



Warranty Field Campaign

Campaign Number: c2623	Revision:	Released Date: 01-Sep-2022
BP74E Coolant Leak Safety Campaign		Expiration Date (U.S. and Canada): 12-Jan-2050
		Expiration Date (International): 12-Jan-2050

Attention

- U.S. / Canadian Distr./Branches and Div. Offices (Automotive)

If additional information is required, please contact your Cummins Warranty Operations Group Leader.

Description

This Safety Campaign is being issued to address potential internal coolant leaks that may develop within the battery pack, potentially creating a high voltage short circuit via the conduction path through the coolant. This condition may result in localized heating within the battery. An internal coolant leak may lead to gases venting from the battery pack, smoke or a battery fire on certain BES CM2450 EV101B units in Gillig buses. The internally leaking coolant will cause a HV Exposure lamp and Stop EV lamp to be displayed on the vehicle dashboard while the vehicle is in operation. This Safety Campaign authorizes certified repair locations to change the battery pack coolant to a low conductivity coolant and, tighten the internal coolant outlet fitting. Cummins is working with the vehicle manufacturers to implement the necessary vehicle changes to accommodate the new coolant.

Action

In order to qualify for repair under this field action, a drivetrain system:

1. will be covered Regardless of coverage status, and
2. **must** show as OPEN on QuickServe® Online for this field action.

Note : The SSN list is attached for reference.

After verifying that the drivetrain system meets the above requirements, perform the following actions:

1. Follow campaign instructions on battery pack coolant port retorque and Low Conductive Coolant retrofit. Please refer to Attachment B for detailed instructions.
2. Remove and Replace the Resolver Harness by following the Motor Interface Wiring Harness/Remove and Install Procedure. Please refer to the BES CM2450 EV101B Service Suite found on QuickServe® Online.
 - a. Select Service tab.
 - b. Select the Propulsion System tab.
 - c. Select the Electronic Controls tab.
 - d. Select the Motor Interface Wiring Harness.
 - e. Select Remove and Install.
 - f. Follow the procedure to complete the upfit.

Note : This wire harness has been included in the OEM supplied parts kits.

Material Disposition

Materials removed as a result of this field action **must** be scrapped.

Reimbursements

Parts

Note : Parts, materials and tools are going to be provided to the repair locations prior to campaign release. Parts, materials and tool list can be found in Attachment B. In addition, the kit will include the Resolver Wiring Harness needed to complete the repairs as outlined in the instructions.

There are no parts claimable in this field action.

Note : SRTs to gain access that are required to complete the repair, that are sufficiently explained in the claim narrative, may also be claimed on this action.

Labor Using Applicable Access Code and Time

SRT Code	Description	Time (hrs)
00-90X	Administrative time	
31-024	High Voltage Battery Pack - Drain and Fill, Each - BES CM2450 EV101B	

SRT Code	Description	Time (hrs)
34-003	Motor Interface Wiring Harness - Remove and Install - BES CM2450 EV101B	
99-901	CAMPAIGN ACTIVITIES (QTY 15)	
99-00A	COMPLETE CAMPAIGN ACTIVITIES (QTY1)	

Travel

Travel is **not** covered under this field action Towing is **not** covered under this field action.

Other Claimables

Consumables are covered under this field action.

Note : Additional parts, such as o-rings, gaskets and fasteners, that are required to complete the repair, but **not** listed, may be claimed in Other Claimables. Please consolidate all consumables and claim them as one line item in Other Claimables titled CAMPAIGN SUPPLIES or other appropriate selections. Please include brief summaries on the details of items claimed. A lack of documentation in the narrative may result in a reduction in claim reimbursement or claim denial.

Claim Instructions

For Cummins Dealers, claims for this Field Campaign **must** be filed via **RAPIDSERVE™** Web (rsw.cummins.com). For information regarding **RAPIDSERVE™** Web, please reference the "Warranty" tab in QuickServe® Online. If there are additional questions, please contact your local Cummins Distributor.

Claim Codes	
Description	Code
Account Code:	65
Pay Code:	North America Distributor = X
Pay Code:	North America Dealer = D
Pay Code:	International Distributor = I
Pay Code:	International Dealer = R
Failure Code:	WHVHBA

Attachments

[Click here to see c2623_ssn-list.xlsx](#)

(/service/english/attachments/c2623_ssn-list.xlsx) [Click here to see c2623_bp74e_coolant_leak_safety_campaign_attachment-b.pdf](#)

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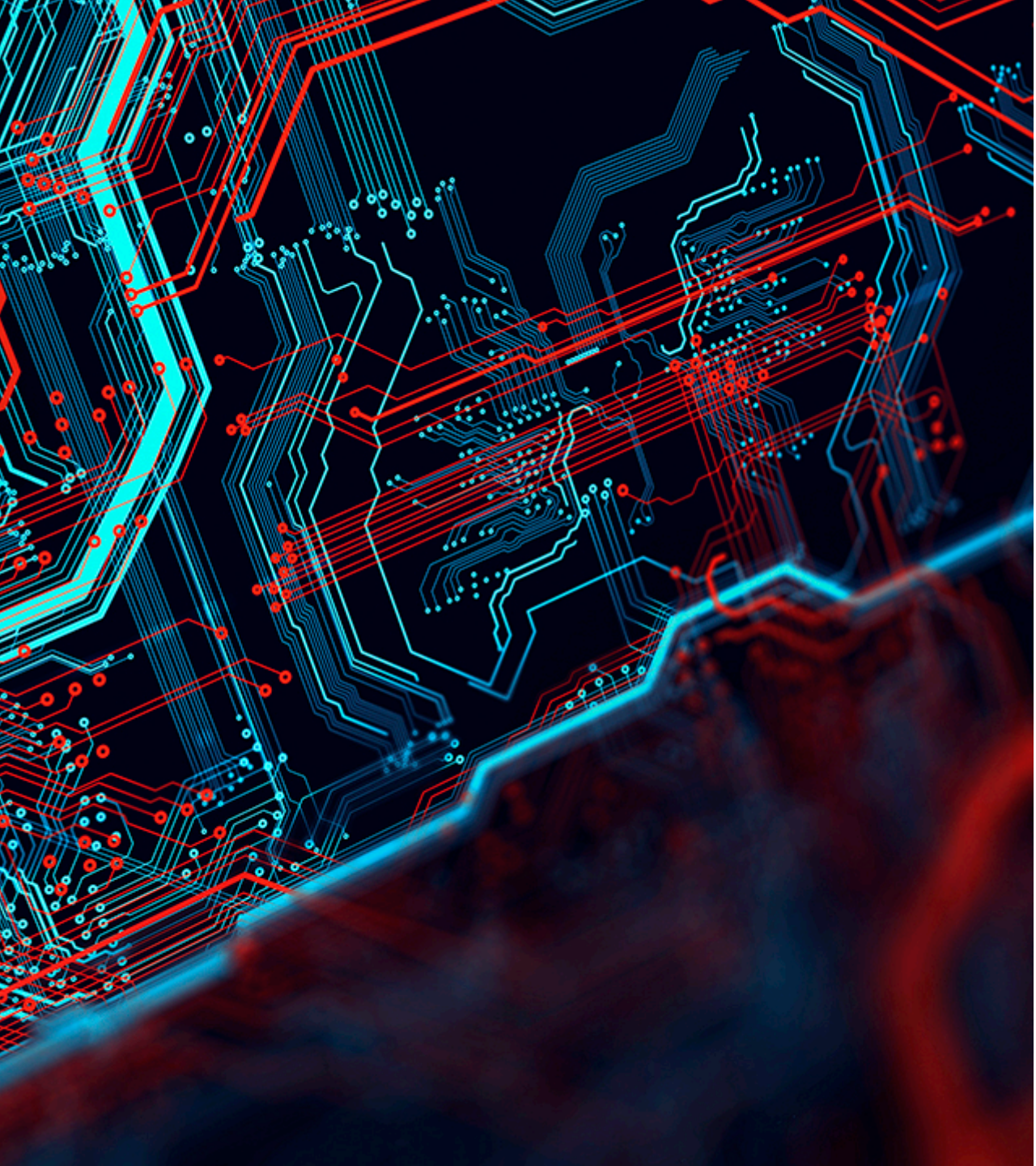
Engine Family	Fuel System
Design Application	Market Application
Automotive	Bus

Document History

Date	Details
	Document Created; 01-Sep-2022

Last Modified: 01-Sep-2022

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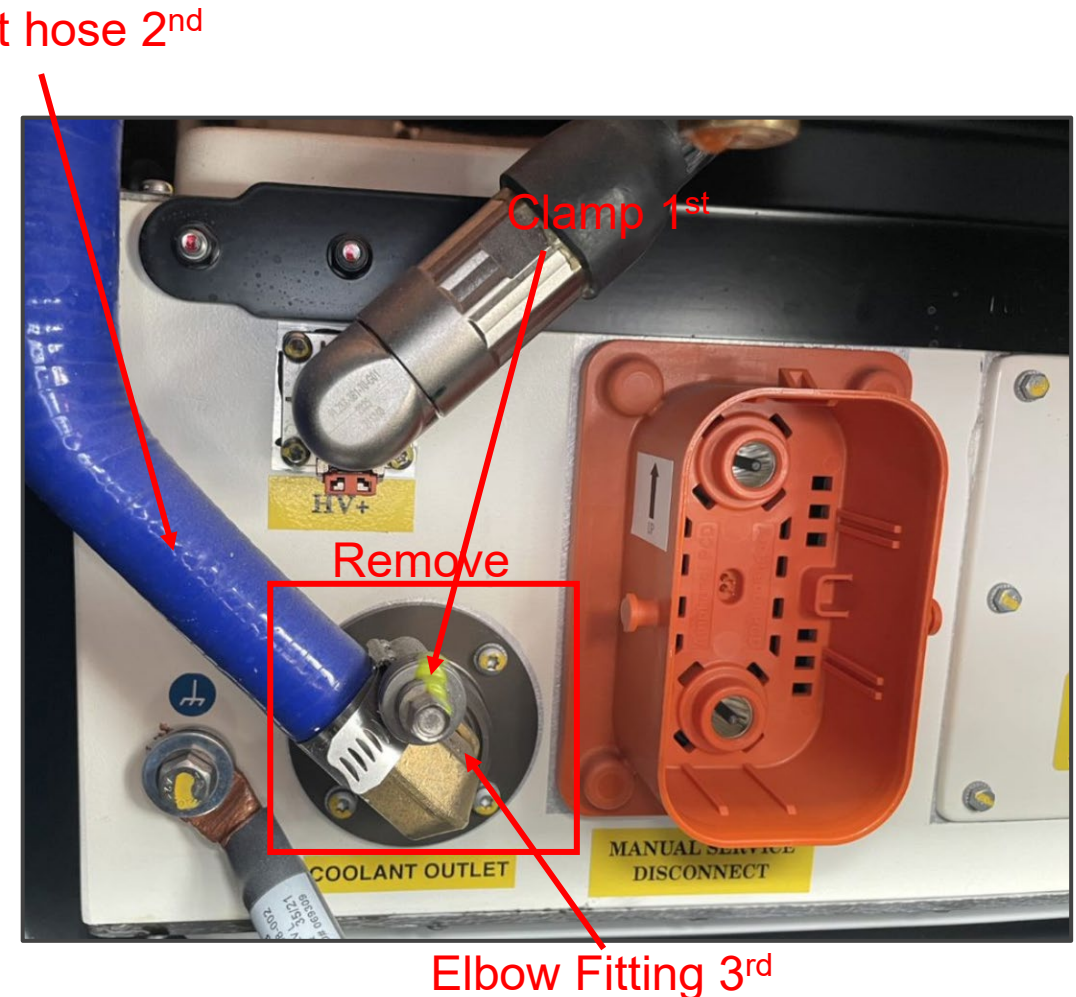
**BP74E
Goodwood
Coolant Outlet
Port Retorque
Instructions**

22 August 2022

Cummins Confidential

Remove Fittings Procedure

1. Park on a flat level surface with room to locate two 55 gallons drums
2. Set the parking brake and chock the wheels
3. Master run control in the off position and Low Voltage disconnect in the off position
4. Perform Lockout Tagout procedure using proper safety guidelines and PPE requirements
5. Follow Coolant Drain Procedure as outlined in Quick Serve Online
6. Remove coolant hose clamp at outlet port
7. Remove coolant hose
8. Remove elbow fitting



Retorque Coolant Port Nut

6. Use Internal Knurled-Grip Extractor tool with calibrated torque wrench to torque coolant port nut counter-clockwise to 5 Nm

Note: Ensure Extractor Tool is inserted into coolant port perpendicular to the battery pack face before torquing. Insert tool as deep as it will go. Do not attempt to use tool placed into coolant port at an angle or you may receive a false torque reading.



Replace Fittings

7. Reinstall brass elbow fitting and torque to 45 FT LB \pm 2 FT LB at the nut
8. Reinstall Coolant Hose
9. Reinstall coolant hose clamp torquing nut to 8-9 IN LB for Oetiker or 45 IN LB for Breeze clamps
10. After retorque procedure is complete for each high voltage battery pack, place purple sticker on each pack by coolant outlet port
11. Enter each pack serial number into claim

Oetiker Clamp



Breeze Clamp



Sticker Placement



Coolant hose 2nd



Elbow Fitting 1st

Proceed to Low Conductive Coolant Retrofit Procedure



Low Conductive Coolant Retrofit, Flush and Fill Procedure

12 AUG 2022

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Scope

- To make vehicle changes and complete a procedure to flush out the existing coolant with deionized water and then install the low conductivity coolant.

Vehicle Changes

- Change the roof mounted vent piping to hoses and fittings which are compatible with the low conductivity coolant
- Removes the existing coolant filter and replaces this with a strainer and ion exchange cartridge
- Install a Flush and Fill Manifold/Valve assembly required to flush out the old coolant and install new coolant

Coolant Flush and Fill

- Uses a remote electric pump connected to the new flush and fill manifold to flush out the existing coolant
- Uses the same set up to use the new low conductivity coolant to flush out the deionized water and install the new coolant

Parts Required

These will be installed before the flush and fill and will remain installed on the bus.

- Gillig Part Number
 - Gen 2.0: 82-9168-000 Cummins LCC Upgrade Kit
 - Gen 2.5
- Contains parts for the vent line replacement, strainer, filter, and flush fill manifold/valve assembly and a new coolant decal.

