

INSTALLATION PROCEDURE

Installing a CDS SV into 2021 6.6L V8 Chevy Express

COMPLETELY READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION!

This document is a guide for installing a CDS 4.8 SV into a 2021 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 CDS 4.8 SV 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 to fuel lines, brake lines and electrical components under the van 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 CDS 4.8 SV:

1. CDS 4.8 SV Front End Assembly
2. Yaw Sensor Cooling Assembly
3. CDS 4.8 SV Power Pack Assembly (Includes blower, pump, frames)
4. CDS 4.8 SV Tank Assembly (Includes the instrumentation panel)
5. Alfa Laval Coolant and Salsa Blower Heat Exchangers
6. Pass Through Kit

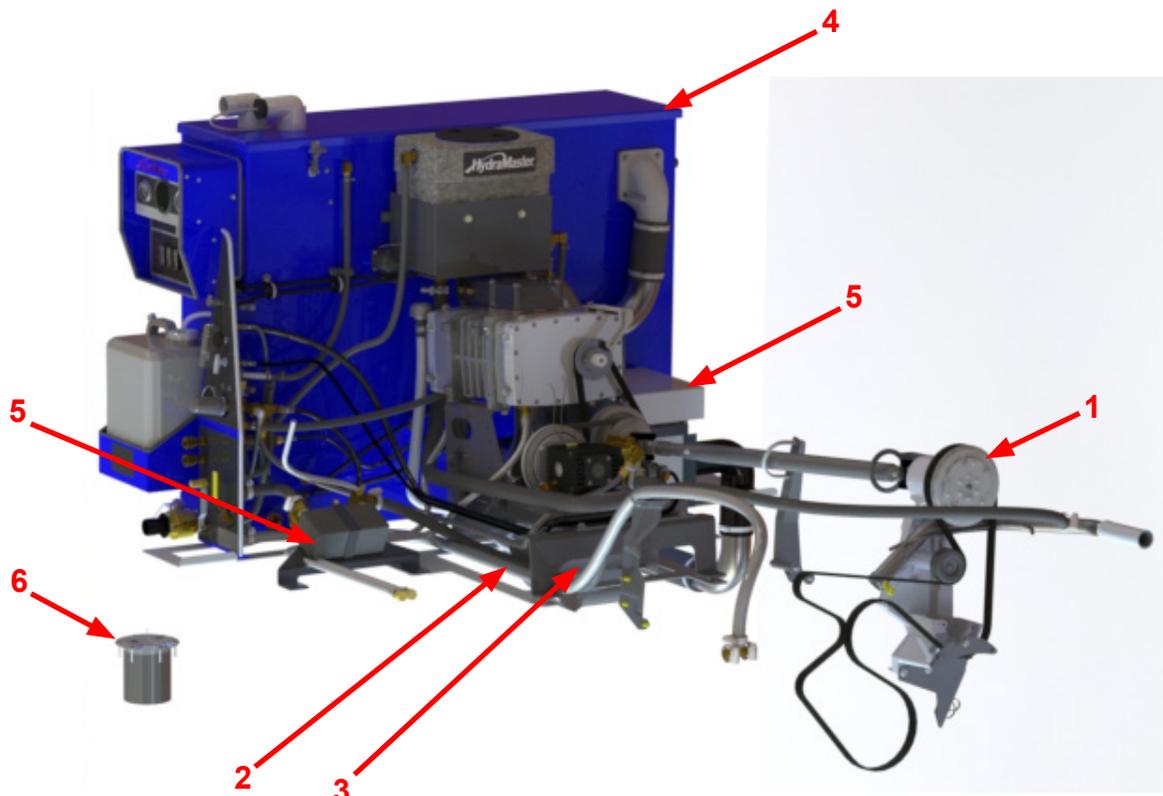


Figure 1. Standard CDS 4.8 SV

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

1. Preparing the inside of the van
2. Preparing the front end
3. Draining coolant
4. Removing and modifying van's front end components
5. Installing CDS SV 4.8 Front end
6. Reinstalling van's front end components
7. Using the CDS SV 4.8 Templates
8. Installing the power pack
9. Installing the tank
10. Installing the heat exchangers
11. Plumbing the recovery tank, power pack and heat exchangers
12. Wiring the recovery tank, power pack and heat exchangers
13. Installing the throttle control module
14. Refilling Van's cooling system
15. Calibration and setup of the unit

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

⚠ WARNING

To prevent serious personal injury, ensure that the major components of the CDS 4.8 SV 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:

3-1/4" Hole Saw 4 1/2" 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; 12" or 16" Long 3/8" Drill Bit; #16 or #17 Bit; can also use 11/64" Bit; 13/64" Bit
Ratchet	Torque Wrench (15 - 40 ft. lbs.)
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)	
(Recommended) Hydramaster Installation Templates (Kit number 000-079-414 which includes PN: 000-105-835, 000-105-836 and 000-105-837)	
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

Table 1. CDS 4.8 SV Standard Hose Routings

Part Number	Description	From	To
000-068-203	Hose, 3/16" X 34" Teflon 1/4" F JIC X 1/4" F JIC	Water Box	Hi-PSI Manifold
000-068-330	Hose, 5/16" Teflon X 16.5" Lg.	Plate Heat Exchanger	By-Pass Valve
000-068-385	Hose, 3/4" I.D. X 18 ft - Green Stripe - Cut to Fit	Plate Heat Exchanger	Van Cooling System (In)
000-068-385	Hose, 3/4" I.D. X 18 ft - Green Stripe - Cut to Fit	Dual Heat Exchanger	Coolant Flow Inlet
000-068-385	Hose, 3/4" I.D. X 18 ft - Green Stripe - Cut to Fit	Coolant Flow Outlet	Van Cooling System (Out)
000-068-491	Hose, 3/16" x 10" Lg. Teflon 1/4" NPT x 1/4" JIC F	By-Pass Valve	Pressure Gauge
000-068-518	Hose, 3/16" X 18.25" Lg. Teflon w/f JIC Ends	Hi-PSI Manifold	Chem Metering Valve
000-068-588	Hose, 3/8" Throb X 52" Lg. CDS	Pump Outlet	By-Pass Valve
000-068-706	Hose, 3/16" Teflon X 70" Lg. w/ Fem JIC Ends	Chemical Metering Valve	Chemical Pump Outlet
000-068-734	Hose, 1/2" X 42.5 Lg w/ 3/8" NPT and 3/8" SAE F	Water Box	Incoming Fresh Water
000-068-755	Hose, 5/16" Teflon X 31" Lg. w/ 3/8" JIC	Salsa Heat Exchanger	Hi-PSI Manifold
000-068-758	Hose, 5/16" Teflon X 50" Lg. 3/8" JIC	Plate Heat Exchanger	Salsa Heat Exchanger
000-068-977	Hose, 5/32" I.D. Vacuum X 52" Lg.	Pressure Gauge	Blower Outlet
000-068-978	Hose, 5/32" I.D. Vacuum X 82" Lg.	Lube Port	Blower
000-068-991	Hose, 1/2" I.D. Rubber X 42" Lg.	Water Box	By-Pass Valve
000-068-1037	Hose, 3/8" I.D. X 39" Lg., Clr w/Braid	Chemical Jug	Chemical Meter
000-068-1038	Hose, 3/8" I.D. High Temp X 72" Lg.	Chemical Meter	Chemical Pump Inlet
000-068-1039	Hose, 3/8" I.D. Rubber X 31" Lg.	Chemical Metering Tee	Recovery Tank
000-068-1049	Hose, 3/8" Rubber X 5" Lg.	Chemical Metering Tee	Chemical Metering Valve
000-068-1050	Hose, 3/8" Rubber X 12" Lg.	Chemical Metering Tee	By-Pass Valve
000-068-1099	Hose, 1" I.D. Suction X 70" Lg.	Pump Inlet	Water Box

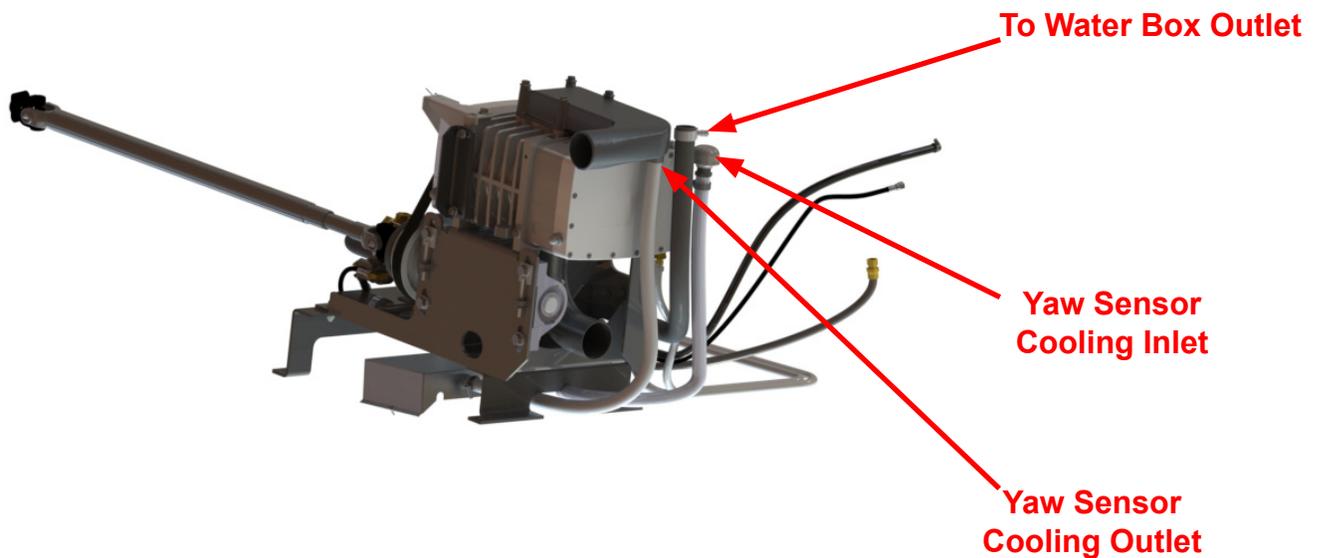
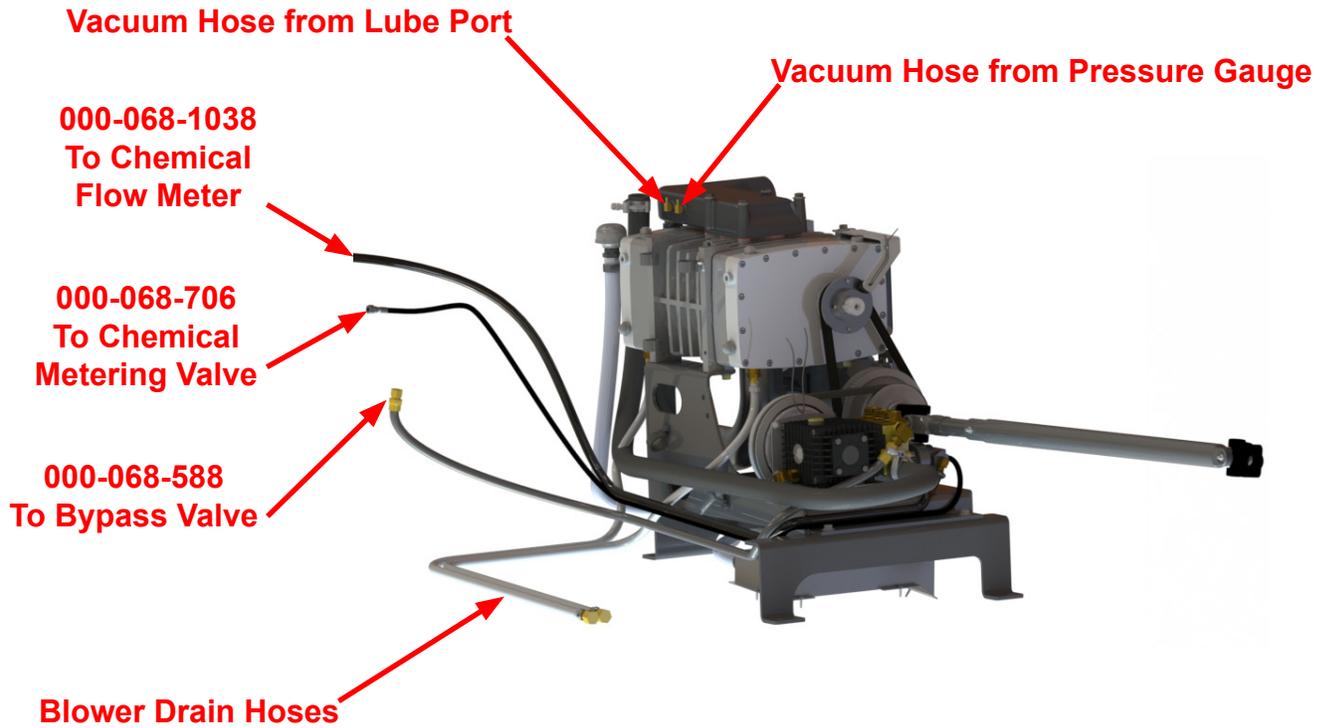


