INSTALLATION PROCEDURE

Installing a CTS 4.8 Flex System into a 2014 Chevy Van

Part Numbers Affected: Various

Date Changes Take Affect: 2014

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

This document is a guide for installing a CTS 4.8 Flex System into a 2014 Chevy.

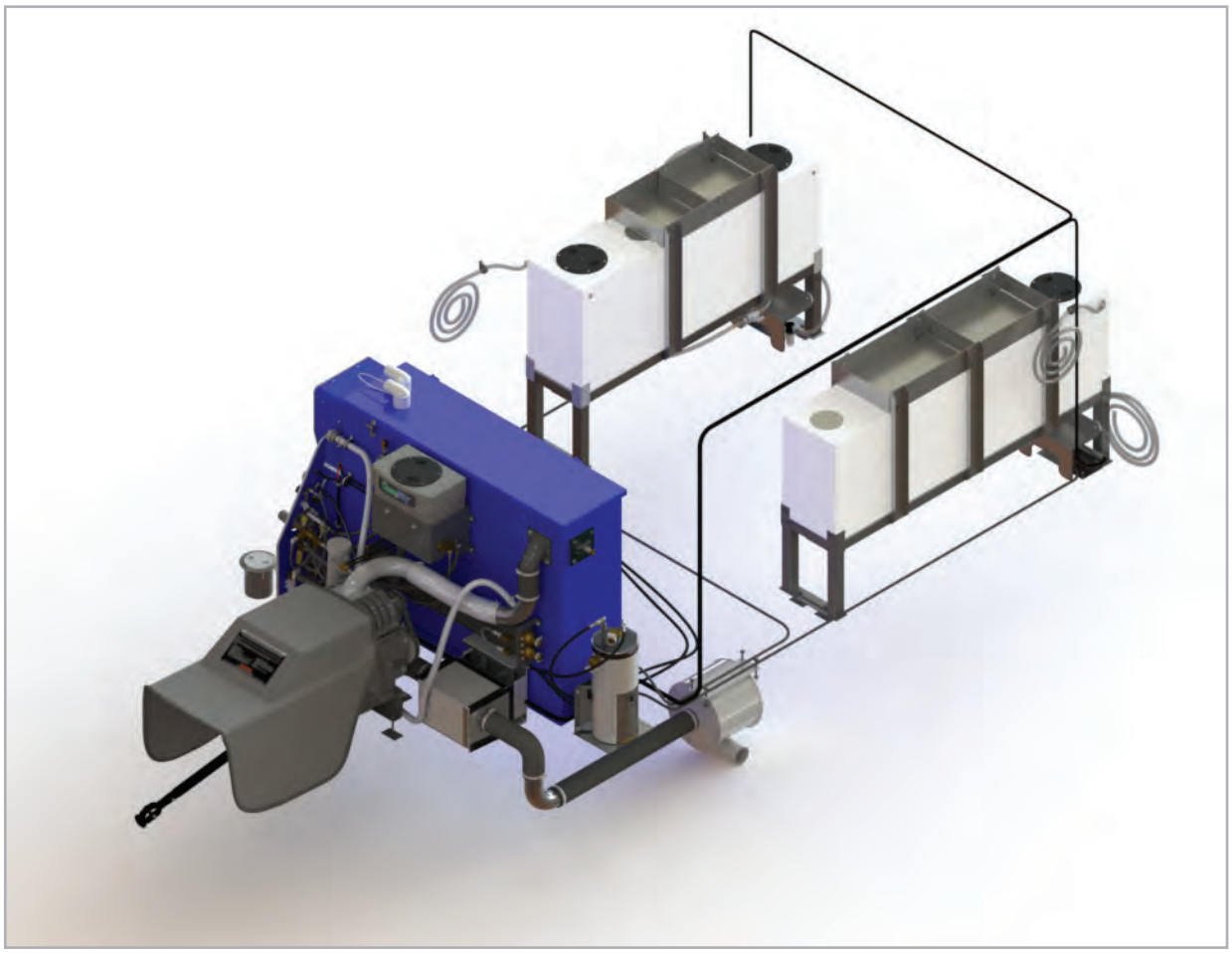

Figure 1. CTS 4.8 Flex System

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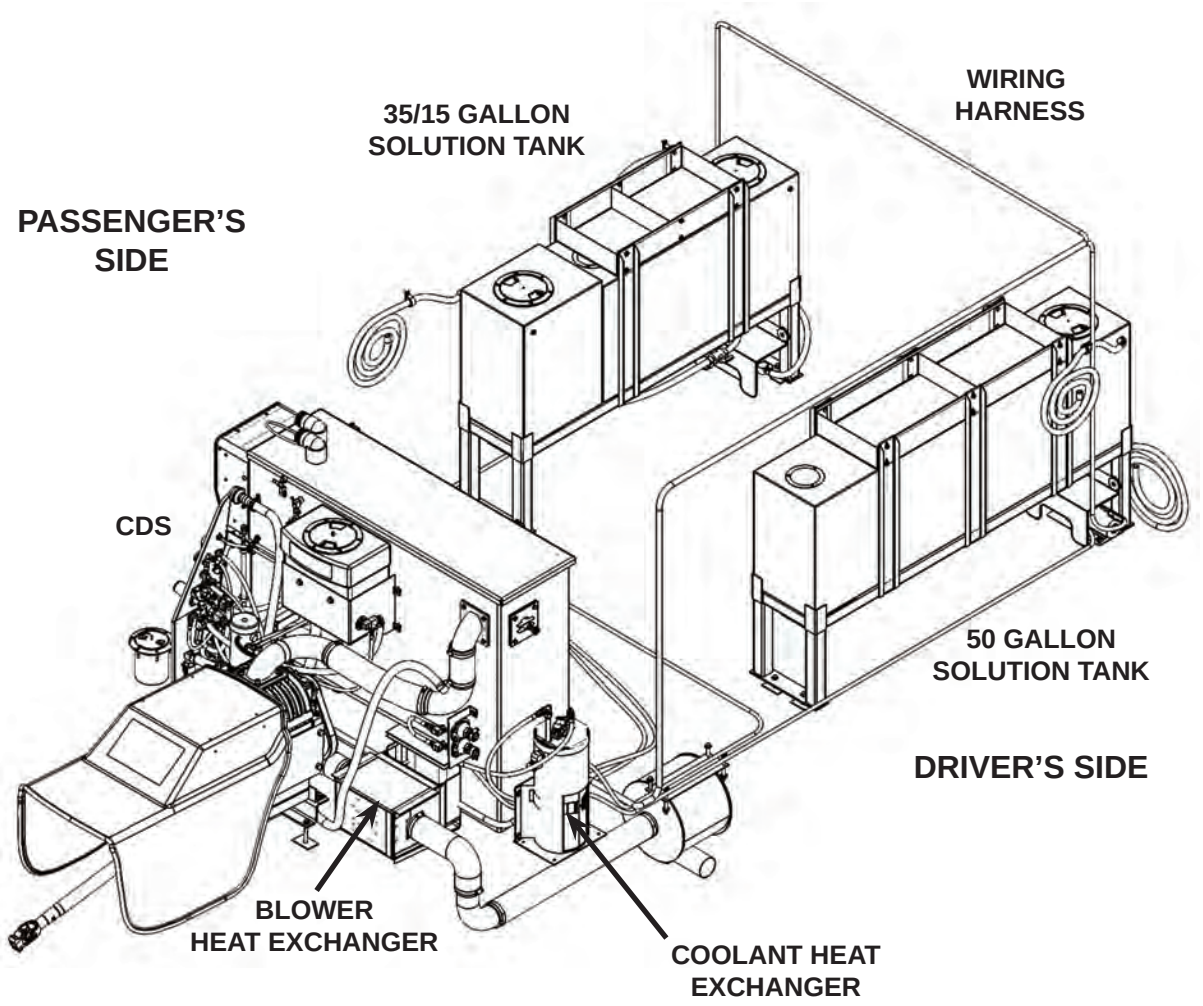


Figure 2. CTS 4.8 Flex - Major Components

The basic CTS 4.8 Flex system, P/N 751-020-722-10**,** includes the contents listed in Table 1. If you ordered P/N 751-021-722-10, you will receive all the parts listed in Table 1 in addition to a Dura-Flow Automatic Pump Out (APO), a 50 Gallon Tank assembly kit and a 35 Gallon/15 Gallon Tank assembly kit (see Table 2).

NOTICE

Figure 2 show a typical CTS 4.8 Flex configuration and may not represent your customers' current configurations.

UPON RECEIVING THE CTS 4.8 FLEX SYSTEM

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

Table 1. CTS 4.8 Flex - P/N 751-020-722-10

000-041-707	Assembly Cover Pump	2
000-052-168	Conn 2 Plastic Vacuum Hose	2
000-063-060	Harness Secondary	1
000-063-067	Harness Wire Flex	1
000-068-065	Hose 2” X 50 ft Vac Blue	5
000-068-385	Hose 3/4” Green Stripe X 18 ft	1
000-068-990	Hose Assembly 1/4” Solution X 125 ft	2
000-078-562	Kit Mach Parts CDS	1
000-078-934	Kit Install	1
000-079-130	Kit Yaw Sensor Cooling Chevy	1
000-081-057	Label Set	1
000-093-030	Silencer	1
000-150-174	Driveshaft Universal	1
000-154-147	Spacer Power Pack Rear Coated	1
000-154-185	Spacer Power Pack Front Coated	1
000-182-038D	Manual CDS Owners Guide	1
000-182-750D	Manual CDS Flex Owners Guide	1
601-004-701	Assembly Power Pack	1
601-005-751	Assembly Salsa Heat Exchanger	1
601-006-751	Assembly Coolant Heat Exchanger	1
601-015-014	Finish Package Chevy CDS	1
601-020-008	Assembly Cowling Chevy CDS	1
601-021-134	Assembly Front End Chevy	1
601-021-750	Assembly Dash Box QC	1
601-021-752	Assembly Pump Pasenger Side Kit	1
601-021-753	Assembly Pump Driver Side Kit	1
601-060-750	Assembly Recovery Tank	1

Table 2. Additional Parts for the CTS 4.8 Flex - P/N 751-021-722-10

000-079-097	Kit CDS Dura-Flow APO	1
000-163-751	Assembly 50 Gallon Tank Kit	1
000-163-753	Assembly 35 and 15 Gallon Tank Kit	1

INSTALLATION GUIDELINES

⚠WARNING

To prevent serious personal injury, ensure that the major components of the CTS 4.8 Flex System are well secured to the floor of the vehicle with the hardware supplied.

- IMPORTANT: For best results, DRY FIT all assemblies before installing them in the van.
- Quality of the fit and finish of the CTS 4.8 Flex System depends solely on the installer. While HydraMaster provides all parts and instructions necessary, it is up to the installer to use their own craftsmanship to provide a clean, safe and quality installation that the customer will be satisfied with. Please follow sound, standard shop practices.
- In some cases, due to prior vehicle modifications, it may be necessary to modify the vehicle to continue installation.
- 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.

NOTICE

Also note that there must be at least 19” distance between the passenger-seat rear studs and the front most surface of the Recovery Tank (see Figure 3).

NOTICE

After bleeding the coolant system, follow the set up and calibration procedure starting on page 74 of this document.

After completing the CTS 4.8 Flex System installation, burnish the clutch (see page 75) and bleed the coolant system.

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	Clear 100% Silicon Sealant (temperature range – 60 to +300 degrees F, cured)
Tape Measure	White chalk/marker
Loctite® 242 or equivalent; Loctite 545	Utility Knife and Hose Cutter, or Box Knife
Pipe Thread Sealant (temperature range - up to +500 degrees F)	
Personal protective equipment (PPE) such as gloves, safety glasses and shoes, and earplugs or muffs.	

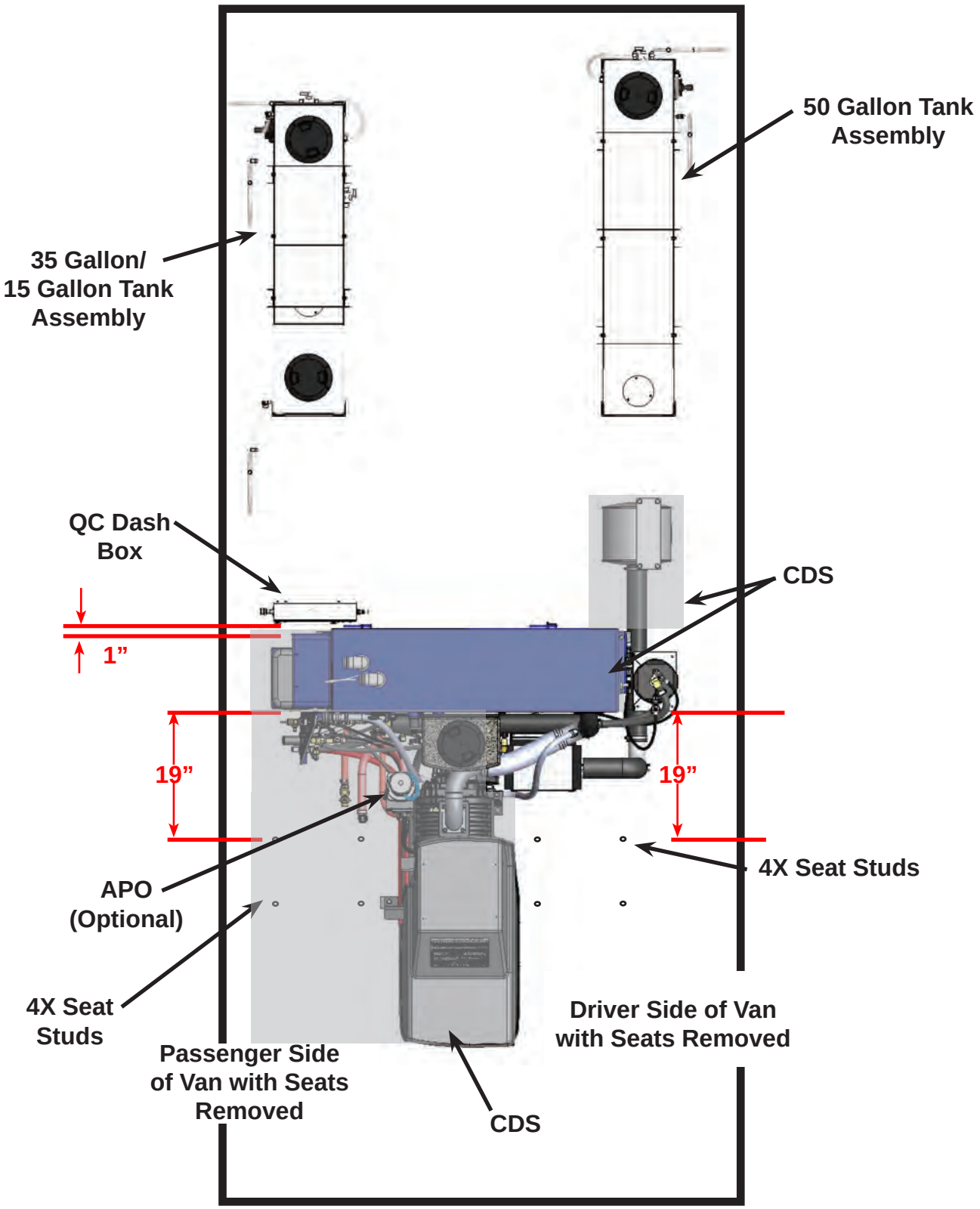


Figure 3. Top Down View of CTS 4.8 Flex in Van - Sample Configuration (All CDS parts are shown in gray-shaded areas.)

NOTICE

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

THE YAW SENSOR COOLING ASSEMBLY MUST BE INSTALLED FIRST FOR THE CDS CONFIGURATION.

1. Installing Yaw Sensor Cooling Kit
2. Installing Front End Clutch Assembly
3. Installing Parts from Finish Kit
4. Installing the CDS Main Wiring Harness
5. Installing 3 Speed Throttle Control Kit
6. Installing Power Pack Assembly
7. Installing Dura-Flow APO Assembly (Optional)
8. Installing Blower Heat Exchanger Assembly
9. Installing Pass Through Assembly
10. Installing Recovery Tank Assembly
11. CDS Hose Routing
12. Modifying Engine Cowling
13. Installing Coolant Heat Exchanger/Cross Assembly
14. Installing Quick Connect (QC) Dash Box
15. Solution Tanks and Pumps - Pre-Installation
16. Installing Solution Tank and Pumps
17. Routing Flex Hoses
18. Routing Flex Wiring Harness
19. Finishing CTS 4.8 Flex Installation
20. Pump Tuning Instructions
21. Installing Rear Door Kits (Optional)

⚠WARNING

To prevent serious personal injury, ensure that the major components of the CTS 4.8 Flex 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.

STARTING THE 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. Remove both driver and passenger seats. Remember to unplug and unfasten the seat belt sensor wires.
3. Remove the cup holder assembly from the engine cowling.

NOTICE

The cup holder assembly will not be reused.

4. Carefully remove the plastic dash covers on the driver and passenger sides (see Figure 4). 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 dog house engine cowling.

NOTICE

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

Figure 4. Plastic Dash Covers

INSTALLING YAW SENSOR COOLING KIT

To install the Yaw Sensor Cooling Kit:

1. 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).
2. Locate the original yaw sensor cover in the center of the floor, immediately behind the dog house, and between the seats.
3. Remove the clear plastic cover that is over the top of the yaw sensor (see Figure 5). This plastic cover will not be re-installed.
4. Apply high heat silicone sealant to the bottom flanges of the new yaw sensor cover that is supplied with the kit.
5. Position the new cover (P/N 000-041-312) over the yaw sensor, making sure that it fits.
6. Clean the cover's wire slot, removing any burrs and nicks that could damage wires. Also, be sure the wires can easily pass through the slot (see Figure 6).

Figure 5. Remove the Original Clear Plastic Cover Remove

CAUTION

If necessary, clean the wire slot with a file to remove the burrs and nicks that can result in damage to wires. This type of damage is not covered in the warranty.

Figure 7 shows the parts in the Yaw Sensor Cooling Kit Assembly

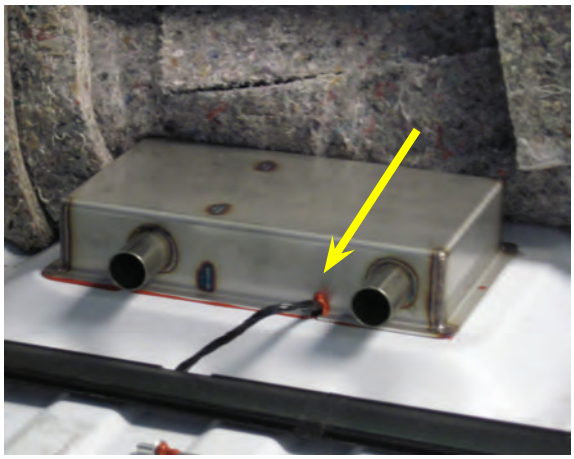


Figure 6. Apply Silicone Around Wires

Item	Part Number	Description	Qty
1	000-033-053	Clamp, 1-1/2” Cushion Loop	1
2	000-033-029	Clamp, Size #12 Hose	4
3	000-049-020	Filter Screen - Medium	1
4	000-052-034	Fitting, Yaw Sensor Cooling	1
5	000-068-829	Hose, 1” Vacuum - Gray W - 72”	1
6	000-068-828	Hose, 1” Vacuum - Gray W - 84”	1
7	000-052-908	Insert 3/4 X 1 Hose w/o Barb	1
8	000-143-112	Screw,10-24 X 1/2” Self Tapping Pan HD-Phillips	2
9	000-041-312	Cover, Yaw Sensor Cooling	1

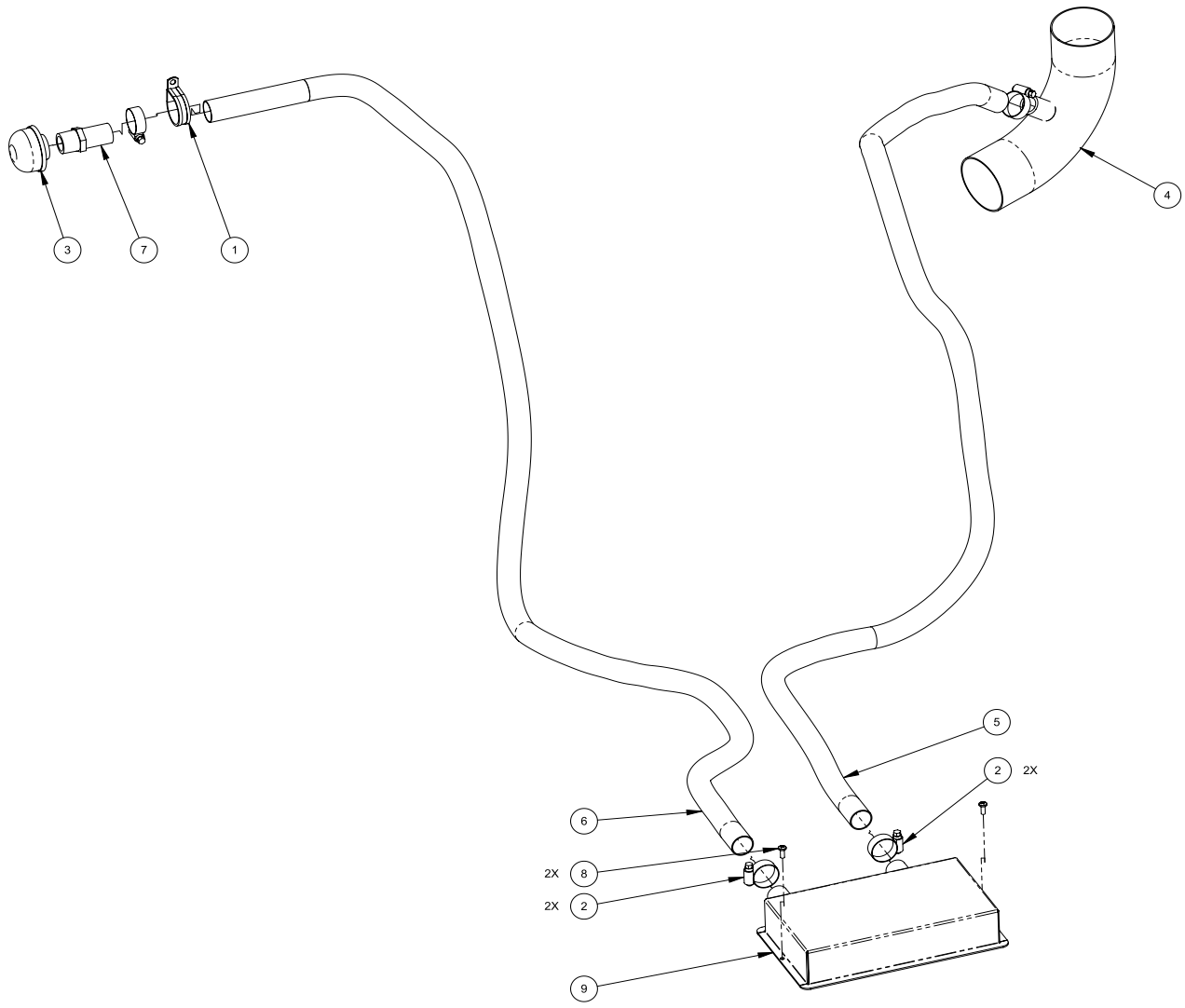


Figure 7. Yaw Sensor Cooling Kit Assembly

7. With either the #16 or #17 drill bit, drill two holes into the van floor, using the 2 holes from the yaw sensor cover as a reference (see Figure 8).
8. Bolt the cover to the floor with the two supplied self-tapping screws (P/N 000-143-112).

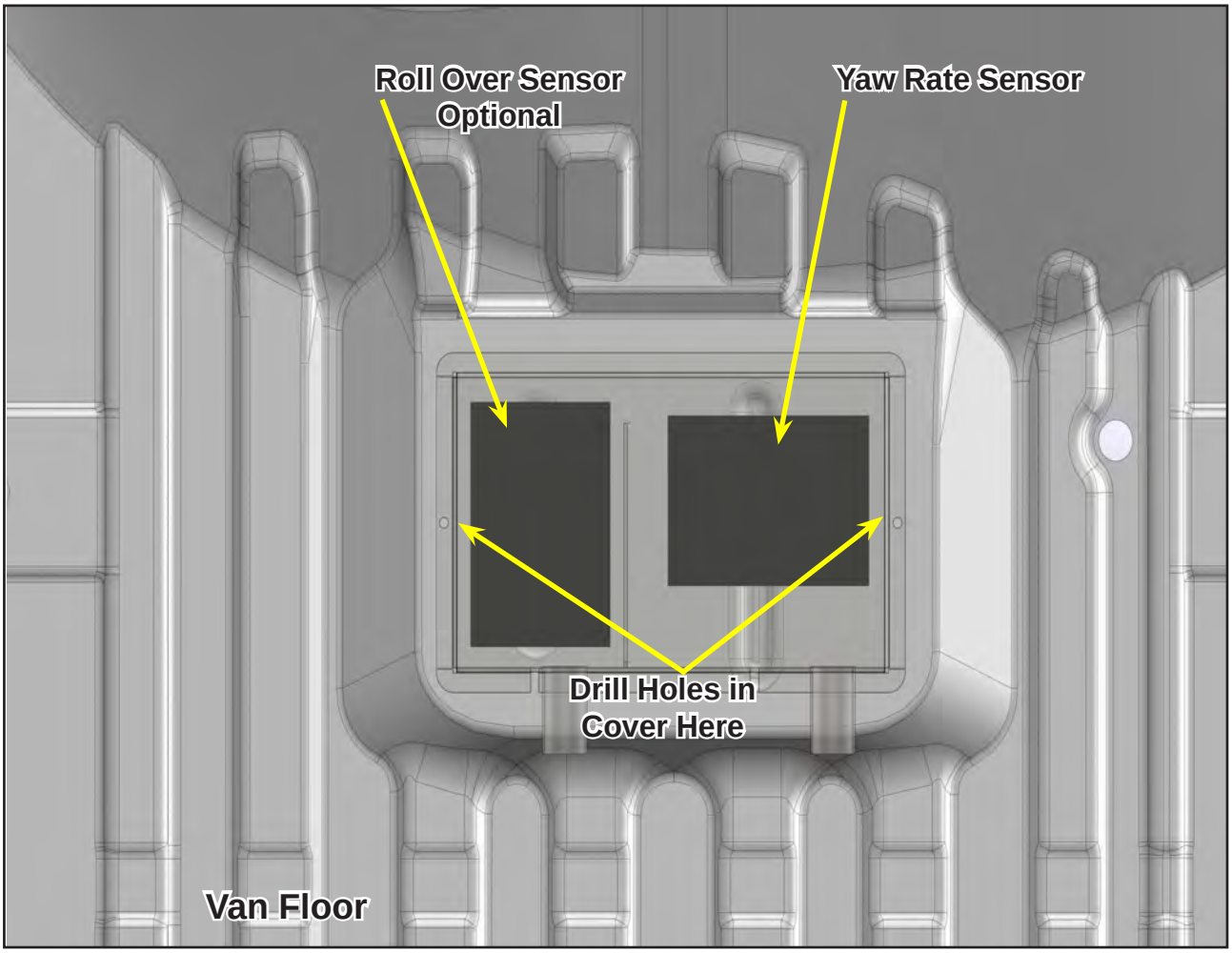


Figure 8. Top Down View of Van Floor - Mount New Cover Over Yaw Sensor

CAUTION

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

9. Wrap the yaw sensor wires with electrical tape where the wires will pass through the cover.
10. Place a generous amount of silicone around the taped wires that pass though the side of the cover surface (see Figure 6).

CAUTION

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

11. Connect the two 1” flex hoses to the new cover over the yaw sensor. Use the provided size #12 hose clamps (P/N 000-033-029) to secure the hoses (see Figure 9).

NOTICE

The longer gray vacuum hose (P/N 000-068-828) 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

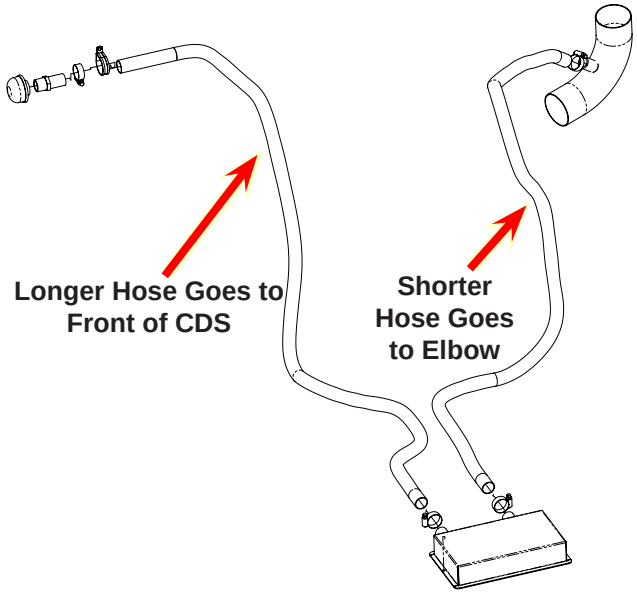


Figure 9. Route and Connect 2 Hoses

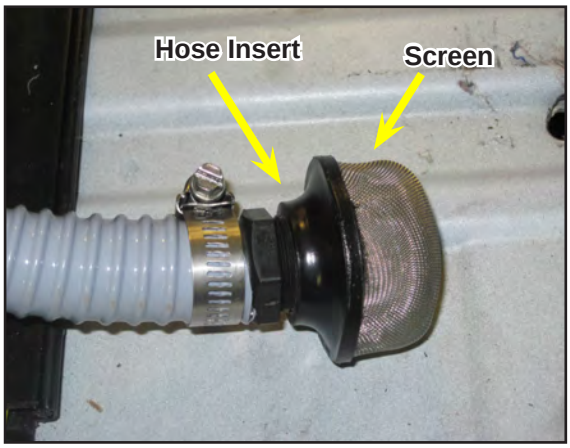


Figure 10. Install Hose Insert and Filter Screen on Longer (Passenger-Side) Hose

side cargo door (see Figure 9). The shorter gray vacuum hose (P/N 000-068-829) will run from the yaw sensor cover (driver’s side) to the Recovery Tank elbow joining the Recovery Tank to the Blower (refer to page 37).

12. Install the hose insert and filter screen onto the end of the longer hose (see Figure 10).
13. 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 11). This will allow the routing of the shorter hose under the Blower for proper cooling of the yaw sensor.