Equipment and Materials Required:

- Gilling service tool kits
 - This includes the electric coolant pump and all the hoses, valves and fittings to connect to the bus mounted flush and fill manifold/valve assembly
 - Includes a quick coupler to drain coolant from the bus.
- 40 Gallons deionized water
- 14 Gallons Low conductivity coolant Gillig Part Number
- 55 Gallon drum to collect old coolant and deionized water
- 5-gallon bucket to collect drained coolant
- 5/16 drill bit and drill
- Source of 120 Vac to power the coolant pump
- Conductivity Meter
- Coolant Concentration meter
- Step Ladder
- Square Key
- Method to access roof and safety equipment to work on the roof.

Misc

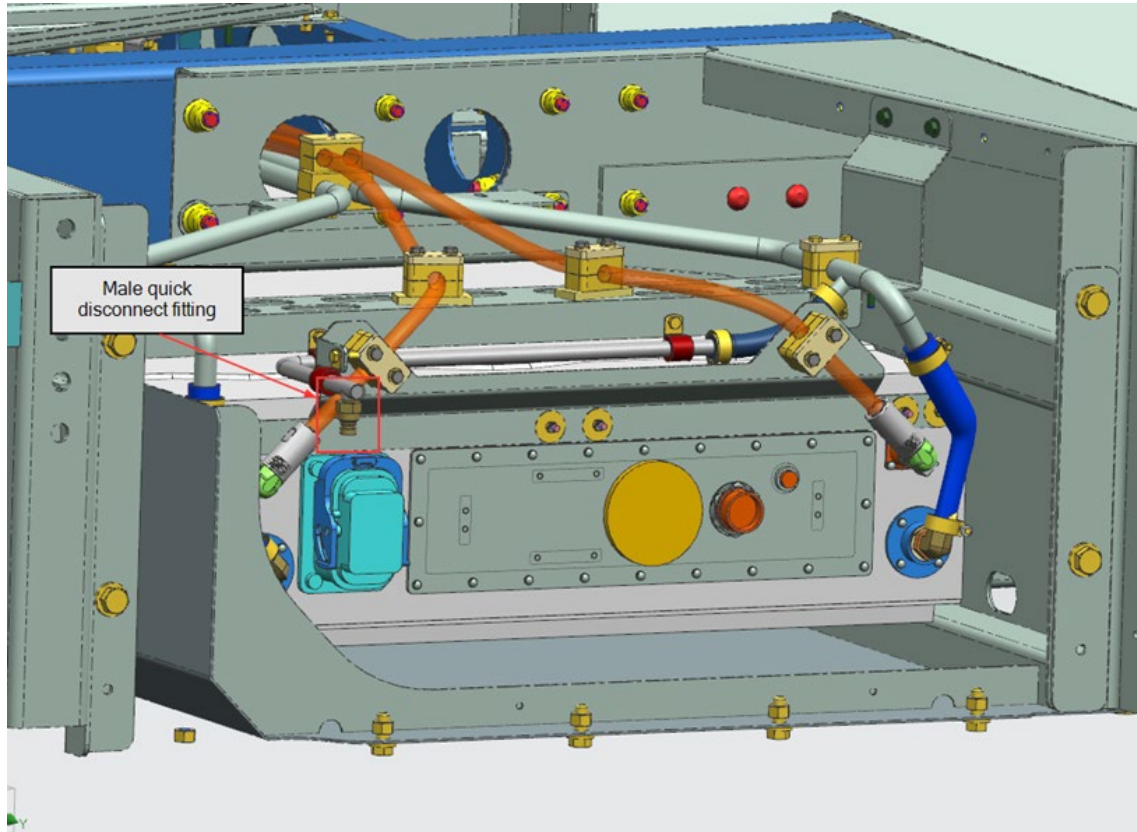
- Appropriate disposal for removed coolant and deionized water.

Step 1 Vehicle Set Up and Drain

After running the Battery retorque procedure, vehicle should still be on flat level surface with room for two 55 gallon drums, wheels chocked, locked out tagged out, and drained of coolant. Then proceed to the following steps:

1. Ensure pressure cap is on surge tank but red lever is lifted up.
2. If any coolant is in the battery coolant loop, using the female quick coupler (Eaton p/n 6FFS25) or Cummins p/n 2892459 install at the existing coupler at the inlet pipe to the chassis battery and drain as much coolant as possible. About 3 to 5 gallons. This allow installing the new parts without spilling coolant. See Detail A for coupler location
3. After draining remove the quick coupler and install ¼ turn valve (Gillig P/N 53-20873-006).

Detail A



Step 2: Remove CS pontoon and fence

1. Unplug the condensers LV plug
2. Remove sheet metal cover on CS that spans from the pontoon to the rearmost HV battery. Set cover to the side
3. Remove access cover on CS pontoon (6 screws). This will allow access to the pontoon's mounting bolts.
4. Remove pontoon's mounting bolts
5. Loosen bolts on fence directly in front of CS pontoon. The fence and pontoon overlap each other.
 - Alternative: Remove fence in front of CS pontoon and set aside.
6. Remove pontoon and set aside; this may take 2 people
7. See Detail B

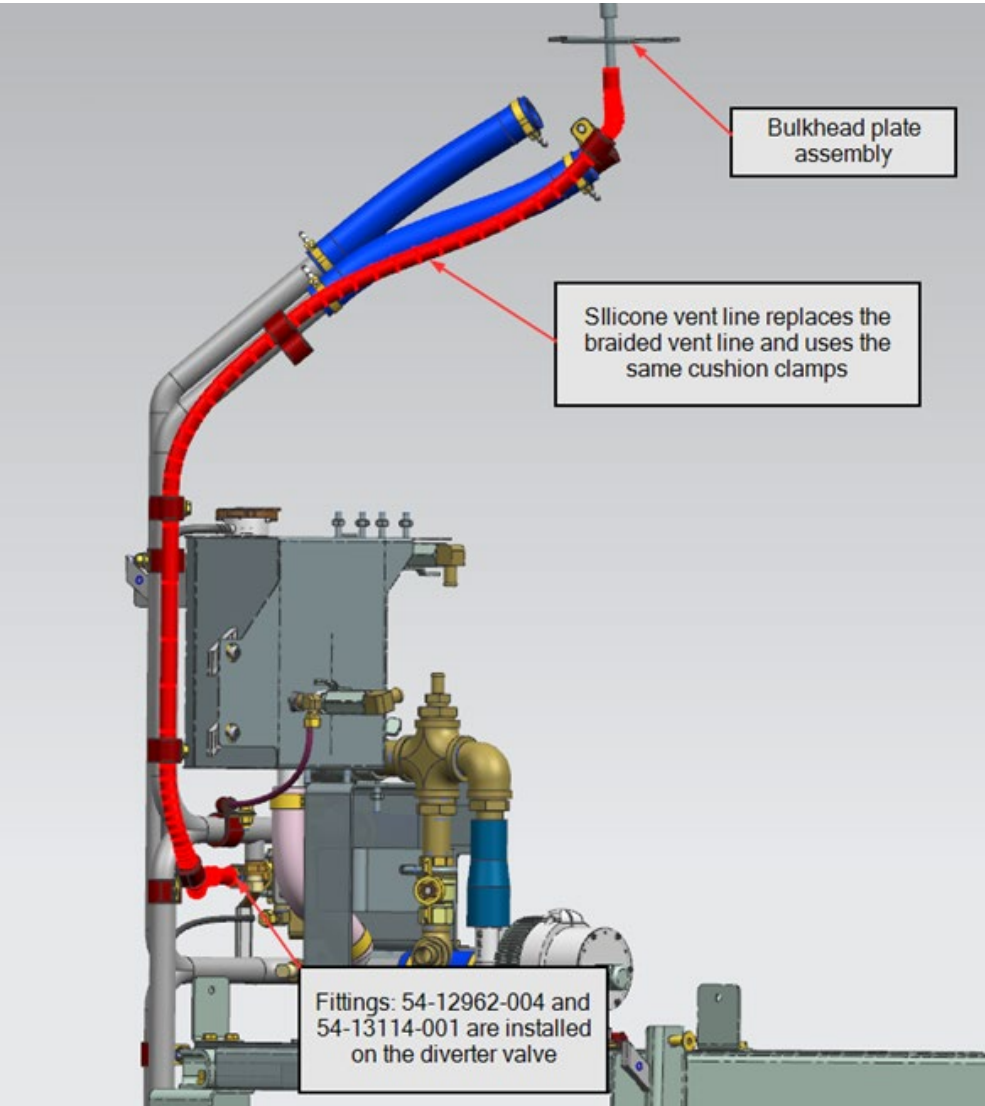
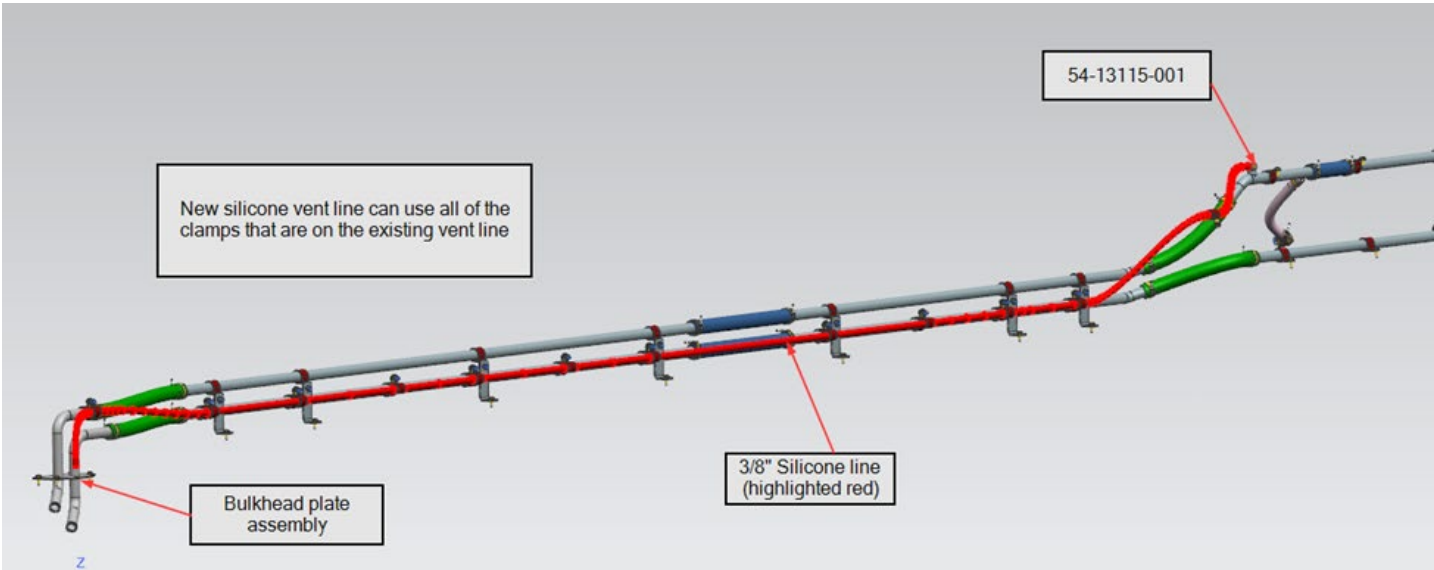
Detail B



Step 3: Install new vent piping

1. Remove the existing braided vent line that travels from the top of the bulkhead plate to the upper pipe of the roof battery piping.
2. Remove the braided vent line that travels from the bottom of the bulkhead plate to the small diverter valve mounted on the HVAC outlet piping.
3. Remove the MNPT to JIC elbow fitting on the upper pipe of the roof battery piping and replace with appropriate MNPT to hose beaded elbow.
4. Remove the MNPT to JIC fitting at the diverter valve and replace with the proper brass fittings.
5. Ensure the check valve stays on the diverter valve
6. Remove bulkhead fitting from bulkhead plate. Fitting nut is located on bottom side of plate
7. Bulkhead plate removal might be needed for access depending on tools available and is assistance is possible
8. Remove the 2 CS bolts on bulkhead assembly
9. They will be used to fasten the new bulkhead tube assembly.
10. Install new bulkhead tube assembly
11. Install new silicone hoses in place of the braided lines that were removed. Use existing clamps that secured old vent line to secure new silicone line. Ensure the new line does not have excess slack or is rubbing on any components or brackets. Install hose clamps to allow a downward slope to eliminate high and low spots for air bubbles to be trapped.
12. Install hose clamps
13. See Detail C

Detail C



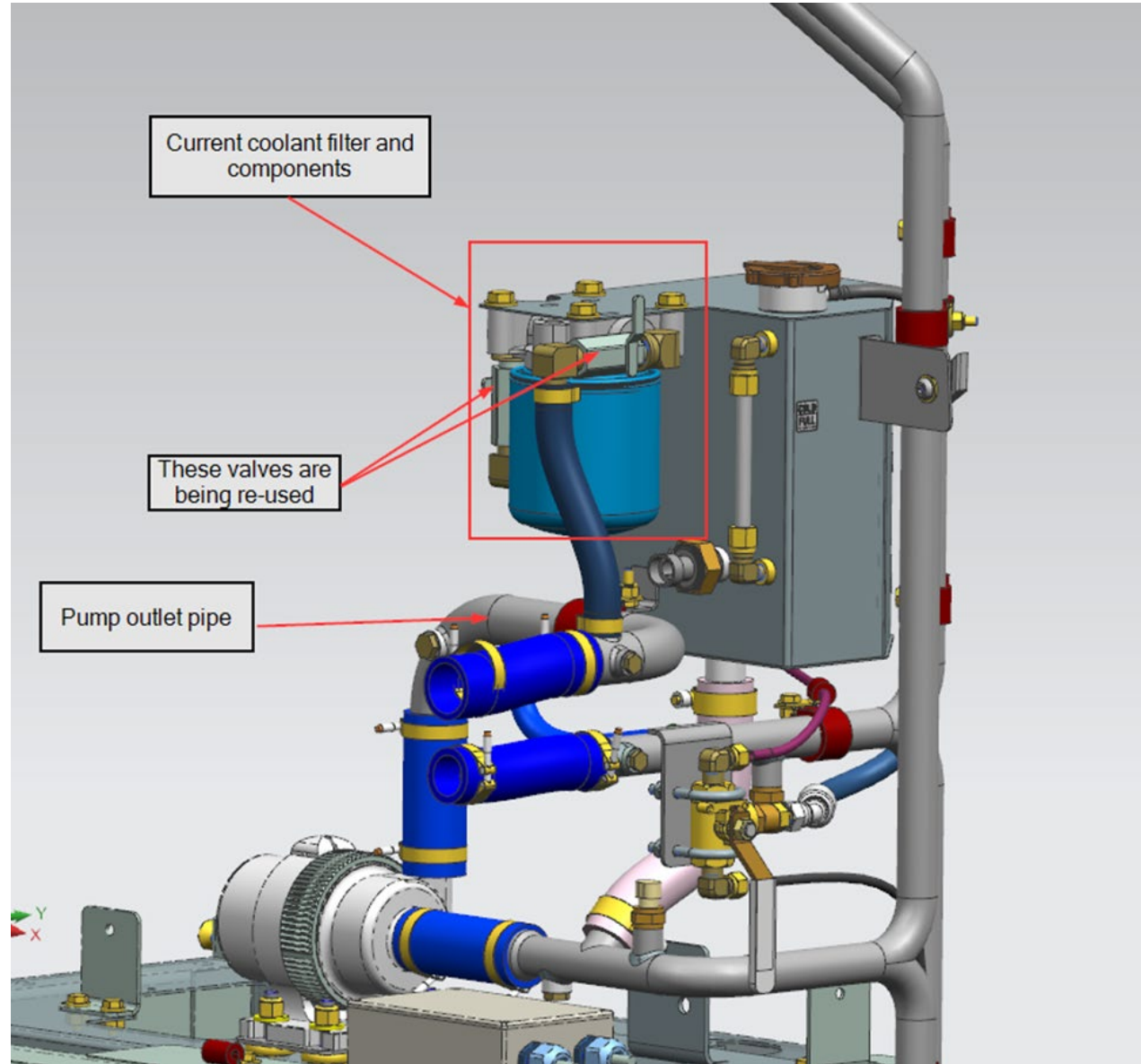
Step 4: Re-install pontoons and other roof components (this step can be the last step so looking for leaks is easier)

1. Re-install pontoons and fence.
 - a. These parts overlap each other so ensure that overlap is correct before fastening all hardware.
2. Re-install the sheet metal cover that travels from pontoon to roof battery
3. Re-connect the condensers LV plug
4. The access cover on the pontoon can be re-installed. This access window can be used to look for leaks when it comes time to flush and fill the bus.