Figure 3. Powerpack Hose Routings

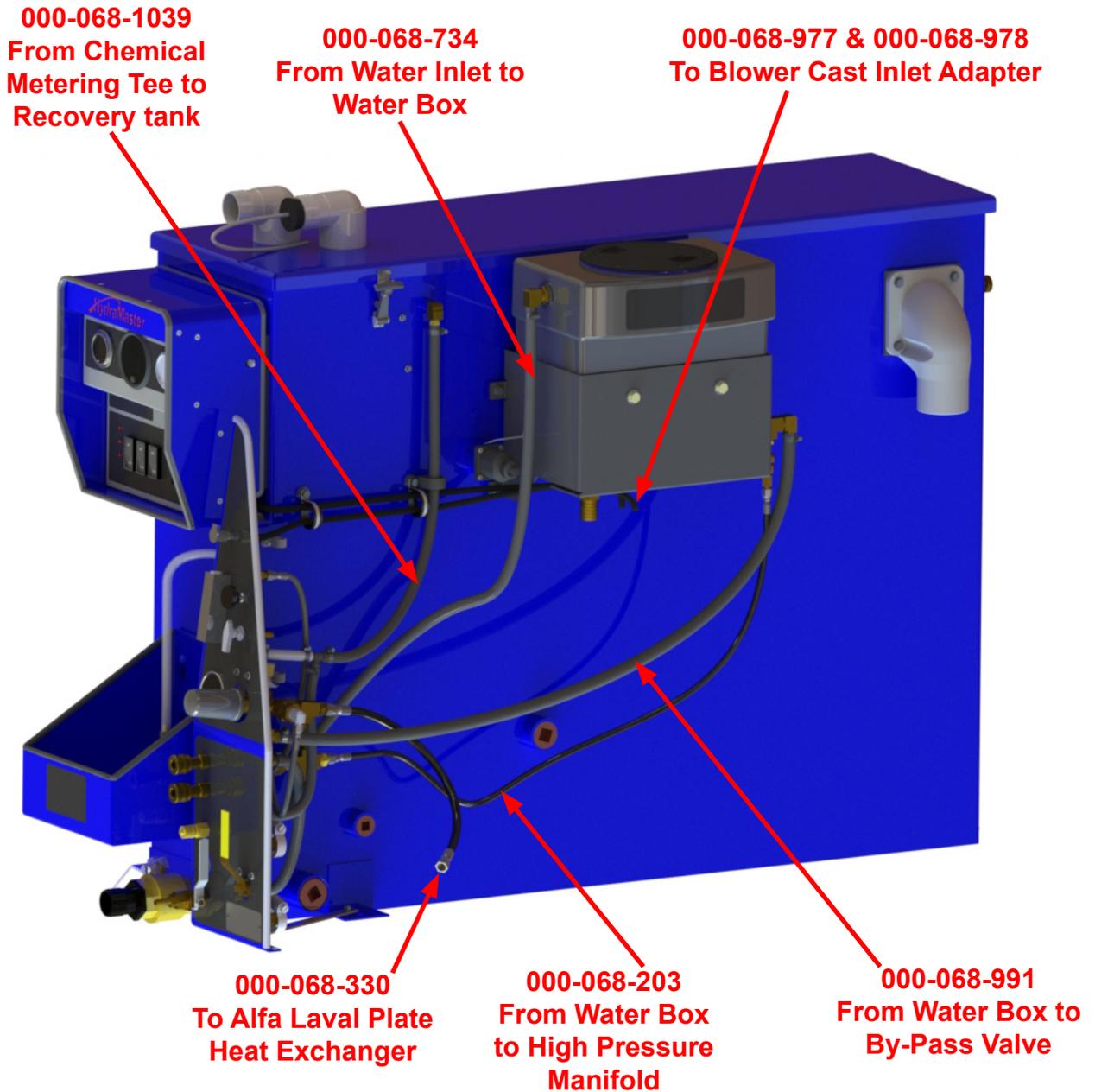


Figure 4. Recovery Tank Hose Routings

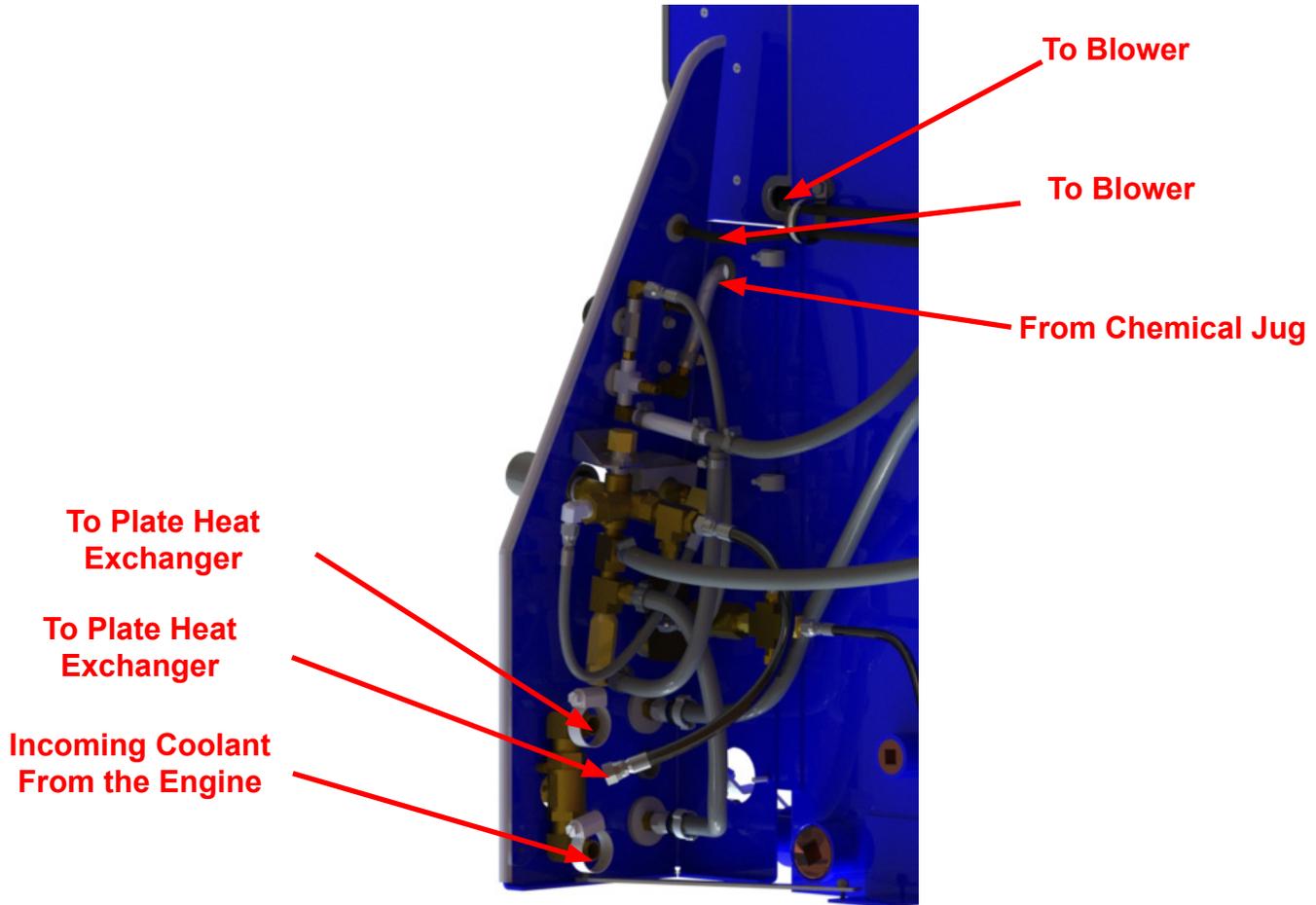


Figure 5. Recovery Tank Panel Assembly Hose Routings

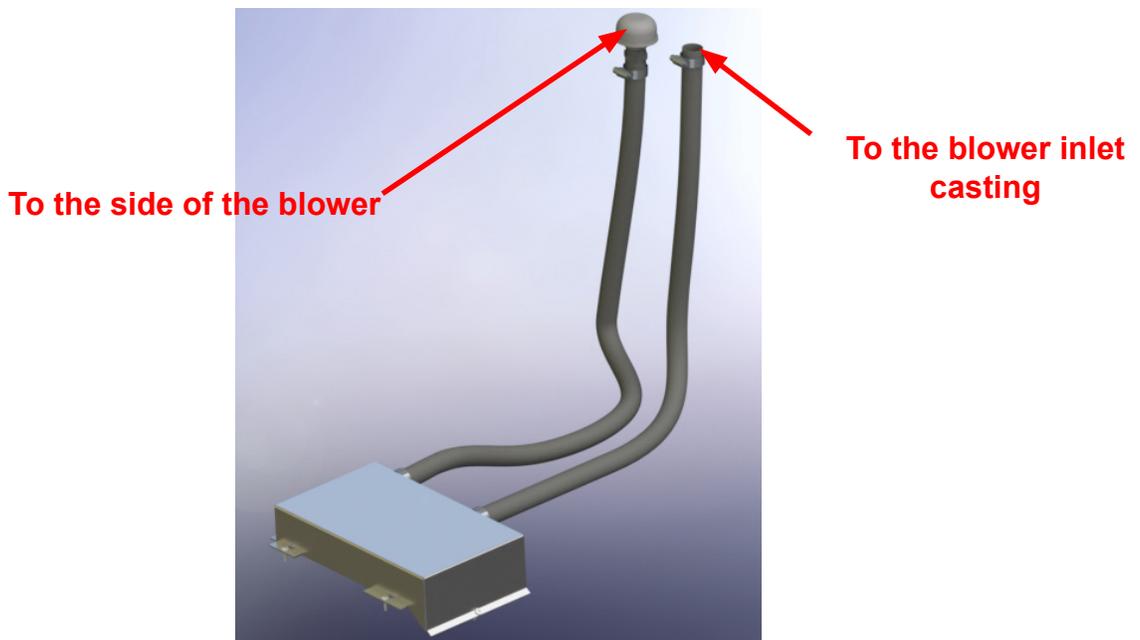


Figure 6. Yaw Sensor Assembly Hose Routings

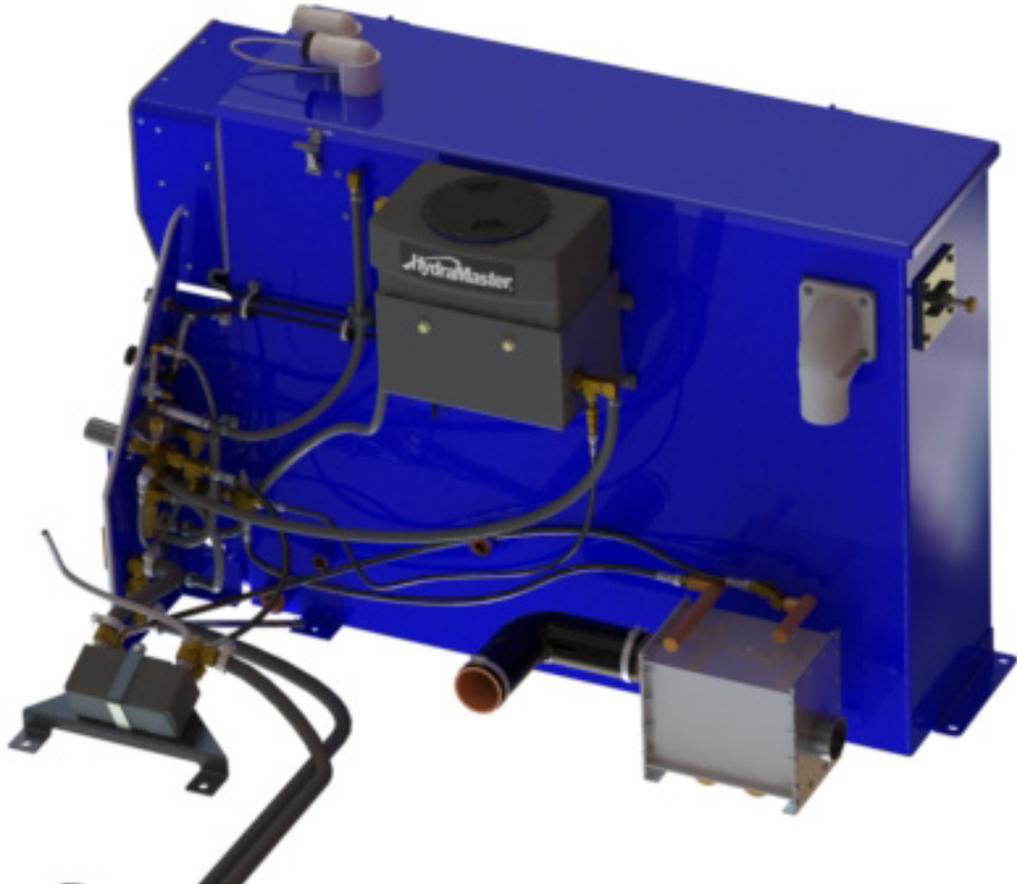


Figure 7. Heat Exchangers System Hose Routings

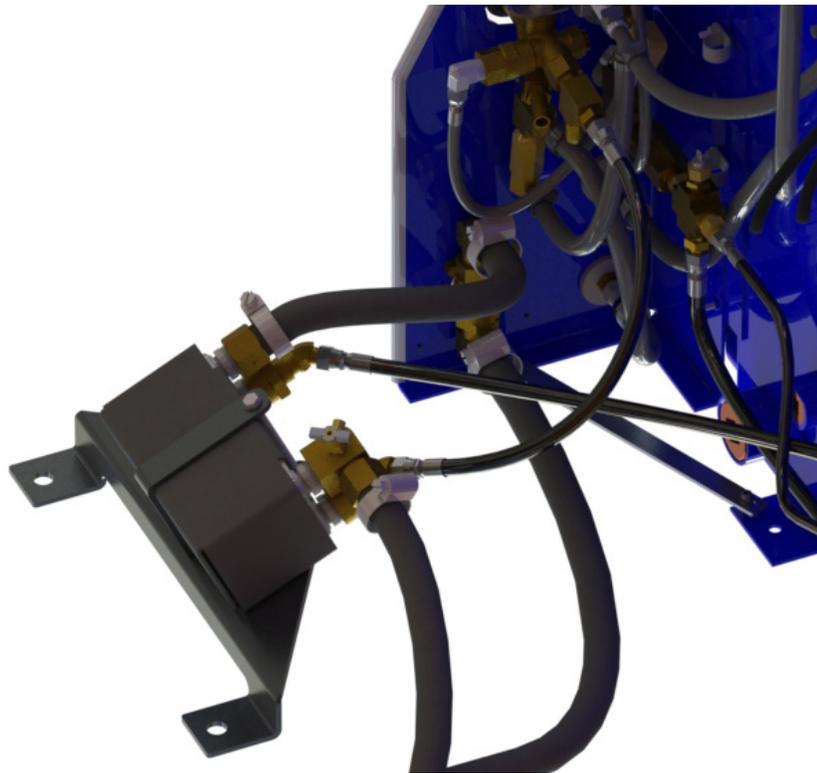


Figure 8. Plate Heat Exchangers Hose Routings



Figure 9. Power Pack to Recovery Tank and Silencer Hose Routings

PREPARING INSIDE THE VEHICLE FOR INSTALLATION

1. Remove the driver and passenger seats.
2. Remove the dog house engine cowling.
3. Remove the cup holder assembly from the engine cowling.

4. Carefully remove the plastic dash covers on the driver and passenger sides. 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.
5. Remove the engine cowling.



Figure 10. Plastic Dash Covers

6. 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).

FRONT END INSTALLATION PREP

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 bolts shown in the figure below and loosen the clamp between the air cleaner tube assembly and throttle body. There are two snap-in grommets under the air cleaner, apply some force upwards to remove the assembly. Use a shop rag to cover the throttle body intake.



Figure 11. Unplugging the Air Cleaner



Figure 13. Unbolting the Air Cleaner



Figure 12. Air Cleaner and tube removed

3. Locate the fastener holding the radiator over-flow container and remove it. Remove radiator over-flow container and stage to the left of the engine bay.



Figure 14. Radiator Over-flow Bolt



Figure 15. Radiator Over-Flow Container Moved Out of the Way

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. Remove the power steering pump by removing the bolts accessible through the openings on the pulley and stage to the right of the engine bay. Save the bolts as they will be used to mount the power steering pump to the front end bracket later.



Figure 16. Power Steering Moved to the Side

6. Unplug van's harness shown below and move the harness away from the engine block to gain better access to the front of the engine block and the power steering bracket (note shown below).

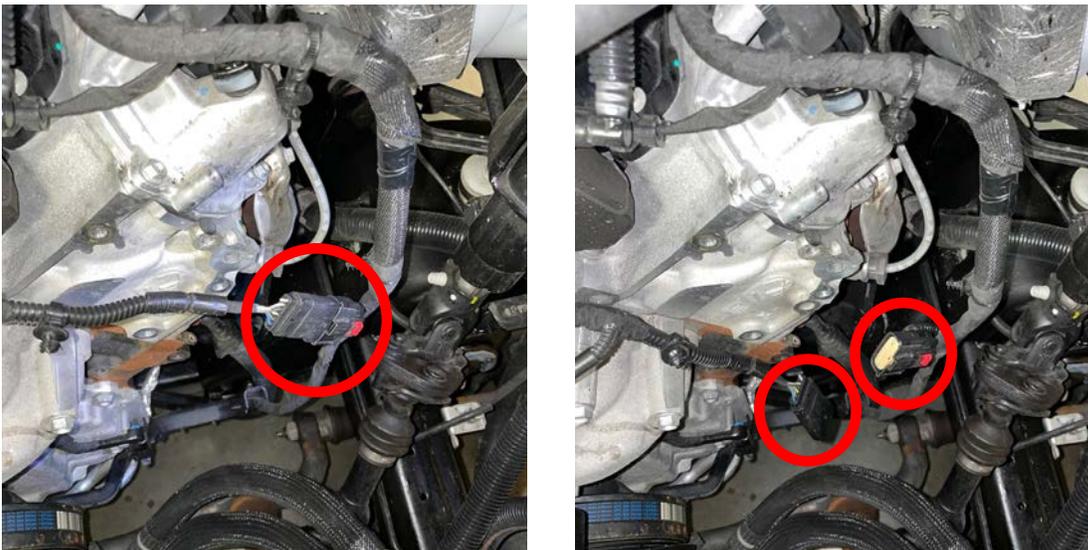


Figure 17. Disconnecting Wiring Harness

DRAINING ENGINE COOLANT (COOLANT SYSTEM VACUUM REFILL TOOLS)

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 17).

Other similar tools are also available. Follow the manufacturers guidelines and drain coolant from the system.



Figure 18. AirLift II Cooling System Vacuum Filler

DRAINING ENGINE COOLANT (ALTERNATIVE PROCEDURE)

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 $\frac{3}{4}$ " 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 18).
- 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 $\frac{3}{4}$ " brass 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.

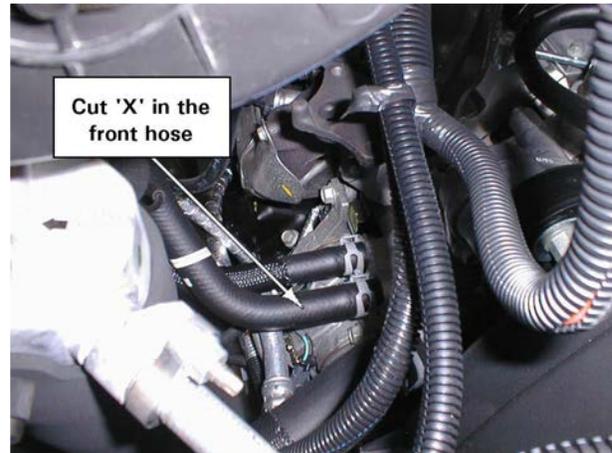


Figure 19. Cut Small 'x' 2.5" from Water Pump Hose

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 or Propylene Glycol, which caused birth defects in animal studies. Do not store in open or unlabeled containers. KEEP OUT OF REACH OF CHILDREN AND ANIMALS.

REMOVING THE UPPER RADIATOR HOSE

1. Loosen the clamps noted on figure below, and remove the radiator hose assembly from the top of the radiator and engine block. Take care not to damage the hose and sleeve assembly as they will be modified and used at a later step.

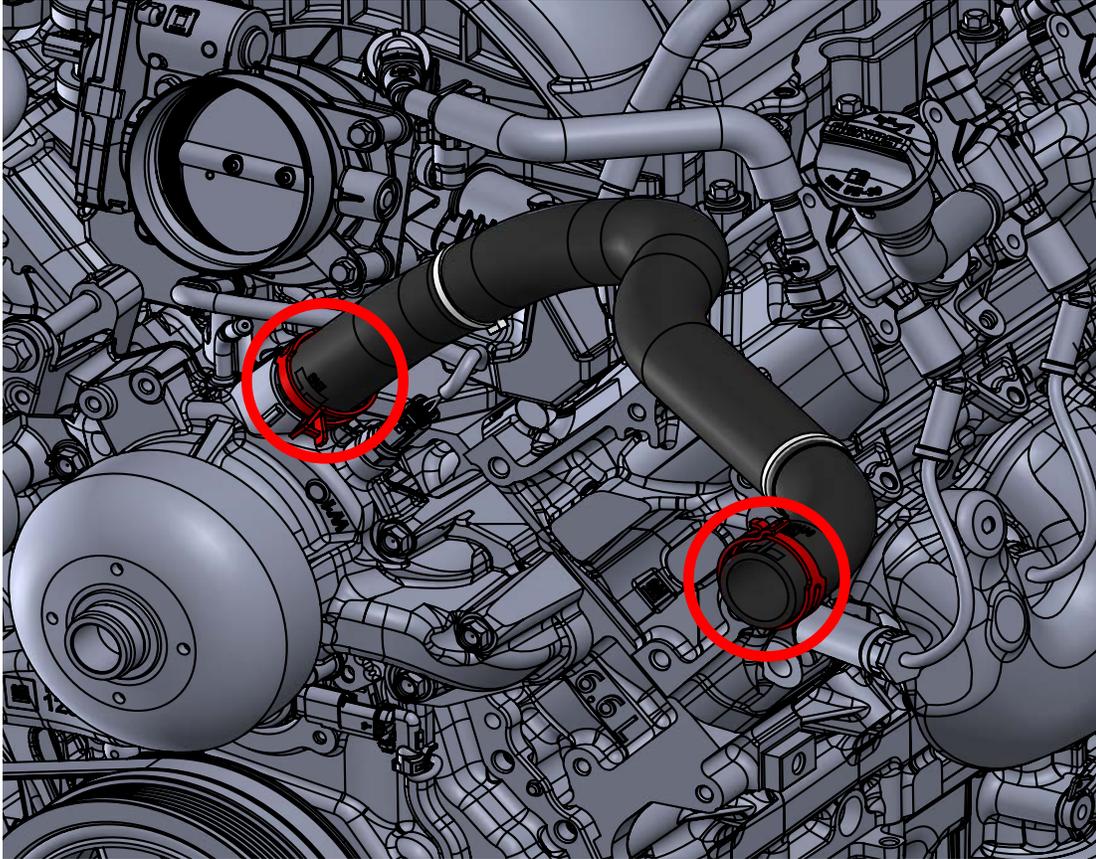


Figure 20. Radiator Hose Assembly

REMOVING THE RADIATOR OVERFLOW HOSE

1. Locate the radiator overflow hose. Loosen the clamps noted on figure below, and remove the overflow hose from the radiator hose assembly running on top of the radiator to engine intake manifold. Take care not to damage the hose and sleeve assembly as they will be modified and used at a later step.

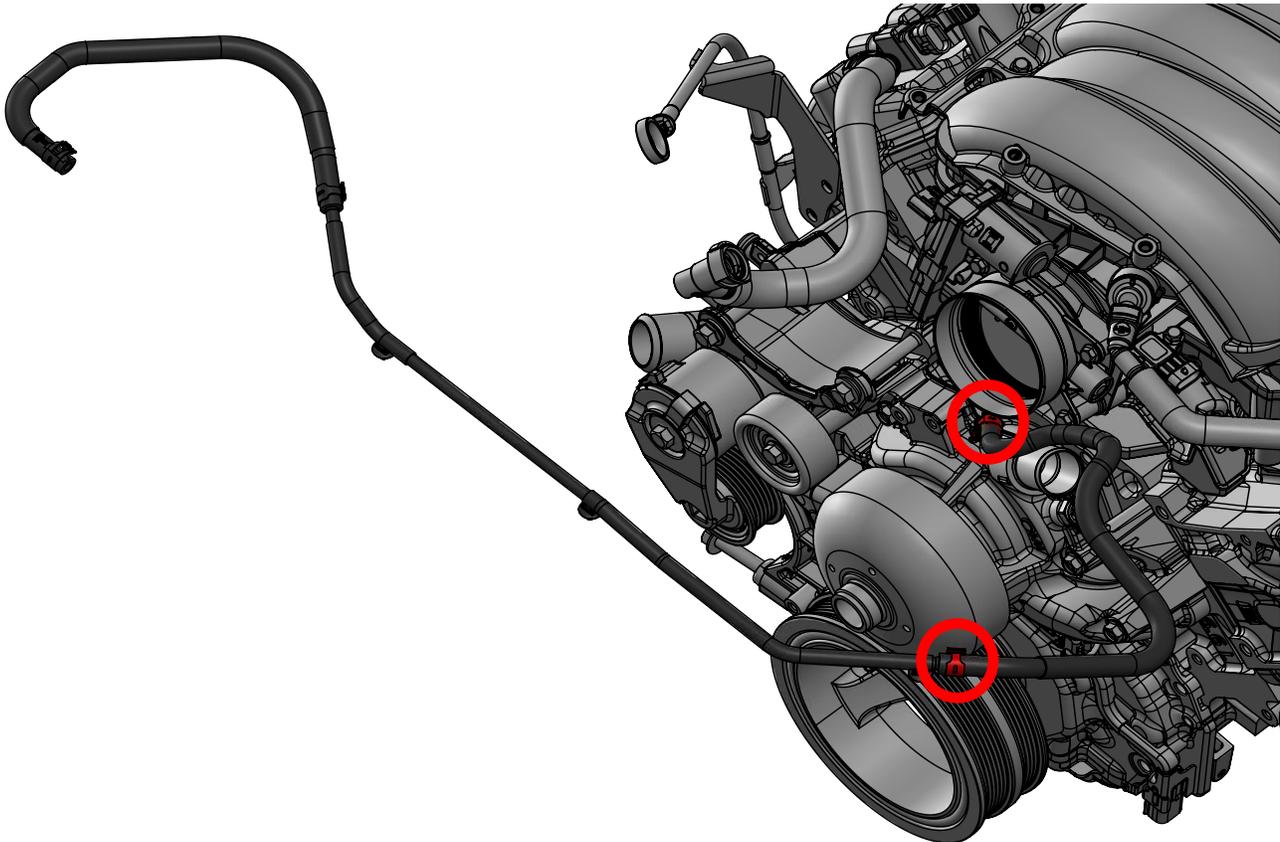


Figure 21. Radiator Overflow Hose Assembly

MODIFYING ENGINE COOLING FAN SHROUD

1. Locate the engine cooling fan shroud between the engine block and radiator.
2. Remove the bolt from the assembly.
3. Cut and remove the metal collar flush with the plastic extrusion so that about 1/4" of the shoulder is left.

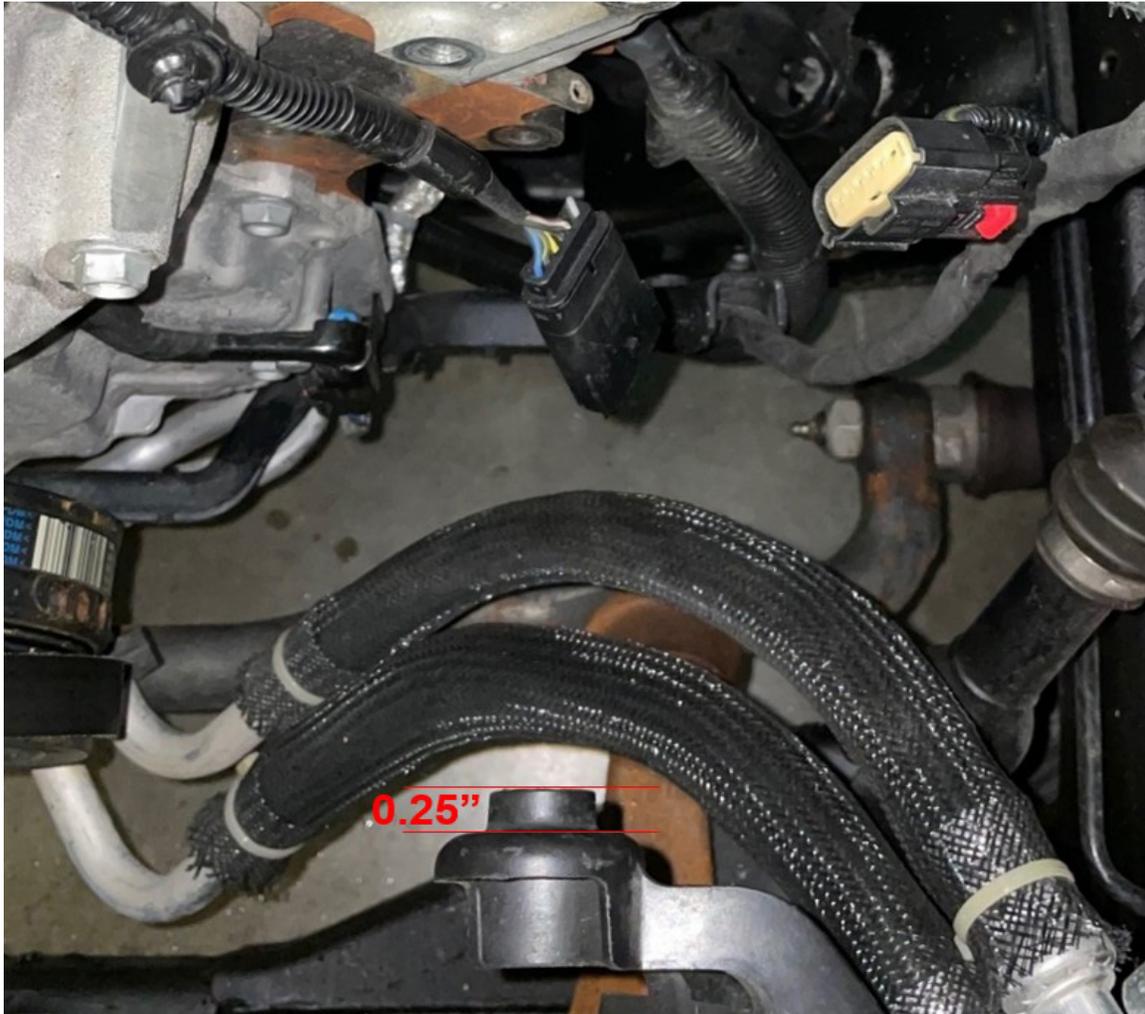


Figure 22. Modified engine cooling fan shroud

REMOVING THE POWER STEERING PUMP BRACKET FROM THE ENGINE BLOCK

1. Remove the three bolts fastening the bracket to the engine block.
2. This part can be discarded as the CDS 4.8 SV front end assembly will provide a new bracket for the Power Steering Pump.