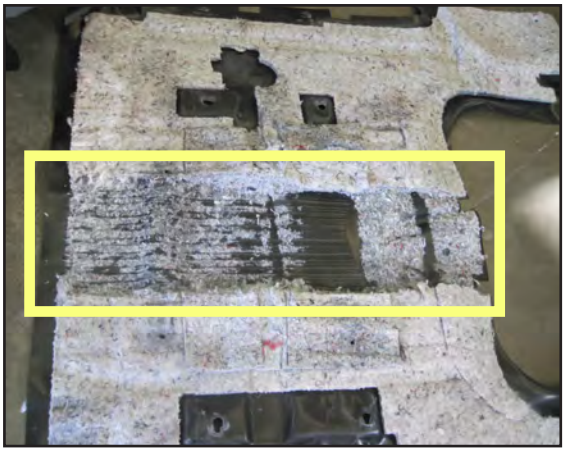


Figure 11. Remove Batting from Floor Mat

CAUTION

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

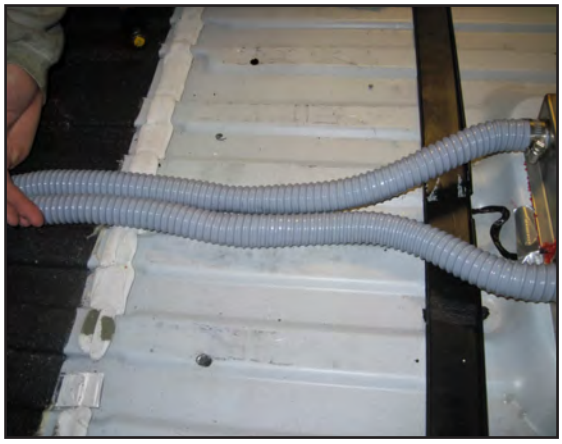


Figure 12. Route Hoses Straight Back Toward Cargo Area

14. Replace the van floor mat being sure to route the two hoses side-by-side and straight back toward the cargo area of the van (see Figure 12).
15. Continue with the CDS installation.

The final assembly will have a 1” diameter hose attached to the Blower elbow and a 1” diameter hose routed toward the front of the CDS instrument panel (see Figure 9).

Later in the installation, secure the hoses away from all rotating pulleys and off the Blower using the nylon tie wraps and clamps as necessary.

NOTICE

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

16. Disconnect the wiring plug at the air cleaner, then remove air cleaner and tube assembly down to the throttle body. Use a shop rag to cover the intake of the throttle body.
17. Remove radiator over-flow container.
18. 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.

INSTALLING FRONT END CLUTCH ASSEMBLY

⚠WARNING

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

1. Locate the engine alternator.

NOTICE

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

2. At the rear of the alternator, the wires and cable must be extended. First unplug the wiring connector and then remove the battery cable. Modify the harness and cable as follows:
   a. First remove the tape and plastic split loom back to expose gray and orange wires. Cut the wires approximately 2” from the plug and install the orange and gray extension wires with the pink butt connectors provided in the kit. The extended wires can be routed inside the main wire harness that runs forward (see Figure 13).
   b. Second remove the 6-gauge red battery cable by pulling the boot back and then loosen the nut to remove the cable.

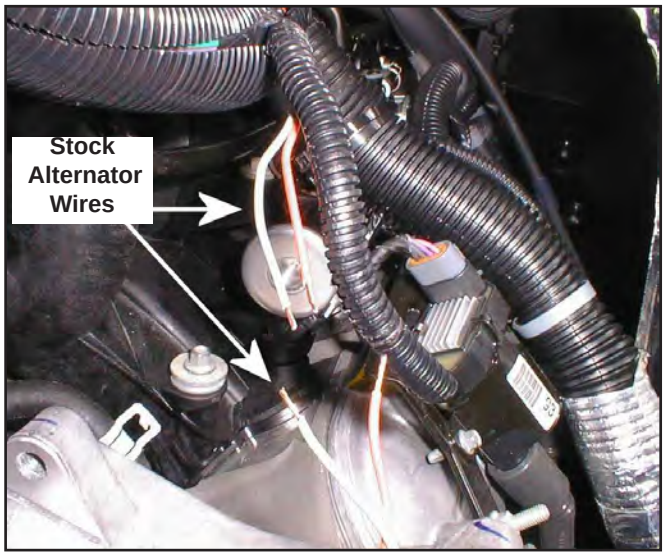


Figure 13. Routing Extended Wires

3. Remove the 2 bolts that mount the alternator.
4. Remove the alternator from the bracket.
5. Assemble the alternator into the clutch housing using the hardware provided. The clutch housing is designed to accommodate either a standard or heavy-duty alternator.

6. Move the 2 brackets to the appropriate set of holes depending on which alternator you are using. The bottom 4 holes are for the standard alternator and the top 4 holes are for the hi amp alternator. The alternator will need to be rotated so that the stud is on the bottom (see Figure 14).
7. Use Loctite 242 on the 4 screws that secure the brackets to the clutch housing.
8. Torque alternator bolts to 30 ft lbs.
9. Attach the new battery cable extension lead provided in this kit to the back of the alternator (see Figure 15). The end with the red boot will attach to the alternator stud (see Figure 14).
10. Before you install the clutch and alternator assembly, secure the engine wiring harness that is located directly behind the stock alternator location so that the harness will clear the drive shaft.
11. Remove the plastic clamp used to secure harness to the intake. This allows the drive shaft knuckle clearance.
12. Cable tie the harness to allow the shaft knuckle to clear the harness.

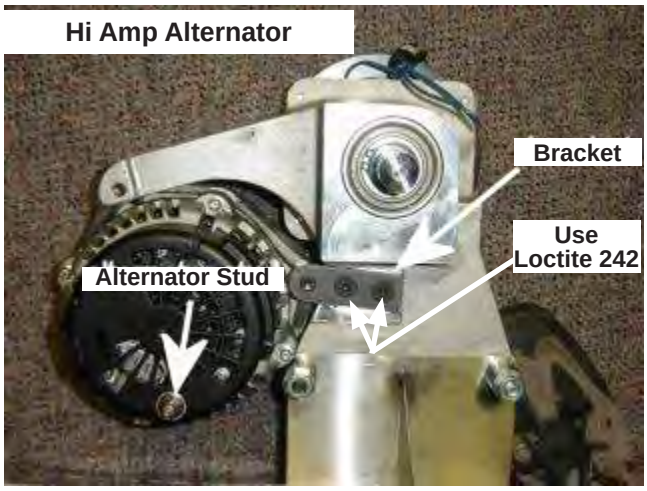


Figure 14. Rotate Alternator

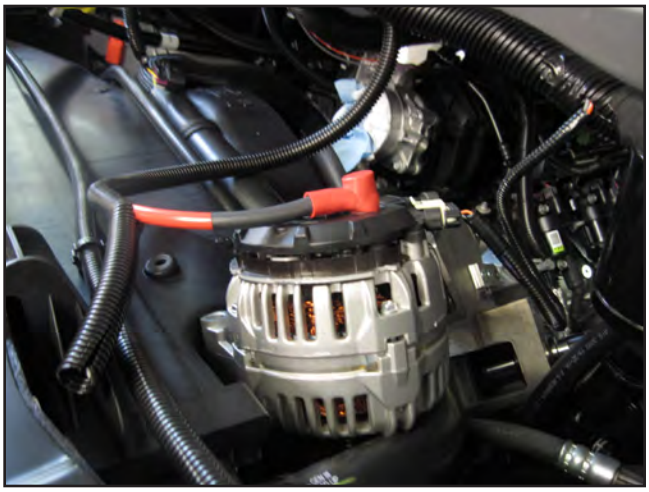


Figure 15. Attach New Battery Cable

CAUTION

Failure to Cable tie the harness this may cause serious damage to the equipment.

CAUTION

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

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

14. Install the clutch and alternator bracket as one unit. You will need to grind off the corner of the stock bracket in order for the assembly to fit. Use the supplied 10mm x 90mm Allen head screw on the right side and use the supplied modified bolt on the left side. The modified bolt has the head shaved down to allow clearance for the new drive belt. Tighten the bolts evenly and torque to 30 ft lbs.
    a. Large case alternator will need to have a small portion 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.

b. See the following figures to gauge the grinding of alternator bracket.
    1. Remove the top right corner of the bracket as shown in Figure 16.
    2. Mark the corner 1-1/8" in length and 3/8" deep as shown in Figure 17.
c. Use a die grinder with a cut off wheel. Cut 3/8" into the bracket after marked on both ends of measured area. Hog out remaining material as shown in Figure 18.
d. Use a 0.025" feeler gauge to verify the alternator/bracket clearance.

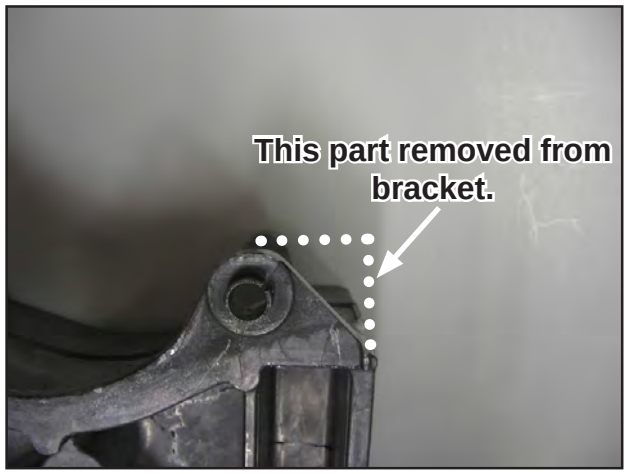


Figure 16. Remove Top Right Corner of Bracket

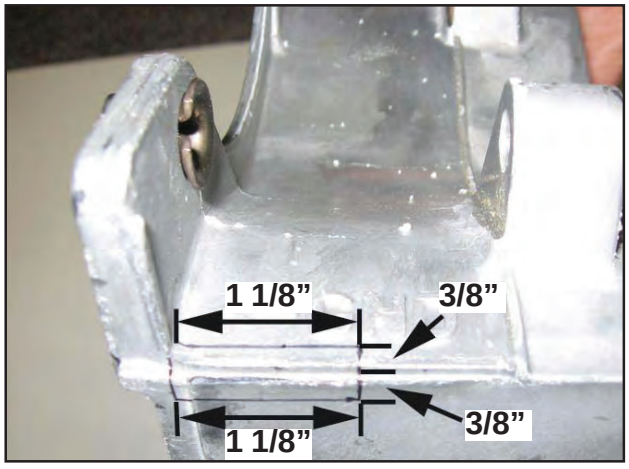


Figure 17. Mark Corner

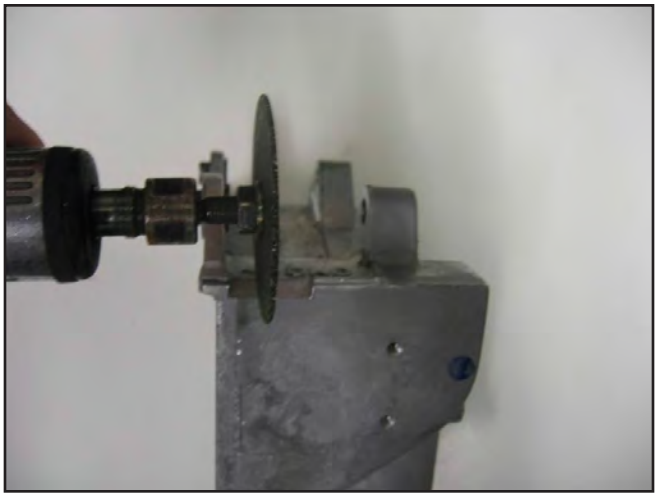


Figure 18. Use Die Grinder to Cut into Bracket

NOTICE

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

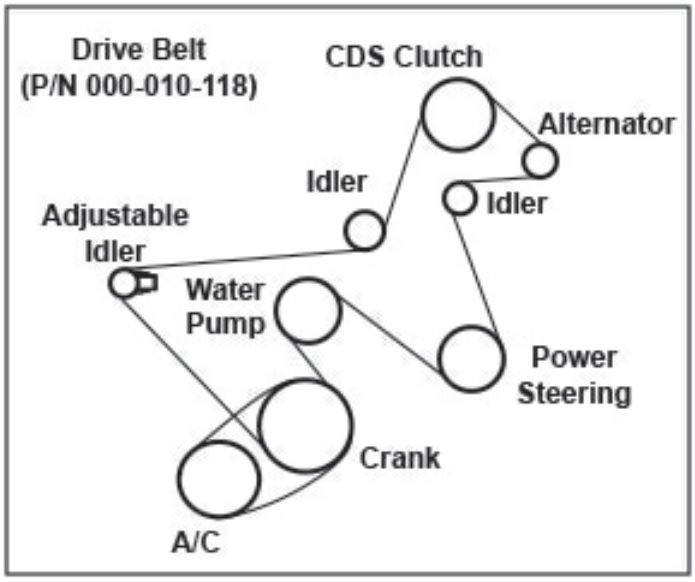


Figure 19. Routing Diagram for New Drive Belt

15. Install the new drive belt (P/N 000-010-118) using the routing diagram in Figure 19.
16. Install the safety ring (fly strap) to the back of the driver side head (see Figure 20). Use the original bolt in back of head and the provided 10mm bolt for mounting. Leave the top of the safety ring off until the drive shaft has been installed.
17. Install the drive shaft onto the back of the clutch. The spline end of the drive shaft will face the Blower Power Pack. Slide the yoke of the drive shaft onto the clutch shaft. The end of the clutch shaft needs to be flush with the inside of the yoke. Torque bolts to 35 ft lbs.
18. Temporarily rest the drive shaft on the safety ring until the Blower Power Pack is installed.
19. Install the top of the safety ring and secure using supplied bolts and nut.

Figure 20. Install Safety Ring

NOTICE

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

INSTALLING PARTS FROM 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 are provided in the Finish Kit.

1. Mount the terminal block to the firewall. This eliminates the need to cut off the original ring connector or splice the wire (see Figure 21 for mounting).

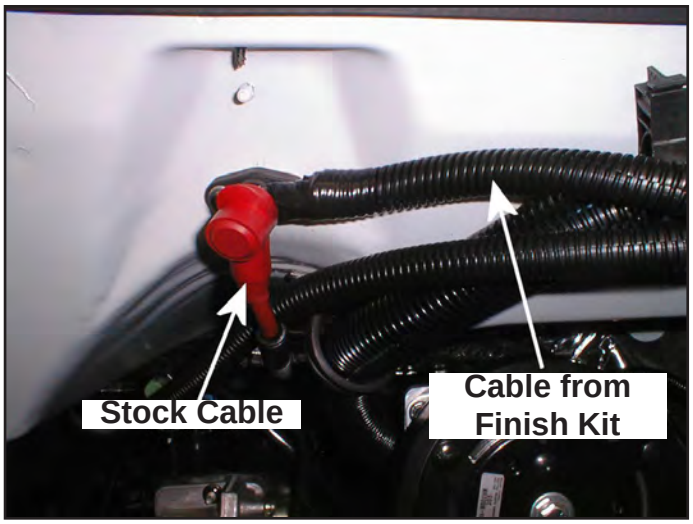


Figure 21. Mount Terminal Block to Firewall

NOTICE

Proper routing of this cable is critical.

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

NOTICE

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

3. Use the provided 1-½ cushion clamp and self-tapping screw to hold the main wire harness away from the CDS clutch (see Figure 22).

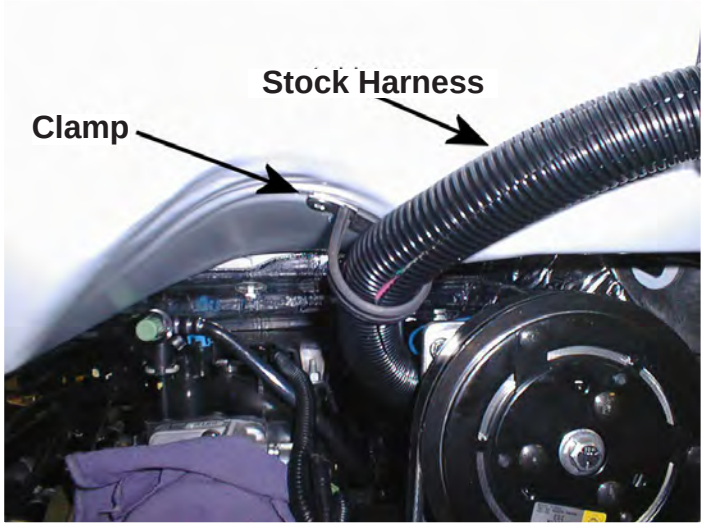


Figure 22. Hold Main Wire Harness Away from CDS Clutch

4. 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 23).
   b. Insert a barbed fitting with a hose attached so the coolant can now be drained into a proper container.

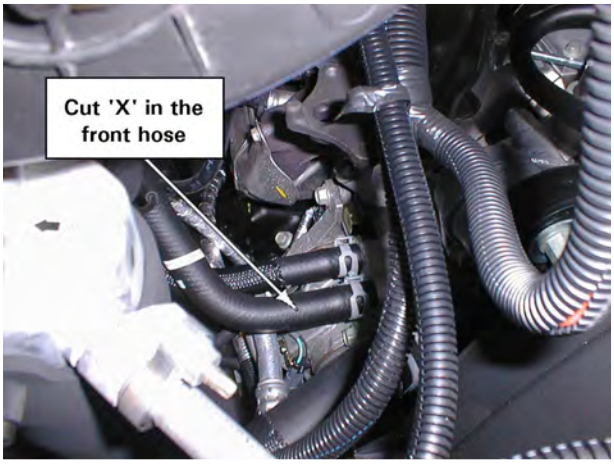


Figure 23. Cut Small 'x' in Water Pump Hose

   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.**

NOTICE

Use Dex-cool Red GM antifreeze or equivalent.

⚠WARNING

WHEN DISPOSING OF USED ANTIFREEZE COOLANT: Follow local laws and regulation. If required, dispose at facilities licensed to accept household hazardous waste. If permitted, dispose in sanitary sewer systems. Do not discard into storm sewers, septic systems, or onto the ground.

⚠WARNING

ANTIFREEZE IS HARMFUL OR FATAL IF SWALLOWED. Do not drink antifreeze coolant or solution. If swallowed, induce vomiting immediately. Call a physician or local poison control hotline Contains Ethylene Glycol, which caused birth defects in animal studies. Do not store in open or unlabeled containers. KEEP OUT OF REACH OF CHILDREN AND ANIMALS.

5. Install the coolant hoses as follows:
   a. Locate the 1-3/8” upper radiator hose and cut in half just before the end of the fan shroud. Install the provided aluminum tee and clamps facing the passenger side.
   b. Install the provided ¾” tee into the ¾” lower hose coming off the water pump (the same hose from which the coolant was drained).
   c. Cut the hose in half and install the tee. The tee needs to be pointing up and slightly towards the front of the van (see Figure 24).
   d. Leave the provided ¾” green stripe hose in its full length.

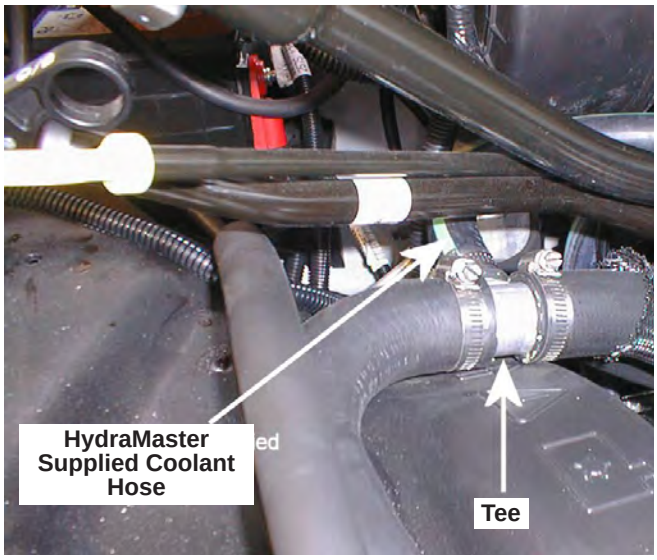


Figure 24. Cut Hose in Half and Install Tee

   e. Feed the two ends, from the passenger compartment, over the passenger valve cover to the front of the van and attach to the tees.
   f. Carefully route the hoses away from any moving parts, sharp edges or hot parts.
   g. Secure the hoses with provided clamps (see Figure 25 on the following page).

CAUTION

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

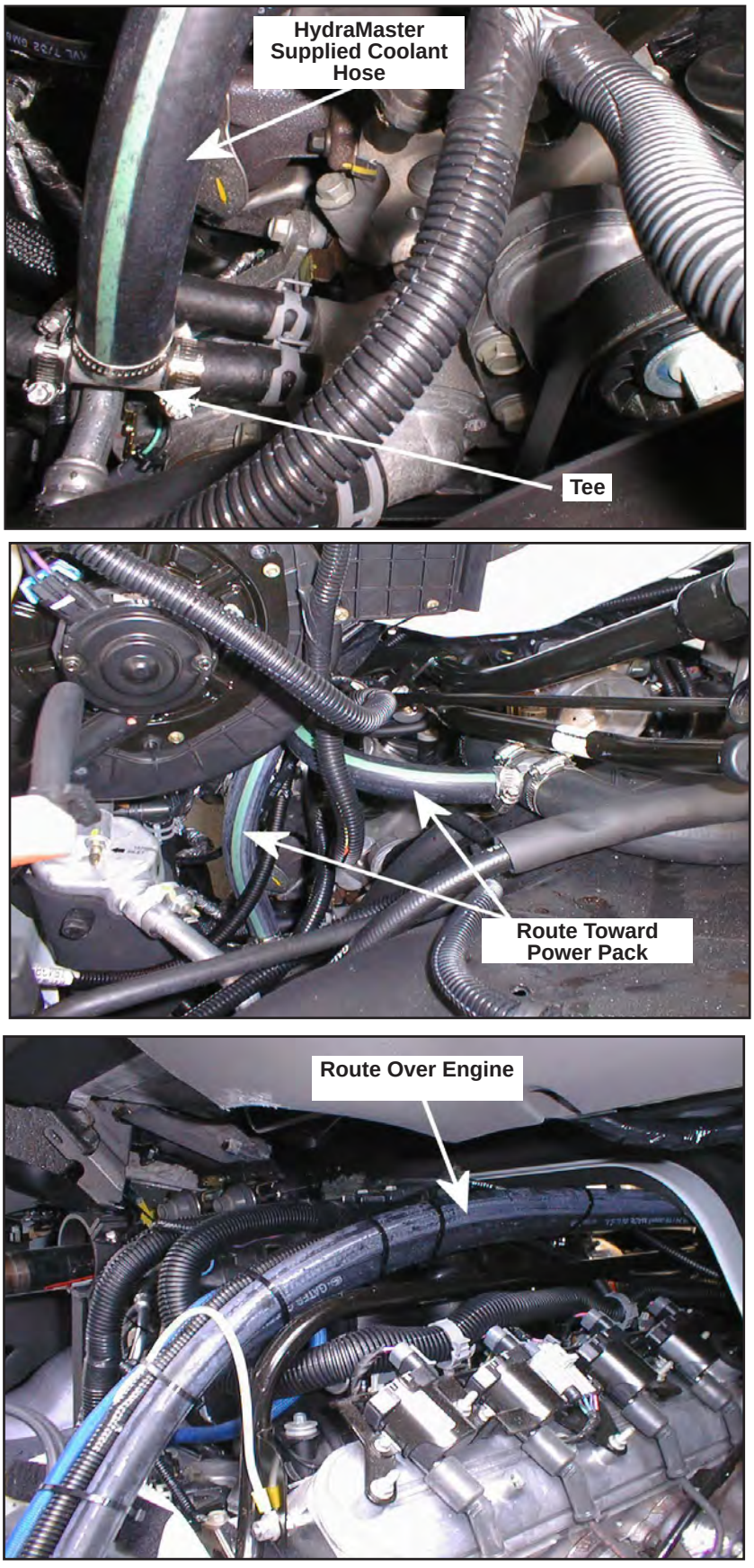


Figure 25. Secure Hoses with Provided Clamps

INSTALLING THE CDS MAIN WIRING HARNESS

Harness wire colors and functions are:

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

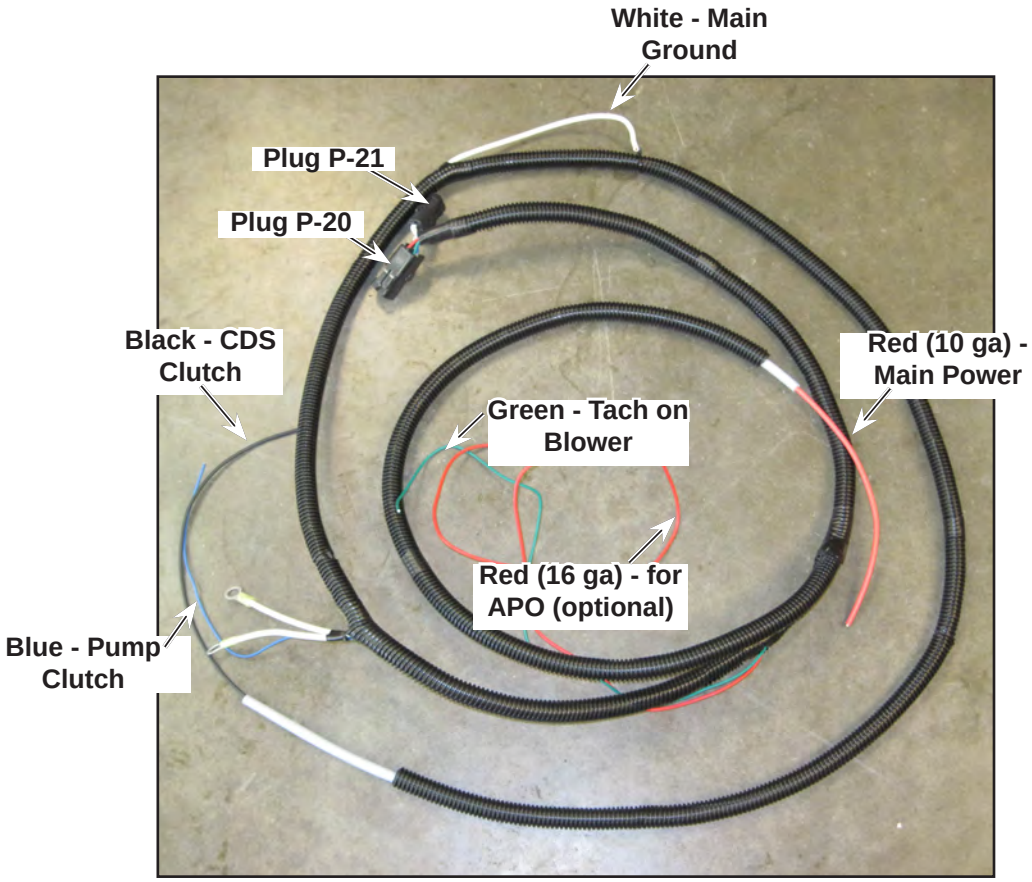


Figure 26. Main Wiring Harness

1. Plug the into the jacks located by the Recovery Tank (behind the instrument panel - see Figure 27).
2. Route main harness towards the passenger side of the Power Pack.
3. At the first ”Y” in the main harness, route the red wire (10 ga) along the Blower frame spacer to underneath the driver seat.

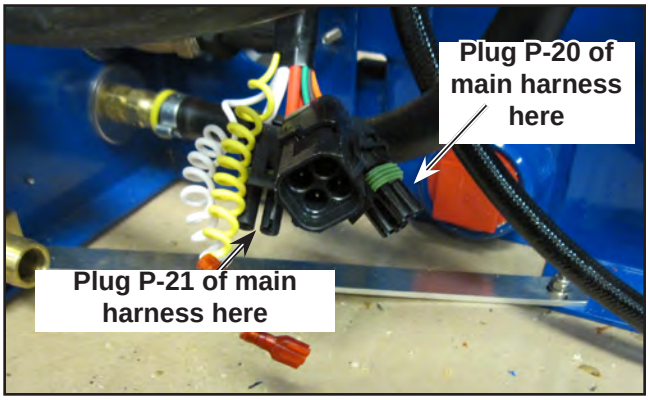


Figure 27. Plug Main Harness into Jacks

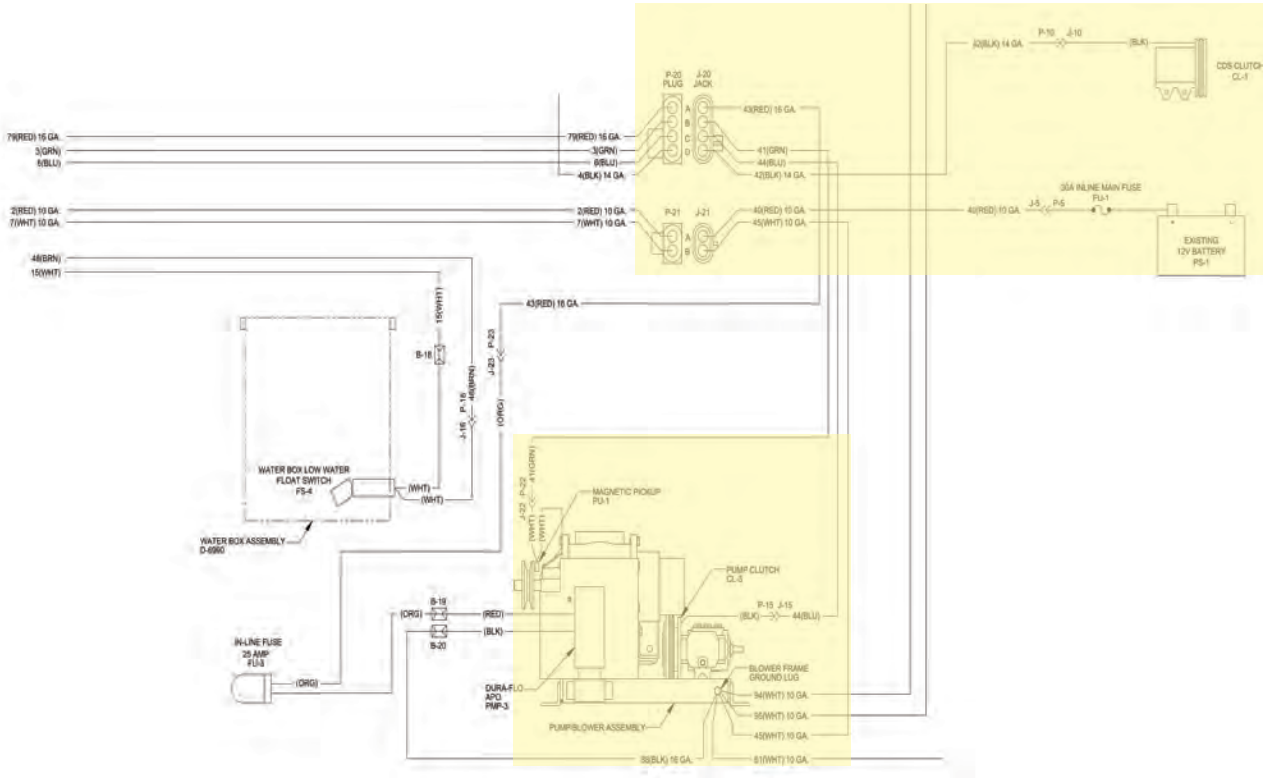


Figure 28. Partial Wiring Diagram Highlighting P-20 and P-21 Plugs

NOTICE

The red wire connects to the provided inline fuse. The fuse connects to the power source under the seat. The fuse holder mounts to the top of the fuse box.