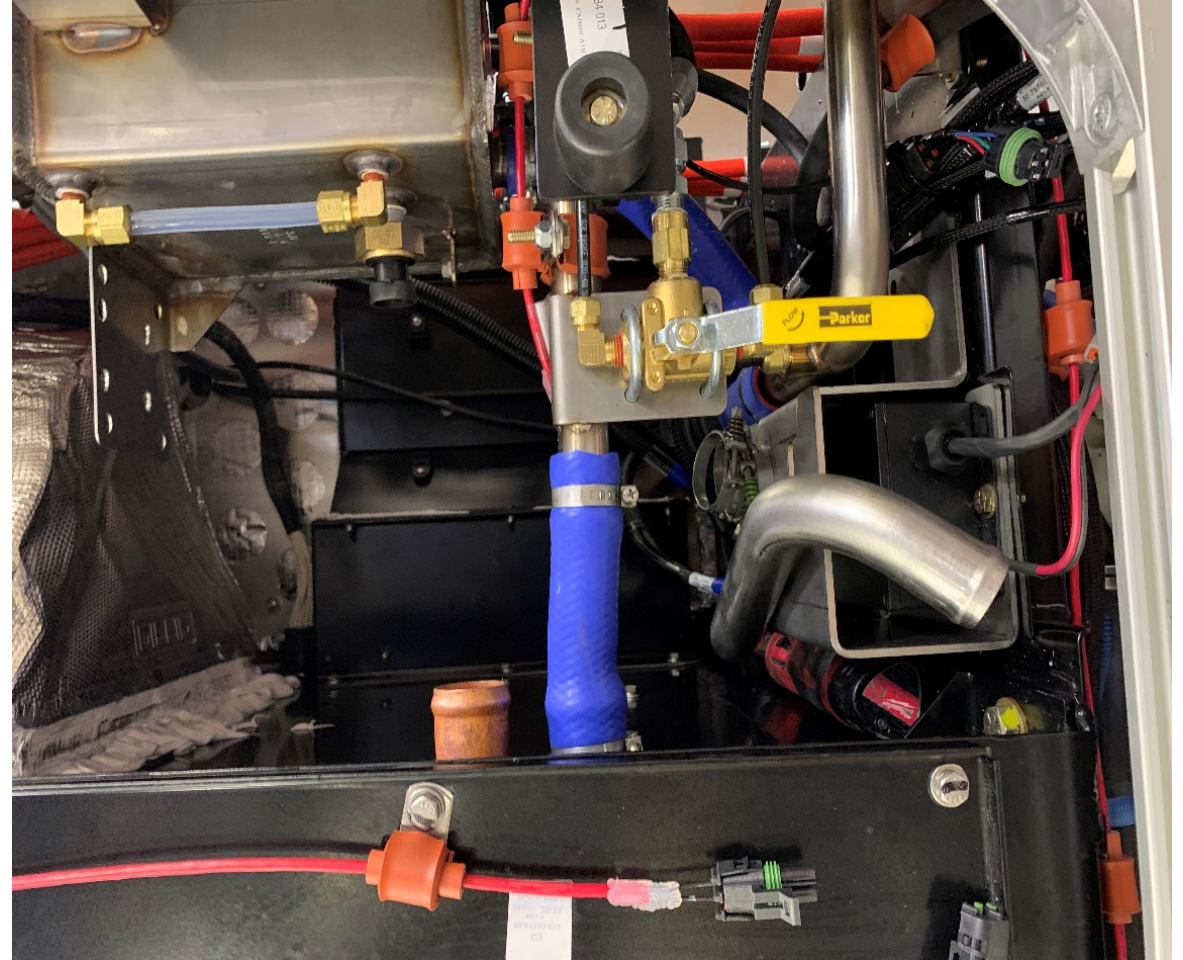
Step 5: Remove the existing filter and pump outlet pipe

1. Remove the coolant filter assembly (filter and filter head) and related hoses
2. Filter head has two ¼ turn valves, one into the head and one out. These valves will be reused with the Y-strainer.
3. Place these valves in a cup of deionized water to soak until time for installation
4. Remove the pump outlet pipe and silicone hoses attached to pipe
5. See Detail D
6. Unplug and remove GRI controller
 1. Be sure to move the exposed plugs out of the way so they stay clean and dry
7. Remove the existing self-tapping screw seen in Detail G. This screw will be re-installed when the controller bracket is installed. This screw is only present on GEN2.0 configurations.

Detail D



Detail D continued....

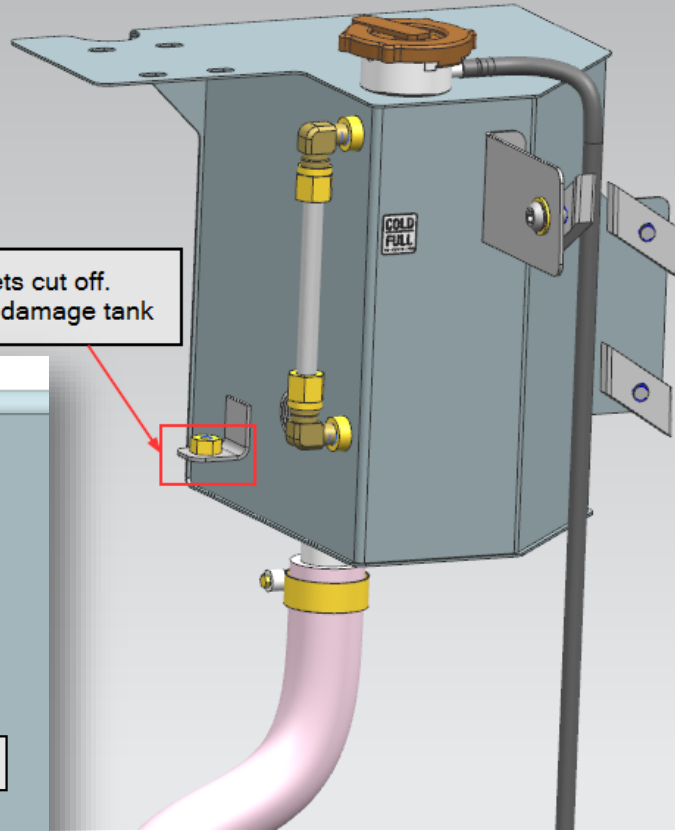


Step 6: Remove and rework Surge tank

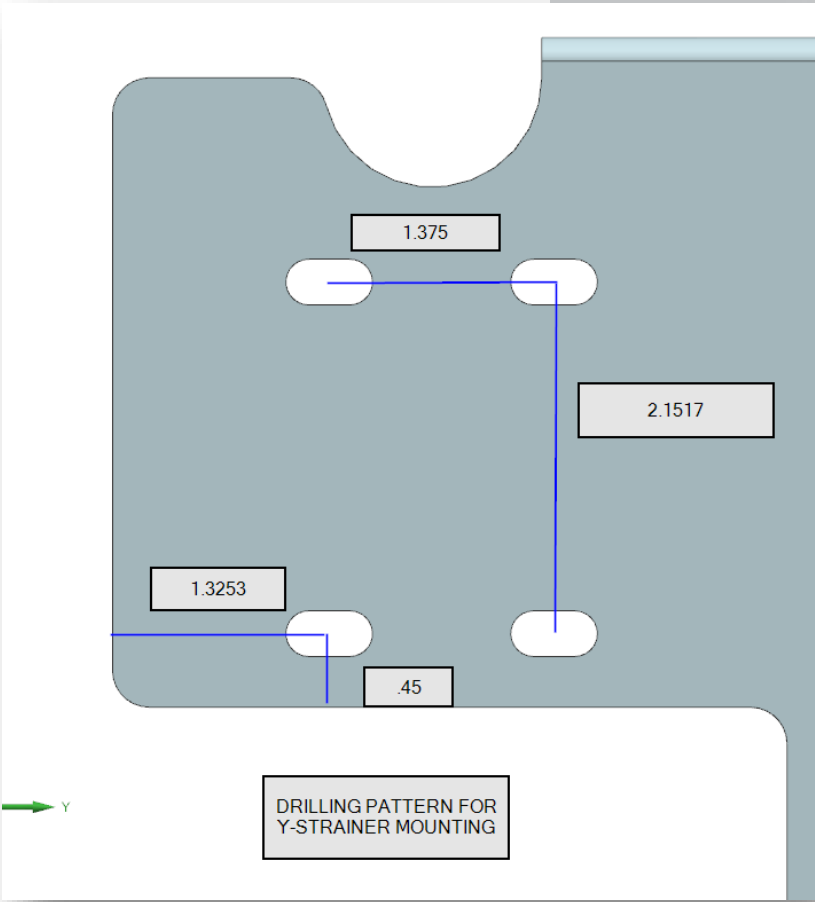
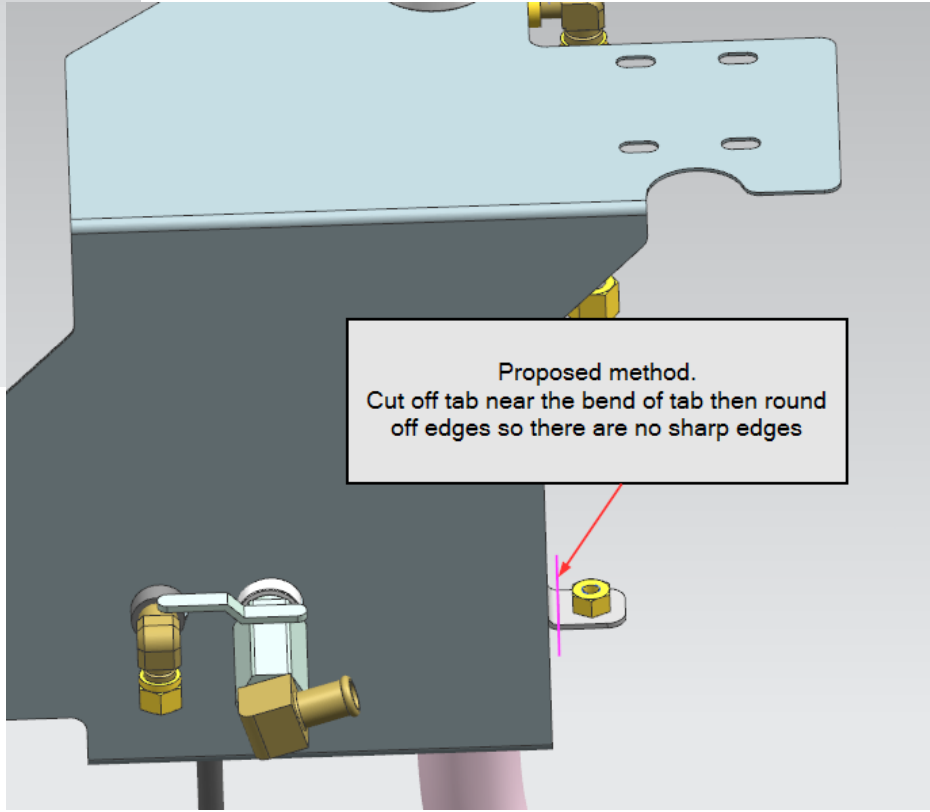
1. Unplug level sensor and remove hoses attached to surge tank
 - One hose on the bottom of the surge tank
 - One small nylon line on the back of the surge tank
 - One small nylon line from the fill neck of the surge tank
2. Loosen 3 bolts that mount the surge tank. Be sure to not lose the nut plates that are inside the extrusion
3. Cut off welded tab on side of surge tank
 - Be sure not to damage surge tank in process of cutting off tab
 - The entire tab does not need to be removed from the side of the tank. The tab can be cut off at or just after the bend
 - After cutting tab off, round off the edges so there are no sharp edges present
 - See detail E
4. Drill 4 holes in surge tank flange for mounting of Y-strainer
5. Rinse out surge tank with deionized water.
6. Install new hose fitting and ¼ turn valve on back of surge tank
7. See Detail F

