REFERENCE:	Nova Bus Manuals
SECTION:	14: Heating and Ventilation
RS N°:	MQR 7621-2507
EFFECTIVE IN PROD.:	NA

APPLICATION DEADLINES: 2025MA30
CLAIM REFERENCE NUMBER:WB5495

SUBJECT:	HVAC coolant pipe leaks.
JUSTIFICATION:	HVAC coolant pipe leaks from various solder locations

LEVEL	DESCRIPTION	DIRECT CHARGES		TIME
		LABOUR	MATERIAL	
1	Inspection for the cracks, leaks and AVT application for the solder joints	Nova Bus	Nova Bus	2 h
2	Replace the affected pipes in 10% of the 30 inspected buses	Nova Bus	Nova Bus	4 h

DISPOSAL OF PARTS

REMOVED PARTS ARE:	DISCARDED *	RETAINED	* Dispose of the unused parts and the defective parts in accordance with local environmental standards in effect.
	Yes	–	

REVISION HISTORY

REV.	DATE	CHANGE DESCRIPTION	WRITTEN BY
NR	2024FE09	Initial release	Devanand

APPROVED BY:

NQF772001 version 5

Irina Negoescu

Signature numérique de Irina Negoescu
Date : 2024.02.09 14:19:54 -05'00'

MATERIAL REQUIRED PER VEHICLE

QTY	PART Nº	REV.	DESCRIPTION
LEVEL 1			
–	–	–	–
LEVEL 2			
1	N85930	B	PIPE HTG SUPPLY
8	N20379	C	TUBE INSULATION 1 3/8" ID
1.25 LF	N43021	–	LOOM 1-1/2"
38	G5007995	–	CABLE TIE
1	N92370	A	PIPE HEATING RETURN
1	N100293	–	PIPE HTG ASSY SUPPLY AC353
3	N20378	C	TUBE INSULATION 3/4" ID
3	G5007996	–	CABLE TIE (0657558)
3	N79131	–	CONNECTOR F-IFL-12, M-NPT-12
1	N100099	A	PIPE HTG ASSY RETURN AC353
1	N100316	A	PIPE HEAT FRONT ASSY
0.25 LF	R015045	–	LOOM 3/4"
1	N100311	A	PIPE HEATING FRONT ASSY

Materials will be available within 77 days once your order has been placed.
To order, please contact novabus.parts@volvo.com
Or by phone for CANADA 1-800-771-6682, for USA 1-877-999-8808
Specify document number, quantity of parts required and shipping address.

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
New York City Transit - NYCT - New York	LC79	9704	9718	L82L1M9[redacted]	L82L3M9[redacted]	15
New York City Transit - NYCT - New York	LD64	9845	9859	L82L3M9[redacted]	L82L8M9[redacted]	15

WARNING

FOLLOW YOUR INTERNAL SAFETY PROCEDURES.

PROCEDURE

1.1. Park the vehicle on an even surface with the transmission on neutral.

1.2. Apply the parking brake and set the master control switch to the ***stop*** position.

1.3. Set the battery disconnect switch in the battery compartment to the ***off*** position.

LEVEL 1 : INSPECTION OF PIPES

1.4. Open the interior Baselight panels at BL1, BL2, BL3 and BL4. Pull back foam installation to expose the coolant pipe solder joints.

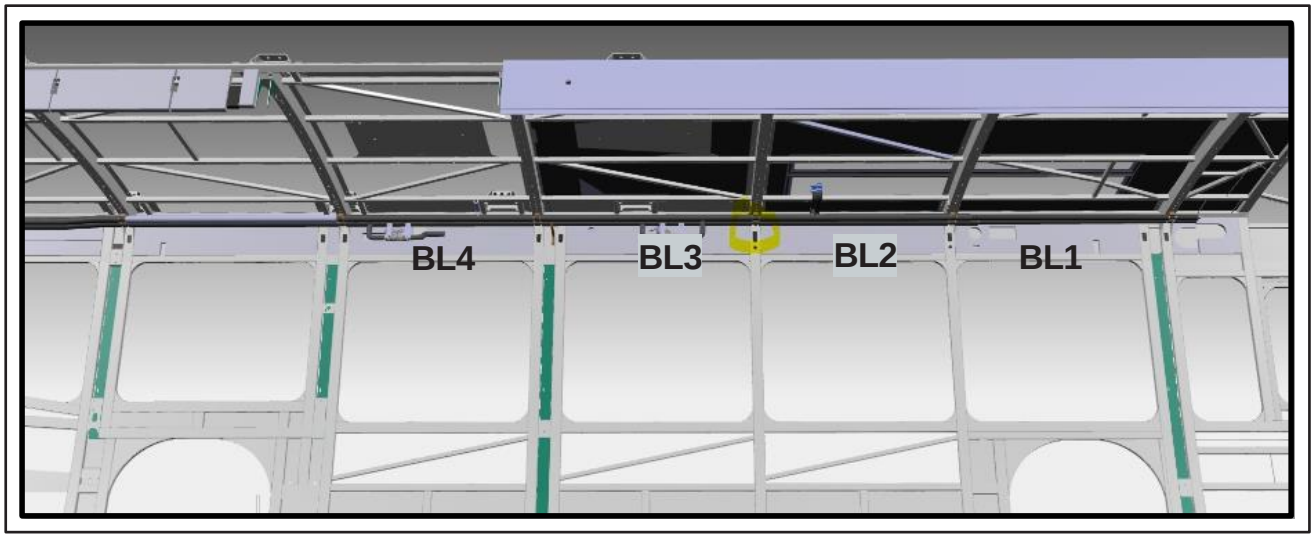


Figure 1 - Baselight Panel location to check Coolant Pipe Solder Joints

1.5. Place the battery master switch on. Open the rear Engine compartment door and locate the rear engine run box and place the engine run switch in the center position.

