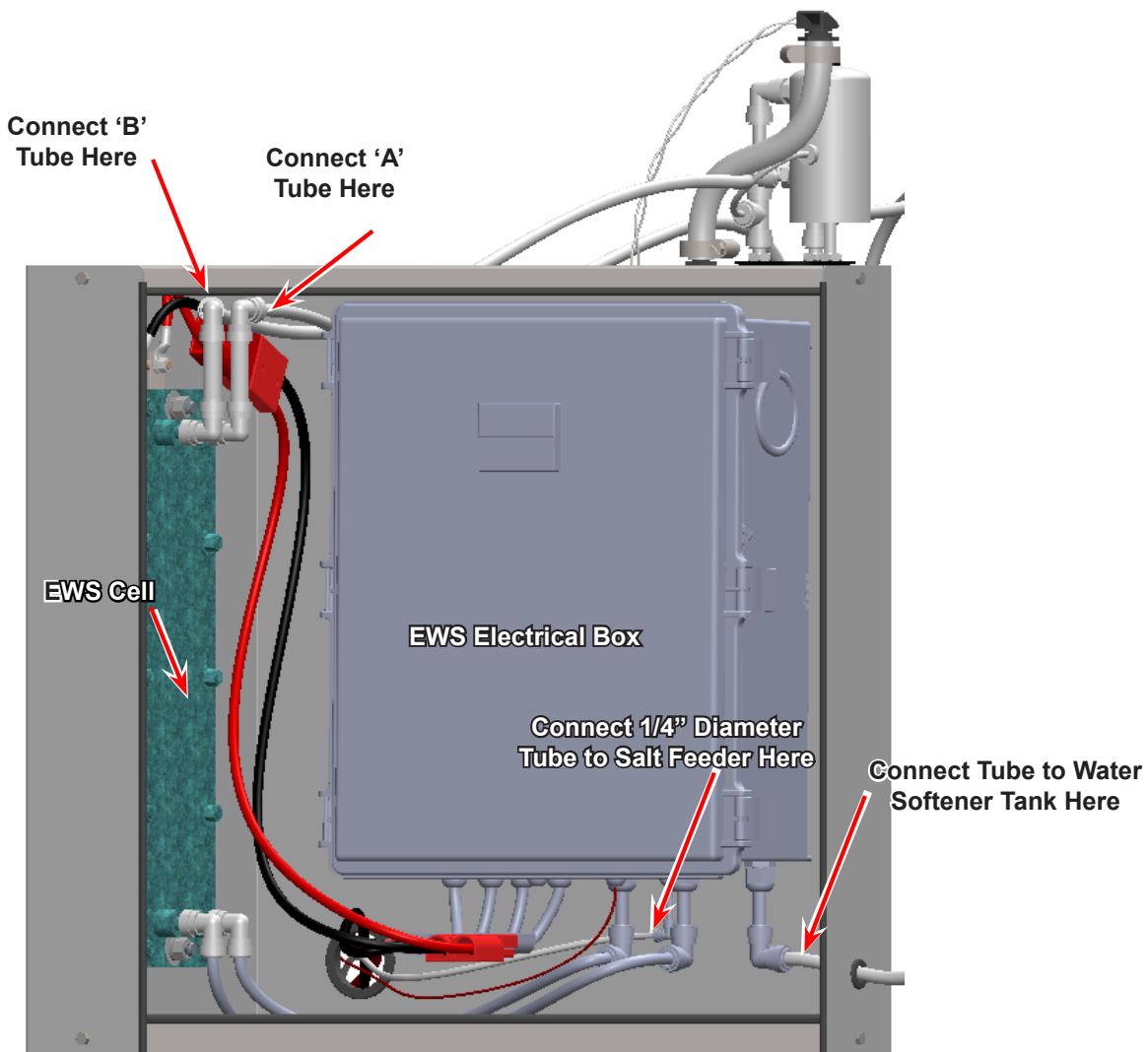


Figure 85. Connect 2 Tubes from Electrical Box and 2 Tubes from Cell

10. Connect a second $\frac{1}{2}$ " diameter tube to the Cell as shown in Figure 85. This tube, for the 'B' water, will be routed to the Safety Shutoff EWS Cover located on top of the HydraCradle (see page 64).
11. Connect a third $\frac{1}{2}$ " diameter tube to the Cell for the 'A' water as shown in Figure 85. This tube will be routed to the drain receptacle (see page 64).
12. Using the $\frac{1}{4}$ " diameter tube, plumb the salt line from the saturated salt feeder into the bottom of the EWS Electrical Box (see Figure 85).

CAUTION

Make sure 'A' and 'B' tubes are correctly oriented and attached to the Cell as shown in Figure 85. If the tubes from the Cell are cross connected, the EWS will not function correctly

13. Make sure all the tubes and hoses are securely connected.

NOTICE

Remember to seal all holes in the van floor with silicon sealant.

Installing Water Softener Assembly

1. To install the Water Softener Assembly, dry fit the frame in the vehicle where it will be accessible (see Figure 86).

NOTICE

The Brine Tank can be located outside the van during cleaning.

2. Using the chalk, mark the locations on the van floor where you will drill the 4 holes (see Figure 86).

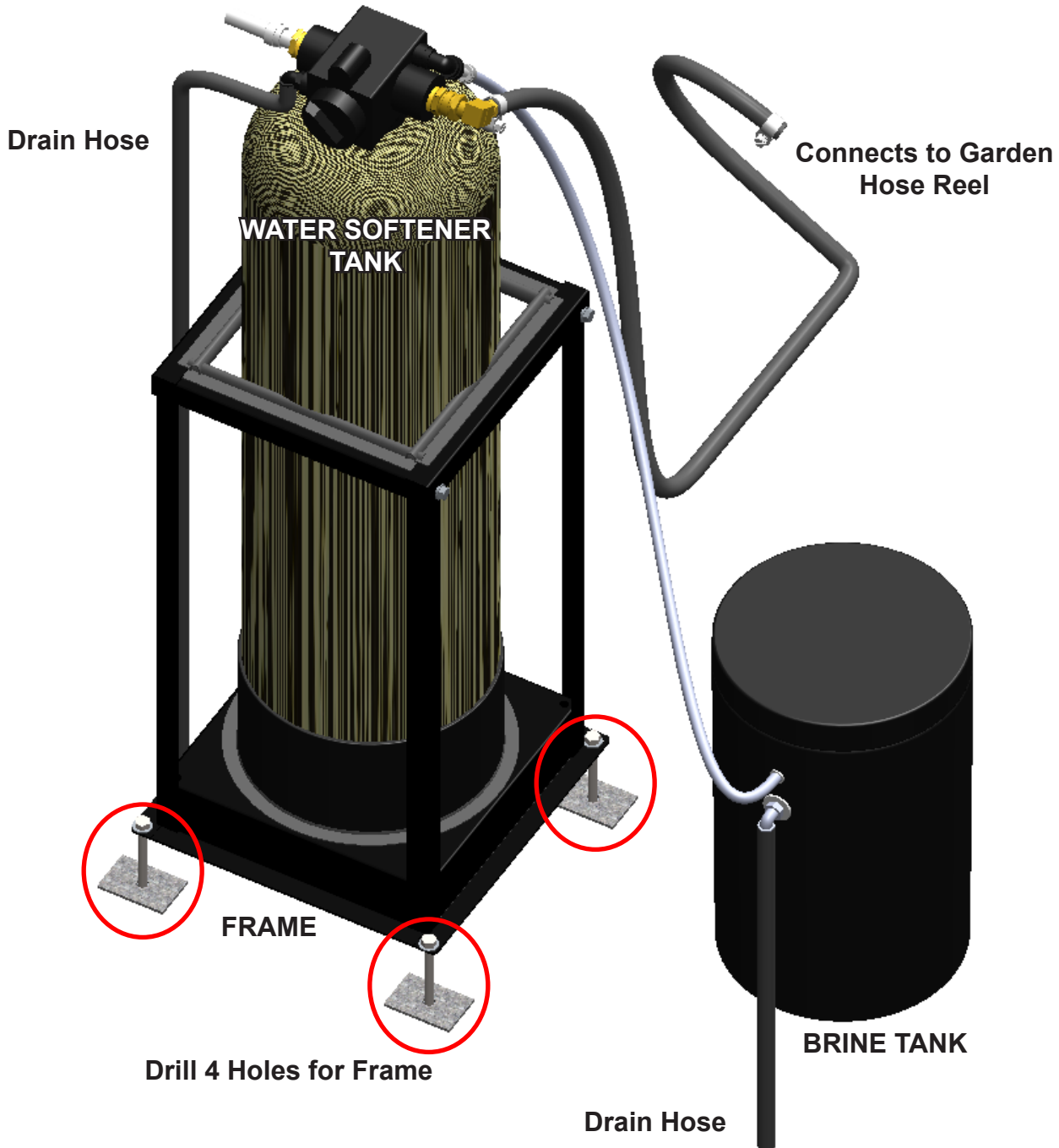


Figure 86. Install Water Softener Assembly

3. Remove the entire frame from the van.
4. Drill a hole through the floor for each corner of the frame.

CAUTION

Many vehicles have critical components mounted directly below the floor that can easily be damaged. Before drilling holes in the floor of the vehicle inspect the underside of the vehicle for critical components. Failure to do so may result in damage to the vehicle.

5. Secure the frame to the van floor with 4 supplied bolts, tie down cleats, flat washers, lock washers and nuts, as show Figure 86 and in Figure 87.

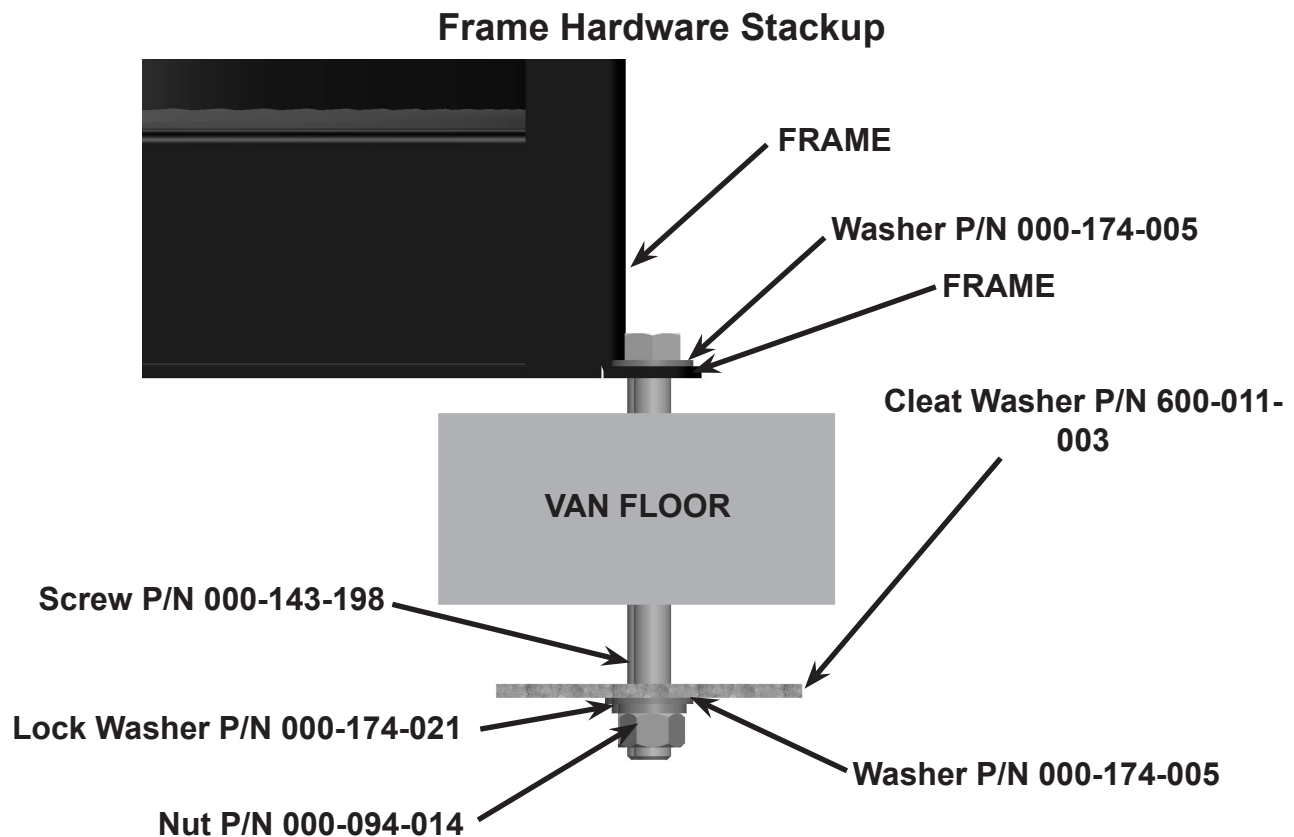


Figure 87. Secure Frame to Floor with Supplied Hardware

6. Drill two 7/8" drain holes through the van floor. Before drilling holes in the floor of the vehicle, inspect the underside of the vehicle for critical components.
7. Place a 1/2" I.D. tube on the barb fitting which is located on the side of the Brine tank. Route it through one of the drain holes to the outside (see Figure 86).
8. Connect the other 1/2" I.D. tube to the barb fitting on the Water Softener head. Route it through the other drain hole to the outside of the van to drain (from step 6 - see Figure 86).
9. Measure and cut the tubing which will run from the Water Softener to the appropriate connector on the bottom of the EWS Electrical Box (see Table 7).
10. Connect one end of the tube to an elbow, insert and adapter to the outlet port of the Water Softener (see Figure 88).
11. Route the other end of the hose through the EWS Shelf to the appropriate connector on the bottom of the EWS Electrical Box (see Figure 88).

