INSTALLATION PROCEDURE

Installing a ZEROREZ CDS into 2016-18 Chevy Van

Part Numbers Affected: Various

Date Changes Take Affect: 2017

COMPLETELY READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION!

This document is a guide for installing a 2017 ZEROREZ CDS into a 2016-2018 Chevy Express Van.

UPON RECEIVING THE CDS

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.

INSTALLATION GUIDELINES

- Quality of the fit and finish of the 2017 ZEROREZ CDS system depends solely on the installer. While HydraMaster provides all parts and instructions necessary, it is up to installers 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.
- 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.

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INTRODUCTION

Figure 1 shows some major components that are shipped with the standard ZEROREZ CDS 2017:

1. Yaw Sensor Cooling Assembly
2. ZEROREZ Power Pack Assembly (Includes blower, pump, frames)
3. ZEROREZ Tank Assembly (Includes the instrumentation panel)
4. Alfa Laval and Salsa Heat (Not Shown) Exchangers
5. ZEROREZ Cradle Tank Assembly
6. ZEROREZ 110 Gallon Tank
7. Pass Through Kit

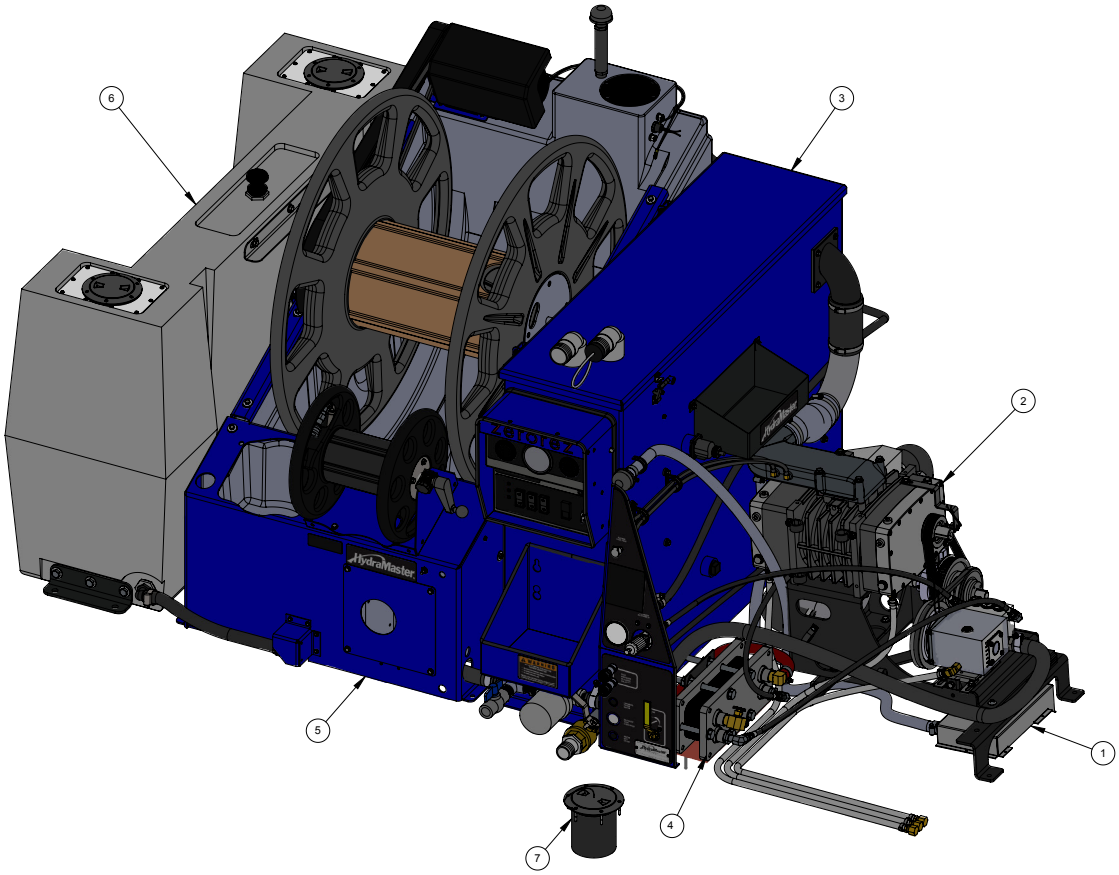


Figure 1. Standard CDS ZEROREZ 2017

This is the suggested order in which assemblies and kits should be installed:

1. Water Dam
2. After Market Coating (i.e. Line-X)
3. Yaw Sensor Cover
4. Front End Installation
5. Power Pack Assembly
6. Wire Harness
7. Pass Through Assembly
8. Recovery Tank Assembly
9. Heat Exchangers and Silencer
10. Cradle Tank
11. 110 Gallon OTWW Tank

Refer to Table 1 during installation for hose routings and hose part numbers.

⚠ WARNING

To prevent serious personal injury, ensure that the major components of the CDS ZEROREZ 2017 are well secured to the floor of the vehicle with the hardware supplied.

NOTICE

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

NOTICE

After the CDS has been completely installed, follow the set up and calibration procedure starting on page 42 of this document.

TOOL LIST

Tools and other items you will need include:

3-¼" Hole Saw 4 ½" Hole Saw with jobber length pilot drill bit (minimum of 6" long)	Dex-cool Antifreeze
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, Box Knife or Hose Cutter
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)	
(Optional) Hydramaster Blower Templates (PN: 000-105-791 and 000-105-792)	
Personal protective equipment (PPE) such as gloves, safety glasses and shoes, and earplugs or muffs.	

NOTICE

HydraMaster recommends the use of a cooling system vacuum filler to ensure a leak free installation and eliminate time consuming bleeding and purging of the cooling system. We use the Airlift II manufactured by CPS Products. It can be found at: www.cpsproducts.com (Figure 2).

Figure 2. AirLift II Cooling System Vacuum Filler

WATER DAM INSTALLATION

Installation of the Water Dam is intended to create a sealed barrier on the floor of the van (between the recovery tank and the cab) to prevent spillage in the cargo area, from migrating to electrical components in the cab. As such it is important to attach the aluminum angle securely to the van's floor then carefully seal it to prevent leaks. We recommend that this is

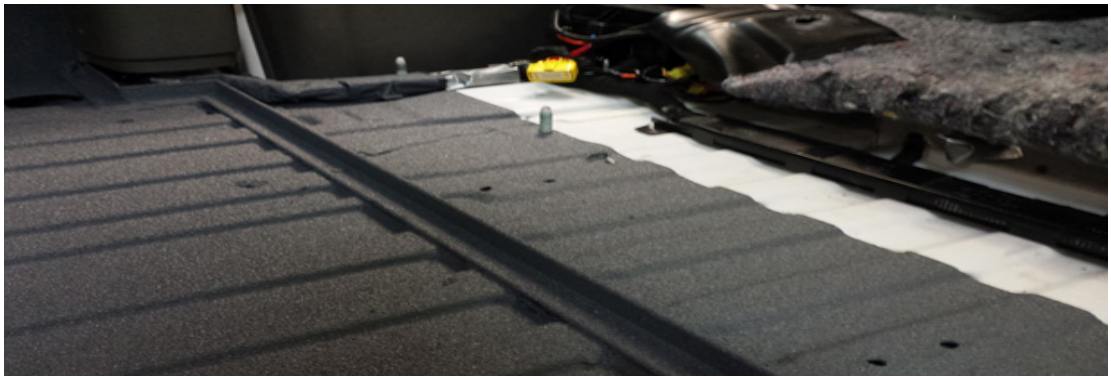


Figure 3. Installed Water Dam with Line-X Coating on the Van's Floor

done prior to the van floor being coated with after-market coatings, like Line-X.(Figure 3) Further, we recommend that this coating extend up to the rear seat posts in the cab of the van and up the sides of the van 12"or more. (Figure 3)

Be careful drilling any holes in the van floor! Make sure that the area below the floor is clear of vehicle components (like the fuel tank) before drilling.

Included is a 1 x 1 x 1/8" aluminum angle with two cuts in it. One cut is a notch in the flat side at 60" from the "Passenger" end of the angle, and a single slit on the flat at 63". The notch will allow a bend in the material in one direction, and the slit will mark a second bend in the opposite direction.

1. Remove both driver and passenger seats. Remember to unplug and unfasten the seat belt sensor wires.
2. Lay the length of angle in the van, with the flat end of the metal toward the rear of the van. The angle will sit just behind the body seam, right along the adhesive stitching, at the center of the B-pillar of the van (where the seat belts attach to the van walls). Some of the body adhesive might need to be cut and trimmed to allow the angle a straight line from the passenger's to the driver's side of the van.
3. Run the angle as close to the seam as possible to the driver's side. At the 60" notch, bend the angle toward the rear of the van. Bend it only far enough that the angle will pass to the rear of the driver's side B-pillar. (Figure 4)

Figure 4. Angle Behind the Driver's Seat

4. Use the second cut, a slit at 63", to bend the angle back toward the front of the van and pass right next to the driver's side B-pillar. This should leave enough space for the hole that will be required in the CDS install for the exhaust from the salsa to the silencer. Trim to fit.
5. Secure the angle to the floor every 10-12" using self-tapping screws or other fasteners.
6. Protect wire harnesses from any sharp edges created by the Water Dam.
7. Using silicone, fill the gaps between the valleys of the van floor and the angle, and along the body seam on the backside. This uses a lot of silicon, and will provide 1/3 of the protection. **Do not use it sparingly.**

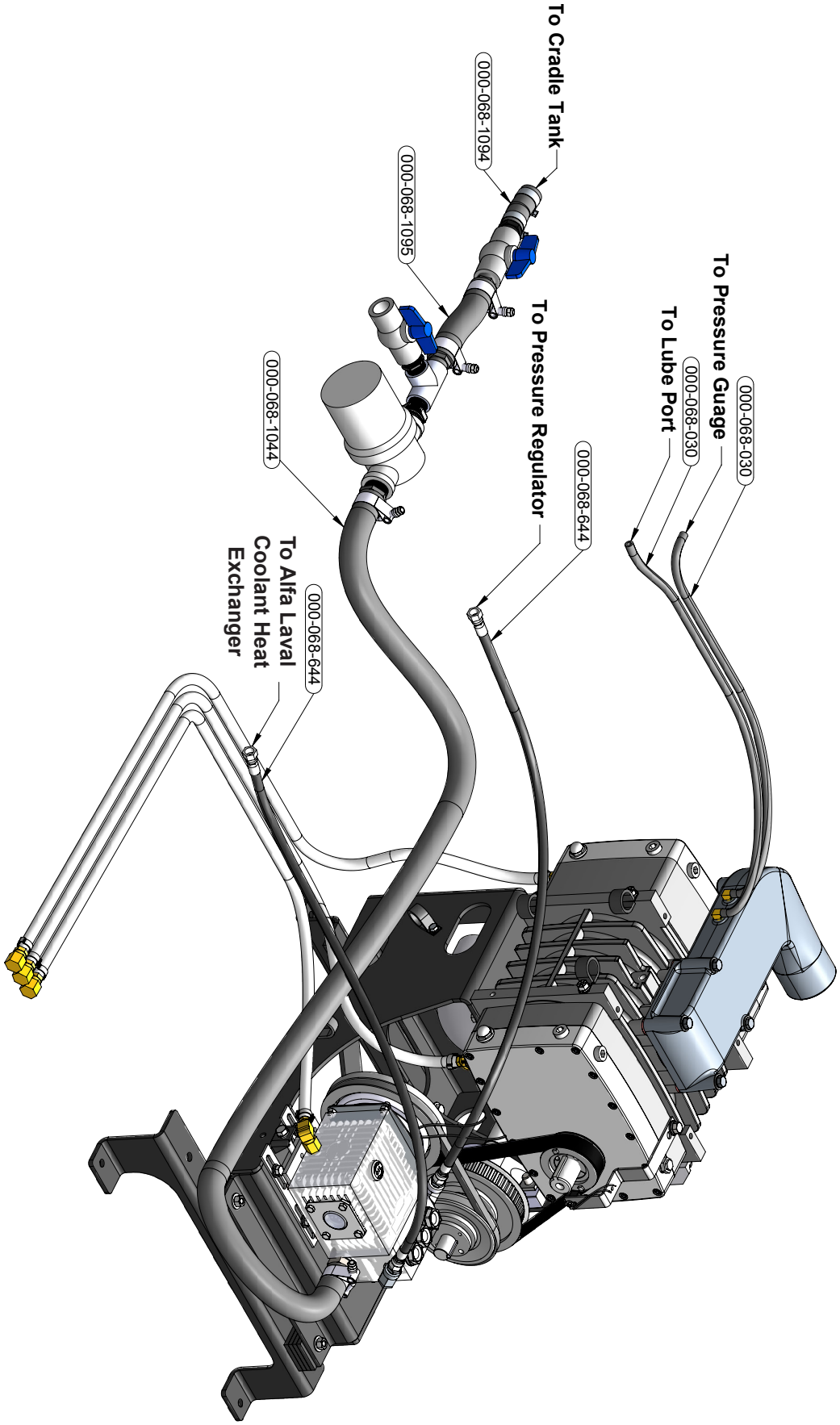
Figure 5. Application of Silicone Between the Angle and the Van's Floor

8. **Be careful drilling any holes in the van floor!** Make sure that the area below the floor is clear of vehicle components (like the fuel tank) before drilling. Drill 5/16" – 3/8" drainage holes through the van floor every 10-12" on the cargo side, within 2" of the angle. This will allow any spillage that is blocked by the water dam to drain away and help protect the van floor from long term water exposure.
9. When the silicone is dry, test the seal of the water dam by dumping a gallon of water over the width of the van with it parked on a downhill slope. Poor the water slowly at first to not overcome any section of the water dam and drainage holes. If any water has made it past the dam and over to the body seam side, mark that area to be have additional silicon sealing after the van floor is dry. Drill additional holes to the rear of the water dam as seen fit for effective drainage
10. Cut the cab van floor mat to meet the edge of the Water Dam.
11. When the seal is complete, take the van in to have the cargo area coated.

Figure 6. Installed Water Dam with Line-X and the Mat Cut to Length

Table 1. 2017 ZR CDS Standard Hose Routings

Part Number	Description	From	To
000-068-030	HOSE, 5/32" I.D. RUBBER/ VACUUM	Lube Port	Blower
000-068-030	HOSE, 5/32" I.D. RUBBER/ VACUUM	Blower	Pressure Gauge
000-068-1044	HOSE, 1" SUCTION X 41" LG.	Water Pump	ZR Cradle Tank (In-Line Filter)
000-068-1094	HOSE, 1” I.D. GREEN STRIPE X 3” LG.	ZR Cradle Tank (Shut-Off Valve)	ZR Cradle Tank
000-068-1095	HOSE, 1” I.D. SUCTION X 6” LG.	ZR Cradle Tank (Dump Valve)	ZR Cradle Tank (Shut-Off Valve)
000-068-251	HOSE ASSEMBLY, 1/4" SOLUTION X 96" LG. -ZR	Pressure Regulator	ZR Cradle Tank (Rear)
000-068-385	HOSE, 3/4" I.D. GREEN STRIPE X 18FT	Alfa Laval HX	Lower Coolant T (Brass)
000-068-385	HOSE, 3/4" I.D. GREEN STRIPE X 18FT	Coolant Flow Valve	Upper Coolant T
000-068-644	HOSE, 5/16 X 49 1/2 TEFLON W/ JIC ENDS	Water Pump	Alfa Laval HX
000-068-644	HOSE, 5/16 X 49 1/2 TEFLON W/ JIC ENDS	Water Pump	Pressure Regulator
000-068-737	HOSE,5/16"X14.5" W/J IC ENDS	Pressure Regulator	Pressure Gauge
000-068-802	HOSE ASSEMBLY, 5/16"PTFE (TEFLON) X 42" LG.	Alfa Laval	Salsa
000-068-802	HOSE ASSEMBLY, 5/16"PTFE (TEFLON) X 42" LG.	Salsa	Solution Manifold
000-068-974	HOSE, 3/4" I.D. RUBBER x 30" LG. - RED	Alfa Laval HX	Coolant Flow Valve


To Cradle Tank
000-068-1094
000-068-1095
To Pressure Regulator
000-068-644
To Pressure Guage
000-068-030
To Lube Port
000-068-030
000-068-1044
To Alfa Laval
Coolant Heat
Exchanger
000-068-644