1.6. Perform a coolant leak test.

Engine Coolant Leak Test

1.7. Ensure that the Master switch, located on the driver side console is in the OFF position.

Figure 2 - Master Switch in OFF Position

1.8. Place the engine control switch, located on the engine control box, in the rear run position.

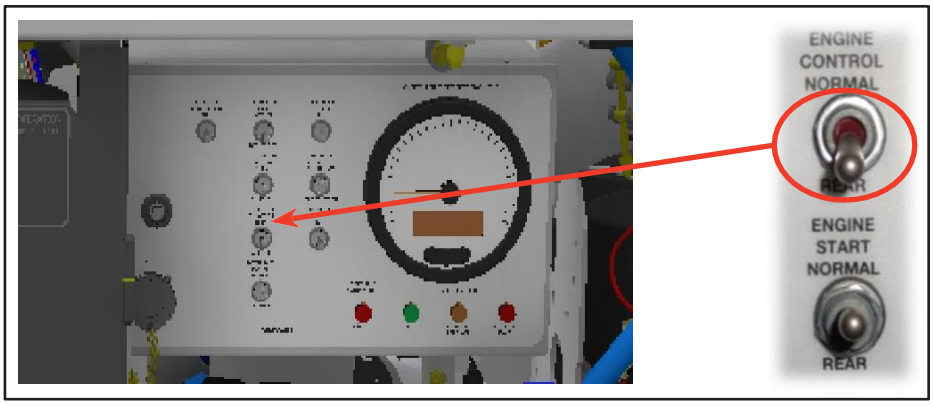


Figure 3 - Engine Control Switch

1.9. Validate the engine cooling system level using ACTIA. The display screen will display the Engine coolant level state it will state Low Cold Level.

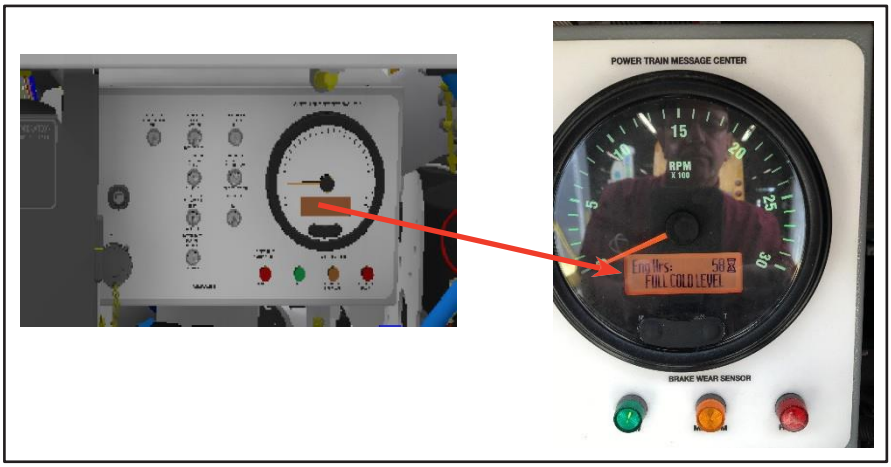


Figure 4 - Engine Coolant Level

1.10. Open the overhead console and locate the Maintenance switch and switch it to the (I) Maintenance mode.

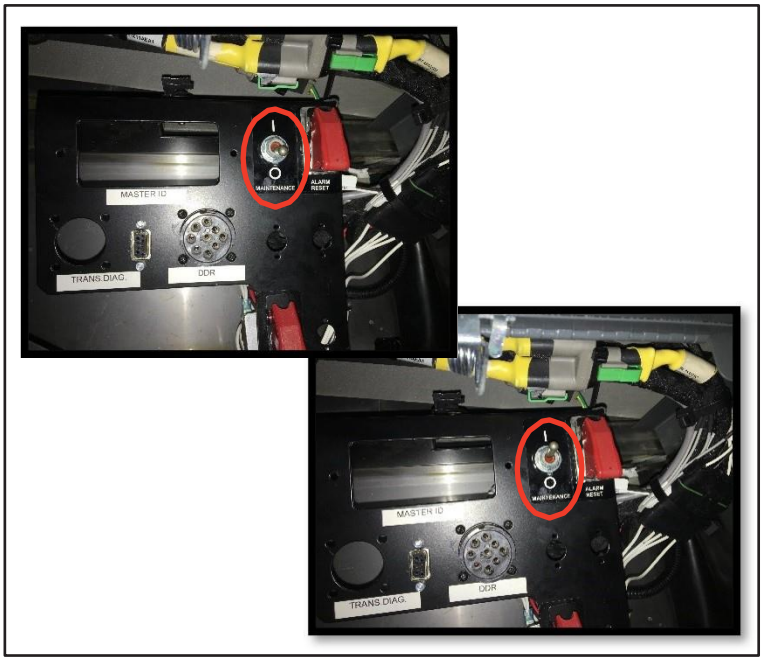


Figure 5 - Location of Maintenance Switch

1.11. Place the Heater Defroster Control valve in the fully open position.

Figure 6 - Heater Defroster Contr

1.12. Ensure on the full control panel that all fill valves are in the closed position.

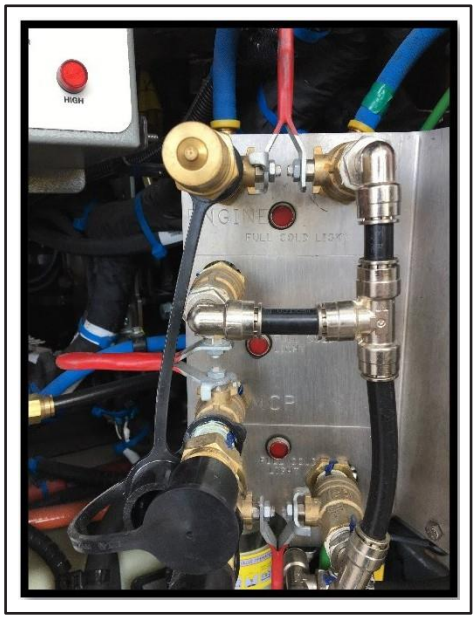


Figure 7 - Checking Valves Closed Position

1.13. Set the engine control switch located on the rear engine control box to the Center position.

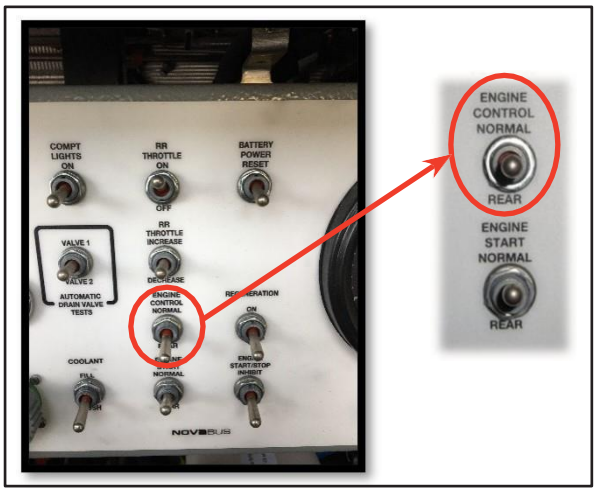


Figure 8 - Engine Control Switch to Center Position

1.14. Press down the engine start switch on the rear engine control box for 5 seconds and release. Press down again on engine start switch for 1 second and release.