NOTICE

Seal the holes in the van floor with silicon sealant.



Figure 88. Route Tube through EWS Shelf to Connector on Electrical Box

12. Place the Saturated Salt Feeder in the CDS storage area (see Figure 89). Verify that the air vent exists; if not, drill a 1/4" hole as shown in Figure 90).
13. Refer to Figure 89 - Figure 91 and measure and cut a piece of clear 1/4" tubing which will connect the Salt Feeder to the EWS Electrical Box (Hose 10 on Figure 71).
14. Attach one end of the tube to the Salt Feeder's connector.

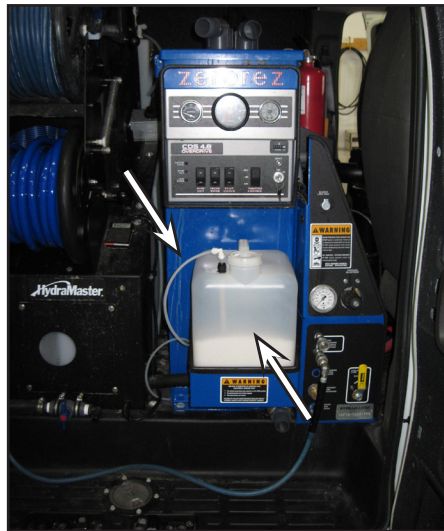


Figure 89. Place Saturated Salt Feeder into CDS Storage Area



Figure 90. Verify that Air Vent Exists

15. Route the other end of the tube behind the HydraCradle Tank through the rear of the EWS Shelf and to the appropriate connector on the bottom of the EWS Electrical Box (see Figure 91).

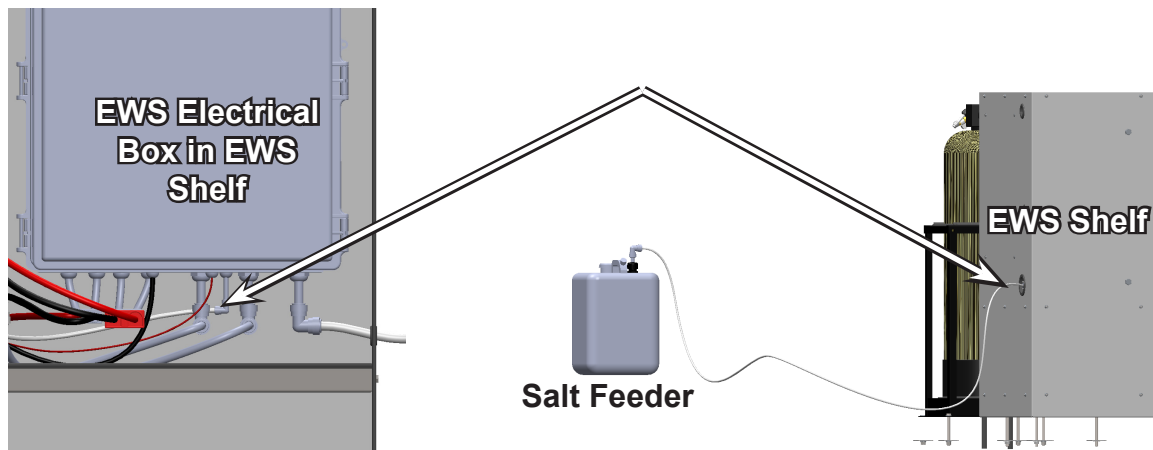


Figure 91. Route Tube from Salt Feeder to Connector on Bottom of EWS Electrical Box

INSTALLING THE 3 TIER STAINLESS STEEL SHELF

Prior to loading the stainless steel shelf into the van, assemble it as indicated in Figure 92 and Figure 93 using the fastening hardware included in the shipment (see Table 8).

Table 8. Parts List for 3 Tier Stainless Steel Shelf

Item	Part No.	Description	Qty
1	000-015-024	Bracket, Shelf Mounting	2
2	000-081-173	Label	1
3	000-083-020	Leg, 3 Tier Shelf	2
4	000-094-010	Nut, 1/4"-20UNC Hex	24
5	000-094-015	Nut, 3/8"-16UNC Hex 2-Way Locking	4
6	000-143-333	Screw, 1/4"-20UNC X 0.50" Lg. Hex Head	24
7	000-143-198	Screw, 3/8"-16UNC X 4" Lg. Hex Head - Full Thread	4
8	600-011-003	Tie Down Cleat Washer - Fabricated	4
9	000-166-057	Tray, 3 Tier - 47"	3
10	000-174-019	Washer, 1/4" Lock	24

1. Set aside items 5 and 8.
2. Dry fit the 3 Tier Stainless Steel Shelf in the rear of the van (see Figure 92).
3. Mark where the 4 holes will be drilled into the van floor.

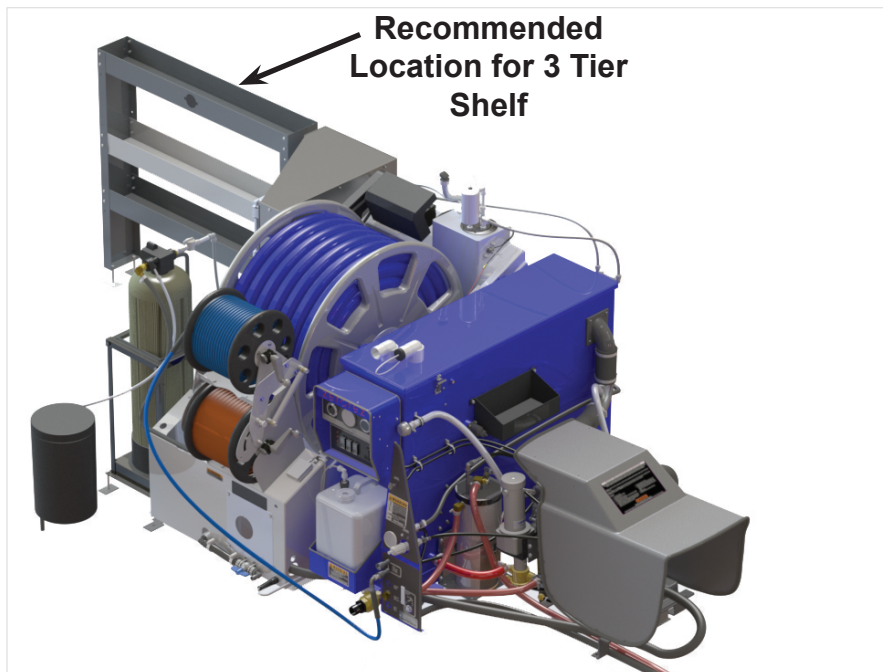


Figure 92. Recommended Location for Shelf

4. Drill the holes.
5. Secure the shelf to the van's wall and floor with the four cleat washers and nuts.

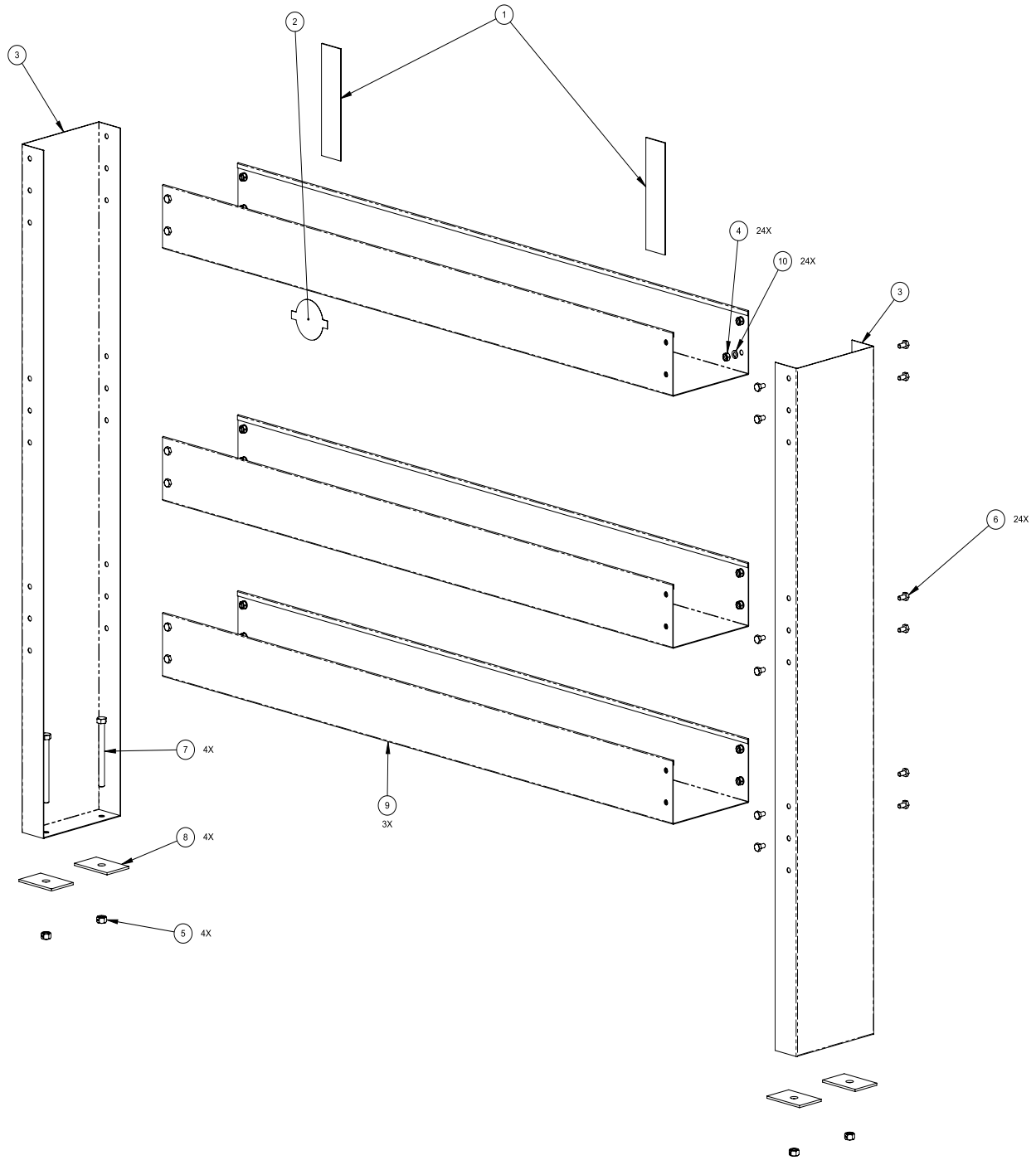


Figure 93. Assemble 3 Tier Stainless Steel

INSTALLING REAR DOOR KITS

NOTICE

This section references three kits which you will need to complete the back door assembly:

Furniture Pad/Snap Block Kit (P/N 000-163-015)

Back Door Shelf Kit (P/N 000-163-050)

Panel Set (P/N 000-100-021)

Table 9. Parts in P/N 000-163-015 Furniture Pad/Snap Block Set Kit

Item	Part No.	Description	Qty
1	000-163-024	Holder, Furniture Pad - Coated	1
2	000-081-173	Label	1
3	000-094-004	Nut, #10-24UNC Hex	8
4	000-143-132	Screw, #10-24UNC X 0.75" Lg. Hex Head	4
5	000-174-001	Washer, #10 Flat	12
6	000-174-014	Washer, #10 Lock	8