Detail E

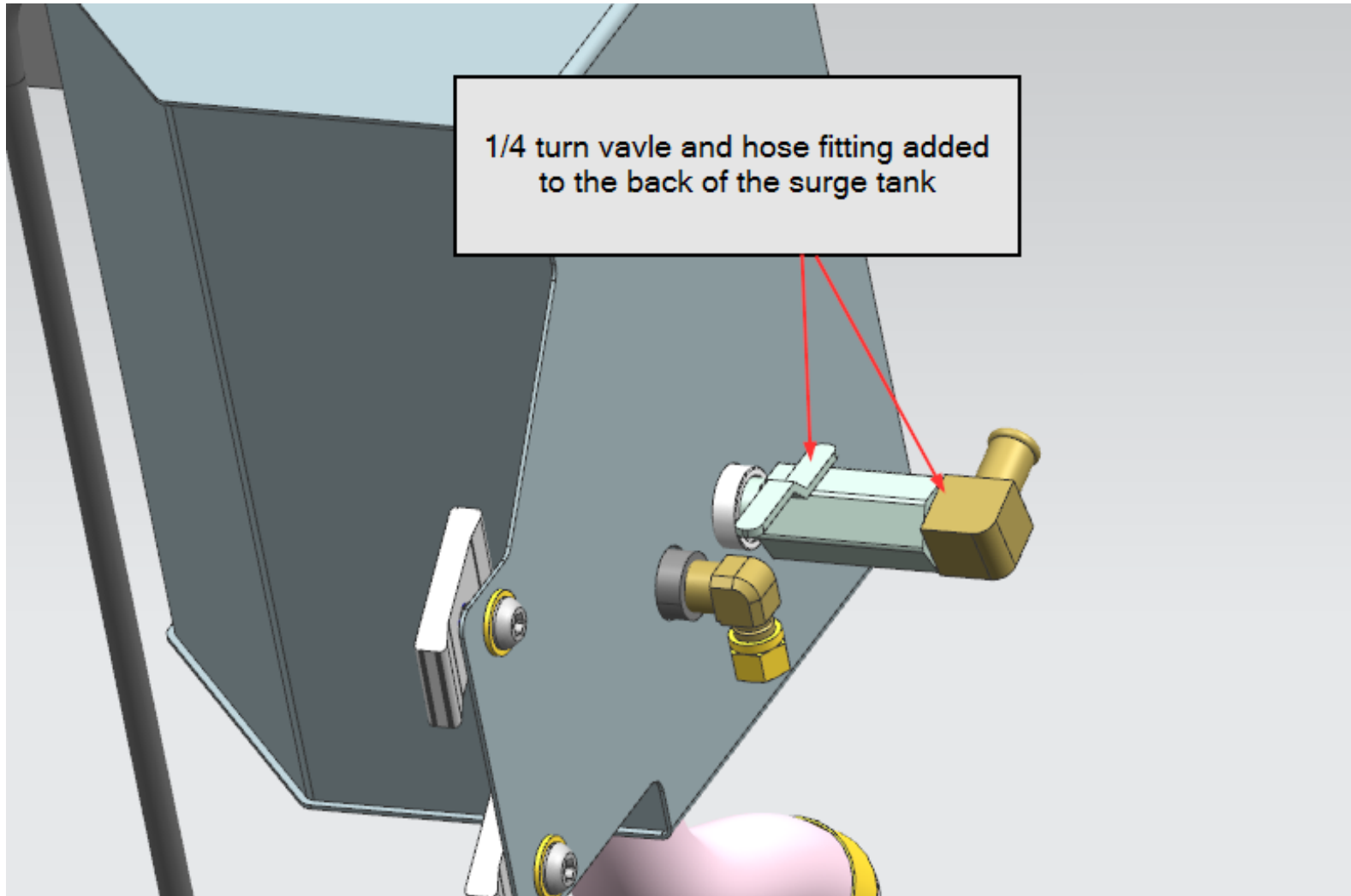
This tab gets cut off.
Be sure not to damage tank



Proposed method.
Cut off tab near the bend of tab then round
off edges so there are no sharp edges



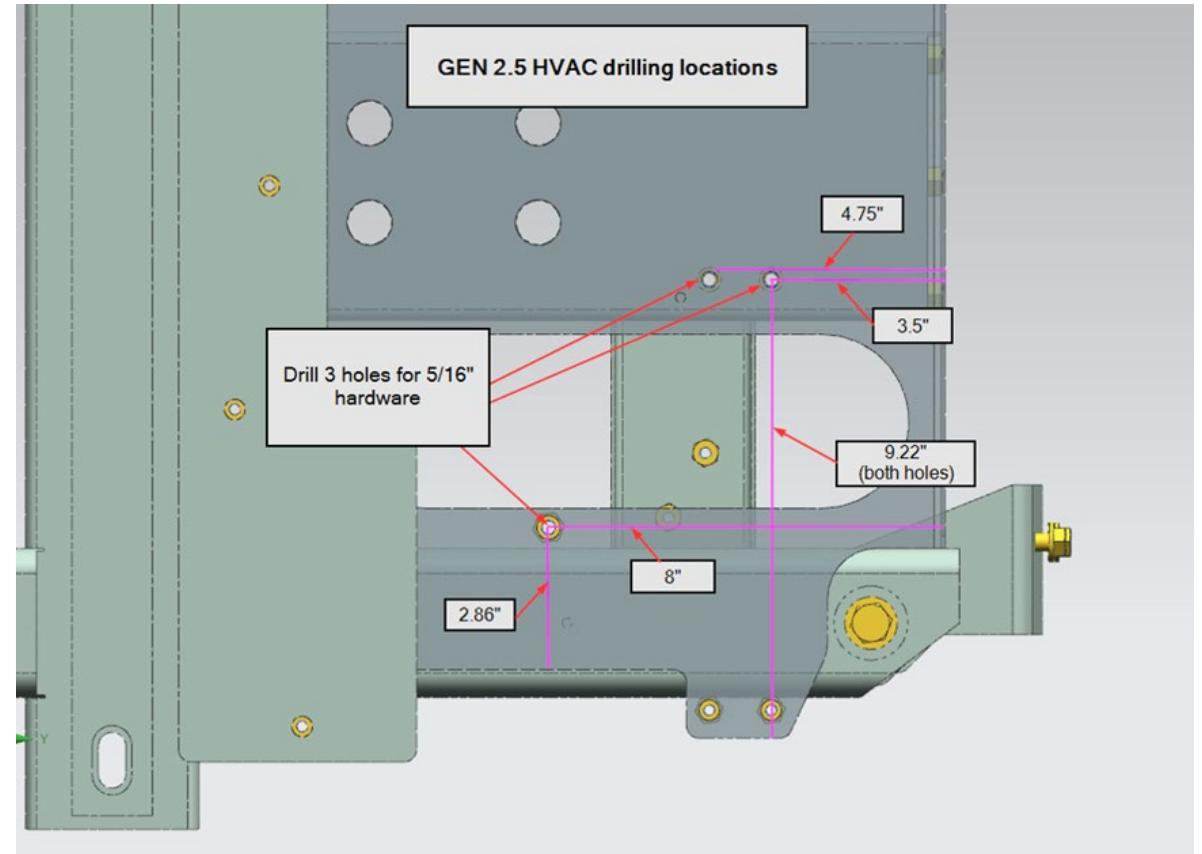
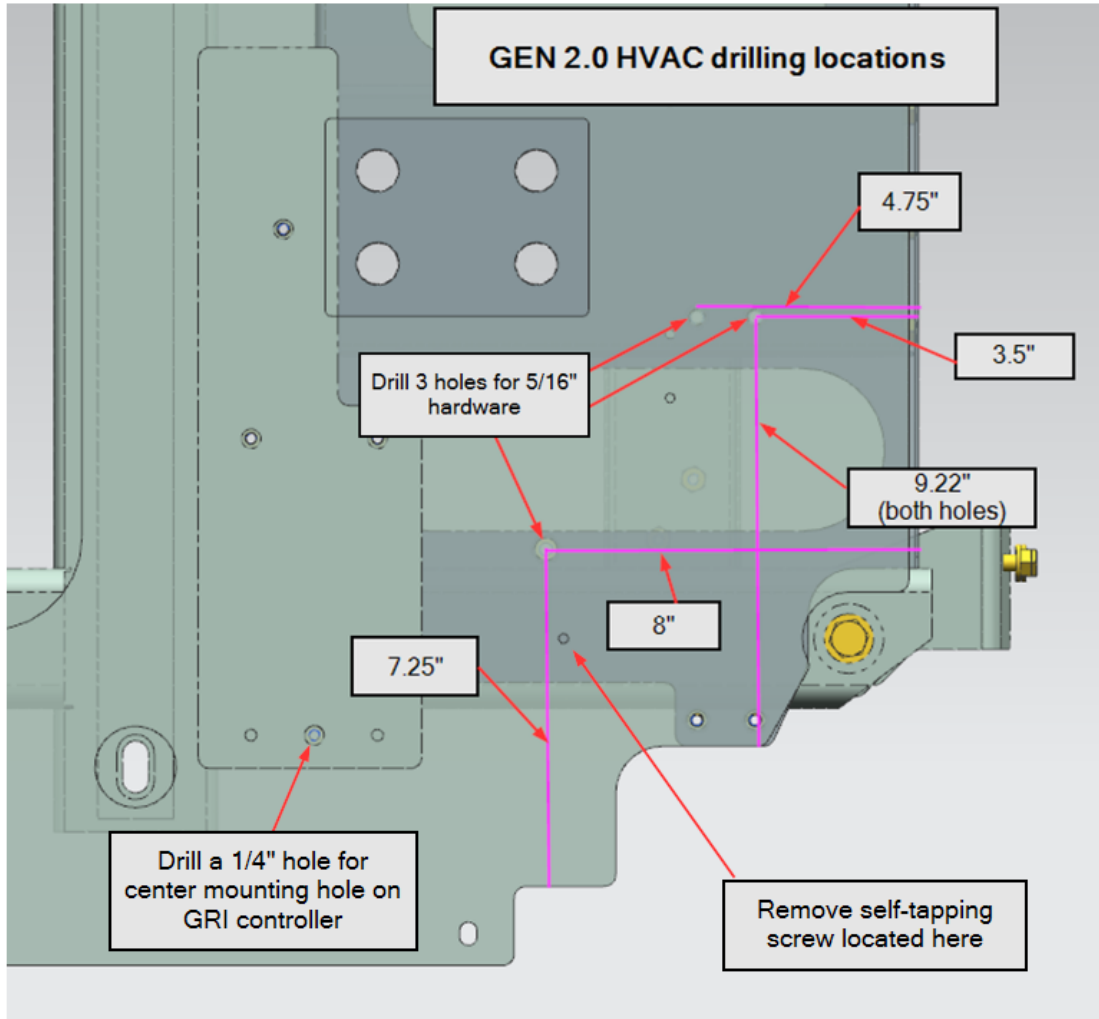
Detail F



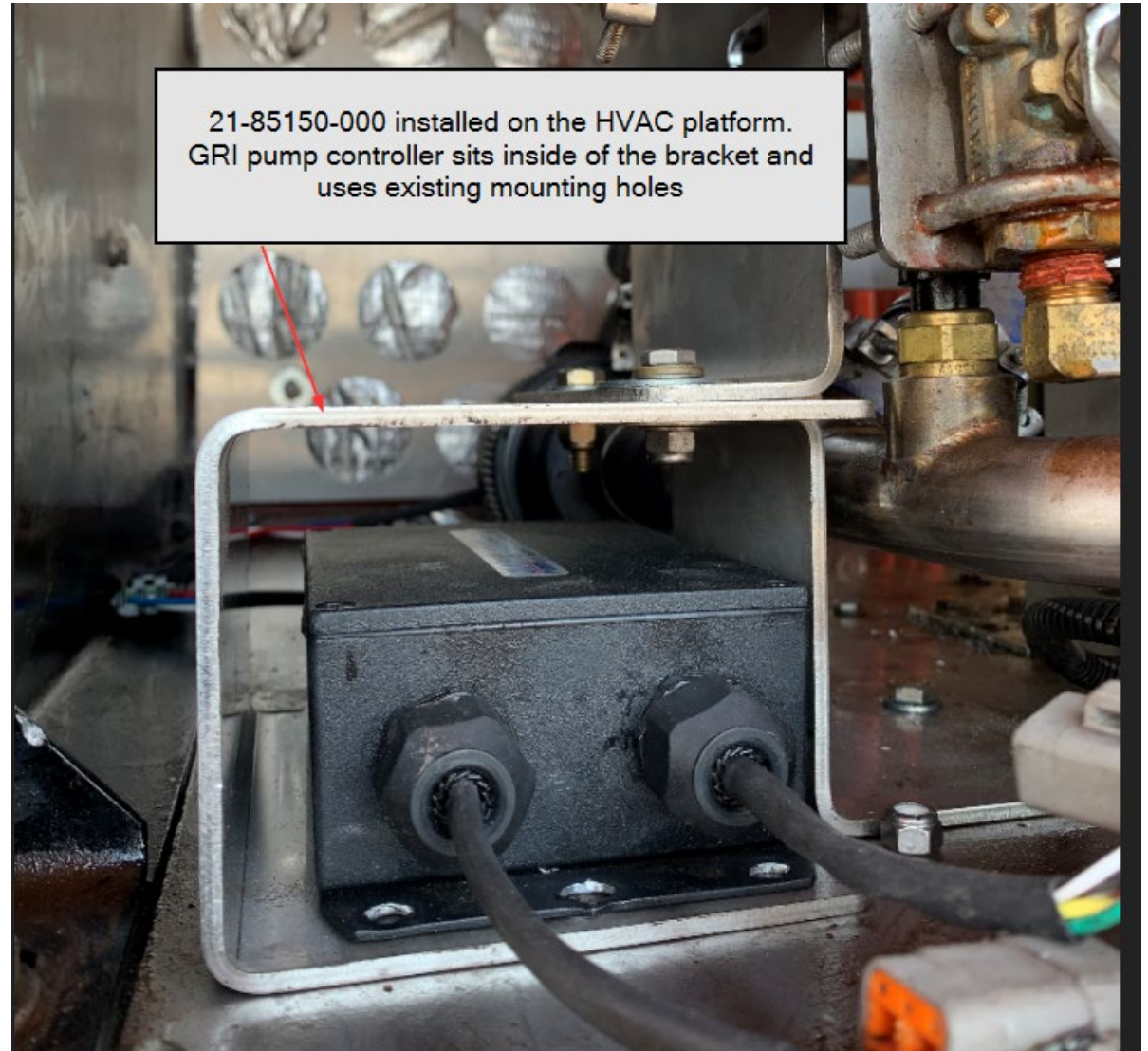
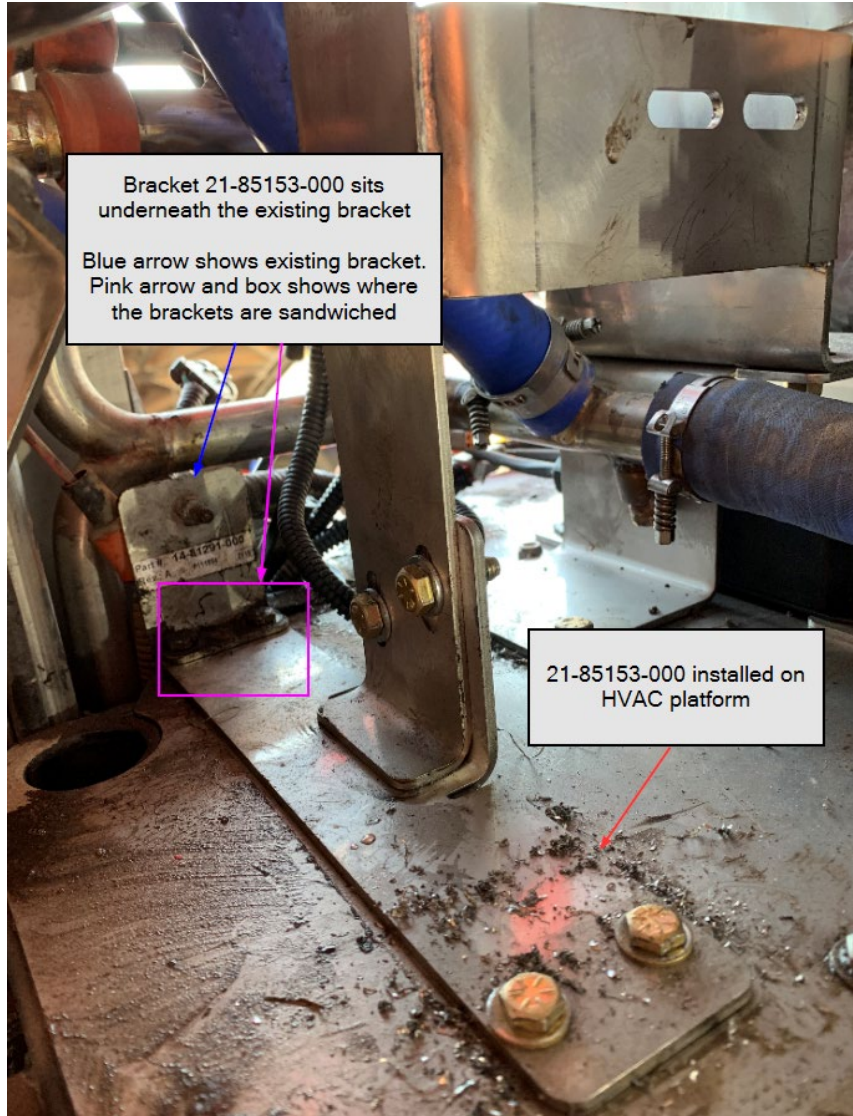
Step 7: Rework the HVAC Platform