Figure 9 - Engine Start Switch

1.15. Remove engine surge tanks cap and install pressure tester.

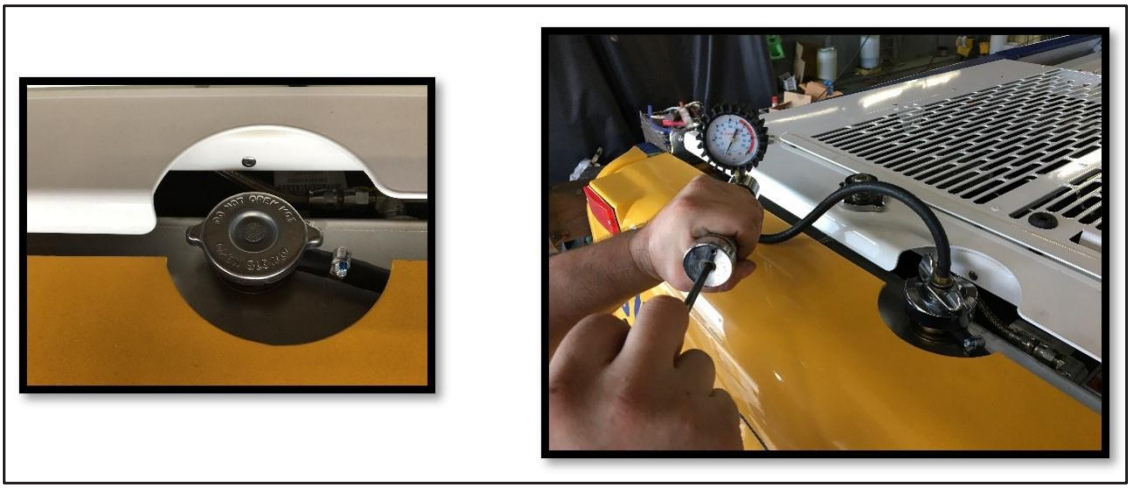


Figure 10 - Install Pressure Tester

1.16. Pump the pressure up to 20 to 21 psi and check to see if pressure holds. Check for leaks.

1.17. Wait for 20 minutes and Check whether the pressure regulator gauge shows a decrease in pressure. If there is a decrease in pressure a leak check must be performed (see leak checking below).

Figure 11 - Pressure Check

NOTE

A decrease in the gauge pressure indicates a leak in the engine coolant system. If there is no decrease in pressure indicated on the gauge, the engine cooling system is good and posable air was trapped in the system.

Leak Checking

Leak test with engine coolant empty.

If the gauge shows a decrease in pressure, there is a possible leak in the system. You will need to pressurize the engine cooling system with air, to the same pressure you used to check for leaks. Spray the cooling system with the use of a spray bottle with soap-water solution and check for leaks.

Leak test with engine coolant.

For system with coolant still in the system look for a coolant leaking from the fitting and hose's.

Figure 12 - Leak Testing

1.18. Inspect all of the welded joints on the copper pipes. Inspect all hose clamps. In both cases, look for leaks and seepage. Below reference shows the visual inspection of solder joints.