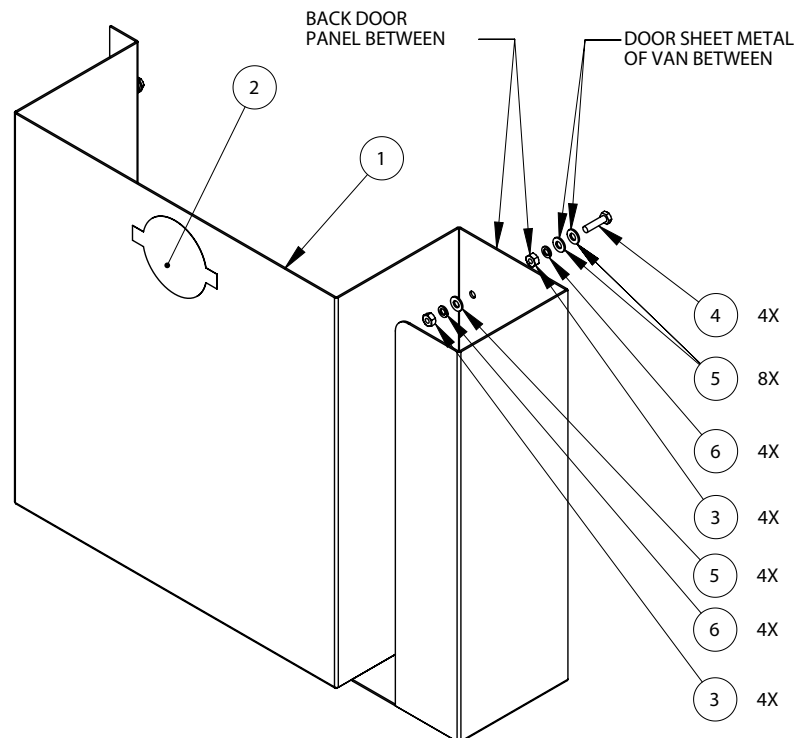


Table 10. Parts in P/N 000-163-050 Back Door Shelf Kit

Item	Part No.	Description	Qty
1	000-081-173	Label	1
2	000-094-004	Nut, #10-24UNC Hex	12
3	000-143-132	Screw, #10-24UNC X 0.75" Lg. Hex Head	6
4	000-163-049	Shelf, Back Door	1
5	000-131-003	Trimlok, 1/8" X 3/4"	2
6	000-174-001	Washer, #10 Flat	18
7	000-174-014	Washer, #10 Lock	12

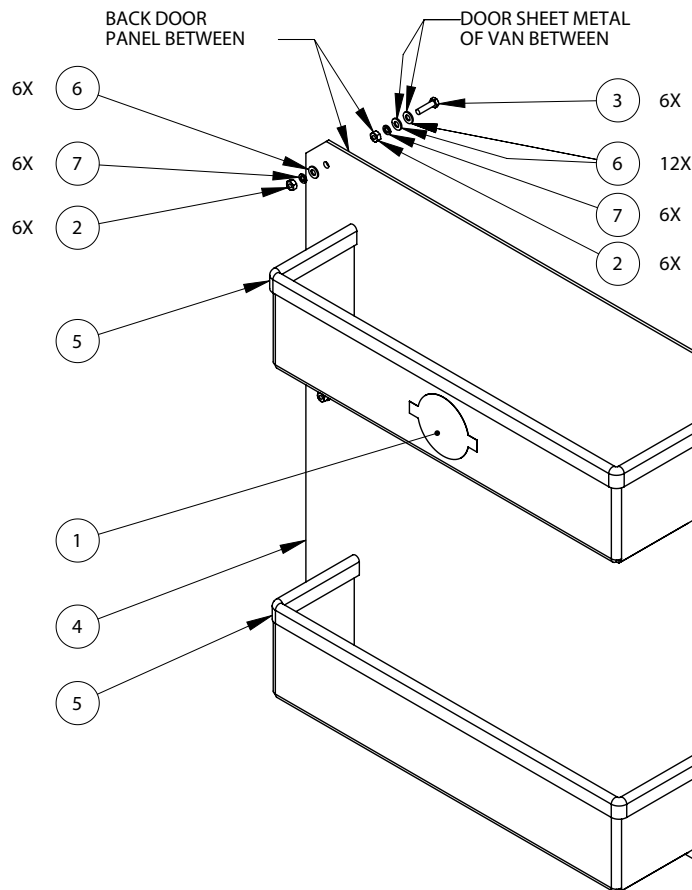
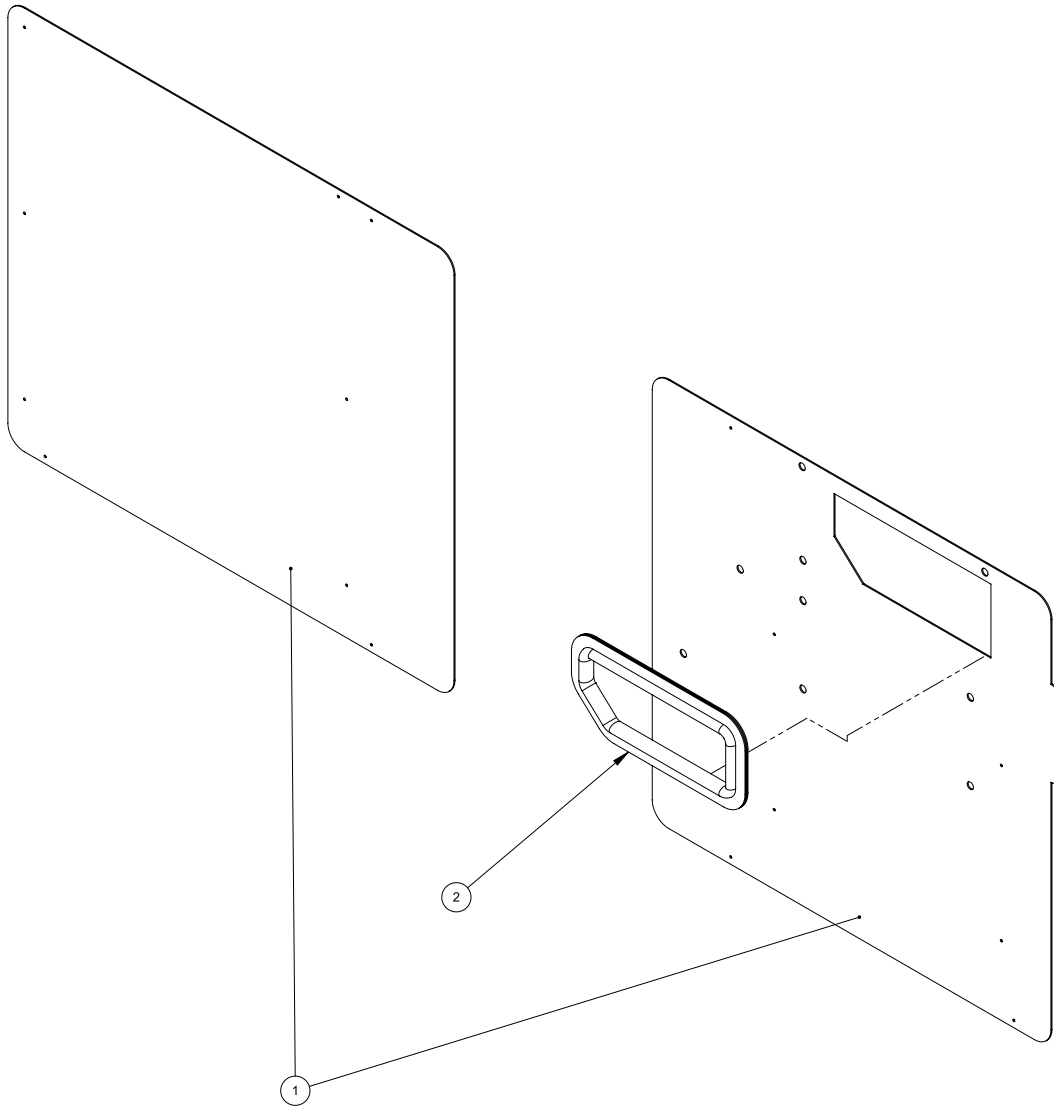


Table 11. Parts in P/N 000-100-021 Panel Set Kit

Item	Part No.	Description	Qty
1	000-100-020	Set, Panel (2 Pieces)	1
2	000-131-060	Trimlok Seal, 3/4"	3 ft



1. Dry fit the Panels, Back Door Shelf and the Furniture Pad/Snap Block onto the van's back doors, and mark where the holes should be drilled (see Figure 94).
2. Using the drill with the 13/64" bit, carefully drill holes into the sheet metal and through the two Panels, if necessary.



**Back Door Shelf Kit
(P/N 000-163-050)**

**Left Hand Door Panel
(P/N 000-100-020)**

Do Not Install Trimlok (P/N 000-131-060 from Panel Set (P/N 000-100-021) until Step 6.

**Right Hand Door Panel
(P/N 000-100-020)**

**Furniture Pad/Snap Block
Kit (P/N 000-163-015)**

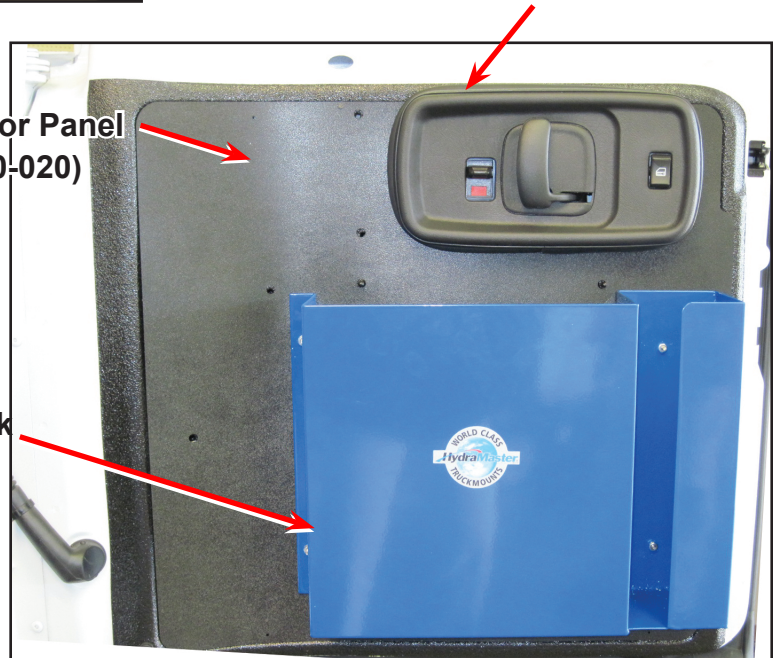


Figure 94. Location of Shelf and Furniture Pad/Snap Block on Back Doors

3. Position the two Panels (P/N 000-100-020) onto the rear doors. Do not install the Trimlok (P/N 000-131-060) on the right hand door until parts from the other two kits have been installed.
4. Install the Left Hand Door Panel and the Back Door Shelf Kit (P/N 000-163-050) onto the left hand door, using the fastening hardware included in the kit (see Figure 95).

NOTICE

Mount the fastening hardware onto the 10-24 X 3/4" screw in the order shown in Figure 95 and install as shown in Figure 94.

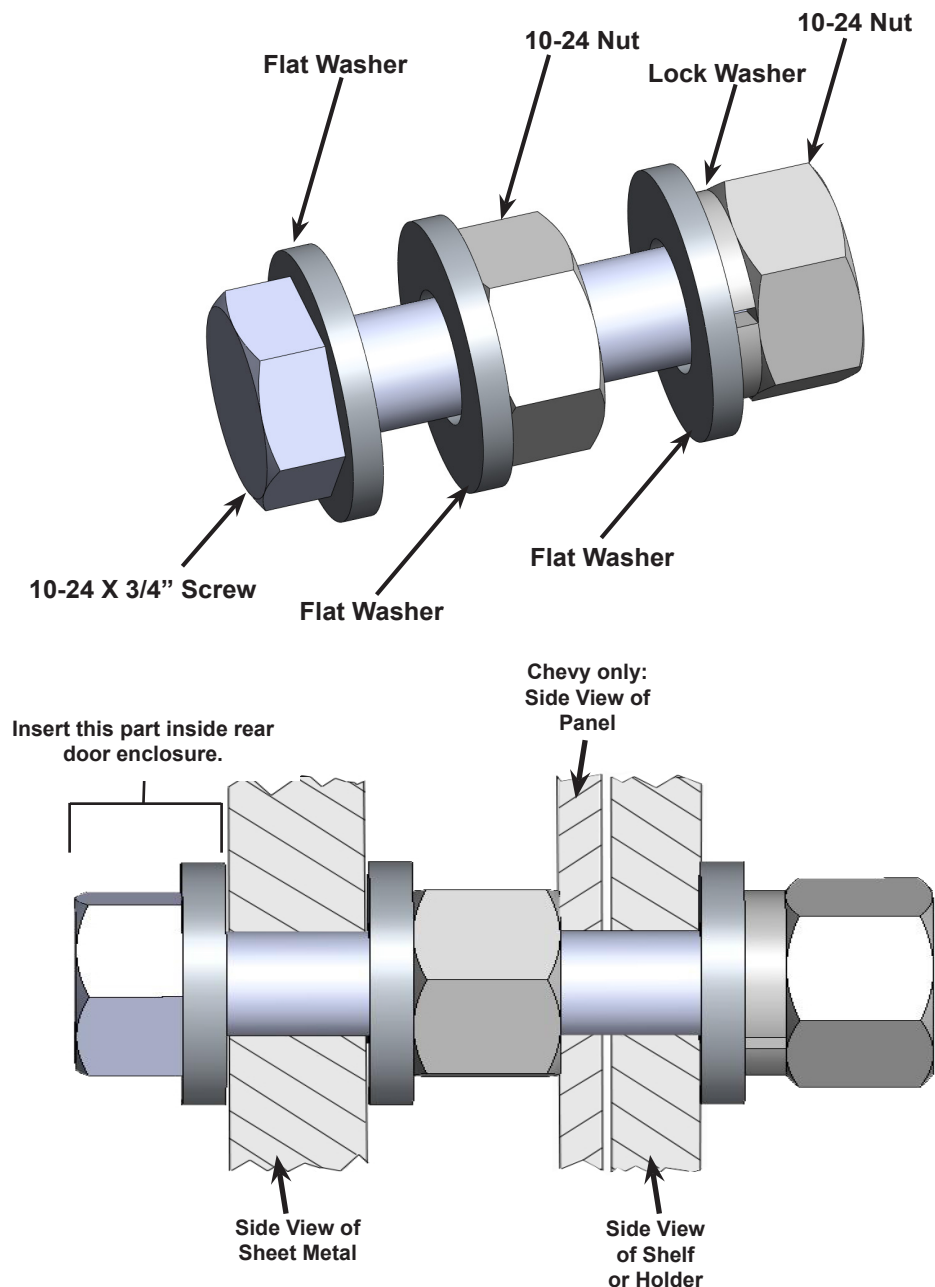


Figure 95. Install Fastening Hardware in This Order, Starting from Left

5. Install the Right Hand Door Panel and the Furniture Pad/Snap Block Kit (P/N 000-163-015) onto the right hand door, using the fastening hardware shown in Figure 95.