1. Drill 3 - 5/16 holes into the HVAC platform
2. Use templates seen in Detail G to locate and drill holes
 - a. Alternative rework method. Use brackets to find proper hole location
 - i. Install the GRI pump controller and controller bracket using the existing controller hardware and holes. This will locate one of the new hole locations. Note: Before installing this bracket, remove the self-tapping screw, labelled in Detail G. This self-tapping screw is only present for GEN2.0
 - ii. Install 21-85153-000 bracket on the HVAC platform. This bracket is installed underneath an existing bracket on the HVAC platform.
 - iii. See Detail H.
 - iv. Loosely re-install existing hardware.
 - v. Center slots between 21-85152-000 and 21-85150-000 to properly locate 21-85153-000. Snugging up hardware in slots will help keep brackets steady. Once brackets are located, mark holes for rework
 - vi. While brackets are mocked up on the HVAC platform, gently place the flush and fill manifold in location to determine if fitting tweaks are needed
3. A 1/4" hole may need to be drilled for the GRI pump controller. The new pump controller bracket has this mounting hole, and it is seen identified in Detail G.
4. Once new holes are drilled, 21-85150-000 and 21-85153-000 can be installed and fastened to the HVAC platform.

Detail G



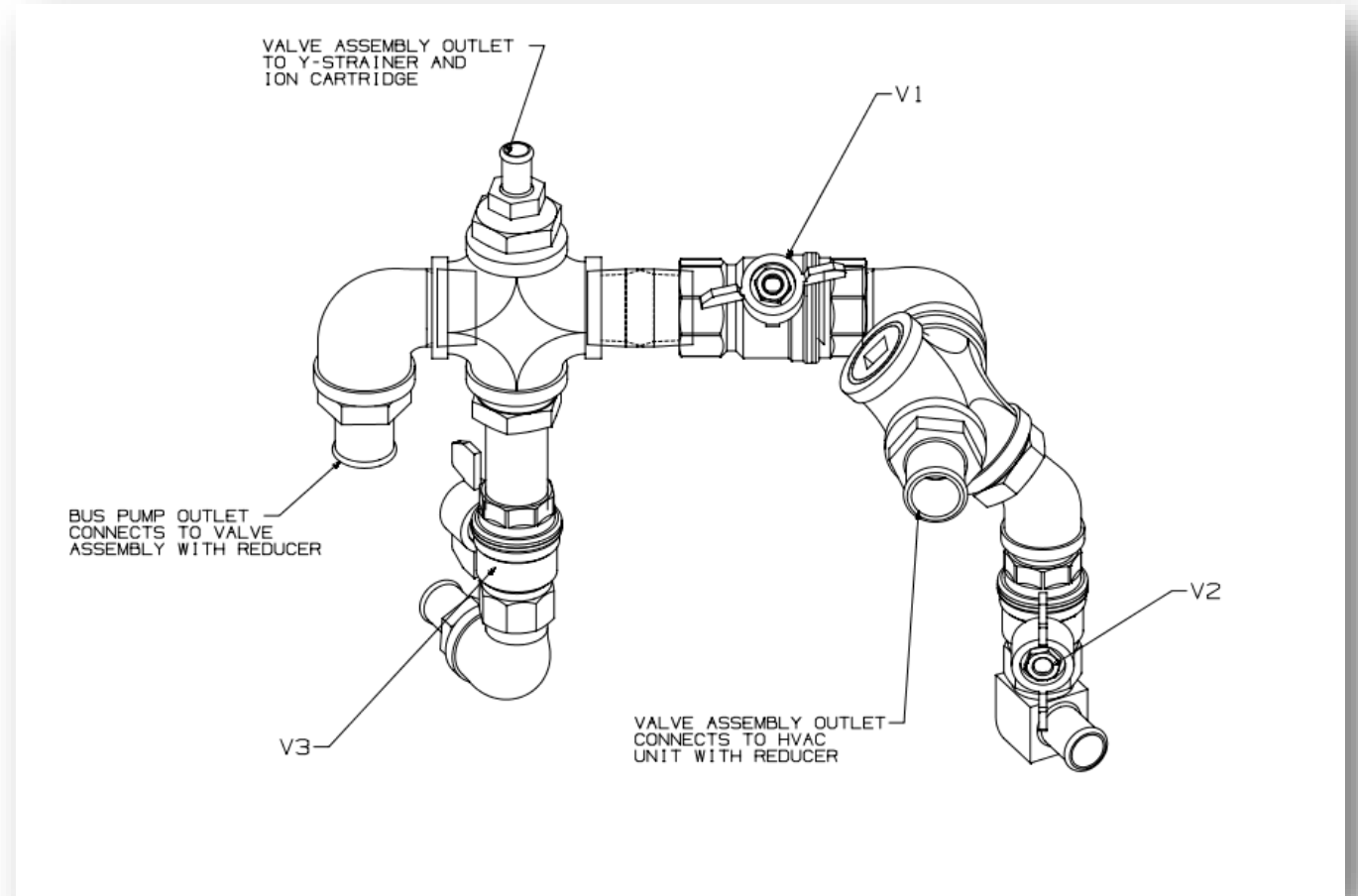
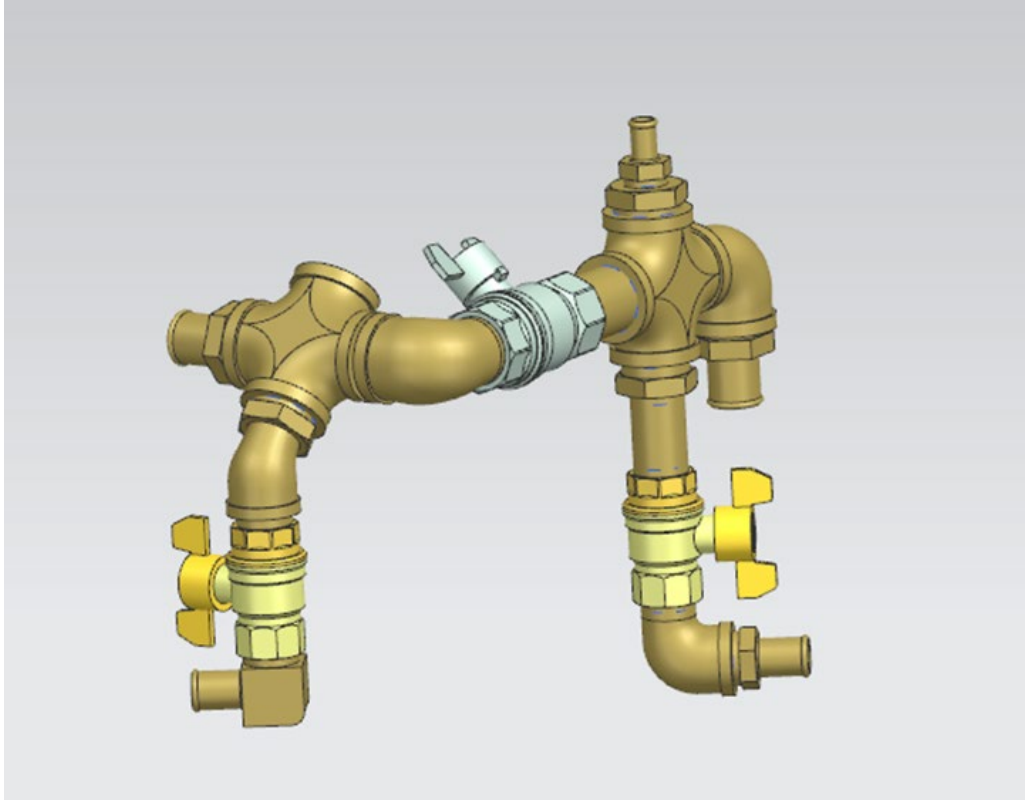
Detail H



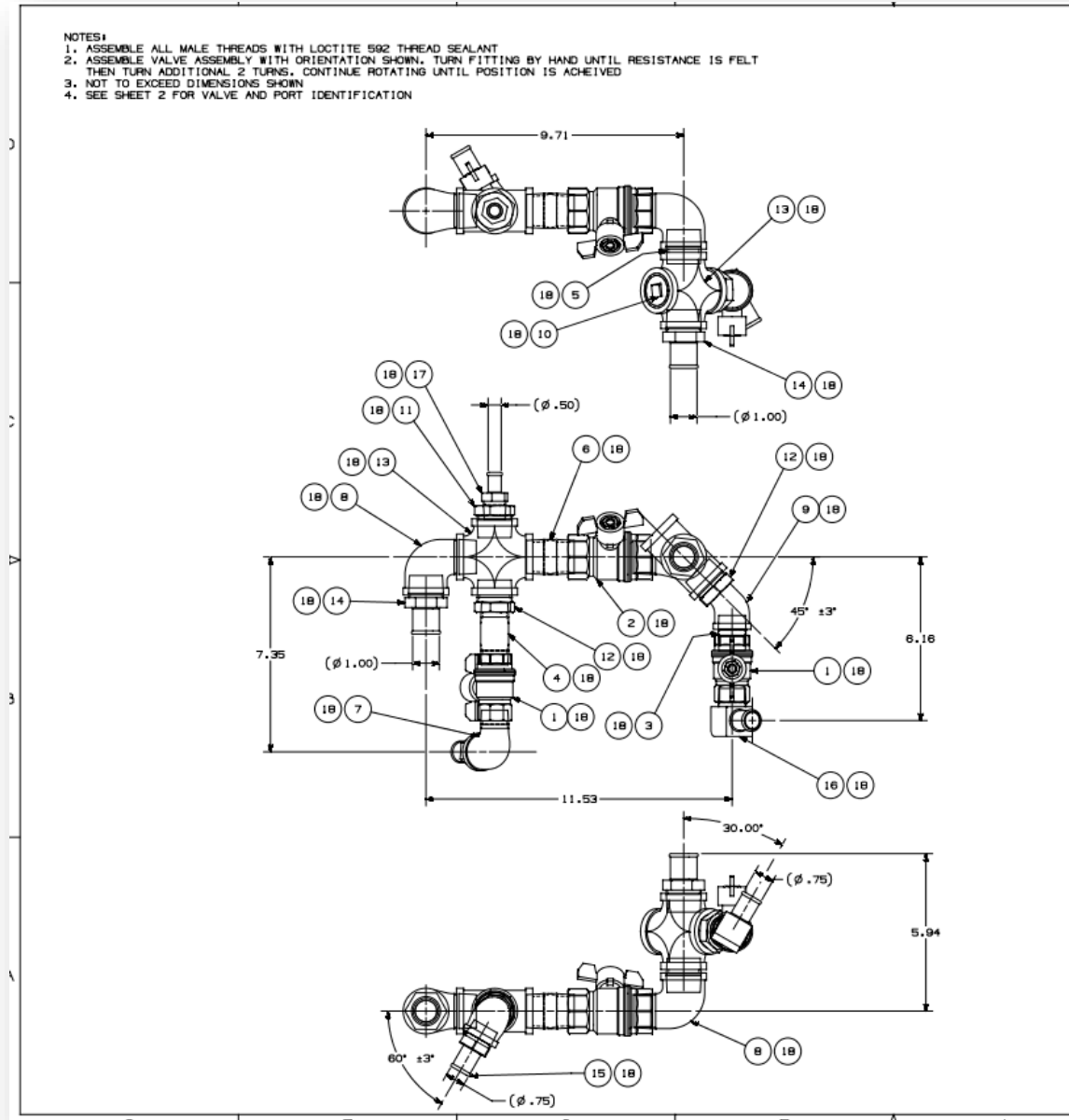
Step 8: Install the Flush and Fill Manifold Valve Assembly