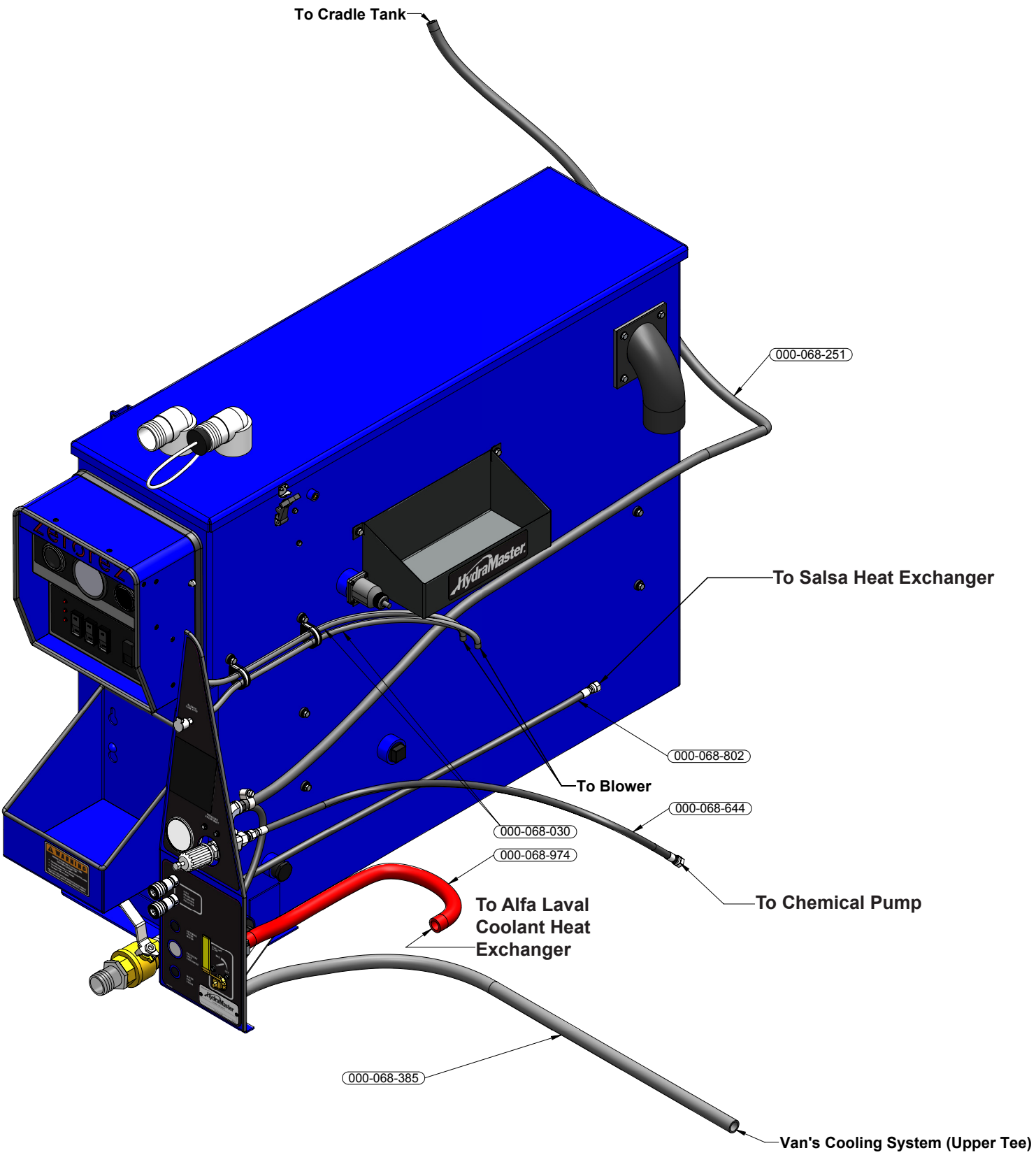


Figure 7. Recovery Tank Hose Routings

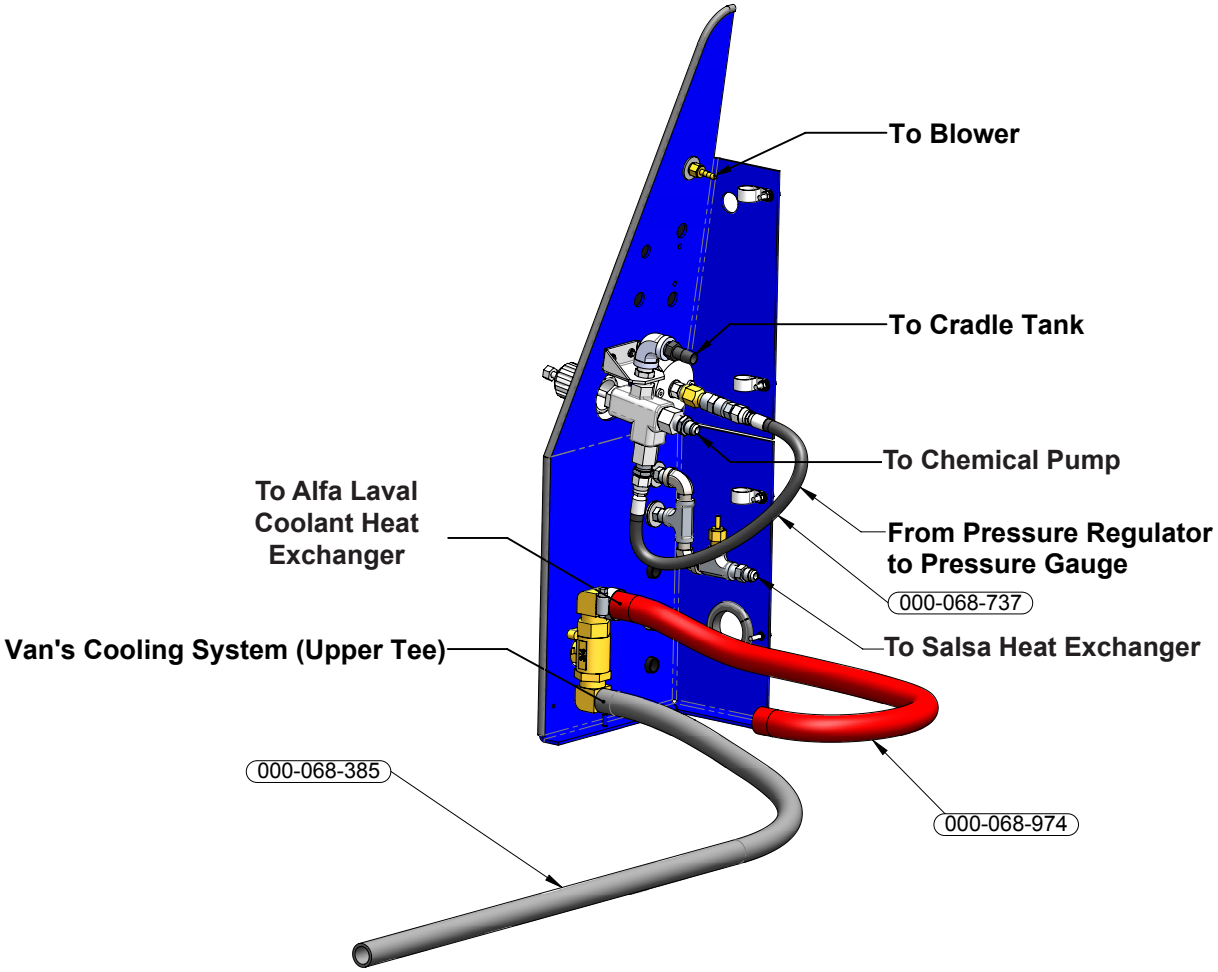


Figure 8. Recovery Tank Panel Assembly Hose Routings

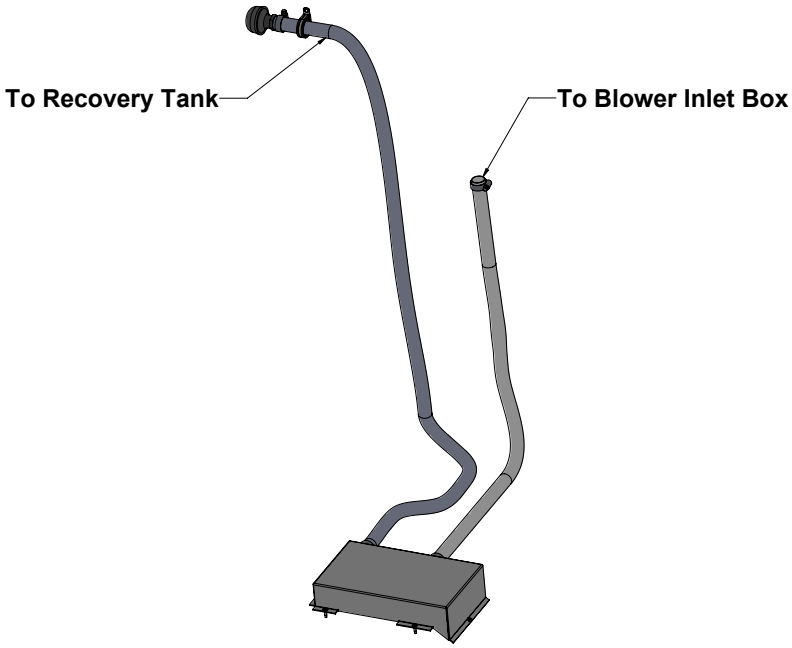


Figure 9. Yaw Sensor Assembly Hose Routings

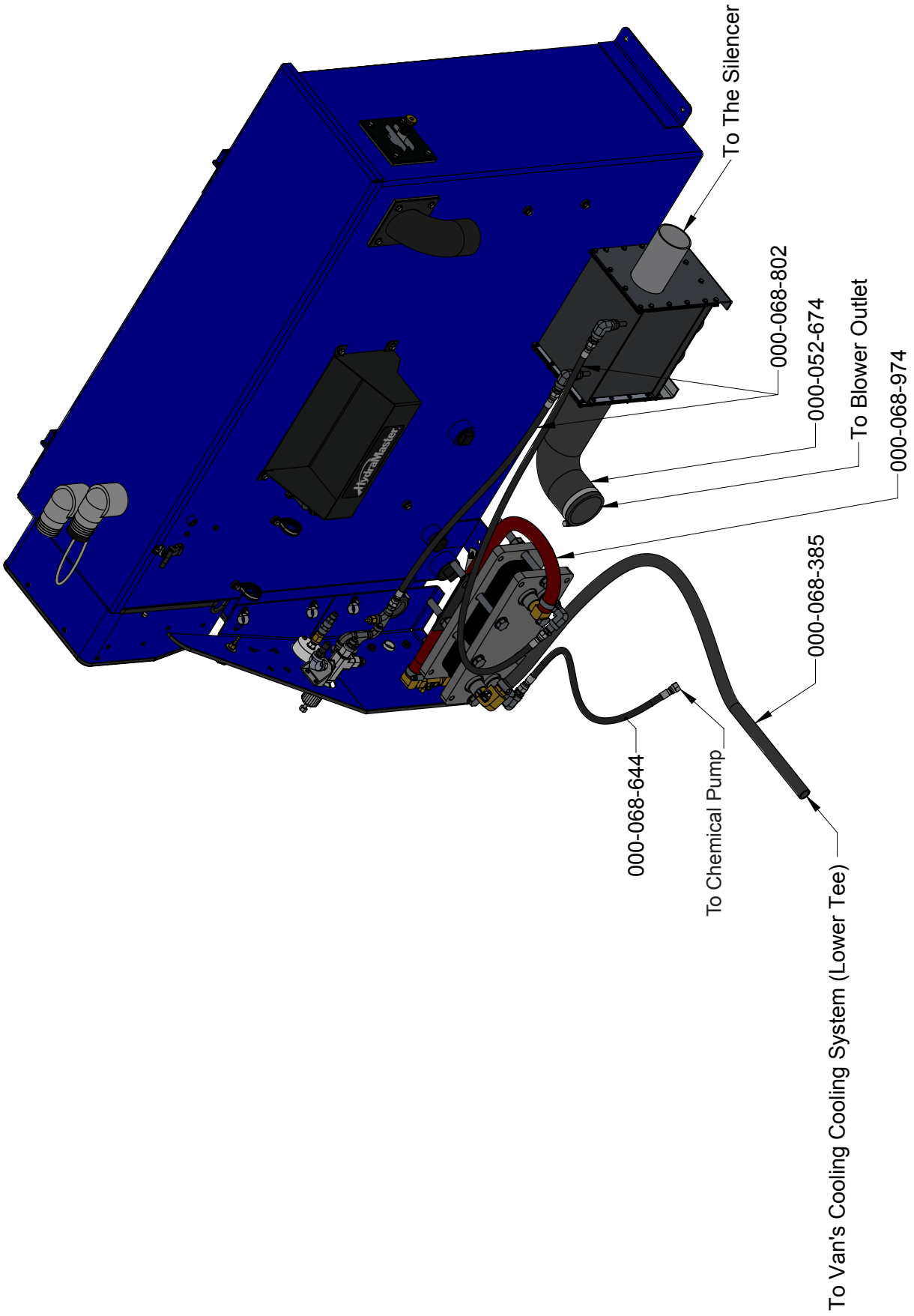


Figure 10. Heat Exchangers Hose Routings

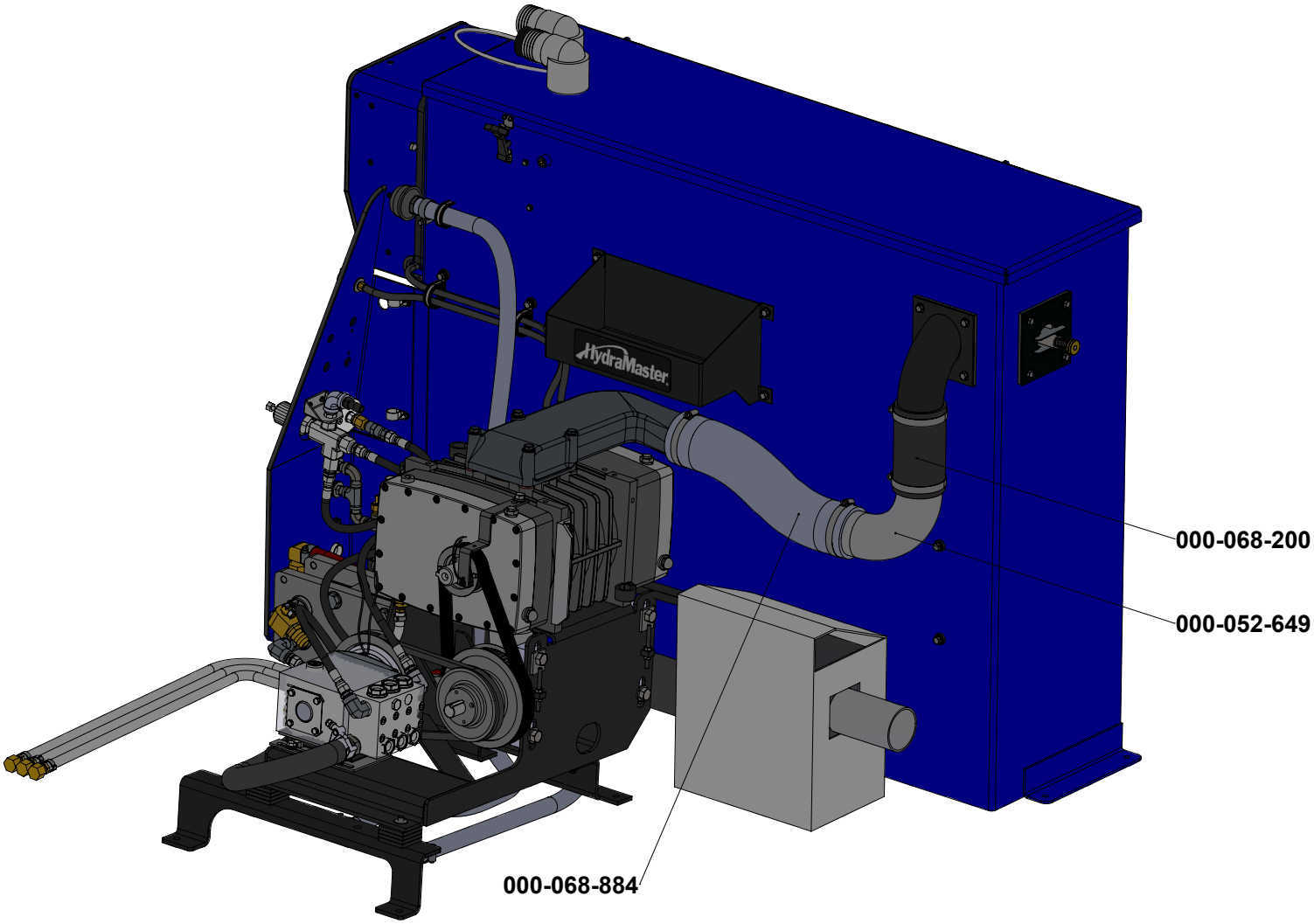


Figure 11. Power Pack to Recovery Tank Hose Routings

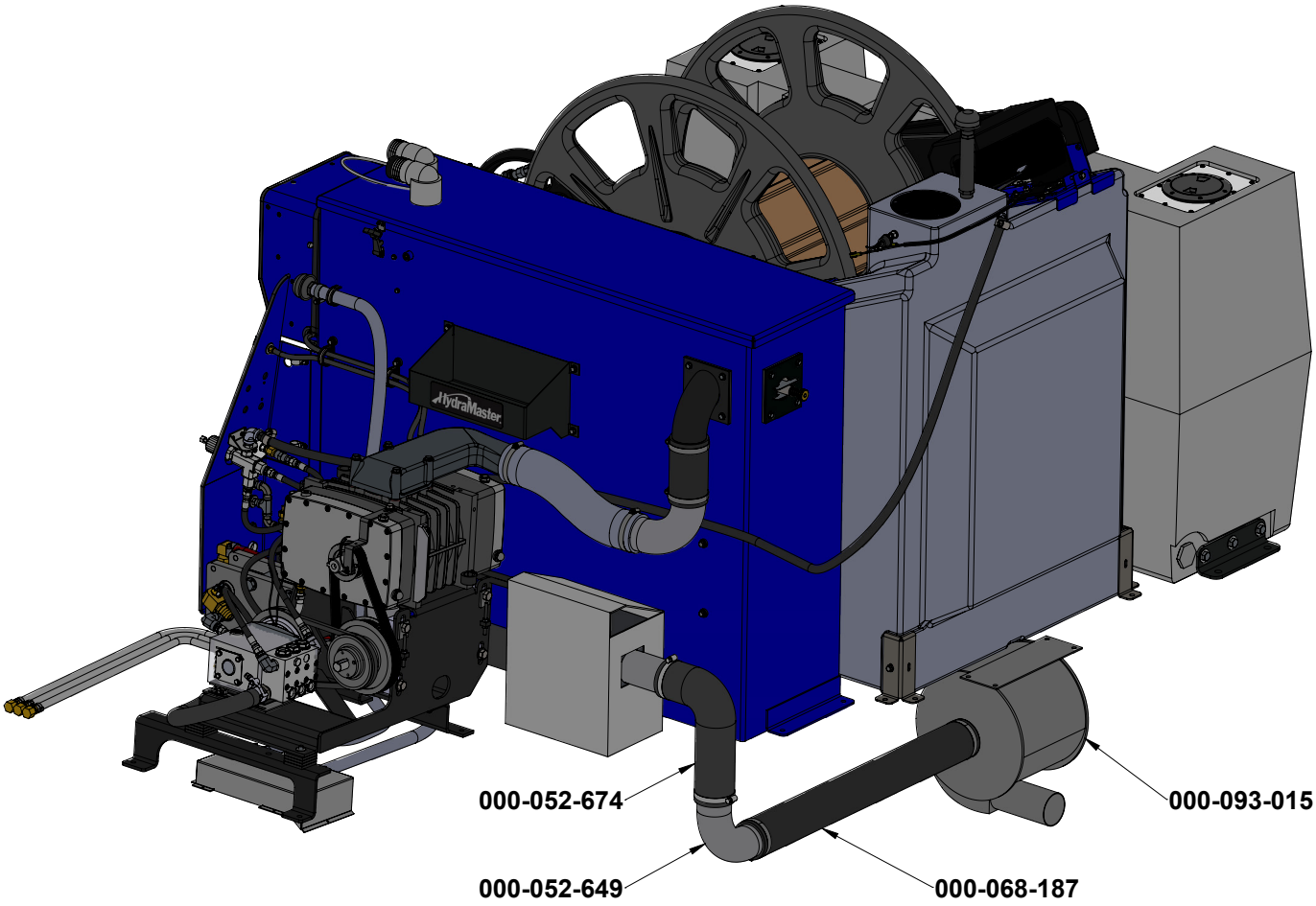


Figure 12. Salsa to Silencer Hose Routings

PREPARING VEHICLE FOR INSTALLATION

1. Remove the dog house engine cowling.
2. Remove the cup holder assembly from the engine cowling.

NOTICE

The cup holder assembly will be reused.

3. Carefully remove the plastic dash covers on the driver and passenger sides (see Figure 13). 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.
4. Remove the engine cowling.

Figure 13. Plastic Dash Covers

NOTICE

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

5. 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).
6. Locate the yaw sensor cover in the center of the floor, immediately behind the dog house, and between the seats.

INSTALLING YAW SENSOR AND SENSING DIAGNOSTIC MODULE (SDM) COVER KIT

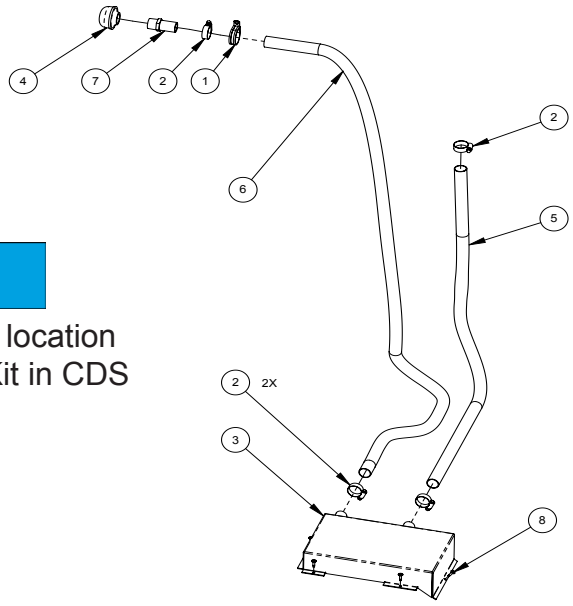
Parts included in the Yaw Sensor and SDM Kit are listed here and shown in Figure 14.

1. Remove and discard the plastic cover provided by manufacturer (see Figure 15).
2. Align and fit the new cover over the Sensing Diagnostic Module (SDM) and yaw sensor (see Figure 16).
3. Ensure the dam is positioned between the SDM and yaw sensor; route the wires through the two wire exits on the cover, and apply silicone to the flanges liberally (see Figure 17).
4. Lower the cover, make sure it is as flush as possible with the van's floor and fasten the unit to the floor with the self-tapping screws provided (see Figure 18).
5. Apply silicone to the exposed edges and around the wire exits to seal the unit.

CAUTION

Inspect the wire exits to ensure there are no burrs, if necessary, remove the burrs and nicks that can result in damage to wires. This type of damage is not covered in the warranty.

Item	Part Number	Description	Qty
1	000-033-053	Clamp, 1-1/2" Cushion Loop	1
2	000-033-029	Clamp, Size #12 Hose	4
3	000-041-323	Cover, Yaw Sensor and SDM Weld	1
4	000-049-020	Filter Screen - Medium	1
5	000-068-830	Hose, 1" Vacuum - Gray W - 56"	1
6	000-068-828	Hose, 1" Vacuum - Gray W - 84"	1
7	000-052-908	Insert 3/4 X 1 Hose w/o Barb	1
9	000-143-058	Screw, #8 TEK X 3/4" Lg.	4



NOTICE

See Figure 1 for location of Yaw Sensor Kit in CDS configuration.

Figure 14. Yaw Sensor and SDM Kit Assembly

Figure 15. Remove and Discard Plastic Cover

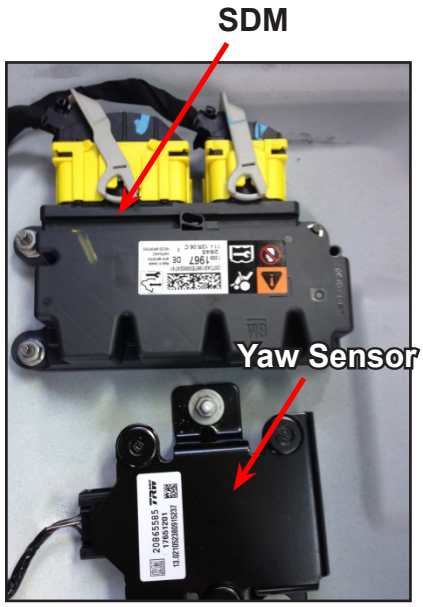


Figure 16. Fit New Cover over SDM and Sensor

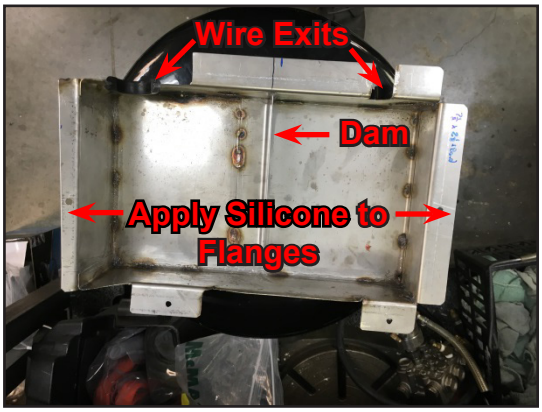


Figure 17. Route Wires through Two Exits

Figure 18. Lower New Cover over SDM and Sensor

CAUTION

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

CAUTION

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

1. Connect the two 1" flex hoses to the new cover over the yaw sensor. Use the provided hose clamps to secure the hoses (see Figure 19).