NOTICE

Make sure the hardware fastens through the Back Door Shelf, the Furniture Pad and the Panels as shown in Figure 94.

6. Install the Trimlok (P/N 000-131-060 from Panel Set P/N 000-100-021) around the door handle on the right hand door (see Figure 96).



Figure 96. Install Trimlok (P/N 000-131-060) Around Door Handle

INSTALLING PASS THROUGH ASSEMBLY

Dry fit the Pass Through Assembly (from P/N 000-078-381) on the van's step to help locate the Pass Through hole.

1. Remove the van's step liner to prepare for the cutting process.
2. Position the Pass Through Assembly on the step to help locate the hole. The recommended location for the Pass Through is just to the left side of the CDS unit. Make sure to leave enough room so that the backside of the step does not interfere with the Pass Through.
3. Trace an outline around the Pass Through (see Figure 97).
4. Locate the center of the cutout and drill a 1/4" pilot hole through the multiple layers of material. This hole will help guide the hole saw.
5. Using the 4-1/2" hole saw, cut through the multiple layers of the step. The number of layers of material will vary depending on the make and model of the van.
6. Re-install the step liner.
7. Using the 4-1/2" hole saw, drill through the step liner from underneath the van.
8. Apply silicone sealant around the Pass Through and place the Pass Through in the hole.
9. Align the Pass Through in the hole and secure it using the 6 supplied self-tapping screws (see Figure 98).
10. Thread on the cover.

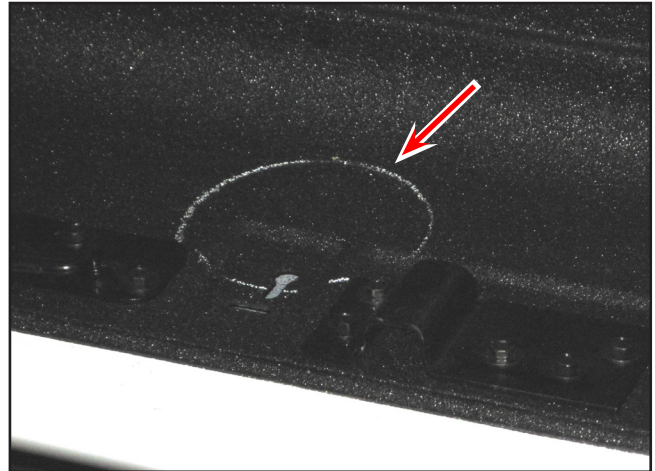


Figure 97. Trace an Outline Around Pass Through



Figure 98. Secure with 6 Self-Tapping Screws

CONNECTING POWER

Flow Switch Cable to EWS Cover Cable

1. Find the Flow Switch cable located at the bottom of the EWS Electrical Box (see Figure 99).
2. Route the Flow Switch cable from the EWS Box through the access holes in the rear of the EWS Shelf and behind the HydraCradle Tank.
3. Connect the EWS Cover cable to the Flow Switch cable (see Figure 99).

NOTICE

See Figure 100 for the EWS electrical diagram.

Front View of Electrical Box

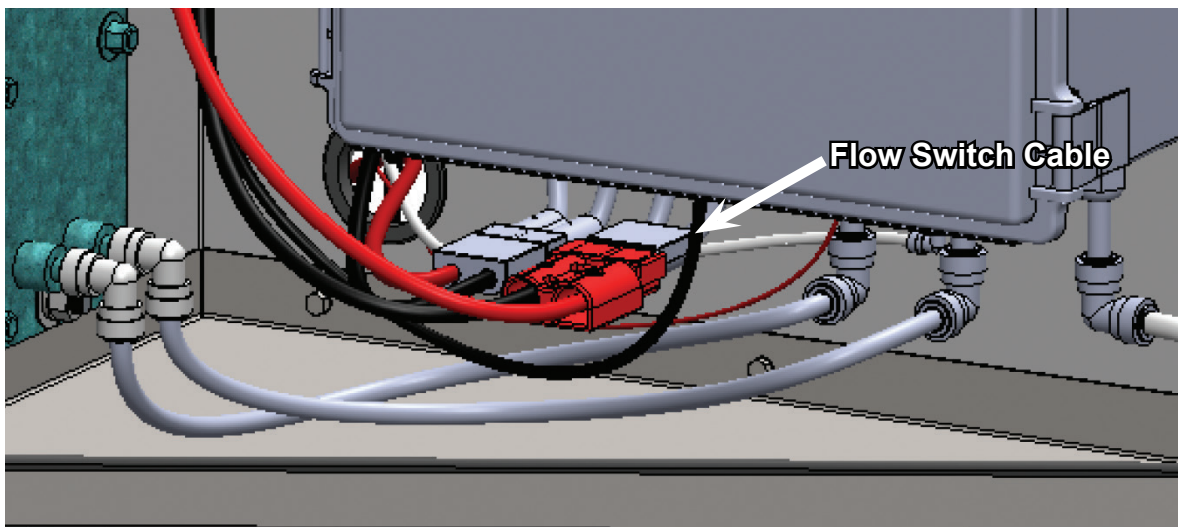


Figure 99. Locate Flow Switch Cable at Bottom of EWS Electrical Box

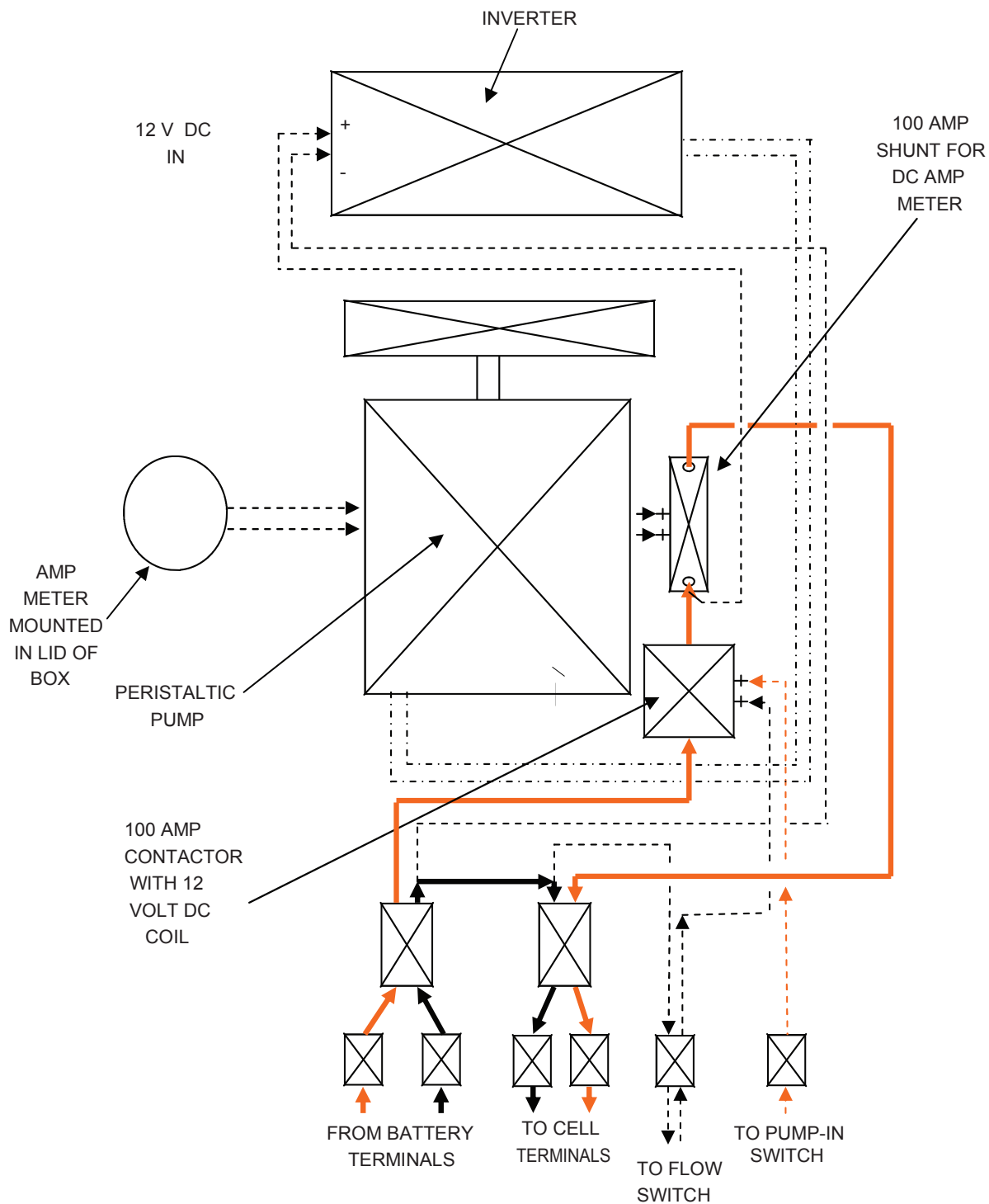


Figure 100. EWS Electrical Diagram

CDS Battery, Electrical Box and Cell

1. Locate the gray connector at the bottom of the Electrical Box; route the CDS's battery cables through the back of the EWS Shelf and connect to the gray connector (see Figure 101).
2. Locate the Pump-In Switch cable on the bottom of the Electrical Box. Route through the rear of the EWS Shelf to the CDS pump-in switch and connect (see Figure 102).
3. Verify that the Cell cables are connected to the red connectors shown in Figure 101 and Figure 102.