NOTICE

When re-installing the driver's seat, take care not to crush or pinch the wires. Wires should be routed around the backside of the seat pedestal, under the opening where they can not be crushed.

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

NOTICE

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

6. Cover all the exposed wires with the provided ¼" split loom for a clean, finished look.
7. Secure all hoses and CDS wiring harness with the provided tie wraps every 6" (see Figure 29).

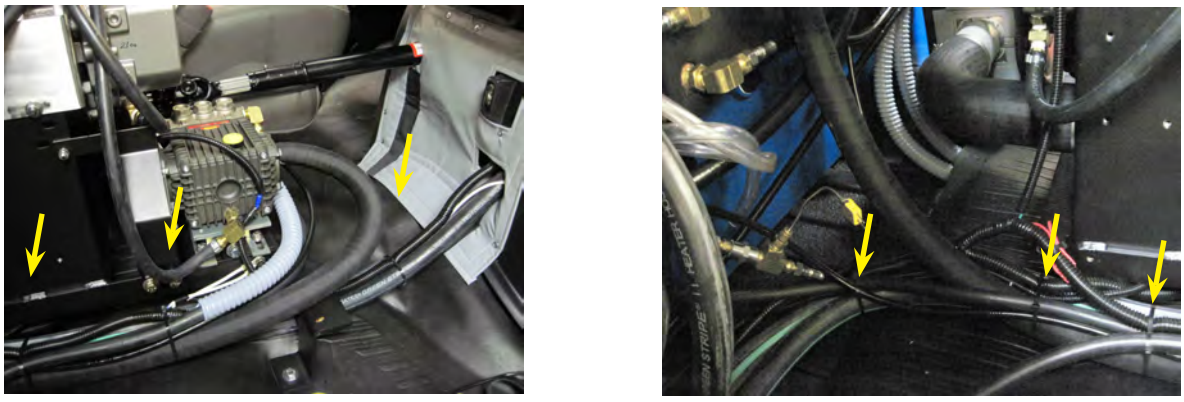


Figure 29. Secure Hoses and Harness Every 6" with Tie Wraps

INSTALLING 3 SPEED THROTTLE CONTROL KIT

Parts in the 3 Speed Throttle Control kit include:

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

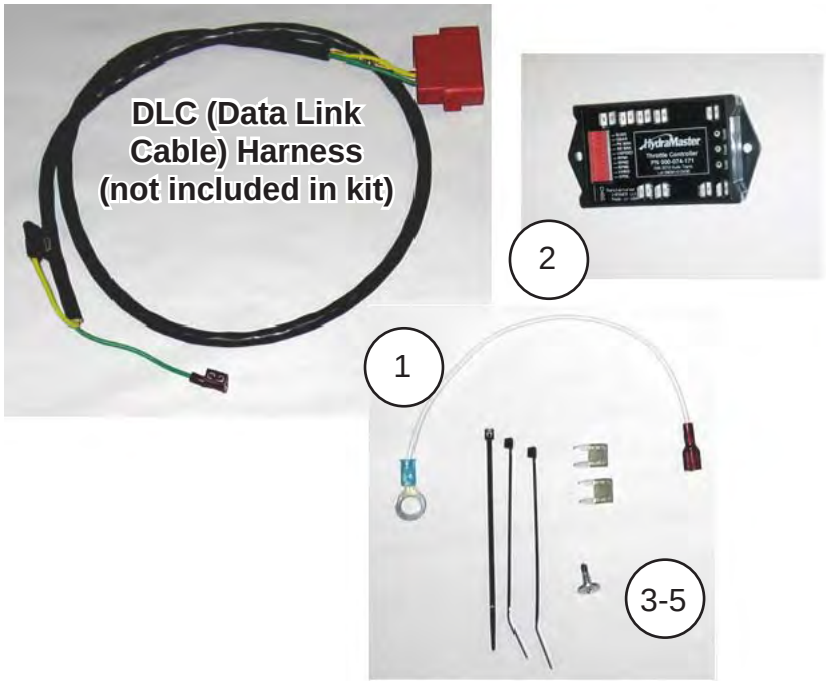


Figure 30. Parts in 3 Speed Throttle Control Kit and DLC Harness

CAUTION

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

⚠WARNING

Make sure the battery ground cable is disconnected prior to performing any work on vehicle electrical components. If it is not disconnected, personal injury or death could result from electrical shock.

1. Using the provided Velcro, mount the new Throttle Control module under the dash just above the gas pedal (see Figure 31).
2. Connect the Data Link Cable (DLC) harness and the provided wires to the controller as follows (see Figure 31 and Figure 32).

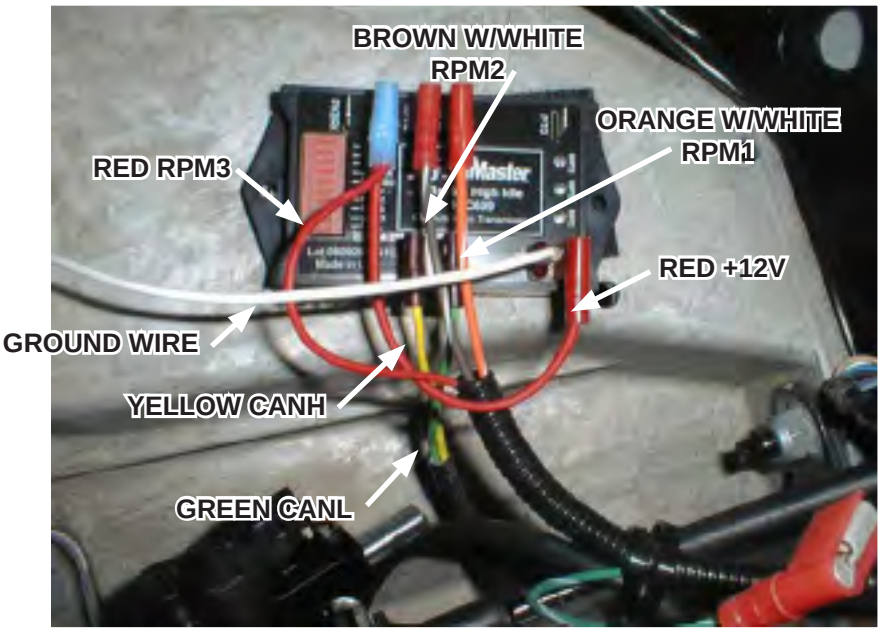


Figure 31. Mount New Throttle Control Module under Dash

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

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

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

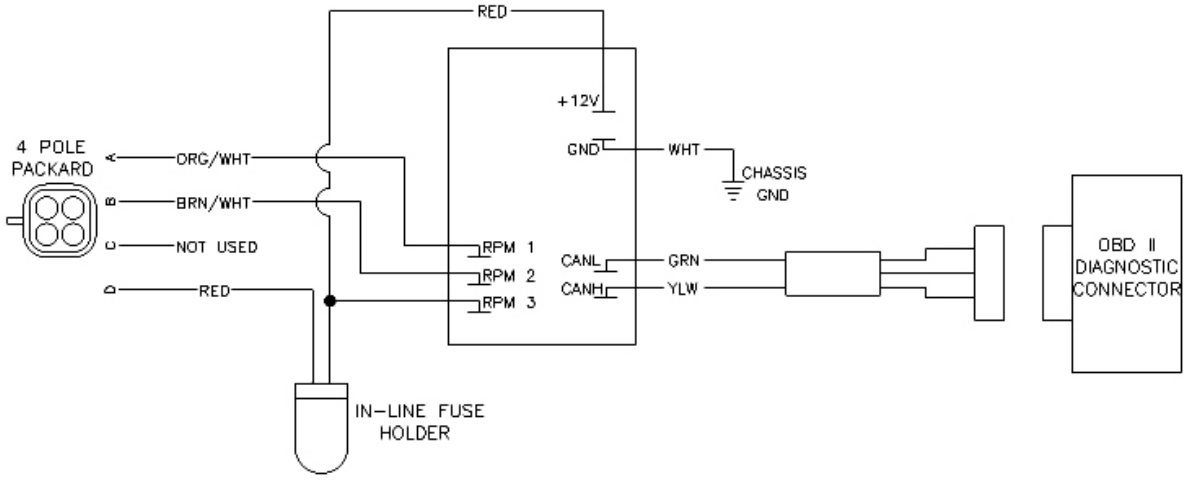


Figure 32. Wiring Diagram for GM 3 Speed Throttle Control

3. Route the DLC harness over the steering column to the Data Link Connector located just above the E-brake pedal. Make sure the harness is routed away from sharp edges and such that it does not come in contact with the driver's feet. Plug the harness in and secure with a wire tie or tape to prevent it from vibrating out over time. See Figure 33.

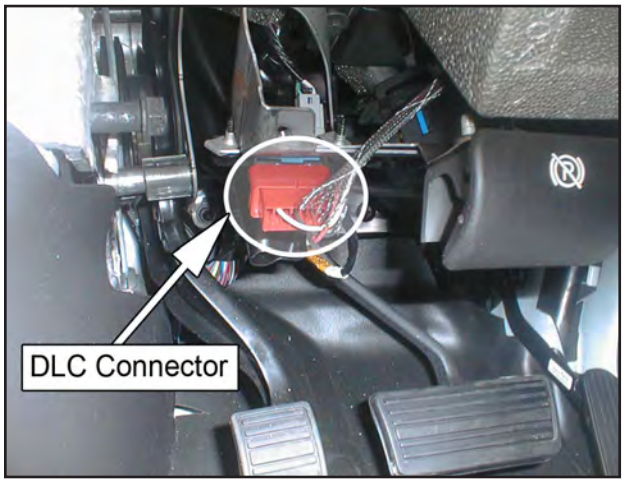


Figure 33. Route DLC Harness over Column to Data Link Connector

4. Connect the provided white wire with terminals to a ground. Refer Figure 34.

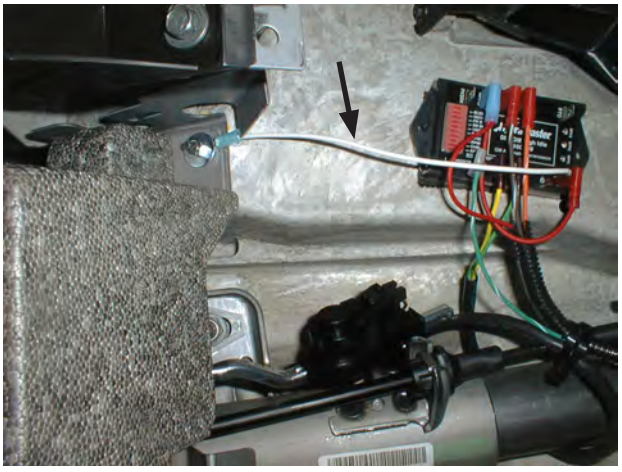


Figure 34. Connect White Wire to Ground

5. Route the nonplugged end of the throttle cable from the CDS unit under the Power Pack and toward the steering column (see Figure 35).
6. Locate the fuse panel and remove the top lid from the fuse panel.
7. Secure the fuse holder (containing the 2 Amp fuse) to the lid of the fuse panel with the provided self-tapping screw (refer to Figure 36). Note that the fuse holder is part of the throttle cable (see Figure 35).

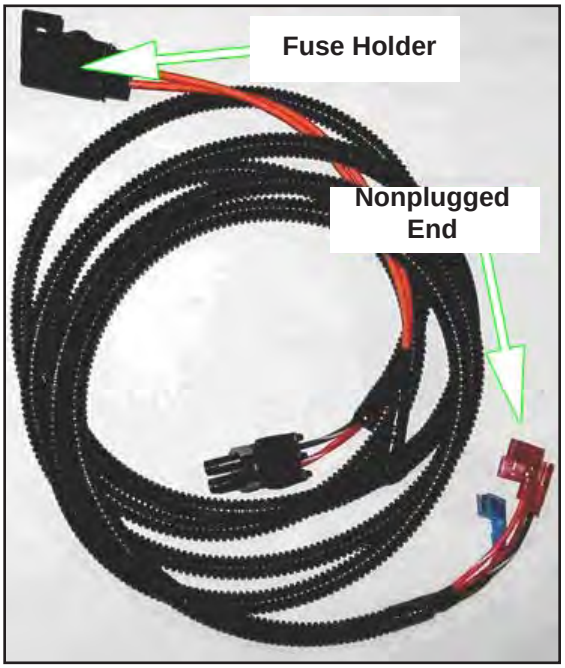


Figure 35. Fuse Holder and Nonplugged End of Throttle Cable

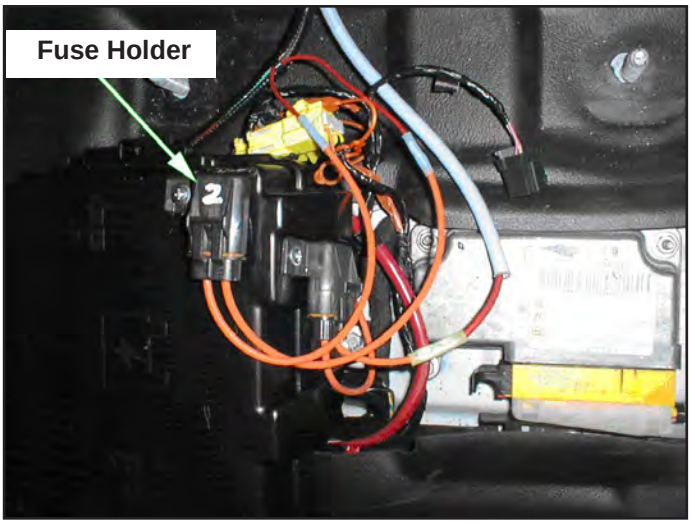


Figure 36. Secure Fuse Holder

8. Route the 3 Speed Throttle Cable under the driver's side floor mat to the controller (refer to Figure 37). Tie wrap or tape to the transmission shift cable, routing it up, under the dash.
9. Locate the 4 pole throttle control plug in the CDS wiring harness and connect the Throttle Control Harness to the plug. Refer to Figure 38.
10. Check all electrical connections.

Figure 37. Route Throttle Cable to Controller

Figure 38. Connect Throttle Control Harness to 4 Pole Plug

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 (see Figure 39).

NOTICE

Prior to installing any assembly or drilling holes, dry fit the vehicle seats, dog house cowling and gray cowling (that fits over the Power Pack) to ensure a proper fit.

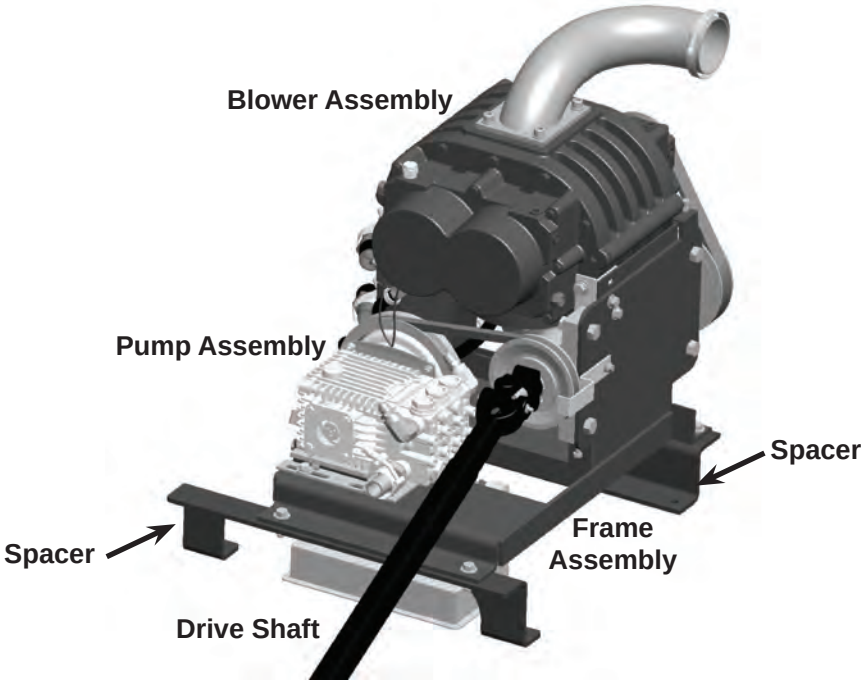


Figure 39. Power Pack with Drive Shaft

1. The frame spacers for the Power Pack get bolted down to the van floor and the Power Pack is bolted to the frame spacers. If there is a need to remove the Power Pack in the future, just unbolt it from the frame spacers.
2. Position the Power Pack with frame spacers (with the pump towards front of van) between the driver and passenger seat locations (see Figure 40).

NOTICE

Make sure that there is a distance of at least 19" between the seats' rear studs and the front most surface of the Recovery Tank as shown in Figure 3.

Figure 40. Dry Fit Vehicle Seats and Power Pack

NOTICE

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

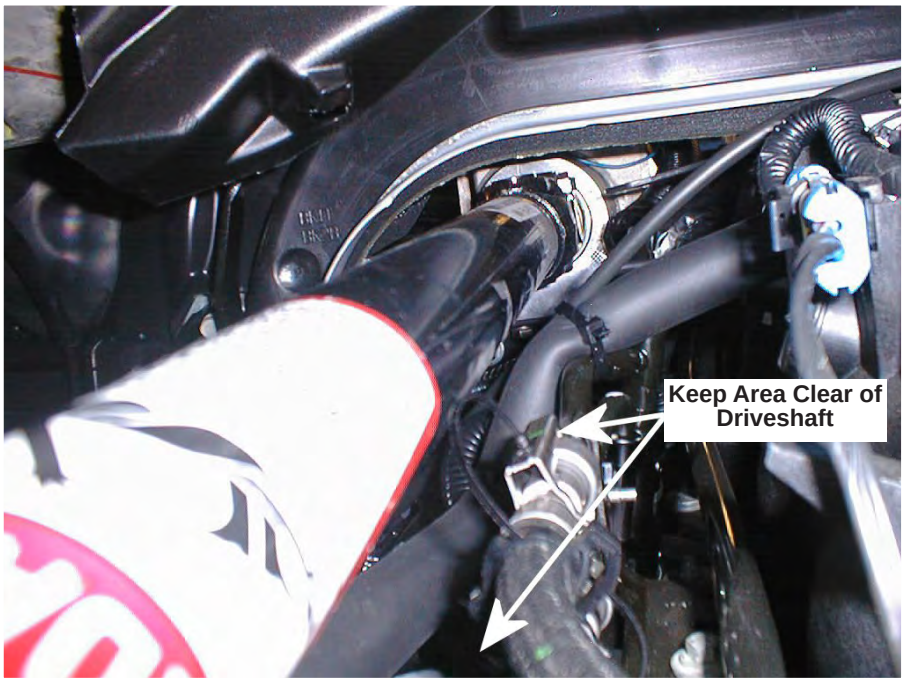


Figure 41. Slide Yoke into Drive Shaft

3. Slide Power Pack up to the drive shaft. Hold the drive shaft in line with jack shaft.
4. Properly position the Power Pack as follows:
   a. Front to Back: Leave ¼" between the jack shaft and the drive shaft yoke. This will allow for future removal of the drive shaft. Slide yoke onto jack shaft but do not tighten bolt yet (see Figure 41).
   b. Side-to-Side: Position as far as possible to the passenger side so the drive shaft does not contact the engines wire harness, throttle cable, breather tube or safety ring. Leave ¼" to ½" between any part of the engine and the drive shaft.
5. With the Power Pack set, place the driver seat in and check clearance. The backrest adjustment may be touching the Power Pack but it should not compress the handle. There should be enough room to slide the cowling between the seat and Power Pack.
6. Adjust the Power Pack as necessary, making sure there will be at least 19" distance between the-seats' rear studs and the front most surface of the Recovery Tank.

NOTICE

Verify that the drive shaft yoke will slide off the jack shaft. Slide the yoke back onto the jack shaft and torque the bolt to 35 ft lbs. The exposed spline of the drive shaft should be no longer than 5” (see Figure 42).

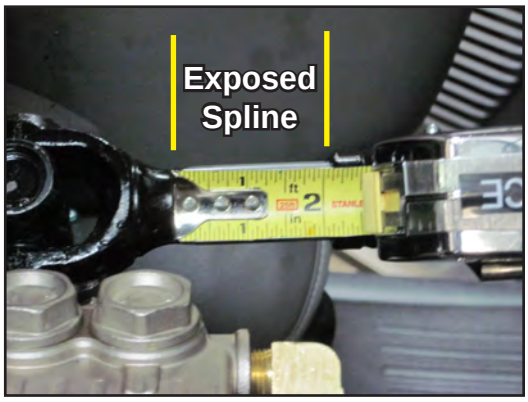


Figure 42. Exposed Spline Should Be No Longer than 5”

7. With the Power Pack in place, drill 3/8” holes through the floor using the Blower frame spacer as a template.
8. Bolt the Power Pack down with the provided hardware (see Figure 43).

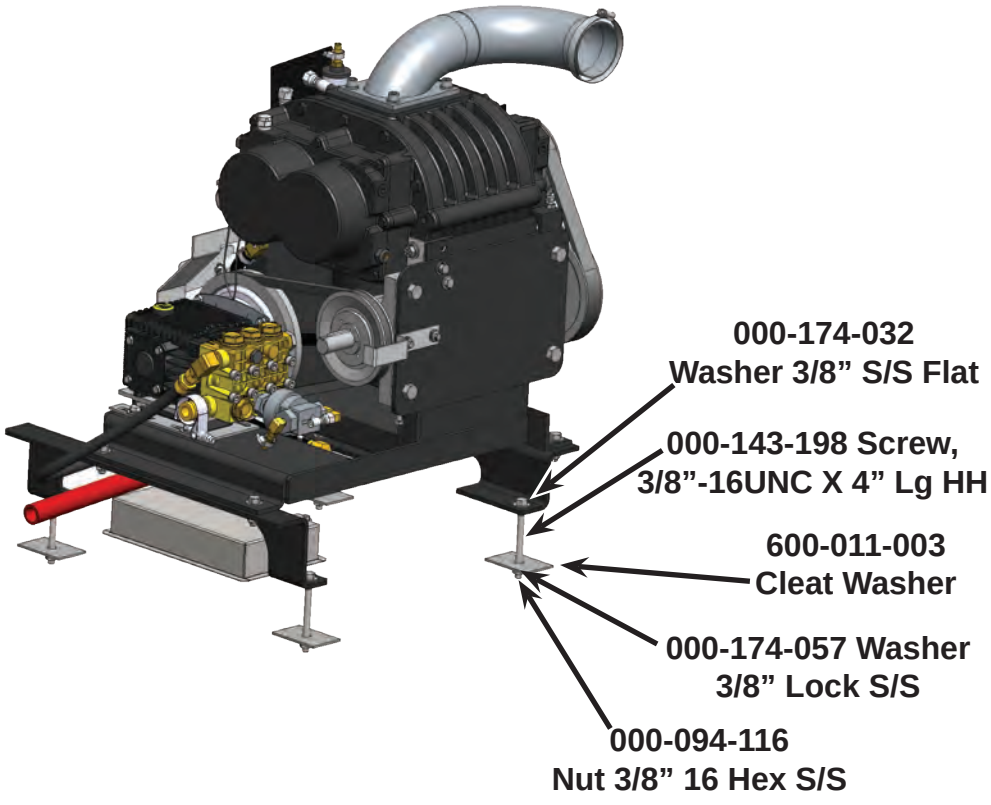


Figure 43. Secure Power Pack to Van Floor with Fastening Hardware

NOTICE

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

.

INSTALLING DURA-FLOW APO ASSEMBLY (OPTIONAL)

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

1. Secure the APO to the Power Pack Assembly using two 1/4-20UNC x 0.75” hex head bolts and two 1/4” washers (see Figure 44).

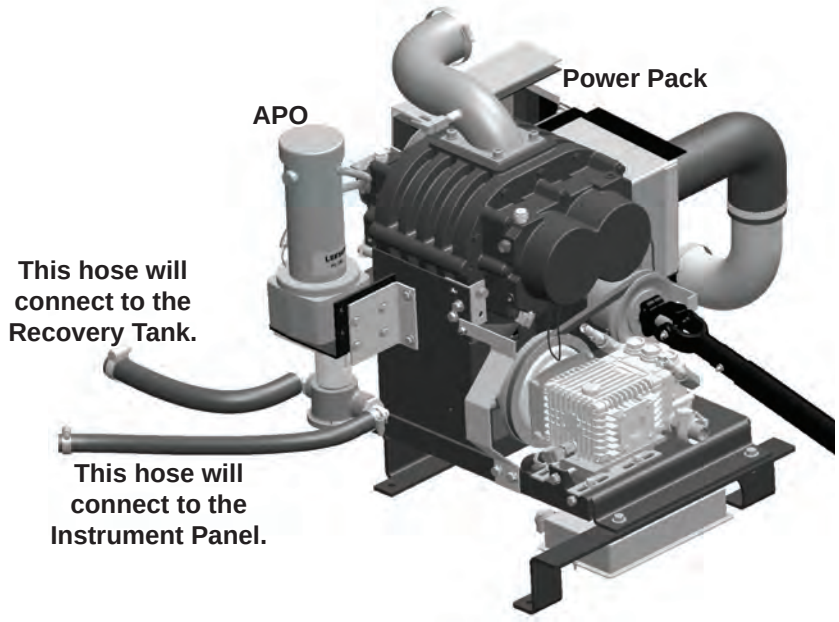


Figure 44. Install APO onto Power Pack

2. Locate the two hoses for the APO (see Figure 44).
3. Later, you will connect one hose to the APO inlet from the connector located near the bottom of the Recovery Tank and then secure the hose on both ends by tightening the hose clamps.
4. You will then attach the other hose from the APO outlet to the bottom of the instrument panel and secure both ends of the hose by tightening the hose clamps.
5. Locate the red wire within the split loom (wiring harness). Connect it to the inline fuse (with the fuse). Connect the fuse to the red APO motor wire (see Figure 45).
6. Route the black APO wire to the ground lug on the Power Pack, under the Pressure Pump.
7. Route the hoses to/from the APO as shown in Figure 44.

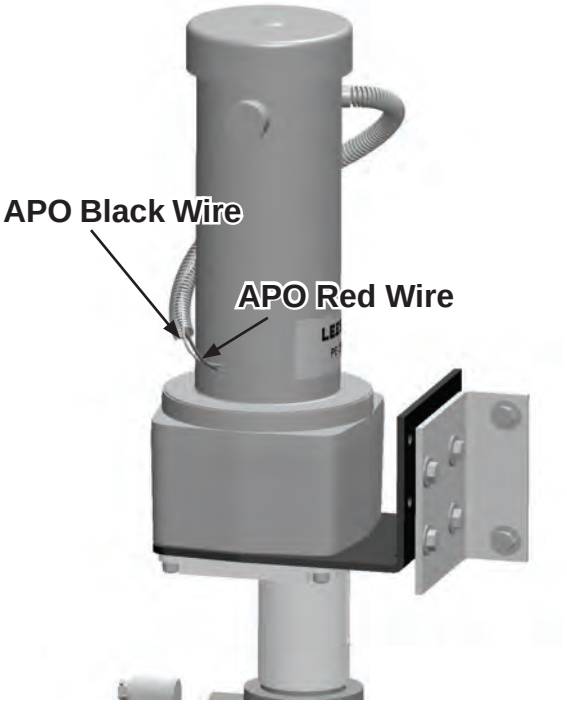


Figure 45. Connect Fuse to Red APO Wire; Route Black APO Wire to Ground Lug on Power Pack

INSTALLING BLOWER HEAT EXCHANGER ASSEMBLY

NOTICE

- Dry fit the Blower Heat Exchanger behind the driver's seat location. Mark the location on the van's floor where the 3" diameter rubber hose (P/N 000-052-674) will be inserted (see Figure 46).
- The Blower Heat Exchanger will be plumbed to the Flex system, not the CDS.

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.

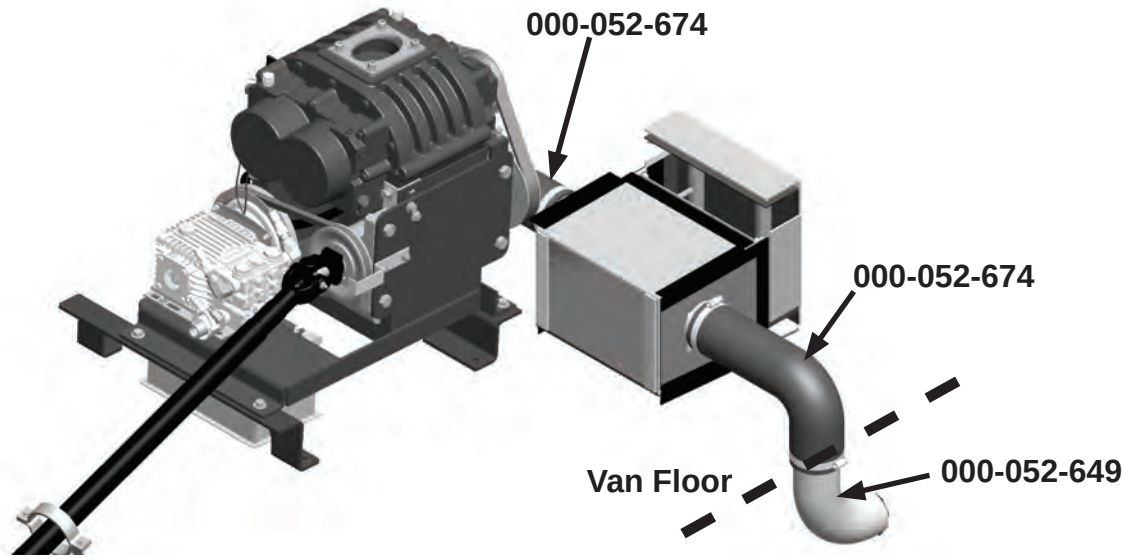


Figure 46. Connect Blower Heat Exchanger's Rubber Hoses and Elbow

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 Blower Heat Exchanger, and route it through the hole in the van floor. Secure the hose to the Blower Heat Exchanger outlet with a hose clamp (see Figure 46).
3. from under the van's floor, slip fit the 3" aluminum elbow (P/N 000-052-649) into the rubber hose protruding through the floor. Secure the elbow to the hose with a hose clamp (see Figure 46).