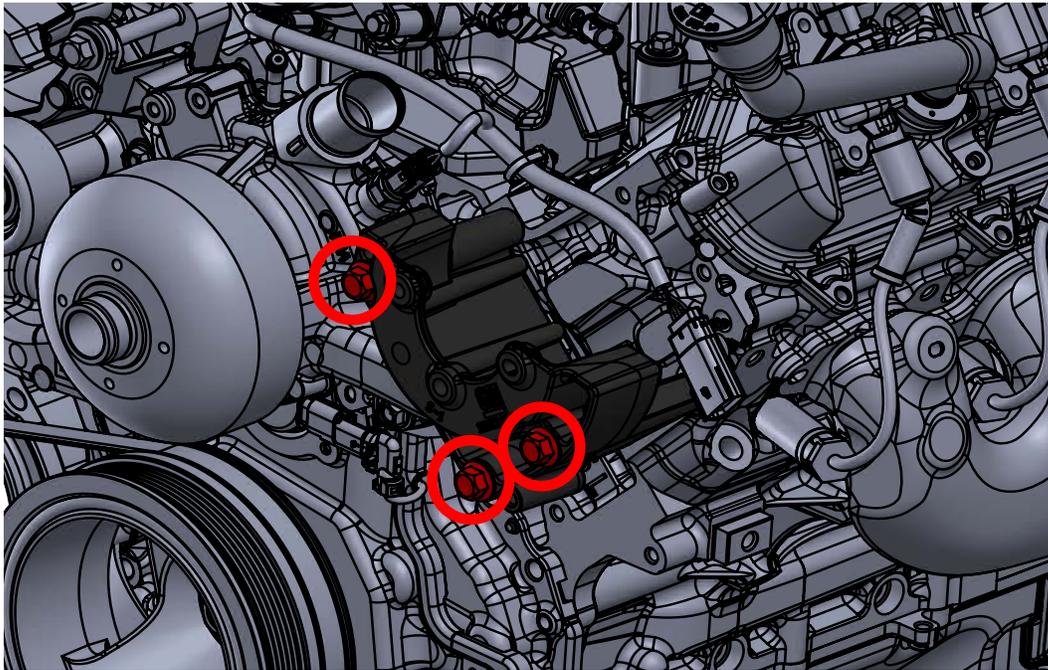


Figure 23. Power Steering Pump Mounting Location

REMOVING AND MODIFYING THE OIL FILLER NECK ASSEMBLY

1. Remove the oil filler neck assembly by unbolting it from the engine block.
2. Modifying oil filler neck by cutting the welded bracket off the tube. Be careful not to cut into or through the tube.

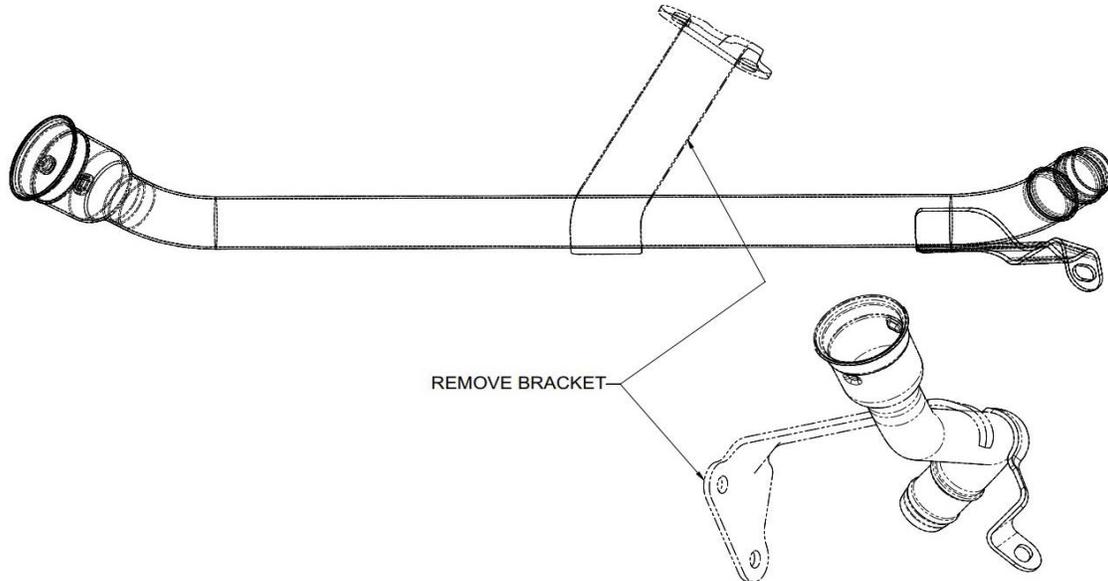


Figure 24. Modifying the Oil Filler Neck

3. Remove the oil filler neck bracket and harness mounting bracket shown below from the engine block. These items can be discarded.



Figure 25. Oil Filler and Harness Bracket

4. Oil filler Neck will be reinstalled shortly after the clutch housing bracket has been installed.

UPPER RADIATOR HOSE MODIFICATION

1. Locate the radiator hose that was removed earlier.
2. Remove the clamps and sleeve. Save the sleeve, it will be cut to length and used at a later step.
3. Cut two sections out of the hose according the drawing below.

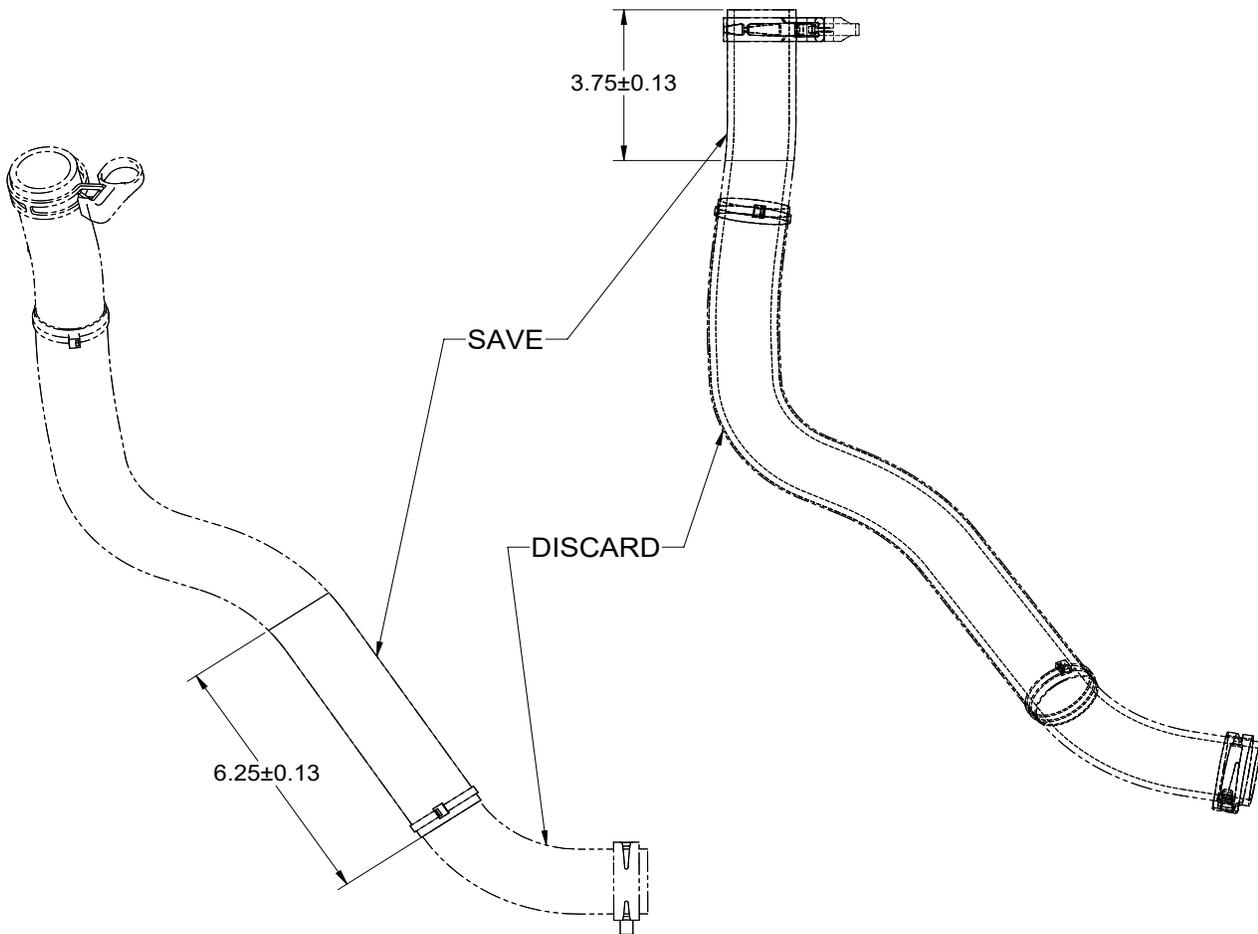


Figure 26. Cut sections of the radiator tube assembly.

OVERFLOW RADIATOR HOSE MODIFICATION

1. Locate the overflow radiator hose that was disconnected earlier.
2. Cut the section out of the hose according the drawing below.

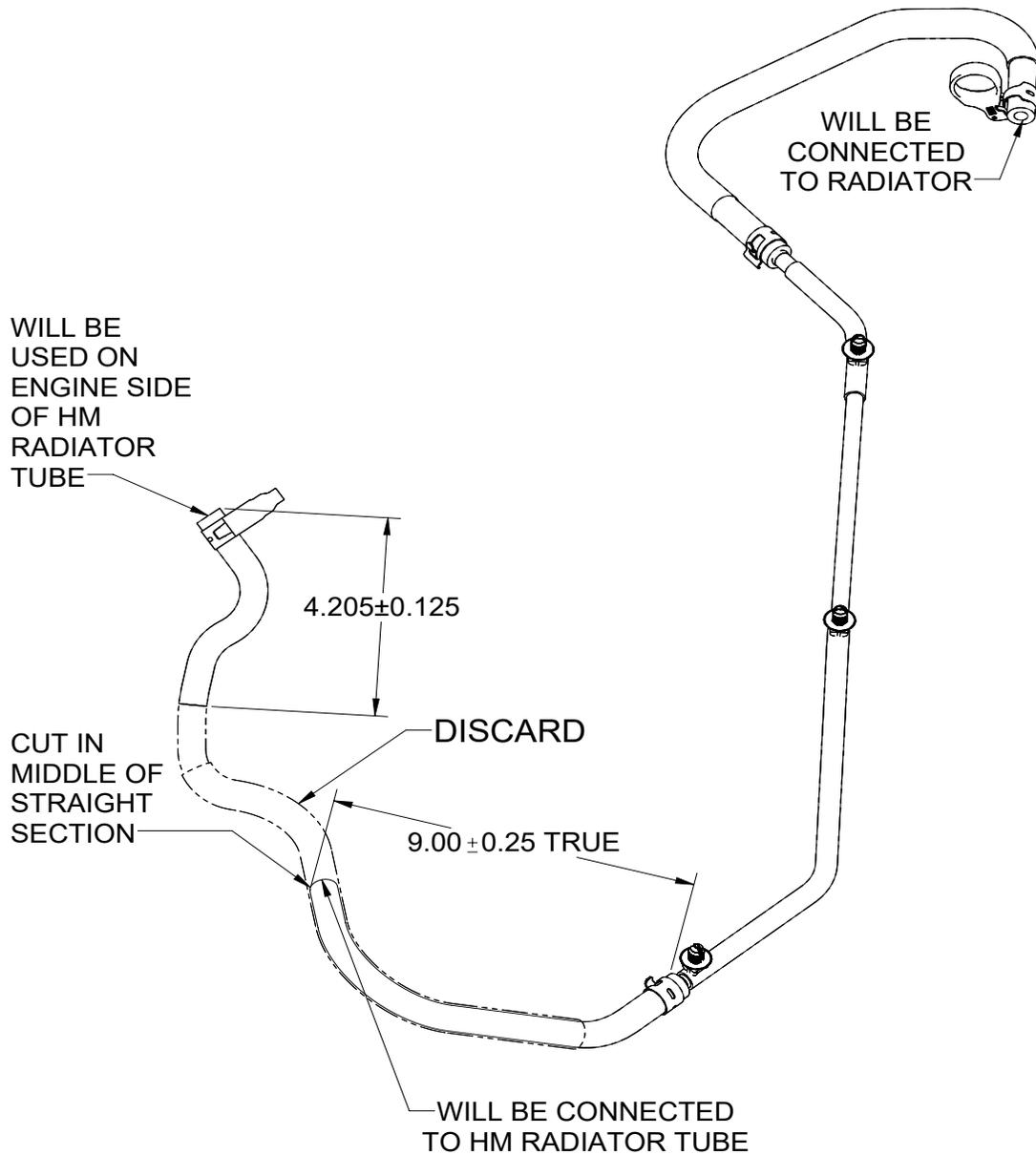


Figure 27. Cut sections of the overflow radiator tube assembly.

PREPARING AND INSTALLING THE CDS CLUTCH ASSEMBLY

1. Locate the clutch assembly and remove the U bolts and bracket highlighted in red. These items will be installed after the clutch assembly has been mounted to the engine block.

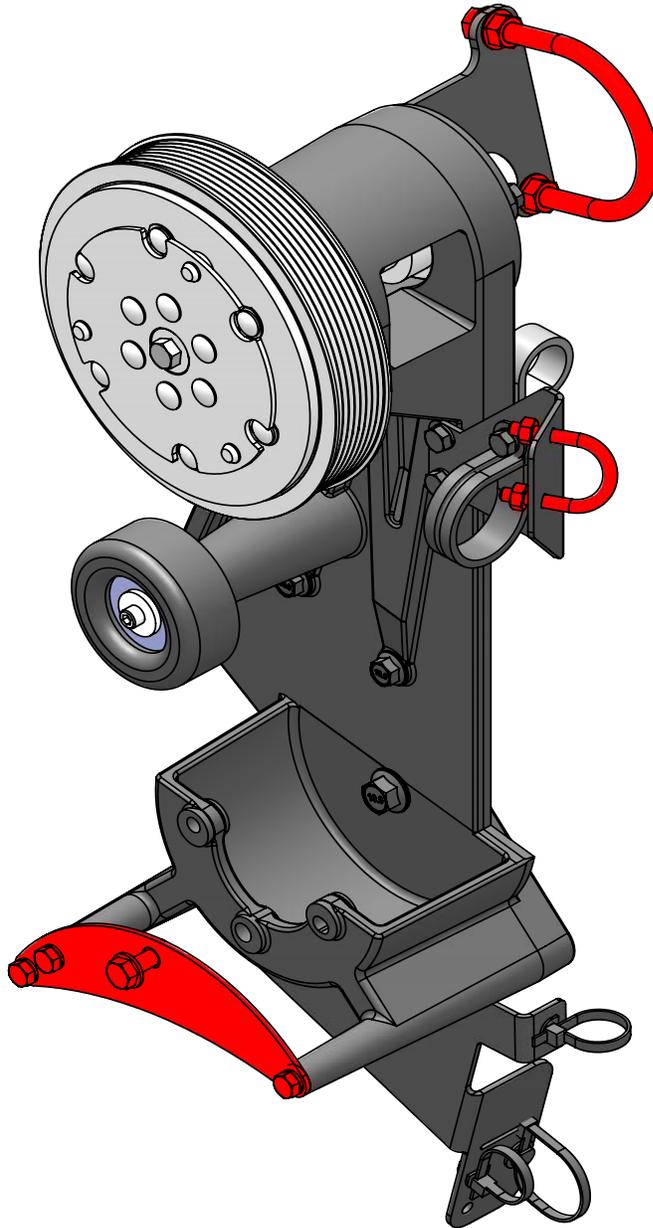


Figure 28. Preparing clutch assembly

2. Mount the clutch assembly to the engine block via the 6 provided bolts:
 - A. SCREW, 8MM X 1.25 X 50MM HEX FLANGE GRD 10.9 STEEL (PN: 000-143-806)
 - B. SCREW, 10MM X 1.5 X 50MM HEX FLANGE GRD 10.9 STEEL (PN: 000-143-804)
3. Torque the 4 bolts noted with an A to 18 ft. lbs.
4. Torque the 2 bolts noted with an B to 37 ft.lbs.
5. Note that the bolts on the bottom of the assembly will also be used to mount the harness bracket on the bottom as well.

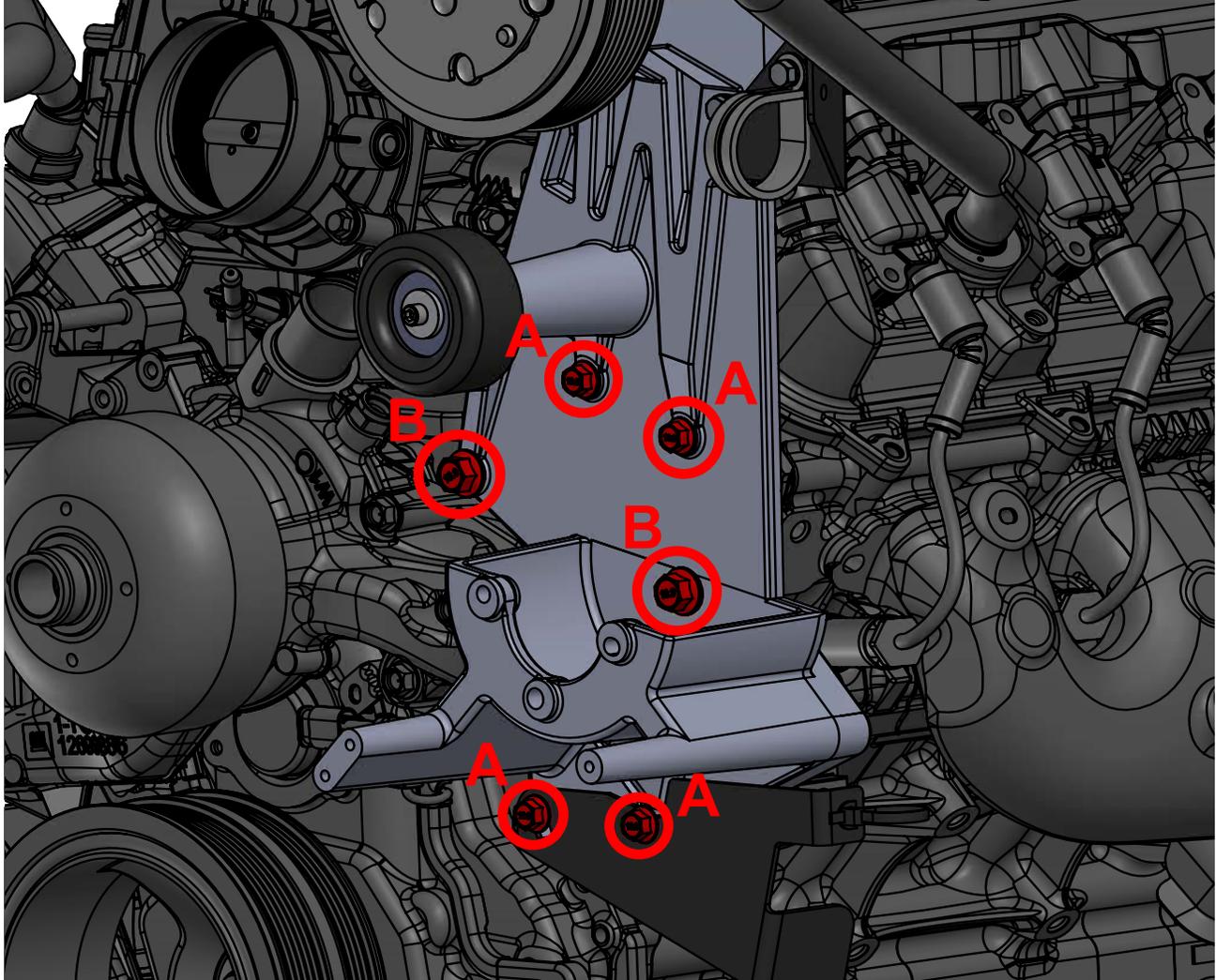


Figure 29. Mounting the clutch onto the engine

ROUTING THE ENGINE HARNESS THROUGH THE HARNESS BRACKET ON THE CLUTCH HOUSING

1. Locate the zip tie mounting locations on the clutch housing assembly.
2. Route the harness that is running on the front lower section of the engine (the harness should be in a plastic extrusion with a snap in feature), snap the plastic housing into the bracket.
3. Route the exposed section of harness through the zip ties noted below.
4. Route harness that runs along the side of the engine