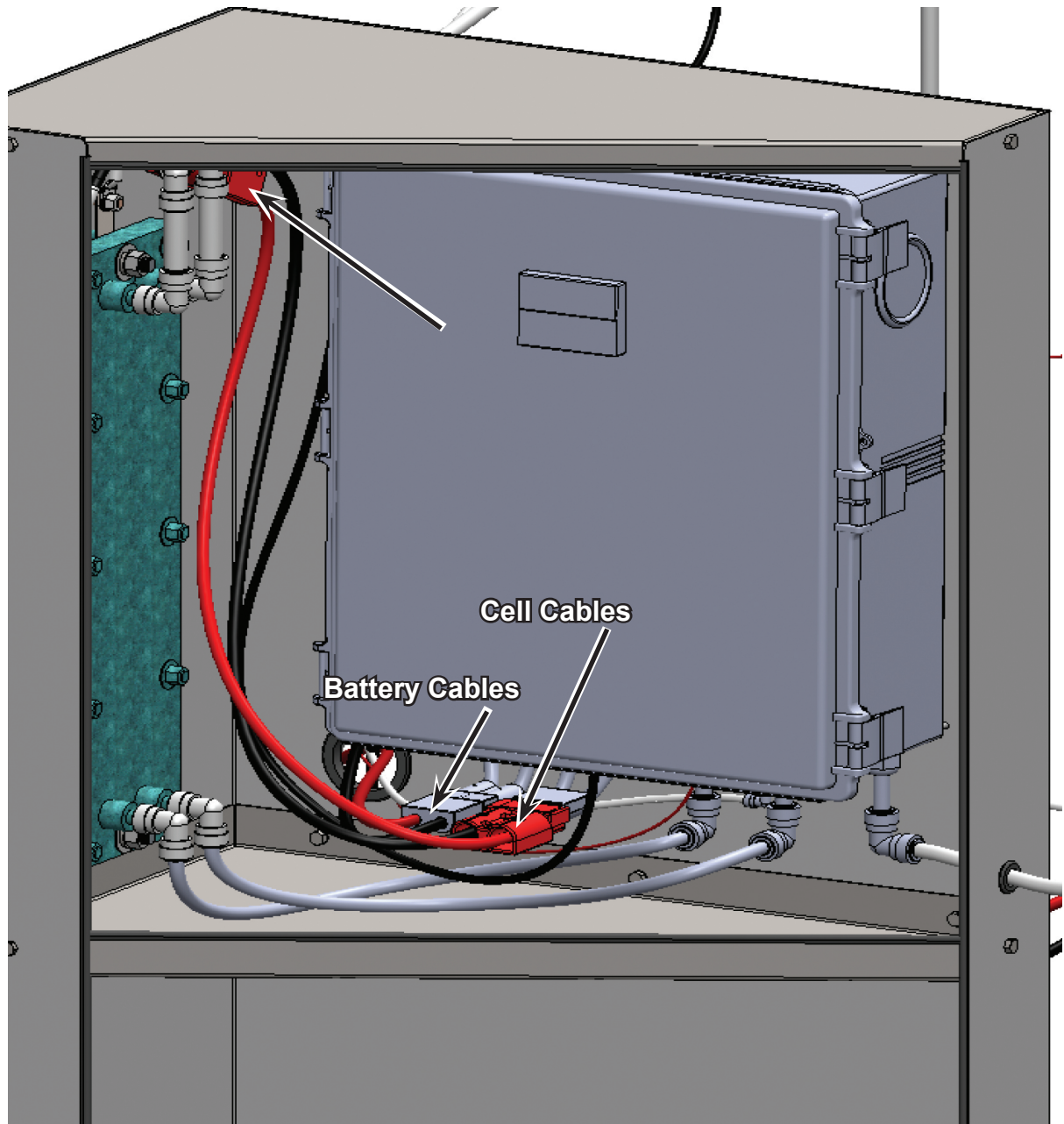


Figure 101. Locate Power Cables on Electrical Box

Front Bottom View of Electrical Box

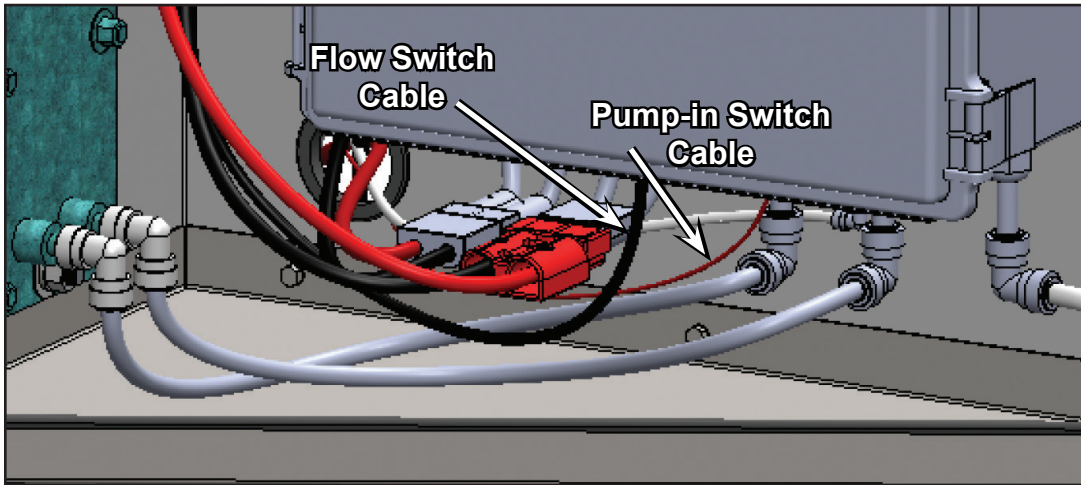


Figure 102. Connect Pump-In Switch Cable

Modifying and Connecting the CDS Battery

1. With the CDS powered down, disconnect both the positive and negative terminals from the battery.
2. Remove the van's battery from the van to eliminate the possibility of bodily damage.

⚠ WARNING

It is imperative that you first remove the battery from the van. Failure to comply with this can result in personal injury or death.



Figure 103. Install Circuit Breaker (Shown without Red Boots)

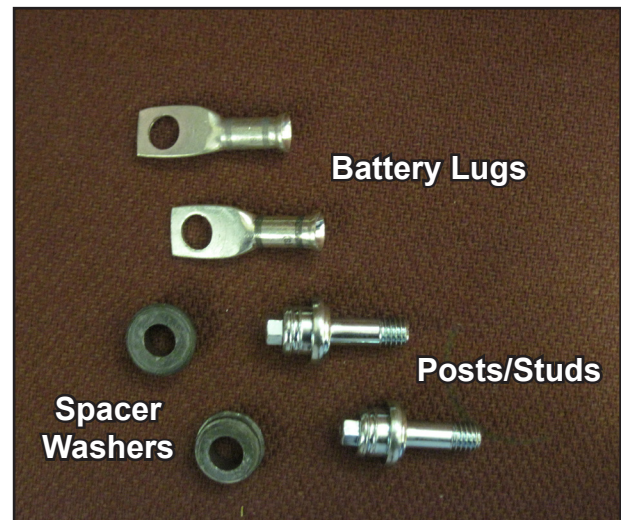


Figure 104. Battery Lugs, Spacers and Posts/Studs

3. Install the circuit breaker (P/N 000-018-001) onto the wall of the engine compartment near where the battery was as shown in Figure 103.
4. Route the positive and negative cables from the EWS Shelf around the CDS unit, under the Power Pack and along the main wiring harness to the front of the van, to the battery tray.
5. Cut the positive cables (red) at the necessary length to reach the output terminal of the 100 Amp circuit breaker which was previously installed. Crimp one of the battery lugs (see Figure 104) on the end of the cable and secure it to the output terminal of the circuit breaker. Tighten the connection.
6. Attach the 2 ft positive cable (P/N 000-063-051) to the input terminal of the circuit breaker. Tighten the connection.
7. Re-install the battery and secure it as it was originally.
8. Route the negative EWS cable (black) to the negative terminal of the battery. Cut the cable to length, strip the insulation and crimp the remaining battery lug (see Figure 104) on the cable.

- Using one of the new long style posts and a stud (see Figure 104), connect the vehicle ground cable, spacer and EWS negative cable to the negative terminal (-) of the battery as shown in Figure 105. Tighten the connection.
- Using the other new long style post and a stud, connect the vehicle positive cable (red), spacer and the circuit breaker input cable (red - P/N 000-063-051) to the positive terminal (+) of the battery as shown in Figure 105. Carefully tighten the connection.

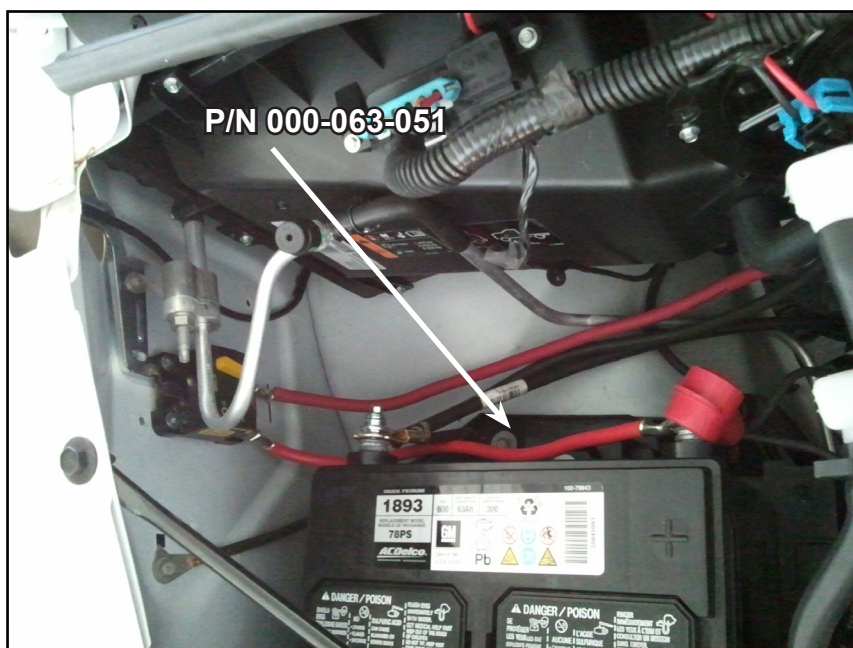


Figure 105. Connect EWS Power Cable (P/N 000-063-051)

FINISHING INSTALLATION

After the Zerorez EWS CDS 4.8 has been completely installed, load the Solution and Garden hoses onto the respective small hose reels on the HydraCradle Tank.

1. Connect the vacuum hose sections with the hose couplers.
2. Load the vacuum hose onto the larger reel.
3. Guide the vacuum hose onto the reel hub so that the hose is evenly distributed on the hub.
4. Locate the hose connector on the Solution Hose Reel and connect the hose.
5. Turn the hand crank away from you to load the hose, guiding the hose onto the Solution Reel hub.

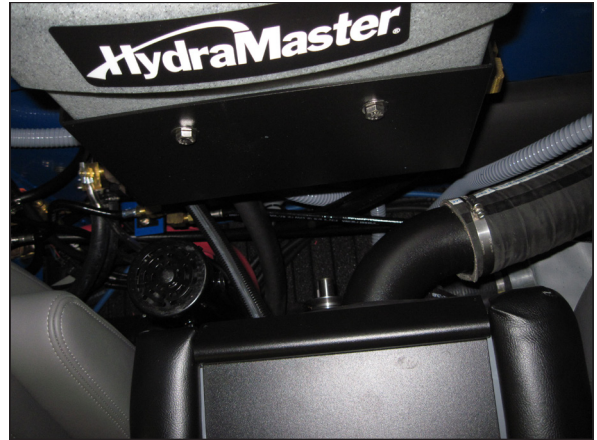


Figure 106. Top Down View - Fit Recovery Tank to Cowling

NOTICE

To set the brake on the Solution Hose Reel, gently turn the tension knob, located near the handle, to the right.

Confirm that:

1. **Van key switch is in off position.**
2. **CDS key switch is in off position.**
3. **All wires are secured to the Throttle Controller.**
4. **All hoses are connected and secured (see Table 3 and Table 4 for hose connection information.)**
5. **CDS is installed and ready for testing.**
6. **All chassis conditions are met.**
7. **Both vacuum ports on the Recovery Tank are open.**
8. **The AC/heater switch is in the OFF position.**

Modify Cowling

1. Re-attach battery cables.
2. Secure the coolant hoses and wire harness into a clean bundle using provided tie wraps.
3. Cut the doghouse according to Figure 107 and Figure 108.

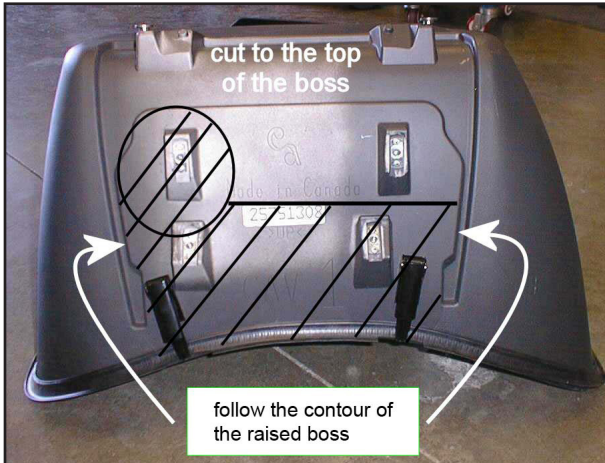


Figure 107. Cut to Top of Boss and Follow Contour



Figure 108. Fit Over Pump and Hoses

NOTICE

Only one large cut needs to be made in the doghouse. The piece that is cut out can be discarded. Clean the edges of the cut.

4. Re-install the doghouse into the van.

NOTICE

It will be a tight fit over the high pressure pump and hoses.

5. Install the doghouse seal as follows:
 - a. Locate the Velcro strip on the back of the seal. Using rivets, install the strip to the metal lip of the van floor. This will help create a tight seal all the way around.
 - b. Open the Velcro strips of the seal, and slide over the drive shaft and hose bundle. Position the seal as is shown in Figure 109. Close Velcro strips around shaft and hose bundle.
 - c. With the seal square on the doghouse, drill 7/32" holes between the stitching around the perimeter of the seal and install the provided rivets.



Figure 109. Position Seal as Shown

6. Modify the driver's side dash cover, closest to the doghouse (see Figure 110).
7. Modify the passenger's side dash cover, closest to the doghouse as necessary.
8. Re-install the passenger dash cover.
9. Reconnect the positive battery cable.
10. Re-install air cleaner assembly and antifreeze overflow container.



Figure 110. Modify Driver's Side Dash Cover

NOTICE

Use Dex-cool Red GM antifreeze or equivalent.

11. Route petcock hose (mounted on heat exchanger) to a small drain pan and open to allow air to vent.
12. Fill the radiator with coolant. (GM recommends that you fill the antifreeze a small amount at a time):
 - a. Fill the radiator until it is full and no bubbles appear, and then close the petcock.
 - b. Start the vehicle and run for approximately 2 - 3 minutes. Monitor the engine temperature gauge the entire time.

NOTICE

The motor will heat up rapidly.

CAUTION

If the gauge starts to read more than 210 - 215 degrees F, turn the engine off. Failure to do so may result in engine damage.

- a. Allow the engine to sit until the antifreeze starts to bleed down.
- b. Repeat this procedure until all the air is bled out of the petcock and the engine is operating at the normal temperatures.