4. Connect the other 3” diameter rubber hose (P/N 000-052-674) to the Blower Heat Exchanger inlet;
5. Route and connect the hose to the Blower outlet adapter, and secure with hose clamps on both ends. 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 47).
6. 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.

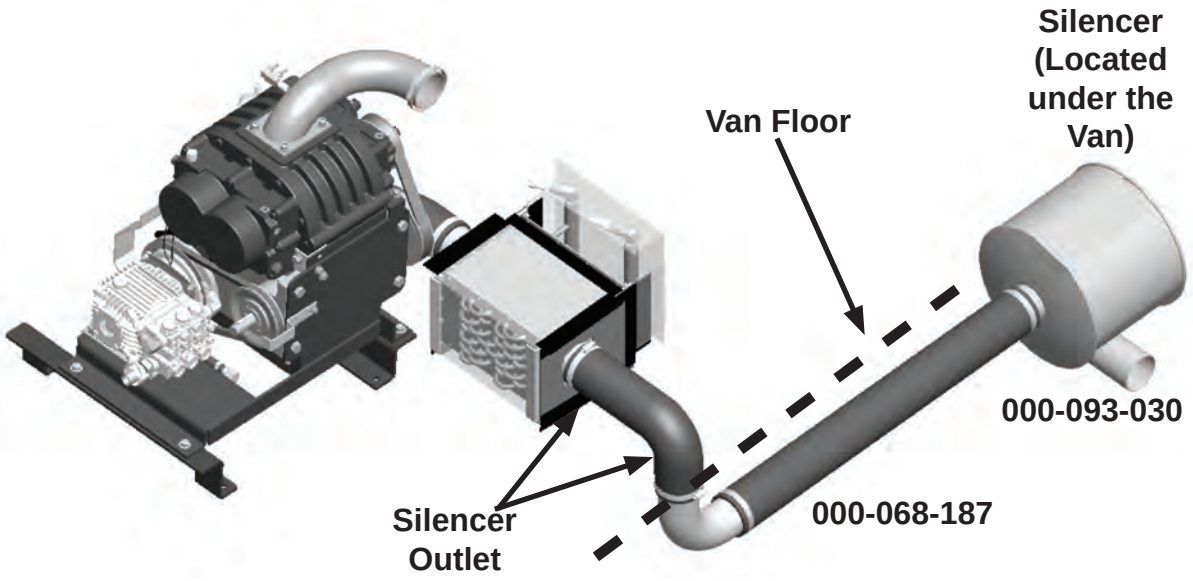


Figure 47. Attach Long End of Elbow to Hose Assembly

NOTICE

After the Flex System has been installed, route and connect two 3/8” Teflon hoses with JIC ends to/from the Blower Heat Exchanger, explained later in the instructions.

INSTALLING PASS THROUGH ASSEMBLY

NOTICE

Install the Pass Through Assembly before installing the Recovery tank.

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

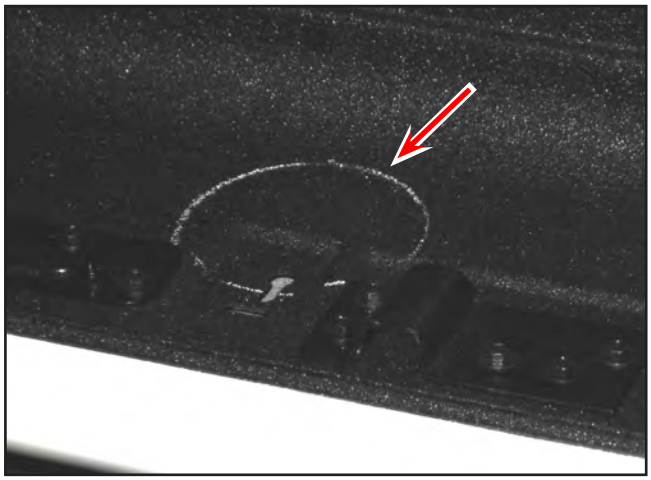


Figure 48. Trace an Outline Around Pass Through

1. Remove the van's step liner to prepare for the cutting process.
2. Position the Pass Through Assembly on the step to help locate the hole. The recommended location for the Pass Through is just to the left side of the CDS unit. Make sure to leave enough room so that the backside of the step does not interfere with the Pass Through.
3. Trace an outline around the Pass Through (see Figure 48).
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 49).
10. Thread on the cover.

Figure 49. Secure with 6 Self-Tapping Screws

INSTALLING RECOVERY TANK ASSEMBLY

⚠WARNING

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

1. Remove the Recovery Tank from the pallet and load it into the van. The Recovery Tank placement will be determined by dry fitting. The flexible hoses allow 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. Also, verify that there is at least 19" distance between the seats' rear studs and the front most surface of the Recovery Tank.

2. Mark the positions of the 5 Recovery Tank bracket holes (see Figure 50 and Figure 51). The Recovery tank will be secured to the floor later in the installation.

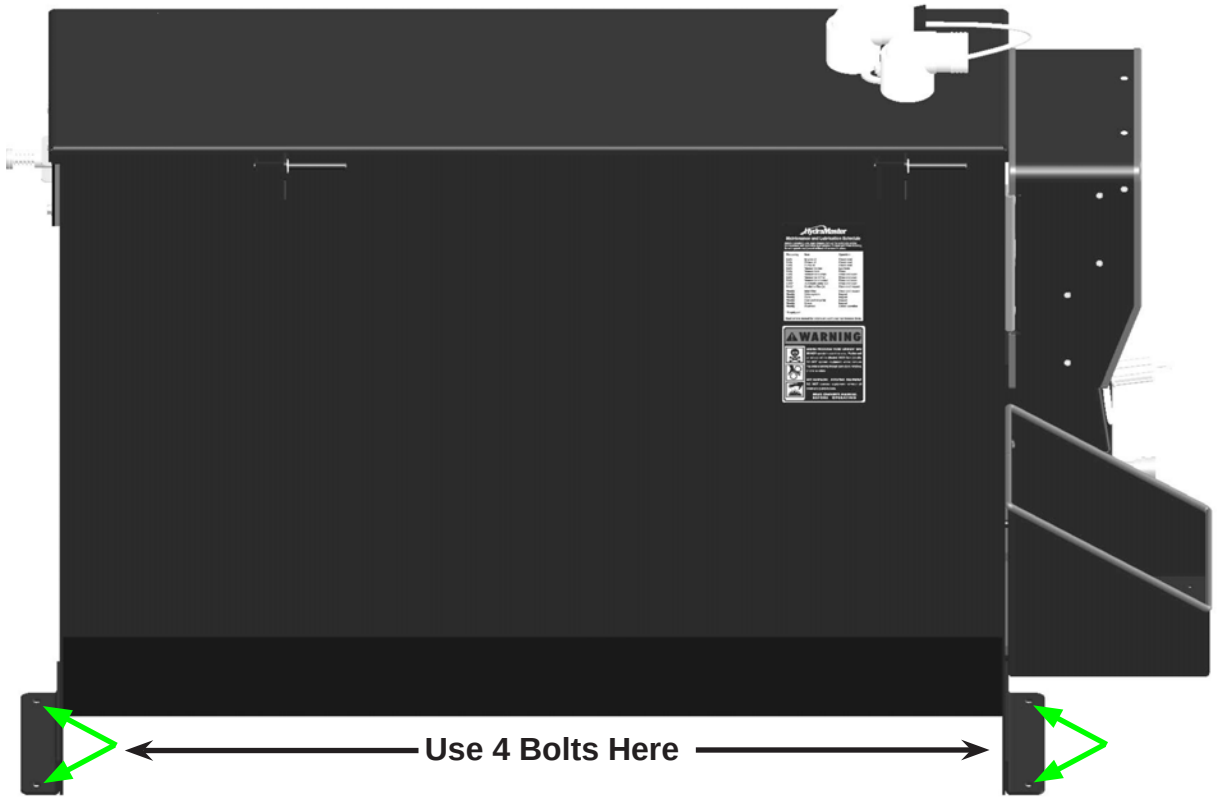


Figure 50. Mark Hole Locations for Recovery Tank - Rear of Tank

3. Remove the U-shaped hose from the rear of the dual heat exchanger (see Figure 52). Keep the hose clamps.

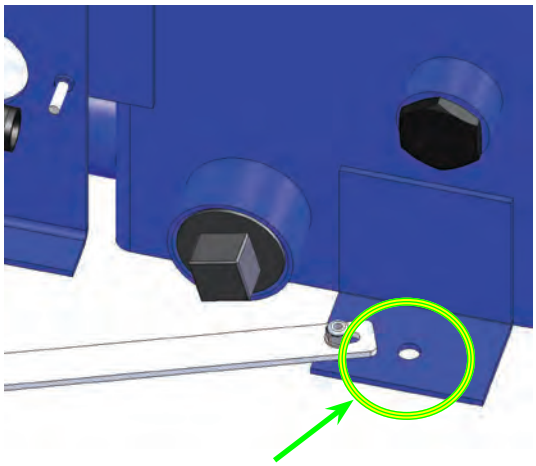


Figure 51. Mark 5th Hole for Recovery Tank - Front of Tank

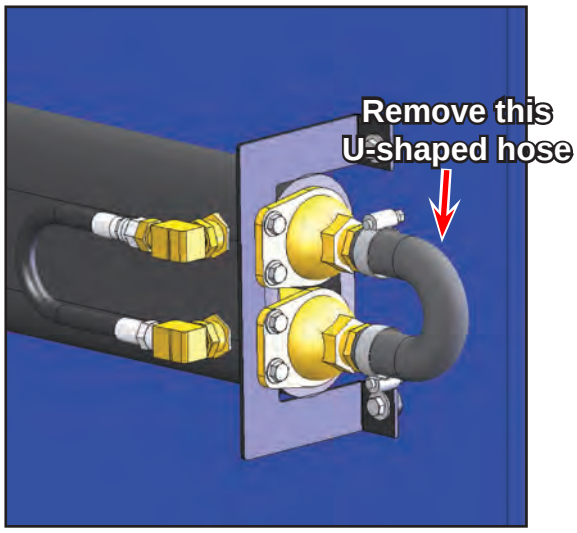


Figure 52. Remove U-shaped Hose from Rear of Dual Heat Exchanger

4. Drill the 5 holes through the van floor for the Recovery Tank.
5. Use the 5 screws (P/N 000-143-198, 3/8 X 4" S/S) from the kit to secure the Recovery Tank to the floor - 4 screws on the rear of the Recovery Tank and 1 towards the front of the tank behind the instrument panel (see Figure 50 and Figure 51).

CDS HOSE ROUTING

1. Route and connect the 1” diameter hose (P/N 000-068-829) from the Yaw Sensor Cover to the Blower elbow (see Figure 53).
2. Connect these hoses and elbow as shown in Figure 53:
   1. P/N 000-052-034 Elbow (from Yaw Sensor Cooling Kit)
   2. P/N 000-068-200 Hose
   3. P/N 000-068-884 Hose

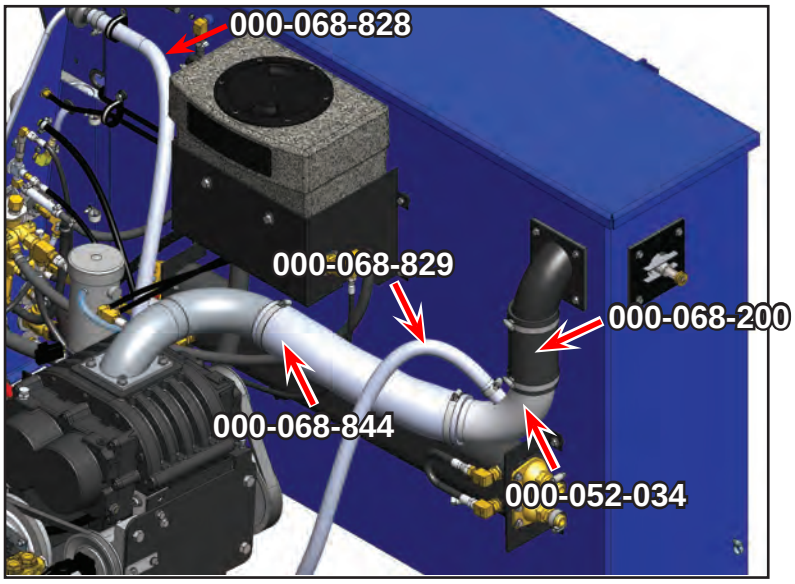


Figure 53. Connect Hoses and Elbow to/from Recovery Tank

3. Route the longer 1” diameter hose (P/N 000-068-828) from the Yaw Sensor Cover toward the CDS instrument panel (see Figure 53).
4. Secure the hoses away from all rotating pulleys and off the Blower using the nylon tie wraps and clamps as necessary.

5. Route the coolant hoses from the back of the engine along the passenger side of the Power Pack to the dual heat exchangers mounted on the Recovery Tank (see Figure 54).
6. Route and connect hoses to/from the Power Pack as shown in Figure 55 and Figure 56.

NOTICE

Proper routing of the coolant is critical for optimum performance.

The inlet hose that comes from the upper radiator hose tee must be connected to the lower barb on the coolant flow valve (see Figure 54). The outlet hose routes from the upper insert on the Dual Heat Exchanger to the lower tee on the engine's water pump.

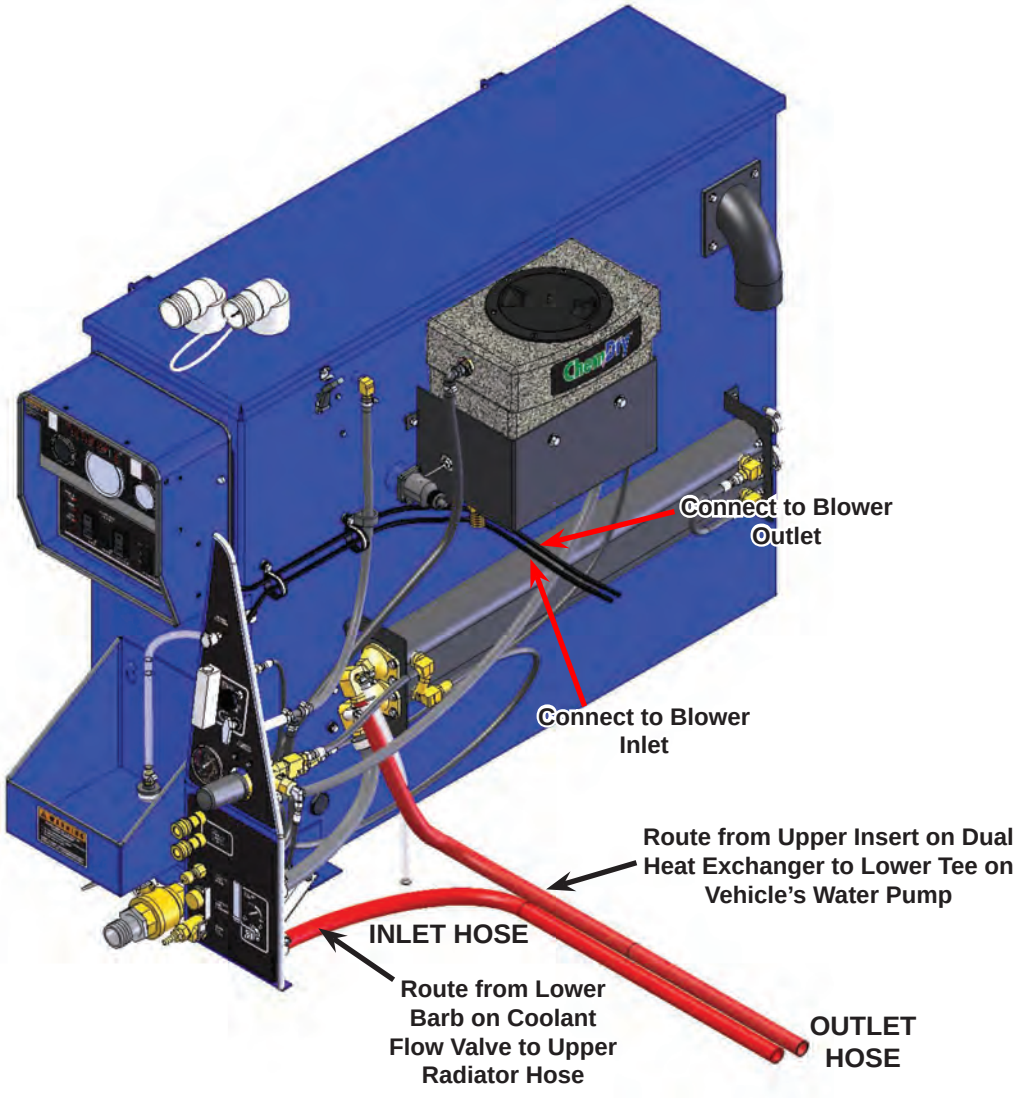


Figure 54. Proper Routing of Coolant Hoses to/from Engine and Blower

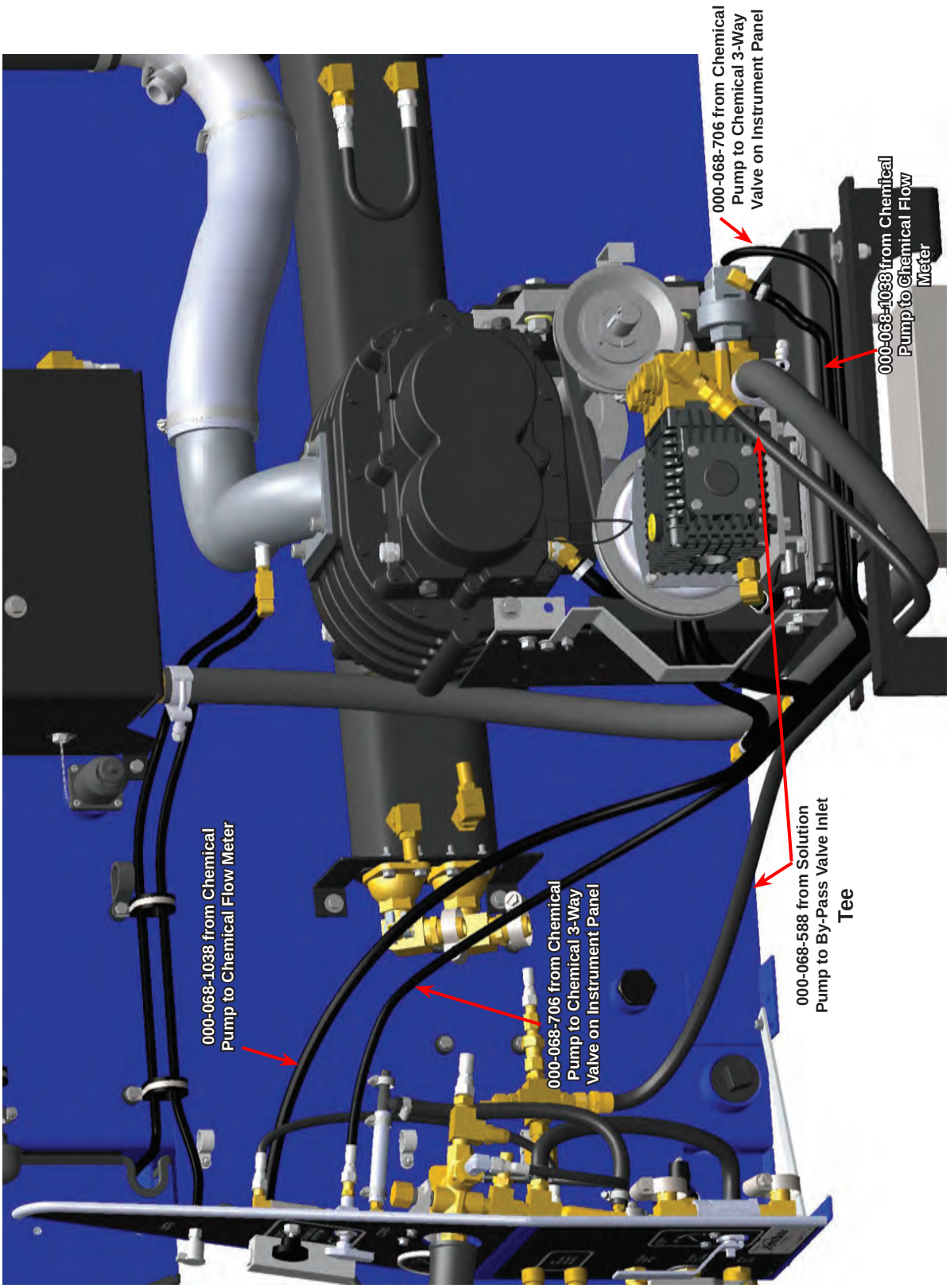


Figure 55. Power Pack Hose Routings

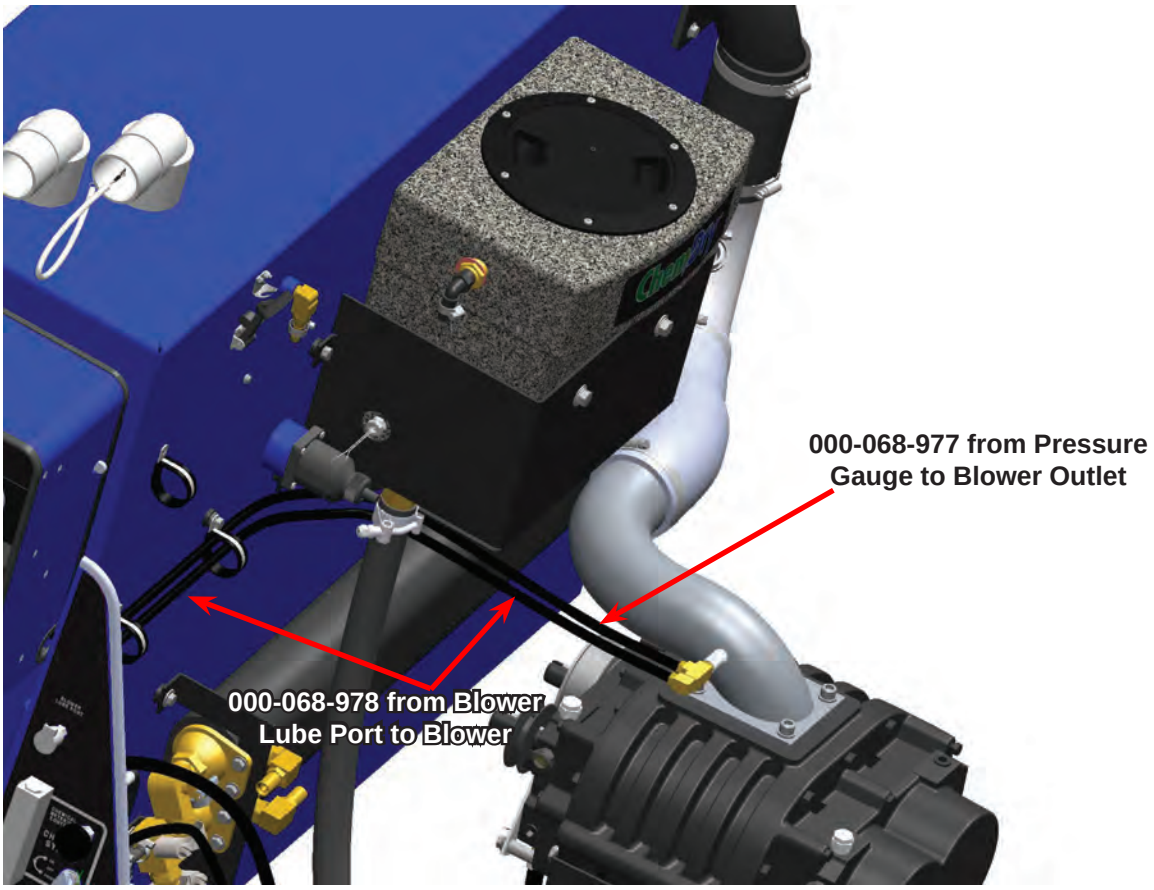


Figure 56. Connect Factory Installed Hoses to Tees on Power Pack

NOTICE

The vacuum line hoses, P/N 000-068-978 and P/N 000-068-977, shown in Figure 56, are installed on the Recovery Tank at the factory.

MODIFYING ENGINE COWLING

1. Re-attach battery cables.
2. Cut the doghouse according to Figure 57 and Figure 58.

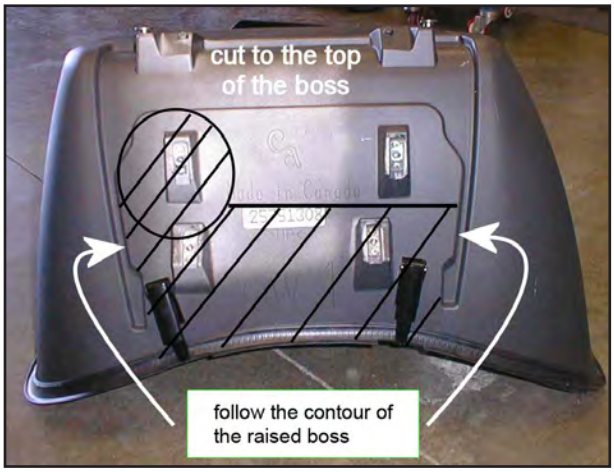


Figure 57. Cut to Top of Boss and Follow Contour

Figure 58. 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 the button head screws, 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 59. Close Velcro strips around shaft and hose bundle.
   c. With the seal square on the doghouse, install button head screws or the supplied rivets between the stitching around the perimeter of the seal.
   d. Modify the driver's side dash cover, closest to the doghouse (see Figure 60).

5. Modify the passenger's side dash cover, closest to the doghouse as necessary.
6. Re-install the passenger dash cover.
7. Re-install air cleaner assembly and antifreeze overflow container.

Figure 59. Position Seal as Shown

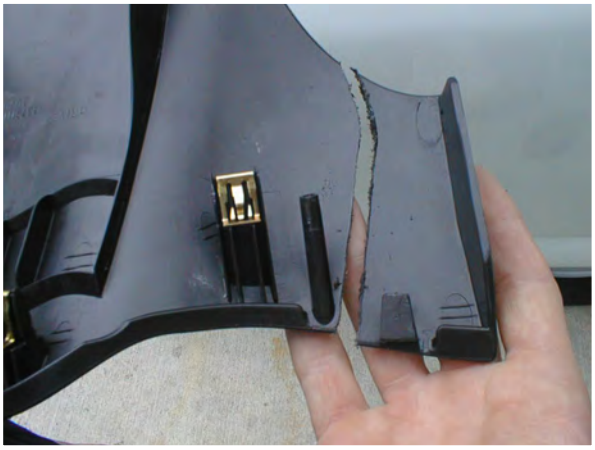


Figure 60. Modify Driver's Side Dash Cover

INSTALLING COOLANT HEAT EXCHANGER/CROSS ASSEMBLY

NOTICE

Dry fit the Coolant Heat Exchanger/ Cross Assembly behind the driver's seat location, to the side of the Recovery Tank (see Figure 61).

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.

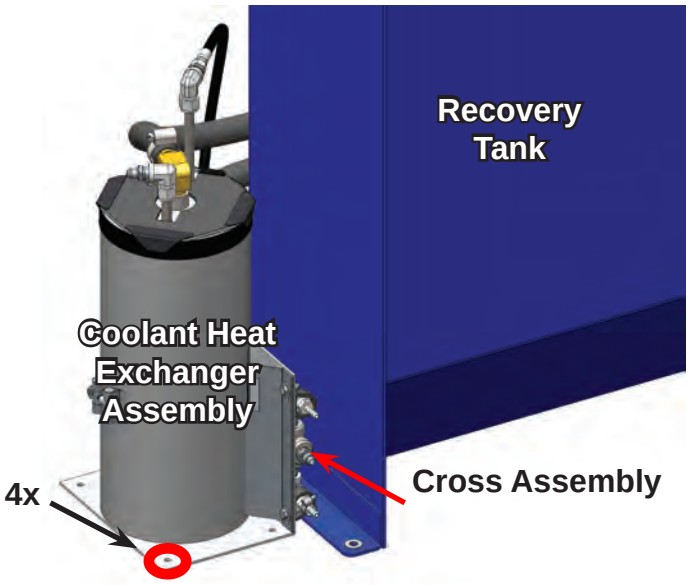


Figure 61. Installing Coolant Heat Exchanger/Cross Assembly

1. After dry fitting the Coolant Heat Exchanger Assembly on the floor of the van next to the CDS, mark the location of the 4 holes (see Figure 61).
2. Check the underside of the van to ensure that there is nothing in the way before installing the Coolant Heat Exchanger.
3. Drill 4 holes as marked using a 1/8" drill bit and secure the Coolant Heat Exchanger/Cross Assembly to the floor with four 1/4"-20 x 1" long self tapping screws.

NOTICE

After the Flex System has been installed into the van, you can connect and route the Coolant Heat Exchanger Assembly hoses as explained later in this document.

INSTALLING QUICK CONNECT (QC) DASH BOX

NOTICE

Dry fit the Quick Connect Dash Box next to the Recovery Tank (see Figure 3).

1. Remove the wing nuts from the QC Dash Box (see Figure 62).
2. On the other side of the QC Box, remove the screws and washers, using a 5/16 nut driver.