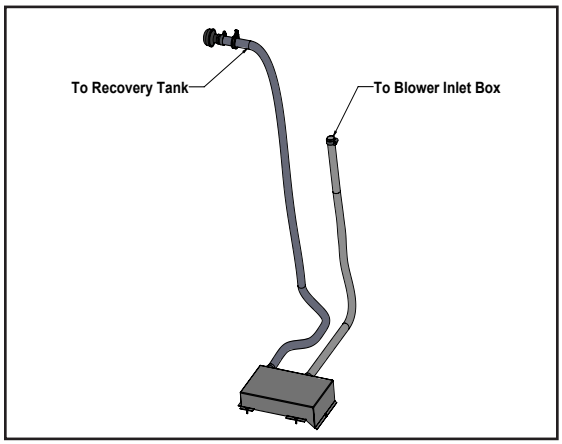


Figure 19. Route and Connect 2 Flex Hoses

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 cover (driver's side) to the blower inlet fitting.

2. Install the hose insert and filter screen onto the end of the longer hose (see Figure 20).

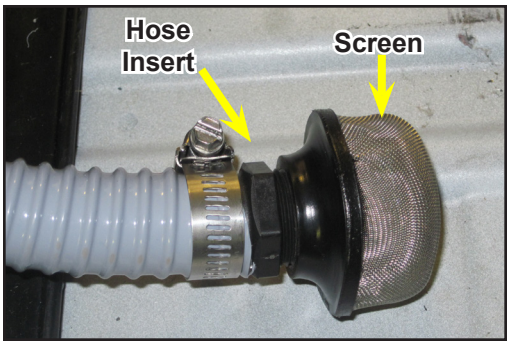


Figure 20. Install Hose Insert and Filter Screen on the Longer (Passenger-Side) Hose

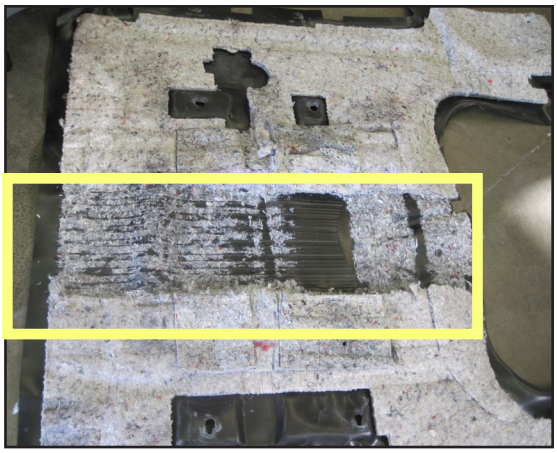


Figure 21. Remove Batting from Floor Mat

3. 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 21). This will allow the routing of the 1" hose under the Blower for proper cooling of the yaw sensor.

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 leaks and spills.

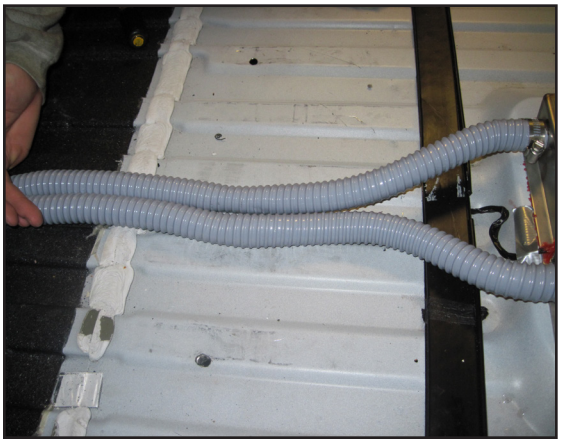


Figure 22. Route Hoses Straight Back Toward Cargo Area

4. 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 22).

NOTICE

The final assembly will have a 1" diameter hose attached to the blower inlet and a 1" diameter hose routed toward the front of the CDS side panel.

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

NOTICE

The Power Pack front and rear spacers allow routing of the two 1" hoses, under the Power Pack, up to the blower inlet and behind the front panel of the CDS.

Figure 23. Installed Yaw Sensor cover with front mat laid over it

FRONT END INSTALLATION

1. Open hood and disconnect negative battery cable at the battery.

⚠ WARNING

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

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 throttle body intake.
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.

PREPPING 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.

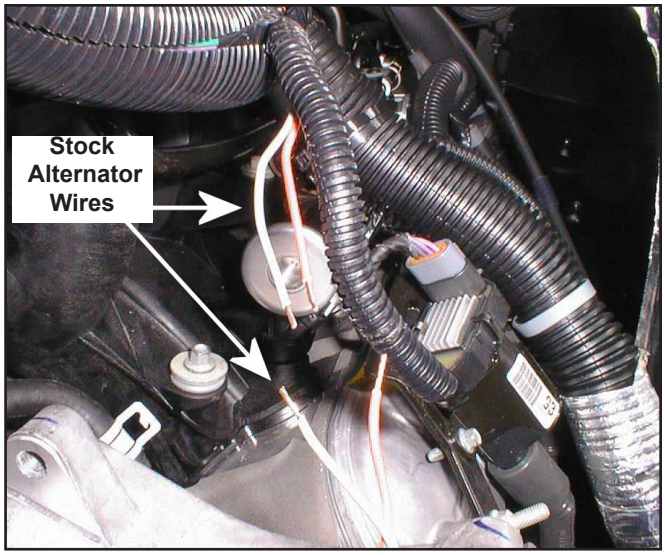


Figure 24. Routing Extended Wires

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.
3. Remove the 6-gauge red battery cable by pulling the boot back and then loosen the nut to remove the cable.
4. Remove the 2 bolts that mount the alternator.
5. Remove the alternator from the bracket.
6. 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 1/4" wire loom provided and routed along the main Chevy wire harness that runs forward (Figure 24).

7. 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.
8. Assemble the alternator into the clutch housing using the hardware provided. The clutch housing is designed to accommodate heavy-duty alternator.
9. Ensure the 2 brackets are attached to the bottom 4 holes regardless of the alternator size. The alternator will need to be rotated so that the stud is on the bottom (Figure 25).
10. Use Loctite 242 on the 4 screws that secure the brackets to the clutch housing.
11. Torque alternator bolts to 30 ft lbs.
12. Attach the new battery cable extension lead provided in this kit to the back of the alternator (see Figure 26). The end with the red boot will attach to the alternator stud (see Figure 26).
13. Remove the plastic clamp used to secure harness to the intake. This allows the drive shaft knuckle clearance.
14. Cable tie the harness to allow the shaft knuckle to clear the harness.

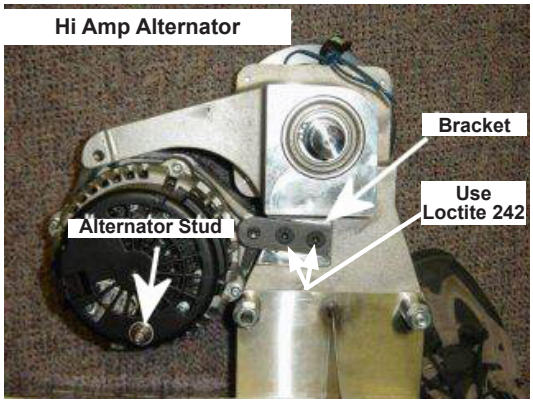


Figure 25. Assembled Clutch Assembly before Installation

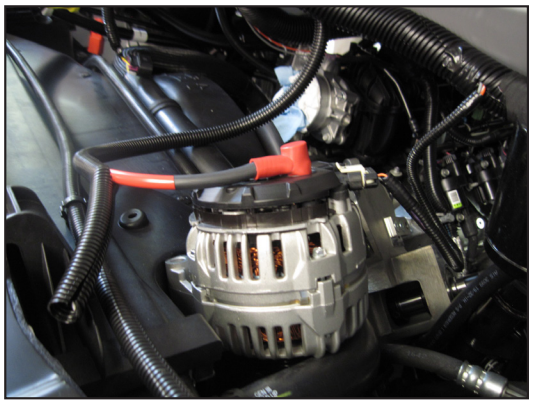


Figure 26. Attach New Battery Cable

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.

15. 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.

MODIFYING CLUTCH HOUSING MOUNT CRADLE BRACKET

You will need to grind off the corner of the stock bracket in order for the assembly to fit.

1. Large case alternator will need to have a small portion or 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.

2. See the following figures to gauge the grinding of alternator bracket.
   a. Remove the top right corner of the bracket as shown in Figure 27.
   b. Mark the corner 1-1/8" in length and 3/8" deep as shown in Figure 28.

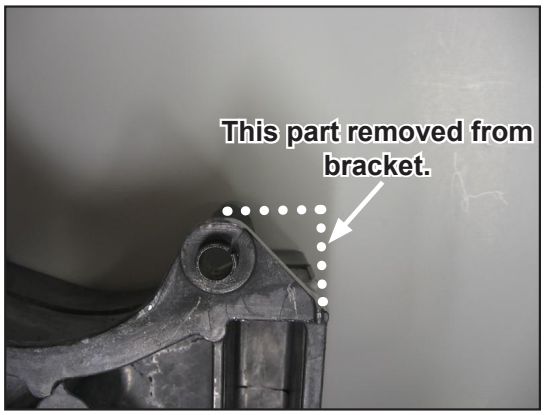


Figure 27. Remove Top Right Corner of Bracket

3. 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 29.
   a. Use a 0.025" feeler gauge to verify the alternator/bracket clearance.

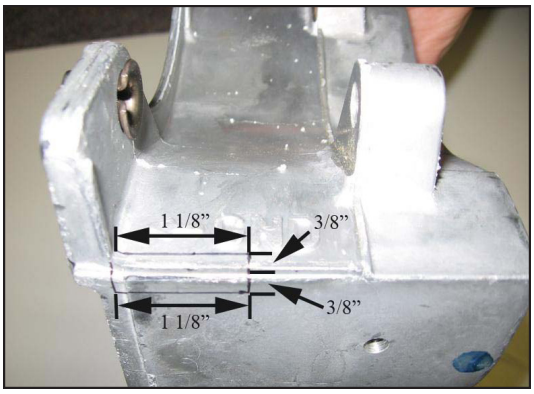


Figure 28. Mark Corner

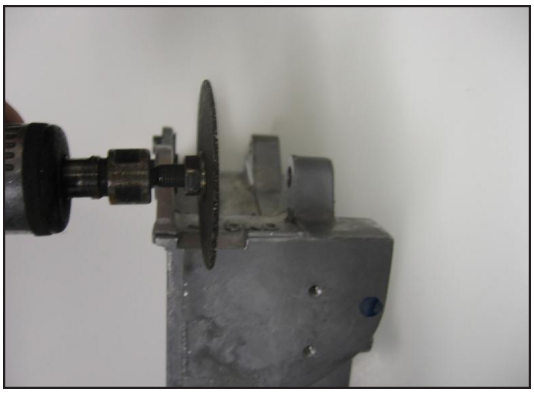


Figure 29. Use Die Grinder to Cut into Bracket

INSTALL CLUTCH ASSEMBLY

1. Install the safety ring (fly strap) to the back of the driver side head (see Figure 30). Rotate the fly strap clockwise as far as the bracket will allow. 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.
2. Install clutch housing onto the cradle mount. Next install the van's alternator into the clutch housing.
3. Attach a ring terminal and a blue connector to the clutch's two black wires.
4. Attach the driveshaft to the clutch shaft. Resting the drive shaft on the safety ring.
5. Ground the clutch by inserting the ring terminal between the flat washer and the protector bracket. (Figure 31)
6. Next install the shaft protector bracket onto the clutch housing.

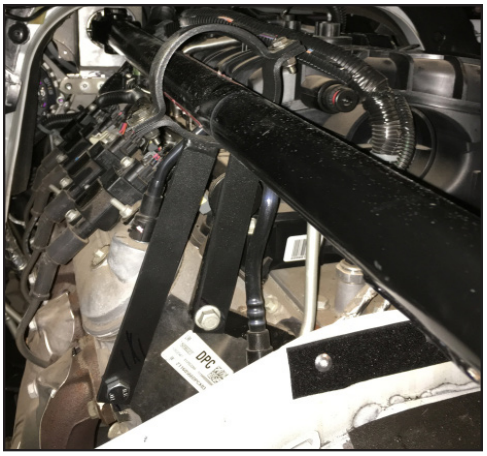


Figure 30. Driveshaft resting on a fully installed safety ring

Figure 31. Grounding location on the clutch housing

USING THE CLUTCH HOUSING MODIFICATION TOOL AND INSTALLING THE PULLEY

1. Remove the clutch coil and the clutch spacer plate. (Figure 31a)

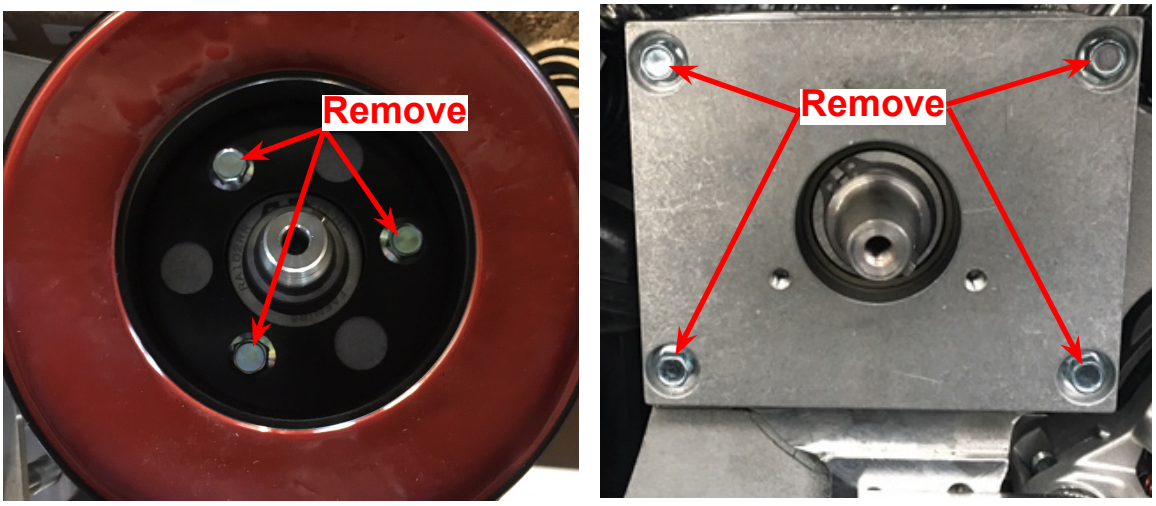


Figure 31a. Preparing the Clutch Assembly

2. Install clutch housing modification tool onto the clutch shaft using the provided washer and 5/16-24 x 1.75" bolt. Hand tighten to bolt.
3. Use a 3/4" Wrench to loosen the roller arm and move it to the lower limit. Hand tighten the bolt once the arm is at the lowest point.
4. Using a 1/2" Drive Ratchet Wrench, slowely roll the tool onto the firewall above. Repeat the process a few times so a proper indentation has been made on the sheet metal.
5. Use a 3/4" Wrench to loosen the roller arm and move it to the highest limit. Hand tighten the bolt once the arm is at the highest point.
6. Once again, using a 1/2" Drive Ratchet Wrench, slowely roll the tool onto the firewall above. Repeat the process a few times so a proper indentation has been made on the sheet metal.
7. Remove the clutch housing modification tool from the clutch shaft and reinstall the the clutch spacer plate and the clutch coil using blue loctite to the bolts.
8. Next install the clutch pulley onto the clutch housing installed in the previous step, torque the bolt to 19 lbf.ft. (Figure 32)
9. 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 (Figure 32). Use blue Loctite on the bolts and tighten them evenly and torque to 30 lbf.ft.
10. Install the top of the safety ring and secure using supplied bolts and nut. Temporarily rest the drive shaft on the safety ring until the Blower Power Pack is installed.

NOTICE

See Figure 33 on the next page for the full assembly.

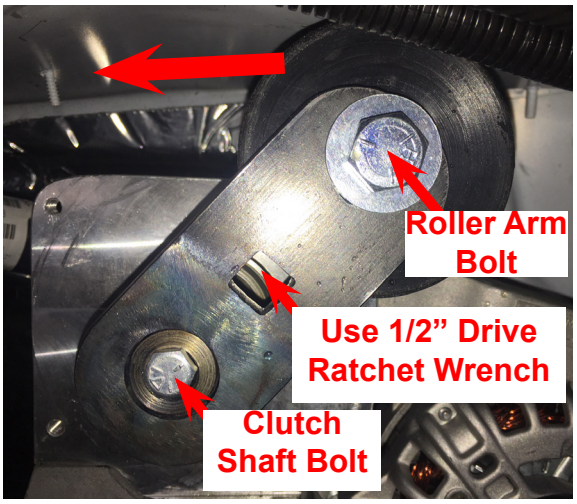


Figure 31b. Installing the clutch pulley and clutch housing

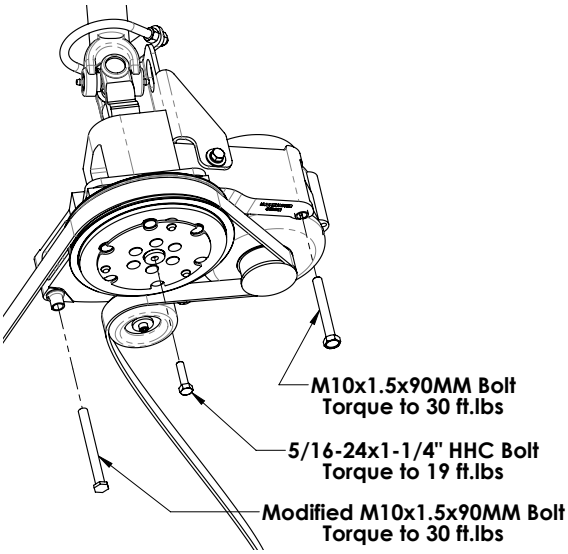


Figure 32. Installing the clutch pulley and clutch housing

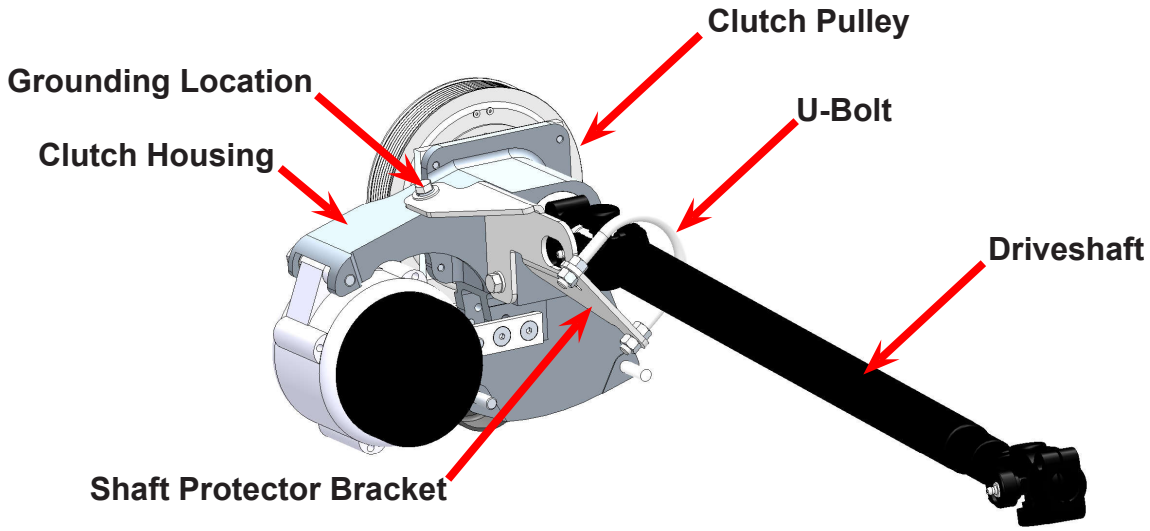


Figure 33. The Clutch Assembly Along with the Driveshaft

NOTICE

2016 model year vans require a different tensioner standoff spacer and replacement of the factory power steering pulley. Before beginning the installation ensure that the kit has been included with your purchase as a line item. Please contact the factory for Kit ZR CDS Chevy 2016 Pulley and Spacer. (PN: 000-079-222)