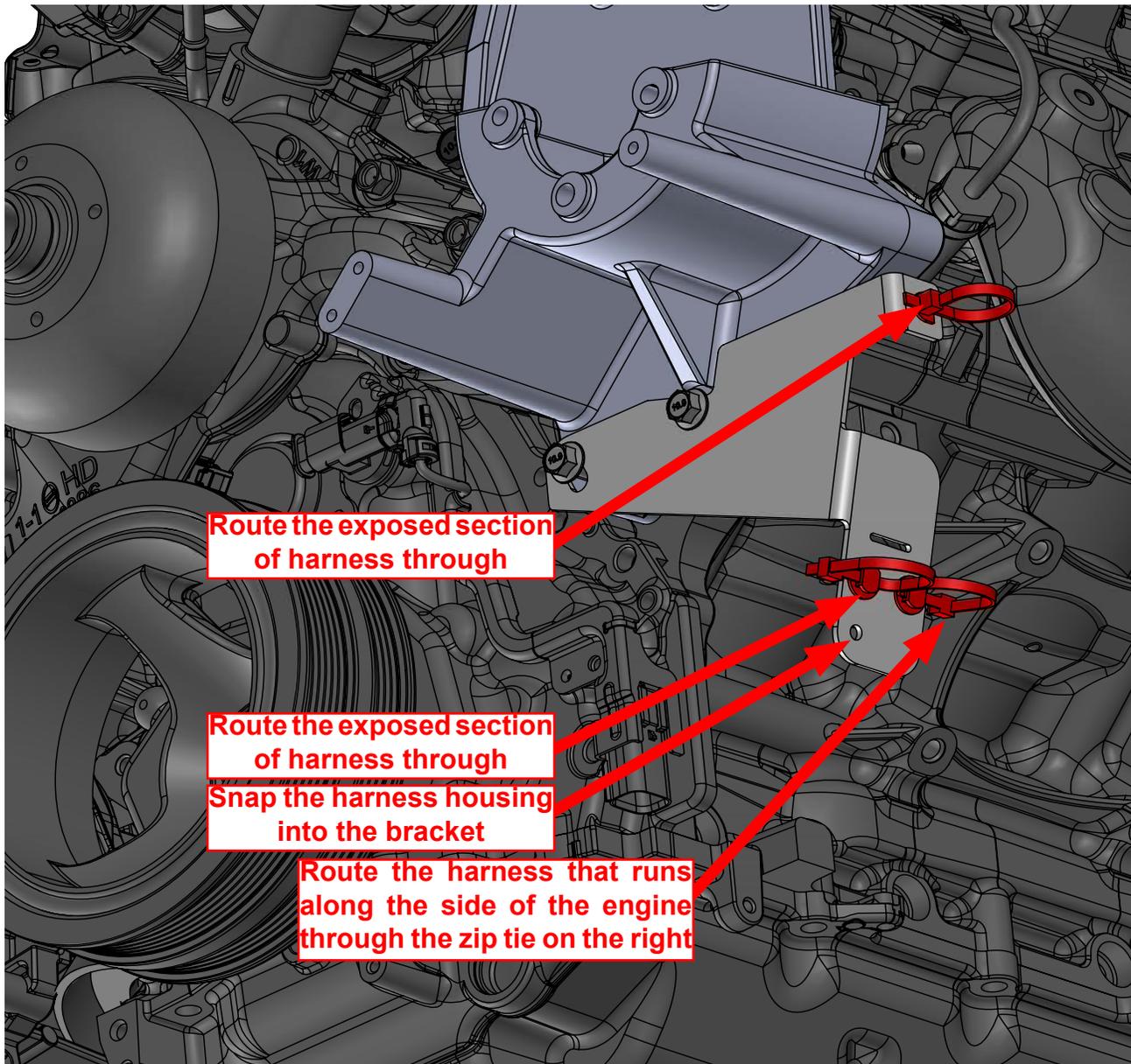


Figure 30. Engine Harness Routing

INSTALLING THE DRIVESHAFT ON THE FRONT END CLUTCH

1. Locate the driveshaft and prepare it for installation by loosening the bolt on the yolk and pry the open on the yoke for easier installation on the shaft. Apply a drop of super glue to the key on the clutch key way to hold the part in place during installation.
2. Route the driveshaft over the engine into the cabin, align the key way on the yoke and key on the shaft and slide the yoke onto the front end shaft. Ensure 1/4" of the shaft is protruding through the yoke.
3. Tighten the bolt on the yoke.

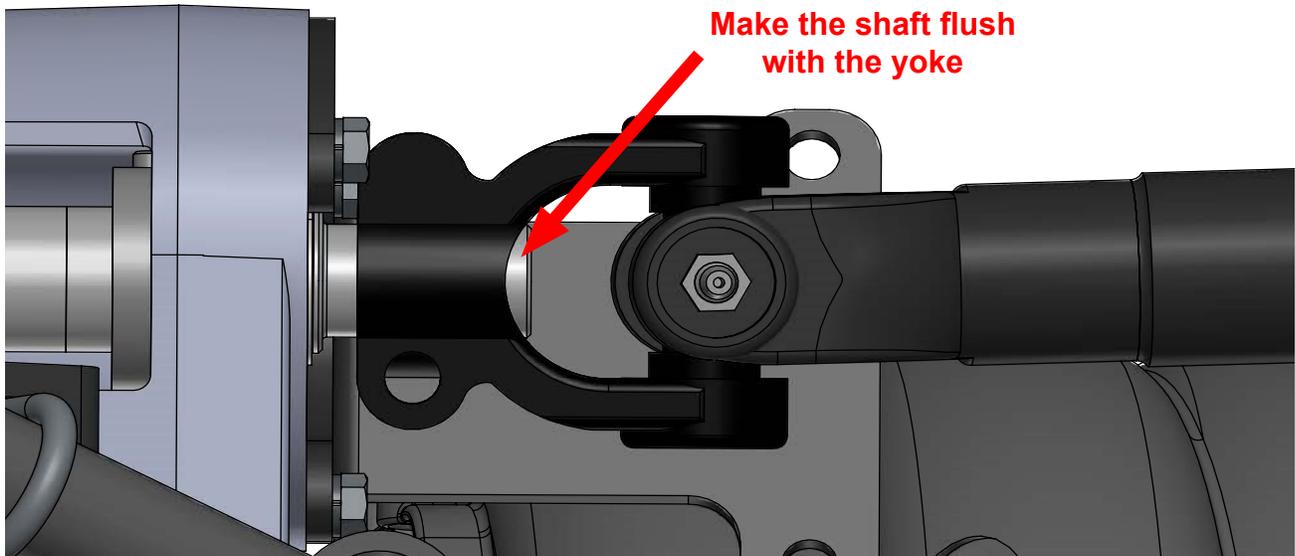


Figure 31. Correctly installed drive shaft on the front end assembly

4. Re-install the fly strap and Oil Fill Neck U-bolt on the bracket.

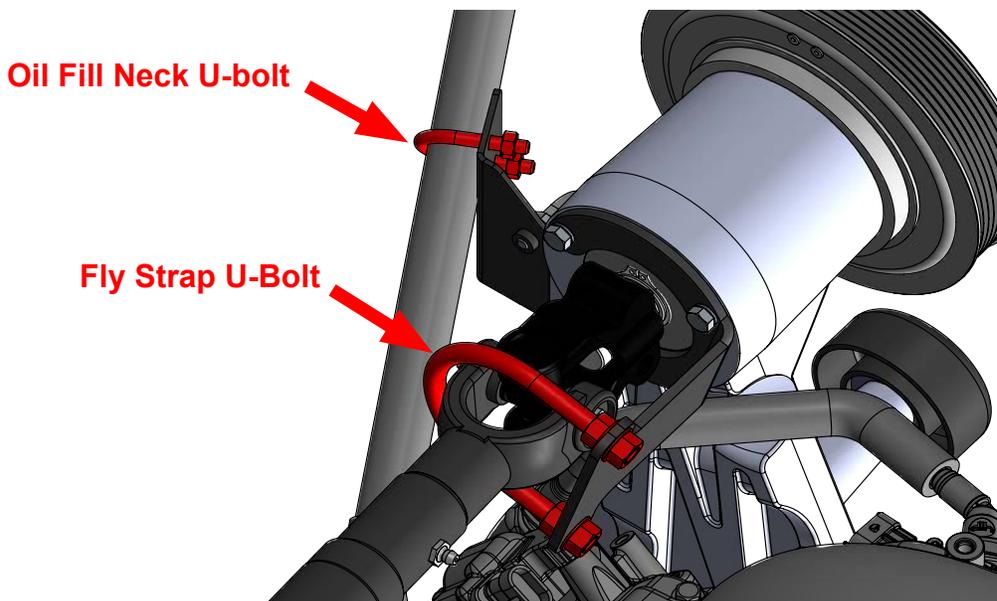


Figure 32. Reinstalling U-bolts on the front end assembly

REINSTALLING THE POWER STEERING PUMP

1. With the front end bracket assembly fully mounted to the engine re-install the power steering pump.
2. Align pulley so the bolt mounting holes are visible through the openings on the pulley.
3. Locate the bolts that were originally used to mount the power steering pump to the power steering cradle and use them to install the power steering pump onto the housing.

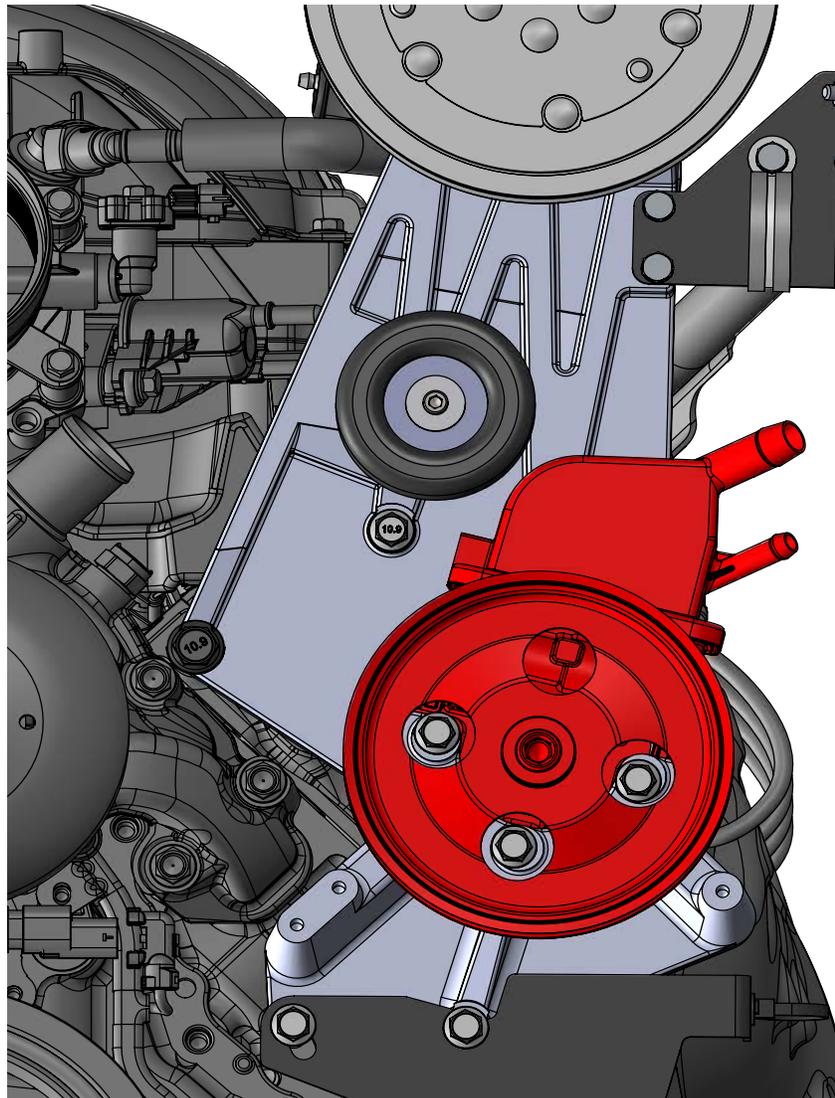


Figure 33. Power Steering Pulley Reinstalled on the Clutch Housing

INSTALLING THE DRIVE BELT ON THE FRONT END ASSEMBLY

1. Locate the CDS belt in the front end kit under, PN:000-010-141.
2. Install the belt according to the routing diagram noted below and the label provided in the front end kit. (Label PN: 000-081-539)
3. When installing the belt on the CDS clutch, leave the front two grooves empty.
4. Install the CDS Drive Belt Routing label under the hood of the vehicle.

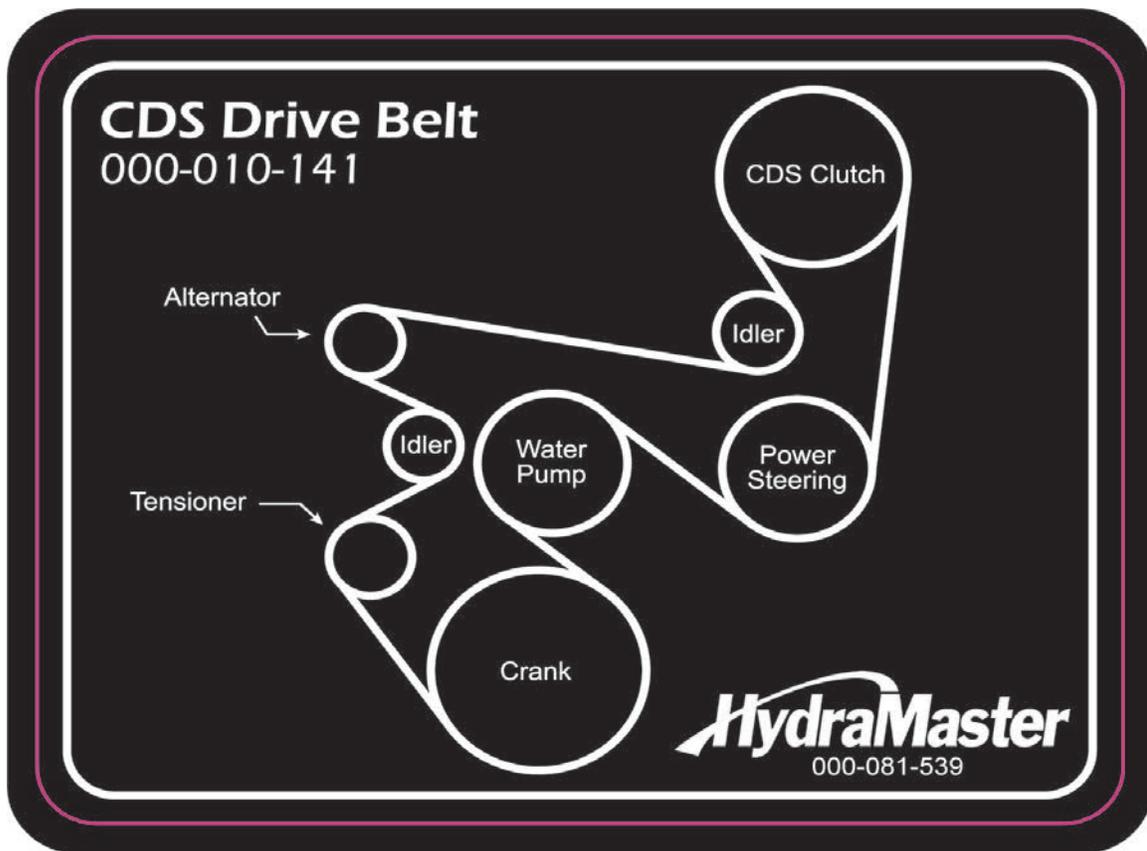
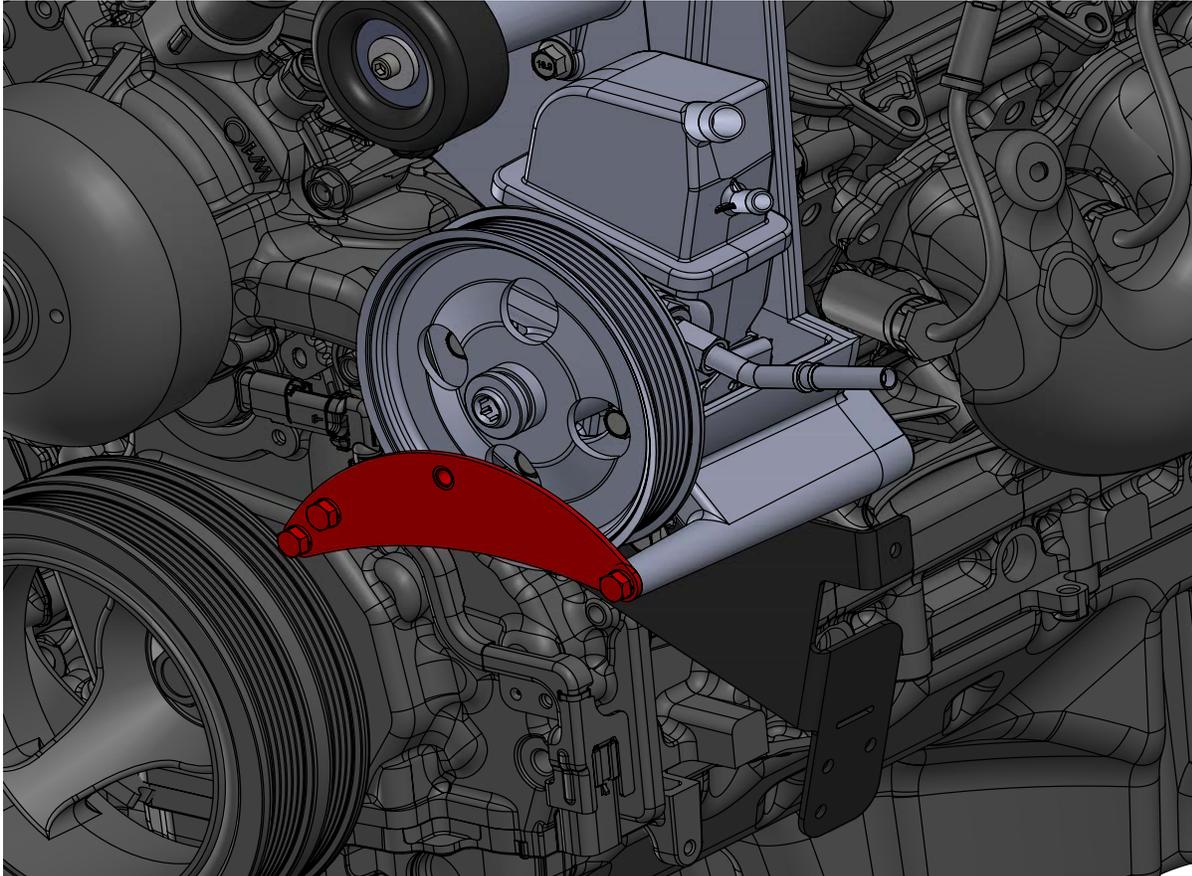


Figure 34. CDS Drive Belt Routing as Noted on the Label

INSTALLING THE CRESCENT BRACKET TO FRONT END CLUTCH HOUSING

1. Locate the crescent bracket assembly that was removed prior to installation of the clutch housing.
2. Reinstall the assembly onto the clutch housing, in front of steering pump pulley.



**Figure 35. Crescent Bracket Reinstall on the Clutch Housing
(belt and hoses hidden for clarity.)**

INSTALLING COOLING FAN SHROUD TO THE CRESCENT BRACKET

1. Ensure the cooling fan shroud has been modified according to the earlier step.
2. Mount the cooling fan shroud to the crescent bracket with the provided hardware.