1. Flush and fill manifold will come pre-assembled in the kit.
2. See Detail J to visually confirm manifold is pre-assembled properly prior to adjustments
 - a. Minor adjustments to some fittings may be needed due to on-bus variation
 - b. This check can be completed in the previous step or in the following bullet points
3. Install ion cartridge to valve assembly bracket, 21-85152-000 prior to installing bracket on the bus. Ion cartridge is installed using cushion clamps, nylon spacer, and appropriate hardware.
 - a. If clearance checks for the brass assembly were not performed in the previous step, it is recommended to not fasten the brass assembly to the bracket.
 - b. Perform clearance checks and fitting rotations, if needed, at this step
4. Install valve assembly bracket
5. Install the brass valve assembly
6. Install silicone reducers from brass valve assembly to bus pump and to HVAC unit.
 - a. These reducers will have to be trimmed in order to fit properly. Be sure to not trim the reducer too short as this would yield poor hose clamp securement
7. See Detail K for a fully assembled bracket
8. See Detail L for installation of brackets, ion cartridge and brass assembly in the bus

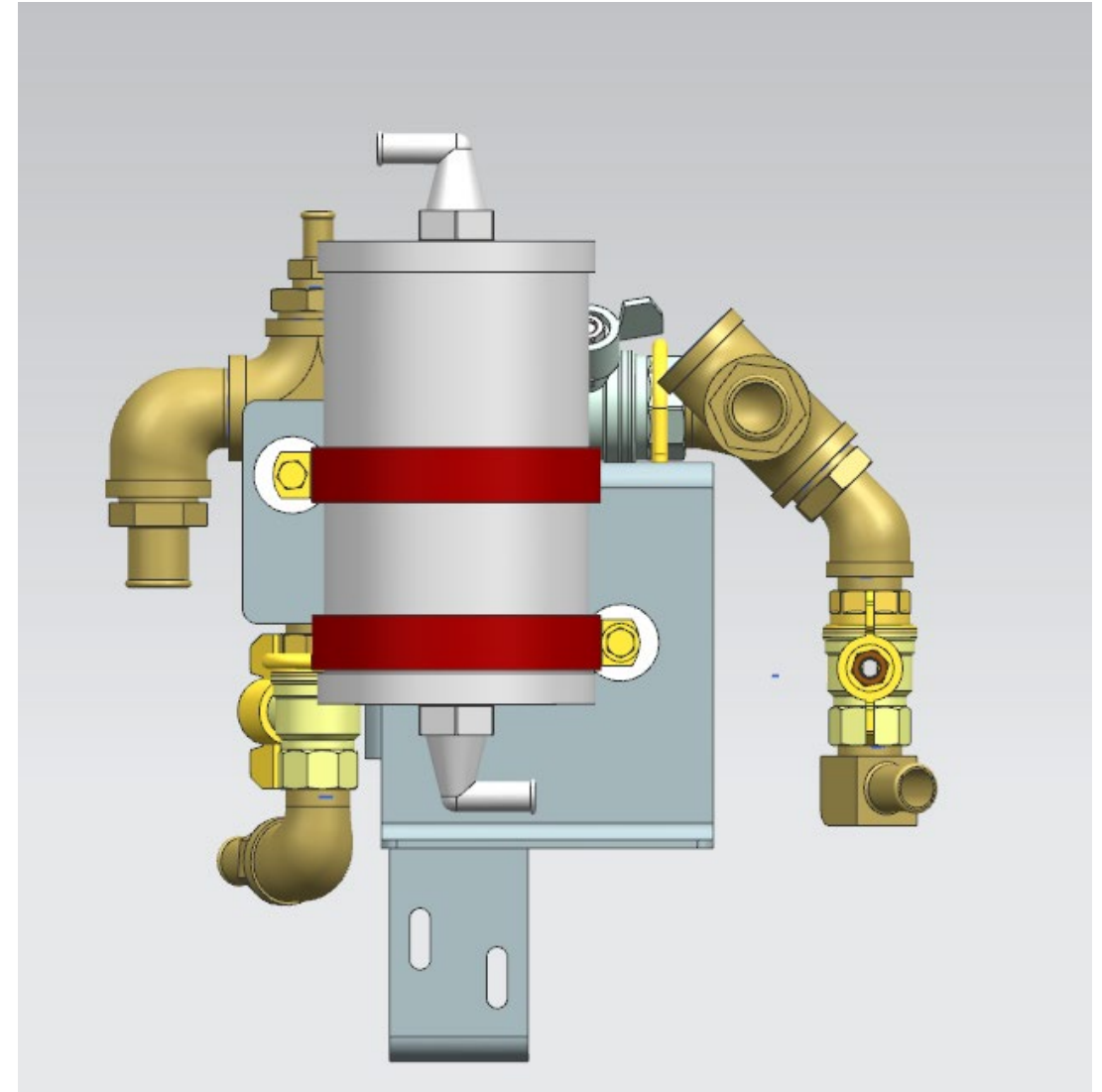
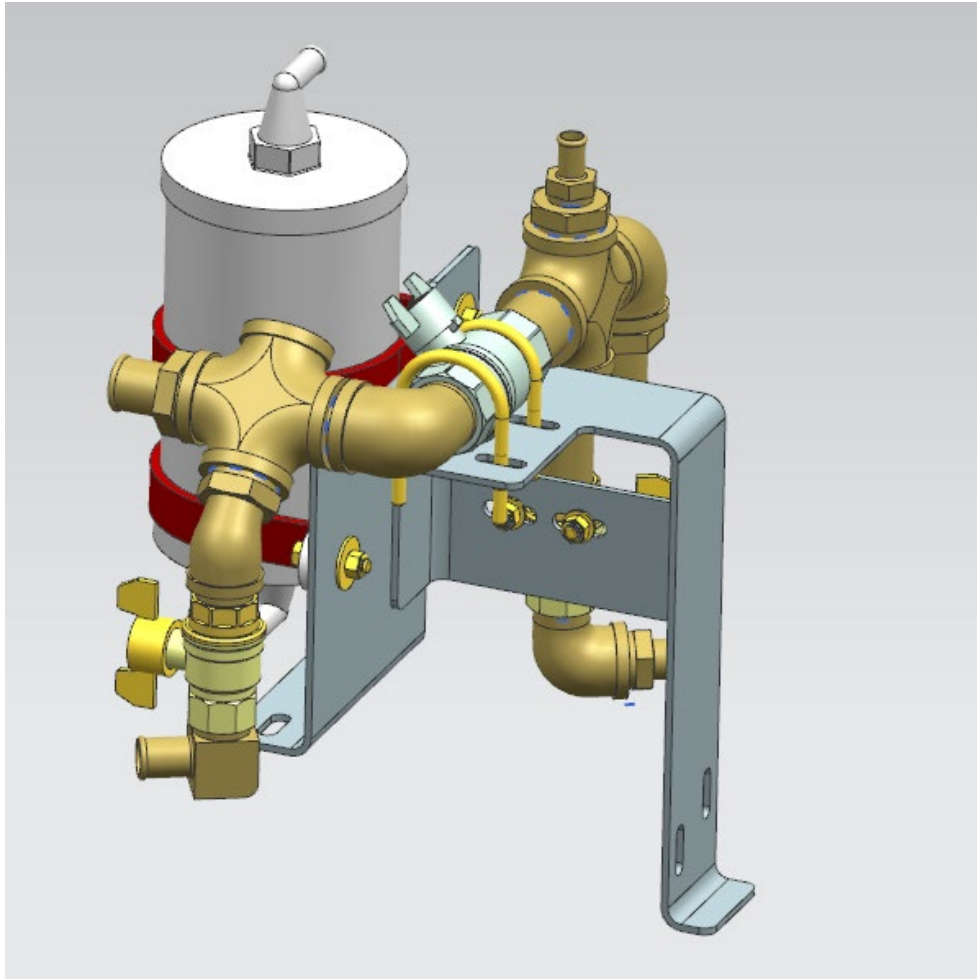
Detail J



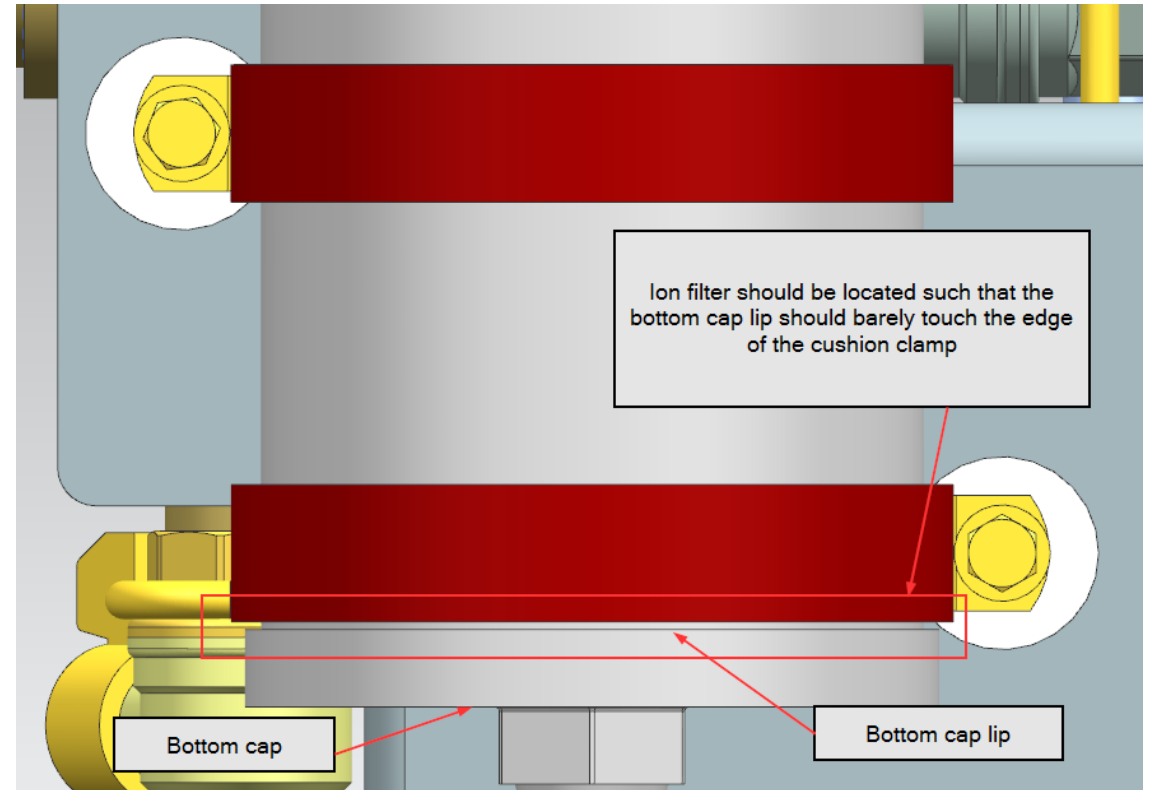
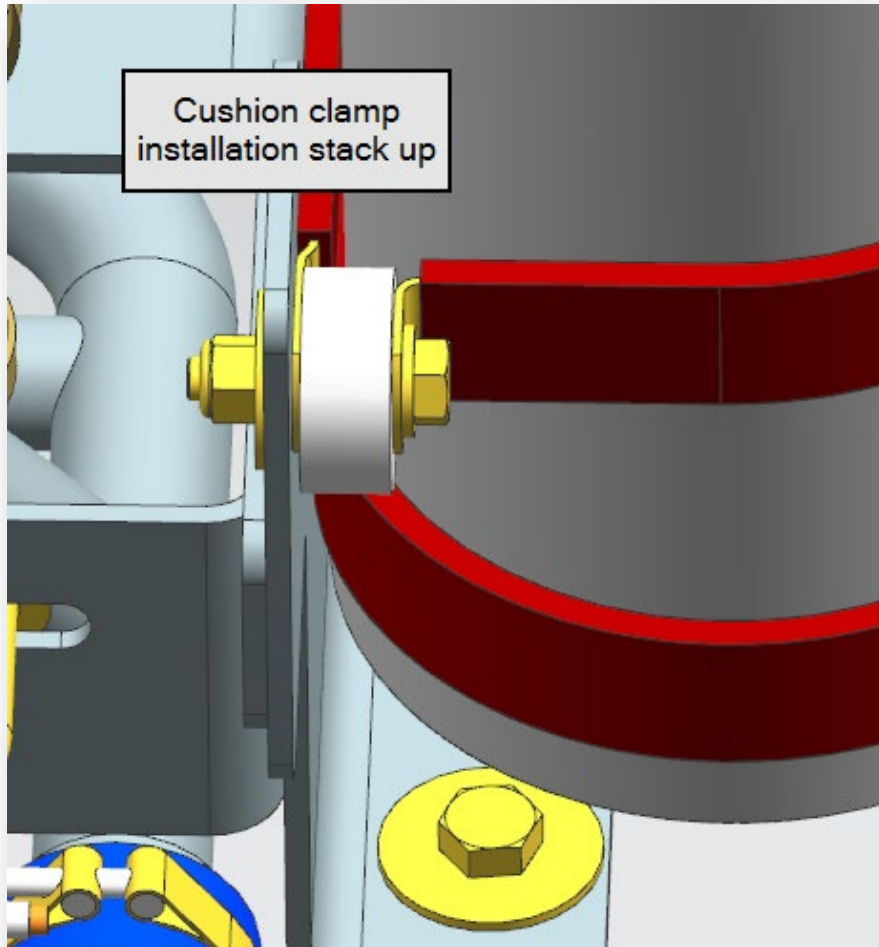
Detail J continued....