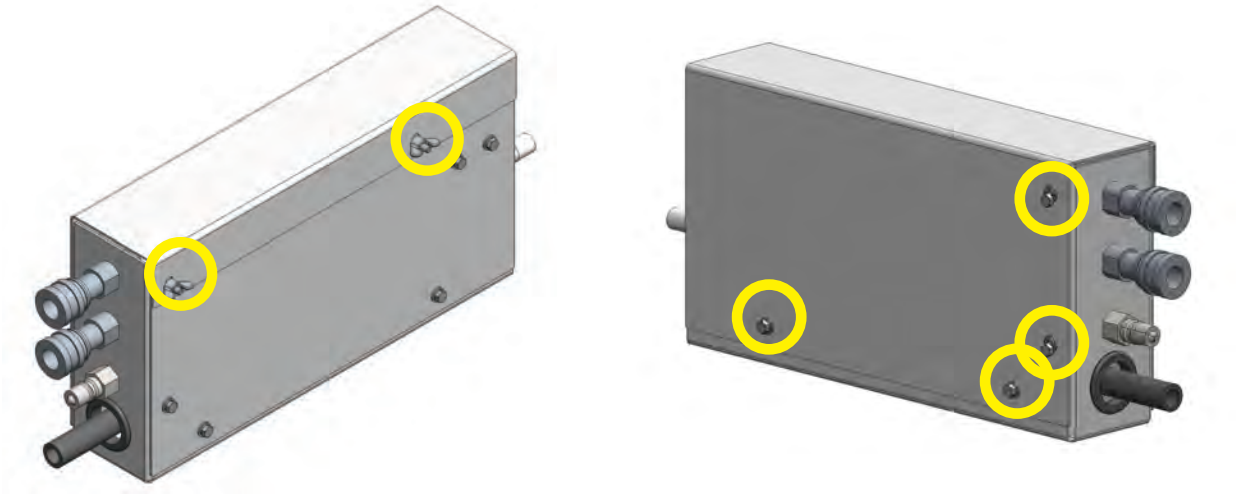


Figure 62. Remove Wing Nuts, Screws and Washers from QC Dash Box

3. Lift the top/left panel off the Box to access the 2 holes on the bottom of the Box (see Figure 63).

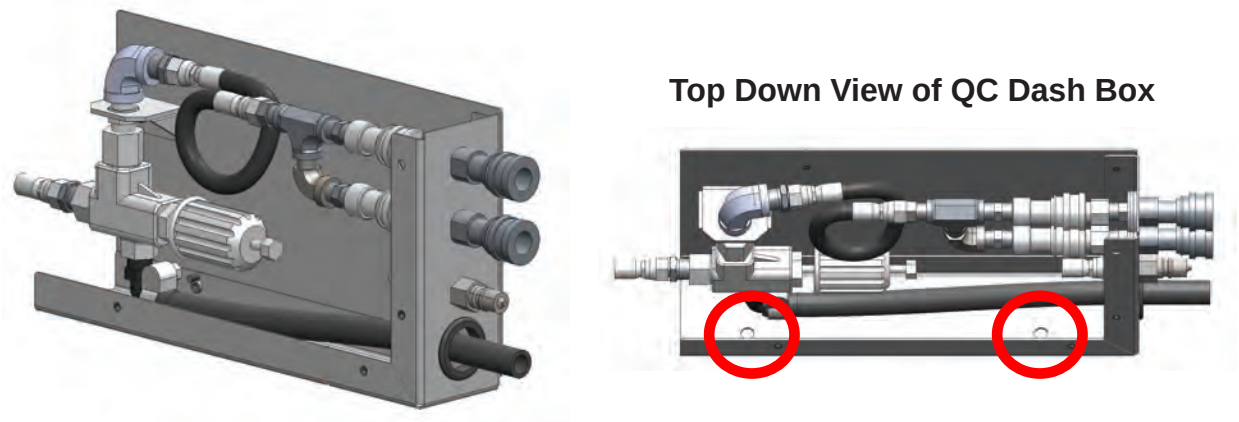


Figure 63. Lift Off Top/Left Panel and Locate 2 Holes Inside Box

4. After positioning the QC Dash Box approximately 1” from the Recovery Tank, mark the 2 hole locations on the van floor.
5. With a 1/4” bit, drill the 2 pilot holes; with a 3/8” bit, drill the holes through the van floor.

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.

6. Fasten the QC Dash Box to the van floor with 2 tap bolt screws and washers.
7. Secure the Box from under the van with 2 cleat washers, 2 flat washers and 2 nuts provided in the Installation Kit P/N 000-078-934.

NOTICE

After you connect and route the QC Dash Box hose which attaches to the male QC inside the Dash Box, re-install the top/left panel and wing nuts onto the QC Dash Box.

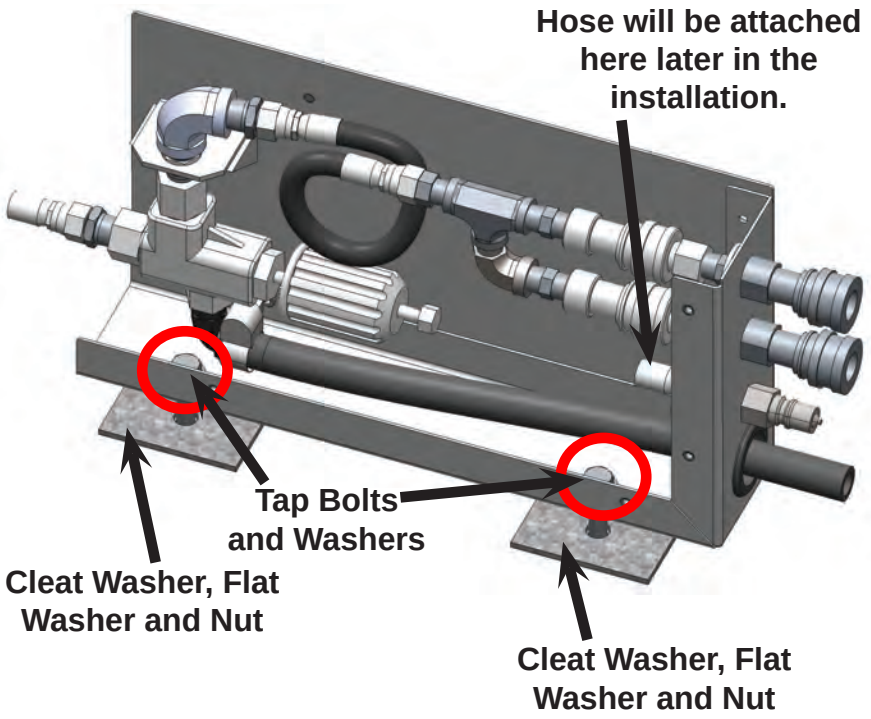


Figure 64. Install Stackup as Shown

SOLUTION TANKS AND PUMPS - PRE-INSTALLATION

Solution Tanks

Before loading the solution tank assemblies into the van:

1. Locate the holes in the sides of the tanks as shown in Figure 65. Notice there is 1 hole on the 50 Gallon Tank Assembly and 2 holes on the 35/15 Gallon Tank Assembly. (There is 1 hole on the 35 Gallon Tank Assembly; the assembly is not shown in Figure 65.)
2. Insert a plug, P/N 000-106-173, into each of those holes. (Plugs are provided in the hardware kit shipped with each tank.)

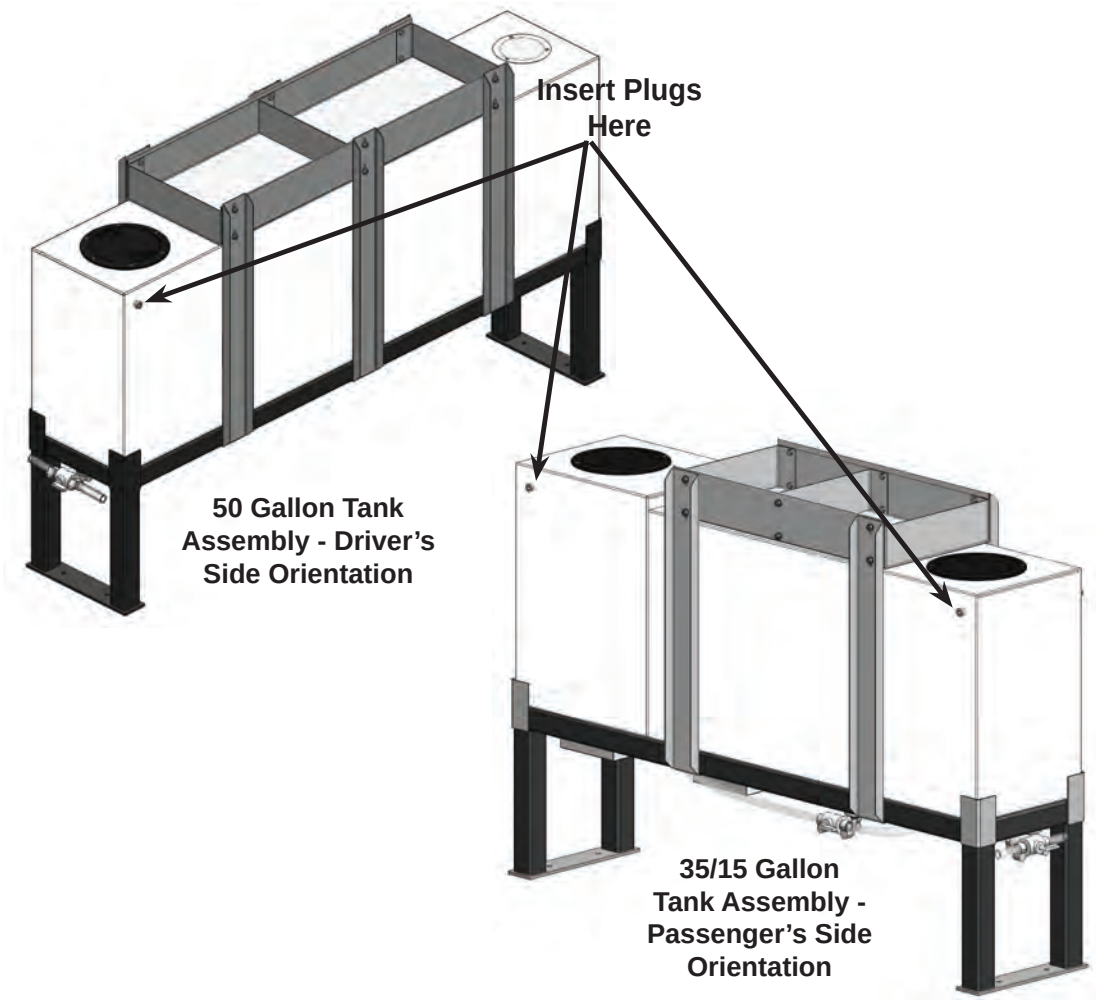
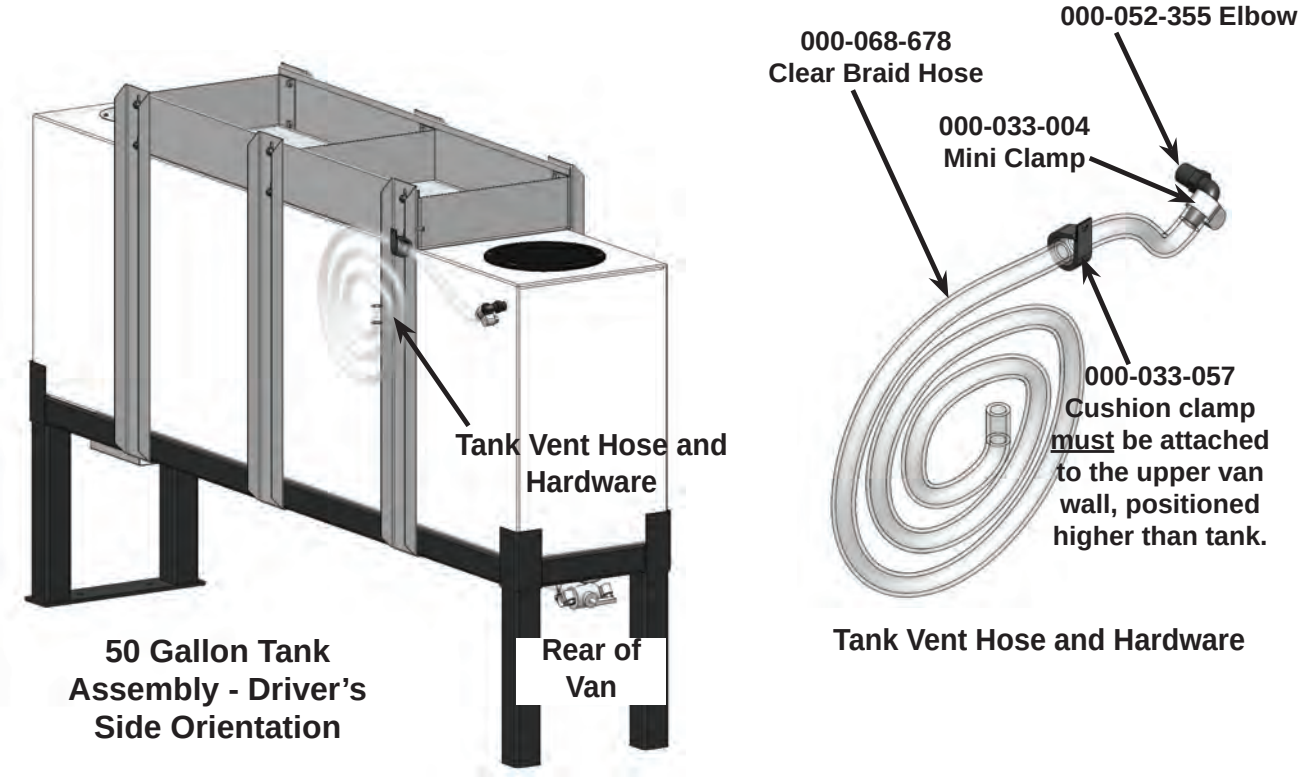


Figure 65. Insert Plugs into Holes in Sides of Tanks

3. Install the tank vent hoses and fastening hardware into the holes on the outer walls of the tanks for proper venting. (Hardware and hoses are shipped with each tank.)
4. Install each cushion clamp (P/N 000-033-057) to the upper wall of the van with self-tapping screws; route the tank vent hose through the clamp.



CAUTION

Make sure you route each tank vent hose up through a cushion clamp, installed on the upper van wall. The open end of each tank vent hose MUST be located above the tanks. If the tank vent hose is not routed in this manner, solution may pool in the van.

NOTICE

Do not cut the tank vent hoses.

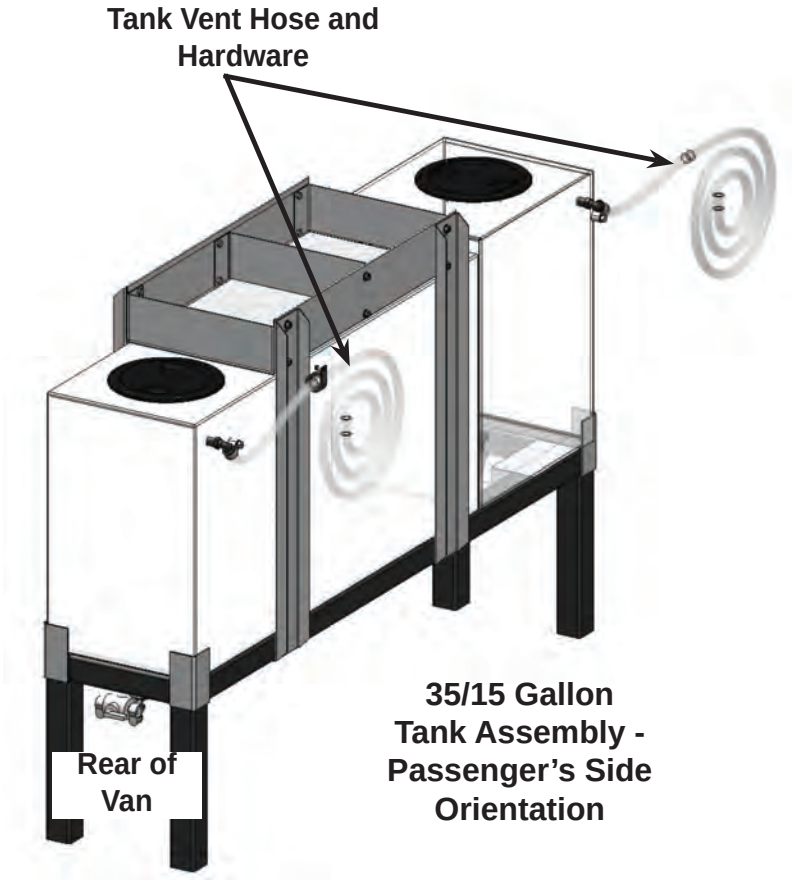


Figure 66. Install Tank Vent Hoses and Hardware

INSTALLING SOLUTION TANK AND PUMPS

The 50 Gallon Tank Assembly will typically be positioned on the driver's side, over the wheel well, next to the van's wall (see Figure 67); the 35 Gallon/15 Gallon Tank Assembly (or 35 Gallon Tank Assembly) will typically be positioned on the passenger's side, over the wheel well, next to the other wall.

1. Load the Tank Assemblies into the rear of the van and dry fit.
2. After dry fitting each tank, mark the location of the frame holes (4 per frame - see Figure 68). Using a 3/8" bit, drill the 8 holes through the van floor.

Figure 67. 50 Gallon Tank Assembly Positioned Over Wheel Well

50 Gallon Tank Assembly on Driver's Side

35/15 Gallon Tank Assembly on Passenger's Side

Figure 68. Drill Holes through Van Floor

3. Insert up to 3 cleat washers between the frame's bracket and the interior of the van floor at each outermost hole at the rear of the van (see Figure 69). These cleat washers act as shims to level the frame's legs. You may not need all 3 cleats.

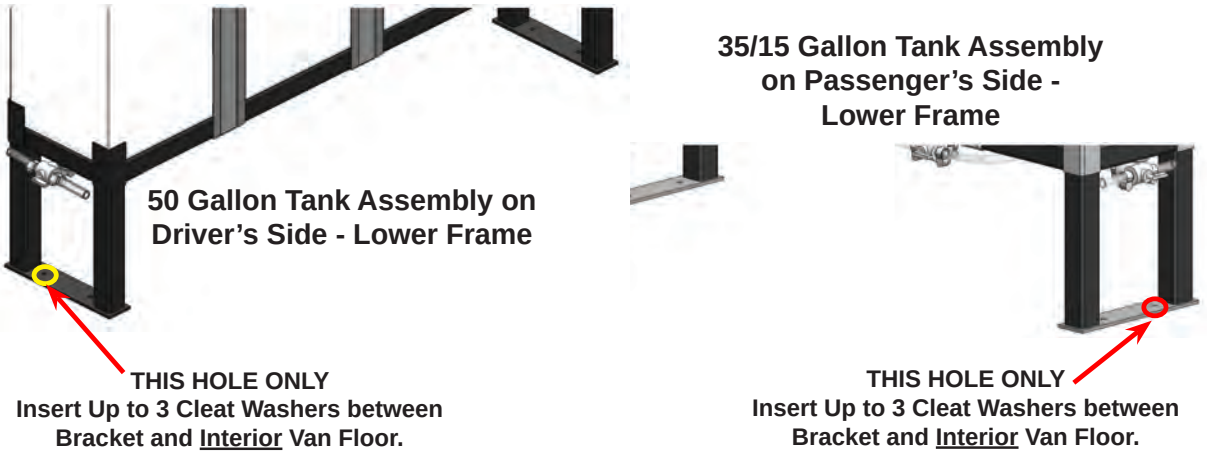


Figure 69. Lower Part of Frames - Securing Tank Assemblies to Van Floor

4. Secure the frames to the van floor with hardware provided in the Installation Kit, P/N 000-078-934, and fasten. For each of the 8 holes, install 1 screw (tap bolt) and fastener to secure the frame from inside the van; install 1 cleat washer, 1 flat washer and a locking nut under the van.

Driver Side Pump

1. On the driver's side of the van, position the driver side pump at the rear of the van, under the tank frame mounting bolts and washers, near the van wall as shown in Figure 70.

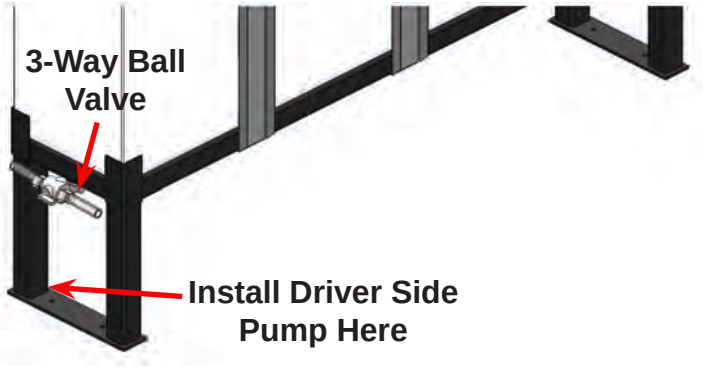


Figure 70. Install Pump at Rear of Van

NOTICE

Position the driver side pump with the flat end of the pump facing the van wall.

2. Loosen the 2 tap bolt screws and slide the pump mounting plate under the screws so that the plate tabs are secured by the screws (see Figure 71).

3. Retighten the screws.

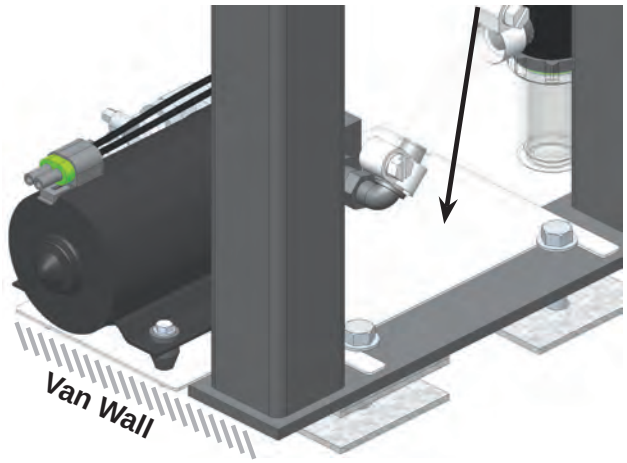


Figure 71. Slide Mounting Plate under Screws

4. A clear braid hose, P/N 000-068-677, is pre-installed onto the 3-way ball valve at the factory. Connect that hose to the pump's strainer (see Figure 72).

NOTICE

Cut the clear braid hose to fit if needed.

5. Secure the hose with the provided hose clamp.

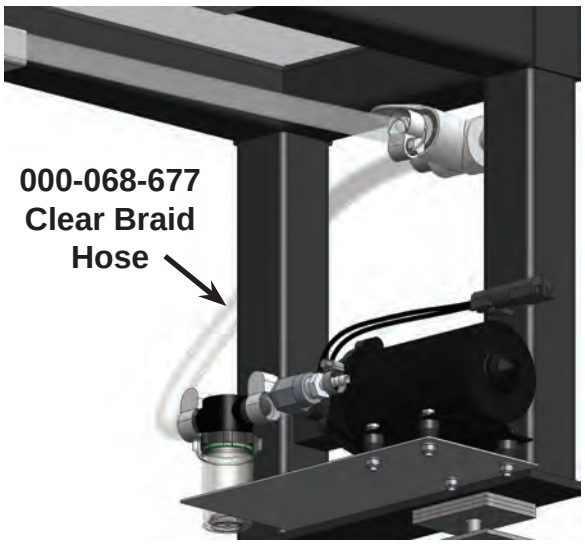


Figure 72. Connect Hose from 3-Way Ball Valve to Strainer

6. Position the Flex Pump Cover over the pump, attaching the magnets to the tank frame (see Figure 73).

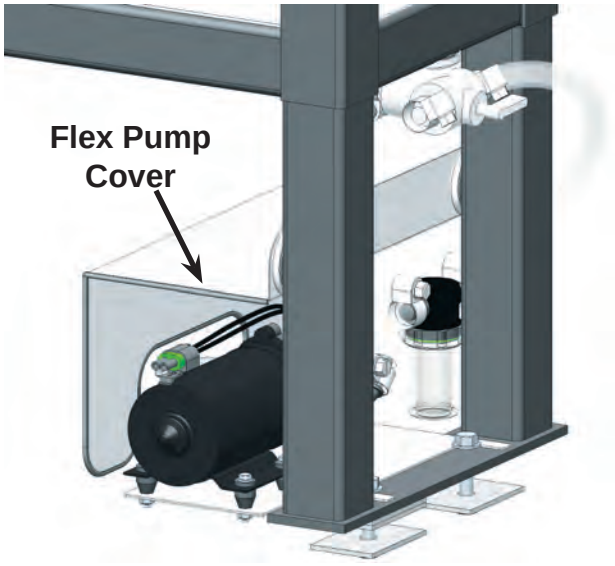


Figure 73. Position Flex Pump Cover over Pump

NOTICE

There is 1 lever located on the 3-way ball valve on the 50 Gallon Tank Assembly. There are 2 levers on the 35 Gallon/15 Gallon Tank Assembly, one for each tank.

The levers control the direction of the flow. Before operating the Flex System, turn the appropriate lever toward the direction of the flow. To drain the tanks, turn the lever away from the flow.

To turn the flow off, turn the levers in the vertical position

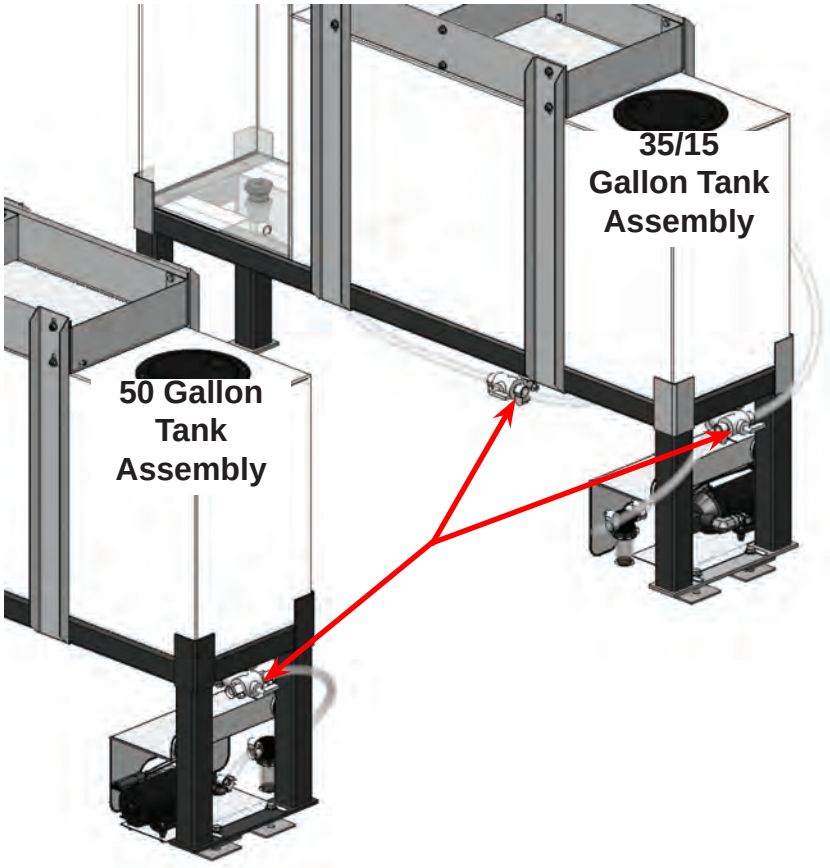


Figure 74. Lever Locations on Tank Assemblies

Passenger Side Pump

1. On the passenger's side of the van, position the passenger side pump at the rear of the van, under the tank frame mounting bolts and washers, near the van wall as shown in Figure 75.

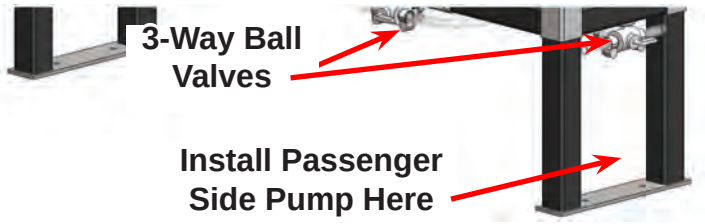


Figure 75. Install Passenger Side Pump under Tank Frame at Rear of Van

NOTICE

Position the passenger side pump with the flat end of the pump facing the van wall.

2. Loosen the 2 tap bolt screws and slide the pump mounting plate under the screws so that the plate tabs are secured by the screws (see Figure 76).
3. Retighten the screws.

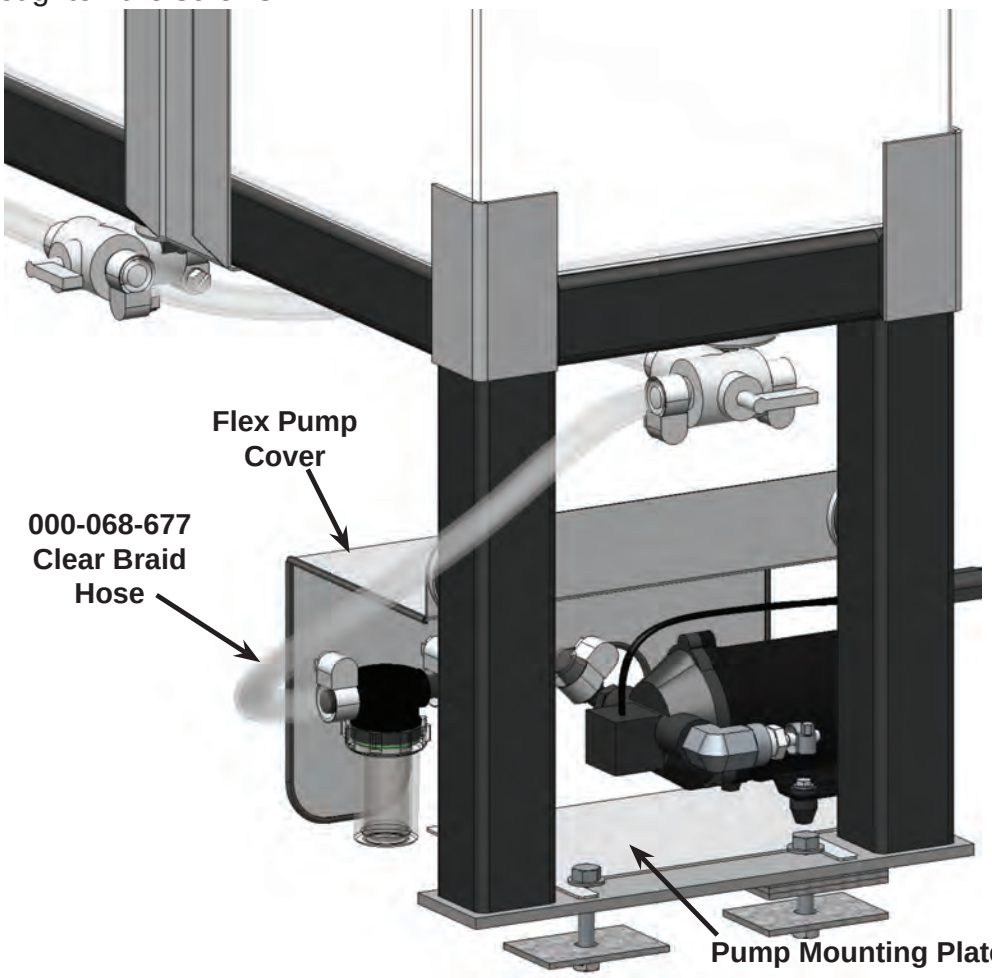


Figure 76. Position Passenger Side Pump with Flat End Facing Van Wall

4. A clear braid hose, P/N 000-068-677, is pre-installed onto the 3-way ball valve at the factory. Connect that hose to the pump's strainer (see Figure 76).
5. Secure the hose with the provided hose clamp.
6. Position the Flex Pump Cover over the pump, attaching the magnets to the tank frame (see Figure 76).