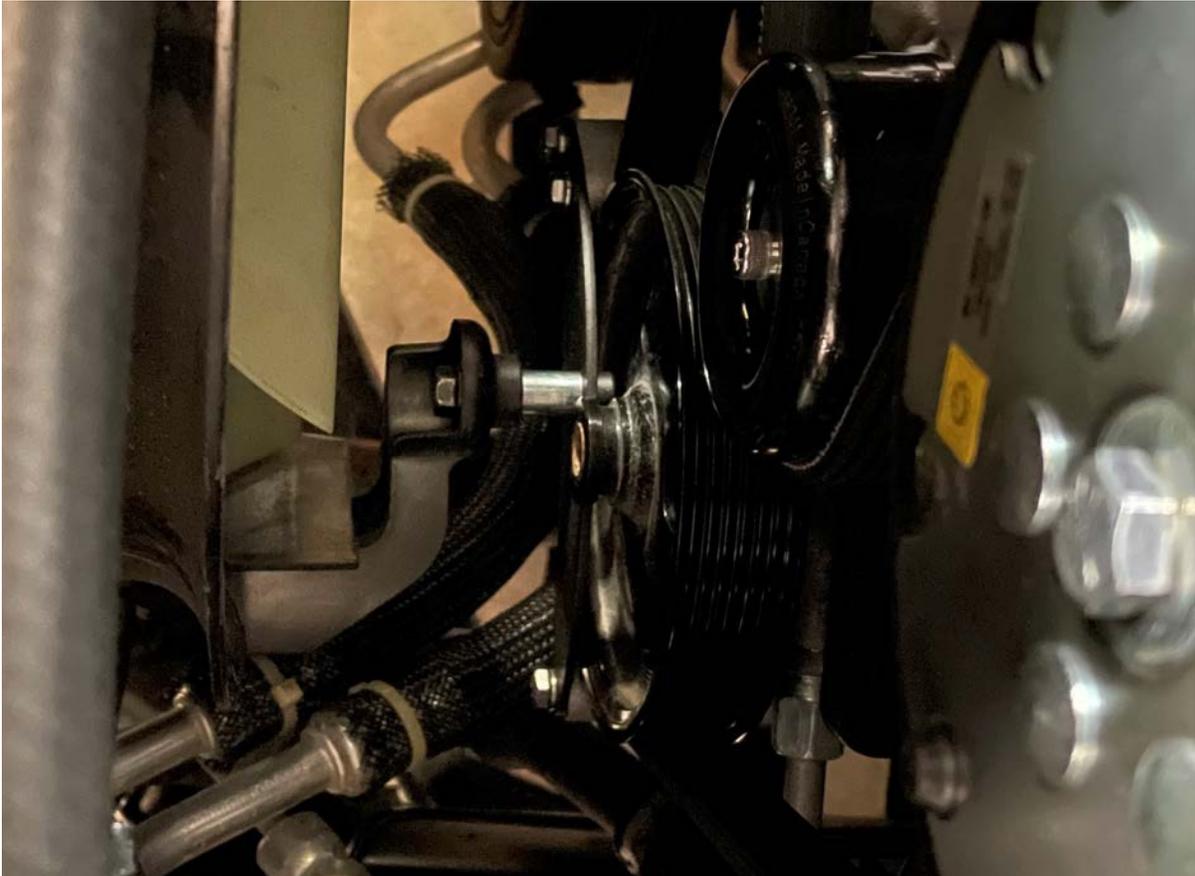


Figure 36. Cooling fan Shroud Mounted onto the Crescent Bracket

INSTALLING THE UPPER RADIATOR TUBE BETWEEN THE ENGINE BLOCK AND RADIATOR

1. Locate upper radiator hose and overflow radiator hose sections that were modified earlier along with the upper radiator tube provided in the front end kit.
2. Remove the holding clamp shown in the figure on the next page.
3. Route the upper radiator tube under the clutch assembly. Use the smaller section of the modified radiator hose (3.75") and the S-bend section of the radiator coolant overflow to make the connection between the upper radiator tube and the engine block.
4. Locate the black mesh protector that was on the original coolant tube assembly, cut the piece so it covers the portion of the upper radiator tube that lies under the clutch and zip tie onto the SS.
5. Reinstall the holding clamp and mount the tube onto the clutch housing assembly.
6. Locate the remaining modified radiator hose (6.25") and the overflow radiator hose assembly, install these sections between the upper radiator tube and the radiator.
7. Use the provided clamps to complete the installation of the upper radiator tube.



Figure 37. Upper Radiator Tube Connections to the Engine Block



Figure 38. Upper Radiator Tube Mounted to the Clutch Housing

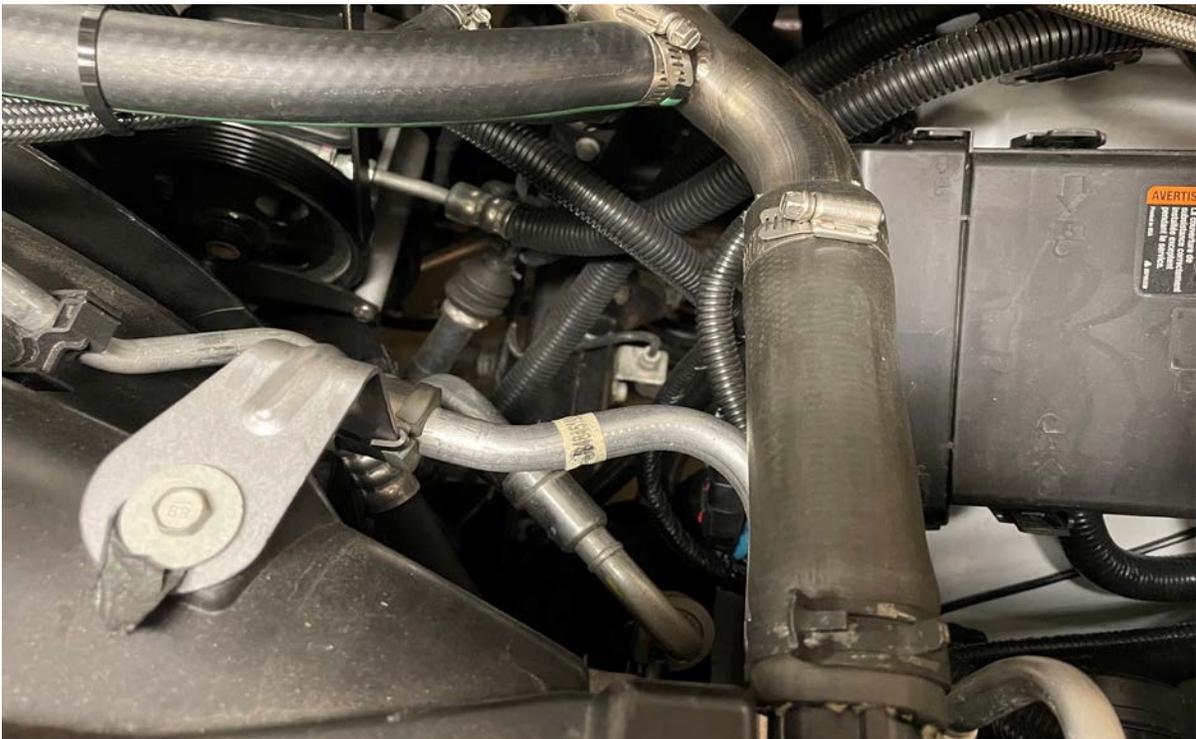


Figure 39. Upper Radiator Tube Connections to the Radiator

INSTALLING COOLANT RETURN TEE

1. Locate the water pump hose on the passenger side of the van. (if the alternative method of coolant draining procedure was followed, this hose has already been cut and you can skip the next step)
2. Cut the hose.
3. Install the brass tee provided in the from end kit between the two cut sections of the hose. The hose on the middle fitting will be installed during the heat exchanger installation. The hose will run between the lower fitting on engine coolant flow valve and the Tee as shown below.
4. Install and tighten the clamps.



Figure 40. Installed Coolant Tee

AIR INTAKE RESONATOR MODIFICATION

1. Loosen the clamps noted on figure below, and remove the assembly from the air intake manifold.



Figure 41. Resonator and Air Intake Tube Assembly Removed

2. Loosen clamp between air intake tube and resonator, and remove the resonator. Resonator inlet will be plugged using the provided plug.



Figure 42. Resonator Assembly Removed

3. Install the plug on the intake tube and tighten the clamp around it.



Figure 43. Resonator Inlet Blocked on the Air Intake Tube

4. Reinstall the assembly on the van.



Figure 44. Modified air intake tube re-installed on throttle body

5. Re-install the air intake assembly onto the air intake tube once the coolant hose inflow and outflow have been installed and routed.

INSTALLING FRONT END FLY STRAP PROTECTOR AND COOLANT HOSE SUPPORT BRACKET ASSEMBLY

1. Locate the front end fly strap protector and coolant hose support bracket assembly in the front end kit.
2. Install the flystrap protector (PN: 000-108-251) using the fasteners shown in figure below. Install the U-Bolt around the driveline.
3. Install the coolant hose support bracket (PN: 000-015-1462) using the fasteners shown. Leave the High Temperature Tie Wrap off until coolant hoses have been installed and being routed.

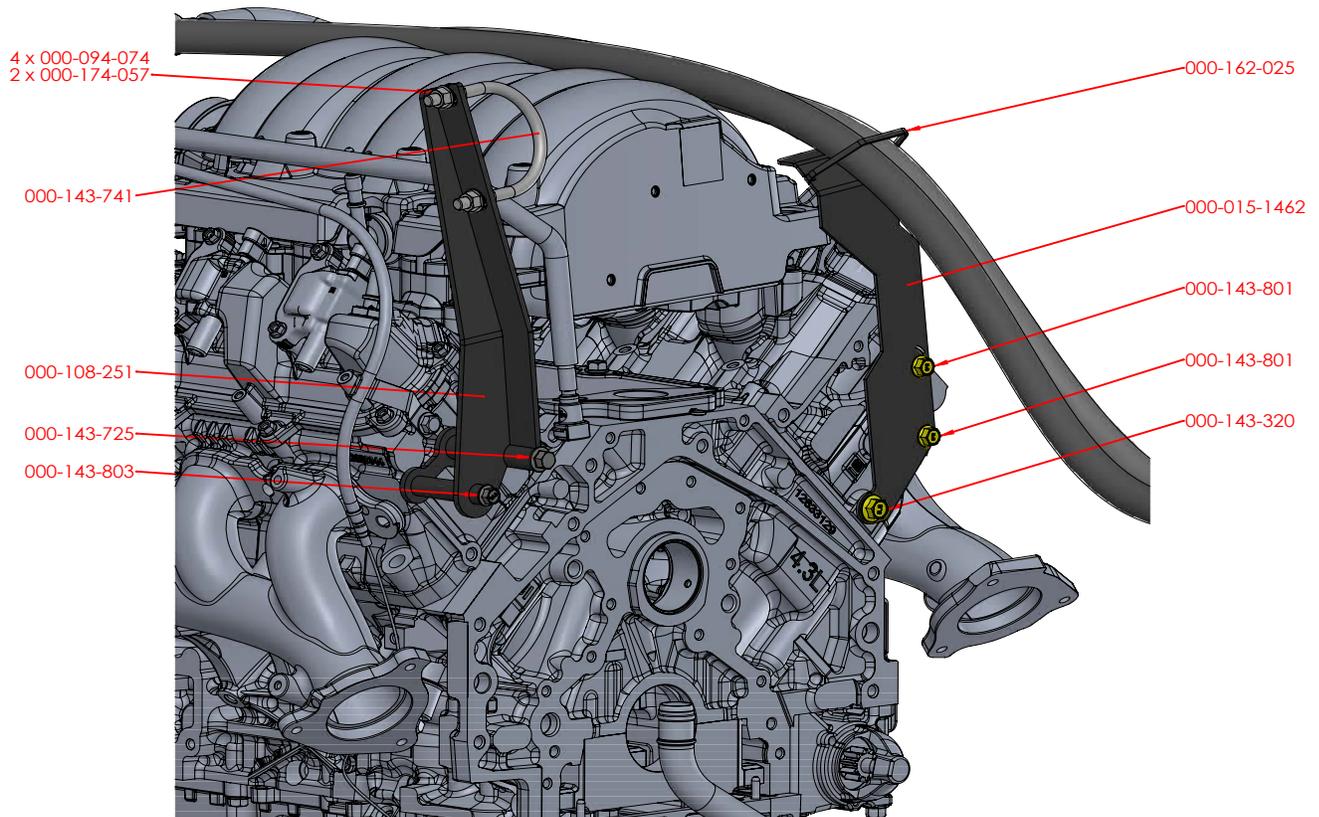


FIGURE 45. FRONT END FLY STRAP PROTECTOR AND COOLANT HOSE SUPPORT BRACKET ASSEMBLY

USING THE INSTALLATION TEMPLATE GUIDES

1. Depending on the van's trim, regular (2500) vs. extended (3500) locate the appropriate silencer mounting template.
2. Lay the template on the floor with the seat studs fully inserted into the seat stud slots (highlighted in red on the next page).
3. Use 1/4" drill bit to drill pilot holes noted in green.
4. Remove the template.
5. Enlarge the holes according to the following list:
 - a. Powerpack mounting locations - 3/8" Drill bit
 - b. Recovery tank mounting locations - 3/8" Drill bit
 - c. Silencer mounting locations - 3/8" Drill bit
 - d. Silencer hose routing location - 3 1/4" Hole saw

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.

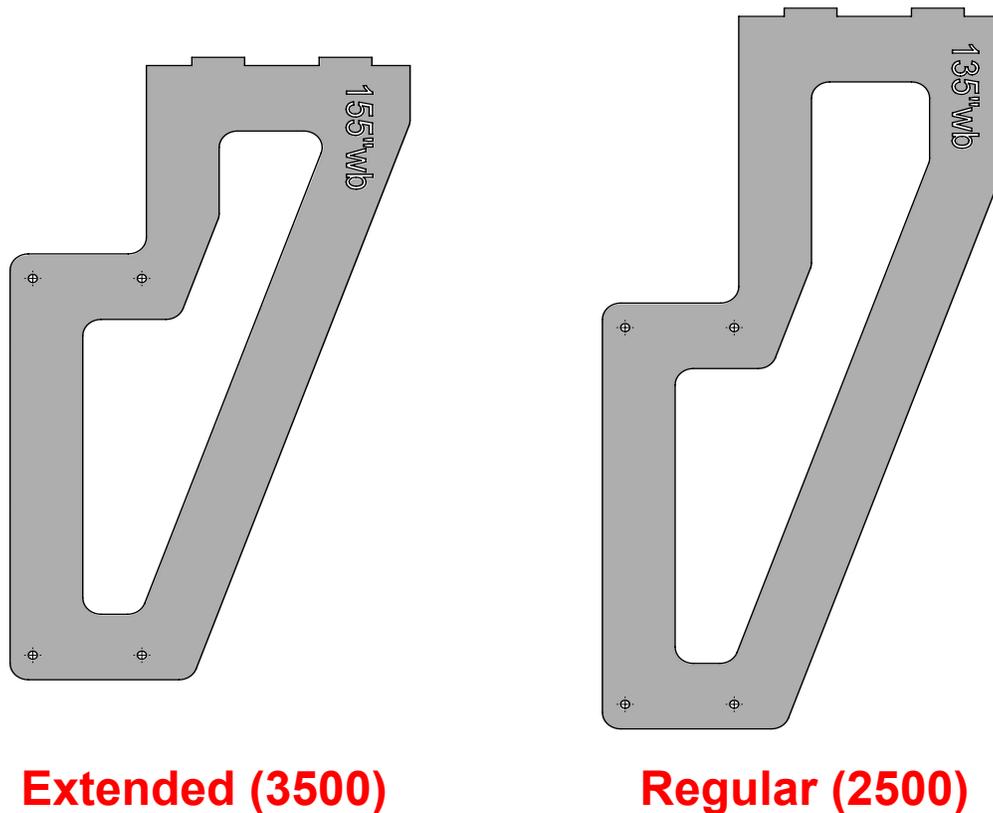


Figure 46. Silencer Templates

FRONT OF THE VAN

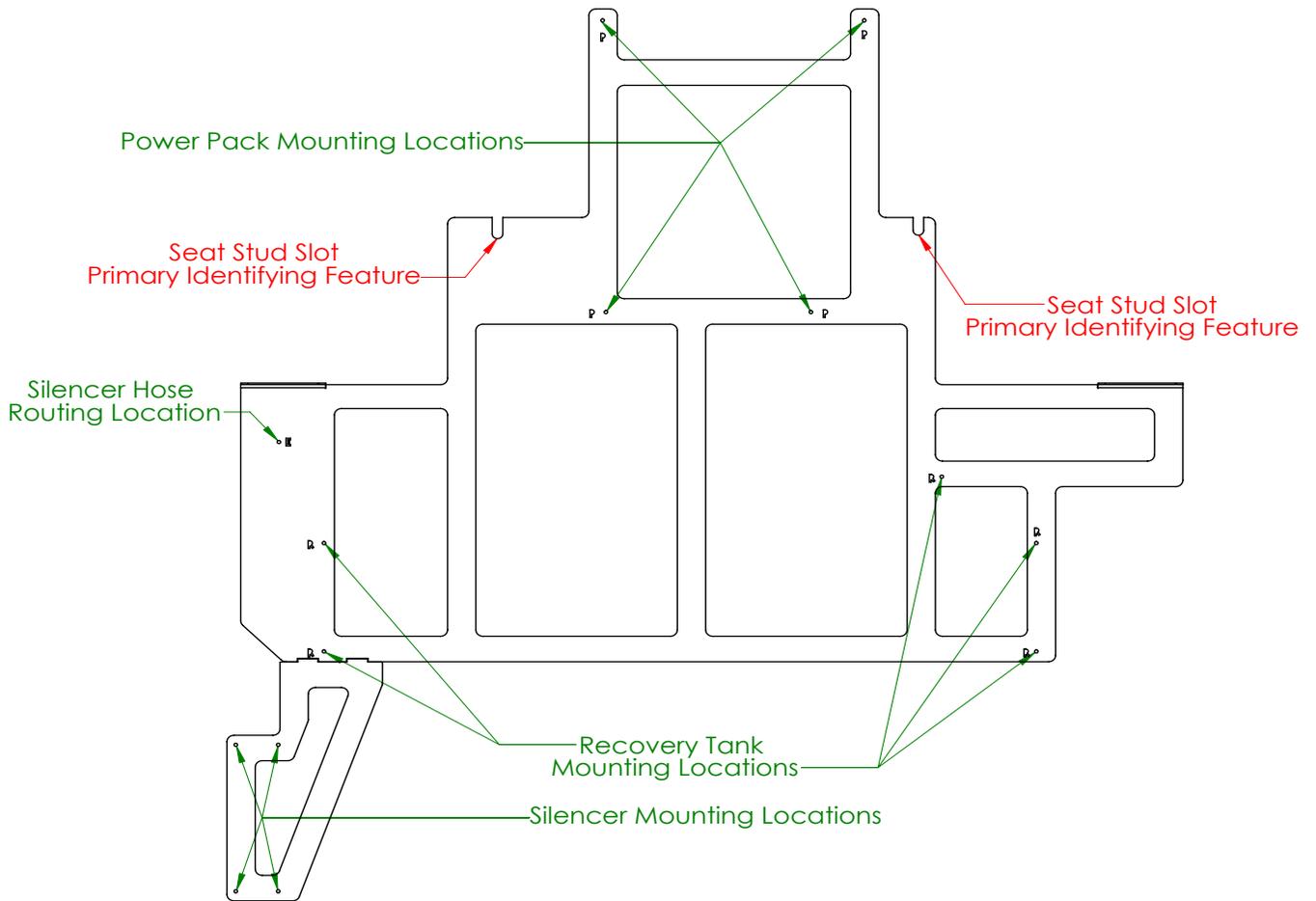


Figure 47. CDS Installation Template

INSTALLING YAW SENSOR AND SDM COVER KIT

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

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

Item	Part Number	Description	Qty
1	000-033-029	Clamp, Size #12 Hose	4
2	000-041-323	Cover, Yaw Sensor and SDM Weld	1
3	000-049-020	Filter Screen - Medium	1
4	000-068-1172	Hose, 1" Vacuum - Gray W - 42"	2
5	000-052-908	Insert 3/4 X 1 Hose w/o Barb	1
6	000-143-058	Screw, #8 TEK X 3/4" Lg.	4

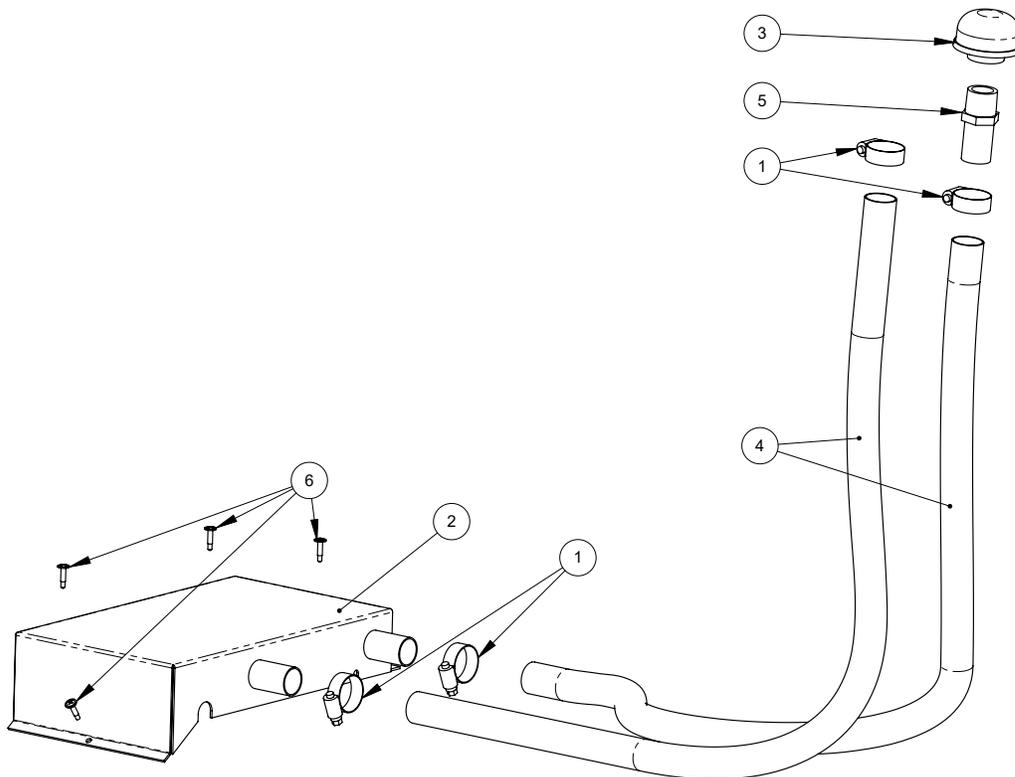


Figure 48. Yaw Sensor and SDM Kit Assembly

1. Remove and discard the plastic cover provided by manufacturer.
2. Align and fit the new cover over the Sensing Diagnostic Module (SDM) and yaw sensor.