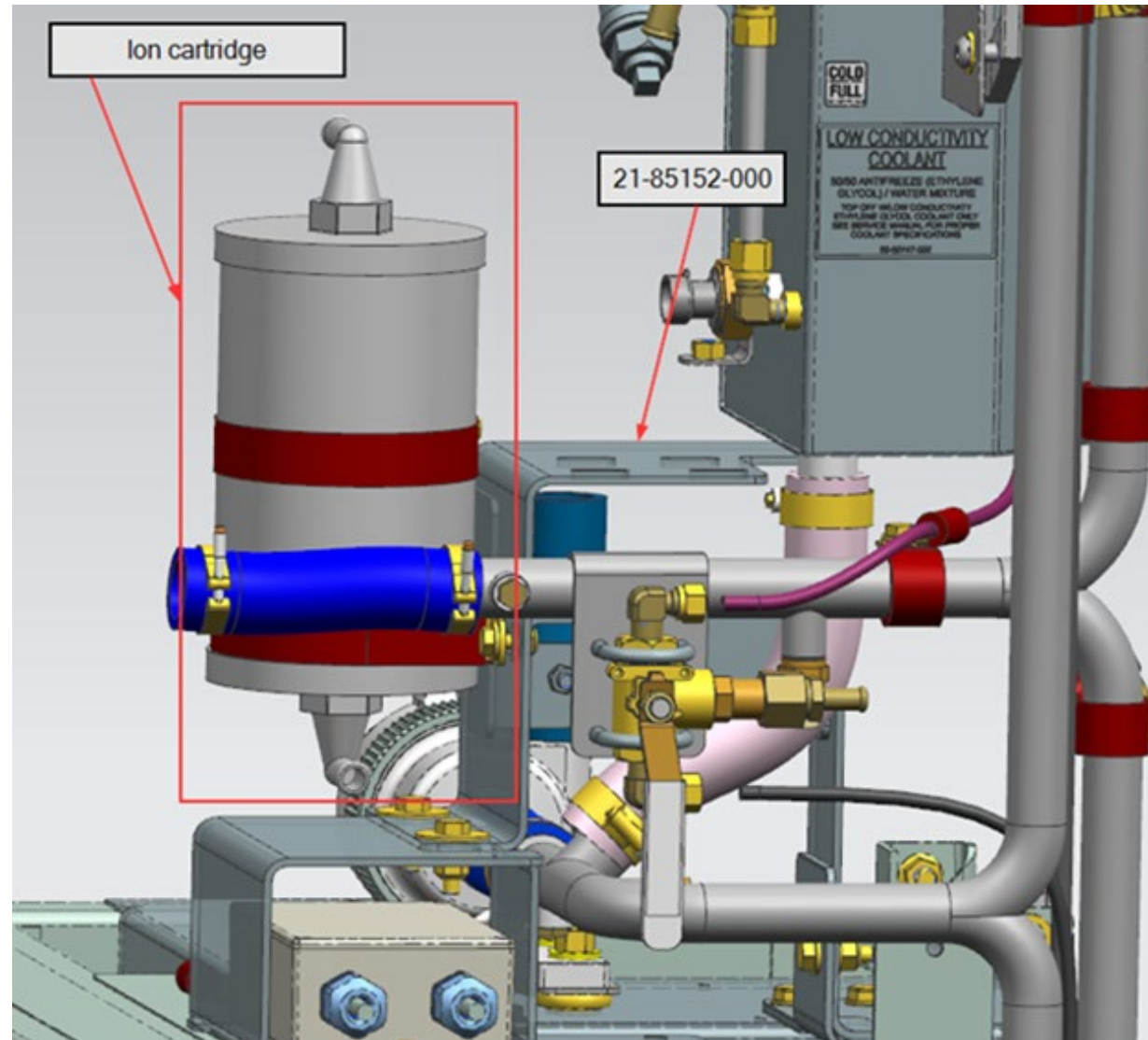
Detail K



Detail K continued....



Detail L



Step 9: Re-install surge tank

1. Re-install reworked surge tank
2. Existing hardware will be used for re-installation
 - a. It is best to have the hardware loosely installed on the surge tank before re-installation
3. Be cautious when re-installing tank that the mounting tab on the back side of the tank does not cut or damage the HV cables running down the side of the bus
4. Surge tank should be at the same height
 - a. If tank needs to be translated upward. Slack should be found in the level sensor, both nylon air lines, and supply line as that will limit translation upward.
5. Re-install main supply line on the bottom of the surge tank
6. Re-install both nylon air lines
 - a. One on the filler neck
 - b. One on the rear of the tank
7. Re-install level sensor cable

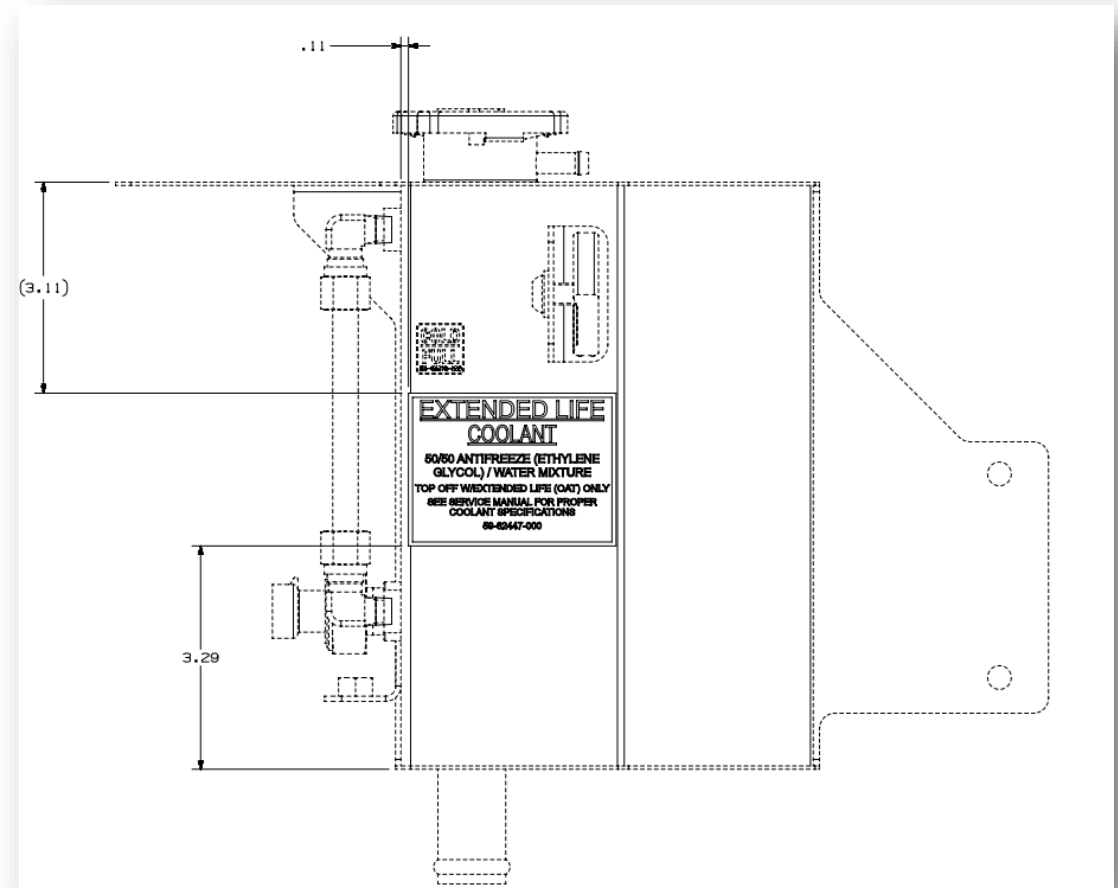
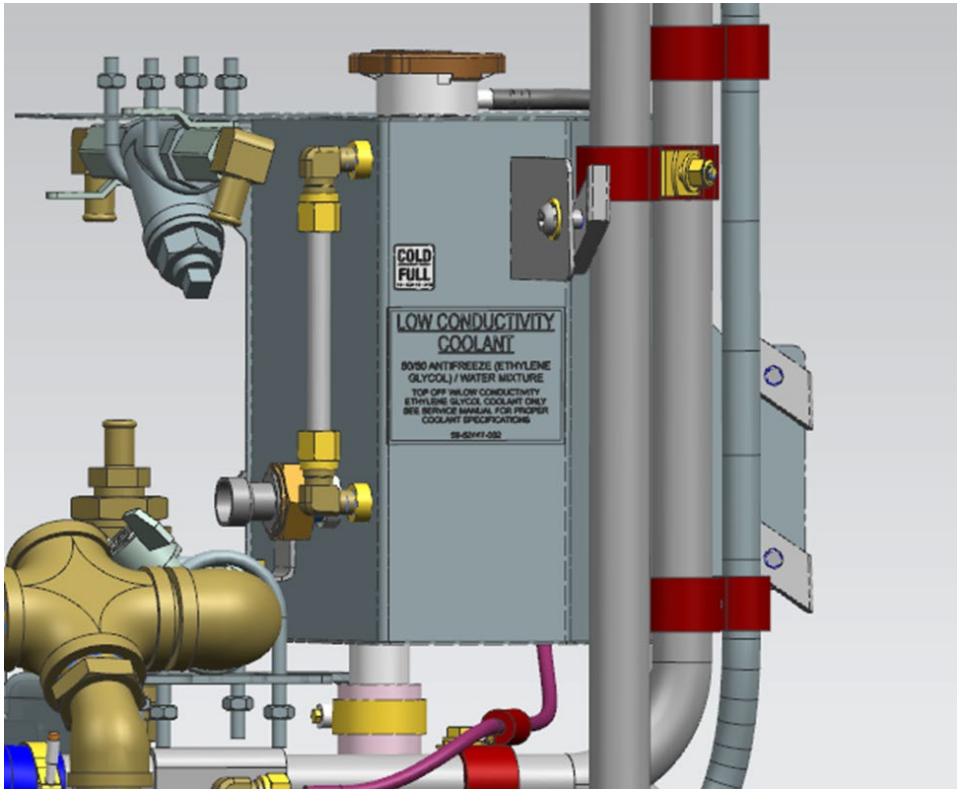
Step 10: Install the new Y-strainer

1. Remove the $\frac{1}{4}$ valves soaking the cup of deionized water and rinse off with deionized water
2. Build up Y-strainer assembly
 - a. 2 – $\frac{1}{4}$ valves. These valves would be the valves from the old coolant filter assembly that were washed out with deionized water.
 - b. Y-Strainer
 - c. 2 – 90 deg elbow, 0.50 hose bead-0.375MNPT
3. Install Y-strainer assembly to the surge tank
 - a. While installing the U-bolts that mount the strainer to the surge tank, ensure they do not contact the HVAC transition duct.
4. Ensure the $\frac{1}{4}$ turn valve handles are free to fully open and close without contacting any other components.
5. Ensure the strainer basket is pointed down
6. See Detail M for Y-strainer assembled proper fitting orientation

Step 11: Install coolant decal on surge tank

1. Locate and install new decal per Detail N

Detail N



Step 12: Post upfit vehicle check

1. Check all hose clamps are tightened and properly installed
2. Check for rubbing and clearance issues between all components
3. Check that all parts are installed, and no parts are missing
4. Check all hardware is installed and torqued to spec

Vehicle Set Up Complete

Flush and Fill Procedure

Precaution Notes

- Low Conductivity Coolant must remain in the original container until placed in the vehicle cooling system. Keep all containers closed until use. Do not move to a temporary storage container.
- Do not use any carbon steel containers to hold deionized water or low conductivity coolant.
- All fill equipment must be compatible with the coolant, do not change any fill equipment without approval.
- Use only deionized water for cleaning of fill equipment

Valve Identification and Function

V1 Inline Flow Control Valve

- Open allows coolant flow from bus pump to flow to the batteries. Open during normal operation
- Closed blocks coolant flow from bus pump and directs coolant to flow out V3. Closed only during flush and fill

V2 Remote Supply Valve

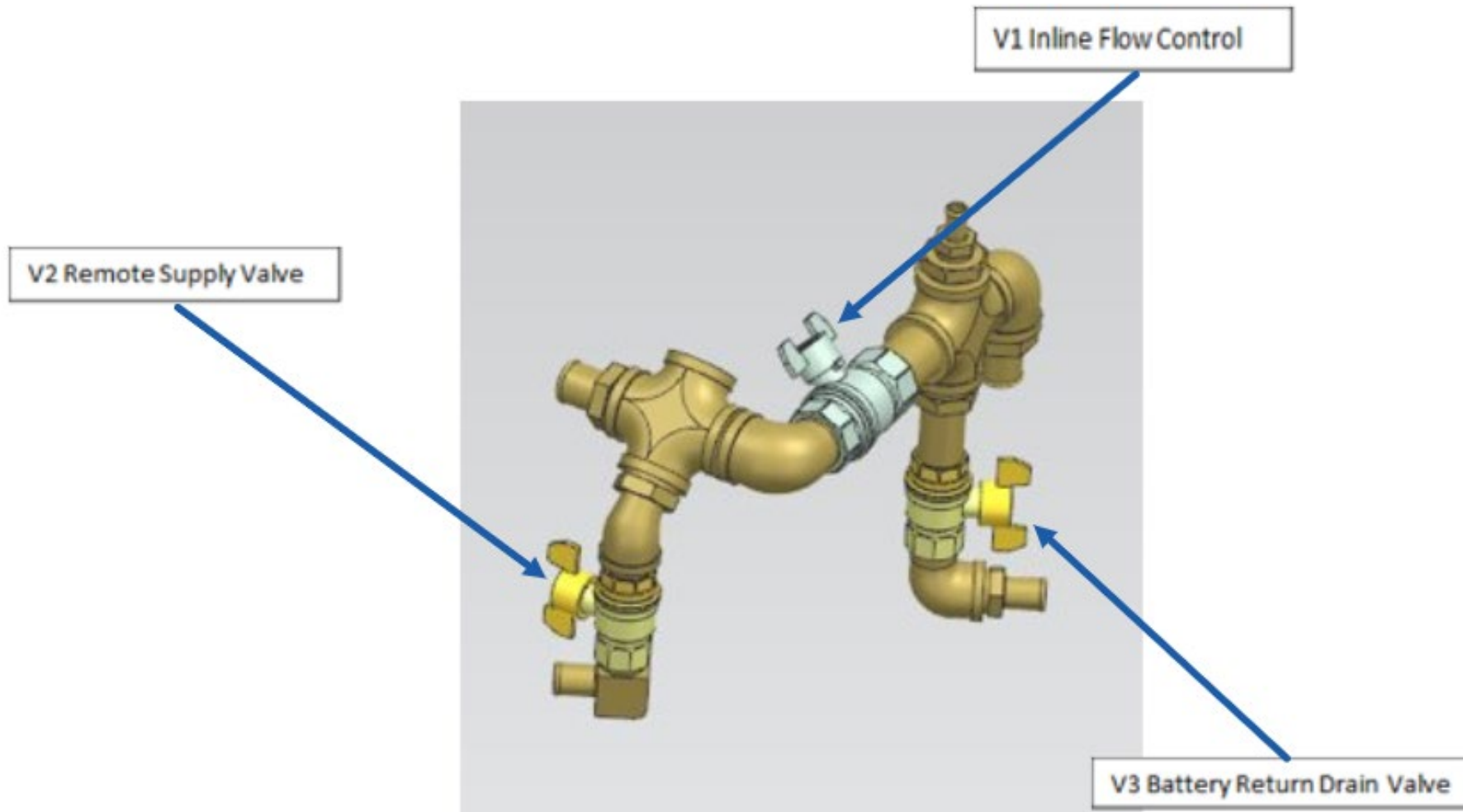
- Open allows coolant flow from bus pump to flow to the batteries. Open during normal operation
- Closed blocks coolant flow from bus pump and directs coolant to flow out V3. Closed only during flush and fill

