NEW FLYER

INSTRUCTION TO SERVICE

ITS: 5930	
SECTION:	231 Coolant System
WRITTEN BY:	Mike Pearson
SUBJECT:	Add EMP Radiator Ground Straps

ITS5930

Bulletin Overview

If dissimilar metals have different electrode potentials, and come into contact with an electrolyte, one metal acts as anode and the other as cathode. The electro potential difference between the dissimilar metals and the presence of electrolytic (salt) solutions can be the driving force for an accelerated attack on the anode member of the galvanic couple. The anode metal dissolves into the electrolyte, and deposits collect on the cathodic metal.

In normal service, voltage levels on coolant pipes have been found to be highly variable and can range anywhere from roughly -1V to +1V.
These voltage levels are capable of causing highly-accelerated heat exchanger corrosion.
Voltage potential between radiator and coolant pipes can be eliminated by grounding the Mini-Hybrid® cooling system and coolant pipes to the vehicle chassis.

Note: If experiencing accelerated radiator corrosion, the work described in this bulletin must be completed in order to maintain your 3 year EMP radiator warranty coverage. Failure to act promptly may affect coverage for accelerated corrosion through the radiator due to stray current.

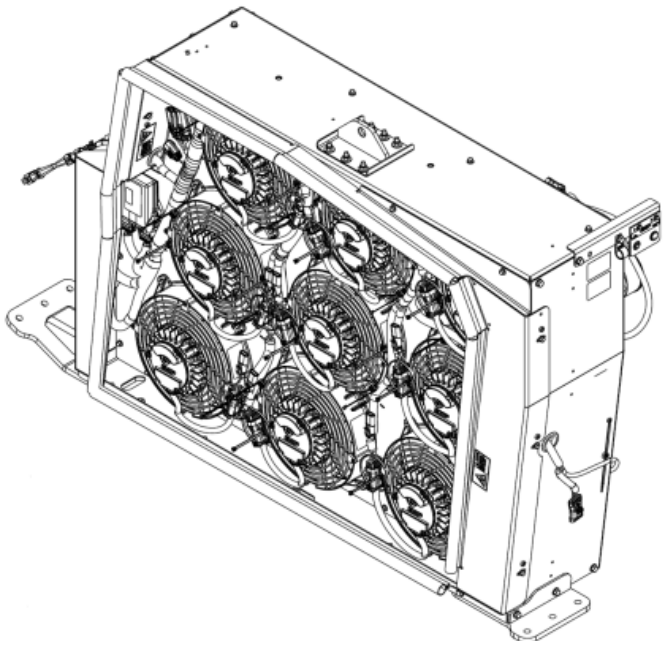

Figure 1: Mini-Hybrid® VPN 2020049001PA01 Cooling System

Issue

Radiator corrosion has been identified on buses with isolated pipe clamps on vehicles 2010 EPA or newer engines and Mini-Hybrid® cooling systems including:

Description	New Flyer p/n	EMP Base #
MH9 NFI XCELSIOR 2010 DIESEL NON-HYBRID	427020	2020049001PA01

Accelerated corrosion was located by the radiator outlet and was limited to vehicles running in icy or snowy winter locations. This corrosion has been determined to be caused by stray voltage carried by the coolant. If the pipes are separated from the radiator via silicone (non-conducting) hoses and the pipes and radiator are not on the same ground plane, electrolysis can occur between the pipes and the radiator. Grounding the radiator and pipes to the vehicle chassis eliminates the electrical potential, stopping the electrolytic corrosion. See Figure 2 for images of accelerated corrosion.

Figure 2: Gen II Examples.

PROCEDURE:

1. Turn the main battery disconnect switch to the “OFF” position.
2. Raise coach in accordance with the New Flyer Service Manual.
3. Typical coolant tube clamp ground strap mounting hardware orientation, see Figure 3.

Figure 3: Ground Strap Mounting Hardware Orientation

4. Locate and remove the fir tree insert from the hole located on the rear of the existing radiator as shown in Figure 4. Disconnect any tyraps and or wires from the fir tree insert.
5. Drill out the existing hole from the fir tree insert using a 25/64” (0.390625) drill bit. Care is to be taken not to damage the radiator behind the shroud when drilling.