Figure 49. Remove and Discard Plastic Cover

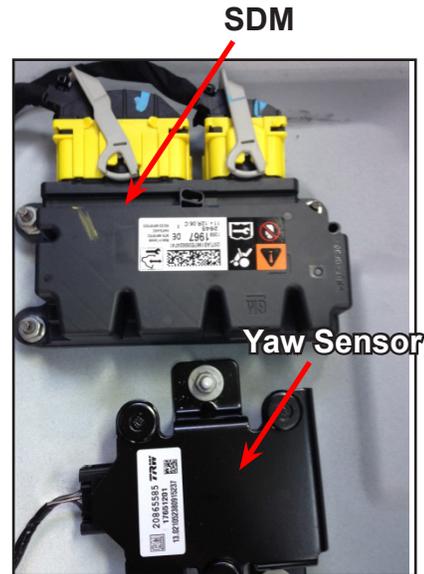


Figure 50. Fit New Cover over SDM and Sensor

3. Route the wires through the two wire exits on the cover, and apply silicone to the flanges liberally.
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.

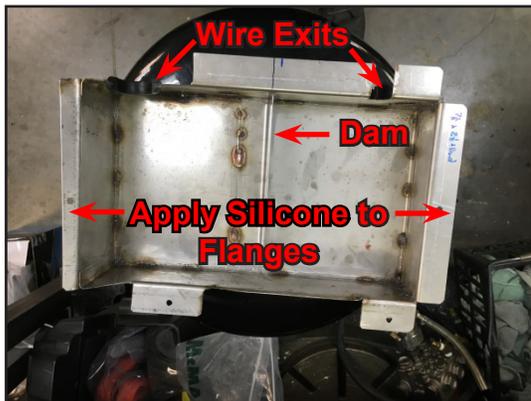


Figure 51. Route Wires through Two Exits



Figure 52. Lower New Cover over SDM and Sensor

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.

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.
2. Install the hose insert and filter screen onto the passenger side hose.

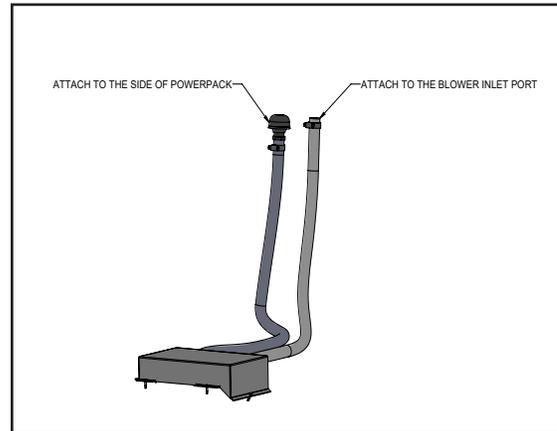


Figure 53. Route and Connect 2 Flex Hoses

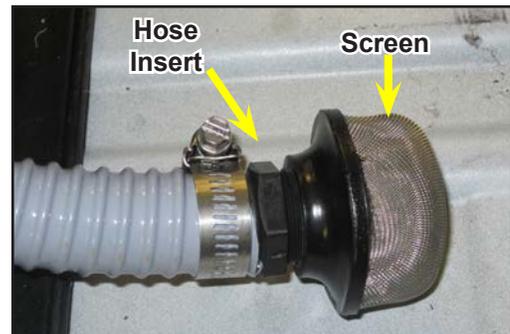


Figure 54. Install Hose Insert and Filter Screen on the Longer (Passenger-Side) Hose



Figure 55. Remove Batting from Floor Mat



Figure 56. Route Hoses Straight Back Toward Cargo Area

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.

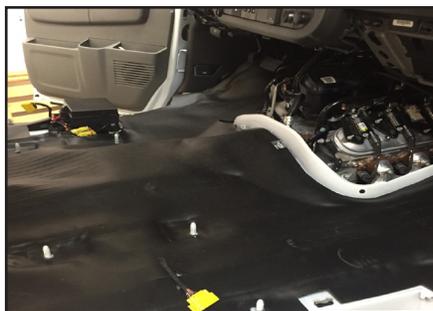


Figure 57. Installed Yaw Sensor cover with front mat laid over it

11015 47th Ave W. Mukilteo, WA
PHONE: (425) 775-7272
www.hydramaster.com

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. 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.

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.

NOTICE

The final assembly will have a 1" diameter hose attached to the blower inlet and a 1" diameter hose routed toward the passenger seat.

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

PREPARING THE POWER PACK ASSEMBLY FOR INSTALLATION IN THE VAN

1. Locate the following items:
 - a. Powerpack on the pallet
 - b. Powerpack front and rear feet on the pallet
 - c. Power pack mounting hardware found in the finish kit
2. Raise the powerpack and attach the feet according to the drawing below.

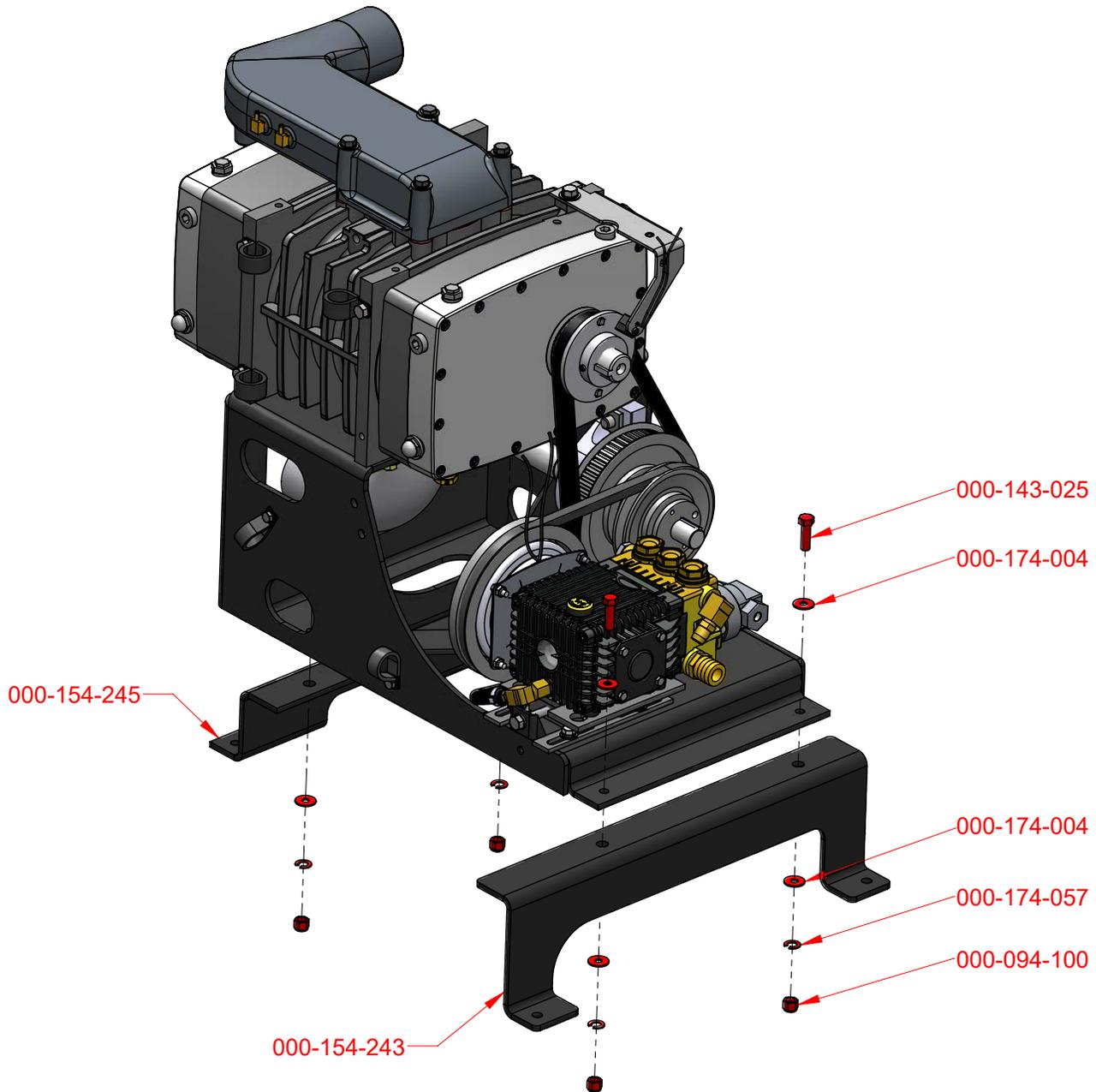


Figure 58. Assembling the Powerpack

INSTALLING THE POWER PACK IN THE VAN

1. With the feet installed on the powerpack, place the assembly inside the van, over the yaw sensor cover and align the hole on the feet with holes drilled earlier using the template. Take care not to damage the yaw sensor inlet and outlet hose and route the hoses under the rear spacer.
2. Locate the power pack and recovery tank mounting hardware in the finish kit.
3. Use the fastener configuration below to attach the powerpack feet to the floor of the van via holes drilled using the installation guideline template. Note that the bolt head and flat washer will be on top of the feet and the tie down cleats will be placed on the underside of vans floor.
4. Rotate the tie down cleats as necessary to clear parts under the van and to maximize the surface contact with the van's floor.
5. Once the power pack is fully installed in the van, install the driveline onto the blower shaft.
6. Verify U-Bolt clearance on to the rear fly strap.

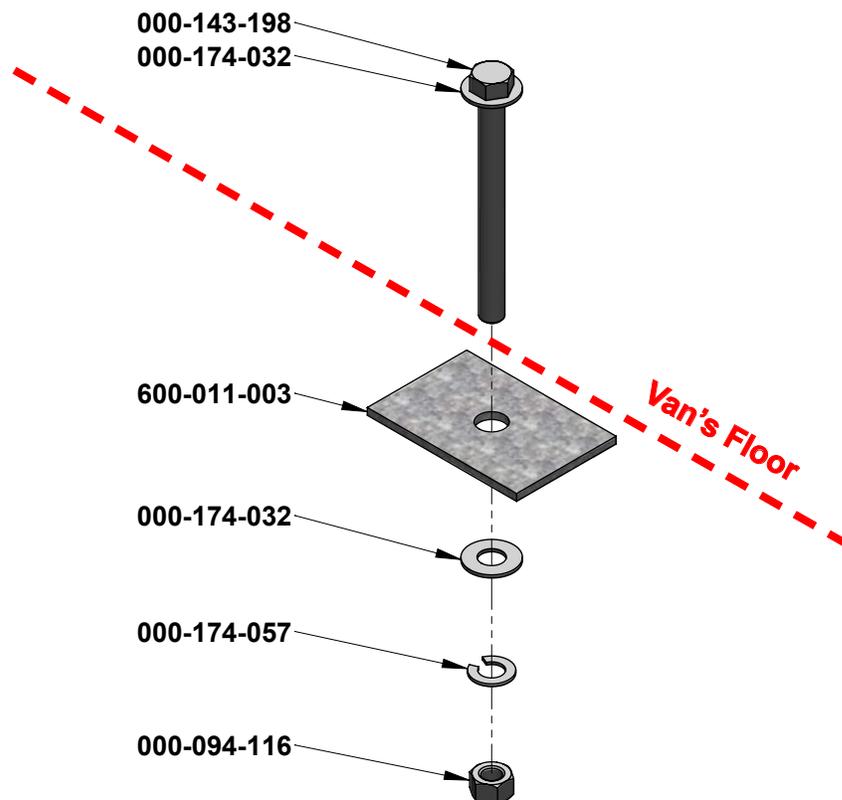


Figure 59. Hardware Used to Mount the Powerpack to the Van's Floor

INSTALLING THE RECOVERY TANK IN THE VAN

1. With the power pack installed in the van. Move the recovery tank behind it.

⚠ 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 may result.

2. Locate the power pack and recovery tank mounting hardware in the finish kit.
3. Use the fastener configuration below to attach the recovery tank to the floor of the van via holes drilled using the installation guideline template. Note that the bolt head and flat washer will be on top of the tank's front, rear and side flanges and the tie down cleats will be placed on the bottom of vans floor.
4. Rotate the tie down cleats as necessary to clear parts under the van and to maximize the surface contact with the van's floor.

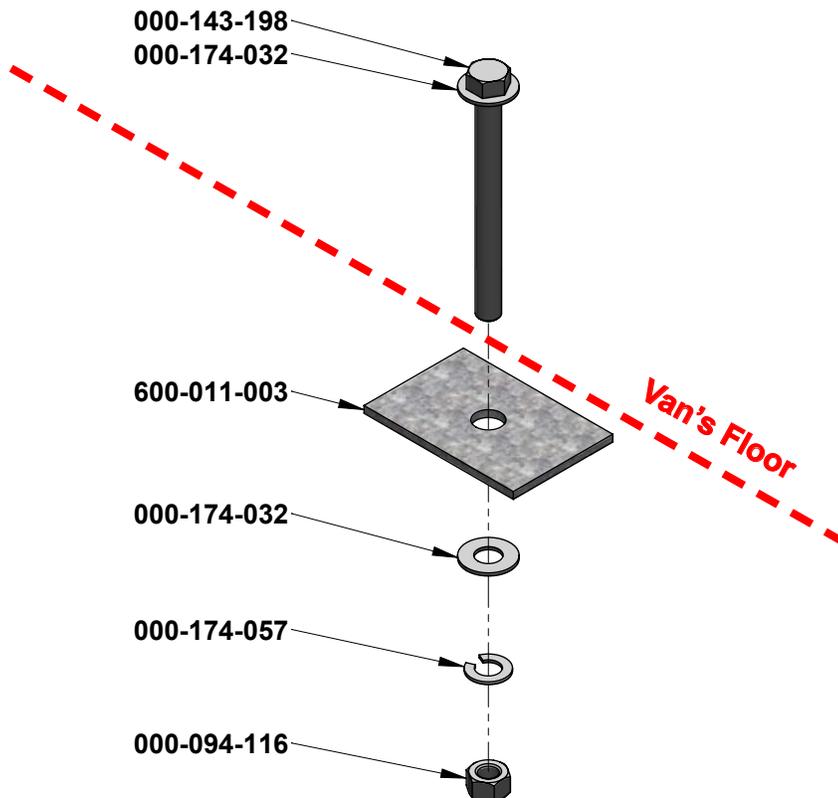


Figure 60. Hardware Used to Mount the Tank to the Van's Floor

INSTALLING THE SILENCER UNDERNEATH THE VAN

1. With the power pack and the recovery tank installed in the van. Locate the silencer assembly.
2. Locate the external silencer mounting hardware in the finish kit.
3. Use the fastener configuration below to attach the silencer to the floor of the van via holes drilled using the installation guideline template. Note that the bolt head and flat washer will be on the vans floor, with the flat washer, lock washer and nut assembly underneath the van against the silencer plate.

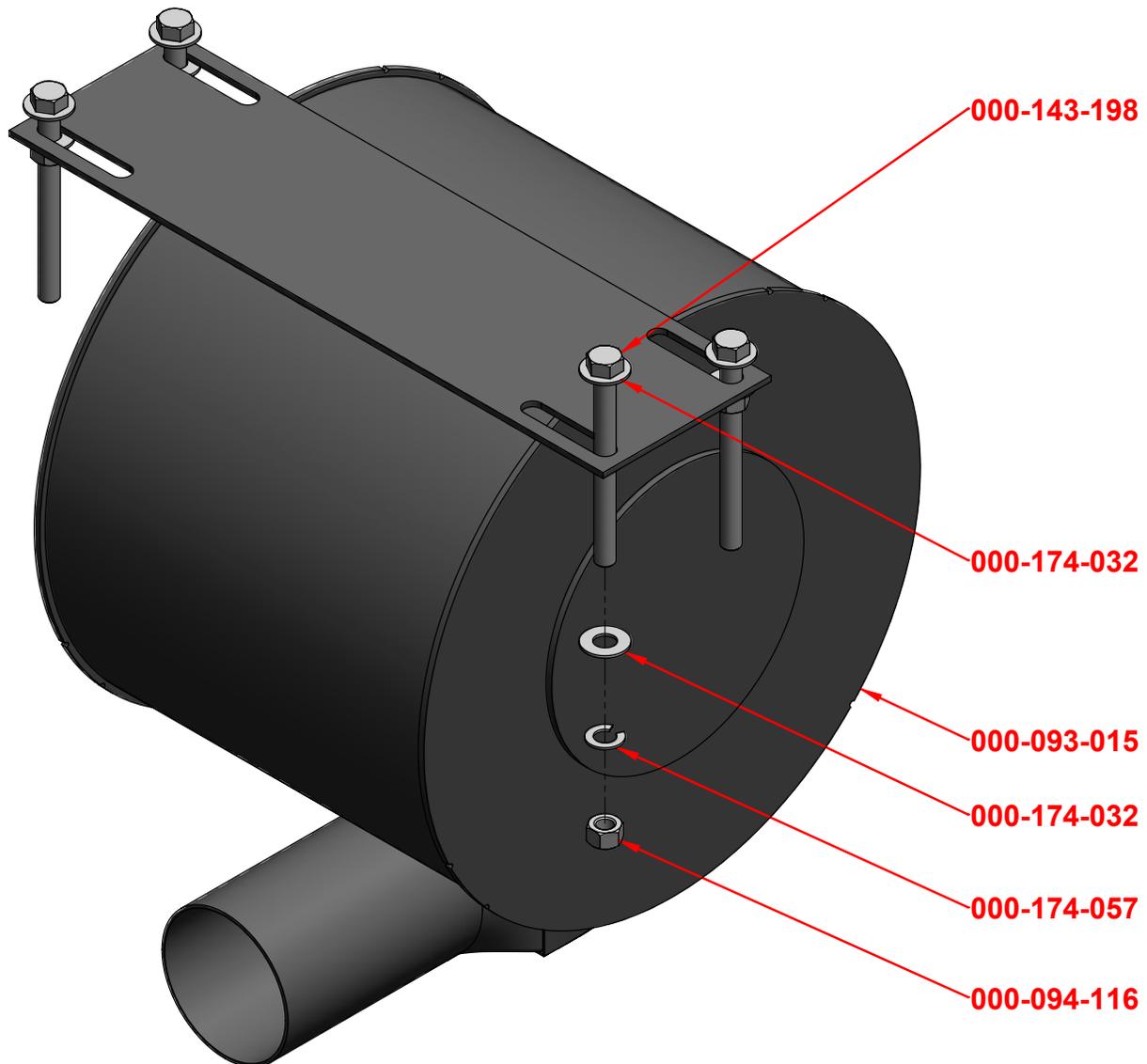


Figure 61. Hardware Used to Mount the Silencer Under the Van

INSTALLING THE PLATE AND SALSA HEAT EXCHANGER IN THE VAN

1. With the power pack and the recovery tank installed in the van, locate the plate heat exchanger assembly.
2. Place the assembly on the rear seat studs behind the passenger seat, with the fittings pointed to the back of the van, hand tighten the seat stud nuts for best fit.

