Battery Electric Vehicle (BEV) Cab Heater Diagnostics

Diagnostic Steps:

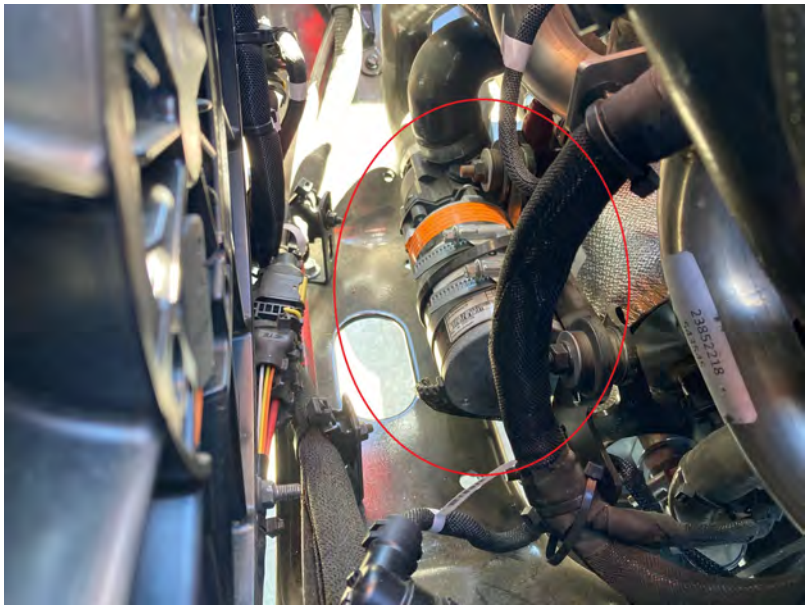
1. Has the Cab Heater update been performed?
   a. If No, please perform the update for improved cab heating.
   b. If yes, continue to step2

2. Is the coolant system full and system been bled?
   a. If No, fill coolant and perform bleeding procedures.
   b. If Yes, continue to step 3.

3. Do you have any heat out of the vents when ambient temperature is below 65f
   a. No Heat- See step 4
   b. Some heat- See step 5

4. If no heat, please check the power to component M122, which is at the bottom of the coolant piping.

Live UI



This is the Cab Heater Coolant Pump. It draws fluid through the cab heaters and pumps it into the cab. Unplug the connector and check for power and ground on the harness side. You should have 24v and a good ground when the heater system is active.