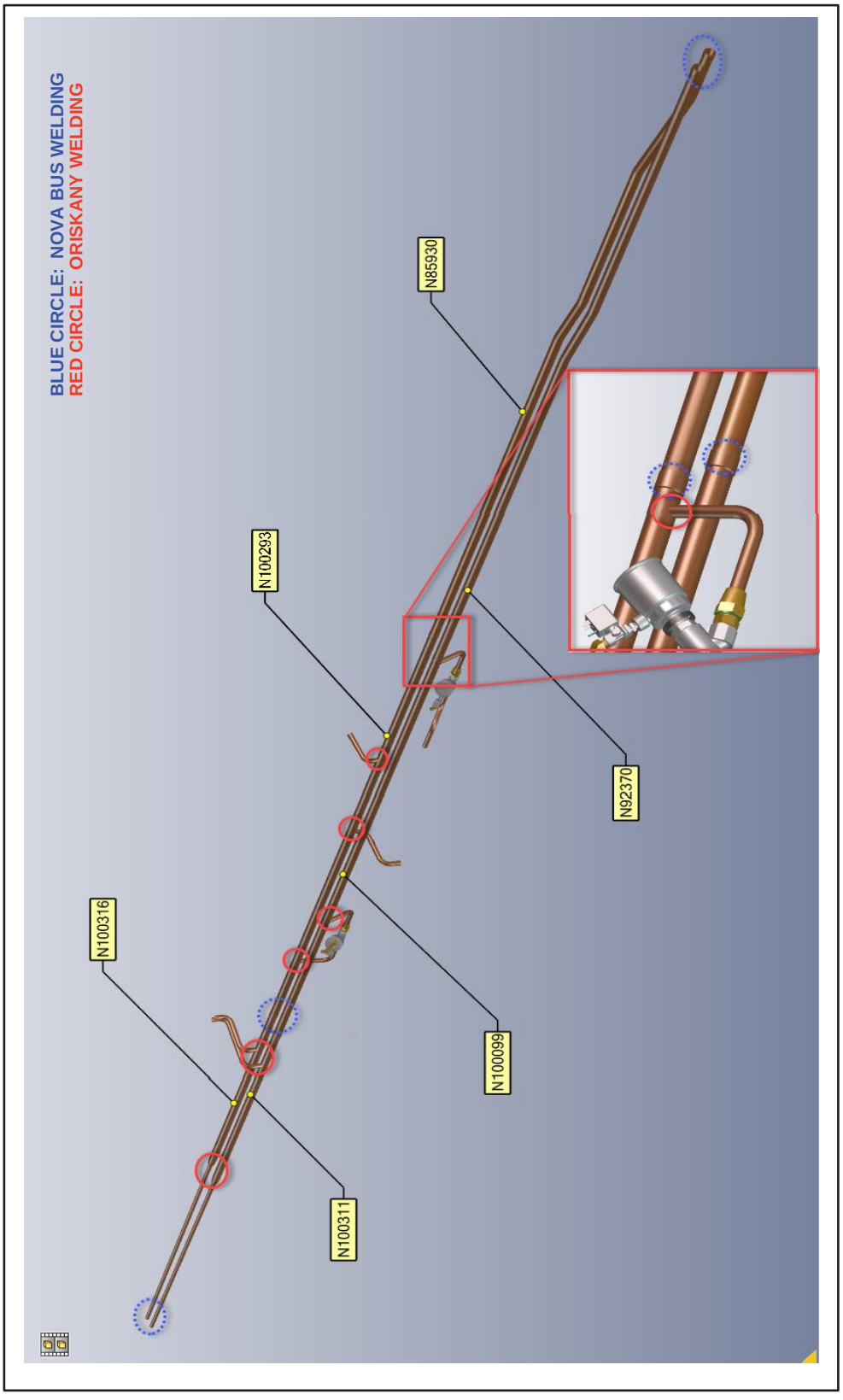


Figure 13 - Inspection of Welded Joints

NOVABUS

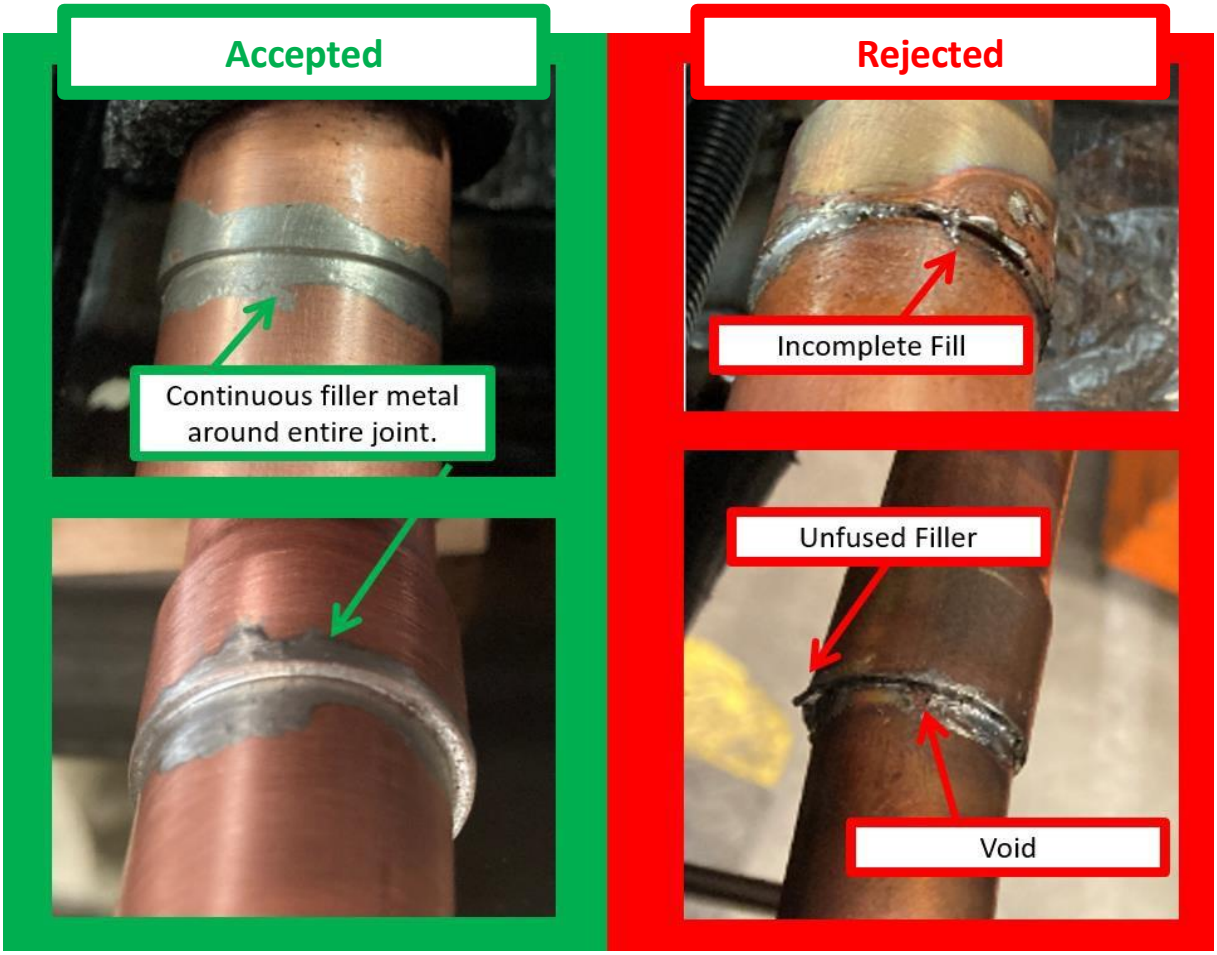
Nova Bus Standard

No. std:	STD0291
Rev.:	00
Date:	2023-02-13
Gr: 20	General

Assembly Standard:		Quality Criteria :	X	Drawing Ref.:		AVT Ref:		Supplier Spec.:	

Title: Visual inspection of solder joints.

Description: When the joint is properly made, filler metal will be drawn into the joint and a **continuous seam of filler metal will be visible completely around the joint**. Evidence of **cracks**, **voids**, **bubbles** or **lack of filler metal** in the joint shall be rejected.

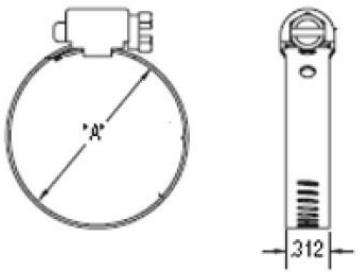


Reference : AVT-0277

(In case of divergence, the document referenced on the BOM takes precedence over the quality standard)

1.19. If coolant leak is detected move to level 2 Removal of Pipes.
1.20. Tighten the clamps on the flexible hoses on the roof unit.
1.21. Turn the vehicle engine off.