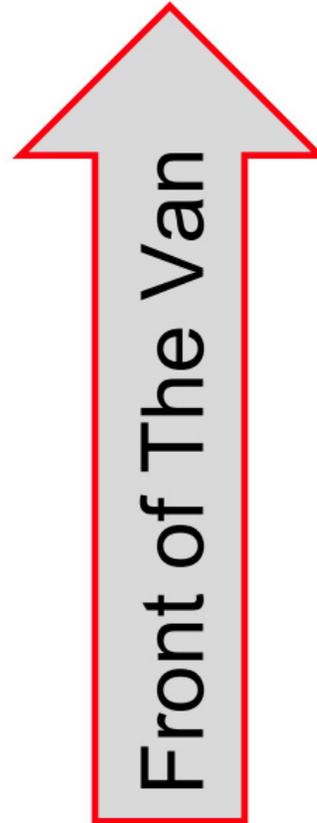
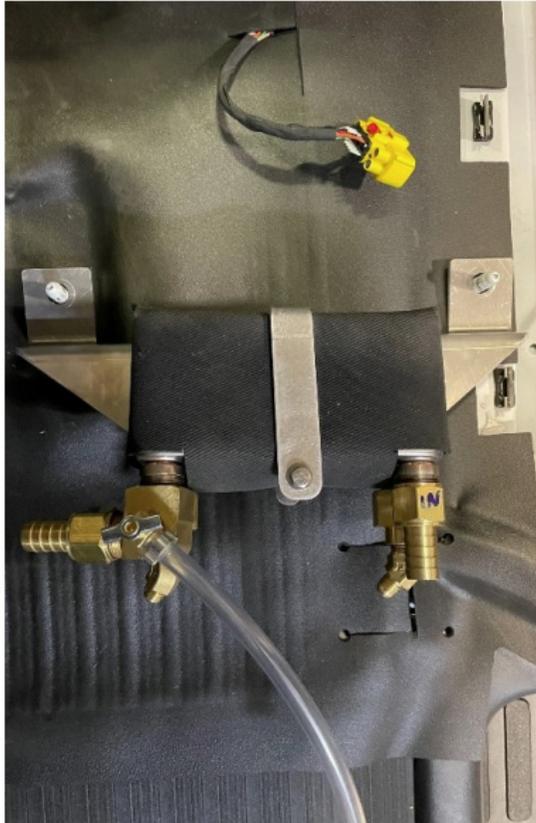


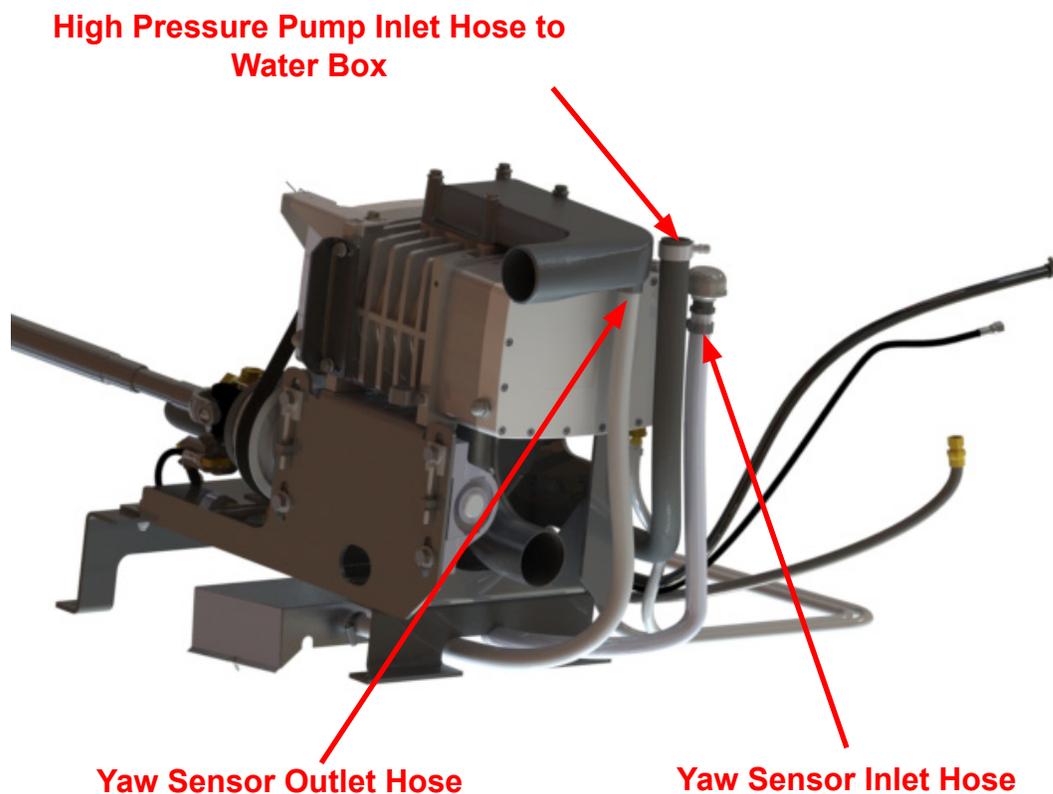
Figure 62. Plate Heat Exchanger on the Passenger Side Seat Studs

3. Locate the salsa heat exchanger and dry fit the unit behind the driver seat.

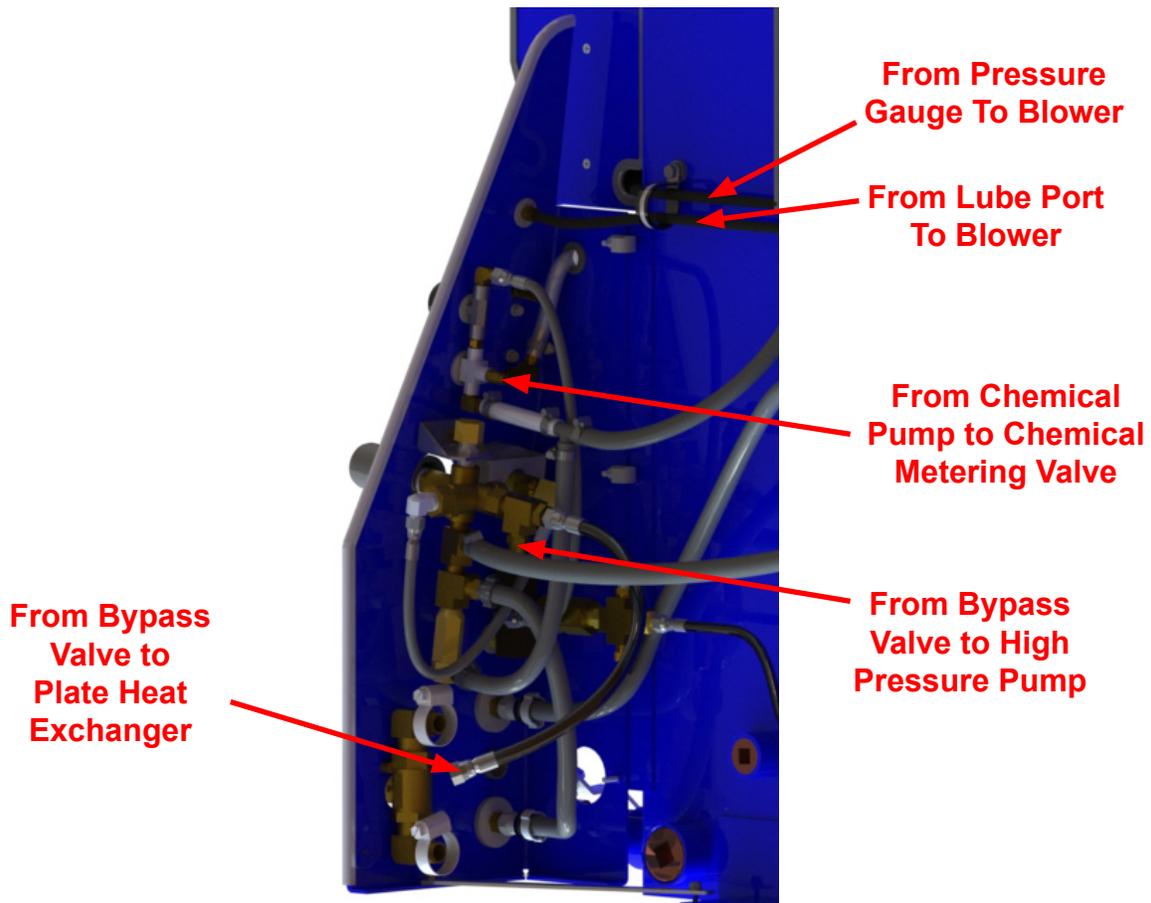
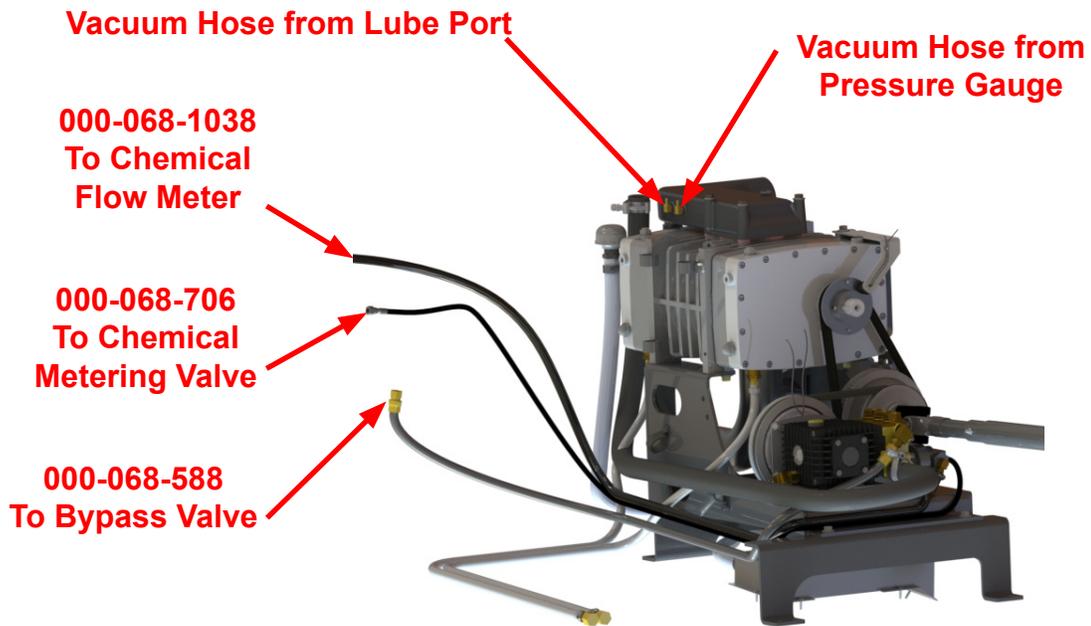
At this point in the installation, the unit is ready to be plumbed and wired.

PLUMBING OF RECOVERY TANK, POWER PACK AND HEAT EXCHANGERS

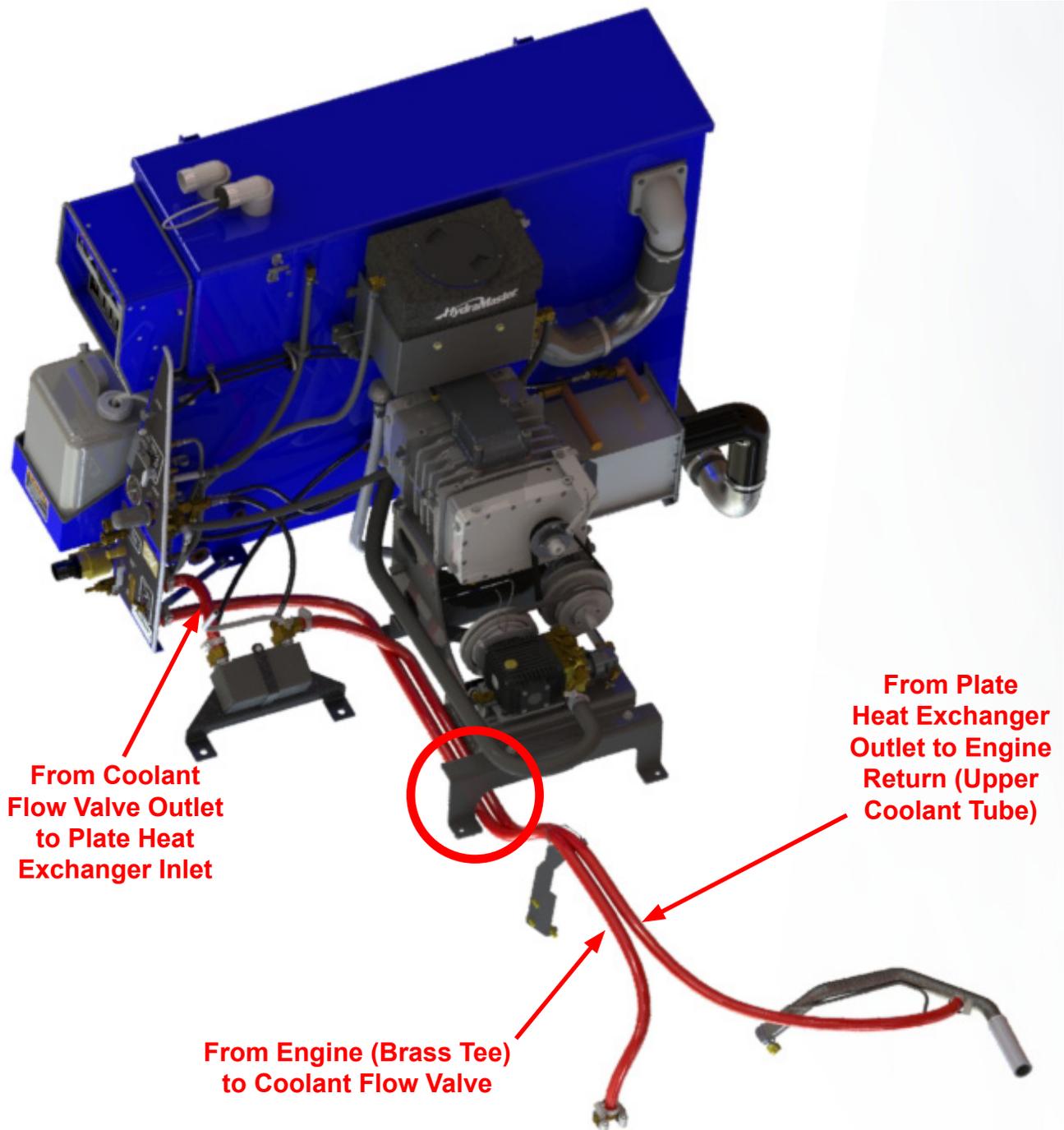
1. With the recovery tank, powerpack and heat exchangers mechanically installed in the van begin plumbing the unit.
2. Locate the inlet and outlet hose on the yaw sensor, ensure that both have been routed under the rear powerpack spacer.
3. Connect the outlet hose to the nipple on the cast aluminum blower inlet.
4. Route the inlet hose to the side of the powerpack and use the clamp on the powerpack to fasten the hose assembly to the powerpack.
5. Connect the high pressure pump inlet hose to the bulk head fitting underneath the water box.

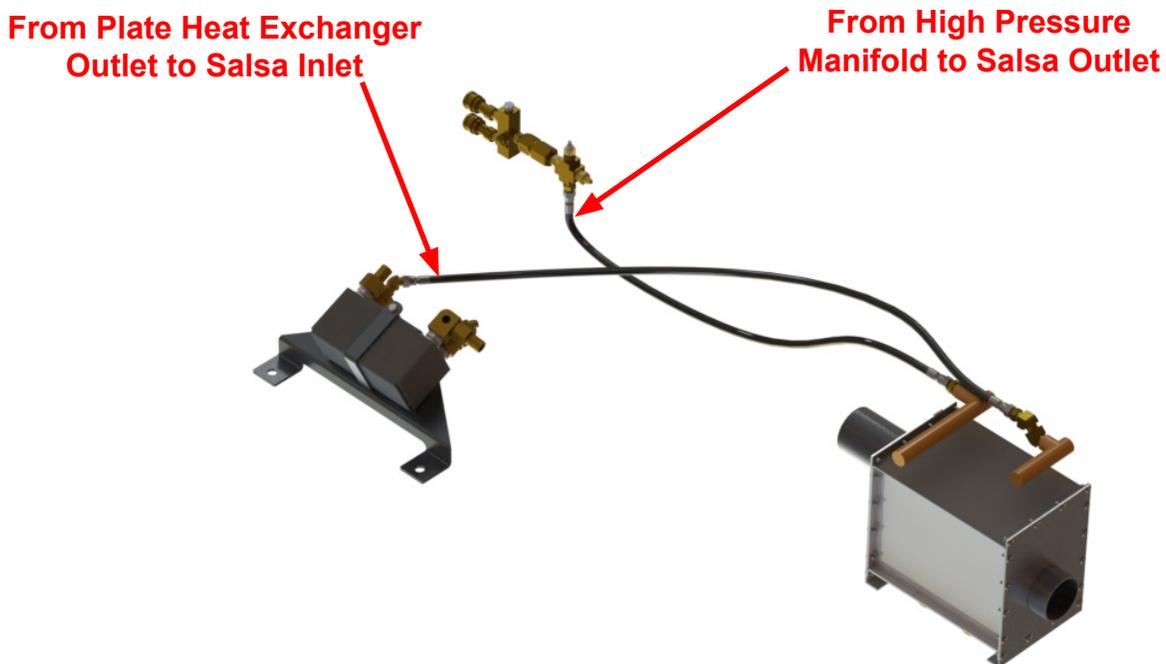
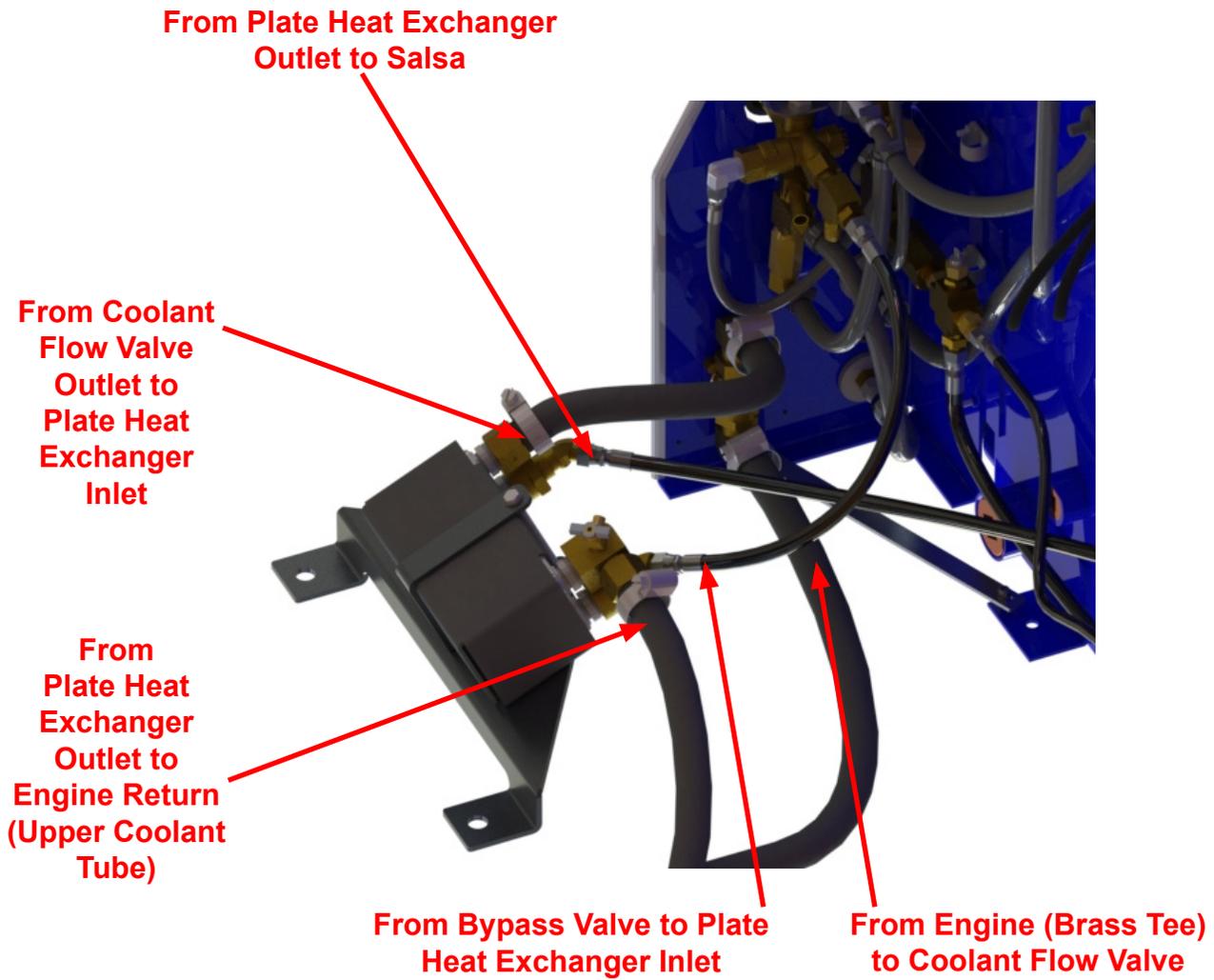


- With the recovery tank, powerpack and heat exchangers mechanically installed in the van begin plumbing the unit, according to the figures below.



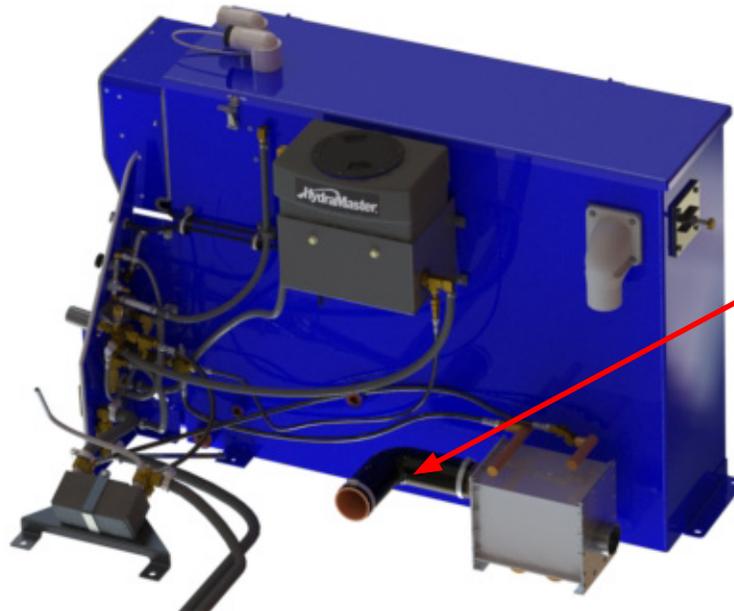
7. When plumbing the plate heat exchanger, run the green striped hoses under the power pack and over the bracket on the passenger side of the engine to make the necessary connections with the brass tee and upper coolant manifold similar to the figure below.
8. Make the remaining connections according to the figures on the next page.