a. No 24v- See step 6

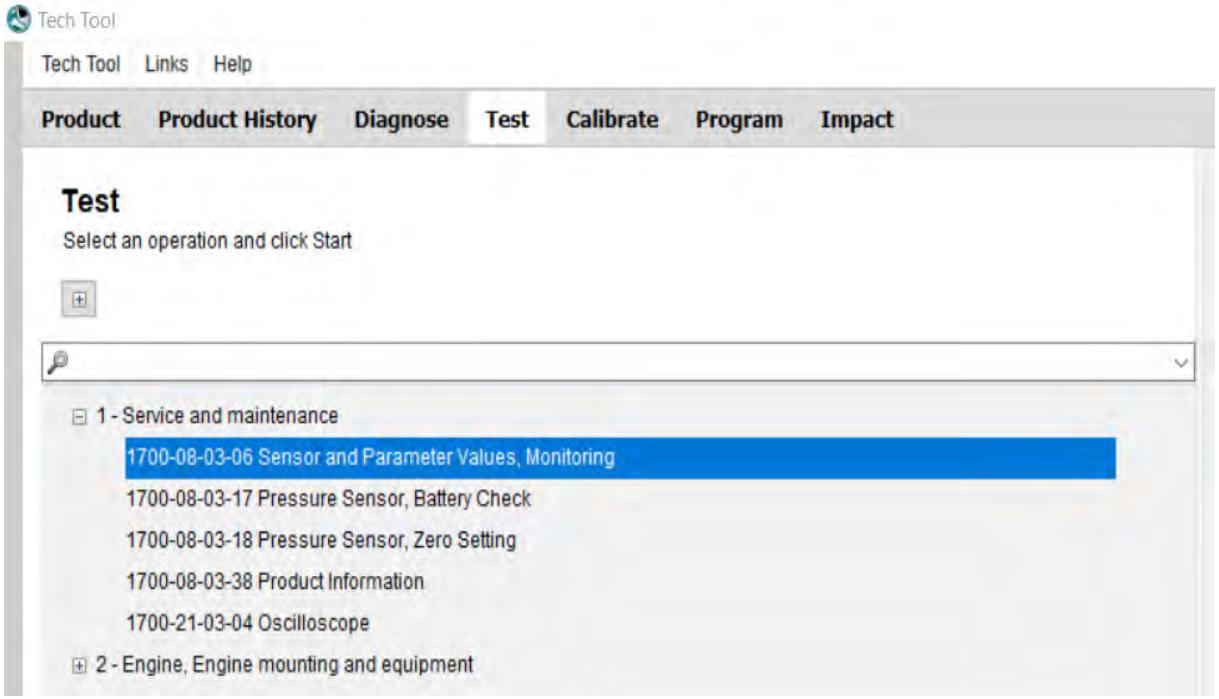
b. No Ground- See step 7

c. 24v and Ground OK- See step 5

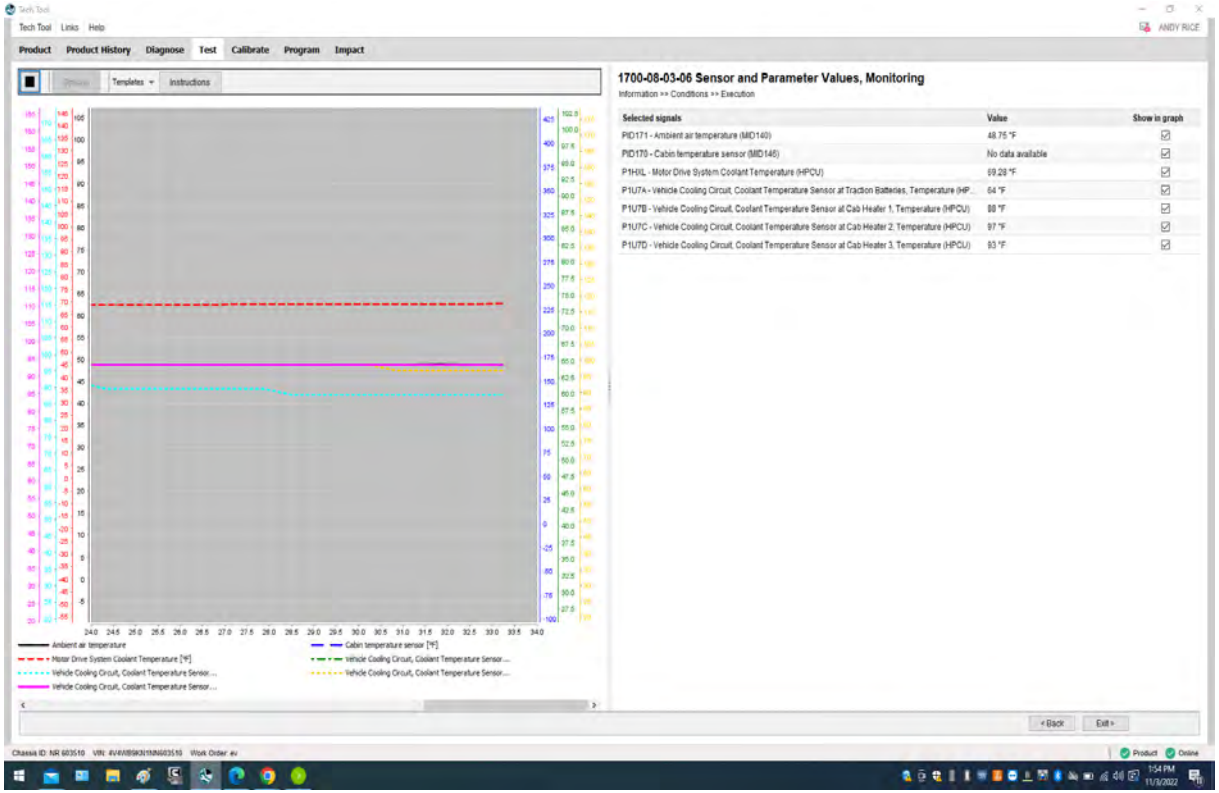
5. Checking the heaters - The truck is equipped with 3 heaters in the front for Cab Heat. Each heater draws around 75 amps and has a temperature sensor mounted into the housing.

a. Check heater temperatures with Tech Tool Function **1700-08-03-06**.

Live UI


Tech Tool
Tech Tool Links Help
Product Product History Diagnose Test Calibrate Program Impact
Test
Select an operation and click Start
1 - Service and maintenance
1700-08-03-06 Sensor and Parameter Values, Monitoring
1700-08-03-17 Pressure Sensor, Battery Check
1700-08-03-18 Pressure Sensor, Zero Setting
1700-08-03-38 Product Information
1700-21-03-04 Oscilloscope
2 - Engine, Engine mounting and equipment

Live UI



You should see temperatures more than 140 degrees F and all 3 heaters should have similar temperatures.

Note - the accuracy of these temperatures requires the pump to be functional.

No coolant flow will show lower temperatures.

i. If They are not equal, check the relay and amperage draw for whichever unit is not. See step 4b for amperage draw test.

b. Check amperage to each heater. This can be done at the bundle where the 3 heater cables are together. You will be looking for approximately 75 amps per wire, which would be ~225amps if measuring all three at once.

i. If amperage is equal but temperature is not, please replace the heater with low temps.