NOTICE

Step b could take up to 2-3 hours to complete.

- c. Close petcock and recheck that the engine is still operating at normal temperatures.

13. Place the blower cowling over the Power Pack.

NOTICE

It is best to do this before starting the CDS to avoid grease from flinging off the drive shaft.

14. Start the van and check for antifreeze leaks at the installed tees and heat exchangers.
15. CDS clutch burnishing: Engage and disengage the clutch several times to ensure it is



Figure 111. Location of Warning Label on Sun Visor

functioning properly. If full torque will be required immediately, the clutch should be properly burnished.

16. Energize the clutch three times a minute with no load for 50 cycles.
17. Install the warning label, supplied with the Owner's Manual, on the driver's side sun visor as shown in Figure 111.

SETUP AND CALIBRATION OF RPM

With the van's engine running and warmed up, turn the CDS key switch to the ON position.

NOTICE

The rpm on the CDS dash panel must not exceed 1,700 rpm. If it does, turn the key switch off immediately.

Adjustment of the rpm is done through the Throttle Controller using a 1/16" (1.6mm) or smaller flat blade screwdriver. To do this, locate the adjustable trim potentiometers (pots) RPM1, RPM2 and RPM3 on the controller (see Figure 112). Use a screwdriver to turn the trim pot clockwise to increase engine rpm. Each full turn is approximately 300 rpm.

Using the tachometer on the front of the CDS unit, make the following rpm adjustments:

On the Dash Switch, Adjust:	On the Controller, Adjust:
HI	RPM 1 = 1500 rpm
MID	RPM 2 = 1400 rpm
LO	RPM 3 = 1300 rpm

Apply load and confirm each rpm. There may be a 50 -100 rpm fluctuation in rpm between load and no load conditions. Set vacuum relief to 14" Hg on the vacuum gauge.

NOTICE

After applying a load, rpm's may need to be re-adjusted. Adjust only with no vacuum load.

Operation Features

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

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

NOTICE

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

Make sure the operator of the CDS understands that the AC / Heat switch needs to be in the OFF position before activating the CDS unit.

Troubleshooting

On the Throttle Controller, there are LED lights with corresponding labels to provide status and problem detection information (see Figure 112).

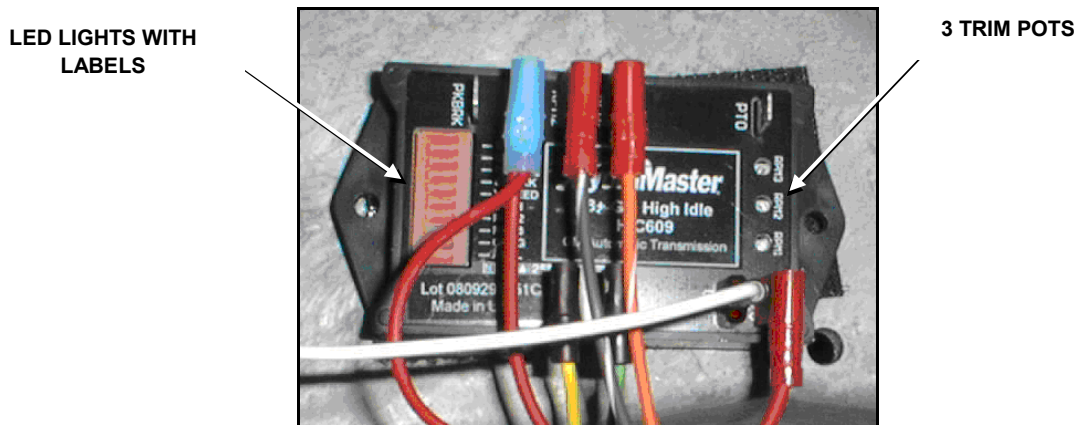


Figure 112. Location of Controller's LED Lights with Labels and RPM Trim Potentiometers

See the Table 12 on page 95 for function codes.

Table 12. Throttle Controller Codes

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

NOTICE

The PCM engine computer will cause the engine speed to momentarily drop back to normal idle speed every time the air conditioner pump cycles on or off.

BEFORE OPERATING THE ZEROREZ EWS CDS AT THE JOB SITE

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

⚠ WARNING

The Zerorez EWS 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. Doing so will cause death or personal injury.

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 rear tires.
4. Make sure all required hoses are correctly connected.
5. 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.

ZEROREZ CDS EWS START UP

1. Make sure the vehicle's gear select lever is in the Park position and the emergency brake is set.
2. Ensure that the saturated salt feeder is filled to the marked levels with salt solution; these levels are marked in black for MAX FILL and red for MIN FILL (see Figure 113).
3. Connect the end of the garden hose, located on the 'live' hose reel of the HydraCradle Tank, to the customer's outdoor faucet.

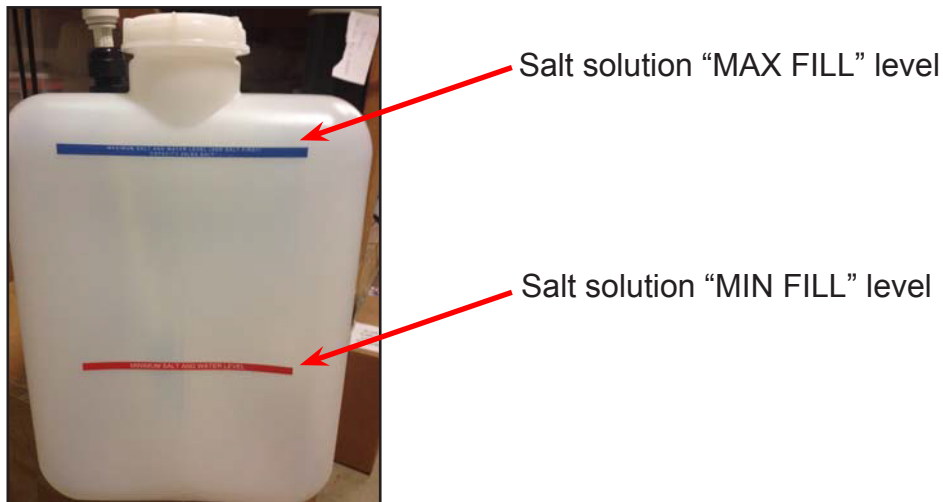


Figure 113. Fill Saturated Salt Feeder to Marked Levels

4. Remove the fastening screw on the EWS Electrical Box, unlatch the Box and open the cover.

⚠ WARNING

Be extremely cautious when power is on and the EWS Electrical Box is open. If you touch any of the live wires, you could risk electrical shock which can cause death or injury.

5. Turn on the outside faucet and adjust via the Flow Adjustment Valve located in the EWS Electrical Box. The incoming water flow to the system, as indicated on the flow meter, should read 1.2 gpm (see Figure 114).

Open Electrical Box to Find Flow Adjustment Valve and Flow Meter

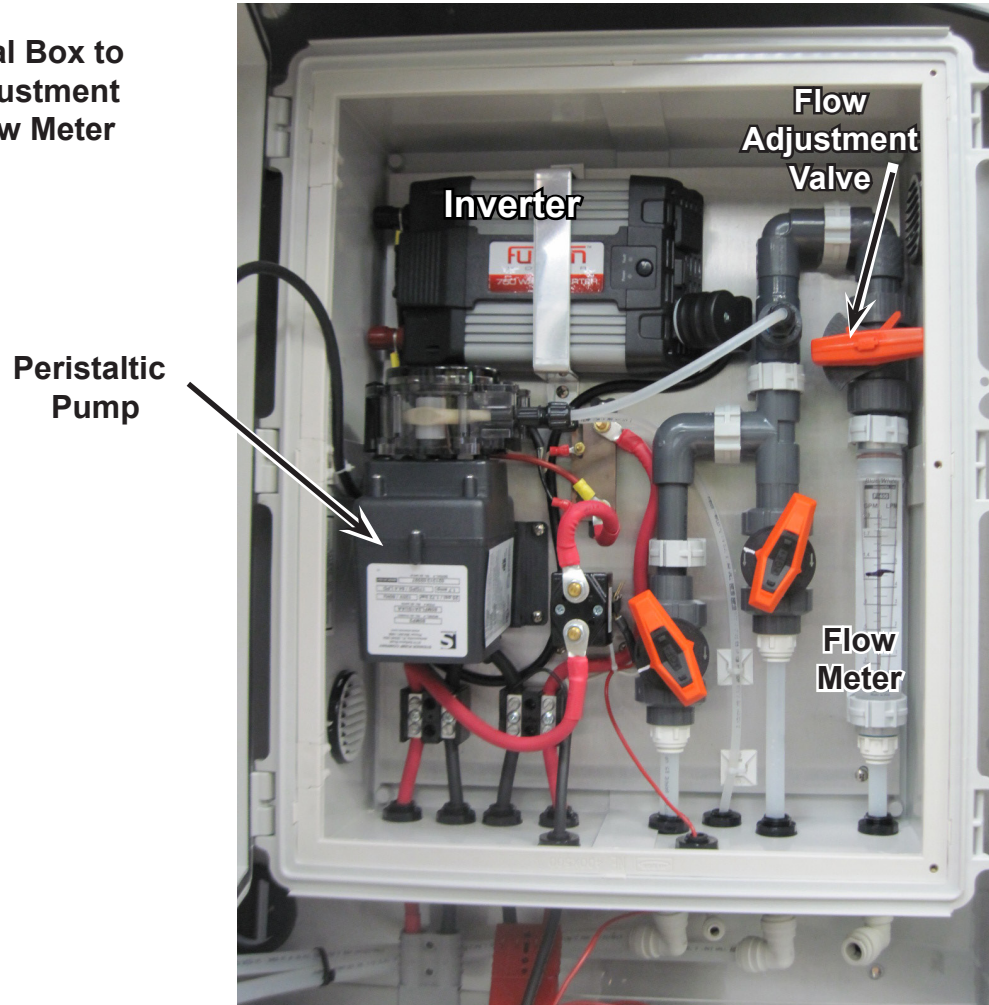


Figure 114. Location of Flow Meter in Electrical Box

6. Start the van's engine and turn the CDS fresh water switch to the 'ON' position. This supplies DC power directly from the terminals of the van's battery to the inlet power terminal in the EWS Electrical Box.
7. After the flow of saline solution through the Cell is established via the flow switch assembly which is mounted on top of the HydraCradle Tank, DC current passes between the electrodes of the Cell and will be indicated by the Amp meter (see Figure 115).

8. Check that the inverter, located in the EWS Electrical Box (see Figure 116), is 'ON' (POWER button showing green) and that the peristaltic pump (see Figure 114), also located in the EWS Electrical Box, is operating (test that the 'ON' switch is really 'ON' if the pump is not visibly turning).



Figure 115. EWS Electric Box and Amp Meter

NOTICE

If the green light is not on, or an orange light is displayed and you hear a high pitch noise, contact your distributor.

9. Check that the Amp reading on the outside of the Box is above 35 Amps (see Figure 115). During normal operation, the Amp meter should read approximately 35-70 Amps.

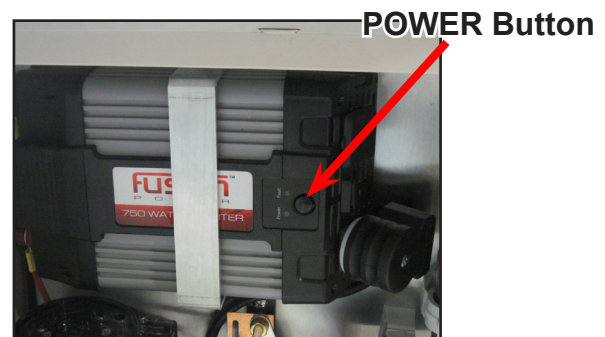


Figure 116. Inverter POWER Button

NOTICE

The flows of 'B' water and 'A' water, which are passed vertically through the Cell, are preset and do not need to be adjusted.

10. Close and latch the EWS Electrical Box, re-installing the fastening screw.
11. Manually unwind the vacuum hose a few feet off of the HydraCradle Tank's vacuum reel, and press on the foot switch to test for power retraction of the hose.
12. Select the cleaning speed appropriate for the cleaning job.
13. Turn on the PUMP CLUTCH switch. Adjust cleaning pressure to desired level.
14. Connect the APO to a dump hose (the length of a garden hose), route the hose to an appropriate waste site and turn the APO switch 'ON'.

NOTICE

The APO will not engage until the water level rises inside the Recovery Tank.

15. Now proceed with the cleaning operation.

NOTICE

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

NOTICE

Do not dump waste or residual 'A' water in any area which might violate local, state or federal law. Drain the Recovery Tank into a sanitary drain system.

ZEROREZ EWS DAILY SHUT DOWN

1. Turn off the CDS fresh water switch.
2. Turn off the outdoor faucet
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. Allow the unit to run for a few minutes with the vacuum hose disconnected in order to remove all moisture from the vacuum pump.
6. Plug the vacuum inlets.
7. Spray a Hydramaster-recommended lubricant (P/N 000-087-006) into the lube port for about 5 to 10 seconds while the unit is running. This will lubricate the vacuum pump and prevent it from rusting. (The lube port is located on the front panel above the pressure gauge.)
8. Remove the inlet plugs, then turn the ignition 'OFF' before draining the Recovery Tank.
9. Turn the heat control valve to the 'OFF' position. This will help avoid engine overheat problems due to reduced coolant flow through the radiator.
10. Drain the Recovery Tank.