ROUTING FLEX HOSES

Route and connect the Flex hoses as shown in Figure 77 - Figure 83. See Table 3 and Table 4 for source/destination hose routing lists.

Follow these steps to:

1. Route and connect the hose, P/N 000-068-680, from the passenger side pump to the top fitting on the cross.
2. Route and connect the hose, P/N 000-068-511, from the cross to the male QC inside QC Dash Box.
3. Route and connect the hose, P/N 000-068-679, from the driver side pump to the cross.
4. Route and connect the hose, P/N 000-068-681, from the male QC on the rear of the QC Dash Box to the Blower Heat Exchanger.
5. Route and connect the hose, P/N 000-068-621, from the rear of the cross to the Coolant Heat Exchanger.
6. Connect the green stripe hoses, P/N 000-068-385, which are factory-installed on the Coolant Heat Exchanger, to the Dual Heat Exchanger on the Recovery Tank.
7. Route and connect the hose, P/N 000-068-333, from the Coolant Heat Exchanger to the outer connector on the Blower Heat Exchanger.

The solution flow diagram is included for reference (see Figure 84).

Table 3. CDS Hose Routing List

Part Number	Description	From	To
000-068-092	Hose, 3/8” X 15” Teflon w/ 3/8” JIC End	Dual Heat Exchanger	CDS: By-Pass Valve
000-068-1037	Hose, 3/8” I.D. X 38” Lg., Clr w/ Braid	Chemical Jug	Chemical Meter
000-068-1039	Hose, 3/8” I.D. Rubber X 31” Lg.	CDS: By-Pass Valve	Recovery Tank
000-068-196	Hose, 3/8” I.D. X 11” Lg w/ 3/8” MPT and 3/8” JIC End	CDS: By-Pass Valve	Dual Heat Exchanger
000-068-203	Hose, 3/16” X 34” Teflon 1/4” F JIC X 1/4” F JIC	Water Box	Hi-PSI Manifold
000-068-385	Hose, 3/4” I.D. X 18 ft - Green Stripe - Cut to Fit	Dual Heat Exchanger	Van Cooling System
000-068-734	Hose, 1/2” X 42 1/8” Lg w/ 3/8” NPT and 3/8” SAE F Ends	Water Box	Water Outlet
000-068-940	Hose, 3/8” I.D. Rubber X 17” Lg.	Hi-PSI Manifold	Dual Heat Exchanger
000-068-977	Hose, 5/32” I.D. Vacuum X 52” Lg.	Pressure Gauge	Blower Outlet
000-068-978	Hose, 5/32” I.D. Vacuum X 52” Lg.	Lube Port	Blower
000-068-991	Hose, 1/2” I.D. Rubber X 42” Lg.	Water Box	CDS: By-Pass Valve

Table 4. Flex Hose Routing List

Part Number	Qty	Description	From	To
000-068-1032	2	1/2" Clear x 8" Lg	Pump Filter	Pump Inlet
000-068-329	1	5/16" Hi-PSI x 21" Lg	QC Box: By-Pass Valve	QC Box: Orifice and Filter Manifold
000-068-328	1	5/16" Hi-PSI x 68" Lg	Coolant Heat Exchanger	Blower Heat Exchanger
000-068-511	1	5/16" Hi-PSI x 59" Lg	Cross	QC Box: Clean Out Port
000-068-621	1	5/16" Hi-PSI x 35" Lg	Cross	Coolant Heat Exchanger
000-068-674	1	1/2" Clear x 16" Lg	Tank Select Valve	Primary Valve
000-068-674	2	1/2" Clear x 16" Lg	Primary Valve	Pump Filter
000-068-675	1	1/2" Clear x 32" Lg	35 Gallon Tank	Tank Select Valve
000-068-676	1	1/2" Clear x 36" Lg	15 Gallon Tank	Tank Select Valve
000-068-677	2	1/2" Clear x 54" Lg	Primary Valve	Drain
000-068-677	1	1/2" Clear x 54" Lg	50 Gallon Tank	Primary Valve
000-068-678	3	1/2" Clear x 78" Lg	Tank	Vent
000-068-679	1	1/4" Rubber x 110" Lg	Driver's Side Pump	Cross
000-068-680	1	1/4" Rubber x 173" Lg	Passenger's Side Pump	Cross
000-068-681	1	5/16" Hi-PSI x 82" Lg	Blower Heat Exchanger	QC Box: By-Pass Valve
000-068-682	1	1/2" Rubber x 60" Lg	QC Box: By-Pass Valve	Drain

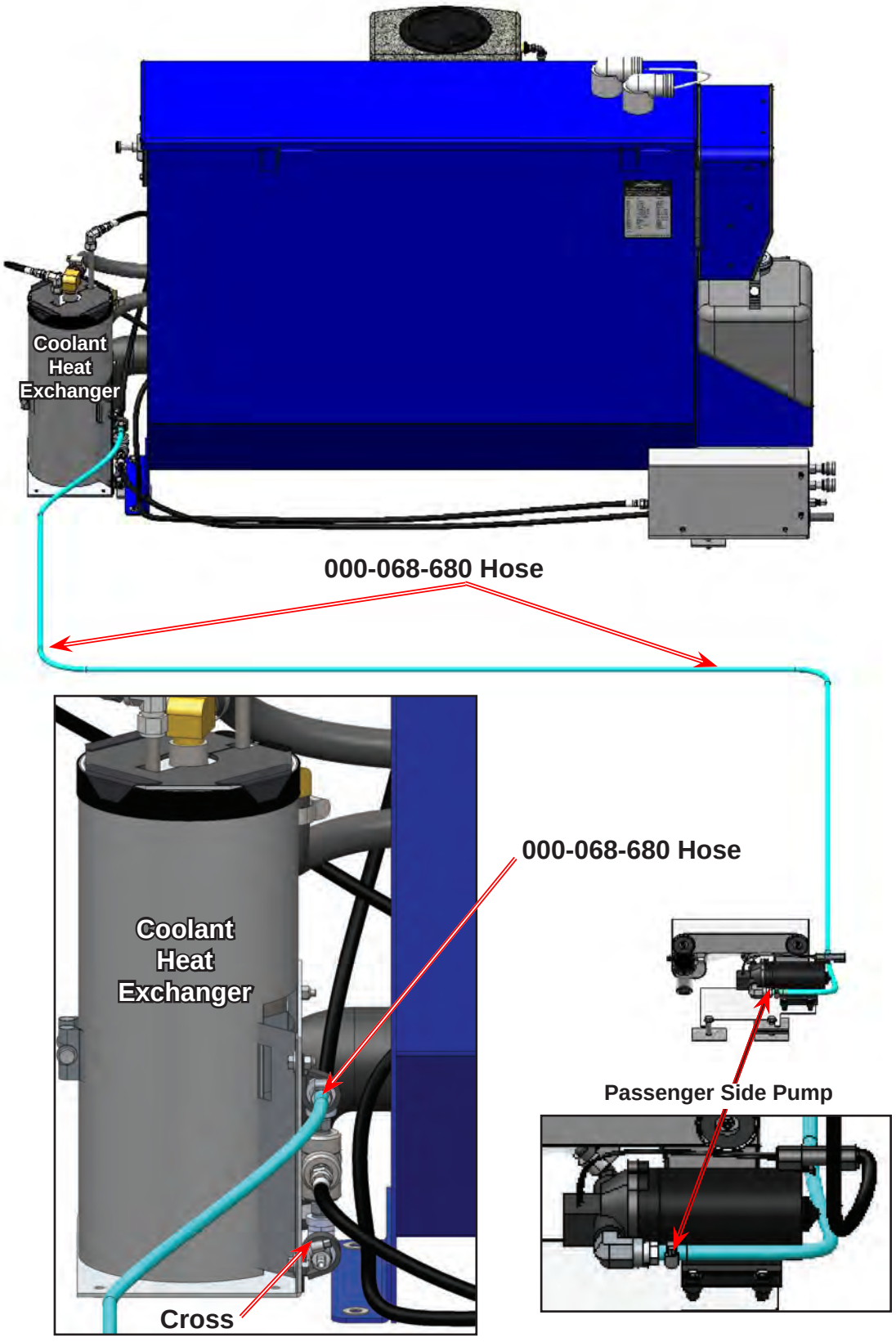


Figure 77. Route and Connect Hose from Passenger Side Pump to Top Fitting on Cross

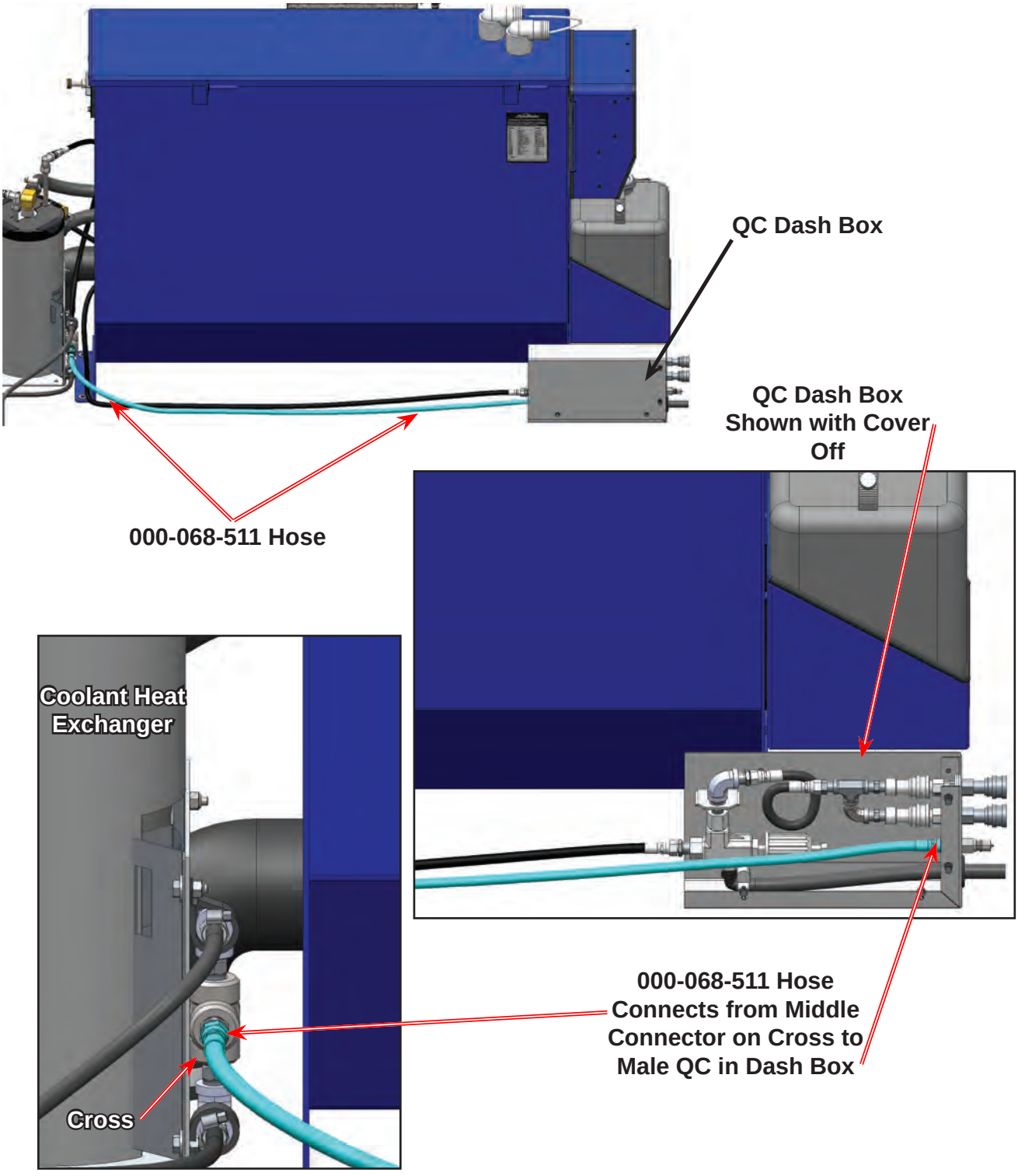


Figure 78. Route and Connect Hose from Cross to Male QC Inside Dash Box

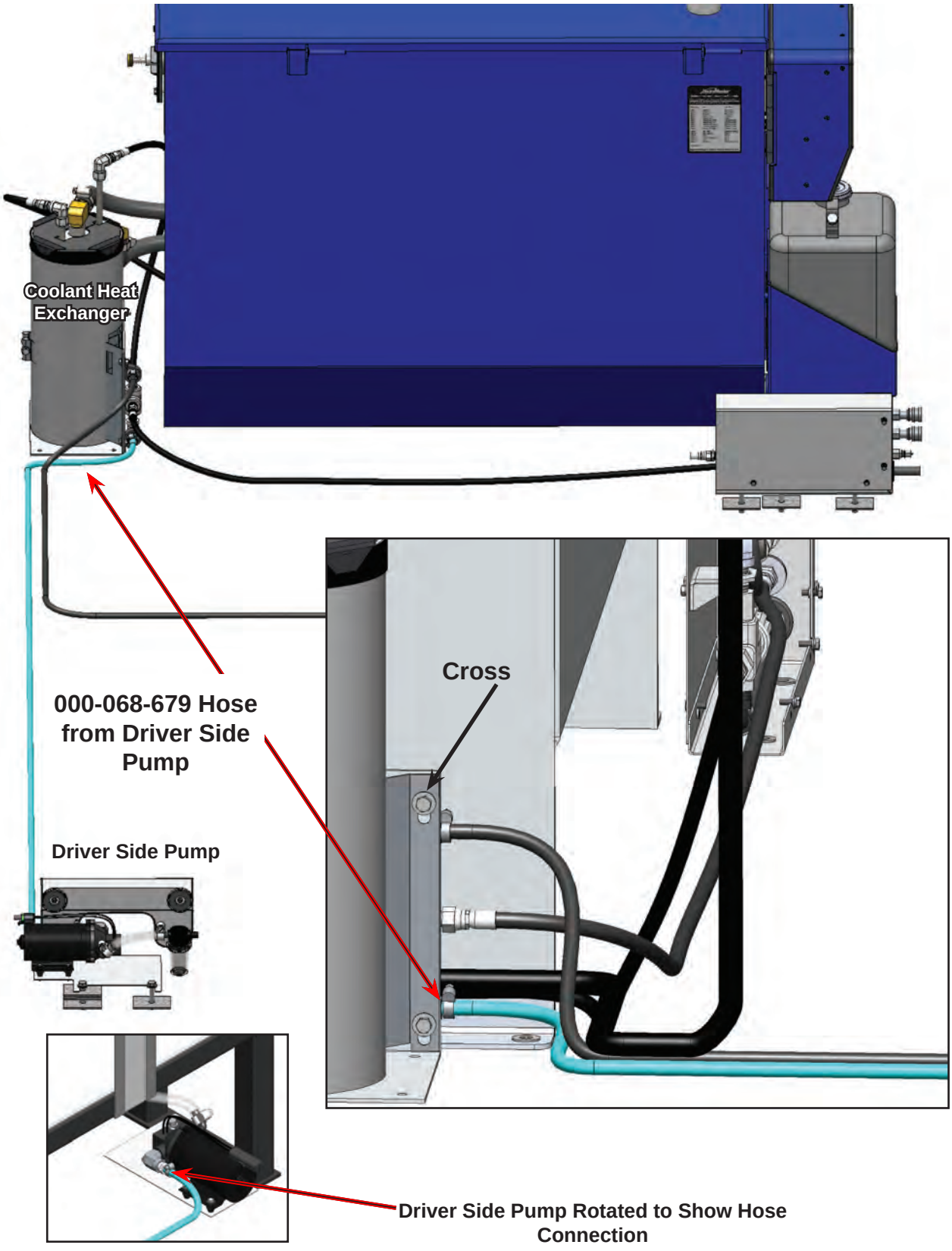


Figure 79. Route and Connect Hose from Driver Side Pump to Cross

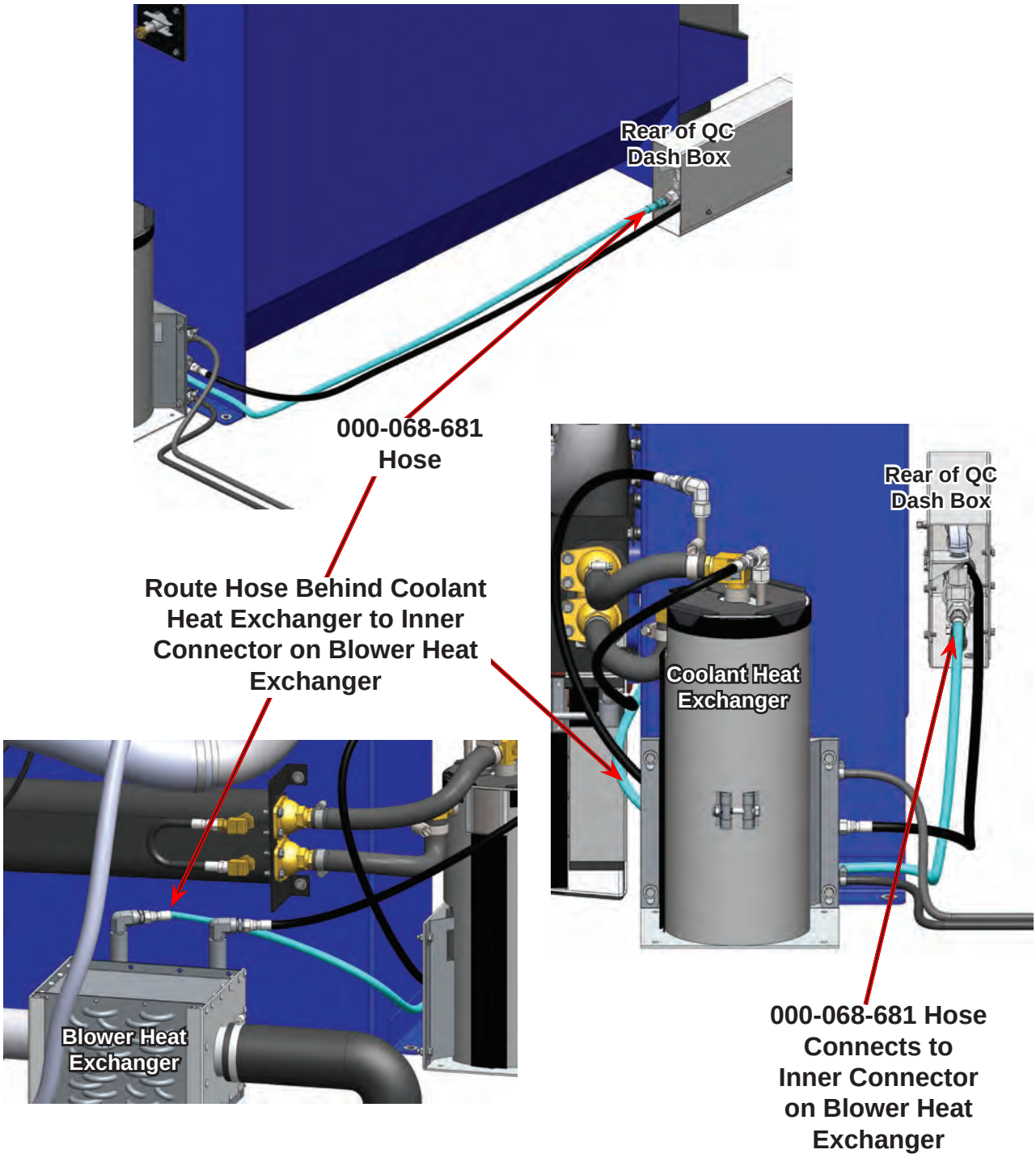


Figure 80. Route and Connect Hose from Male QC on Rear of QC Dash Box to Blower Heat Exchanger

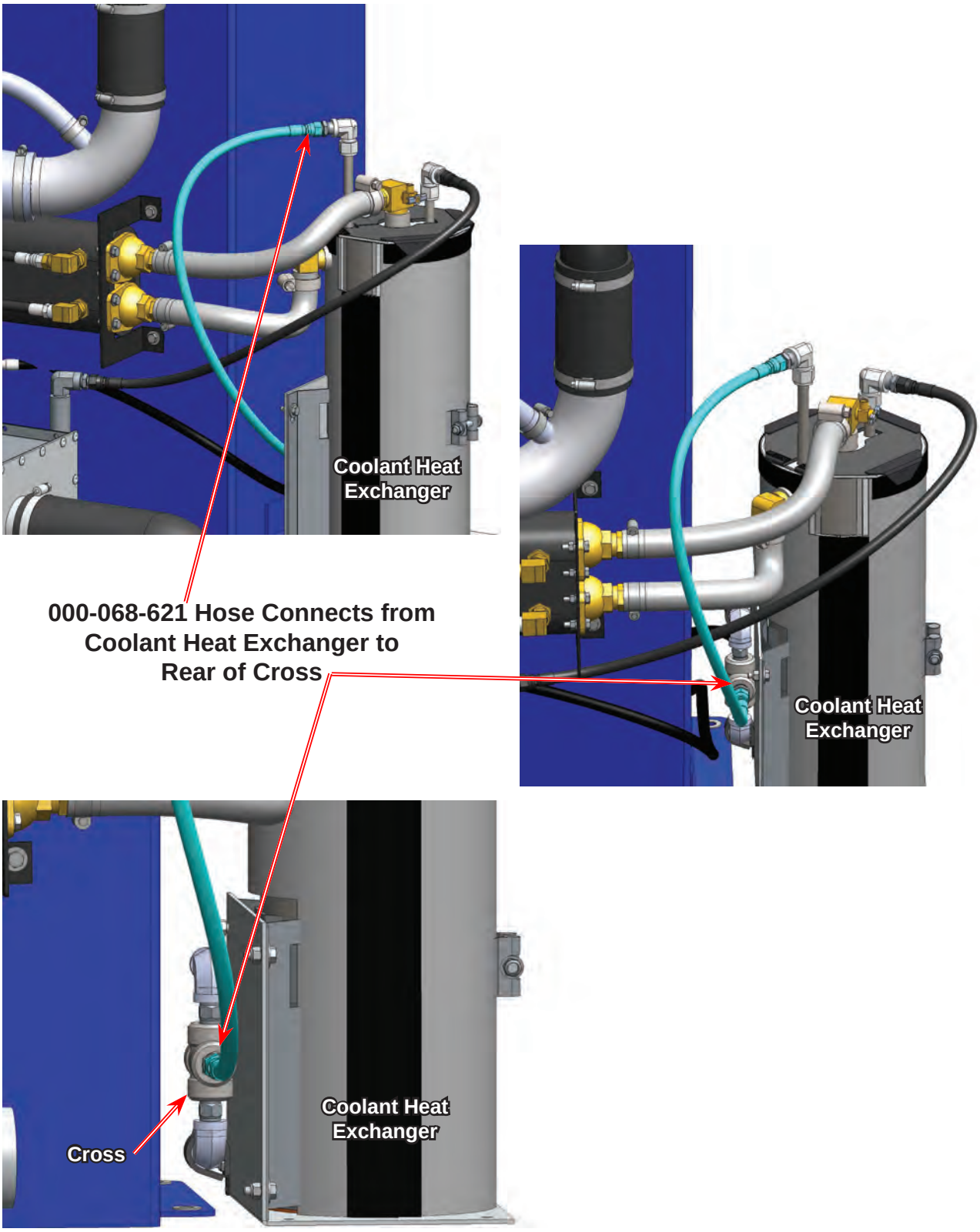


Figure 81. Route and Connect Hose from Rear of Cross to Coolant Heat Exchanger

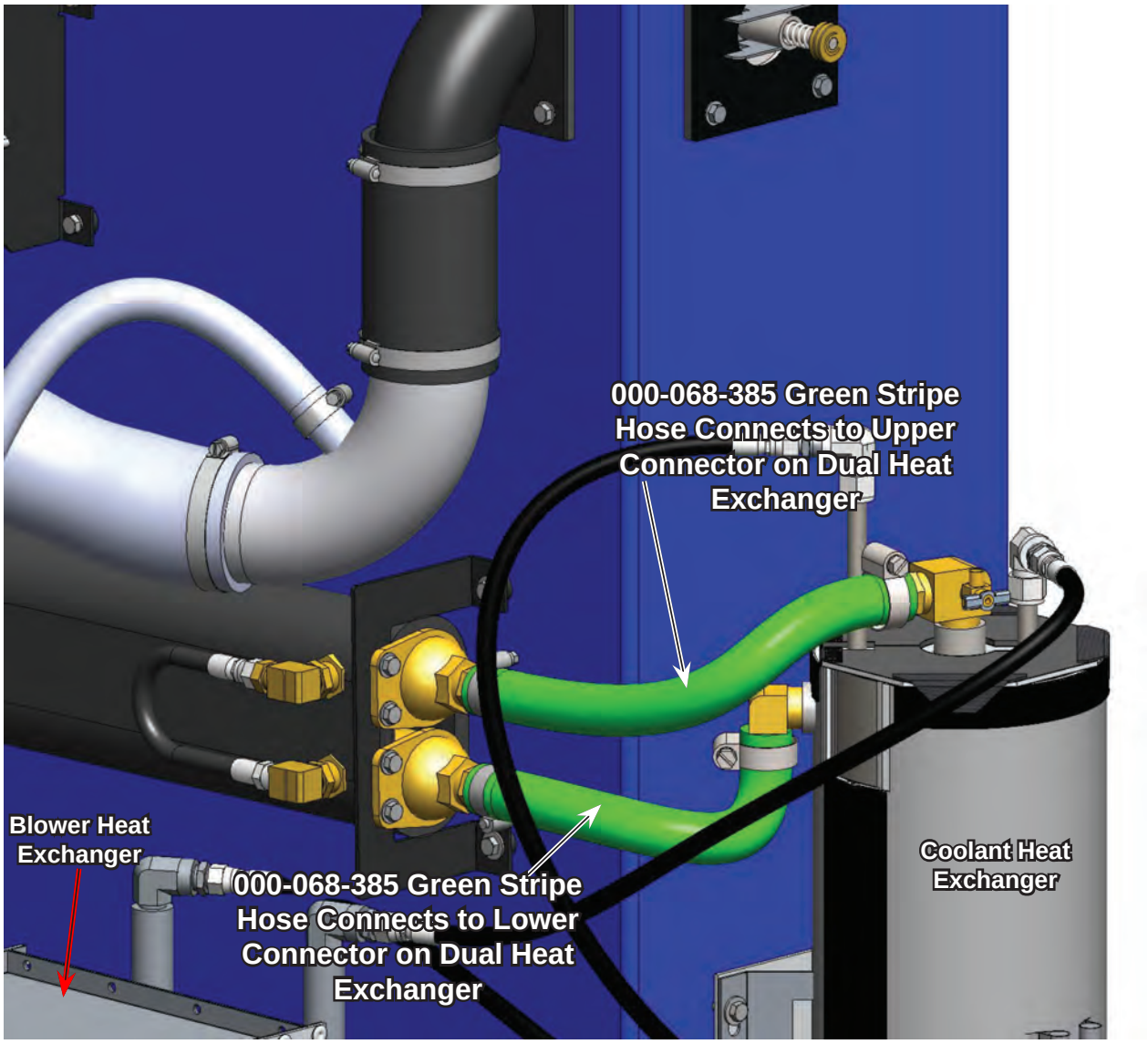


Figure 82. Connect Green Stripe Hoses from Coolant Heat Exchanger to Dual Heat Exchanger on Recovery Tank

NOTICE

Green stripe hoses and clamps, shown in Figure 82, are installed on the Coolant Heat Exchanger at the factory.

Figure 83. Route and Connect Hose from Coolant Heat Exchanger to Outer Connector on Blower Heat Exchanger

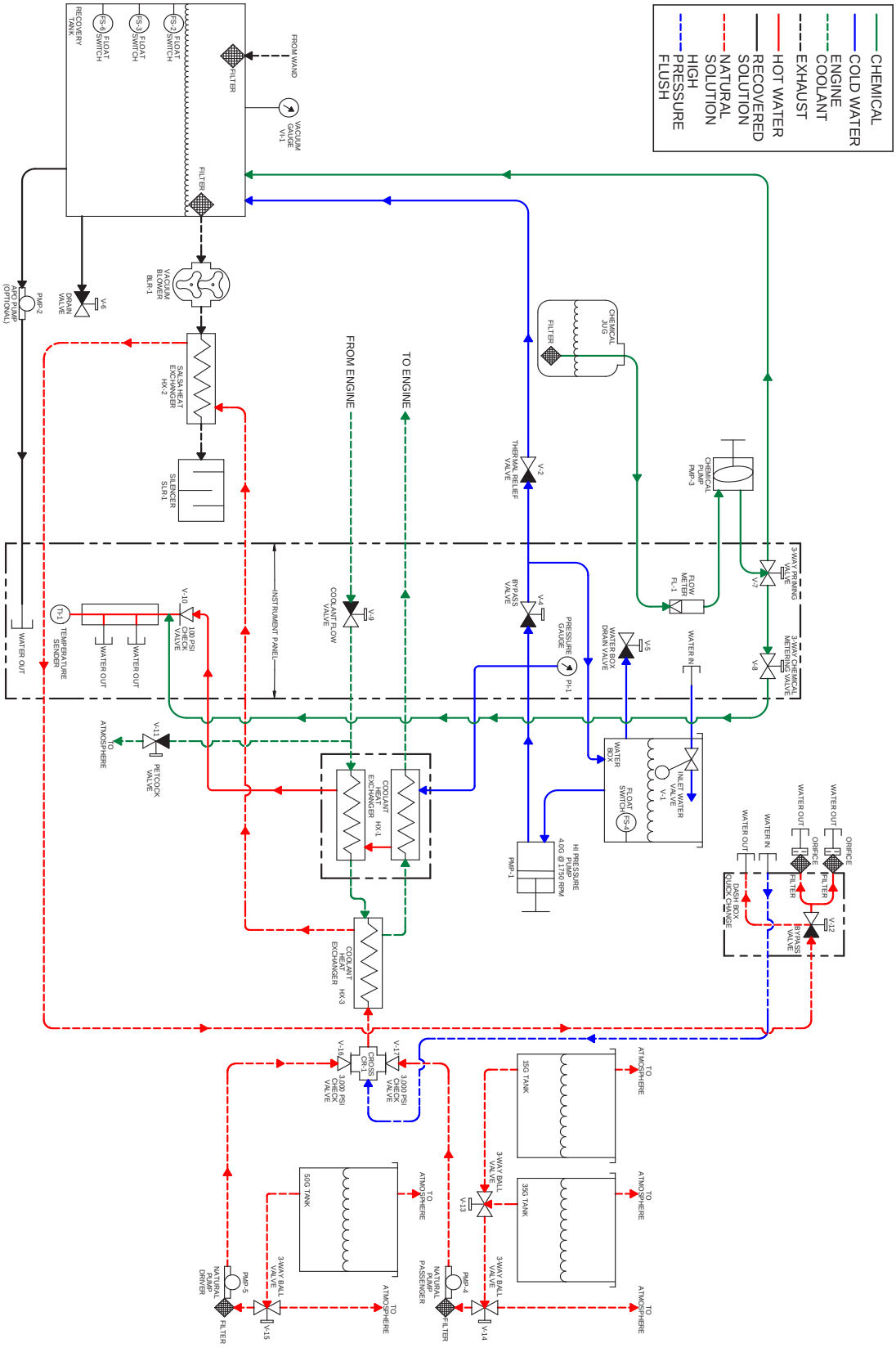


Figure 84. Solution Flow Diagram

ROUTING FLEX WIRING HARNESS

Route and connect the Flex wiring harness as shown in Figure 85 - Figure 91 . See Figure 92 and Figure 93 for Flex wiring diagrams for reference.