Diameter Range and Torque requirement for "BREEZE MINI" clamps



5/16" (7.9 mm) band

Torque

2 +/- 0.25Nm

EFFECTIVE DIAMETER RANGE

SAE Size	Min.		Max.	
	in.	mm.	in.	mm.
4	7//32	5.6	5/8	16
6	7/16	11	25/32	20
8	1/2	13	29/32	23
10	9/16	14	1-1/16	27
12	11/16	17	1-1/4	32
16	15/16	24	1-1/2	38

LEVEL 2 : REMOVAL OF PIPES

1.22. Depressurize the cooling system by opening the surge tank cap, located in the engine compartment.

CAUTION

Wait until the engine coolant temperature is below 120°F (50°C) before removing the surge tank cap. Failure to do so could result in injuries from heated engine coolant spray.

1.23. Partially drain the passenger compartment heating circuit.

CAUTION

Avoid prolonged and repeated skin contact with used coolant. Such contact can cause skin disorders or other injury.

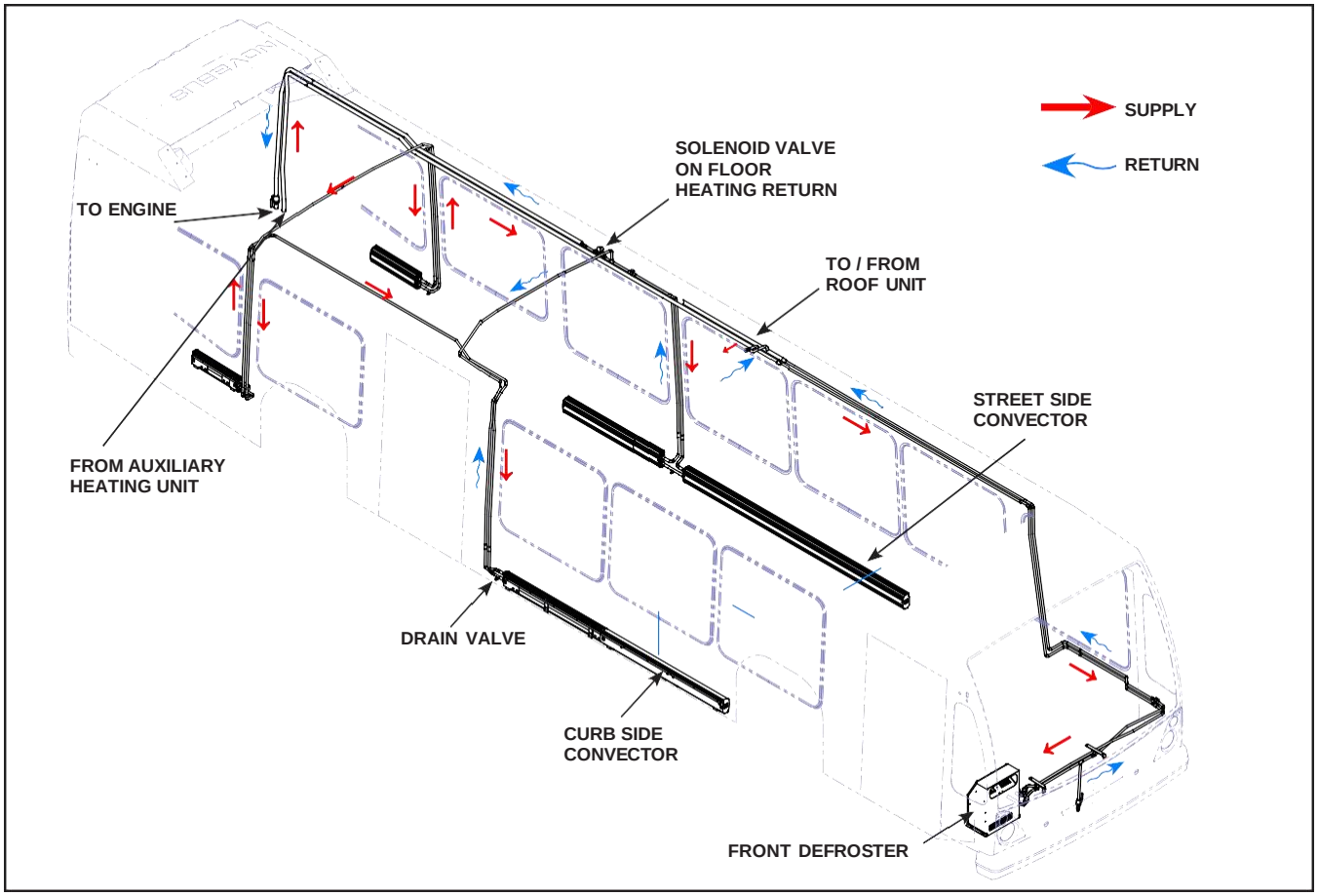


Figure 14 - Typical HV System Flow Chart

1.24. Close the cut-off valve at the auxiliary heating unit output and the return valve of the bus compartment to cut off the compartment circuit from the engine circuit.

1.25. Place the heat control lever of the front ventilation control panel at the extreme right position to open the front defroster butterfly valve.

1.26. Open the main drain valve, located at the front center of the bus, next to the defroster. Have a recovery container handy.

1.27. Remove the protective panels at the bottom of the walls. Open the two small drain valves located in the middle of the bus, at the floor convectors intake; one is on the right and one is on the left.