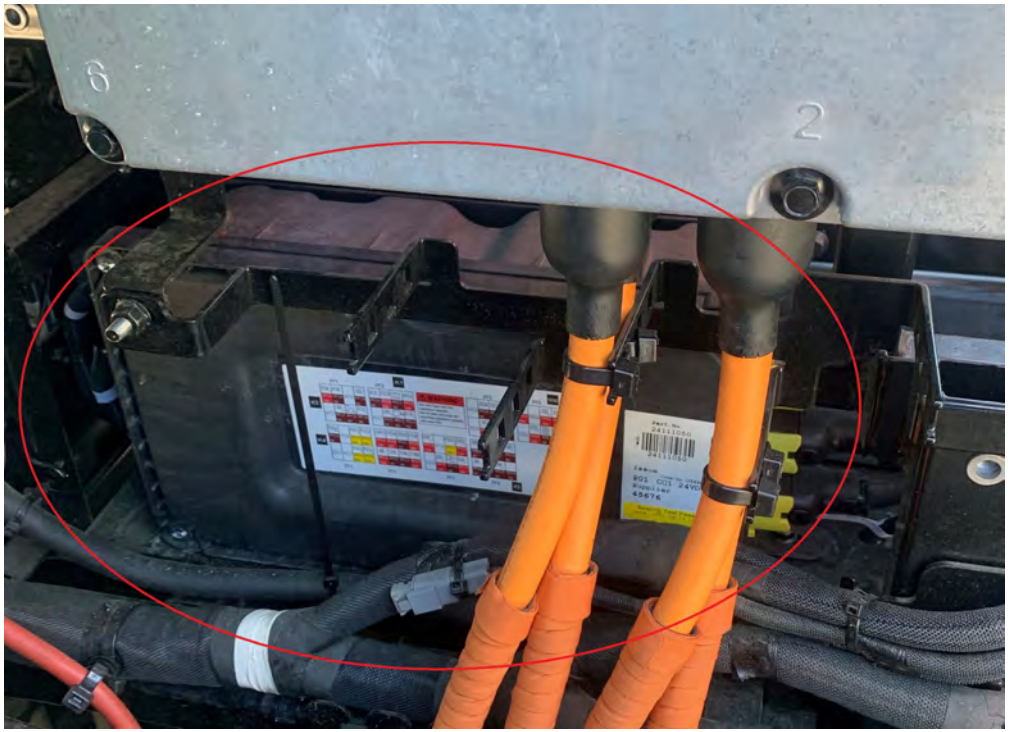
Live UI

ii. If amperage is low or zero on a heater, check its supply voltage at the relay and make sure the relay is activating.

1. Relay inop - replace

2. Relay working but no 24 volts to the relay, inspect the wiring back to the batteries.

6. No 24v to M122- first we need to check the fuse for being in good condition and having 24v. The fuse is located in the ECEC on the passenger side of the engine bay(behind traction cables).



Fuse labeled CHPU in section PF4(10amp) and should have 24v to both side.

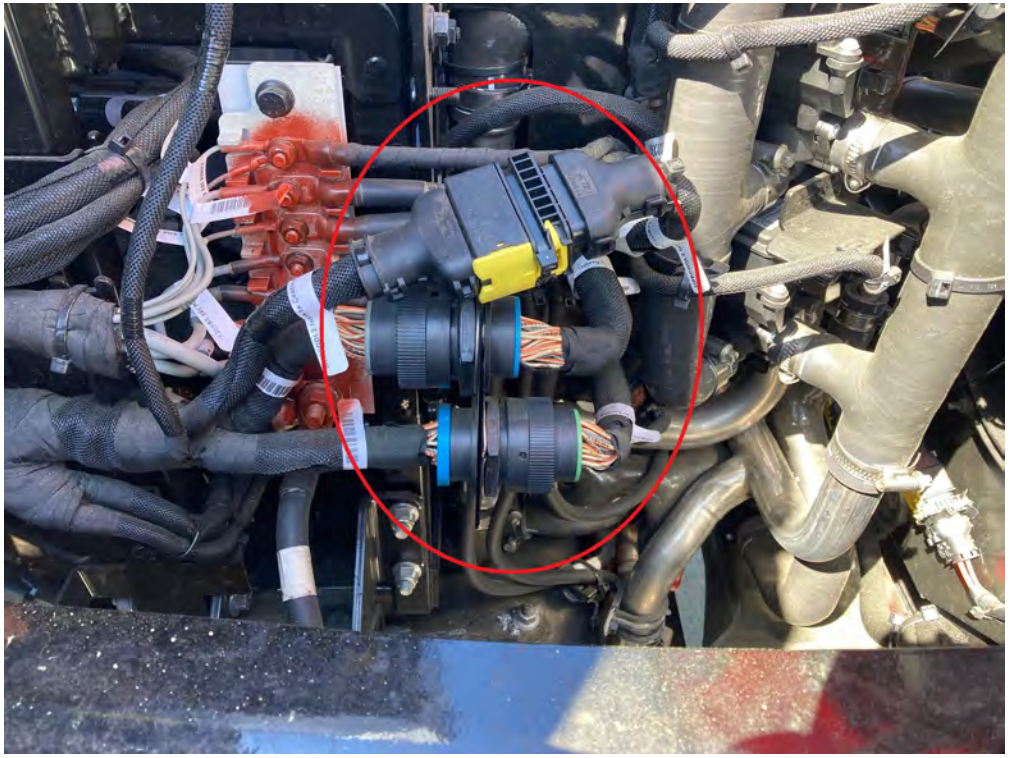
a. Fuse blown - Replace with 15a fuse and perform continuity checks from fuse to pump. You want to see close to 0 ohms on the wire. Also check for a short to ground in the wiring. If tests are good, retest the heater functionality