INSTALL THE BELT TENSIONER OFFSET SPACER

1. Remove the belt tensioner from the engine. Retain the factory bolts to reinstall the tensioner.

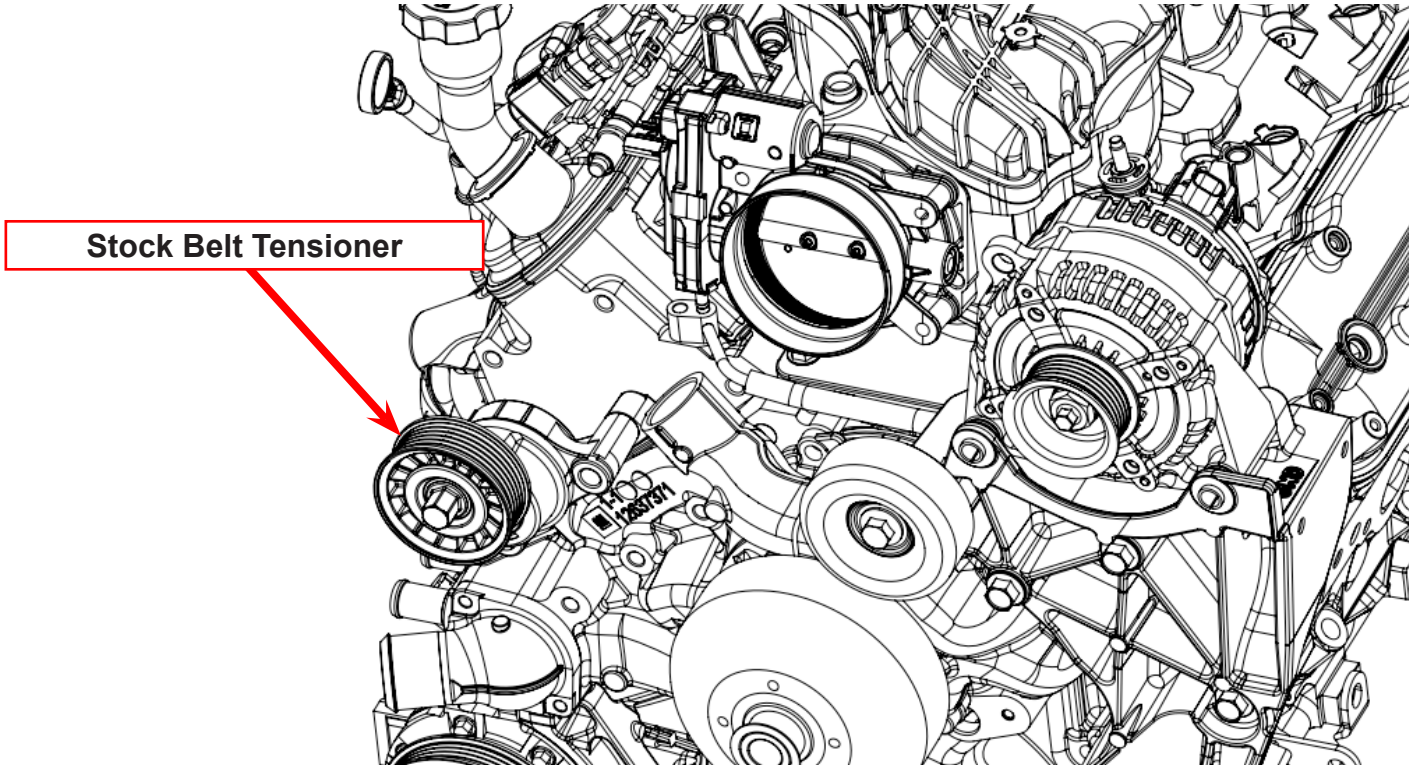


Figure 34. Stock Belt Tensioner

2. Install the tensioner standoff spacer (For 2017- Now model year vans use PN 000-154-225 included standard as part of the front end kit and for 2016 Model year vans use PN 000-154-221 included as part of 000-079-222 kit) using two M10 X 30mm screws (PN 000-143-078). Torque the bolts to 25 Ft*Lbs.

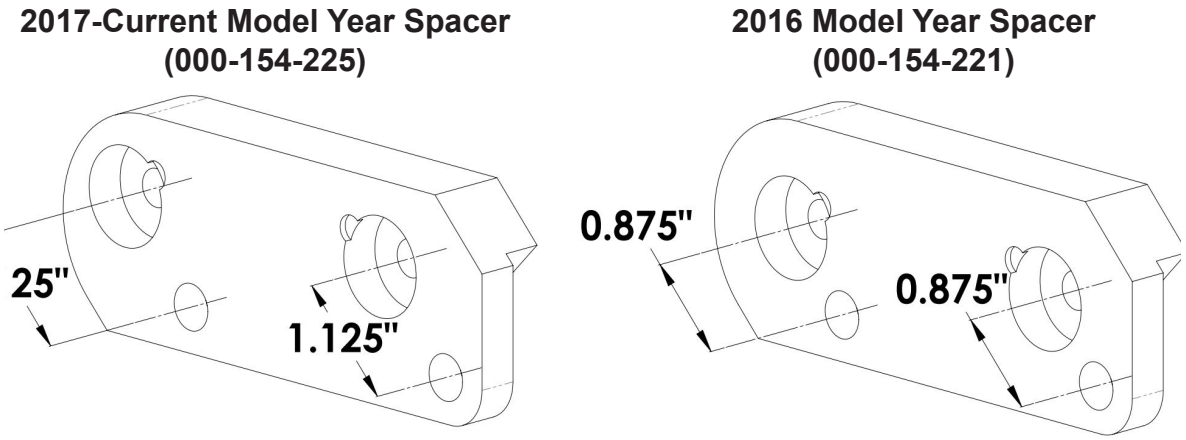


Figure 34a. Tensioner Offset Spacer 000-0154-225 (2017-Now) vs. 000-154-221 (2016)

INSTALL THE NO SLACK BELT TENSIONER

1. Install Hydramaster No Slack Tensioner (PN 000-109-139) the belt tensioner onto the tensioner standoff spacer using the factory bolts. Torque the bolts to 37 Ft*Lbs.

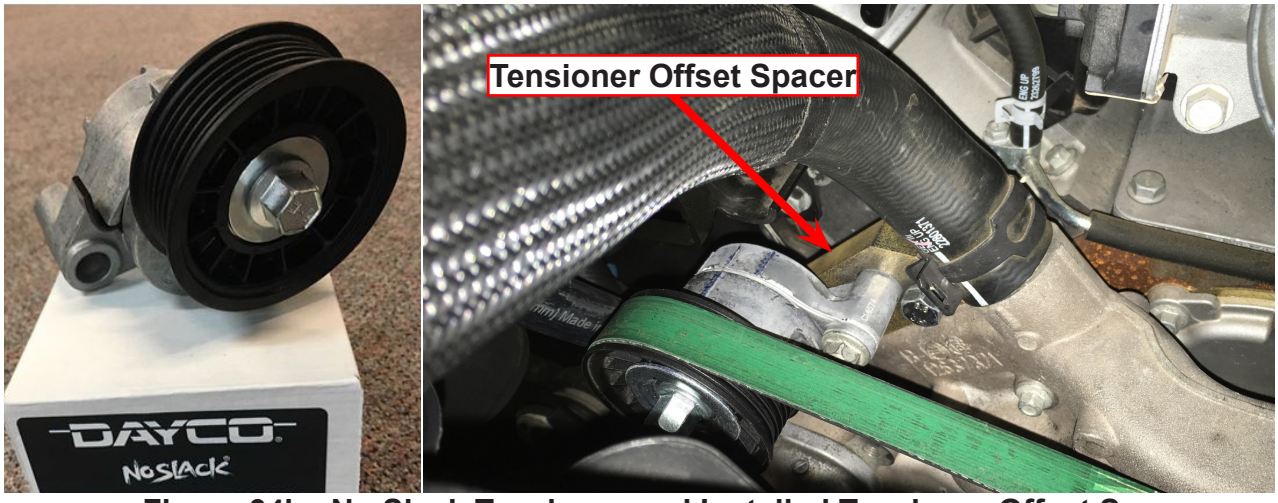


Figure 34b. No Slack Tensioner and Installed Tensioner Offset Spacer

REPLACING THE IDLER PULLEY ON VANS WITH HEAVY DUTY (145A AND 150A) ALTERNATORS

NOTICE

Skip this section if the van came with stock 105A or 110A Aleternator.

1. Remove 90mm Idler Pulley between the alternator and the tensioner with the 76mm CDS Idler Pulley (PN 000-109-095).
2. Torque the bolt to 37 Ft.*Lbs.

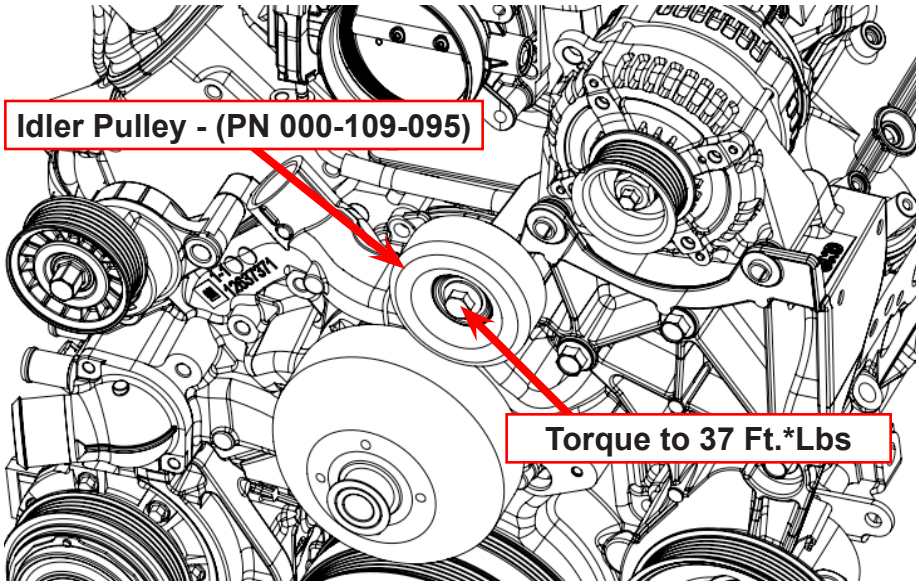


Figure 34c. 76mm CDS Idler Pulley

REPLACING THE POWER STEERING PULLEY ON 2016 MODEL YEAR VANS

1. Remove the stock power steering pulley on 2016 model year vans.
2. Install the Power Steering Pulley provided as part of 000-079-222 (PN 000-109-137) in place of the stock pulley. Torque to 37 ft.*lbs.

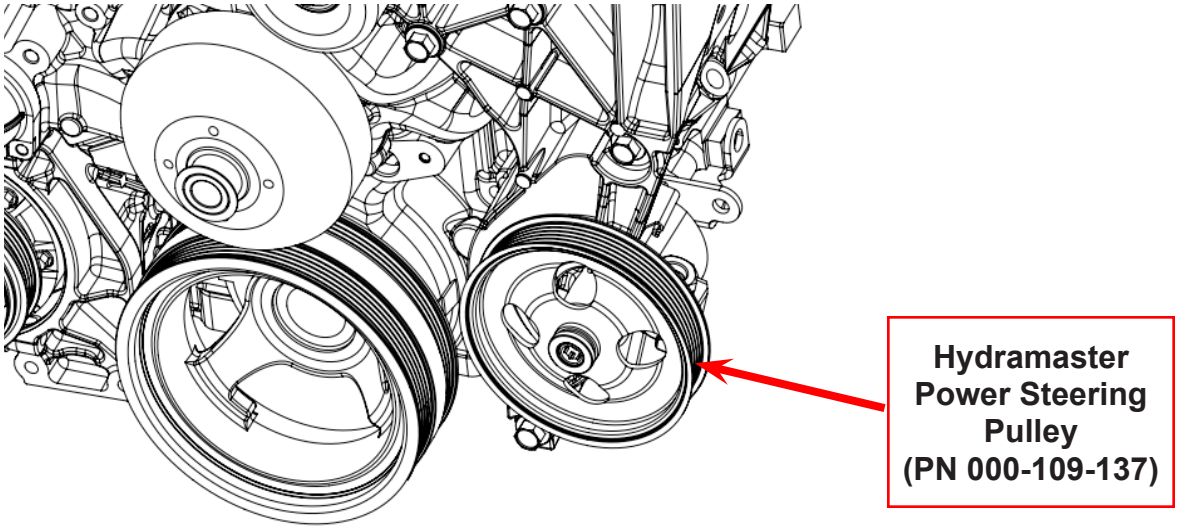


Figure 34d. Hydramaster Power Steering Pulley

INSTALLATION OF THE DRIVE BELT

Install the supplied drive belt using the routing diagram in Figure 35. Ensure the belt is centered by leaving one groove is left empty on each side of the pulley. (Figure 36)

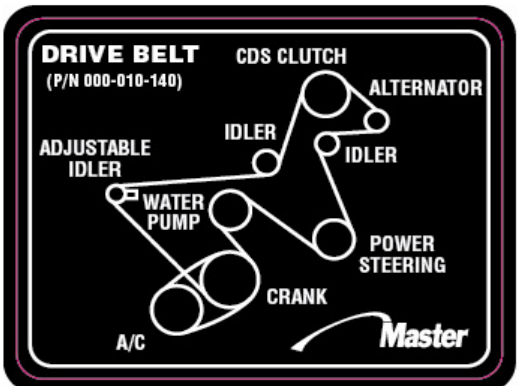


Figure 35. Routing Diagram for Drive Belt

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 post to the firewall. This eliminates the need to cut off the original ring connector or splice the wire (see Figure 37 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.
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 37 and Figure 38).

Figure 36. Center the Belt on the Pulley by Leaving One Groove Empty on Each Side

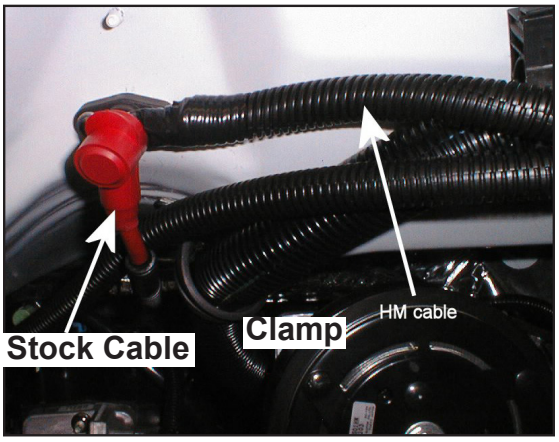


Figure 37. Mount Terminal Block to Firewal

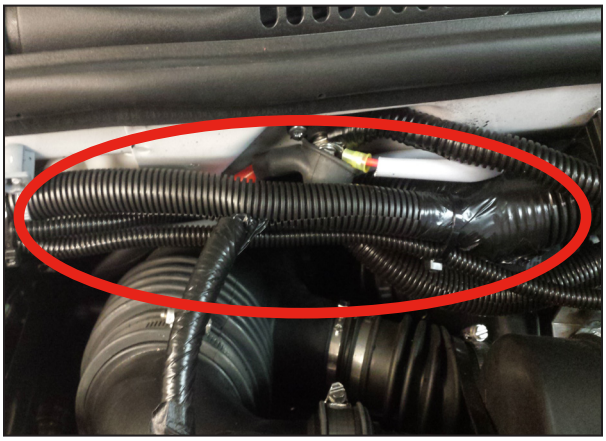


Figure 38. Hold Main Wire Harness Away from CDS Clutch

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, or anything that may rub on the drive shaft. Secure as necessary.

AIR INTAKE RESONATOR MODIFICATION

1. Remove the clamp attaching the resonator (silencer) to the air intake unit (Figure 39).
2. Dismount the resonator from the air intake unit by pulling the resonator up. The resonator is attached to the air intake unit with 2 rubber grommets (Figure 40).
3. Do not damage the grommets; they will be used in a later step.
4. Slide the resonator off the hose that connects it to the air intake unit (Figure 41). Carefully remove the unit from under the hood. Remove the rubber grommets from the mounting location on the resonator.

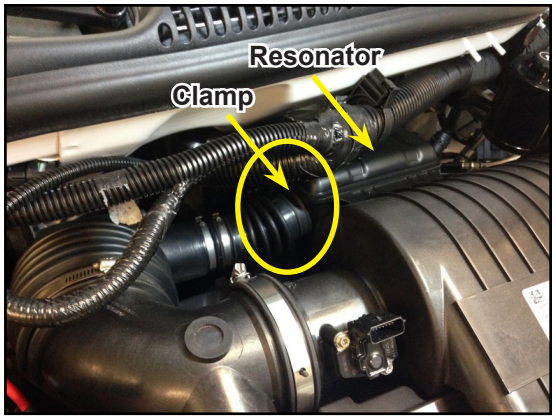


Figure 39. Remove Clamp from Air Intake Unit

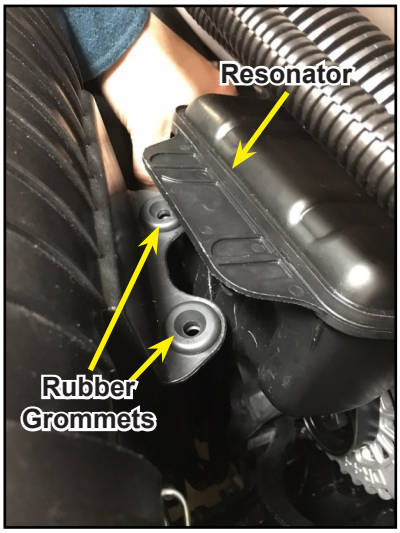


Figure 40. Pull the Silencer UP Vertically to Dismount

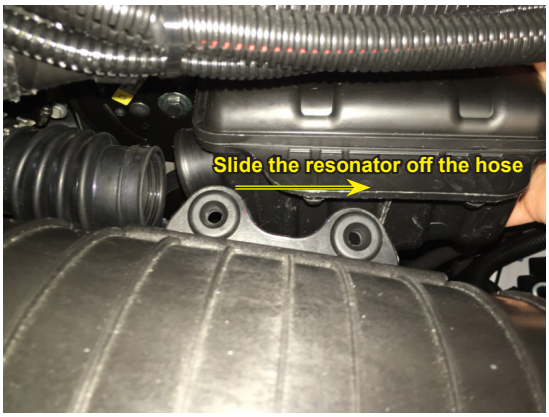


Figure 41. Slide Resonator Off Hose; Remove Resonator from under Hood

NOTICE

The following steps should take place after the clutch has been installed.

1. Mount the bracket onto the air cleaner housing, using 2 flat head bolts, 2 washers and 2 nuts, all provided in the kit. Refer to Figure 42 as a guide to the following component order (stack up is from the bottom, up):
   a. Flat head bolt
   b. Bracket
   c. Air intake unit mount
   d. Washer
   e. Nut

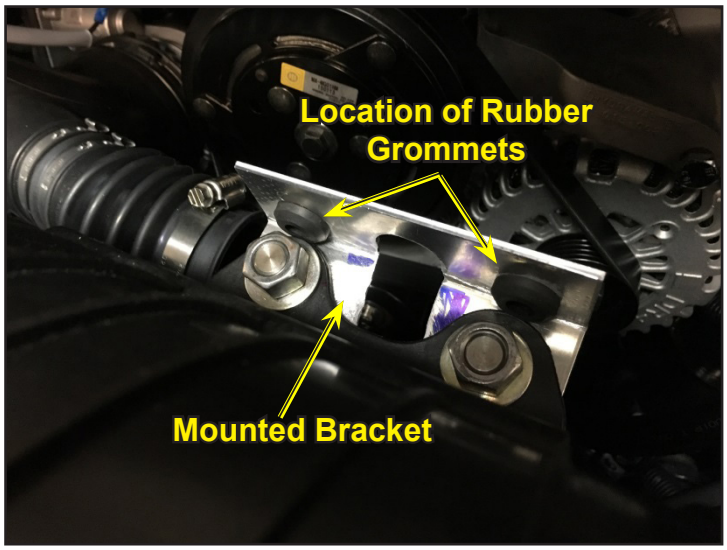


Figure 42. Mount Bracket Using Flat Head Bolts, Washer and Nuts

2. Place the grommets, which were removed in the procedure on previous page, in the holes adjacent to the nuts (Figure 42).
3. Attach the resonator to the hose using the provided clamp.

4. Mount the resonator to the air intake unit via the rubber grommets.
5. Route the large tie wrap between the air intake unit and MAF sensor as seen in Figure 43.
6. Tighten the tie wrap to minimize the resonator's movement.

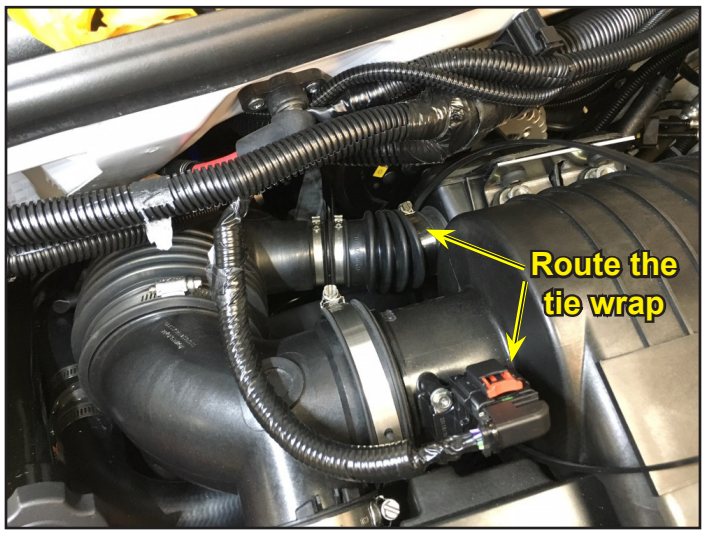


Figure 43. Route Tie Wrap Around Hose and Inlet

Figure 44 shows photos of the finished installation. Note that there should be plenty of space between the resonator and the clutch.