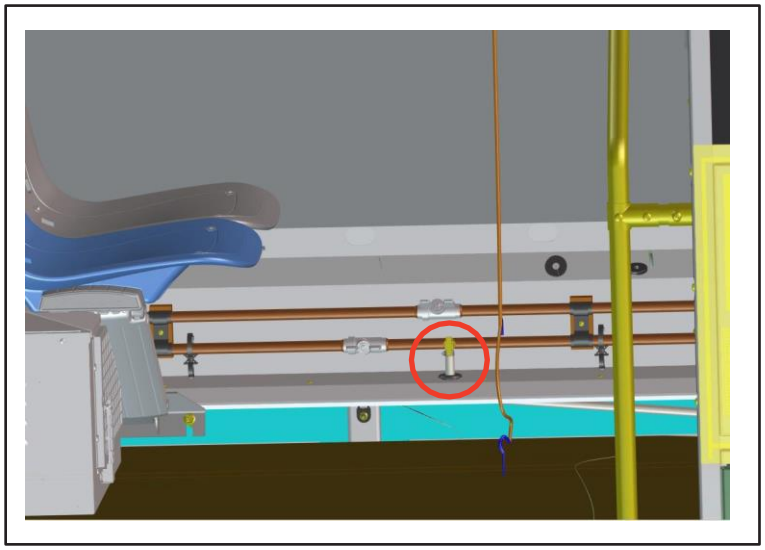


Figure 15 - Drain Valve located on Street side

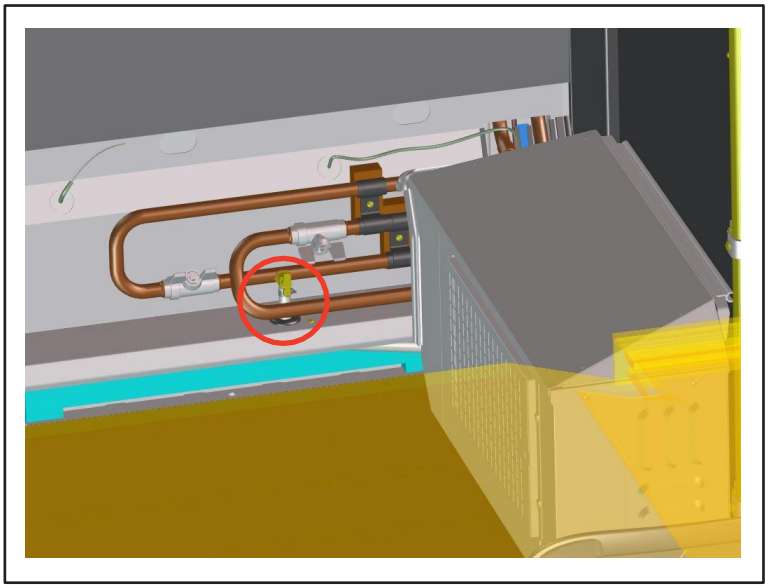


Figure 16 - Drain Valve located on Curb side

NOTE

Before proceeding, make sure a container is available for recovering the liquids that escape from the valve.

1.28. Release the pressure from heating control valve.
1.29. Open the street side baselight/ceiling panel to access the valve.
1.30. Disconnect the elbow connector of the supply cable from the pilot valve.
1.31. Disconnect the pneumatic hose from the valve.
1.32. Loosen the fittings on both sides of the valve and remove the valve.
1.33. Remove the loom and tube insulation from the heating pipes.
1.34. Disconnect and remove the pipes.

Figure 17 - Removal of Damaged Pipes

INSTALLATION OF PIPES

1.35. The Heating pipes must be cut squarely and cleanly.

1.36. Clean the contact surfaces of parts to be assembled with an abrasive pad.

1.37. Welding paste N25165 must be applied with a brush and coat the male and female surfaces of parts to be assembled.

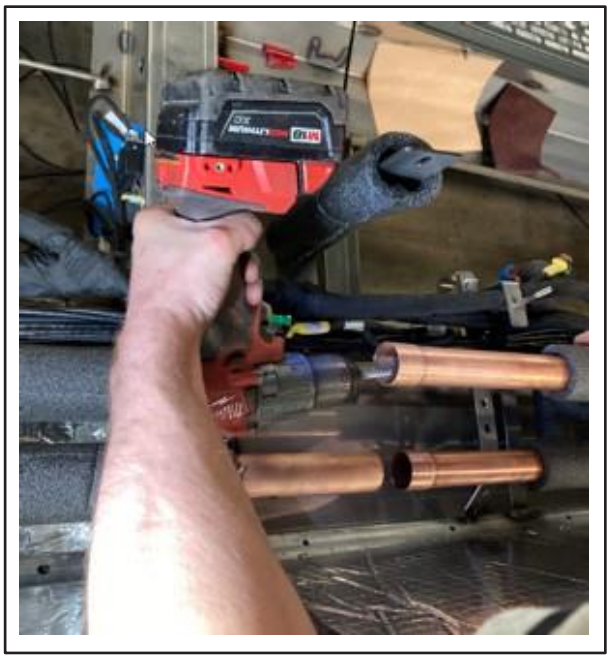


Figure 18 - Cleaning the Pipe Contact surface

1.38. Connect the supply pipe N85930 and return pipe N92370 to the heating pipe of engine compartment.

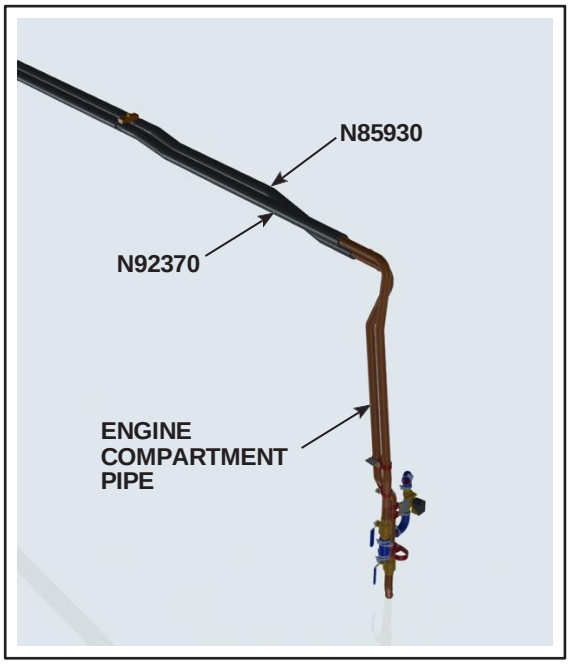


Figure 19 - Installation of Pipes

1.39. After having placed pipes to be joined in their definitive positions, the parts to be assembled are heated evenly with a continuous motion of the flame or maintaining in place the soldering gun.

1.40. Use acetylene / MAPP torch or an electric soldering gun.

1.41. Heat until the tin begins to fuse on the surface of pipes to be joined.

1.42. The filler metal/ welding wire N25166 must flow easily in the joint by capillary effect.

Figure 20 - Soldering the Pipes with Soldering gun

NOTE

It is the heat of the pipe that melts the filler alloy. The operation must continue until the joint is filled. Do not heat when the filler metal is applied.

1.43. Cool the assembly with water 1 to 2 minutes after the required quantity of filler metal/ welding wire is applied, then clean with water to remove any excess flux/ welding paste.

1.44. Add loom N43021 to the wires and secure with cable tie G5007995.

1.45. Add insulation tube N20379 for the heating pipes and secure with cable tie G5007995.

1.46. Repeat the steps 1.26 to 1.33 for the installation of other heating pipes.

1.47. Connect the supply pipe N100293 and return pipe N100099. Add insulation tube N20379 for the pipes and secure with cable tie G5007995.