b. No 24v to fuse- Check relay K4 in the ECEC for powers and ground. You should have 24v ɔ two pins and ground to one when heater active. Then the output pin to the fuse.

i. No 24v at relay - check for 24v supply to the ECEC. If ok, replace ECEC

ii. No Ground- This is fed by the EVCM. Check for continuity to pin B:53 at the EVCM. If no continuity, check wiring back to the EVCM for any faults. Repair or replace as needed. If continuity is ok, see Step 7

c. Fuse good- Check continuity from fuse to pump for open circuits. The harness comes out of the rear of the ECEC and then goes forward to 2 round connectors. Connector MPBCOOL1 contains the 24v(Pin 7) and ground(Pin 8) wire for the M122.



Visually inspect those connectors for damaged or pushed pins. Test for continuity back to the fuse and from the connector to the pump.

i. No continuity to fuse- Check continuity from ECEC connector to MPBCOOL1 connector.

1. Good continuity- inspect both sides of the connection and replace ECEC if no issues are seen.

2. NO or Poor continuity- check harness for faults and repair/replace as needed.

7. No Ground to Pump - As mentioned in step 6c, the ground wire comes from the pump and goes through the MPBCOOL1 connector pin 8.

a. Check pin 8 at MPBCOOL for any issues.

i. If OK, continue to step 7b

ii. If Not Ok, repair or replace as needed.

b. Check continuity from Pin 8 to pump.

i. If OK, continue to step 7c

ii. If Not OK, inspect the harness for any issues. Repair or replace as needed

c.Check continuity from pin 8 to B6 at the Low Voltage Grounds

i. If Ok, confirm that the grounds to the Low Voltage Grounds rail are ok

ii. If Not OK, check the harness for issues. Repair or replace as needed.

Tags bev heater cab heater mack volvo

Categories *

Make and Model > Mack > LR Electric

Make and Model > Volvo > VNR Electric

Vehicle System > HVAC

Feedback

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Give feedback to help improve the content of this article