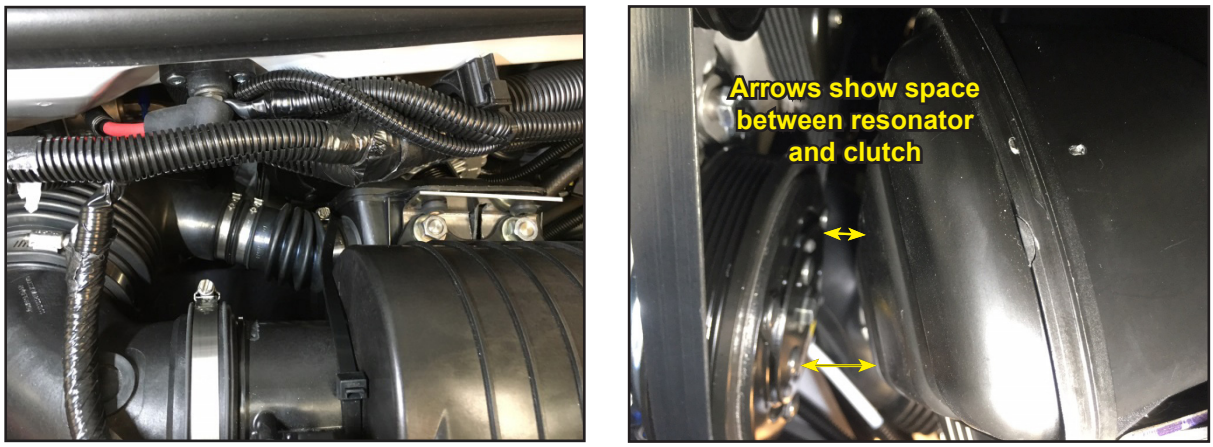


Figure 44. Note Space between Resonator and Clutch

COMPLETION OF FRONT END

1. Re-installation the air cleaner housing assembly
2. Re-install radiator overflow container.

DRAINING ENGINE COOLANT

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 ¾" 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 45).

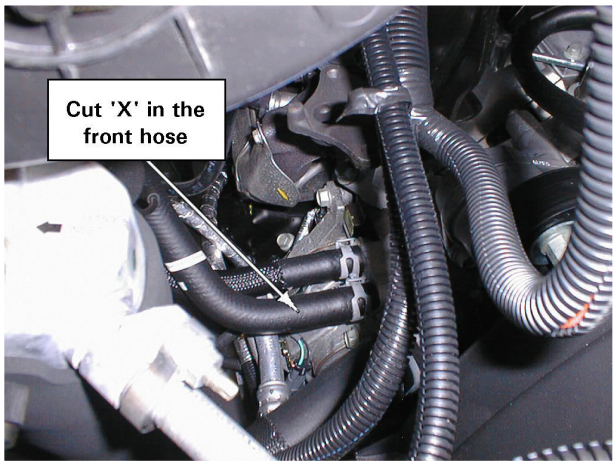


Figure 45. Cut Small 'x' 2.5" from Water Pump Hose

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 ¾" 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.**

⚠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.

INSTALL THE COOLANT HOSES AS FOLLOWS

1. 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.
2. Install the provided ¾" tee into the ¾" lower hose coming off the water pump (the same hose from which the coolant was drained).
3. 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 46).
4. Leave the provided ¾" green stripe hose in its full length.
5. Feed the two ends, from the passenger compartment, over the passenger valve cover to the front of the van and attach to the tees.
6. Carefully route the hoses away from any moving parts, sharp edges or hot parts.
7. Secure the hoses with provided clamps (see Figure 47).

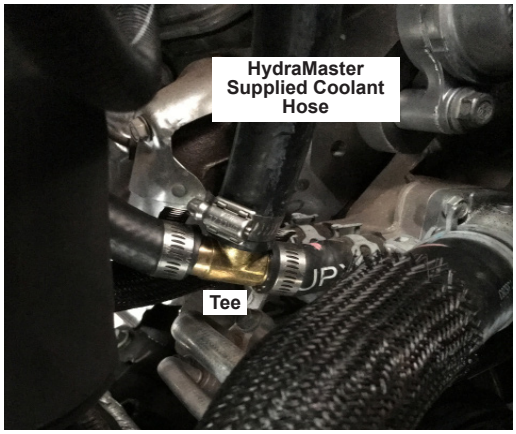
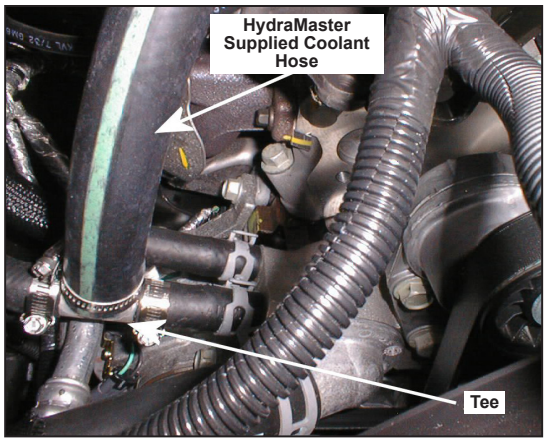
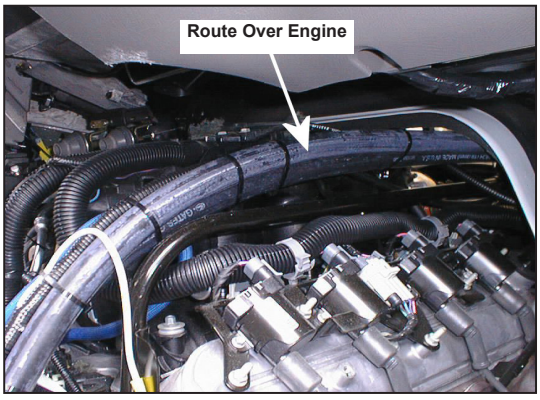


Figure 46. Cut Hose in Half and Install the brass Tee

⚠WARNING

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





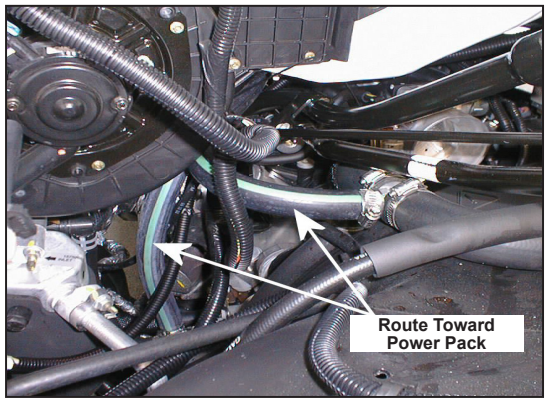


Figure 47. Secure Hoses with Provided Clamps

INSTALLING POWER PACK ASSEMBLY

⚠ WARNING

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

The Power Pack Assembly includes the Frame Assembly, the Blower Assembly and the Pump Assembly (Figure 48).

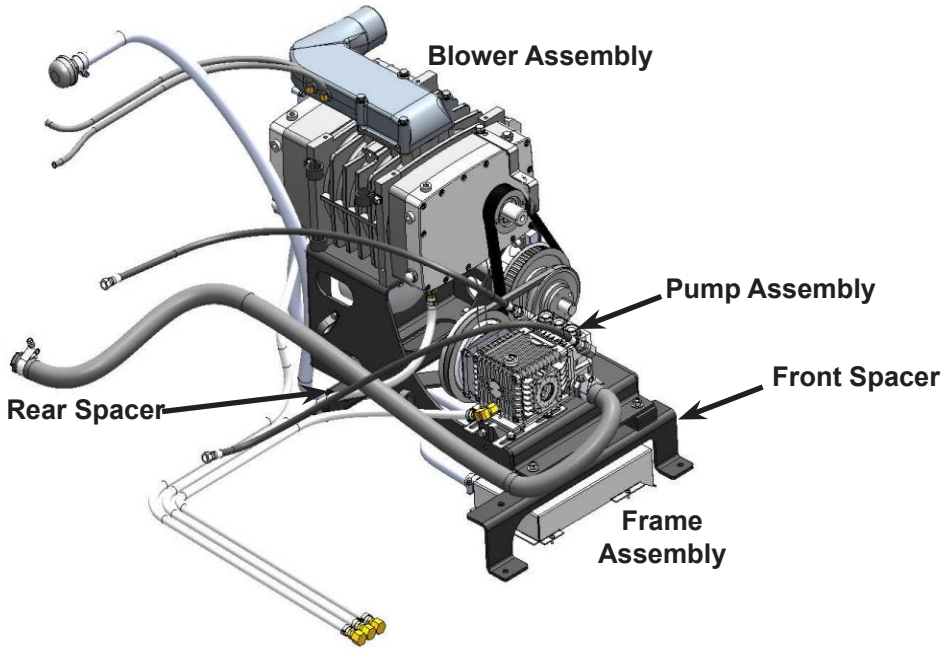


Figure 48. Power Pack

1. Use the blower spacers (PN: 000-174-204) to raise the front of the blower to be within 3% offset of the clutch's shaft. 4 of the left side, 4 on the right side. The rear spacer does not require any of the power pack spacers.
2. Use the blower templates to drill 3/8" diameter holes for the front blower spacer mounting feet PN: 000-105-791 & 000-105-792.
3. Place the driver side template (Marked with a **D**, PN: 000-105-791) on the driver seat studs on the floor of the van. Drill a hole for the left mounting hole on the front spacer.
4. Place the passenger side template (Marked with a **P**, PN: 000-105-792) on the passenger seat studs on the floor of the van. Drill a hole for the right mounting hole on the front spacer.

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.

5. Fasten the front blower spacer to the van's floor using the hardware provided in the 601-015-743.

NOTICE

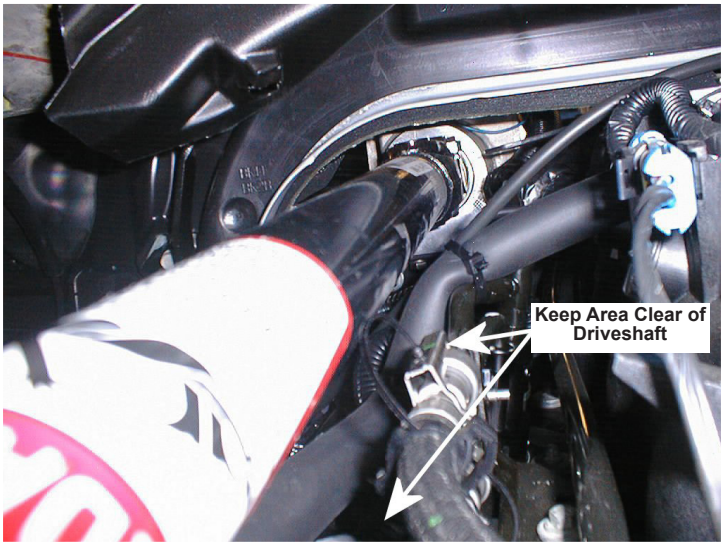


Figure 49. Slide Yoke into Drive Shaft

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".

6. With the Power Pack in place, drill 3/8" two holes for the rear of the power pack through the floor using the Blower frame spacer as a template.
7. Dry fit tank, seats and Salsa to make sure doors close and tank lids open all the way. Blower placement is the key to a good fit and finish.
8. Bolt the Power Pack down with the provided hardware in 601-015-743.

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 blower inlet and behind the front panel of the CDS.

INSTALLING THE WIRE HARNESS

Harness wire colors and functions are:

Red	–	Main power (10 gauge)
White	–	Main ground (10 gauge)
Red	–	for AWDS if selected (16 gauge)
Green	–	Tachometer pick up on Blower (18 gauge)
Black	–	Clutch, CDS (14 gauge)
Blue	–	Pump clutch 4.8 (18 gauge)

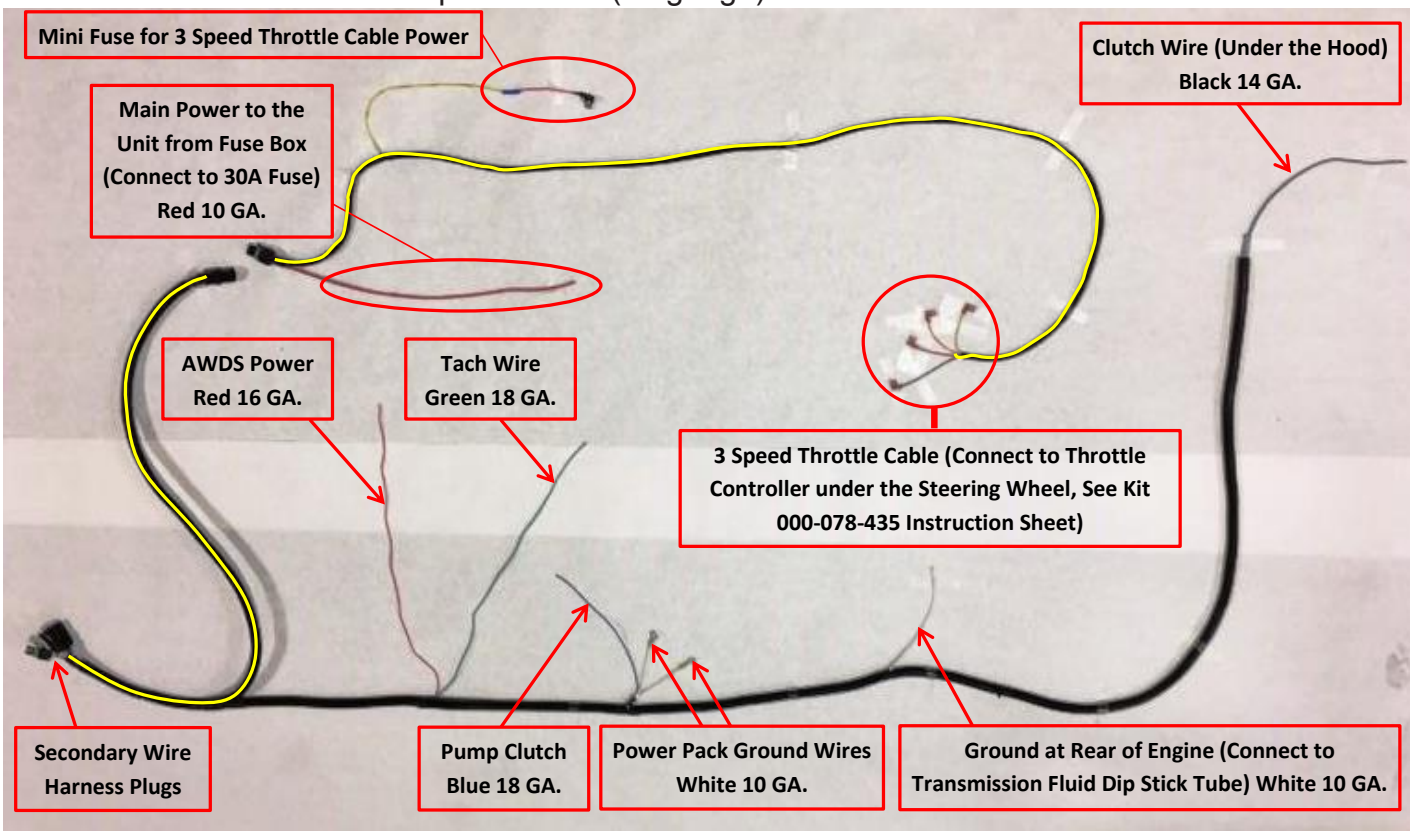


Figure 50. Secondary Wire Harness Breakout

1. Plug the Secondary Wire Harness (000-063-084) into the recovery tank, behind the power pack (Figure 51).
2. Route the branch of the harness with the 3 Speed Throttle Cable and main power wires through the cushion clamp on the driver's side of the blower and to the fuse box located under the driver's seat. Secure the harness with wire ties to the clamp to prevent it from touching the van floor and blower exhaust hose between the blower and the exhaust heat exchanger. Connect the mini-fuse into the fuse box. Connect the 10 AWG red wire to the power source of the fuse box and mount the larger fuse to the top of the fuse box cover.
3. From the fuse box, route the 3 Speed Throttle Cable under the driver's side floor mat, along the step, up to the A-pillar by the emergency brake release, and along the wall to the OBD II plug in. Tie wrap or tape to the transmission shift cable (refer to Figure 52)

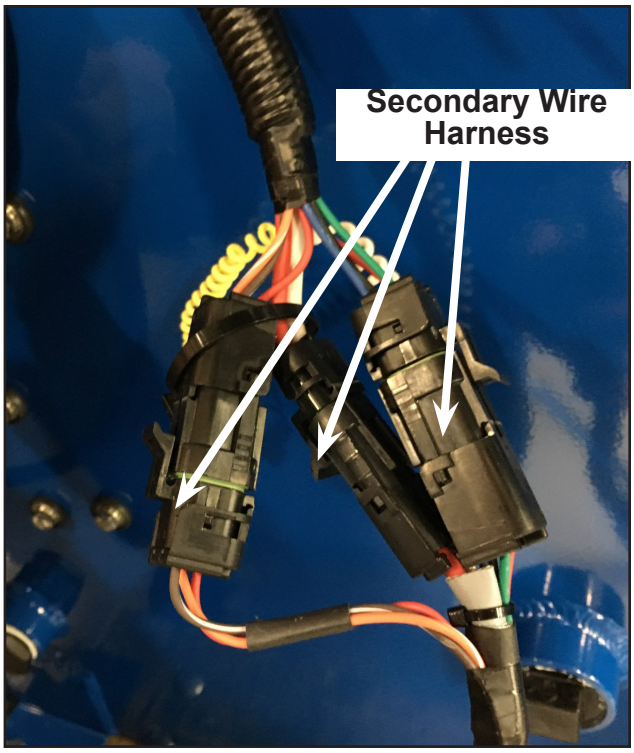


Figure 51. Connect Throttle Control Harness to 4 Pole Plug

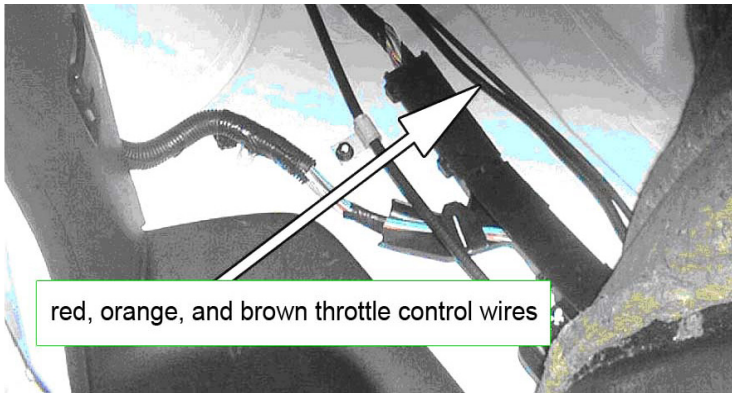


Figure 52. Route Throttle Cable Controller

4. Install the CDS ZEROREZ 16-17 3 Speed Throttle Control Kit (PN# 078-435, See Kit Instructions, kit is shipped as part of the Front End Assembly Kit)

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.

5. Route the other branch of the Secondary Wire Harness from the recovery tank along the passenger side of the Power Pack. Secure this branch to the blower in the clamps, ensuring it does not rest on the blower or the exhaust hoses.

6. Attach the wires of the secondary wire harness to each of the proper locations:
   a. The green wire attaches to the tachometer magnetic pickup (white wire, front side of Blower). The tachometer uses two magnets 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.
7. 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 dip stick tube to ground this wire. (Figure 53)
8. Finally, route the rest of the harness up and over the air cleaner. The black wire attaches to the CDS clutch. Check that the second wire from the clutch is properly grounded to the clutch front end bracket.

Figure 53. Grounding Location on the Transmission Dip Stick Tube

NOTICE

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

9. Cover all the exposed wires with the provided ¼" split loom for a clean, finished look. Secure wires and harness off of van floor with routings and tie wraps.

10. Disconnect the 3 Speed Throttle cable and main power at the plug near the fuse box to mount and remove the driver's seat. Route this harness over the seat pedestal to keep the harness off of the van floor and protected from water or solution that might accumulate nearby. (Figure 54)

Figure 54. 3 Speed Throttle Cable, Main Power and AWDS Harness (Optional) Off the Floor.

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 (Figure 55).
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 4-½" 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 4-½" 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 56).
10. Thread on the cover.

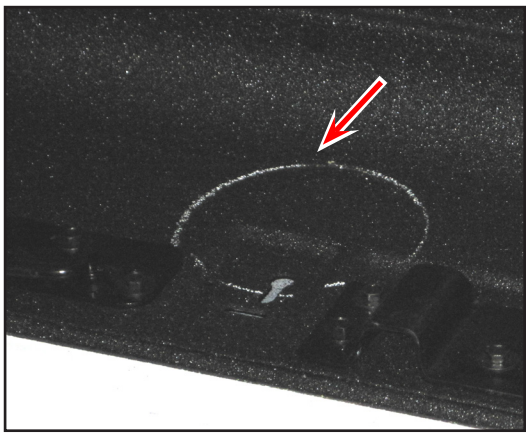


Figure 55. Trace an Outline Around Pass Through

Figure 56. Secure with 6 Self-Tapping Screws

⚠ 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 side to side placement will be determined by dry fitting. Measure 19” from the rear seat studs to tank for front to back alignment. 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 57).
3. Drill the 4 holes through the van floor.
4. Use the 5 bolts from the kit to secure the Recovery Tank to the floor - 4 on the rear of the Recovery Tank (see Figure 57) and 1 towards the front of the tank (see Figure 58).