Caution: The use of a drill depth gauge is recommended to limit the depth of the hole to 0.50” or less to avoid any damage to the radiator.

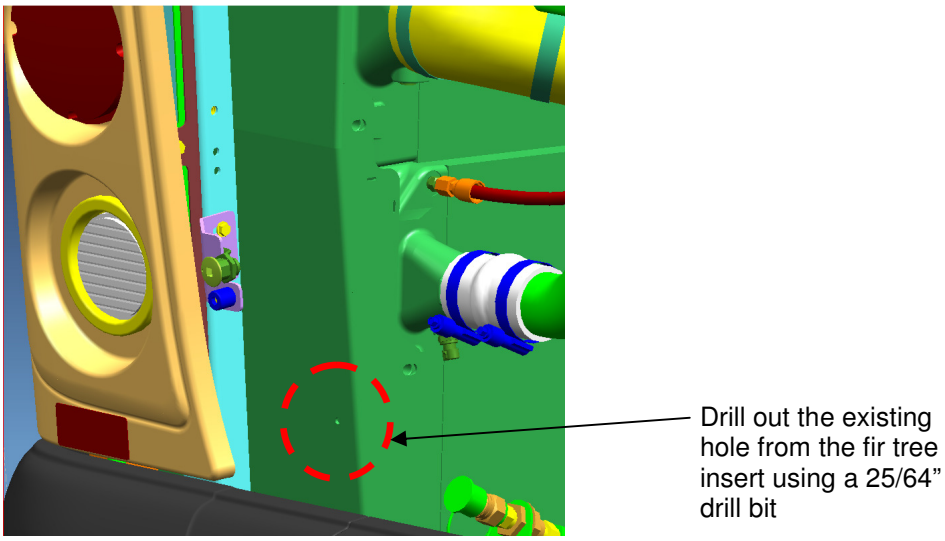

Figure 4: Fir Tree Mounting Hole

6. Install the rivnut from kit p/n 6449313 into the newly enlarged hole, see Figure 5.
7. To ground Mini-Hybrid® cooling system shroud secure the ¼” hook terminal end from the supplied 50” cable using a flange head bolt supplied with kit p/n 6449008. If the removed tyrap was used to secure wires, also install the p-clip from kit p/n 6449313 under the bolt head to secure the wires. Torque to 12±2 ft-lbs, see Figure 5.
8. Route ground wire to area approximately 4.5” forward of the welded rail (see Figure 10), routing wire away from any hot surfaces or sharp edges. Use zip ties to secure wire at 18-24” intervals. Adjust cable orientation if necessary.

Caution: Grounding to the same welded assembly is required. Grounding to a bolted assembly is NOT acceptable.