Related links and attachments

VNe Cabin heater update

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VOLVO VNe

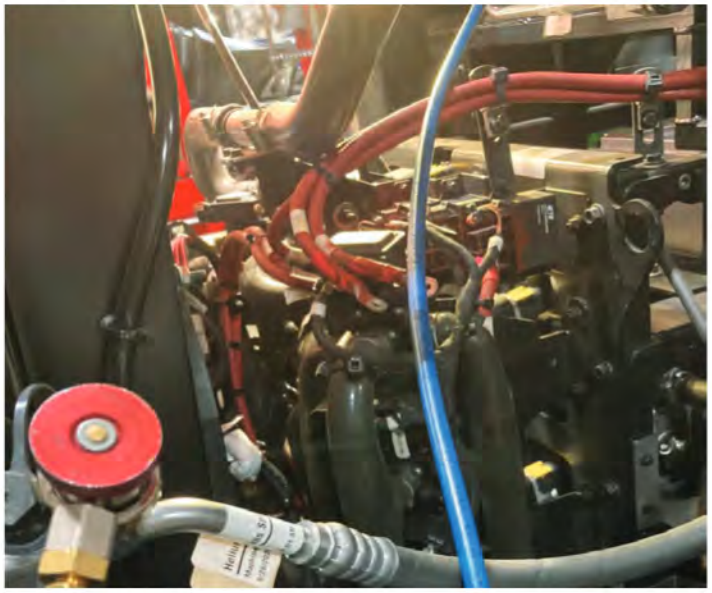
P4290 Phase 1 Cabin Heater Update

Parts List

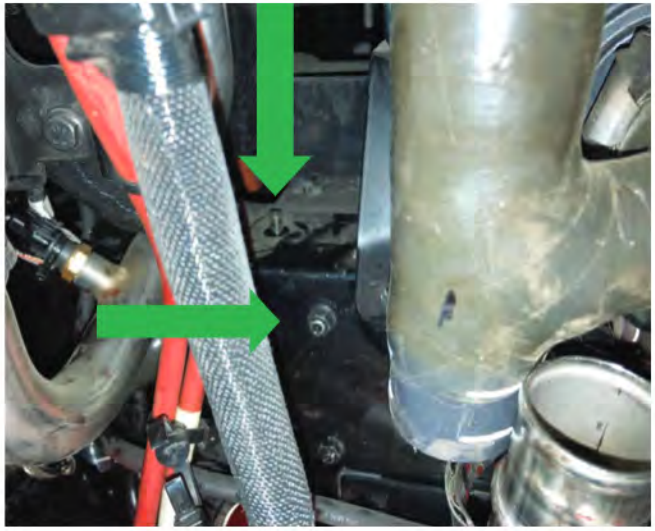
PN	Description	Qty.
21078879	HOSE CLAMP, 32-32	2
24052964	CHECK VALVE,1/3 PSI	1
24052959 or 24078779	COOLING HOSE,COOLING BOX	1
24052962	COOLING HOSE,COOLING BOX	1
24056986	COOLING HOSE,RETURN LINE	1
24052967	COOLANT PIPE,COOLING BOX	1
24078777	COOLING HOSE	1
24052174	COOLANT PIPE,STATIC FILL	1
24052018	COOLING HOSE,STATIC FILL	1
24078785	BRACKET	1
24110412	SUPPORT	1
24078783	BRACKET	1
23996631	Heater Insulation	2

1. Follow Impact procedure 2621-03-02-08, to step 71 then follow steps to remove piping.
2. Take pictures of existing routing/clipping.
3. Disconnect 24v to heater relays (3)
4. Remove 24v cables, coolant pump, heaters and heater bracket
5. Remove 4 bolts on each side.
6. Disconnect harnesses and grounds on RH Side.
7. Start to Remove assembly.
8. When starting to lift assembly there is one hose behind the assembly, one hose on the back LH and RH that need to be loosened for assembly to come out.
9. Once assembly is out start to replace parts as shown below.
10. Install assembly
11. Install cooling package
12. Then follow procedure: 2609-02-01-01 Coolant, filling