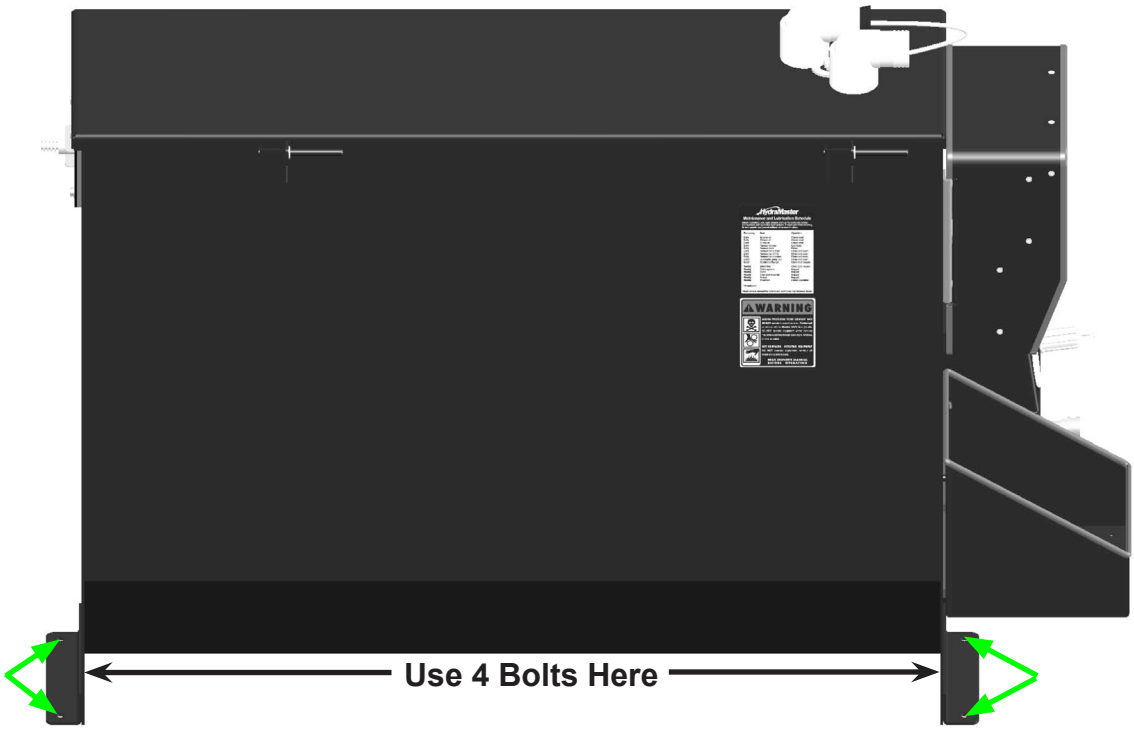


Figure 57. Mark Hole Locations for Recovery Tank - Rear of Tank

5. Connect these hoses and elbow as shown in Figure 59.
6. Route and connect the 1” diameter hose (P/N 000-068-829 - see page 7) from the Yaw Sensor Cover to the Blower elbow.
7. Route the longer 1” diameter hose (P/N 000-068-828) from the Yaw Sensor Cover toward the CDS instrument panel (see Figure 59).
8. Secure the hoses away from all rotating pulleys and off the Blower using the nylon tie wraps and clamps as necessary.
9. Route the coolant hoses from the back of the engine along the passenger side of the Power Pack to Alfa Laval heat exchanger .

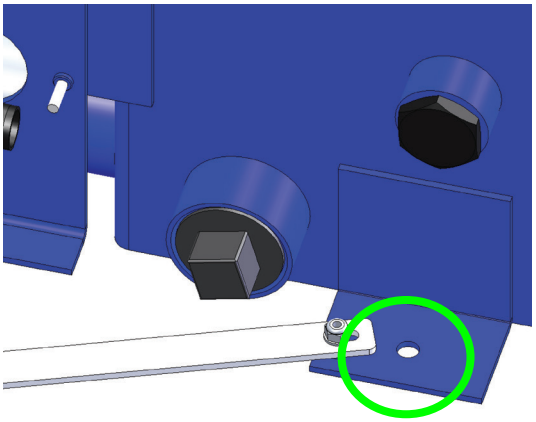


Figure 58. Mark Hole Location for Recovery Tank - Front of Tank

NOTICE

Proper routing of the coolant is critical for optimum performance.
The coolant inlet hose, from the upper radiator tee must be connected to the inlet side of the Alfa Laval heat exchanger (the elbow with the small valve and clear hose attached to it)

10. Secure hoses using the provided clamps.

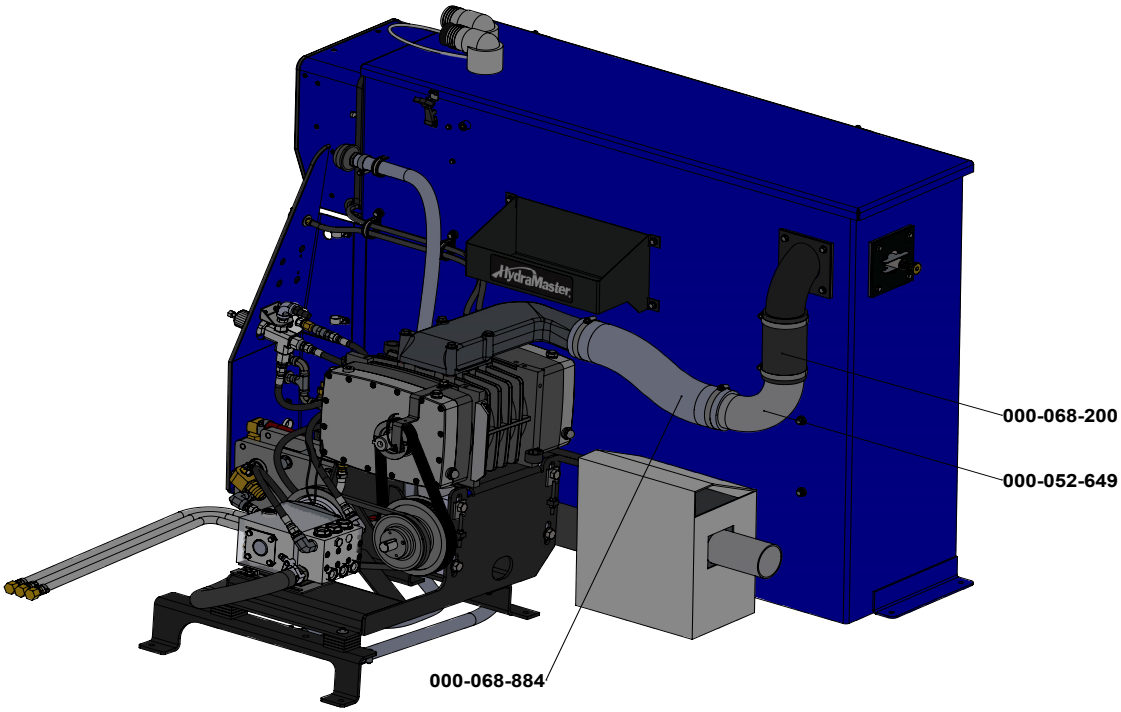


Figure 59. Connect Hoses and Elbow onto Recovery Tank; Attach Smaller Hoses onto Blower Elbow and CDS Instrument Panel

INSTALLING THE ALFA LAVAL ASSEMBLY

NOTICE

Dry fit the Alfa Laval Heat Exchanger behind the passenger's seat.

1. Align the heat exchanger with the water dam leaving as little gap as possible between the bottom of water dam and heat exchanger. Doing so will minimize the foot print of the tank assemblies.
2. Connect the red 3/4" rubber hose (P/N: 000-068-974) on the Alfa Laval outlet to Coolant flow valve (Figure 60). Route the green stripe hose (P/N: 000-068-355) attached the brass lower coolant tee through the opening under the power pack's front spacer and create a rough 90 degree angle along the front of the heat exchanger. Align the hose with the Alfa Laval inlet and cut to fit, attach the hose with clamp. The remainder of the green stripe hose will be used on the recovery tank at a later step.
3. Connect the 5/16" Teflon® hoses with JIC ends (P/N: 000-068-644) attached to the water pump on the power pack to the heat exchangers inlet (Figure 60).
4. The last 5/16" Teflon® hose will be once the salsa heat exchanger is being installed (Figure 60).

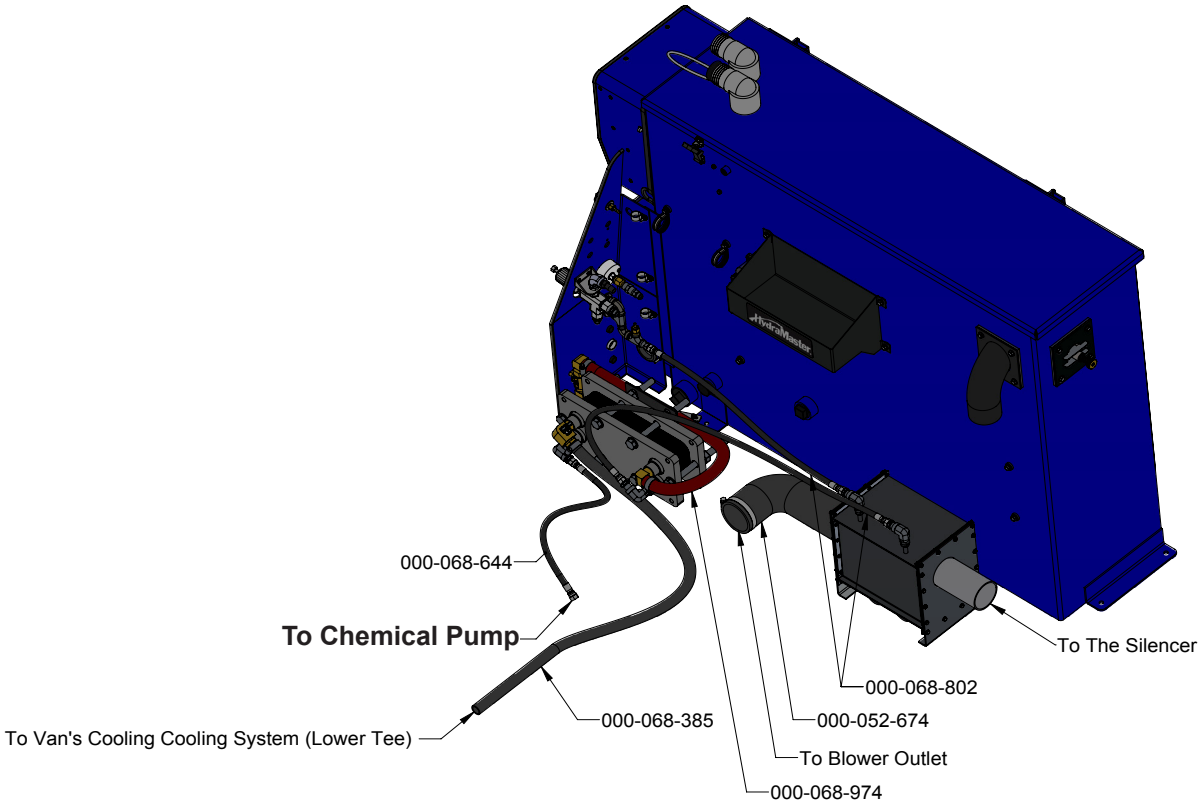


Figure 60. Connect the hoses to Heat Exchangers.

INSTALLING THE SALSA HEAT EXCHANGER AND SILENCER

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 (Figure 61).

1. Pilot drill a hole. With a circular saw, cut a 3 3/8" 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's floor. Secure the hose to the Salsa outlet with a hose clamp (Figure 61).
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 (Figure 61).
4. Connect the other 3" diameter rubber hose (P/N 000-052-674) to the Salsa inlet; connect the hose to the Blower outlet adapter, and secure with hose clamps on both ends.
5. Install the 30" hose assembly (P/N 000-068-187) onto the elbow and then install the silencer (P/N 000-093-030) under the van (see Figure 61). Secure with hose clamps. Depending on the van model, the silencer may span the "rib" of the floor or bolt directly to the van floor.

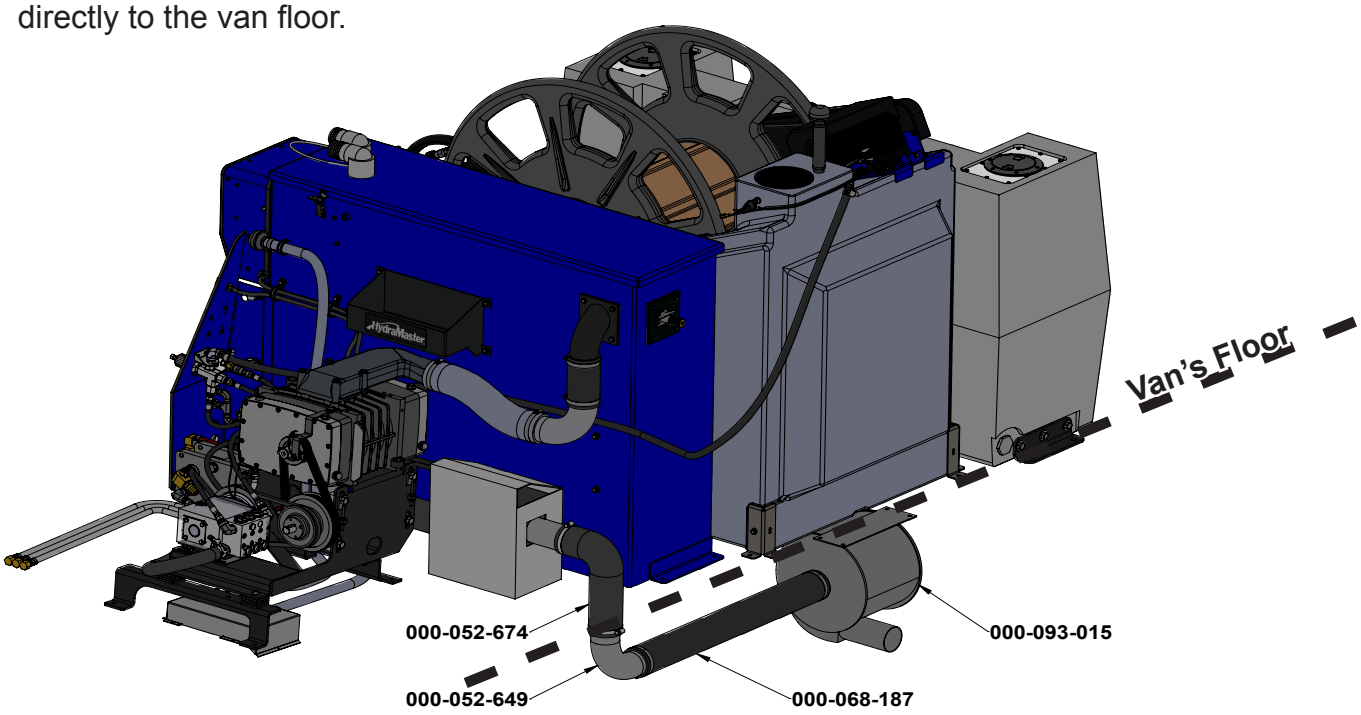


Figure 61. Hose Routings Between Salsa and Silencer

6. Connect two 5/16” Teflon® hoses with JIC ends to the elbows on the Salsa (Figure 62).
7. Route and connect the closest to the blower 5/16” Teflon hose to the Alfa Laval outlet.
8. The other 5/16” hose connected to the outermost elbow on the Salsa will be connected to the pressure regulator on the rear of the instrument panel (Figure 62).

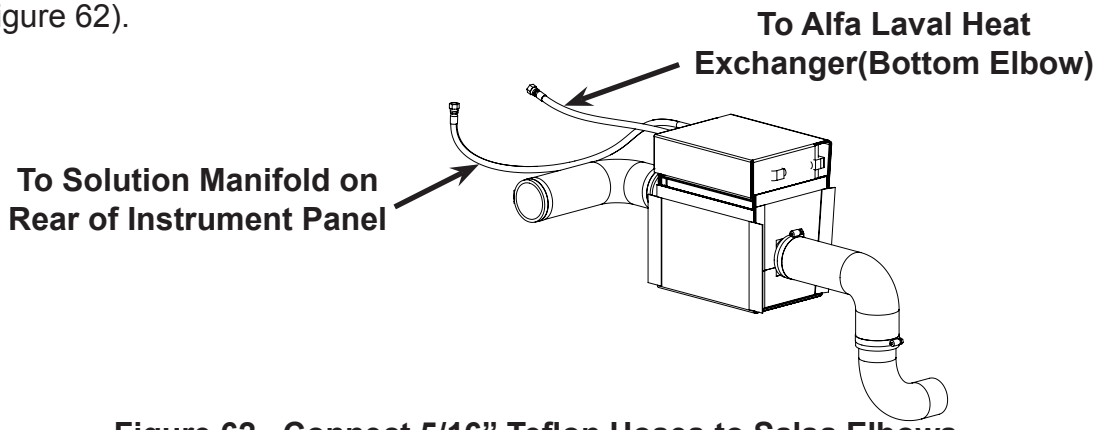


Figure 62. Connect 5/16” Teflon Hoses to Salsa Elbows

Installing the Cradle Tank

Dry fit the Cradle Tank behind the recovery tank. Bring the cradle tank forward so it is butted up next to the cargo door step. Leave enough space between the tanks (about 4") so once the small reel has been installed the operator can use the crank handle with ease. (Figure 63)

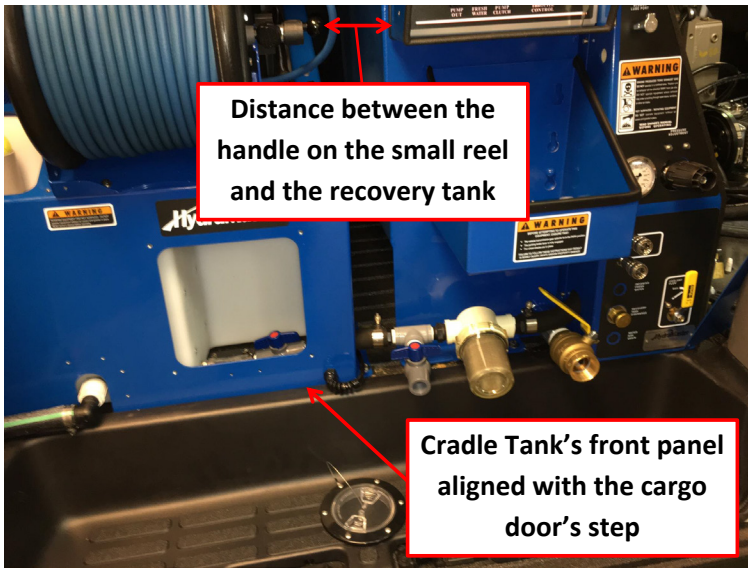


Figure 63. Alignment of a correctly installed Cradle Tank

1. Mark the location of the 6 mounting holes, 4 on the front panel and the 2 back brackets.
2. Drill the 6 holes through the van's floor.
3. Use the Cradle Tank Tie Down Kit (PN: 000-078-200) included with the unit to bolt the tank down. (Figure 64)
4. Install the cradle tank air vent assembly.

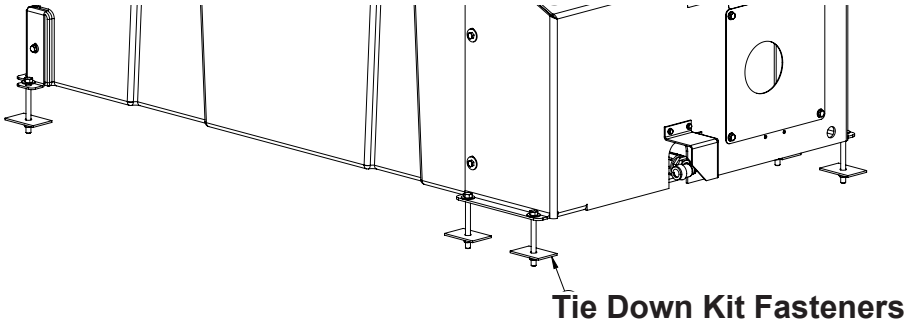


Figure 64. Cradle Tank Tie Down Kit

Assembly and Installation of ZEROREZ 14" Hose Reel

Attach the subcomponents of the reel (Figure 65):

1. Attach the Crank Handle (PN: 000-061-152) using loctite.
2. Attach the 3/8" M X 1/4" F Bushing (PN: 000-052-007) to the Stainless Steel 3/8" Elbow (PN: 000-052-188) and the Solution Hose Assembly (PN: 000-068-251) using Teflon Tape on the threaded parts of each unit.
3. Attach the Triple Bearing Swivel (PN: 000-052-570) to the parts that were assembled above, again using Teflon Tape on the threaded portion of the swivel.
4. Apply Teflon Tape on to the threaded portion of the reel and attach the Triple Bearing Swivel to it.