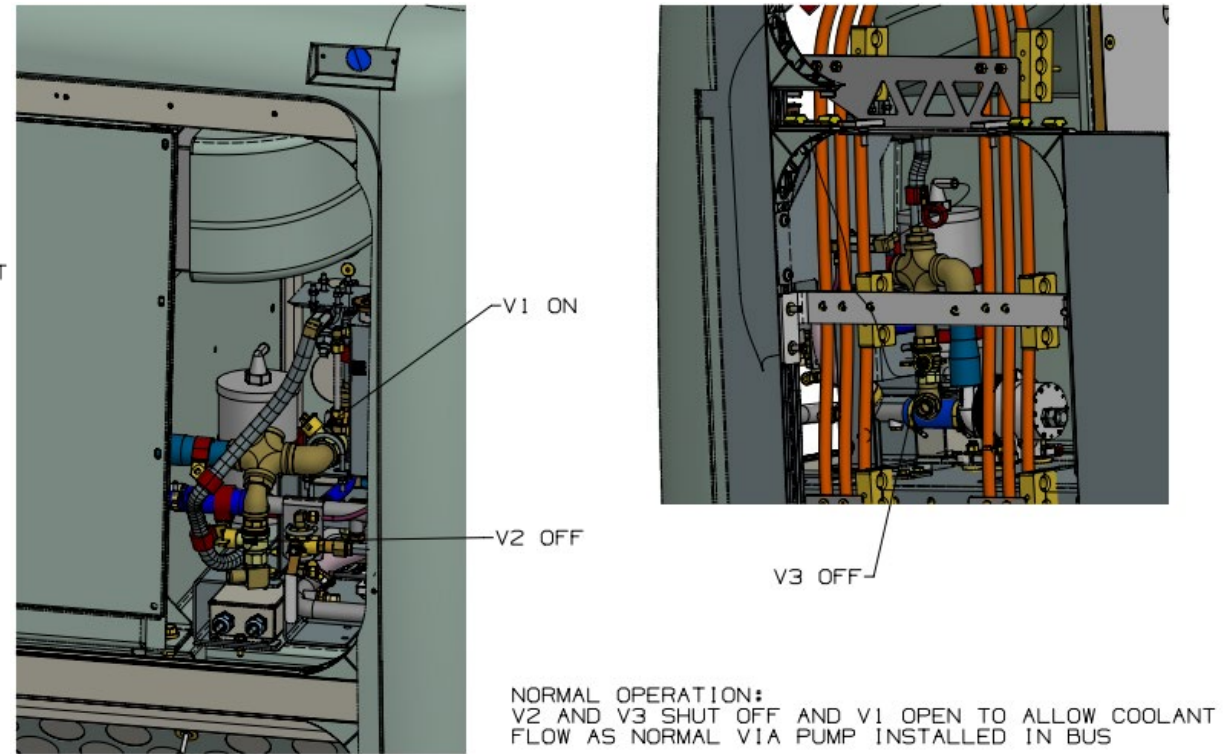
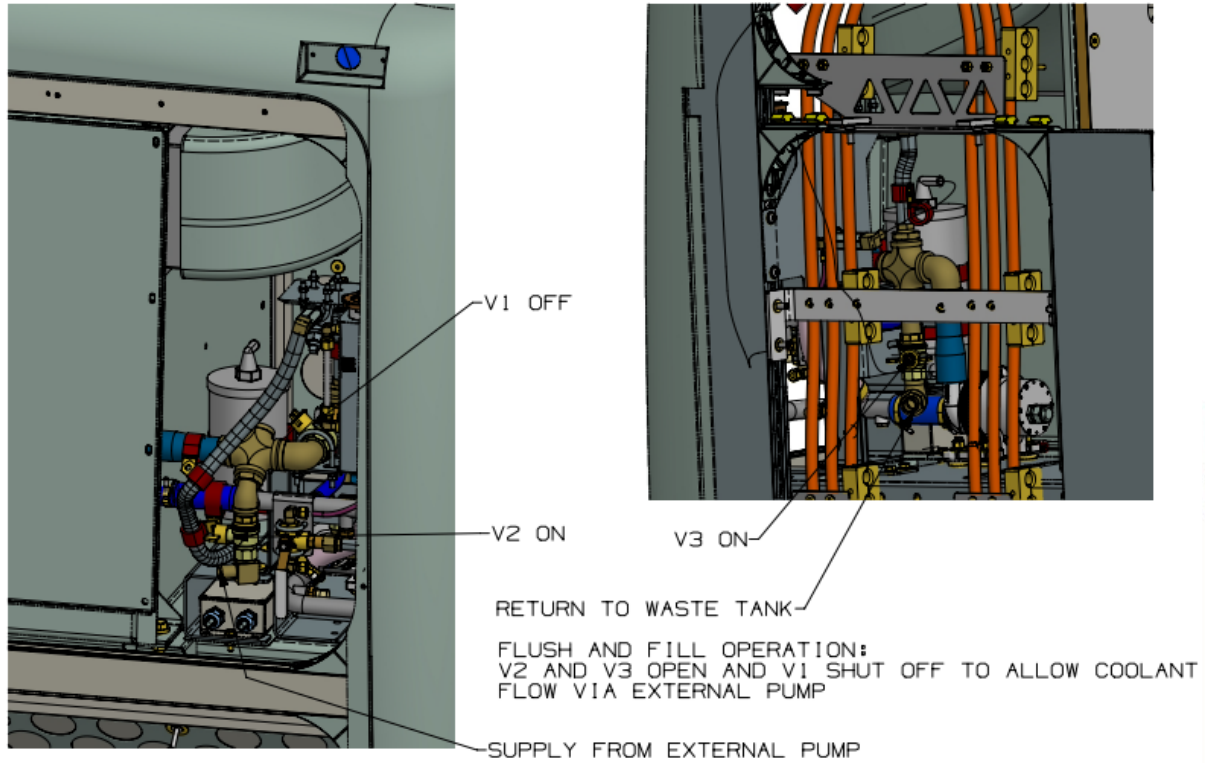
V3 Battery Return Drain Valve

- Open to allow discharge flow. Open only during flush and fill
- Closed to block flow. Closed during normal operation

V4 Discharge Diversion Valve

- Position 1 Flow directed to waste drum
- Position 2 Flow directed to remote pump inlet



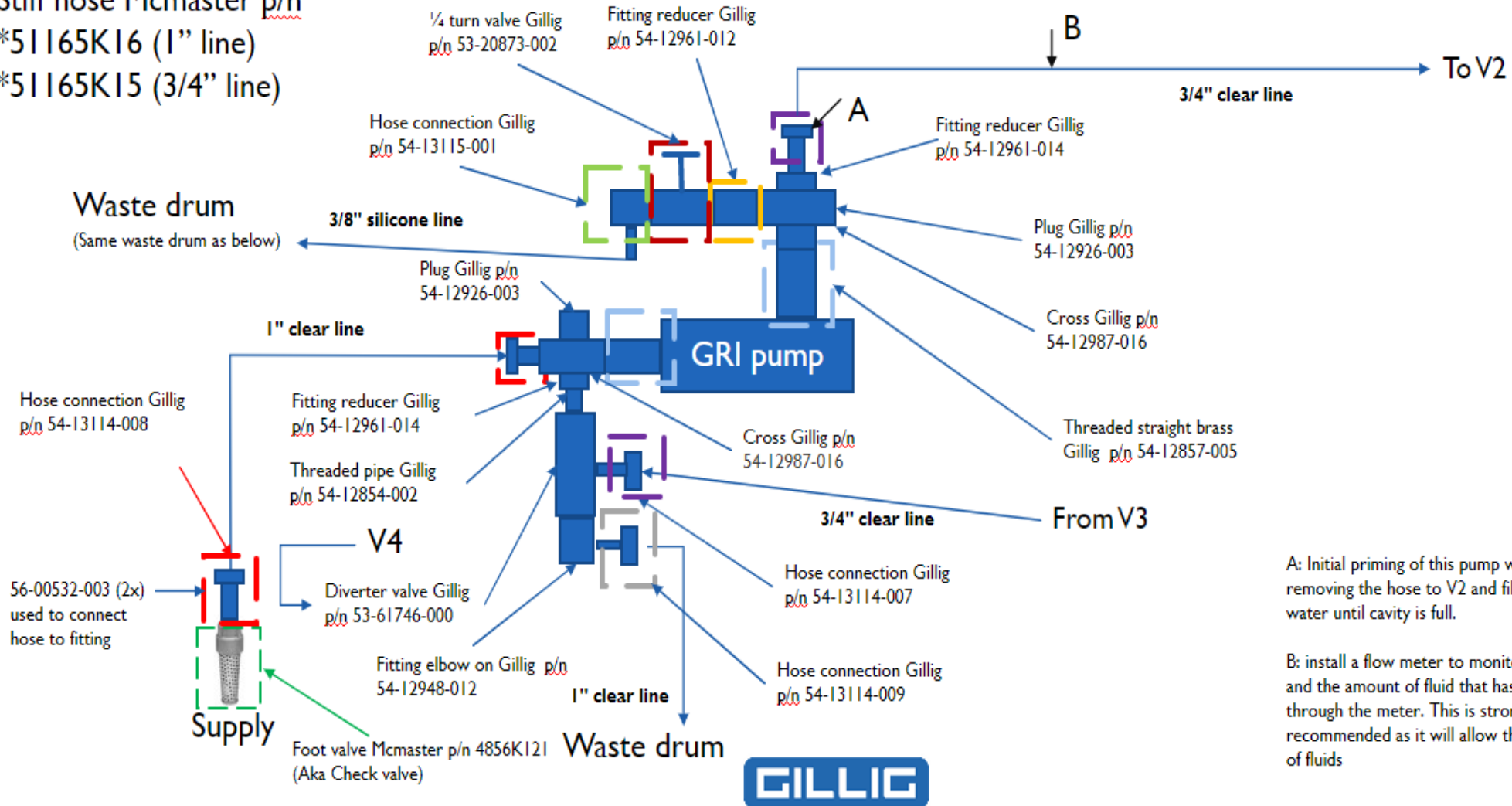


Step 1: Set up remote pump, hose connection, prime

1. Route drain hose coming off of **V4 (Diverter valve)** into waste drum.
2. Connect hose from **V3 (Battery return drain valve)** to **V4**
3. Route suction hose coming from the remote pump into **supply barrel**.
4. Ensure the remote pump is prime of fluid at the discharge port before connecting a hose from **V2 (supply valve)** to remote pump discharge port.

TESTING SET UP

Stiff hose McMaster p/n
 *51165K16 (1" line)
 *51165K15 (3/4" line)



A: Initial priming of this pump will occur by removing the hose to V2 and filling with DI water until cavity is full.

B: install a flow meter to monitor flow rate and the amount of fluid that has passed through the meter. This is strongly recommended as it will allow the monitoring of fluids



Step 2: Preparation

1. Place an additional 5-gallon bucket under surge tank drain line which is located at rear curbside corner of the bus.
2. Close all three ¼ turn valves at strainer and ion exchange cartridge piping to prevent flow through the ion exchange cartridge during flush. Will be opened prior to the coolant fill.

Step 3: Purge with Deionized Water

1. Ensure:
 - a. V2 (Remote supply) and V3 (Battery return drain) is open.
 - b. The valve at the chassis fill port and V1 (Inline flow) is closed.
 - c. V4 (Diverter valve) is switched to position 1.
 - d. 3-way valve is closed.
 - e. Pressure cap is on surge tank and red pressure lever is down (closed).
2. **Turn on the remote pump.**
3. While the remote pump is running, watch the color of the discharging coolant. In about 20 gallons to 35 gallons (60 to 180 seconds) the color should go from red to clear. Color should be clear with no hint of red tint. If required continue to purge until clear.
4. While the pump is running, lift the red lever up (open) on the surge tank cap to allow the deionized water to purge into the surge tank. Hold until the tank sight glass is filled then flip red lever down (closed).

Step 3: Purge with Deionized Water continued....

5. While remote pump is still running move V4 Discharge (Diversion Valve) to position 2 to direct flow to the recirculation mode. Immediately turn off the remote pump.
6. Ensure:
 - a. V2 (remote supply) and V3 (battery return drain) are in closed position.
 - b. V1 (Inline flow) is open.
 - c. V4 (Diverter valve) is at position 1.
7. Turn LV on, day run on, and EV start to allow bus pump to circulate DI water in the system. CAUTION: if you perform recirculate with remote pump, any contamination in the bus can make it way to supply barrel and affect DI water overall.
8. After running bus for 10 mins. Turn off EV, day run off, and LV.
9. Ensure
 - a. V2 (remote supply) and V3 (battery return drain) are in open position.
 - b. V1 (Inline flow) is closed.
 - c. V4 (Diverter valve) remains at position 1.
- 10. Turn remote pump on.**
11. Allow ~10 gallons (~1 min) of DI water to pump out of the waste line.
- 12. Turn remote pump off.**

Step 4: Fill with Low Conductivity Coolant

1. Ensure:
 - a. V2 (remote supply) and V3 (battery return drain) are still in the open position.
 - b. V1 (inline flow) remained closed.
 - c. V4 (diverter valve) remain in position 1.
2. Place remote pump suction hose with foot valve into the drum of low conductivity coolant. Ensure the drum has at least 15 gallons of coolant.
3. Check for proper pump prime
4. **Turn on the remote pump.**
5. While the pump is running lift the red lever up (open) on the surge tank cap to fill the top of tank with coolant. Then lift red lever down (closed).
6. Allow 13-14 gallons to flow out the discharge
7. Take a sample of the final coolant at discharge hose
8. While remote pump is still running move V4 (Diversion Valve) to position 2 to direct flow to the recirculation mode. Immediately turn off the remote pump.
9. **Turn off the pump.**

Step 4: Fill with Low Conductivity Coolant continued...

10. Check the conductivity of the sample
 - a. 10 -15 micro-Siemens or lower continue to the new step
 - b. Above 10 -15 micro-Siemens move V4 back to the position 1 and restart pump and add about 1 gallon coolant. Repeat until 10 -15 micro-Siemens or lower.
11. Ensure:
 - a. V2 (remote supply) and V3 (battery return drain) are in closed position.
 - b. V1 (inline flow) is opened.
12. Drain supply hose going to V2 and drain hose going into V3 before disconnecting the fill and discharge hoses and install the caps.
13. Turn on the bus low voltage and then turn the Master Run Control to Day Run. This will turn on the bus coolant pump
14. Confirm the pump is running check the surge tank fluid level and check for leaks
15. Open all three ¼ turn valves in the strainer and ion exchange cartridge piping to allow flow to the cartridge.
16. Turn off the bus. Flush and Fill is complete.