NOTICE

Do not dump waste in any area which might violate local, state or federal law.
Drain the Recovery Tank into a sanitary drain system.

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

NOTICE

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

HYDRACRADLE TANK DAILY SHUT DOWN

To shut down the HydraCradle Tank after daily use:

1. Clean out the vacuum hose and, pressing on the foot switch, rewind the vacuum hose onto its reel.
2. Rewind the other hose.
3. Place cleaning tools/wands in the tank's storage area.

HYDRACRADLE TANK SHUT DOWN FOR EXTENDED STORAGE

If you want to shut down and store the HydraCradle Tank for an extended period of time:

1. Drain the remainder of the water in the tank.
2. Manually unwind the vacuum hose and remove it from the reel, rinse the hose with clean water and allow it to drain before rewinding it on the reel.
3. Unwind the solution hose, detach from the reel and completely drain the hose before rewinding it onto the reel.

CAUTION

Failure to take appropriate measures to prevent equipment damage due to freezing can result in system failure and loss of warranty on affected parts.

WATER SOFTENER REGENERATION INSTRUCTIONS

NOTICE

Frequency of regeneration depends on the local water hardness. Regenerate as needed to maintain 0 - 1 ppm (parts per million) water quality.

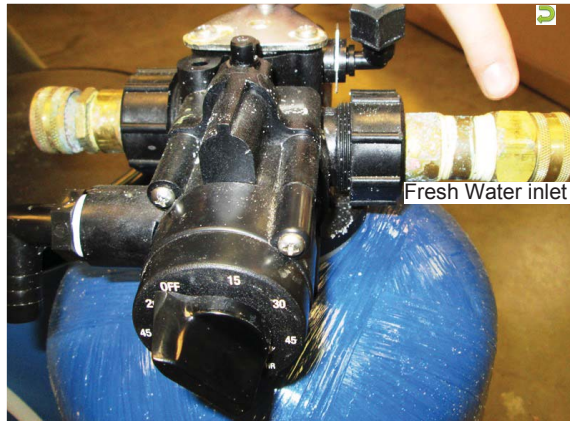


Figure 117. Connect Fresh Water Hose to Fresh Water Inlet

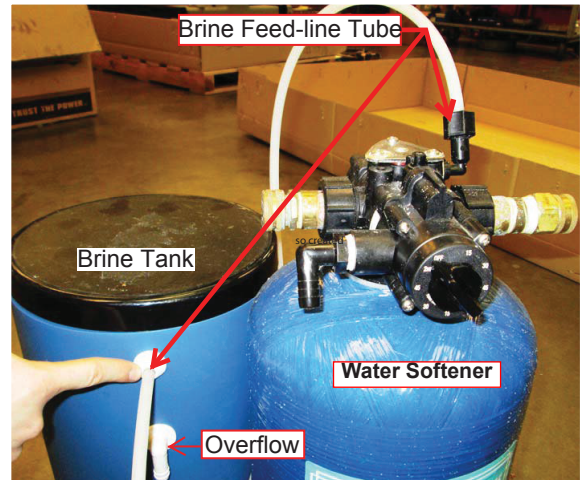


Figure 118. Water Softener, Brine Tank, Brine Feed-Line Tube and Overflow

1. Flush the fresh water hose before using it to supply water to the water softener. After the line runs clear, turn off the water and connect the fresh water hose to the inlet side (see Figure 117) of the water softener (see Figure 118).
2. Slowly turn the fresh water supply on until the supply water valve is completely open.
3. Allow fresh water to flow into the water softener (see Figure 117) and from the outlet (see Figure 119) of the water softener for a minimum of 2 minutes. This will purge the air and any foreign materials from the water softener.
4. Turn off the fresh water flow to the water softener.
5. Remove the lid from the brine tank, shown in Figure 118, and fill the brine tank to the $\frac{1}{4}$ level using only fresh water.
6. Slowly add water softener rock salt (pellets are not recommended) to the water in the brine tank. Add enough salt to reach the top of the water level. Add more fresh water bringing the water level to just below the overflow outlet shown in Figure 118. Stir the water-salt combination very gently (15 seconds) and then replace the cover.

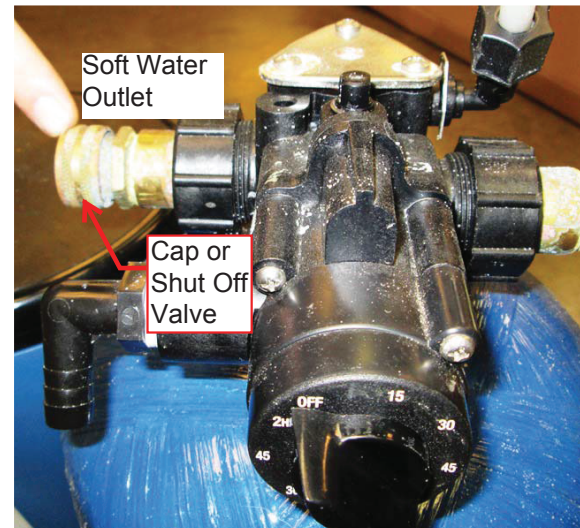


Figure 119. Outlet Side of Water Softener

7. Connect the brine solution feed-line, shown in Figure 118, to both the brine tank and the water softener.
8. Shut off the outlet side of the water softener, shown in Figure 119, using a turn valve or pipe cap.
9. Add a drain tube to the drain outlet elbow (see Figure 120). This waste water is a salt water solution and should be disposed of properly.
10. Slowly turn on the fresh water valve until the water valve is completely open.
11. Turn the manual timer all the way to the **2-hour position** (see Figure 121).
12. Water should begin to flow from the end of the drain elbow or drain tube, shown in Figure 120. **The water softener is being regenerated.**
13. After 3 - 5 minutes, the brine solution will begin to be drawn from the brine tank. The flow can be checked by disconnecting the brine feed-line, shown in Figure 118 from the brine tank. Once the line is disconnected, listen for a vacuum sound at the end of this tube. If you hear a vacuum sound, the system is working correctly; reconnect the feed-line to the brine tank.



Figure 120. Drain Elbow

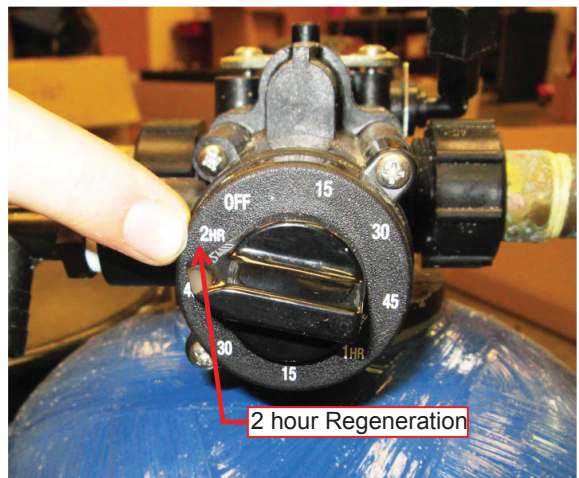


Figure 121. Manual Timer

NOTICE

If the brine waste-water is flowing too fast, water is wasted; or too slow, brine solution draw is reduced. The Drain Flow Adjuster shown in Figure 122 can be adjusted to vary the brine waste-water flow rates. For most applications, this Drain Flow Adjuster should be left to the FULL OPEN, or WIDE OPEN, position.

When you close the Drain Flow Adjuster, the vacuum and solution draw from the brine tank is reduced.

See page 106 for more information on the Drain Flow Adjuster.

14. After the 2 hour regeneration cycle, the manual timer will move to the 'OFF' position (see Figure 122). In the 'OFF' position, the following changes occur:
- The system is fully regenerated.
 - The system is now in service mode (ready to provide soft water).
 - The system allows fresh water to be supplied to the brine tank back through the brine solution feed-line.
 - The brine tank will fill with fresh water and the float will close the water supply once the tank is full.
 - The discharge elbow/waste water line will stop flowing waste water.
15. After the Water Softener has been operated for a period of time, the tank resin will become depleted* again. Repeat the previous steps starting with step 10.

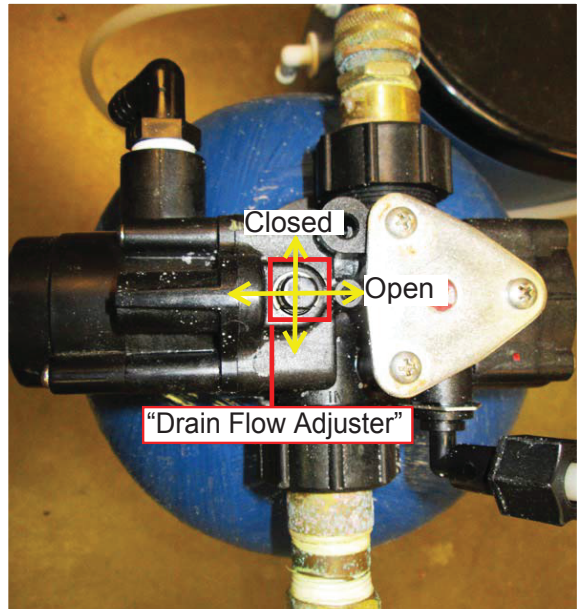


Figure 122. Drain Flow Adjuster

NOTICE

* Check outlet water conductivity at 150 gallons of use.

NOTICE

The quality of the soft water being supplied by the water softener can be determined using a conductivity meter or by adding a conductivity light to the outlet side of the water softener.

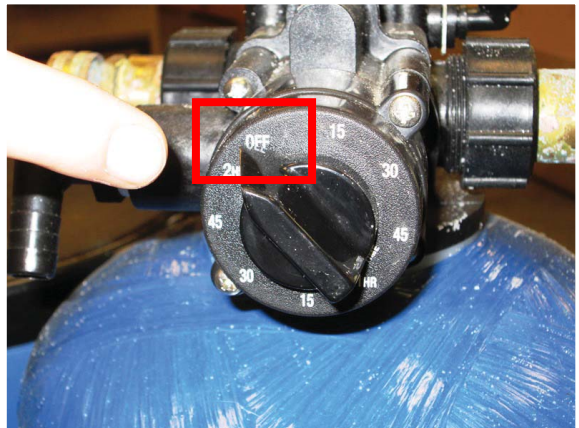


Figure 123. Manual Timer in 'OFF' Position

Drain Flow Adjuster

With the drain flow adjuster (see Figure 122), you can adjust the water flow to drain during regeneration.

The counter pressure so created helps to keep the piston of the valve in the regeneration position when the operating pressure is extremely low (< 7.06 psi).

The drain flow adjuster is locked in the wide open position (see Figure 124).

By releasing the locking screw of the locking plate, you can still use the drain flow adjuster, but note that the maximum flow to drain is limited by the drain flow control.

To adjust:

1. Place the unit in brine/slow rinse position.
2. Turn the drain flow adjuster either to the right or to the left until the piston remains stable in the regeneration position.

NOTICE

Note that closing the drain flow adjuster too much will result in poor suction from the injector.

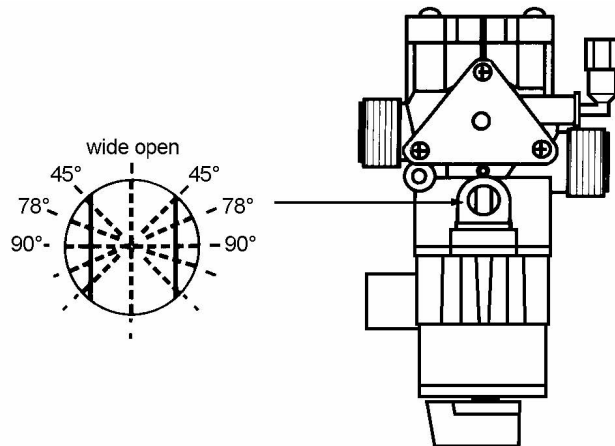


Figure 124. Drain Flow Control on Drain Flow Adjuster

EWS PARTS

To order EWS parts, call your local distributor. In most instances, your distributor either stocks or has access to EWS parts through a regional service center.