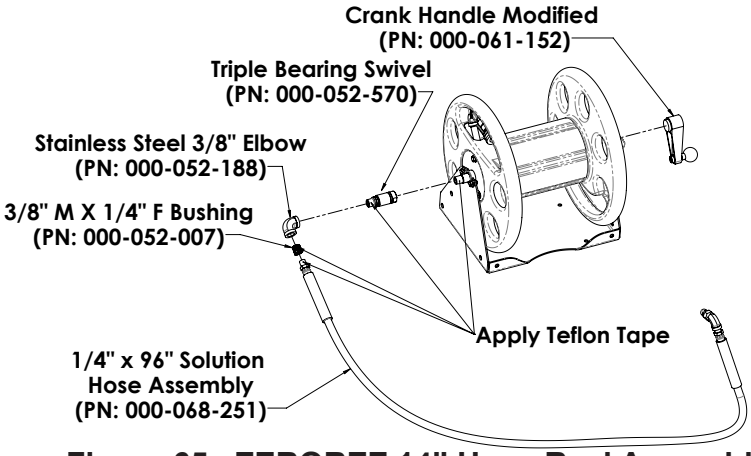


Figure 65. ZEROREZ 14" Hose Reel Assembly

5. Install the 14"Hose Reel to the Cradle Tank using the fasteners included with the unit.
6. Attach the hose on the back of the Cradle Tank to the pressure regulator on the front panel of the recovery tank, routing the hose between the recovery tank and the power pack.

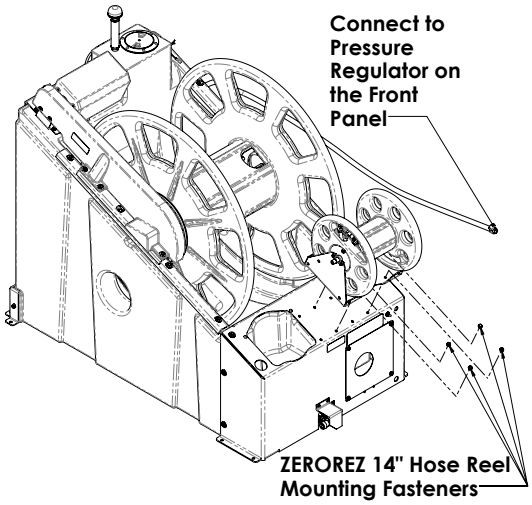


Figure 66. ZEROREZ 14" Hose Reel Installation And Hose Routing

Wiring the Cradle Tank

1. Connect the 10 GA White wire on the Cradle Tank to the negative post of the battery.
2. Connect the 10 GA Red wire on the Cradle Tank to the positive post of the battery.
3. Connect the two white wires from the low water float switch on the cradle tank to the 18 GA. Brown and the 18 GA. White on the recovery tank.

Connecting the In-line Filter from the Cradle Tank to the Recovery Tank

1. Remove the front access panel cover.
2. Assemble the Valve Assembly using Teflon Tape between the fittings and the valve unit. Place the 3" Hose and Clamps on the Assembly. Leave clamps loose. (Figure 67)
3. Put the Valve and Hose Assembly on to the Cradle Tank's fitting inside the front access panel. (Figure 68)

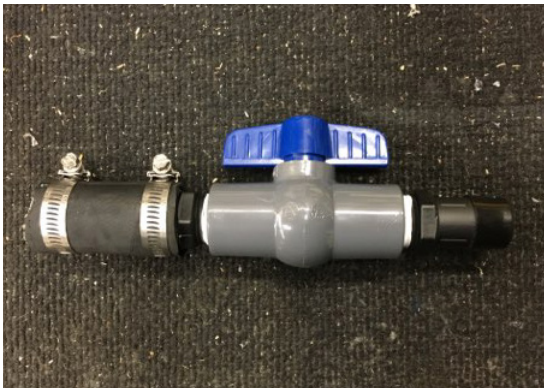


Figure 67. Valve and Hose Assembly

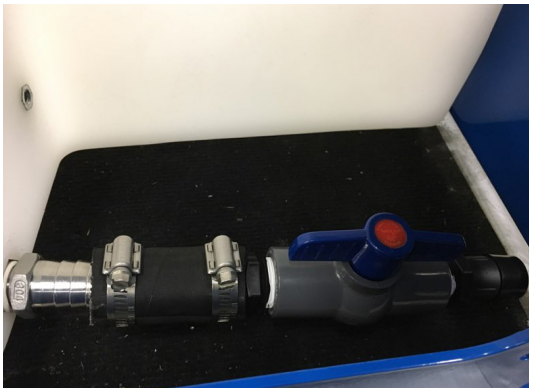


Figure 68. Inside the Front Access Panel

4. Place the clamps on the 6" Hose Assembly. (Figure 69)
5. From inside the front access panel, bring out the fitting and slide the hose assembly on. Be careful not to damage the paint on the front panel. (Figure 70)
6. Attach the 3" hose inside the front access panel to the Cradle Tank. Tighten all 3 clamps on the hoses. (Figure 71)

Figure 69. 6" Hose Assembly

Figure 70. Attaching 6" Hose to the Valve

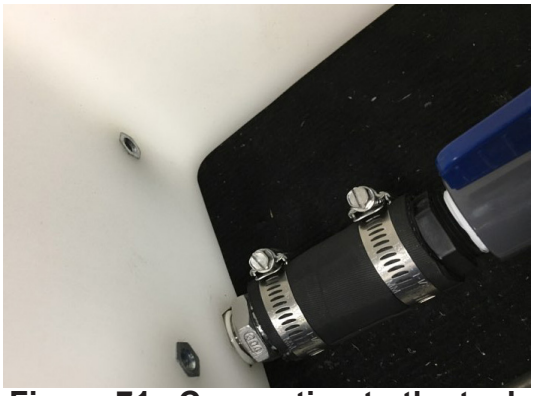


Figure 71. Connection to the tank

7. Next assemble the drain valve and filter assembly (Figure 72). Make sure the arrow on the filter points to the pump.

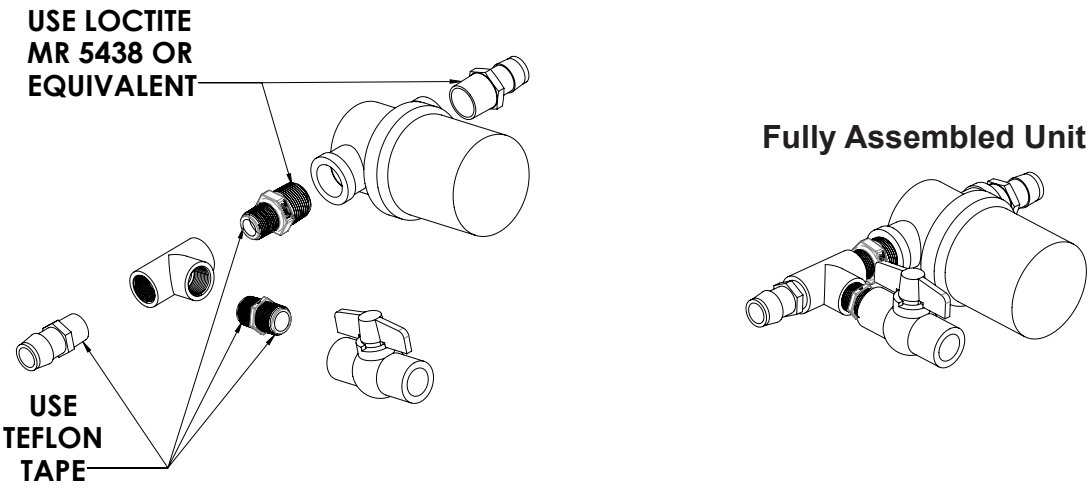


Figure 72. Drain Valve and Filter Assembly

8. Route the coolant hose from the chemical pump on the power pack behind the Alfa Laval unit and through the front panel on the recovery tank and attach it to the filter and tighten the clamp on the hose. Attach the drain valve side of the assembly to the 6" hose assembly that's connected to the cradle tank. Align the units so both units are facing the same direction and tilted towards the ground. (Figure 73)

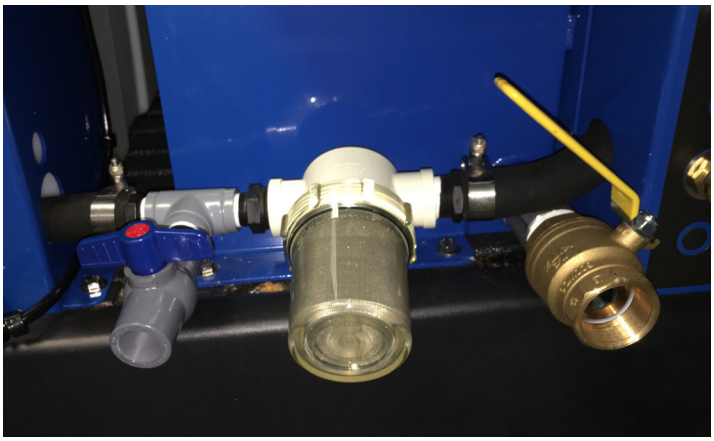


Figure 73. Fully Installed In-line Filter Kit

Installing the 110 Gallon OTWW Tank

Preparing the tank for installation: The following steps should be completed outside of the van:

1. Install the HM lids (PN: 000-041-072)
2. Install the bushing and air valve on top of the tank (Pump-Tec PN: BUS-FLOAT-VALVE and RT110-0012-0002 respectively) using Teflon tape between the bushing, air valve and the tank.
3. Install the Upper Bracket (Pump-Tec PN: URSSB-100/110) to the tank using 3 X 3/8”-16UNC X 0.75” LG Hex Head Bolts and 3 X 3/8” Flat Washers. Use Loctite 262 on the bolt for the ideal attachment to the tank.

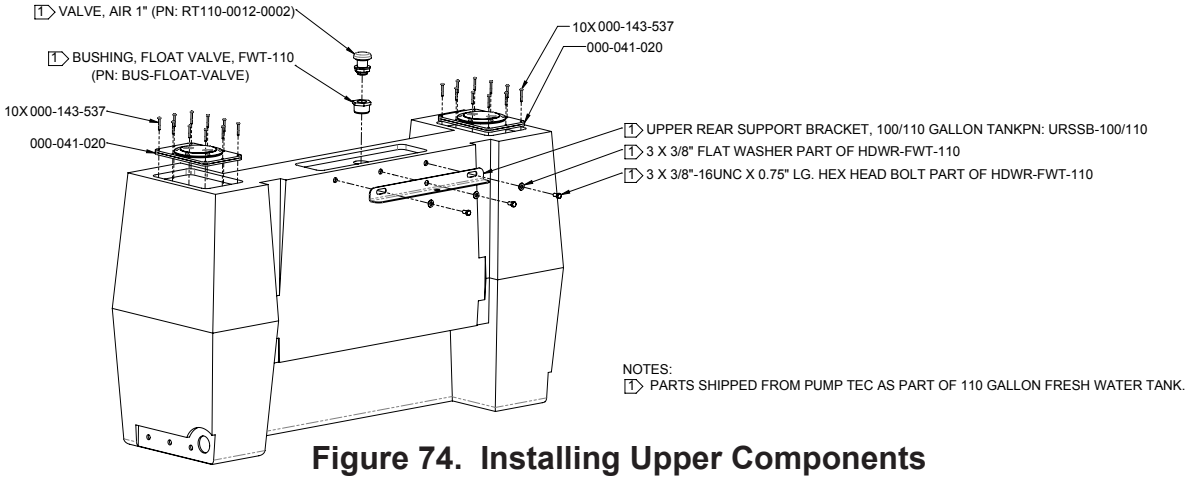


Figure 74. Installing Upper Components

4. Install the 1 1/2” NPT X 1” Nylon Bushing (PN: 000-052-186), the 1” NPT X 1” Barb Elbow (PN: 000-052-131), 30” Green Stripe Hose (PN:000-068-250) and the 2 xSize #16 Clamps. Use Teflon tape on the bushing and the elbow.
5. Install the 1 1/2” Hex Head Nylon Plug (Pump Tec PN: PLUG-1.5 HEX-N) on the opposite side from the to Cradle Tank Adapter.

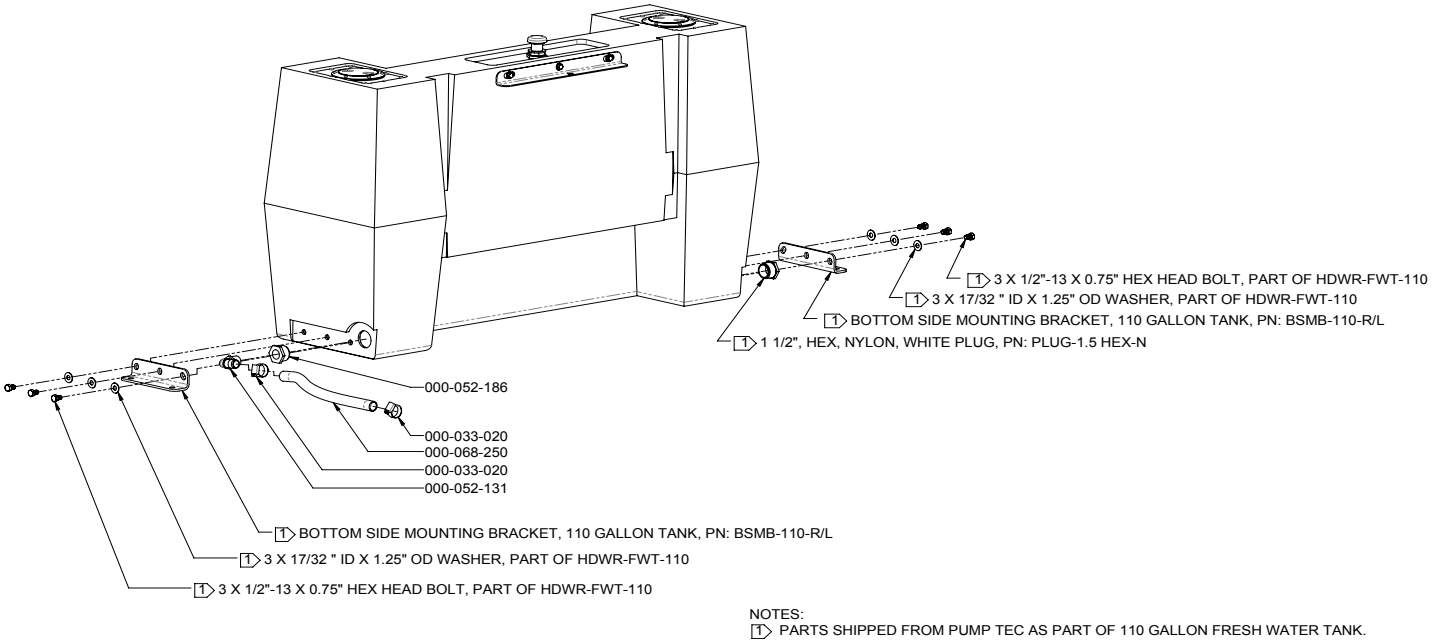


Figure 75. Installing Lower Components

6. Install the two Bottom Side Mounting Brackets (Pump Tec PN: BSMB-110-R/L) using the 6 X 3 X 1/2"-13 X 0.75" Hex Head Bolts and 6 X 3 X 17/32" ID X 1.25" OD Washers included in Pump Tec HDWR-FWT-110 kit. Use Loctite 262 on the bolt for the ideal attachment to the tank.

Installing the Tank on the Van:

Move the tank into the van, use a cardboard on the floor of the van to prevent scratches on the floor. The back of the tank; the side with the Upper Bracket should point towards the Cradle Tank/front of the van.

1. Align the front of the tank with the cradle tank. The two elbows linking the cradle tank to the 110G tank should be offset by 3 to 4 inches with the OTWW tank closer to the cargo door. Leave enough space between the tanks so there is enough room for the floor brackets and the all-thread rod.

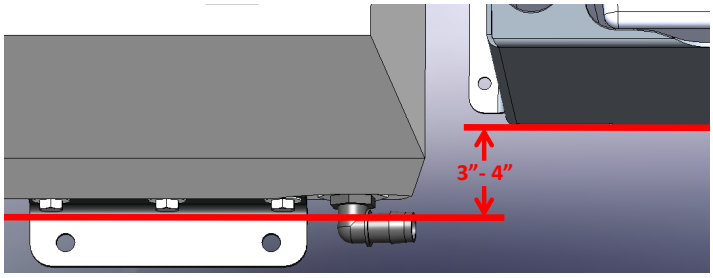


Figure 76. Top View of the Alignment of the Cradle Tank and OTWW Tank.

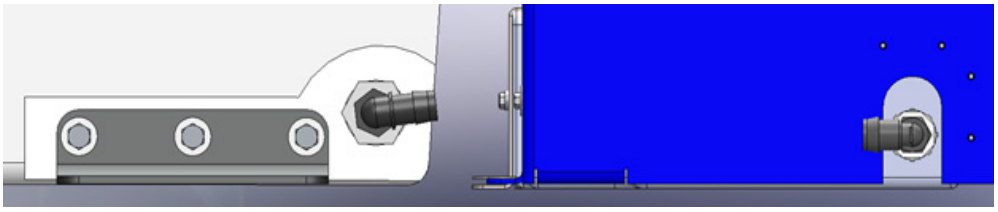


Figure 77. Front View of the Alignment of the Cradle Tank and OTWW Tank.

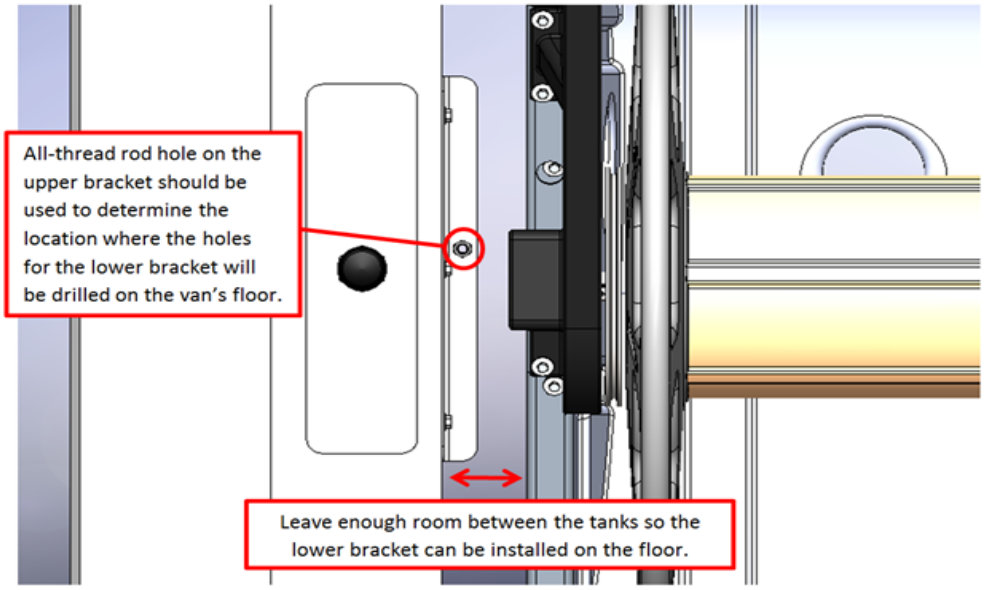


Figure 78. Top view of the Upper Bracket that will be used to determine the location of the Lower Bracket holes on the van's floor.

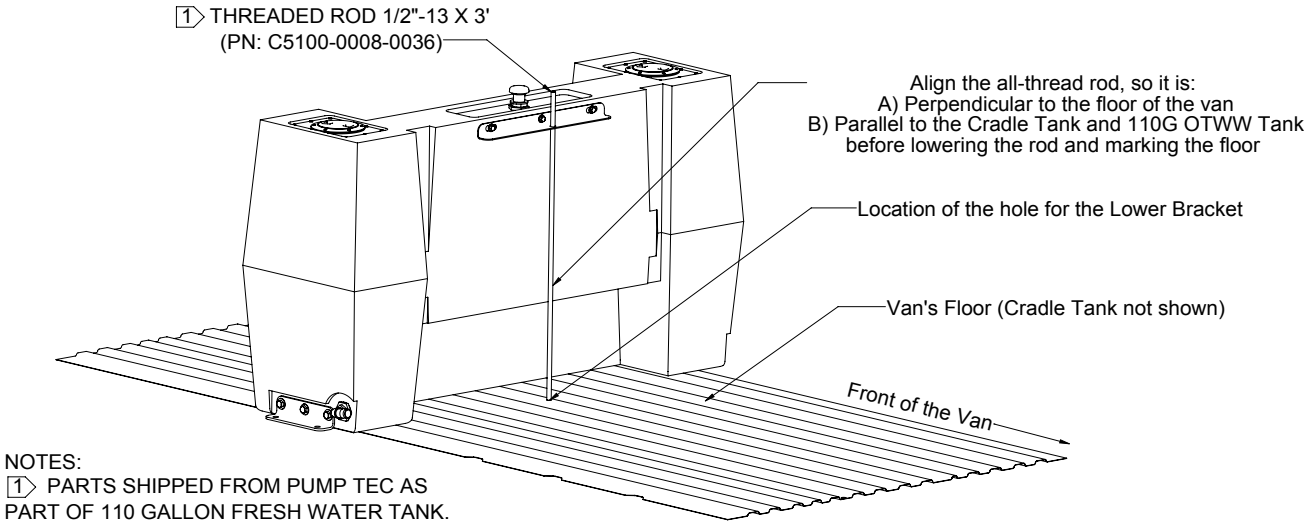


Figure 79. Installing Lower Components

2. Place a dab of grease at the end of the All-Thread Rod (Pump Tec PN: C5100-0008-0036), dry fit the rod between the tanks and mark the location of the hole for where the rod and the lower bracket will be mounted.
3. Once the location has been determined, move the 110 Gallon OTWW out of the way, and use the Wheel Well Support Plate, Top (Figure 80, Pump Tec PN: 40247) to mark the three holes needed for mounting the Wheel Well Support Plate, Top and Bottom (Pump Tec PNs: 40247 and 40248).