1.48. Add Thread loctite N37086 to connectors N79131 to connect the valve with the support bracket and mount the cable tie G5007996.

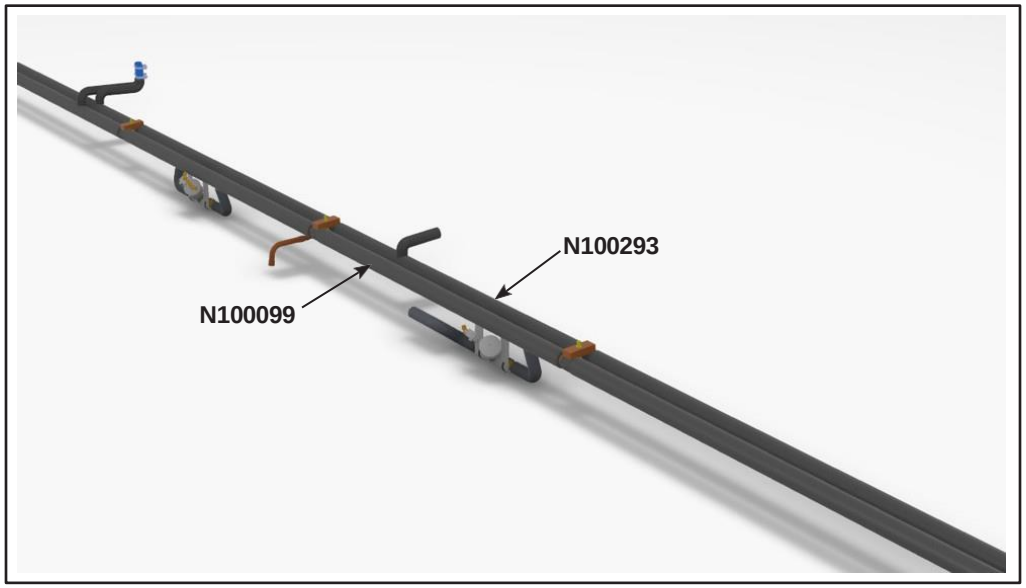


Figure 21 - Installation of Pipes

1.49. Connect the heat pipes N100311 and N100316 to the front defroster pipes and add insulation tube N20379.

1.50. Add insulation tube N20378 for the heating pipes.

1.51. Add loom R015045 for the heating pipes.

1.52. Add loom N43021 for the heating pipes.

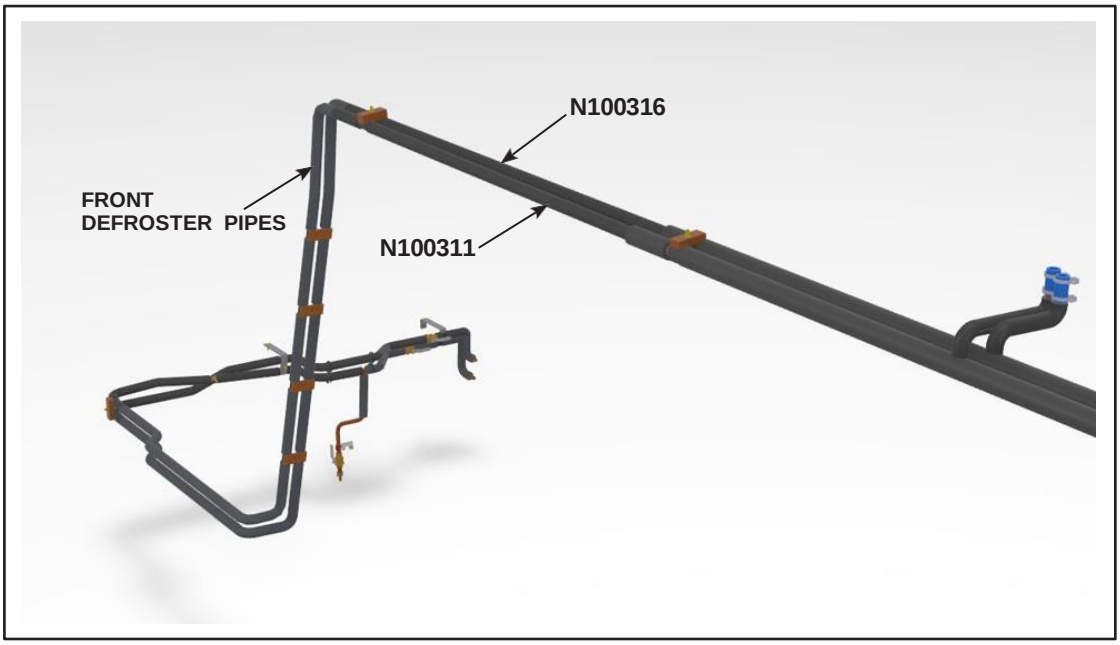


Figure 22 - Installation of Pipes to Front Defroster

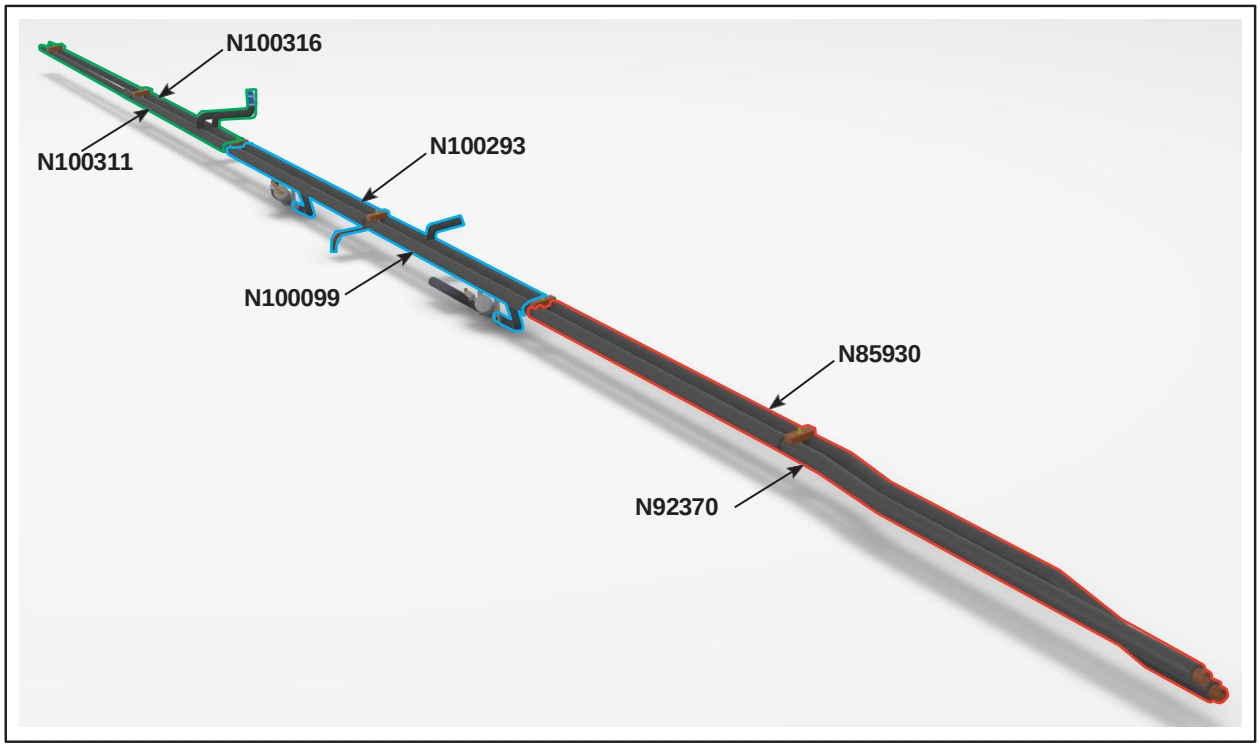


Figure 23 - View of Installed Pipes

1.53. Connect the pneumatic hose to the valve.

1.54. Connect the elbow connector of the valve's wiring harness to the pilot valve.

1.55. Reopen all coolant isolation valves.