Step 3

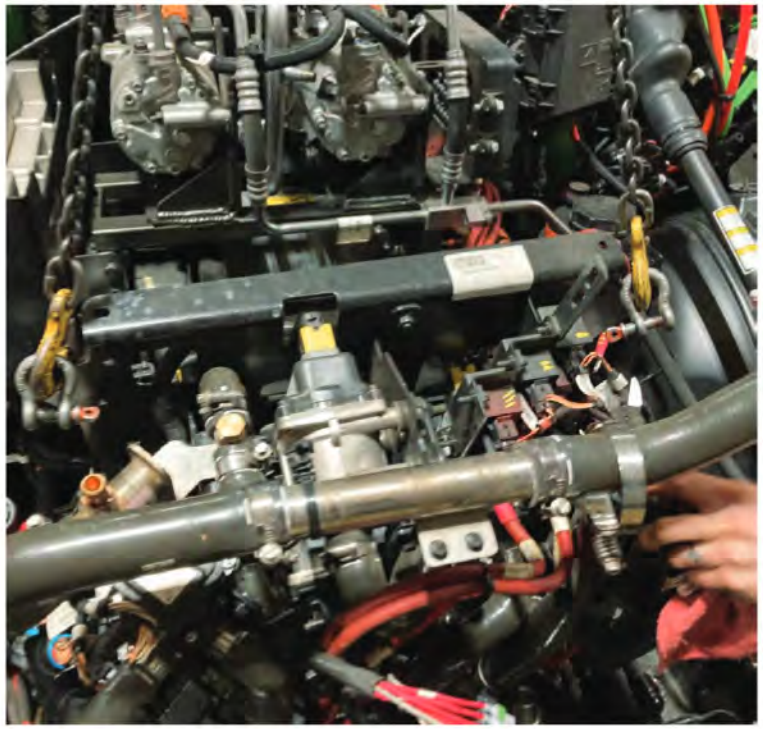


Step 4

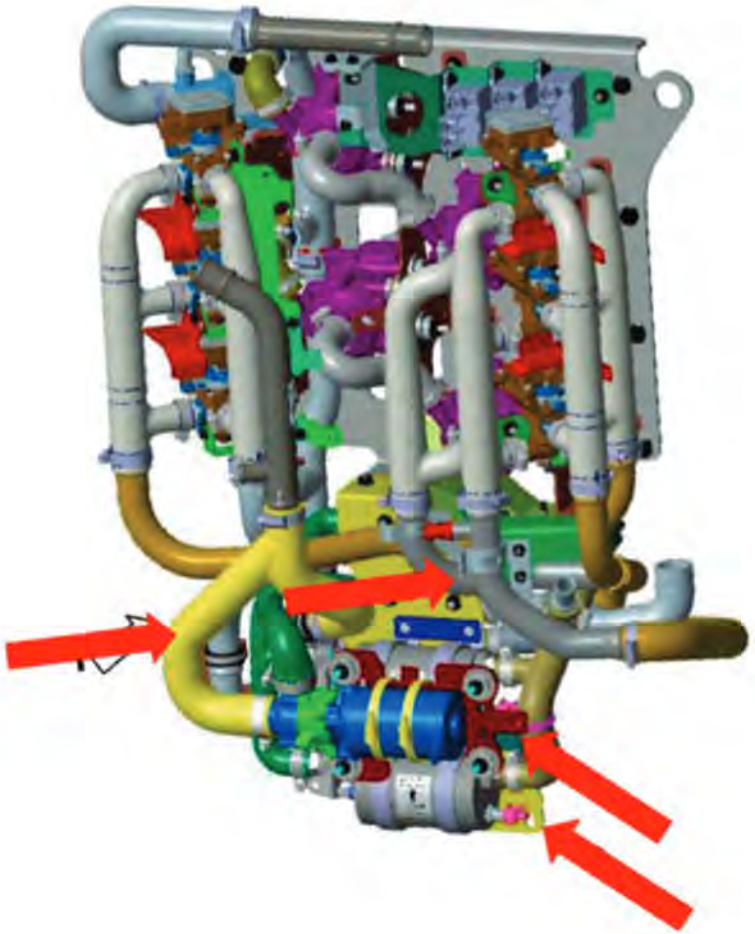


Step 7

Step 8

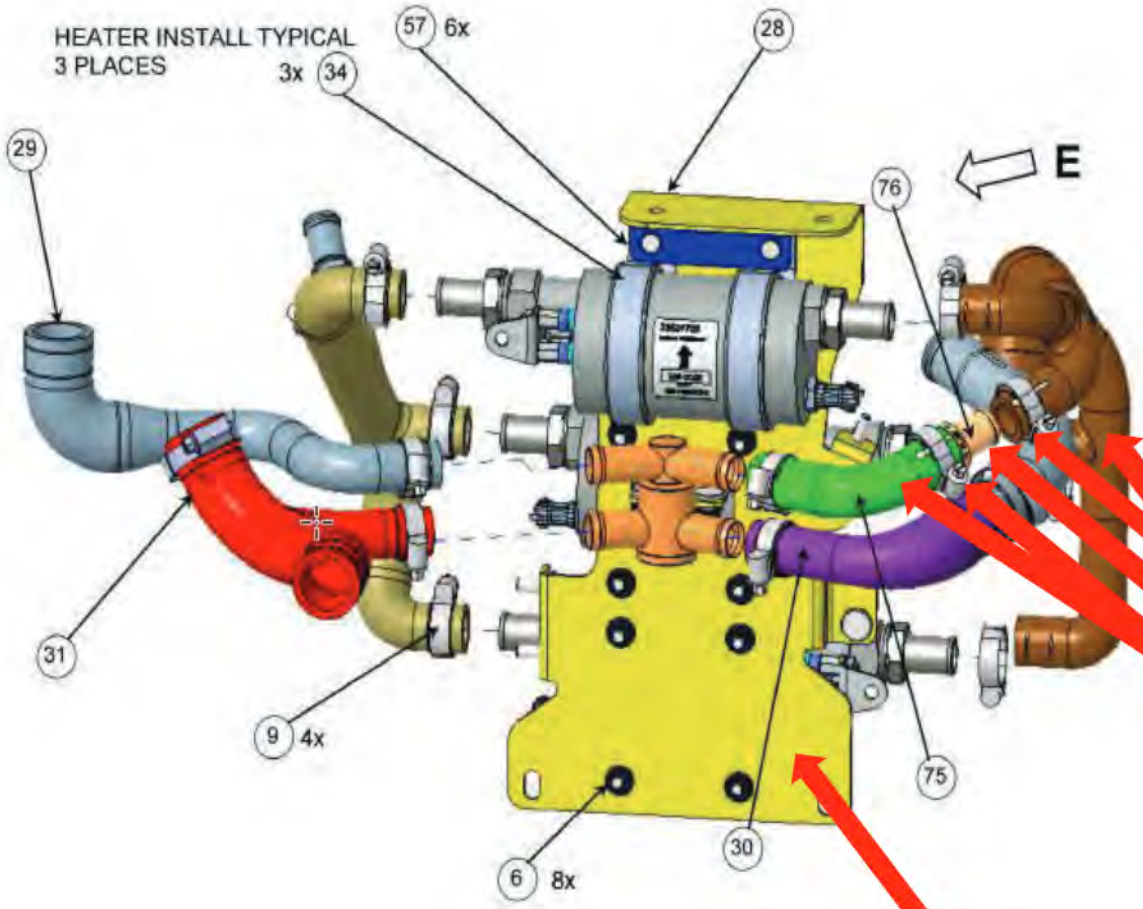


Step 9 – Part Replacement



- **Components with RED arrows to be changed.**
  - **Yellow Hose**
    - **PN: 24078777**
  - **Dark Gray Pipe**
    - **PN: 24052967**
  - **Yellow Bracket**
    - **PN: 24110412**
  - **Blue Brackets**
    - **PN: 24078283**
    - **PN: 24078285**
  - **Check Valve**
    - **(Shown in next image)**
    - **PN: 24052964**
  - **Green Hose to Check Valve**
    - **(Shown in next image)**
  - **Brown Hose to Check Valve**
    - **(Shown in next image)**

Step 9 – Part Replacement



View of the back side of bracket

- **Yellow Bracket**
  - **PN: 24110412**
- **Check Valve**
  - **MAKE SURE FLOW ARROWS ALIGN ON PIPES and VALVE**
- **Green Hose to Check Valve**
- **Brown Hose to Check Valve**

PN's:

- 21078879 (Qty. 2)
- 24052964
- 24052959 or 24078779
- 24052962

PN: 24110412

Original vs NEW

Original

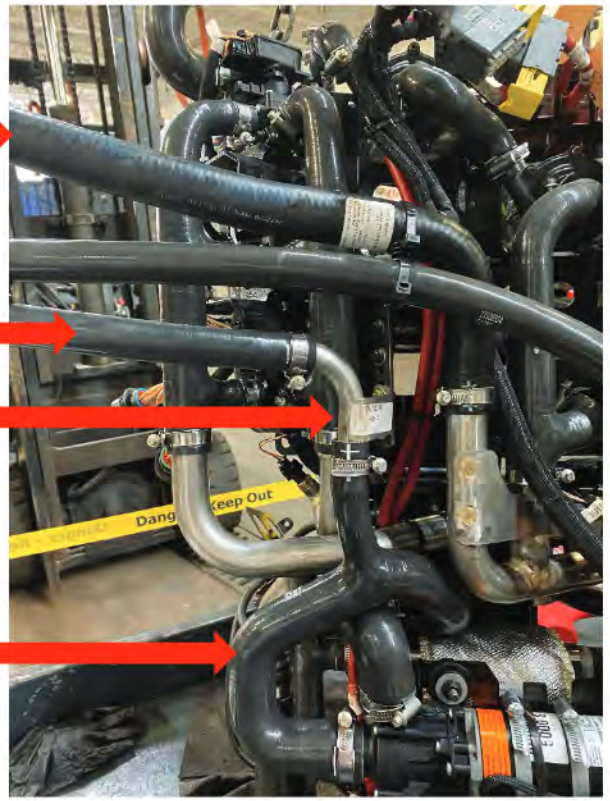
PN: 24052018

PN: 24056986

PN: 24052174

PN: 24078777

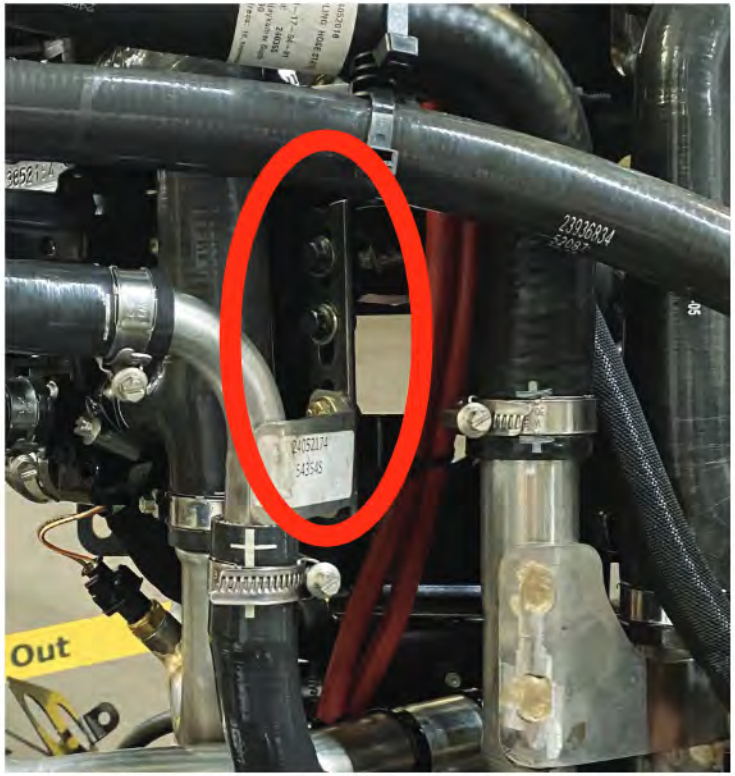
NEW



A Flat bracket may be needed to mount PN 24052174

Before Bracket

After Bracket



Original vs NEW

Original

PN: 24052018

PN: 24052967

PN: 23995971

PN: 23995971

NEW

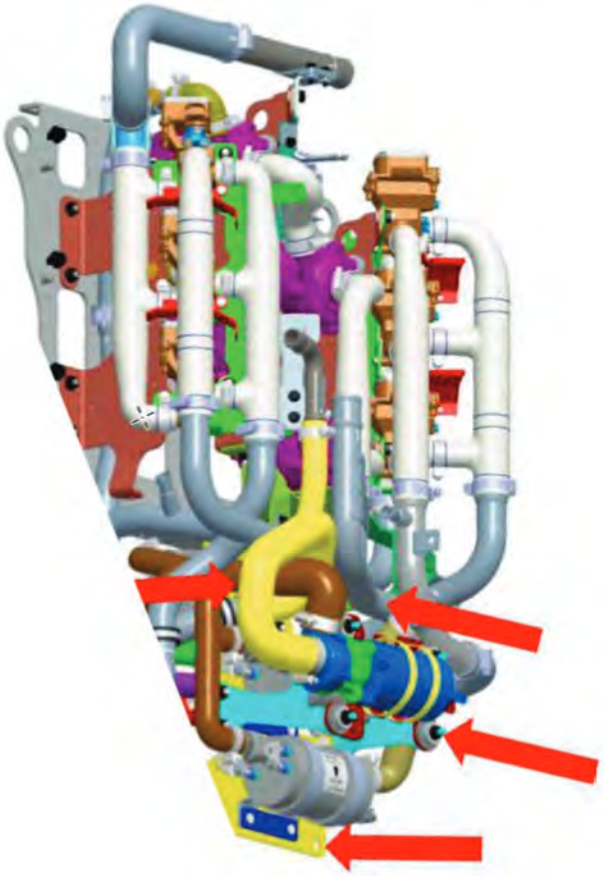
Only front TWO heaters get replaced

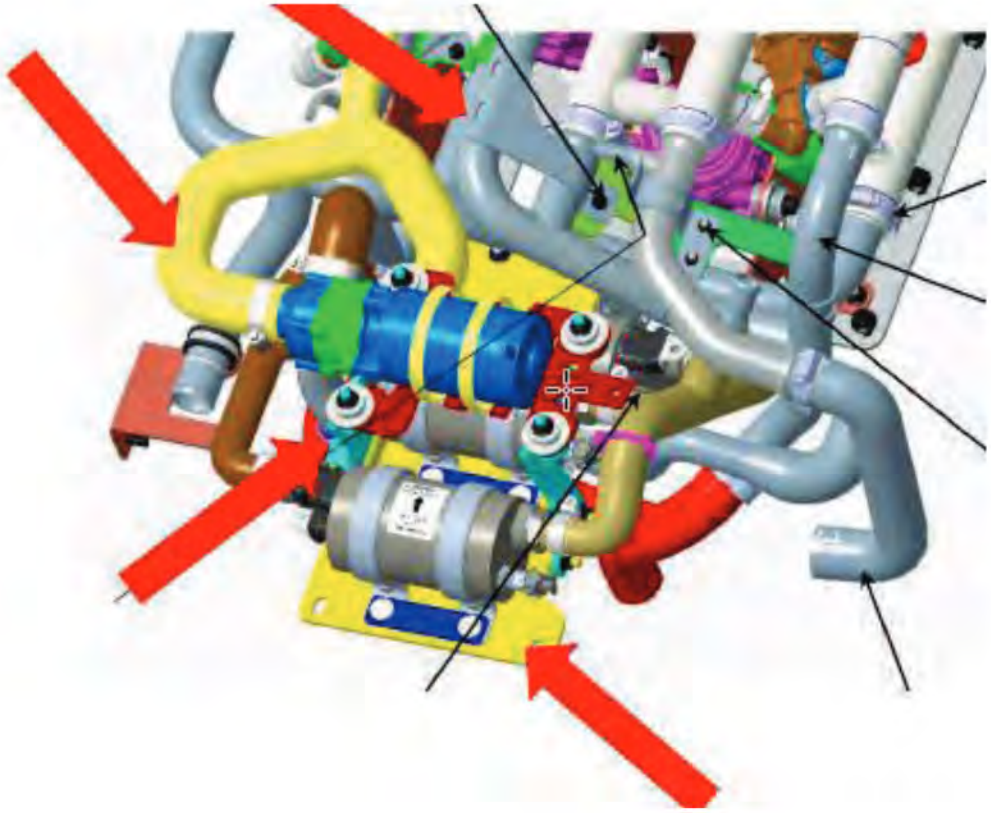
Original vs NEW

Original vs NEW

Original vs NEW

After installing new components





Completed Assembly