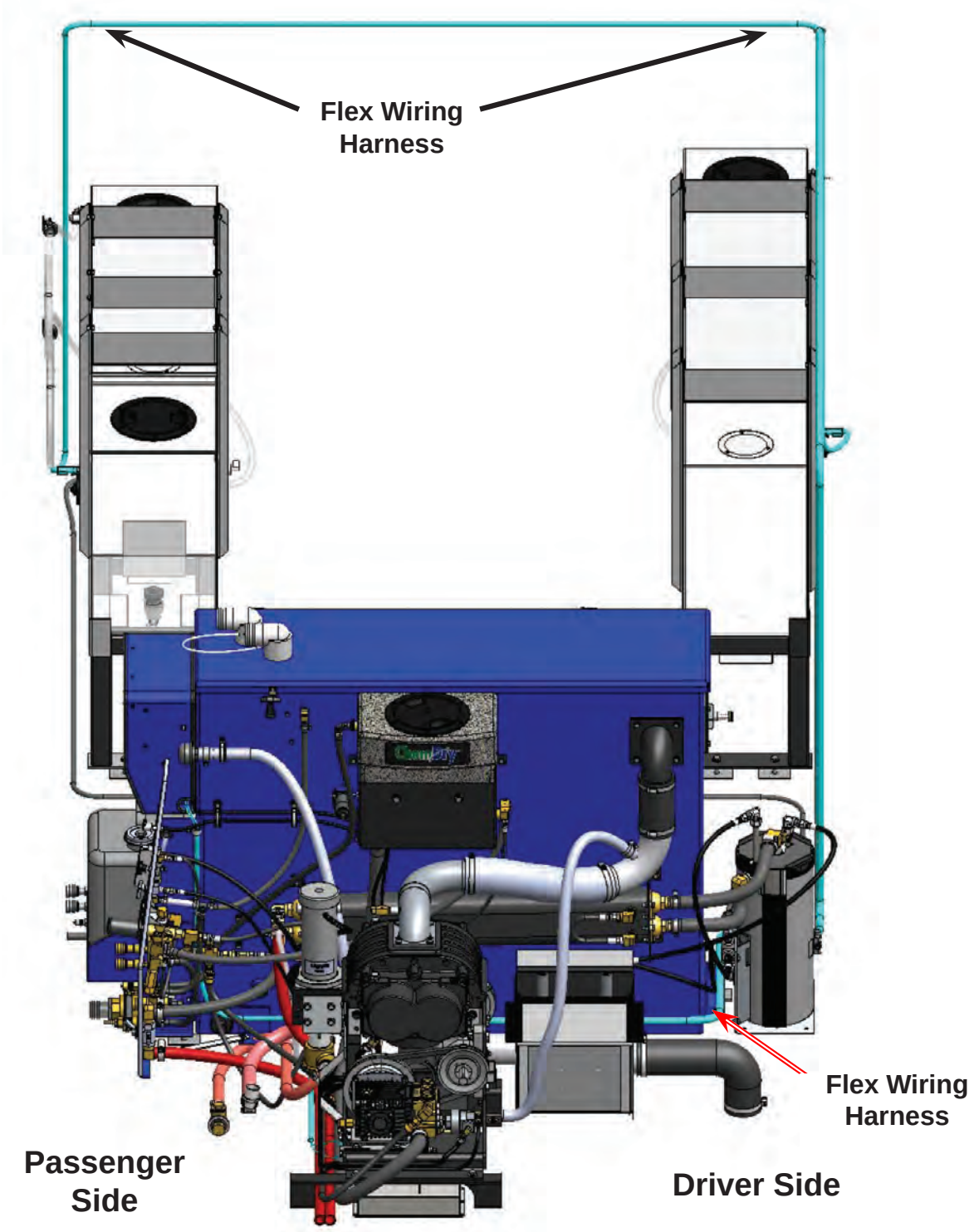


Figure 85. Flex Wiring Harness - Top Down View

1. Route the Flex wiring harness around the van's ceiling, following the van's existing wiring harness and loop the Flex Harness through the existing cushion clamps.
2. Route the Flex wiring harness on the van's floor as shown in Figure 86 so that the 4 connecting points on the Flex Harness will easily reach the passenger side pump, the driver side pump, the CDS dash box near the instrument panel and the Power Pack frame.

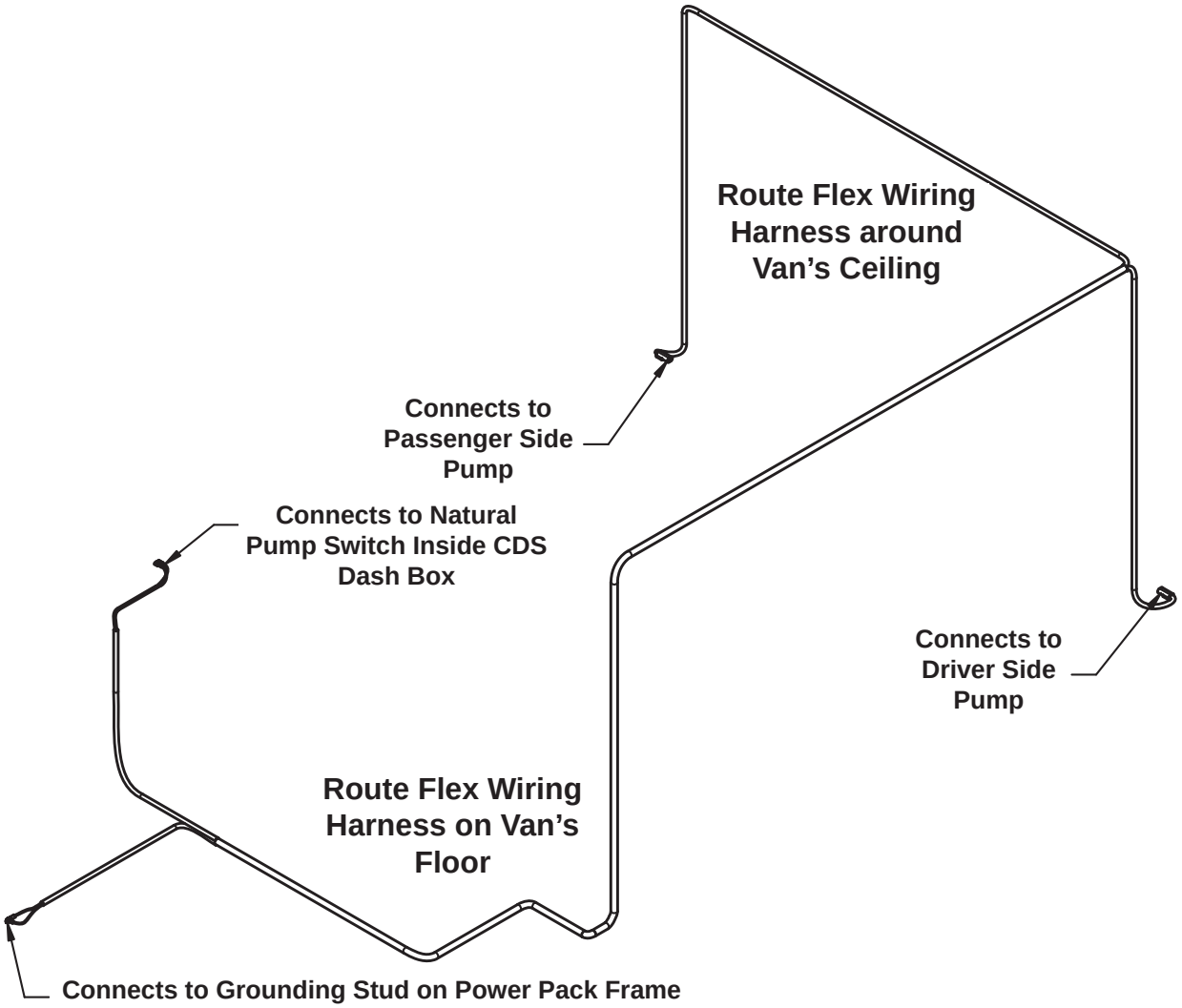


Figure 86. Route Flex Wiring Harness along Van's Ceiling and Floor

Refer to Figure 85 - Figure 91 and follow these steps to:

1. Route and connect the Flex Harness to the Power Pack grounding stud.
2. Route the Flex Harness from the Flex pumps to the pump switch.
3. Open the CDS dash box located near the instrument panel to connect the Flex Harness from the Flex pumps to the pump switch.
4. Route and connect the Flex Harness to the passenger side pump.
5. Route and connect the Flex Harness to the driver side pump.

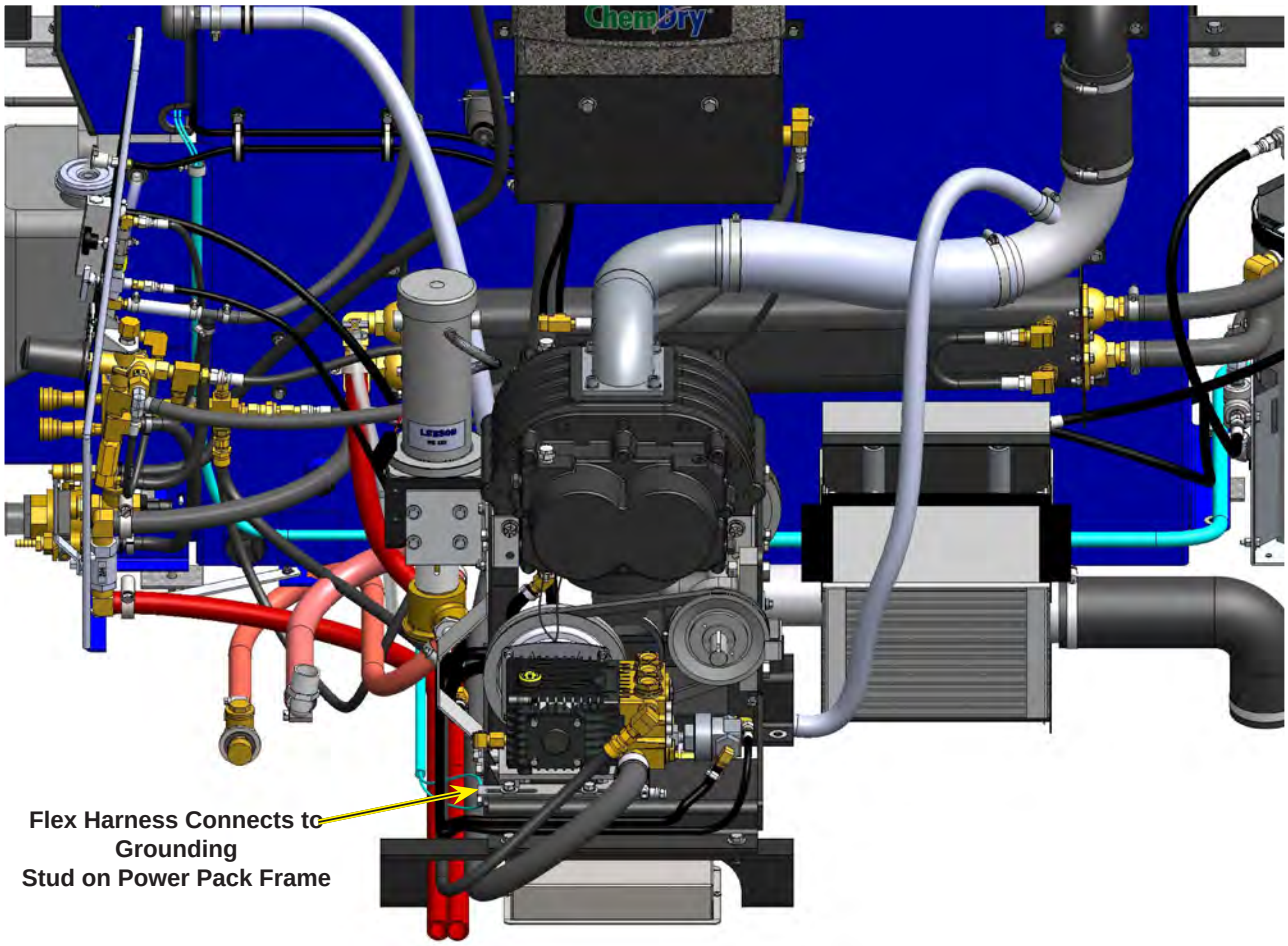


Figure 87. Route and Connect Flex Harness to Grounding Stud

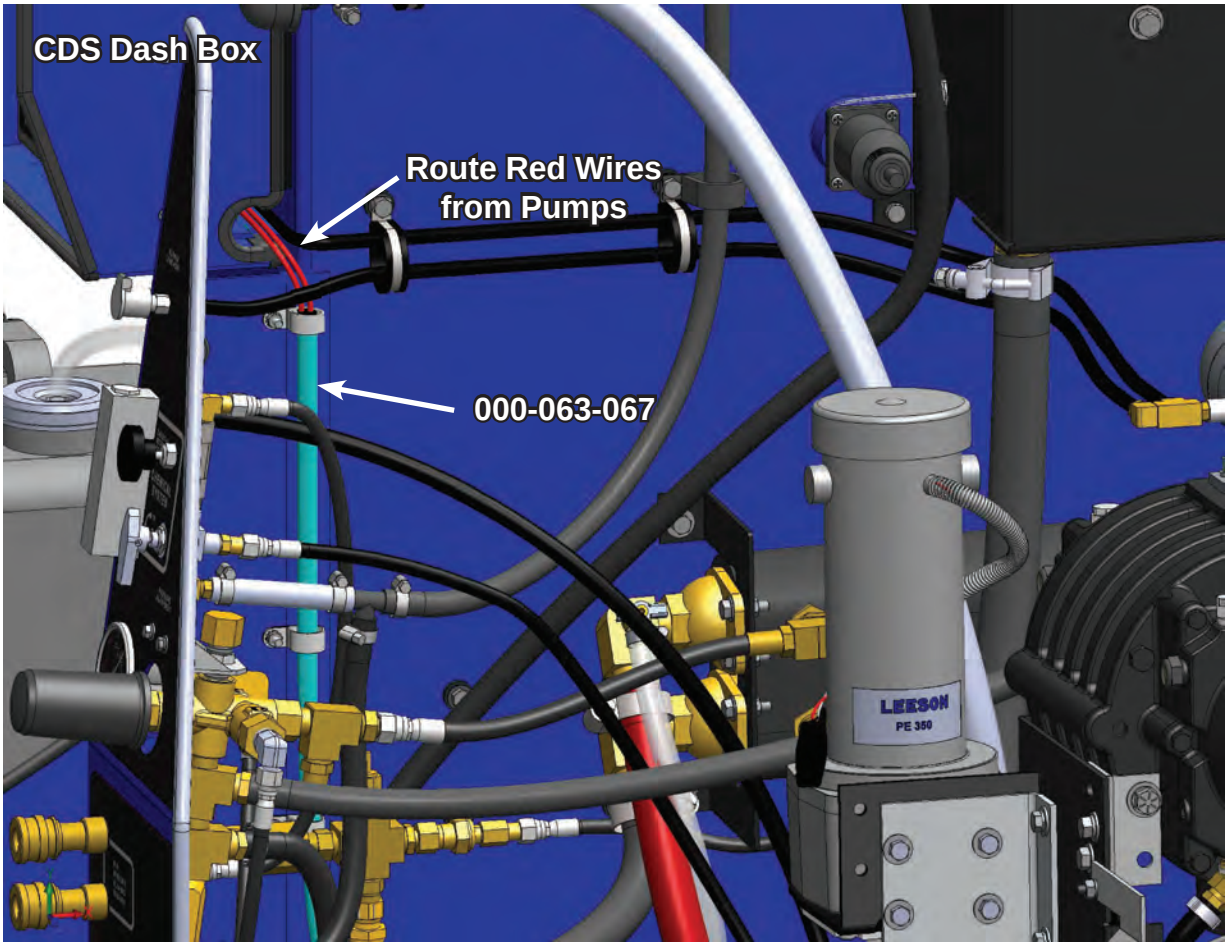


Figure 88. Route Wire Harness from Flex Pumps to Pump Switch

After you open the CDS dash box, locate the Natural Pump Switch, shown in Figure 89. Note that 2 red wires have been factory-installed on the #2 and #5 plugs on the switch.

1. Connect the Flex Harness red wire showing 1 black strip to plug #1 on the pump switch.
2. Connect the Flex Harness plug's red wire showing 2 black strips to plug #6 on the pump switch.

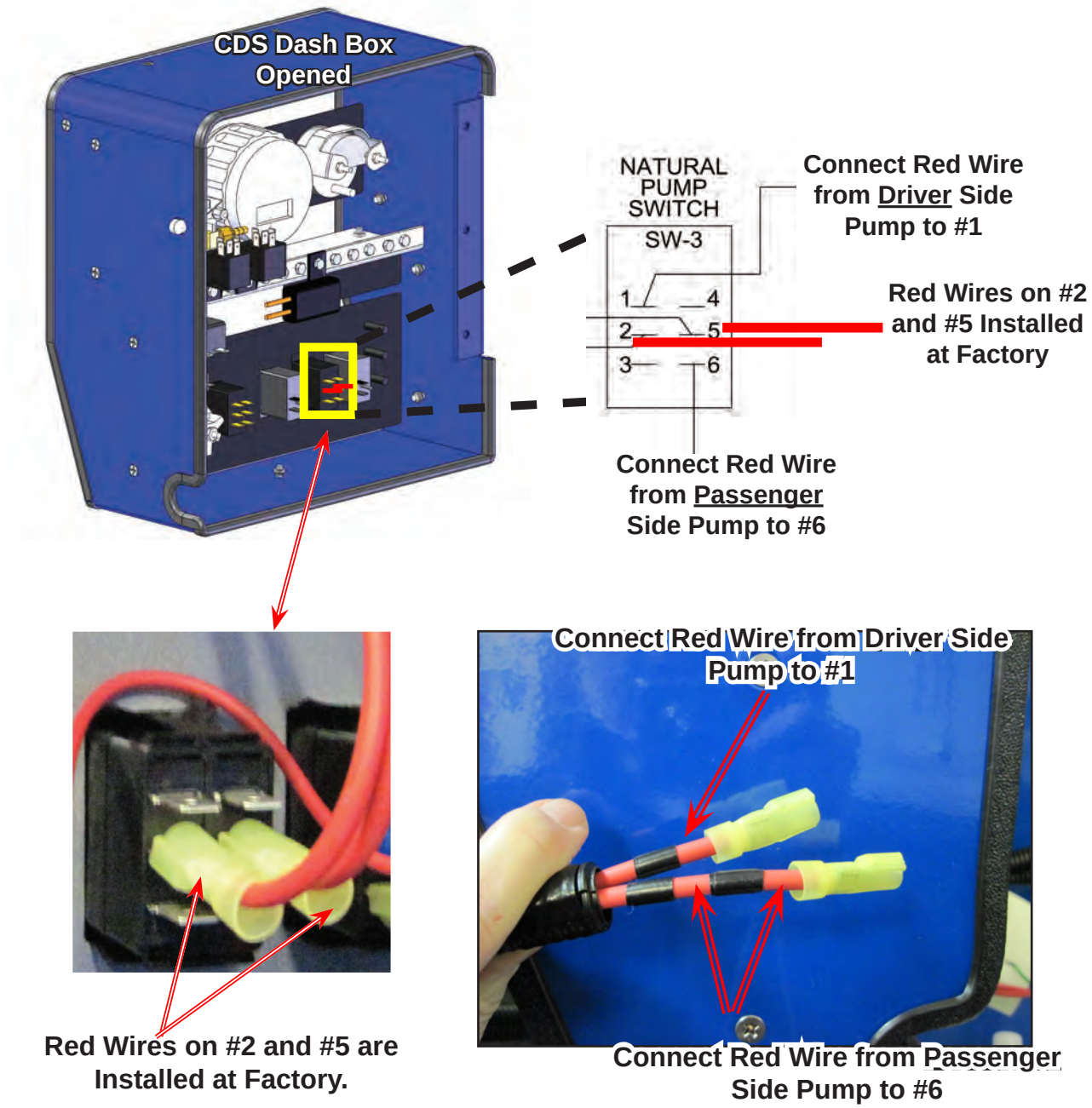


Figure 89. Open CDS Dash Box to Connect Wire Harness from Flex Pumps to Pump Switch