1.56. After all repairs are completed perform leak check before adding coolant. Perform steps 1.7 to 1.16 starting on page 5.

1.57. Return air pressure to the vehicle.

1.58. Fill the engine coolant circuit.

ENGINE COOLANT FILLING PROCEDURE

1.59. Under the vehicle, place a drain pan below the coolant overflow tank and drain hose.

1.60. Open the drain valve on the coolant overflow tank.

1.61. Set the engine fill valve to the front-back position (the handle should be perpendicular to the manifold label plate).

1.62. Connect the filling hose to the quick-connect engine fill port.

1.63. Begin coolant filling until the FULL COLD light turns ON or coolant begin to flow in to the drain pan under the bus.

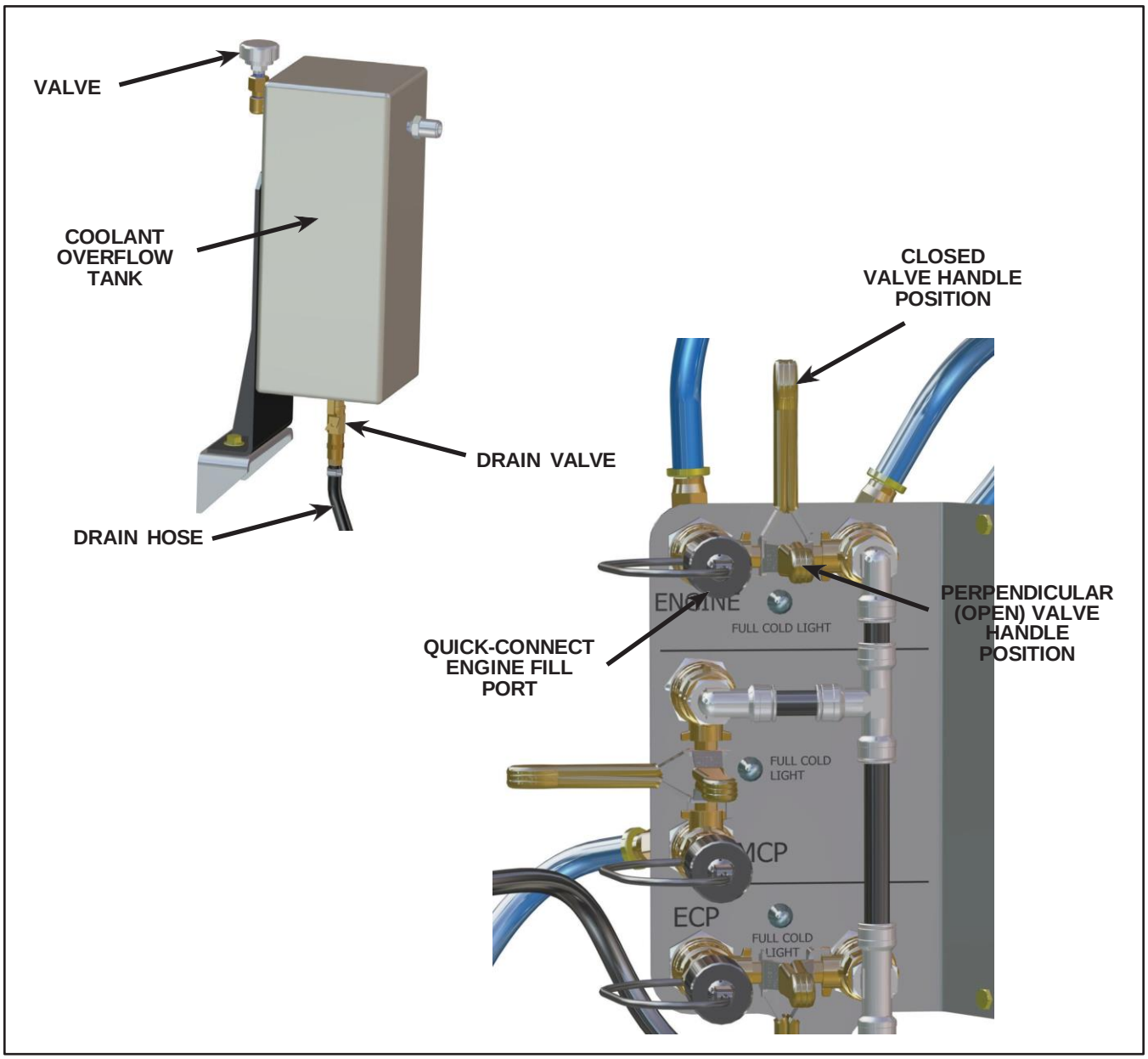


Figure 24 - Coolant Overflow Tank and Coolant Fill Panel

1.64. Vehicle ready for the service.❖