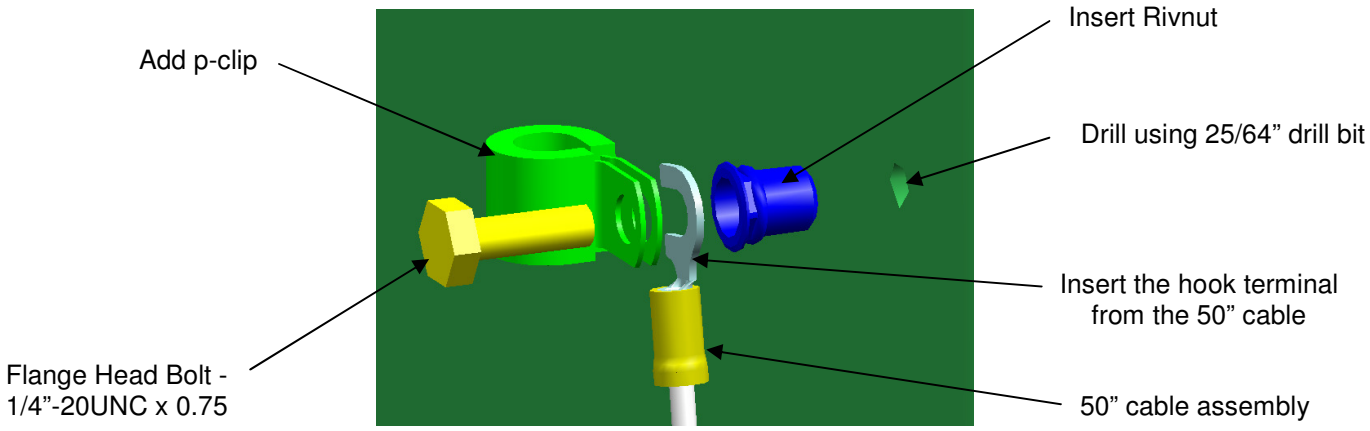

Figure 5: Rivnut and Cable Installation

Caution: Fan shroud must not be grounded to the chassis unless the pipes are also grounded.

9. Install one of the 2.5” guillotine clamps from the parts kit to the existing upper radiator tube at the approximate location and orientation shown in Figure 6, torque to 20 ±2 ft*lbs.
10. Attach the 3/8” ring tongue end of the 16” cable to the bottom stud of the guillotine clamp. Secure and orient the hardware as shown in Figure 3. Torque the hardware to 20 ±2 ft*lbs.
11. Route ground wire to area approximately 4.5” forward of the welded rail (see Figure 10), routing wire away from any hot surfaces or sharp edges. Adjust clamp locations on coolant pipes if necessary.

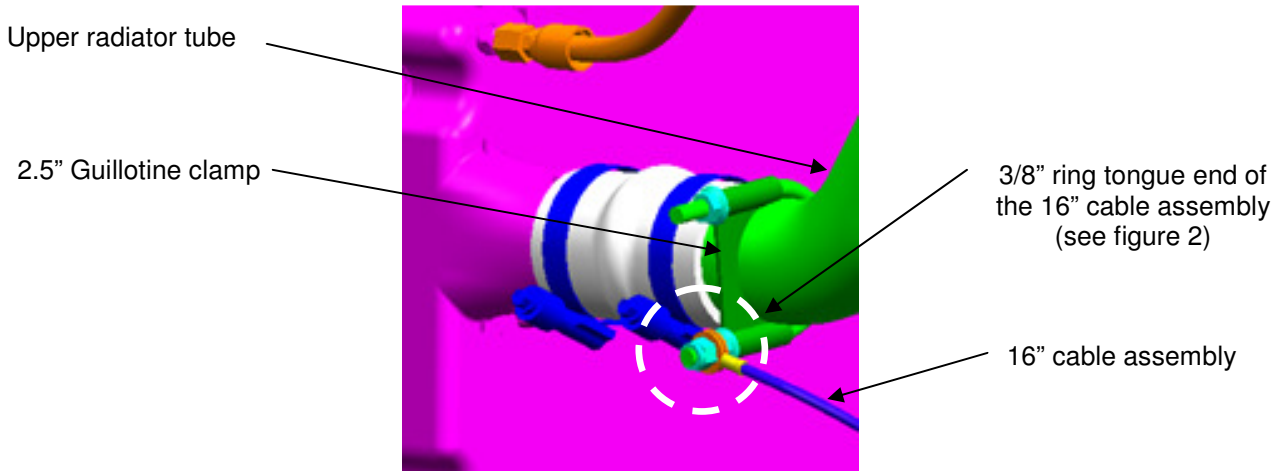

Figure 6: Radiator and Upper Coolant Tube Ground Strap Installation

12. Install one of the 2.5” guillotine clamps from the parts kit to the existing lower radiator tube at the approximate location and orientation shown in Figure 7, 8 and 9. Lower radiator tube may vary in appearance. Torque to 20 ±2 ft*lbs.
13. Attach the 3/8” ring tongue end of the 50” cable to the stud of the clamp as per Figure 3. Secure using the hardware supplied with the clamp. Torque the hardware to 20 ±2 ft*lbs. See Figure 7, 8 and 9.
14. Route ground wire to area approximately 4.5” forward of the welded rail (see Figure 10), routing wire away from any hot surfaces or sharp edges. Use zip ties to secure wire at 18-24” intervals. Adjust clamp locations on coolant pipes if necessary.