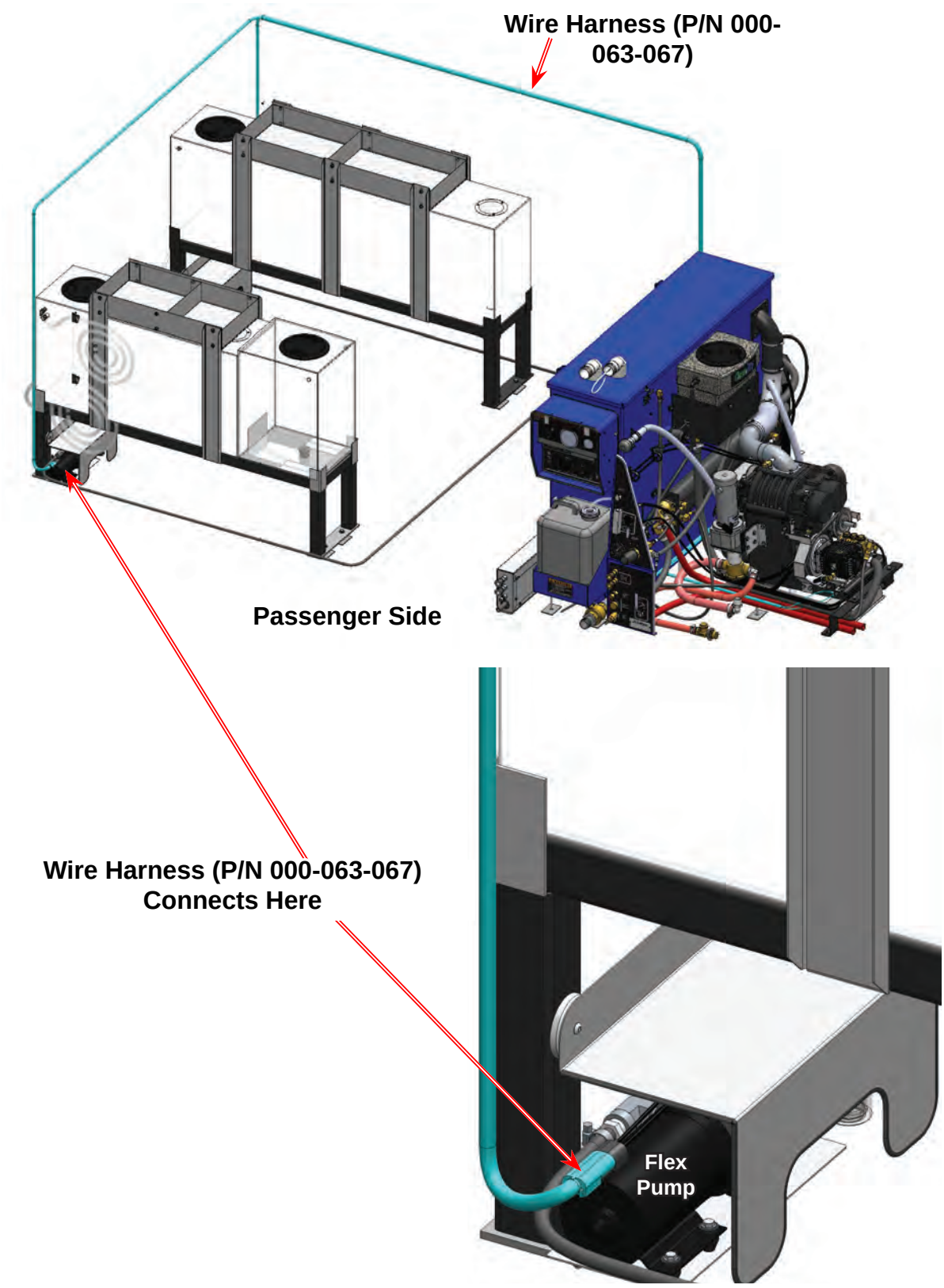


Figure 90. Route and Connect Flex Wire Harness to Passenger Side Pump

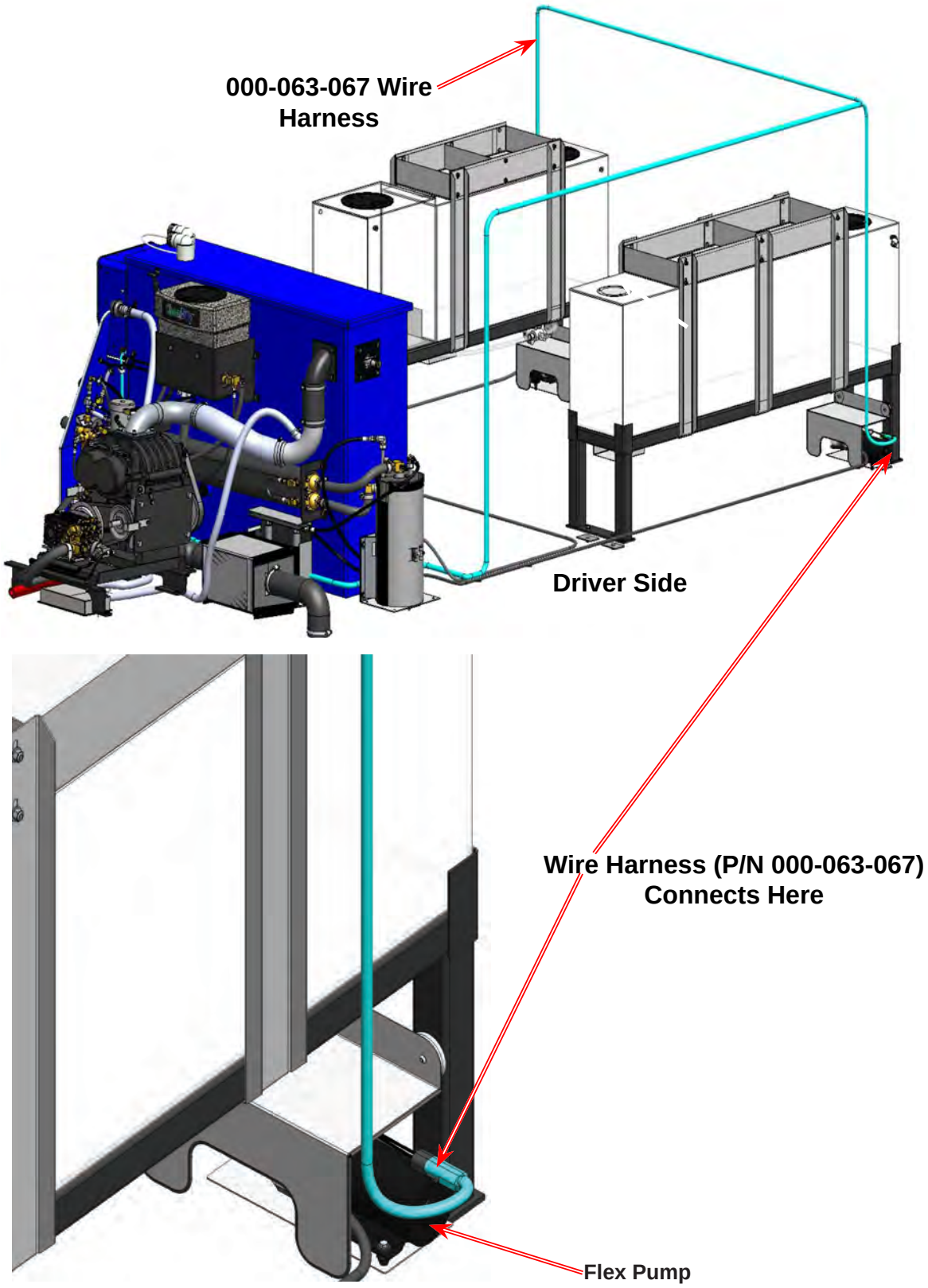


Figure 91. Connecting Wire Harness to Driver Side Pump

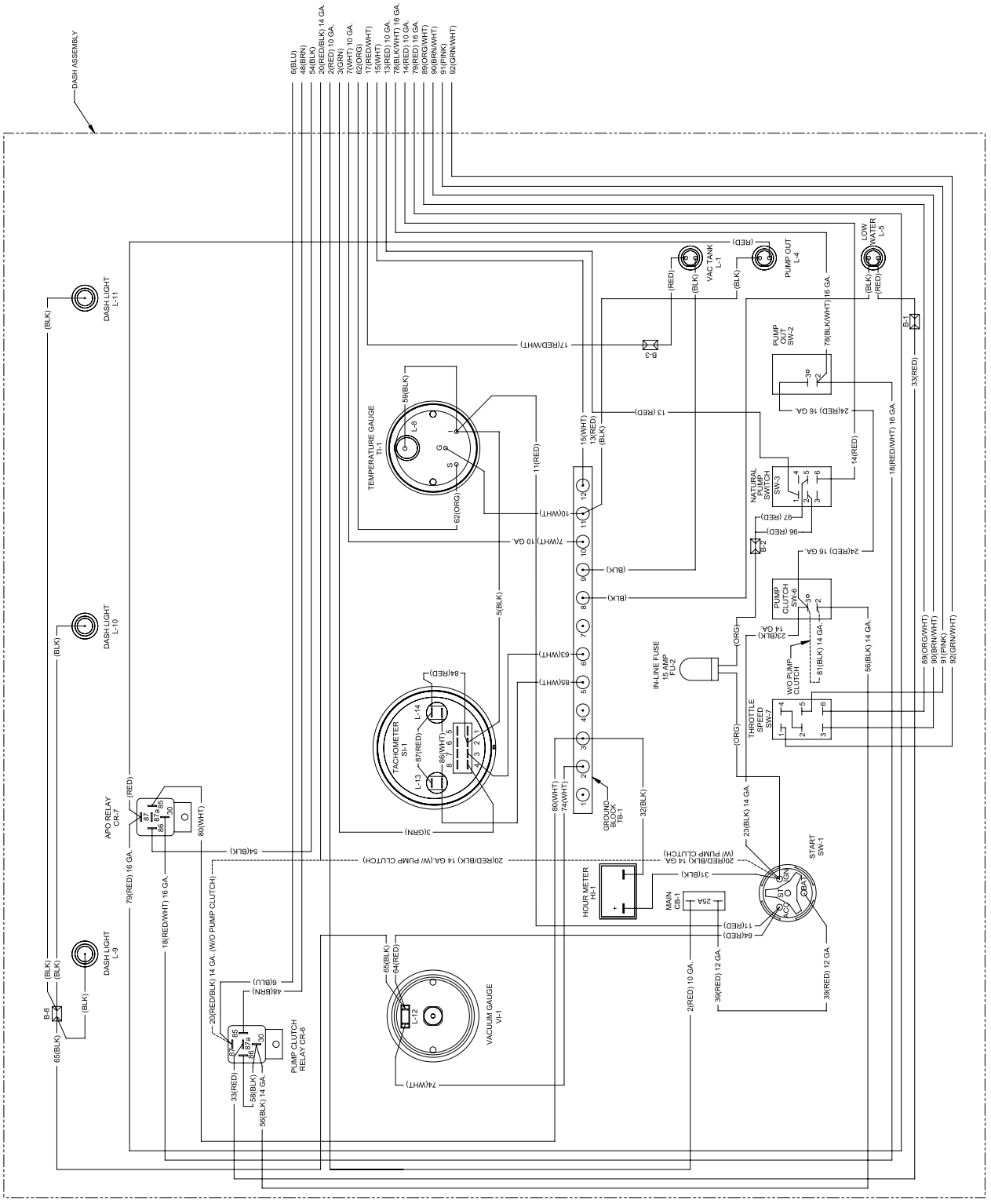


Figure 92. Flex Wiring Diagram - View 1 of 2

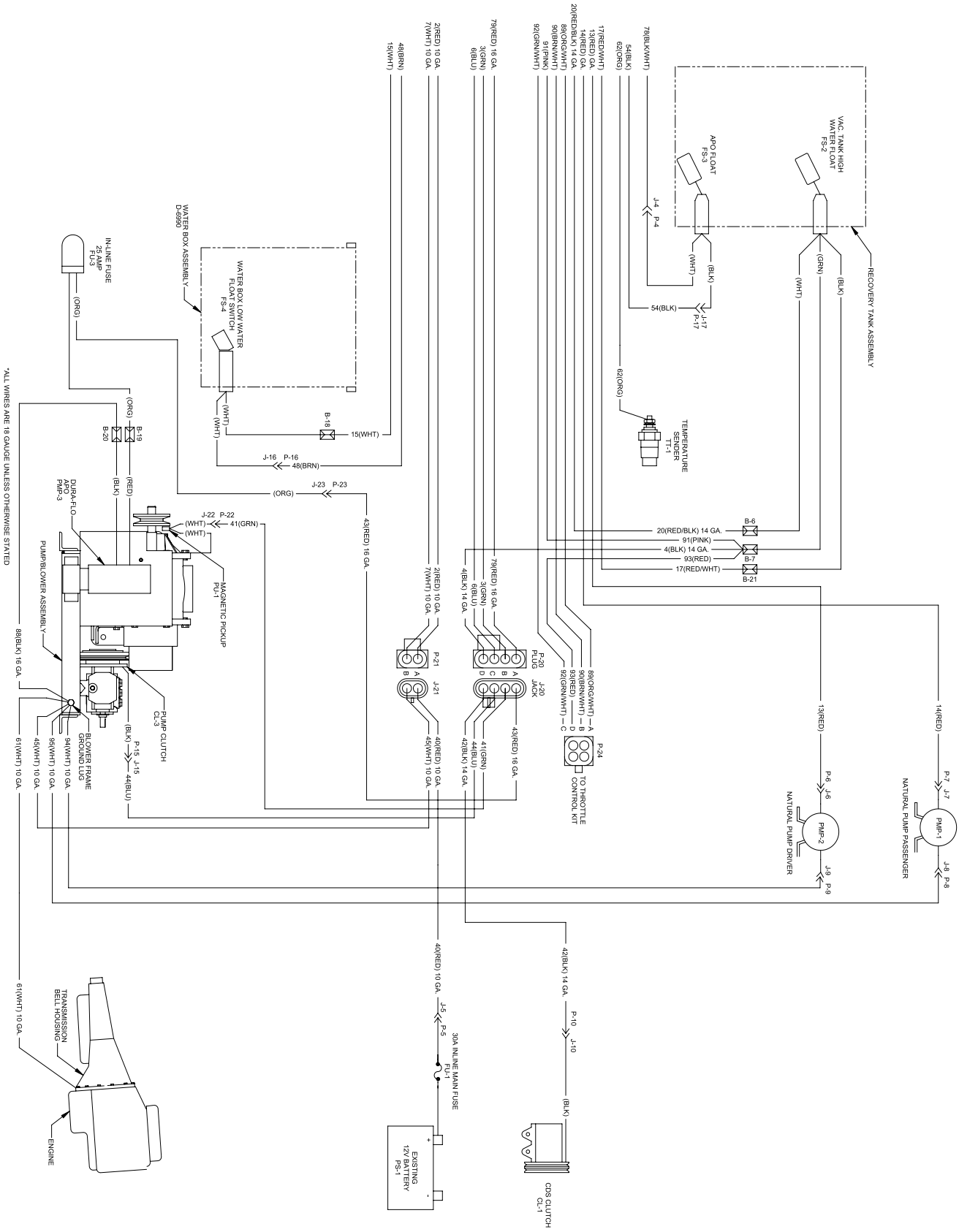


Figure 93. Flex Wiring Diagram - View 2 of 2

FINISHING CTS 4.8 FLEX INSTALLATION

After the CDS 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.
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 van's AC/heater switch is in the OFF position.

NOTICE

Use Dex-cool Red GM antifreeze or equivalent.

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

NOTICE

The motor will heat up rapidly.

CAUTION

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

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

NOTICE

Step 5 could take up to 2-3 hours to complete.

6. Close petcock and recheck that the engine is still operating at normal temperatures.
7. 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.

8. Start the van and check for antifreeze leaks at the installed tees and heat exchangers.
9. CDS clutch burnishing: Engage and disengage the clutch several times to ensure it is functioning properly. If full torque will be required immediately, the clutch should be properly burnished.
10. Energize the clutch three times a minute with no load for 50 cycles.
11. Install the warning label on the driver's side sun visor as shown in Figure 94.

Figure 94. Location of Warning Label on Sun Visor

PUMP TUNING INSTRUCTIONS

Pump tuning for the CTS 4.8 Flex allows the pump pressure switch to turn off when there is no flow out of the tool. This reduces the pump operating temperatures and increases the pump durability.

NOTICE

Pump tuning should be performed every 60 days.

The pump pressure setting adjustment is performed by turning the hex screw, which is close to the center of the pump head, with a hex L-key, provided in the Flex Installation Kit - (see Figure 95).

- Clockwise increases the pressure
- Counterclockwise decreases the pressure.

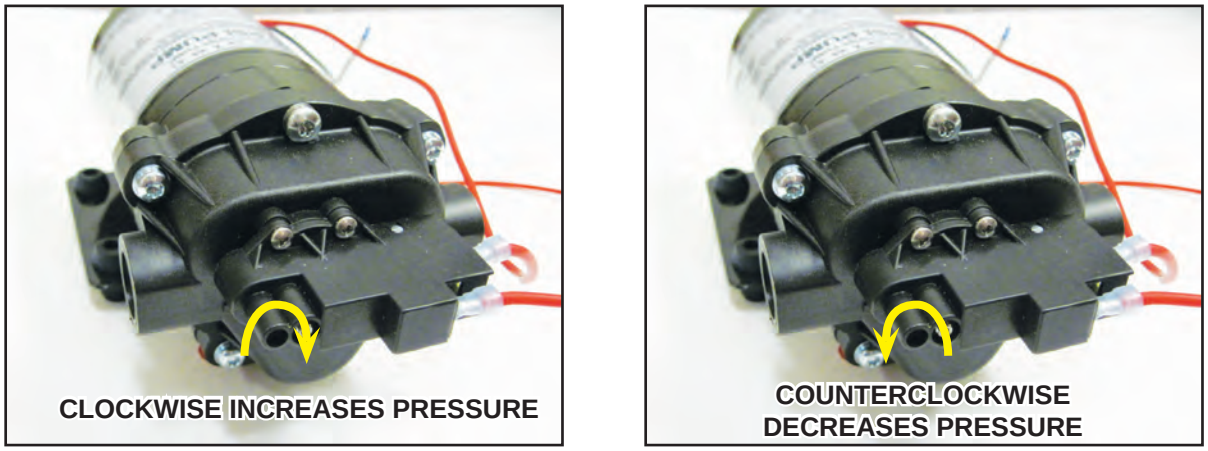


Figure 95. Location of Pump's Hex Screw

Tools required include:

- 1/16" Hex L-Key (one is provided with each pump for your convenience in Installation Kit, P/N 000-078-934).
- Solution hose
- Cleaning tool (upholstery tool/ wand/ rotary cleaning tool) to allow solution to flow out
- Container to collect solution flowing out of the tool.

Start up Pump Tuning Procedure

1. Connect the tool's solution hose to one of the 2 quick disconnects (the stainless steel low pressure solution ports) on the QC Dash Box (see Figure 96).

Figure 96. Connect Solution Hose to QC Dash Box

2. Turn the CDS key to the "ON" position but do not start the CDS unit (see Figure 97).

NOTICE

You do not need to start the CDS unit since vacuum is not needed for this procedure.

3. Turn on the driver's side pump (Pump 1) until all air is bled from the system (see Figure 97).

Figure 97. CDS Flex Dash Panel, Showing Pump Switch Position for Pump #1

4. With the pump still on, disconnect the solution hose from the Flex unit (see Figure 98).

The pump should run for about 3 to 5 seconds and then switch off.

5. Leave the hose disconnected.

Continue on to the Adjustment procedure (page 79).

Figure 98. Disconnect Solution Hose

NOTICE

After the Adjustment procedure has been performed for the driver's side pump (#1 - see page 79), repeat the entire procedure for the passenger side pump (#2 - see Figure 99), starting with step 1 on page 77.

Then, perform the Adjustment procedure for the passenger side pump.

Figure 99. CDS Flex Dash Panel, Showing Pump Switch Position for Pump #2

Adjustment

1. If the pump continues to run for longer than 3 to 5 seconds, turn the screw counterclockwise until the pump switches off (see Figure 100).
2. If the pump switches off as soon as the hose is disconnected (less than 3 to 5 seconds), turn the pump screw clockwise one complete turn.
3. With the pump still on, reconnect the solution hose onto the Flex unit (see Figure 96).

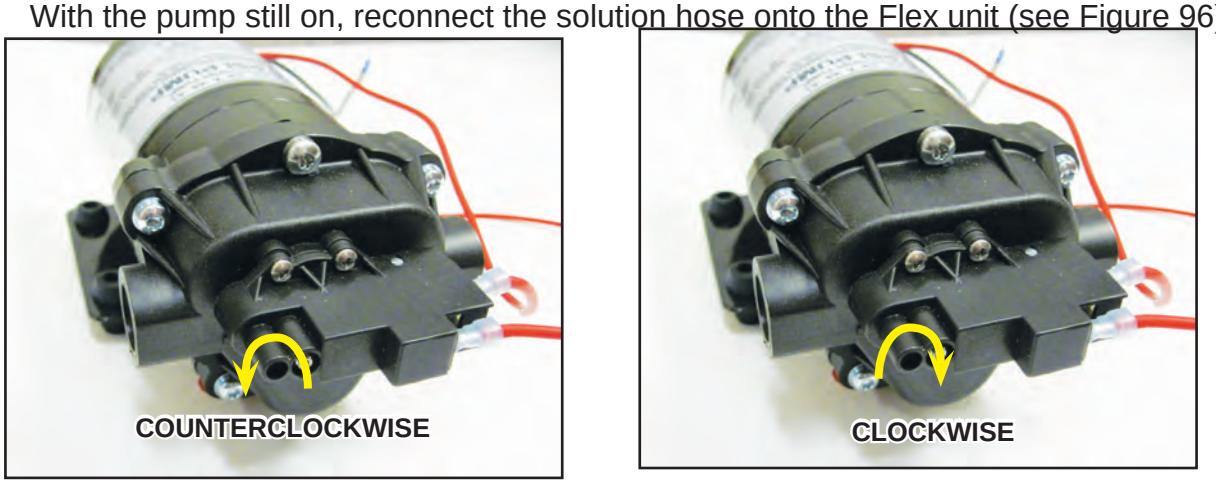


Figure 100. Insert Hex L-Key and Turn It Counterclockwise/Clockwise

The pump should switch on.

4. Repeat steps 1 through 3 on this page until the pump switches off within 3 to 5 seconds after the hose is disconnected.
5. Repeat the entire procedure for the passenger side pump, starting with step 1 on page 77.

INSTALLING REAR DOOR KITS (OPTIONAL)

NOTICE

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

Furniture Pad/Snap Block Kit (P/N 000-163-015)
Back Door Shelf Kit (P/N 000-163-050)
Panel Set (P/N 000-100-021)

Table 5. Parts in P/N 000-163-015 Furniture Pad/Snap Block Set Kit

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

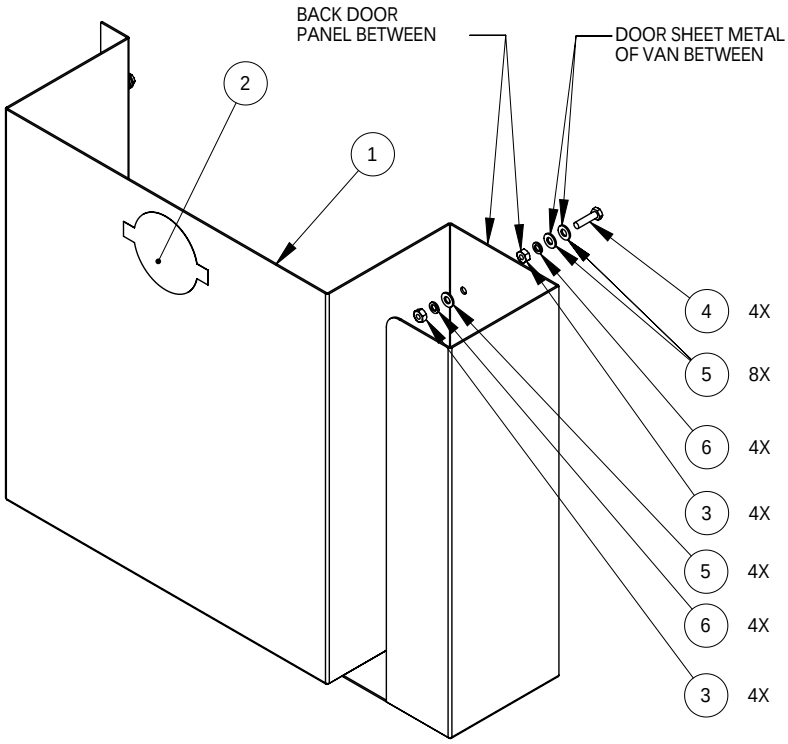


Table 6. Parts in P/N 000-163-050 Back Door Shelf Kit

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

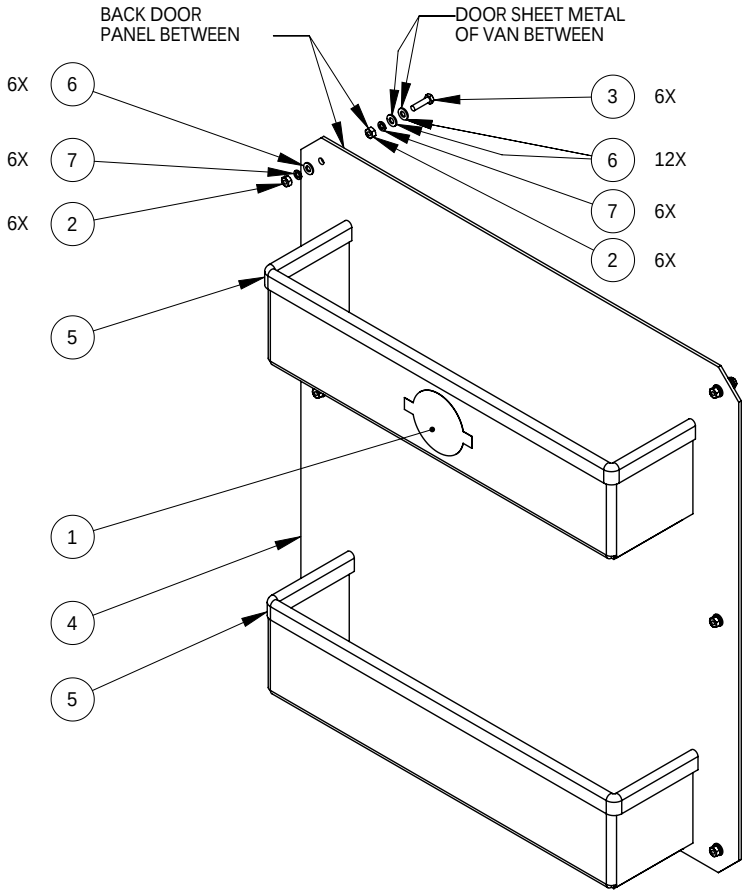
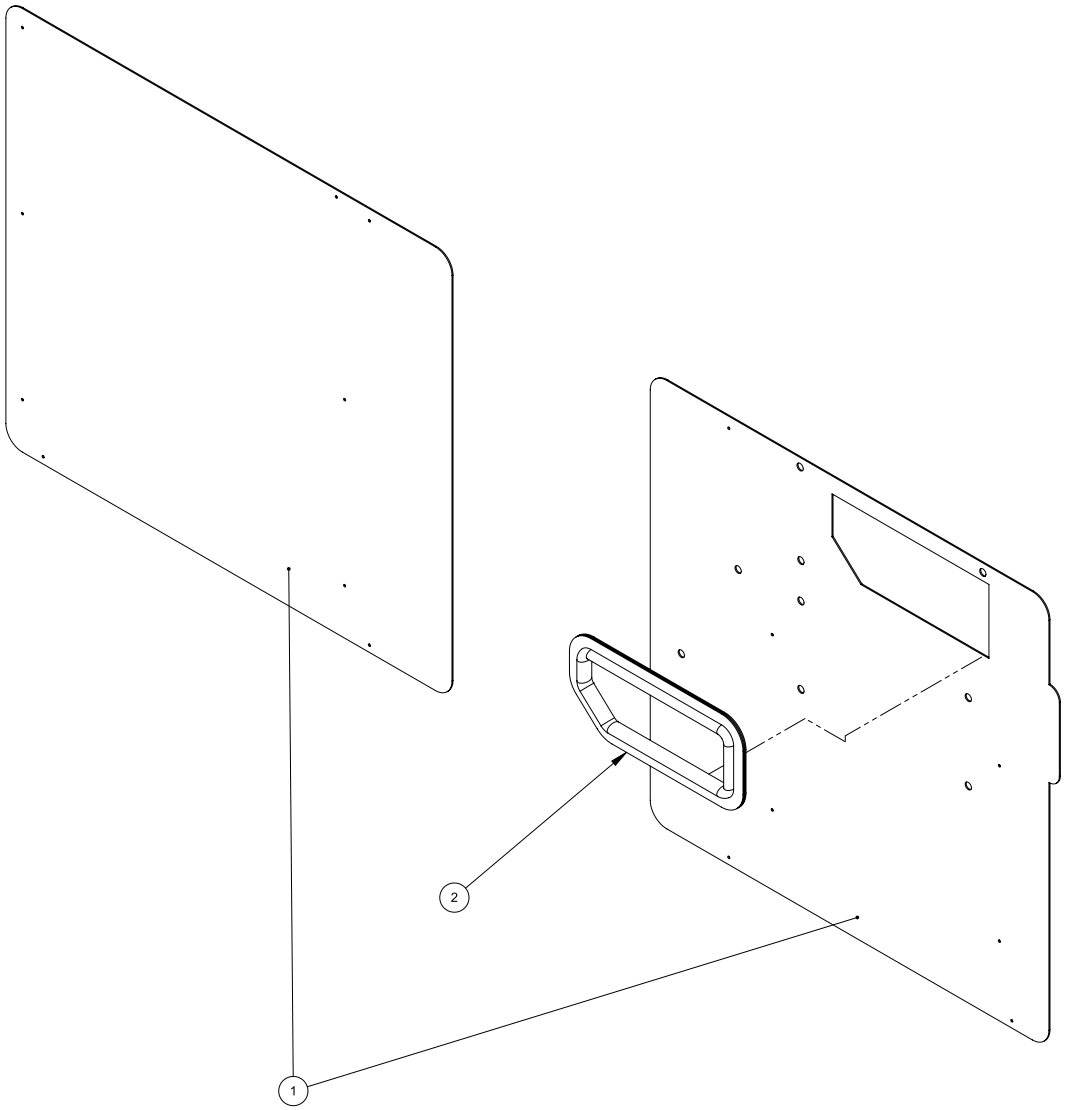


Table 7. Parts in P/N 000-100-021 Panel Set Kit

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



1. Dry fit the Panels, Back Door Shelf and the Furniture Pad/Snap Block onto the van's back doors, and mark where the holes should be drilled (see Figure 101).
2. Using the drill with the 13/64" bit, carefully drill holes into the sheet metal and through the two Panels, if necessary.

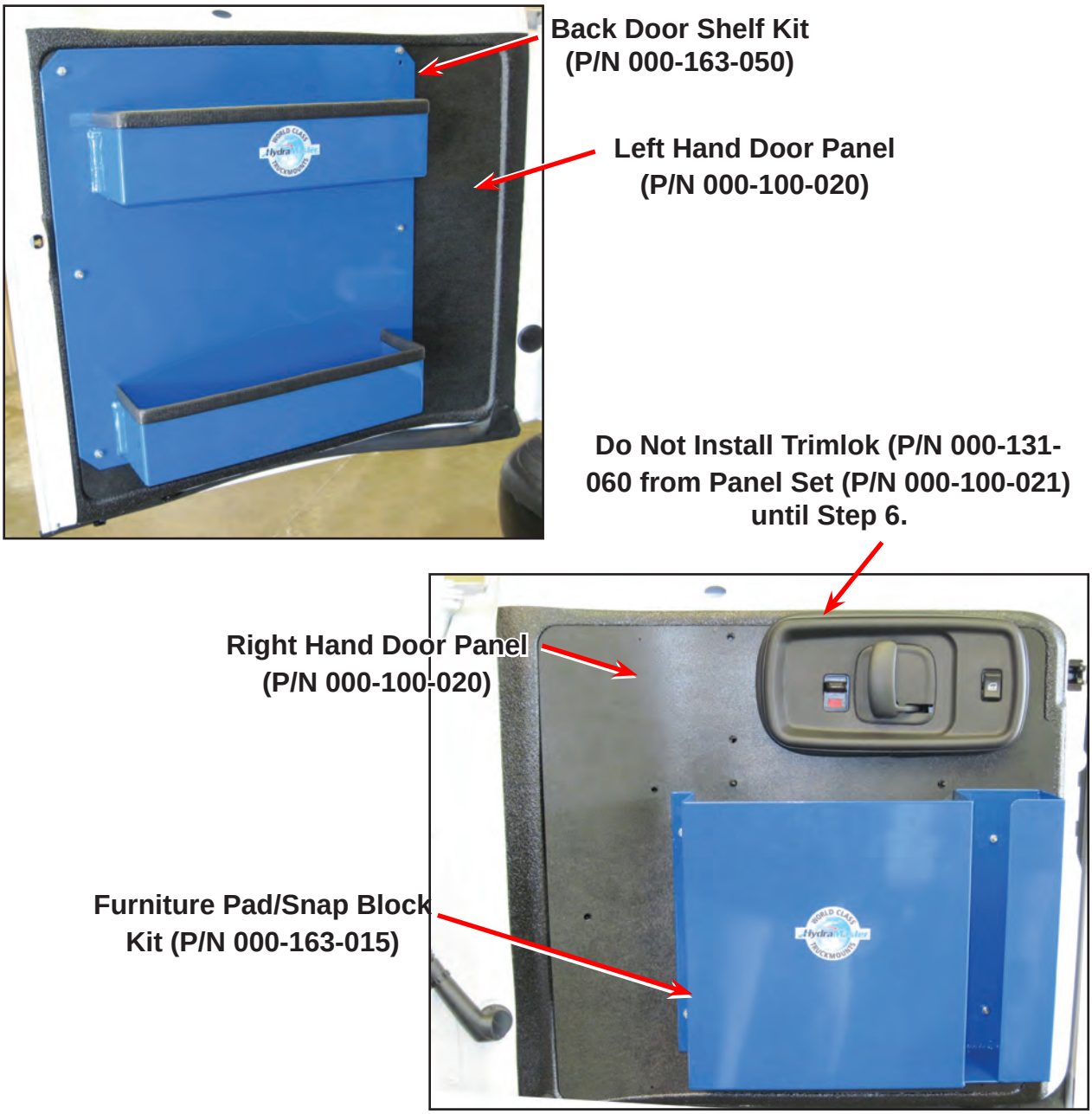


Figure 101. Location of Shelf and Furniture Pad/Snap Block on Back Doors

3. Position the two Panels (P/N 000-100-020) onto the rear doors. Do not install the Trimlok (P/N 000-131-060) on the right hand door until parts from the other two kits have been installed.
4. Install the Left Hand Door Panel and the Back Door Shelf Kit (P/N 000-163-050) onto the left hand door, using the fastening hardware included in the kit (see Figure 102).

NOTICE

Mount the fastening hardware onto the 10-24 X 3/4" screw in the order shown in Figure 102 and install as shown in Figure 101.

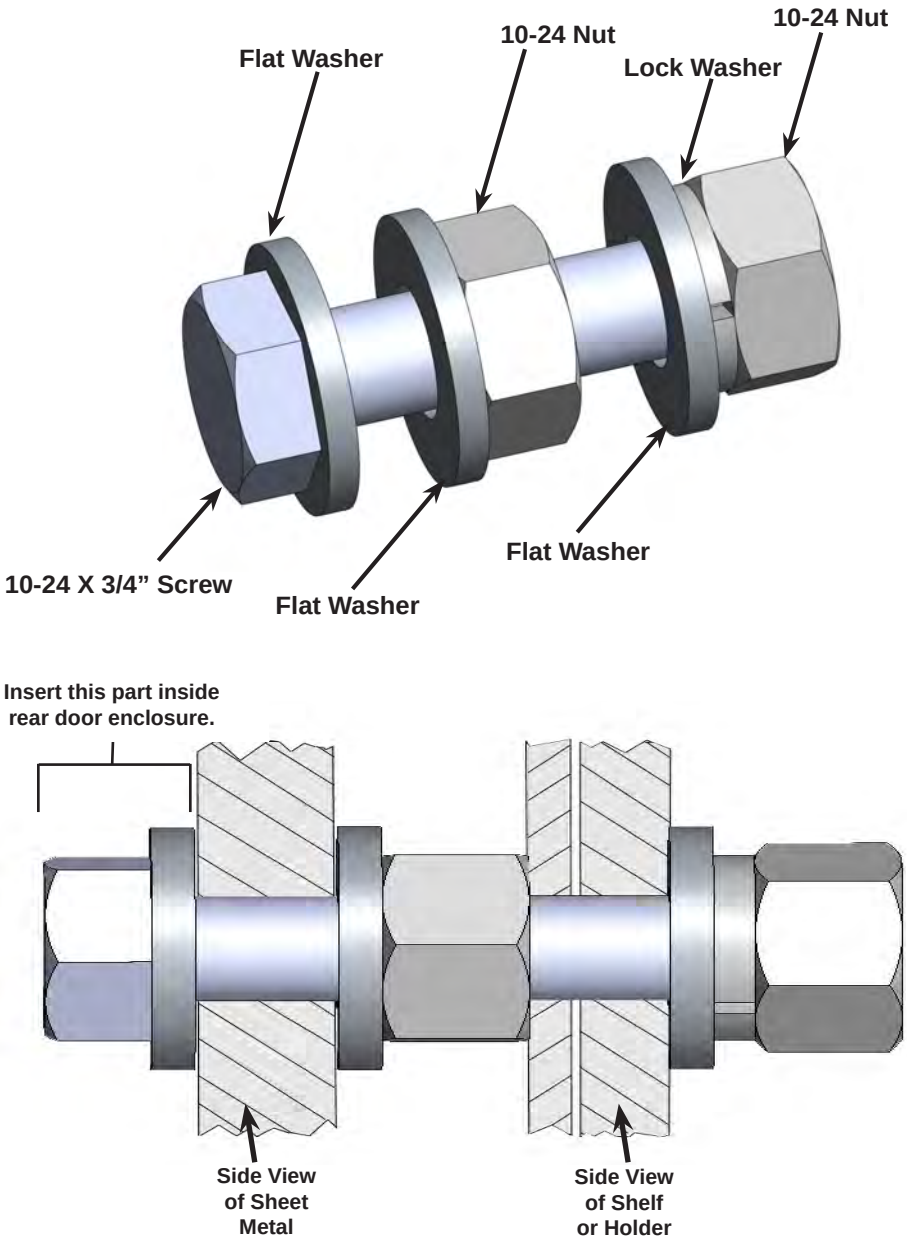


Figure 102. Install Fastening Hardware in This Order, Starting from Left

5. Install the Right Hand Door Panel and the Furniture Pad/Snap Block Kit (P/N 000-163-015) onto the right hand door, using the fastening hardware shown in Figure 102.

NOTICE

Make sure the hardware fastens through the Back Door Shelf, the Furniture Pad and the Panels as shown in Figure 101.

6. Install the Trimlok (P/N 000-131-060 from Panel Set P/N 000-100-021) around the door handle on the right hand door (see Figure 103).

Figure 103. Install Trimlok (P/N 000-131-060) Around Door Handle