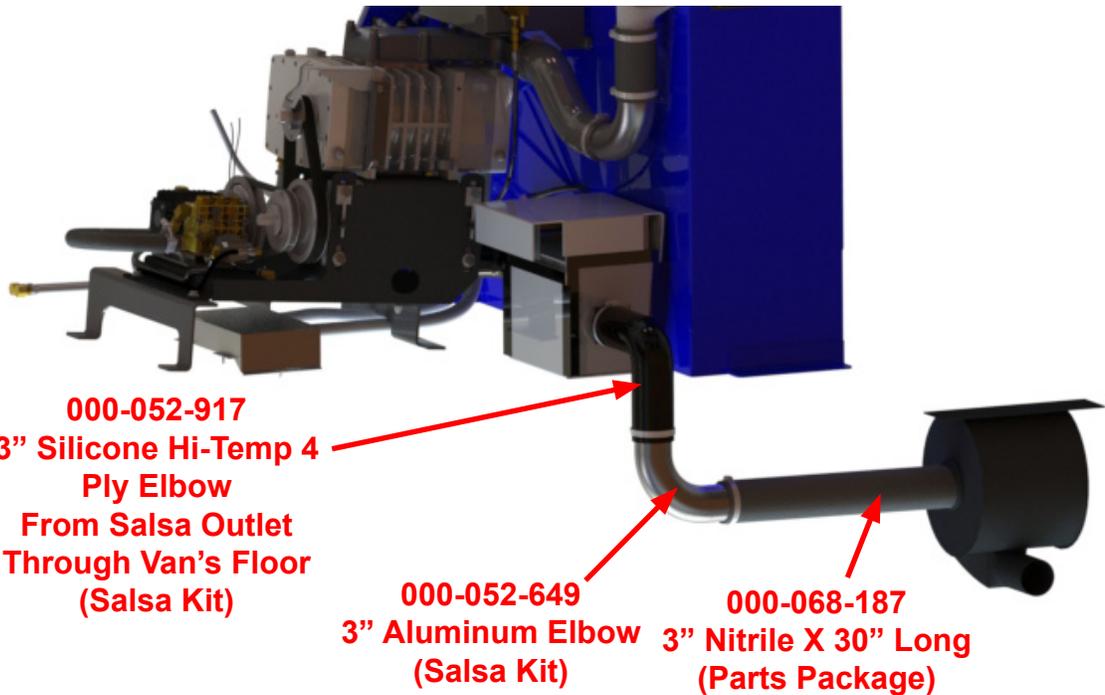


HOSE ROUTING FROM BLOWER OUTLET TO SALSA AND SILENCER

1. Hoses in this section can be found in the salsa and CDS 4.8 SV parts package kit.



000-052-917
3" Silicone Hi-Temp
4 Ply Elbow
From Blower Outlet
and Salsa Inlet
(Salsa Kit)



000-052-917
3" Silicone Hi-Temp 4
Ply Elbow
From Salsa Outlet
Through Van's Floor
(Salsa Kit)

000-052-649
3" Aluminum Elbow
(Salsa Kit)

000-068-187
3" Nitrile X 30" Long
(Parts Package)

HOSE ROUTING FROM RECOVERY TANK TO BLOWER

1. Hoses in this section can be found in the salsa and CDS 4.8 SV parts package kit.



000-068-884
3" EPDM x 13" LG.
From Blower to
Elbow

000-052-649
3" Aluminum Elbow

000-068-200
3" EPDM x 6" LG.
From Tank Adapter
to Elbow

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.
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.
10. Thread on the cover.

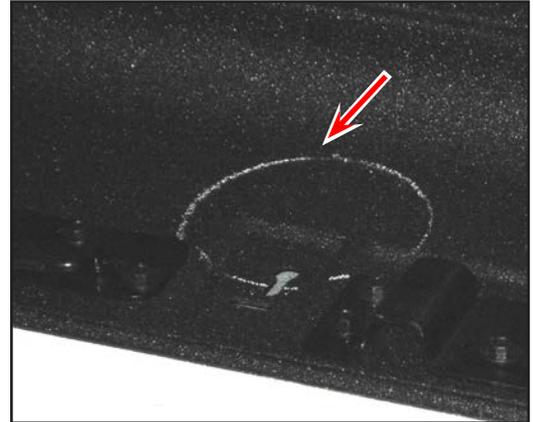


Figure 63. Trace an Outline Around Pass Through



Figure 64. Secure with 6 Self-Tapping Screws

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 CDS SV 4.8 (18 gauge)

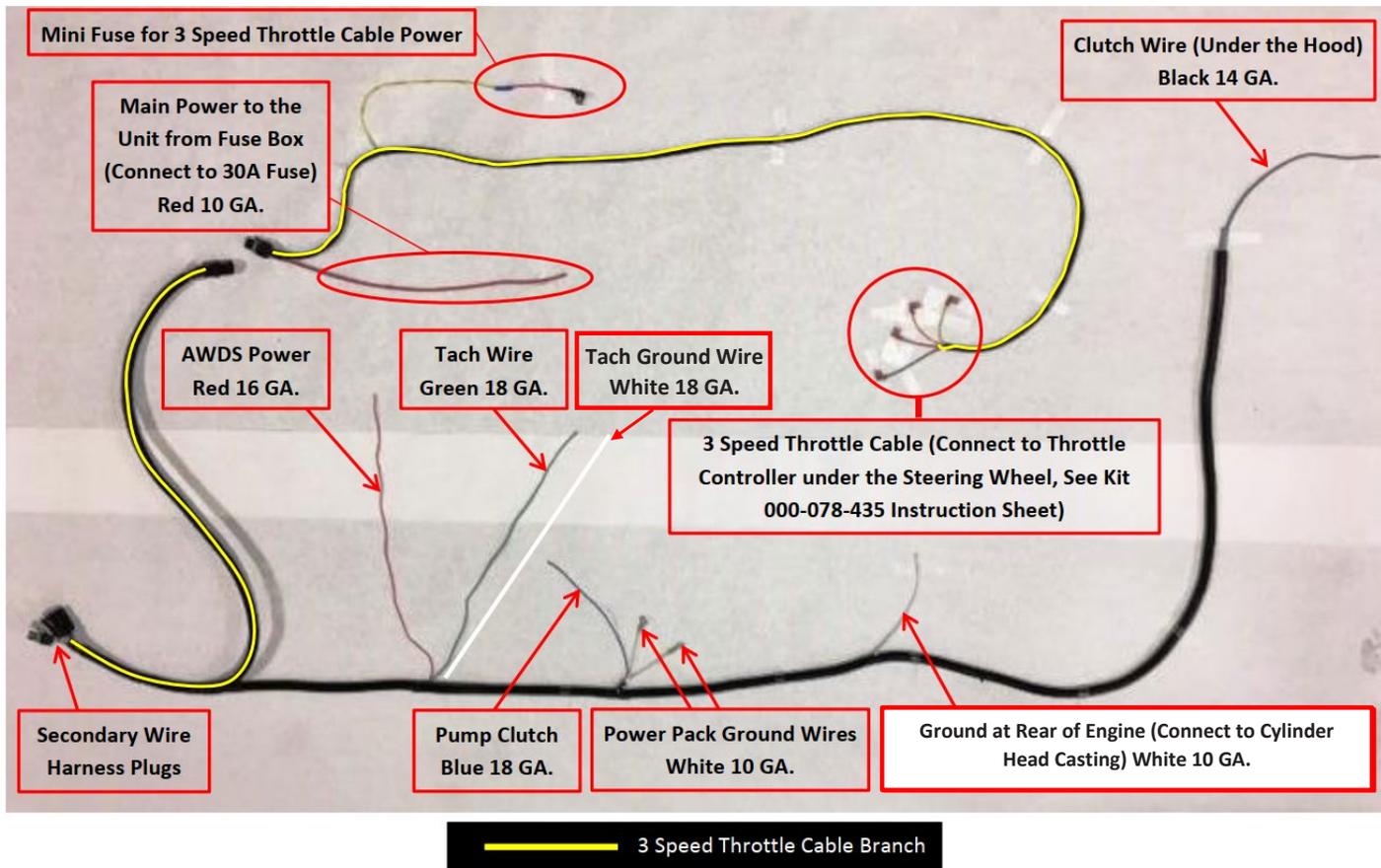


Figure 65. Secondary Wire Harness Breakout

1. Plug the Secondary Wire Harness into the recovery tank, behind the power pack.
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.

NOTICE

Make sure you keep the wires 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.

HARNESS AND HOSE ROUTING CLEAN UP GUIDELINES

After all the electrical and plumbing connections have been made, take some time to clean up the routing of harness and hoses. Use the provided zip ties to secure harnesses and hoses as detailed in the following photos.

1. Route the green stripe coolant hose in between the two fan shrouds as shown below, make sure the plastic mesh sleeve is covering the surface where the hose contacts the fan shroud. Ziptie the plastic mesh sleeve to the hose to prevent it from moving.
2. Route the clutch harness along the firewall and ziptie to the vans harness.



Figure 67. Green Stripe Coolant Hose Routed Between Fan Shroud Pieces

3. Route the green stripe coolant hoses coming from the brass tee and upper radiator tube as shown bellow towards the coolant hose support bracket assembly.
4. Route the clutch harness so it joins the two green stripe hoses over the engine on the passenger side.
5. Zip tie the hoses to the bracket using the provided zip tie in the front end kit.



Figure 68. Green Stripe Coolant Hose Routed Between Fan Shroud Pieces

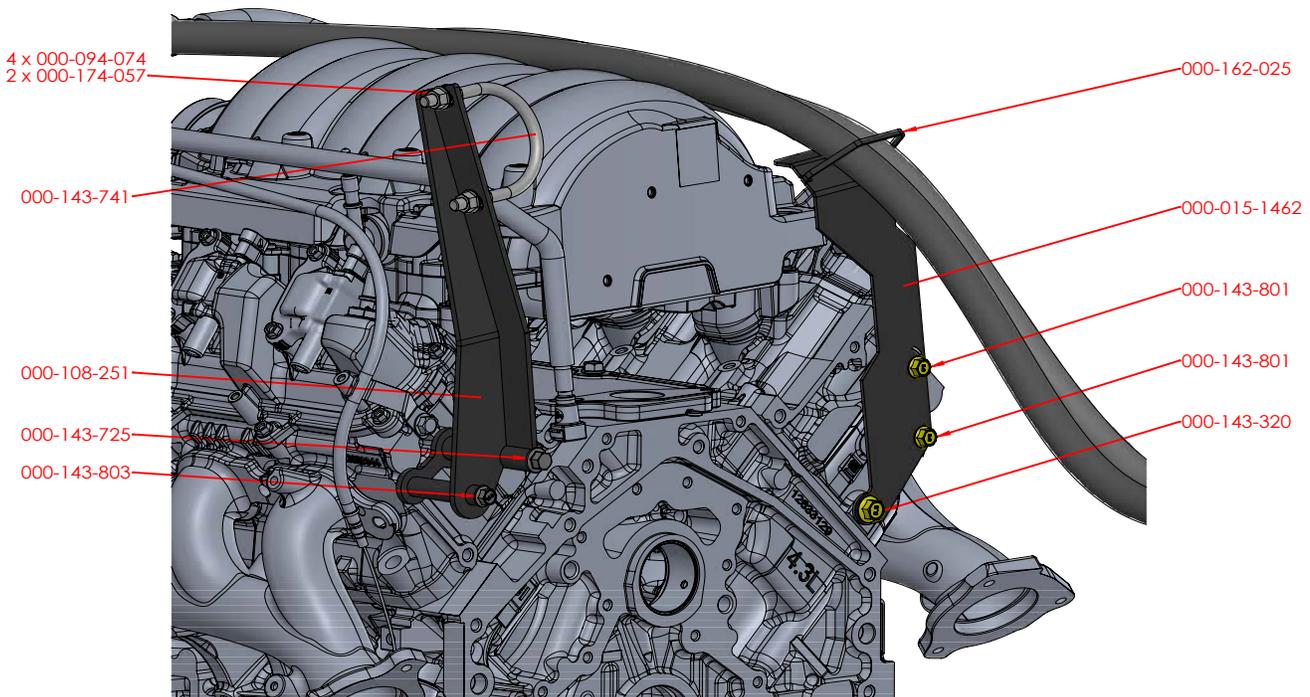


FIGURE 69. COOLANT HOSE SUPPORT BRACKET ASSEMBLY

6. Mount the harness to the powerpack as shown below to lift it off the floor as much as possible.

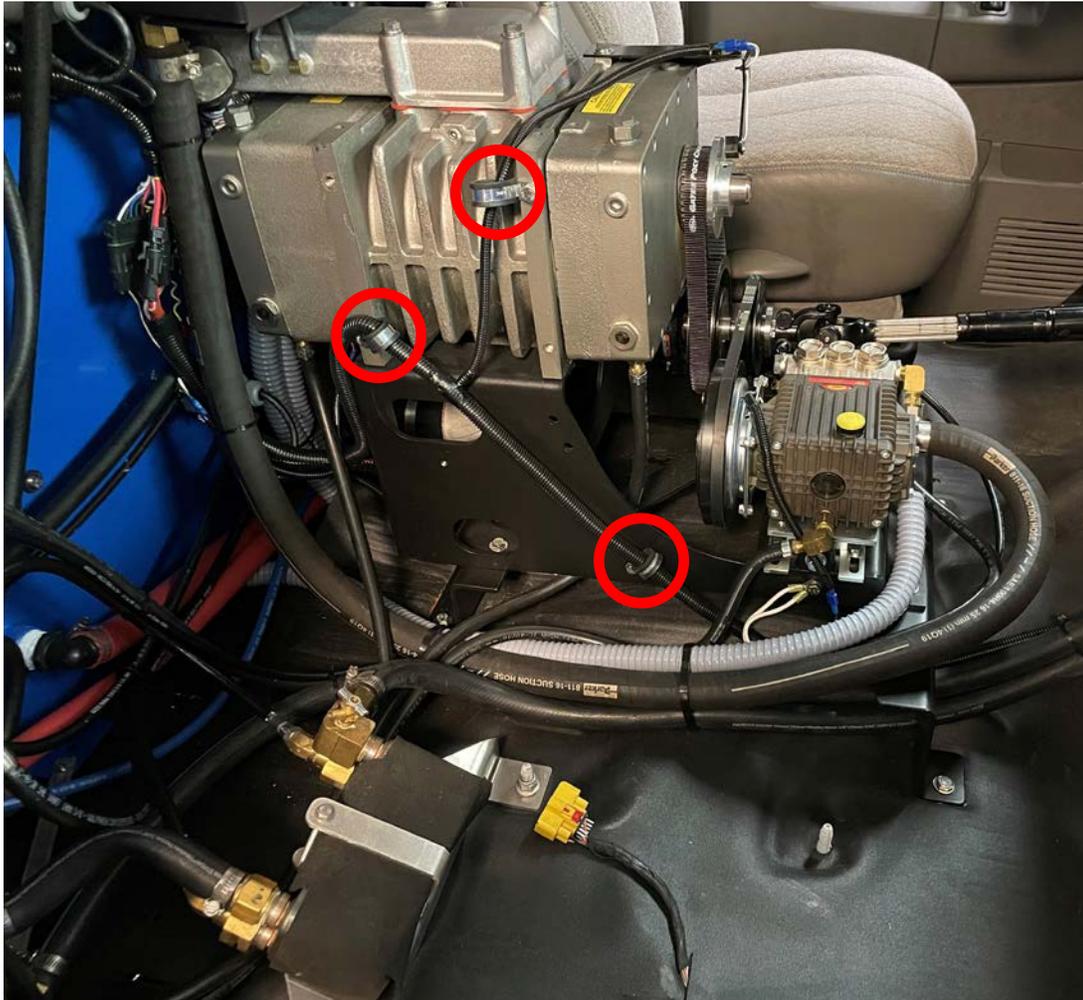


Figure 70. Harness Mounted on the Powerpack

Modify Van's Cowling

1. Secure the coolant hoses and wire harness into a clean bundle using provided tie wraps.

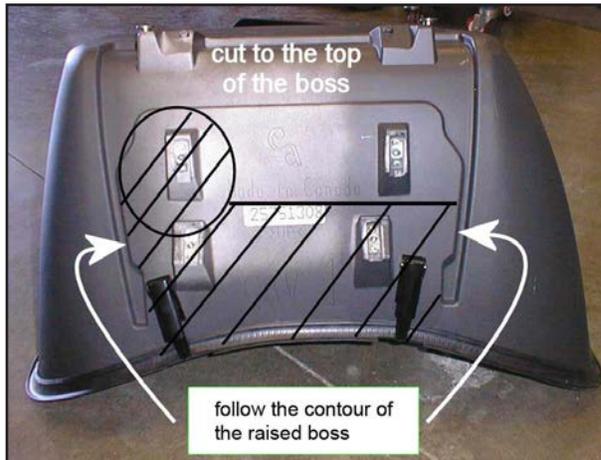


Figure 71. Cut to Top of Boss and Follow Contour



Figure 72. Fit Over Pump and Hoses

2. Cut the doghouse according to figures below.

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. 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 73. Position Seal as Shown

5. Modify the driver's side dash cover, closest to the doghouse.
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.

Refilling Van's Cooling System

NOTICE

Use Dex-cool Red GM antifreeze or equivalent.



Figure 74. Modify Driver's Side Dash Cover

9. 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. Route petcock hose (mounted on the plate coolant heat exchanger) to a small drain pan and open to allow air to vent.
 - b. Fill the radiator until it is full and no bubbles appear, and then close the petcock.
 - c. Start the vehicle and run for approximately 2 - 3 minutes. Monitor the engine temperature gauge the entire time.

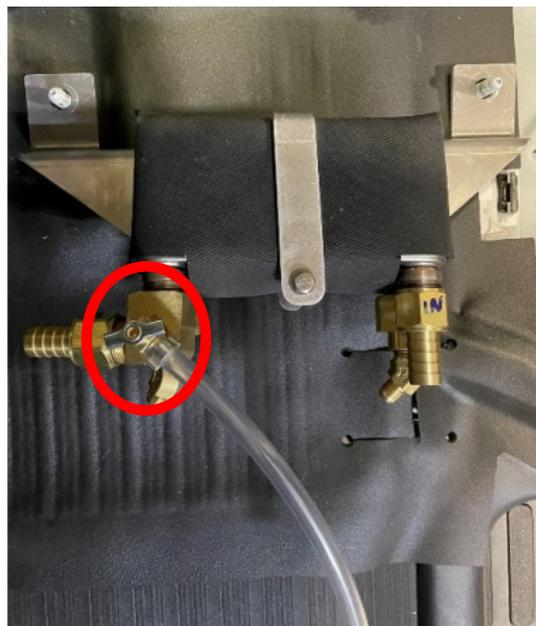


Figure 75. Petcock on Coolant Plate Heat Exchanger

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.

10. Allow the engine to sit until the antifreeze starts to bleed down.
11. 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.

12. Make sure the petcock closed and recheck that the engine is still operating at normal temperatures.
13. Start the van and check for antifreeze leaks at the installed tees and heat exchangers.
14. Install the warning label on the driver's side sun visor as shown below.



Figure 76. Location of Warning Label on Sun Visor

15. Re-install the drivers and passenger seats.
16. Install the cowling assembly between the driver and passenger seats.

NOTICE

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

FINISHING INSTALLATION

After the CDS 4.8 SV 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.**

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 = 3400 RPM
LO	RPM 3 = 3200 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.

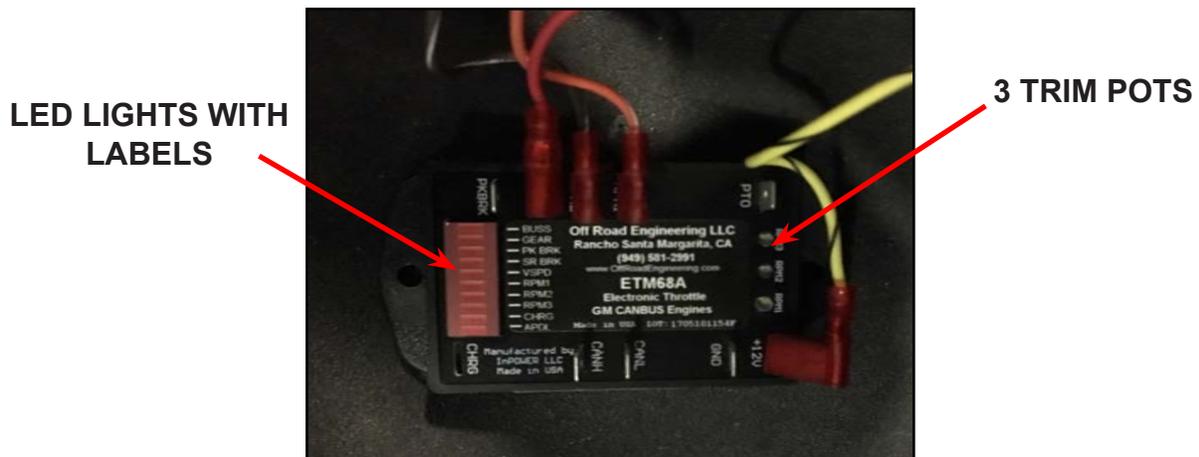


Figure 77. Location of Controller's LED Lights with Labels and RPM Trim Potentiometers

See the Table 2 on the next page to see 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 CDS 4.8 SV 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.

CDS 4.8 SV 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 high pressure pump will not engage until the water level rises inside the water box.

8. Now proceed with the cleaning operation.

NOTICE

The machine will automatically shut down when the Recovery Tank reaches its full capacity and the float switch located inside the tank will activate. 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 CDS 4.8 SV standard procedures.

NOTICE

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

NOTICE

Rinse the system with white 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 instrument 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 4.8 SV is equipped with an AWDS, first connect a garden hose to the outlet on the front of the machine.

If your CDS is NOT equipped with an AWDS, drain the Recovery Tank through the tank drain valve (located under the chemical jug tray).

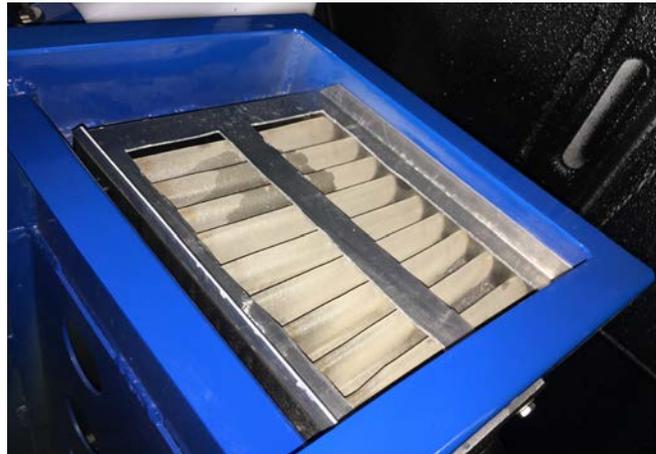
NOTICE

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 CDS 4.8 SV during the colder months of the year, ensure that you properly freeze guard the system. No part of the CDS 4.8 SV 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.