Major EWS Components

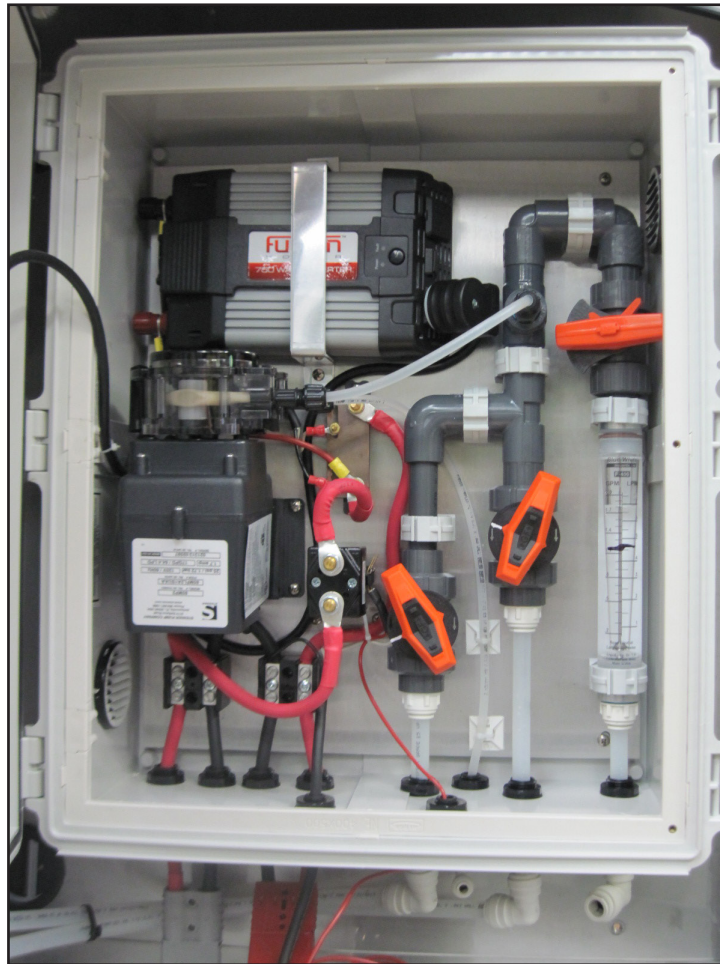


Figure 125. Electrical Box or Power Cabinet P/N 000-163-070



Figure 126. Cell or Electrode Stack P/N 000-163-041



Figure 127. Safety Shutoff Cover P/N 000-041-077



Figure 128. Salt Feeder Assembly P/N 000-163-210

Additional EWS Components

Hoses

Hose	P/N	Diameter	From	To	Length
1	000-068-956	½"	Water Softener	Electrical Box	48"
2	000-068-957	½"	Electrical Box	Cell	28"
3	000-068-957	½"	Electrical Box	Cell	28"
4	000-068-958	½"	Cell	Safety Shutoff Cover	60"
5	000-068-956	½"	Cell	Drain Tee	48"
6	000-068-956	½"	Safety Shutoff Cover	Drain Tee	48"
7	000-068-956	½"	Drain Tee	Drain Elbow	48"
8	000-068-959	½"	Drain Elbow	Atmosphere	6"
9	000-068-960	½"	Tee	Tee	2"
10	000-068-961	¼"	Salt Feeder	Electrical Box	336"

Harnesses/Cables

P/N	Part Description
000-063-043	Power Supply
000-063-044	Cell

FREEZE GUARDING

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

CAUTION

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

The following precautions are recommended prior to and during cleaning jobs:

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 solution hose from the cold ground by running it through an extra 1½" vacuum hose.
3. Leave vehicle doors closed until you begin cleaning; afterwards, open slightly.

NOTICE

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

4. 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.
5. 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

See page 111 for the CDS-specific freeze guard procedure.

CDS Freeze Guard Procedure

To drain the CDS, use Kit P/N 000-078-078 (clear freeze guard hose with plug attached) which is shipped with P/N 750-001-003 (or P/N 750-001-006).

NOTICE

The purpose of this part is to facilitate the removal of water from the CDS 4.8 cleaning equipment. The sale and use of the kit is in no way a guarantee against freeze damage but will be sufficient to guard against severe freeze damage for most major components.

1. Connect the black stopper end of the freeze guard hose to the Recovery Tank inlet (see Figure 129).
2. Connect the other end of the freeze guard hose to one of the outgoing cleaning solution quick connect fittings (see Figure 129).
3. Turn the pump clutch "OFF" at the switch.
4. Turn down the pressure regulator to "0" (counterclockwise).
5. Open the valve and drain the HydraCradle Tank until water no longer flows. This ensures that there is no water at the pump inlet, which could result in freeze damage.
6. Turn on the unit and allow the vacuum to draw the majority of the water from the system.
7. When no water can be seen traveling through the clear hose, turn the unit off.

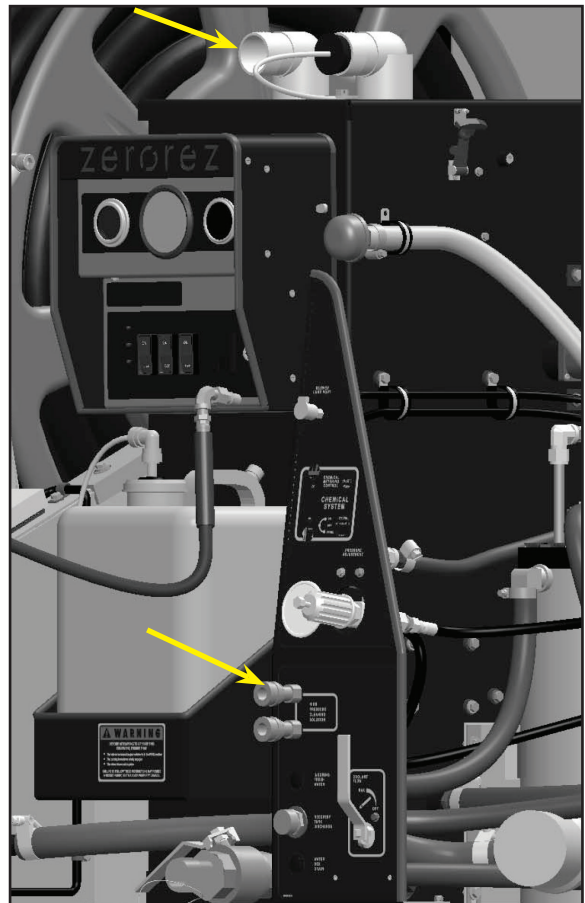


Figure 129. Connect Freeze Guard Hose

EWS/Water Softener Freeze Protect Procedure

Because of the way the EWS and the water softener systems are designed, they cannot be completely freeze guarded by draining. The EWS and the Water Softener and its Brine Tank can only be freeze safe if the vehicle is parked in a heated garage overnight or if an electric heater is run inside the vehicle.



MAINTENANCE CHART - 8 TO 600 HOURS

DAILY MAINTENANCE ZR-EWS CDS 4.8																									
Clean and inspect pump strainer in saturated salt feeder																									
Check engine oil level																									
Empty recovery tank inlet filter																									
Visually inspect machine for loose wires, oil leaks, water leaks, etc																									
Inspect recovery tank stainless steel filter for clogging or damage; clean, repair or replace as needed																									
Inspect and clean the vacuum slot on the cleaning wand. Watch for sharp edges that may tear the carpet; remove any sharp edges as required																									
Lubricate blower with a HydraMaster-recommended spray lubricant (P/N 000-087-006) through lube port																									
INTERVAL IN HOURS ZR-EWS CDS 4.8																									
Engine oil and filter	Change every 2,000 miles.																								
EWS Cleaning and Maintenance	See distributor for details.																								
EWS Water Softener Regeneration	Frequency of regeneration depends on the local water hardness. Regenerate as needed to maintain 0 - 1 ppm (parts per million) water quality.																								
HydraCradle swivel zerk	Lubricate every 40 hours with molybdenum disulfide ("moly") grease.																								
HydraCradle Live Center Reel zerk	4 zerk (P/N 000-052-505), located on the Live Center Reel, Bearing 000-092-025 - Lubricate every 40 hours with molybdenum disulfide ("moly") grease.																								
Pump oil *	Change after first 50 hours of use																								
Blower oil **	Change after first 100 hours of use																								
SERVICE	8	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
Float switch, filters	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I
Check around vehicle and CDS for evidence of oil/fluid leaks			CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
All belts (including HydraCradle) and pulleys (check for wear)			CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
High pressure lines - internal (check for chafing)			CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
Recovery tank (clean thoroughly with high pressure washer)			C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I
Blower inlet filter inside recovery tank			C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I
Vehicle engine rpm on CDS			CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
Hoses and quick connects; check for wear; replace as needed			CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
* Pump oil, GP series 100			R	CH	CH	CH	CH	CH	CH	CH	CH	CH	R	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	R
Vacuum Relief Valve - inspect, clean and lubricate		C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L
SERVICE	8	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
Recovery tank magnesium anodes (P/N 000-108-022); replace as necessary			CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH
All fasteners; tighten as needed ***			CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH
Engine air cleaner filter					C/I				C/I				C/I				C/I				C/I			C/I	
Battery connections					C/I				C/I				C/I				C/I				C/I			C/I	
Blower drive belt (P/N 000-010-052)				CH				CH					CH				CH				CH			CH	
** Blower oil (P/N 000-087-034 Pneulube)					R						R										R				
Vehicle fuel lines (chafing or wear)											CH										CH				
All wiring harnesses (chafing or wear)											CH										CH				
Power pack pillow block bearings											L										L				
SERVICE	8	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
Drive shaft U-joints, splines, zerk (use Mobile DelVac Extreme)																						L			
Salsa Heat Exchanger																						C/I			
Salsa Heat Exchanger magnesium anodes (P/N 000-108-022) and replace as necessary																						CH			
Perform complete vehicle maintenance yearly																									
Van's cooling system; add new anti-freeze																									
Van's transmission fluid																									

* Refers to pump oil
 ** Refers to blower oil
 *** Check blower, drive shaft, front end fasteners

Adjust	A
Check	CH
Clean and Inspect	C/I
Clean and Lubricate	C/L
Flush	F
Lubricate	L
Replace	R



MAINTENANCE CHART - 625 TO 1200 HOURS

DAILY MAINTENANCE ZR-EWS CDS 4.8																								
Clean and inspect pump strainer in saturated salt feeder																								
Check engine oil level																								
Empty recovery tank inlet filter																								
Visually inspect machine for loose wires, oil leaks, water leaks, etc																								
Inspect recovery tank stainless steel filter for clogging or damage; clean, repair or replace as needed																								
Inspect and clean the vacuum slot on the cleaning wand. Watch for sharp edges that may tear the carpet; remove any sharp edges as required																								
Lubricate blower with a HydraMaster-recommended spray lubricant (P/N 000-087-006) through lube port																								
INTERVAL IN HOURS ZR-EWS CDS 4.8																								
Engine oil and filter	Change every 2,000 miles.																							
EWS Cleaning and Maintenance	See distributor for details.																							
EWS Water Softener Regeneration	Frequency of regeneration depends on the local water hardness. Regenerate as needed to maintain 0 - 1 ppm (parts per million) water quality.																							
HydraCradle swivel zerk	Lubricate every 40 hours with molybdenum disulfide ("moly") grease.																							
HydraCradle Live Center Reel zerk	4 zerk (P/N 000-052-505), located on the Live Center Reel, Bearing 000-092-025 - Lubricate every 40 hours with molybdenum disulfide ("moly") grease.																							
Pump oil *	Change after first 50 hours of use																							
Blower oil **	Change after first 100 hours of use																							
SERVICE	625	650	675	700	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050	1075	1100	1125	1150	1175	1200
Float switch, filters	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I
Check around vehicle and CDS for evidence of oil/fluid leaks	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
All belts (including HydraCradle) and pulleys (check for wear)	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
High pressure lines - internal (check for chafing)	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
Recovery tank (clean thoroughly with high pressure washer)	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I
Blower inlet filter inside recovery tank	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I	C/I
Vehicle engine rpm on CDS	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
Hoses and quick connects; check for wear; replace as needed	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
* Pump oil, GP series 100	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	R	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	R
Vacuum Relief Valve - inspect, clean and lubricate	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L	C/L
SERVICE	625	650	675	700	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050	1075	1100	1125	1150	1175	1200
Recovery tank magnesium anodes (P/N 000-108-022); replace as necessary		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH
All fasteners; tighten as needed ***		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH		CH
Engine air cleaner filter				C/I				C/I						C/I				C/I						C/I
Battery connections				C/I				C/I						C/I				C/I						C/I
Blower drive belt (P/N 000-010-052)				CH				CH					CH				R				CH			CH
** Blower oil (P/N 000-087-034 Pneuube)							R										R							R
Vehicle fuel lines (chafing or wear)						CH										CH								
All wiring harnesses (chafing or wear)						CH										CH								
Power pack pillow block bearings						L										L								
SERVICE	625	650	675	700	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050	1075	1100	1125	1150	1175	1200
Drive shaft U-joints, splines, zerk (use Mobile DelVac Extreme)																L								
Salsa Heat Exchanger																C/I								
Salsa Heat Exchanger magnesium anodes (P/N 000-108-022) and replace as necessary																CH								
Perform complete vehicle maintenance yearly																								
Van's cooling system; add new anti-freeze																F								
Van's transmission fluid																								

- * Refers to pump oil
- ** Refers to blower oil
- *** Check blower, drive shaft, front end fasteners

Adjust	A
Check	CH
Clean and Inspect	C/I
Clean and Lubricate	C/L
Flush	F
Lubricate	L
Replace	R

MAN-46213 Rev. B