Figure 80. Wheel Well Support Plate, Top (Pump Tec PN: 40247)

4. Use a 9/16” drill bit to bore the center, and use a 13/32” bit to drill the two side holes.
5. Remove the section of heat shield that the rod holes have gone through. (Figure 81 and 82)

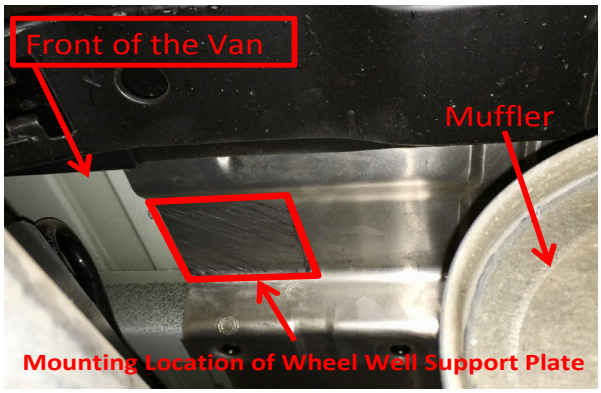


Figure 81. Location of the heat shield to be removed

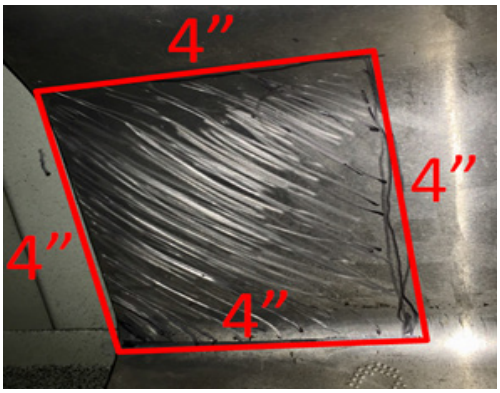


Figure 82. Rough dimensions of heat shield to be removed

6. Place the All Thread Rod through the floor of the van, from underneath the van fasten the Wheel Well Support Plate, Bottom (Pump Tec PN: 40248) so an inch of the rod is sticking out underneath the van.
7. From inside the van, slide the Wheel Well Support Plate, Top (PN: 40247) on the All Thread Rod, raise the All Thread Rod along with the Bottom Support Plate, align the two side holes on the Bottom Support Plate with the holes drilled on the van's floor and the Top Support Plate. Mount the assembly using the 2 X 3/8"-16UNC X 0.75" LG. Hex Head Screws and the 2 X 3/8" Flat Washers. (Figure 83)

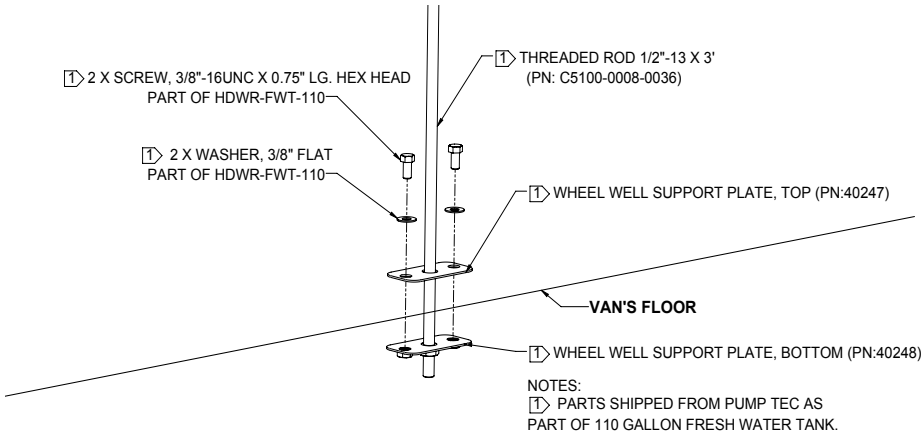


Figure 83. Attached the All Thread Rod to the Van's Floor.

8. At this point you can take the All Thread Rod out or lower it by twisting it in place so the tank's upper bracket mounting hole can be aligned with the Top and Bottom Support Plates installed in the previous step. Align the tank with the Cradle Tank so the elbows are colinear. Leave enough distance in between the tanks so the All Thread Rod can be installed perpendicular to the floor.
9. Place the 1/2" Nut (PN: 000-094-126) between the Upper Bracket and Lower Support assembly on the All Thread Rod. Loosely fasten the 1/2"-13 UNC Hex Stainless Steel Nylock Nut (Part of the HDWR-FWT-110) on top of the upper bracket. (Figure 84)

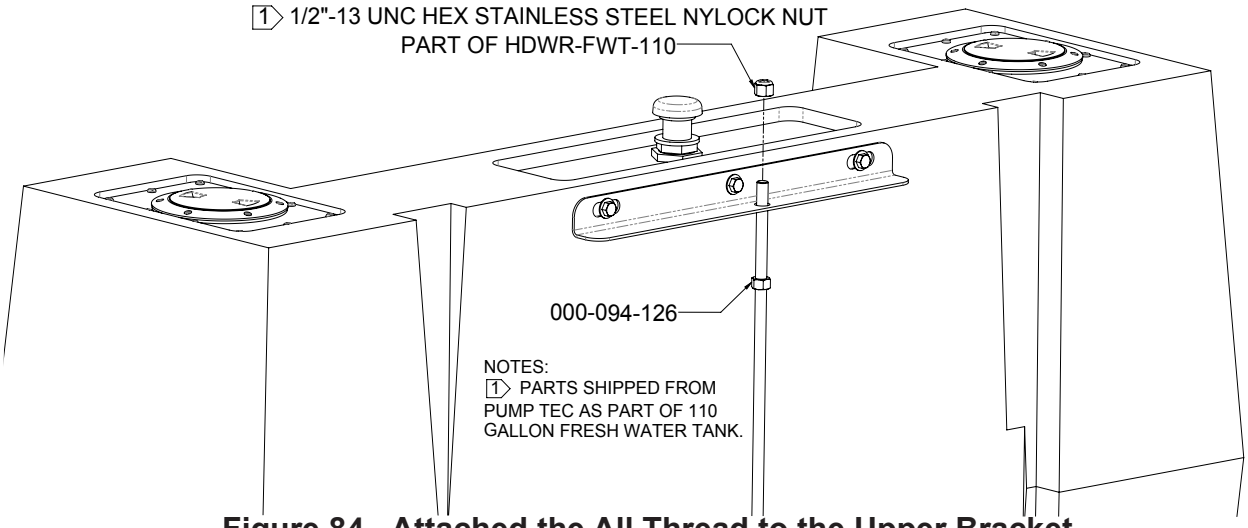


Figure 84. Attached the All Thread to the Upper Bracket.

10. Mount the Tank to the floor using the Bolts, Washers and Nuts Provided. There are 4 mounting locations, 2 on the driver side (not pictured) and 2 on the passenger side. (Figure 85)

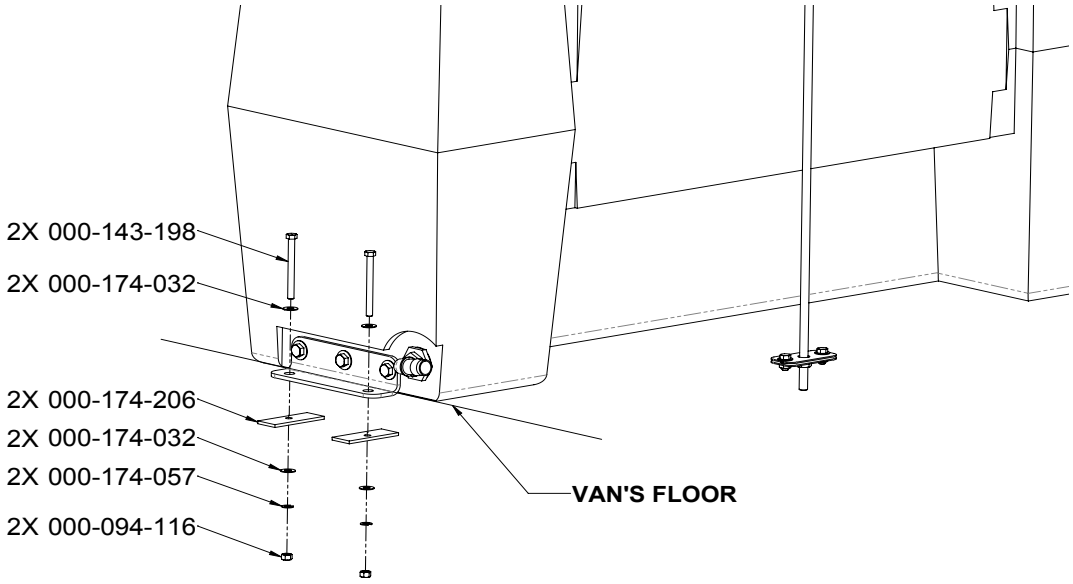


Figure 85. Mounting the 110 Gallon OTWW Tank to the Floor.

11. Adjust the All Thread Rod so at least an inch of threads are exposed underneath the van. Hand tighten the 1/2" Nut against the Upper Bracket. DO NOT OVER TIGHTEN. Doing so will place an unnecessary constant load on the rod. Tighten the upper 1/2" Nylock Nut with a socket wrench. Keeping the sequence is important to completing this step correctly. (Figure 86)

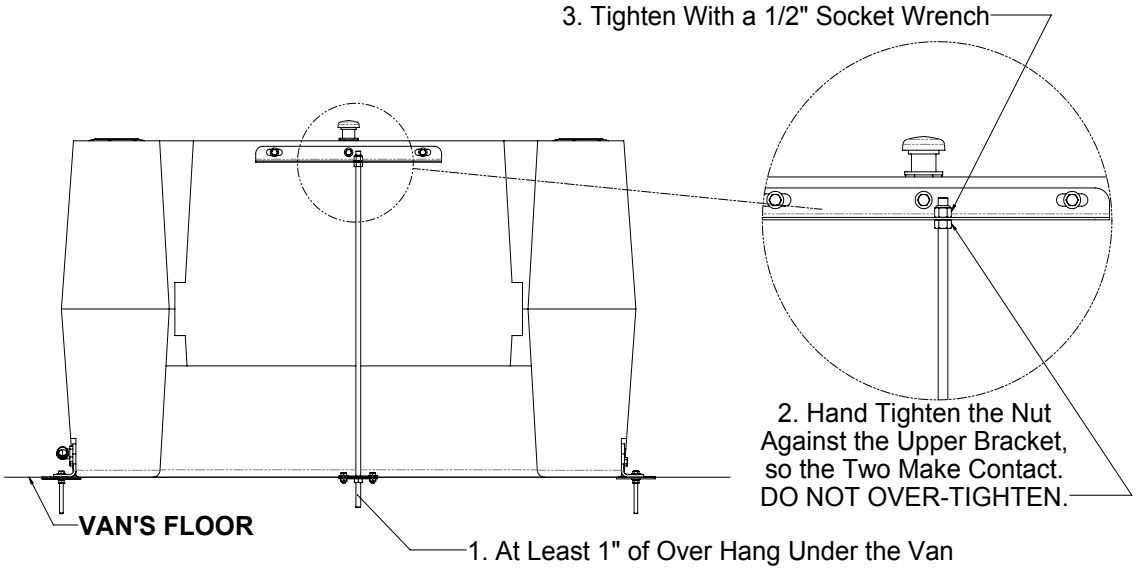


Figure 86. Fastening the Upper Bracket to the All Thread Rod.

FINISHING INSTALLATION

After the CDS ZEROREZ 2017 has been completely installed, 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 1 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. Secure the coolant hoses and wire harness into a clean bundle using provided tie wraps.
2. Cut the doghouse according to Figure 87 and Figure 88.

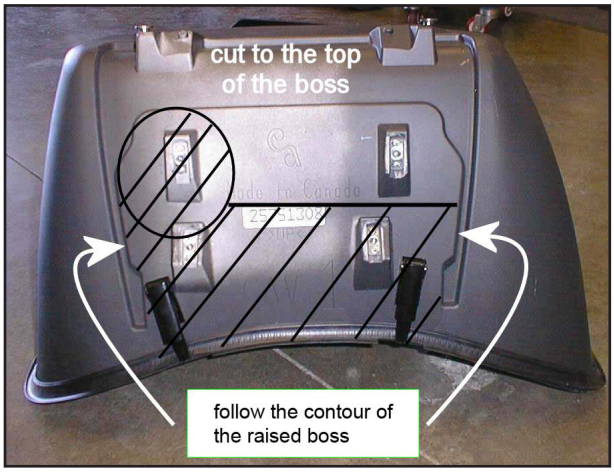


Figure 87. Cut to Top of Boss and Follow Contour

Figure 88. 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.

3. Re-install the doghouse into the van.

NOTICE

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

4. 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 89. 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 89. Position Seal as Shown

5. Modify the driver's side dash cover, closest to the doghouse (see Figure 90).
6. Modify the passenger's side dash cover, closest to the doghouse as necessary.
7. Re-install the passenger dash cover.
8. Reconnect the positive battery cable.

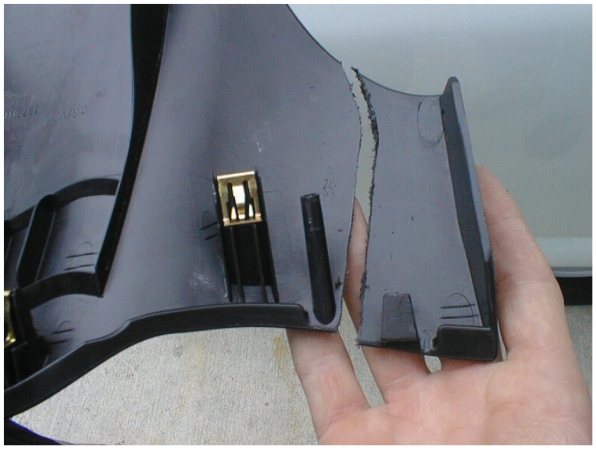


Figure 90. Modify Driver's Side Dash Cover

NOTICE

Use Dex-cool Red GM antifreeze or equivalent.

9. Route petcock hose (mounted on Alfa Laval Coolant heat exchanger) to a small drain pan and open to allow air to vent.
10. Fill the radiator with coolant. (GM recommends that you fill the antifreeze a small amount at a time or use the Airlift II Cooling System Vacuum Filler, skip to step 14 if using the Airlift II):
    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 do so may result in engine damage.

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

NOTICE

Step 12 could take up to 2-3 hours to complete.

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

14. Place the 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.

15. Start the van and check for antifreeze leaks at the installed tees and heat exchangers.
16. Install the warning label on the driver's side sun visor as shown in Figure 91.

Figure 91. Location of Warning Label on Sun Visor

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 3800 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 Table Below). 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 = 3600 RPM
MID	RPM 2 = 3100 RPM
LO	RPM 3 = 2700 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 92).

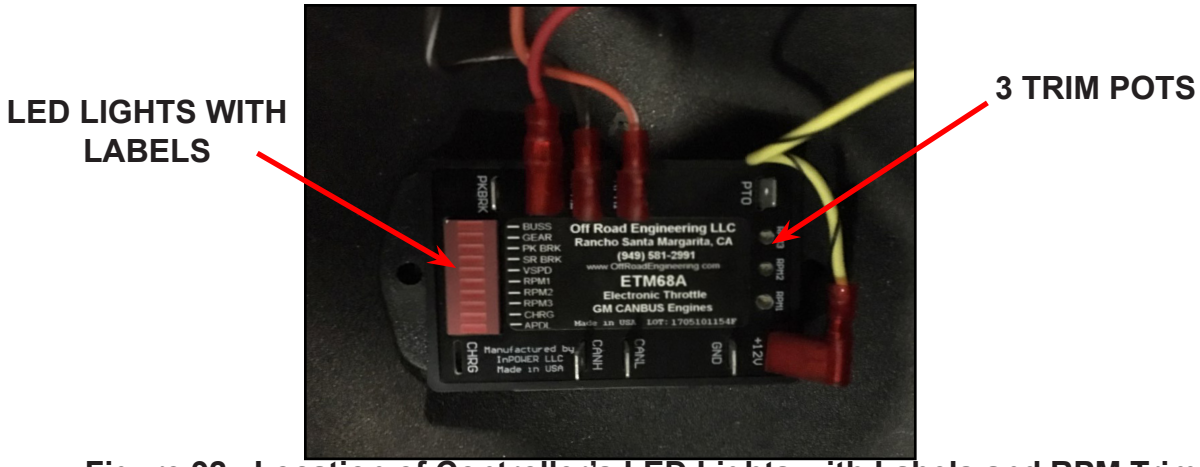


Figure 92. Location of Controller's LED Lights with Labels and RPM Trim Potentiometers

See the Table 2 on page 44 for function codes.

Table 2. 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 CDS ON THE JOB SITE

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

⚠WARNING

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

2. Check the fuel tank to be certain there is adequate fuel to complete the job.
3. Position the wheel chocks on one of the front tires.
4. Connect all required hoses.
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 START UP AT THE JOB SITE

1. Make sure the vehicle's gear select lever is in the Park position and the emergency brake is set
2. Start the vehicle's engine.
3. Turn key on the CDS dash.
4. Select the cleaning speed appropriate for the cleaning job.

NOTICE

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

5. Turn on the PUMP CLUTCH switch. Adjust cleaning pressure to desired level.
6. Turn the heat control valve to 'MAX' only if you will be using cleaning solution. Do not activate the heat exchanger during flood extraction work.

NOTICE

7. Optional: Turn the AWDS switch 'ON' if using the Automatic Wastewater Disposal System.

NOTICE

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

8. Now proceed with the cleaning operation.

NOTICE

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

CDS FLOOD RESTORATION WORK

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

CDS SHUT DOWN

1. Flush chemical system if necessary.
2. Drain and actuate the tool/wand valve to clean heat exchangers and cleaning tools according to ZEROREZ standard procedures.

NOTICE

If freeze guarding is necessary, perform the freeze guard procedure at this time. Draining the 110 Gallon OTWW and Cradle Tank to ½ full or less is recommended to reduce spillage inside the vehicle.

NOTICE

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

3. Lay vacuum hoses out in order for all moisture to be removed from the hoses. This prevents spillage of any dirty solution in your vehicle when storing the hoses.
4. Disconnect the hoses and put them away.
5. 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. 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).
7. Remove the inlet plugs, then turn the ignition 'OFF' before draining the Recovery Tank.
8. Turn the heat control valve to the 'OFF' position. This will help avoid engine overheat problems due to reduced coolant flow through the radiator.
9. Drain the Recovery Tank.

NOTICE

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

If your CDS is equipped without an AWDS, drain the Recovery Tank through the tank drain valve (located under the chemical jug tray).

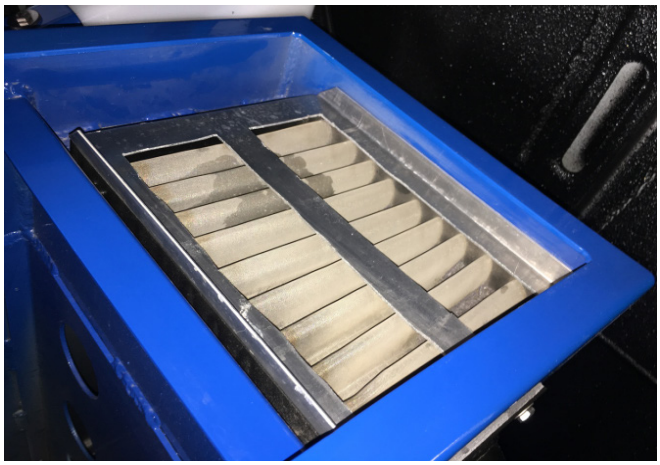
NOTICE

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

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



FREEZE GUARDING

When operating the ZEROREZ CDS during the colder months of the year, ensure that you properly freeze guard the system. No part of the ZEROREZ CDS 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.

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