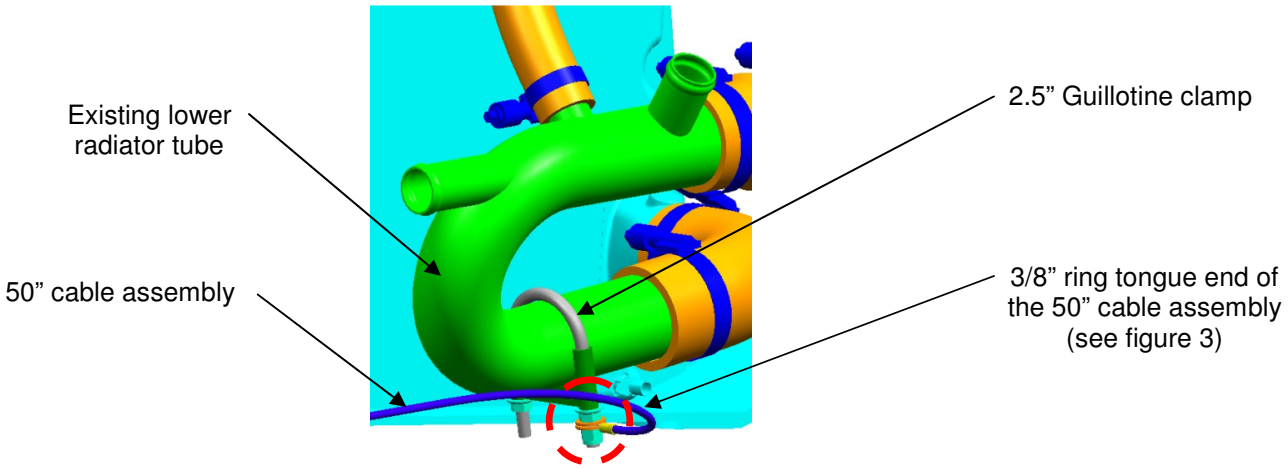

Figure 7: Lower Radiator Tube Ground Strap

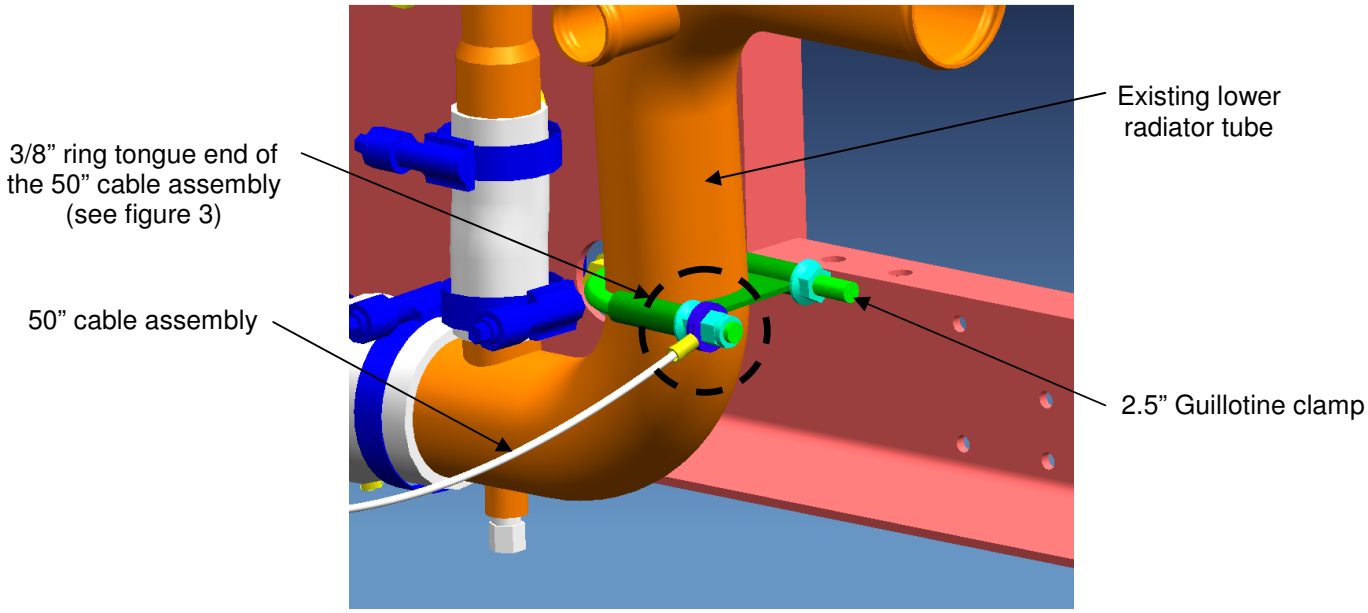

Figure 8: Lower Radiator Tube Ground Strap

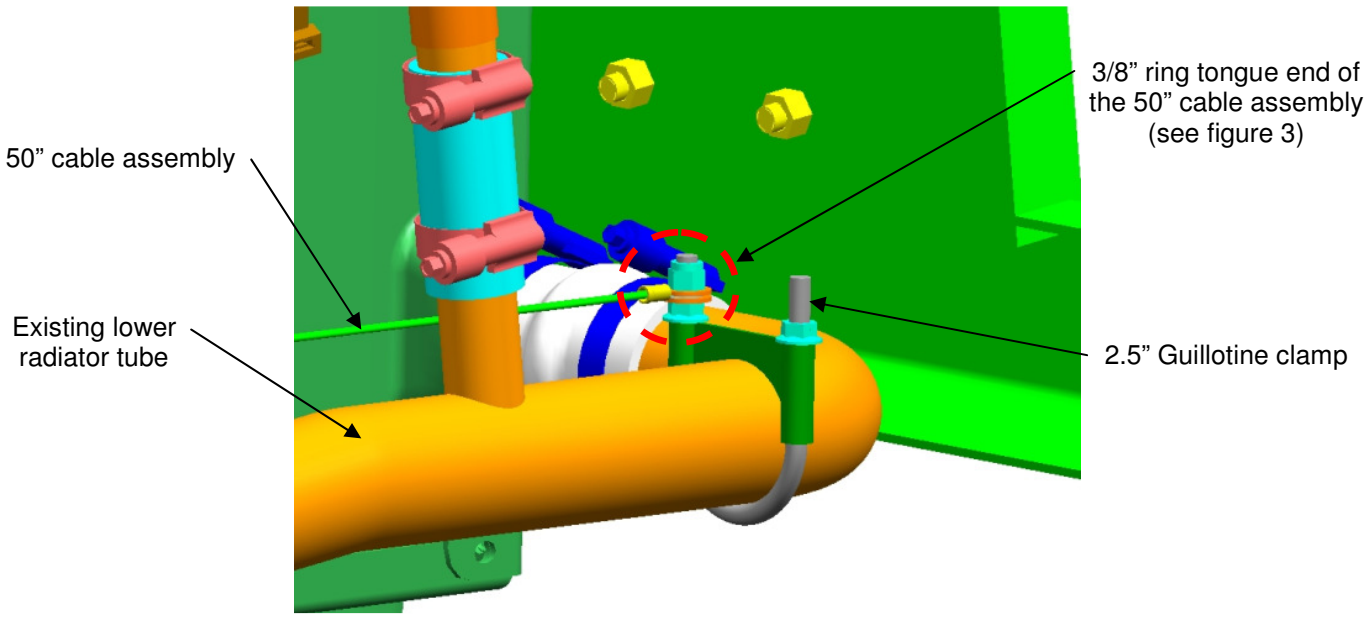

Figure 9: Lower Radiator Tube Ground Strap

15. Route ground wires to area approximately 4.5” forward of the welded rail (See Figure 10), routing wire away from any hot surfaces or sharp edges. Use zip ties to secure wire at 18-24” intervals. Adjust clamp locations on coolant pipes if necessary. Proceed with shroud ground wires before securing pipe grounds.
16. Drill a .281Ø (9/32”) hole thru outer wall of the streetside engine rail for grounding stud approximately 4.5” forward of the bumper mount and 1” down from top of the engine rail. Remove structural coating from rail at washer contact to allow for proper ground contact. Attach upper and lower radiator tube and shroud grounding straps. Torque ¼ UNC x 1.00 bolt to 14 ft-lbs.
17. Apply a protective coating over the installation.

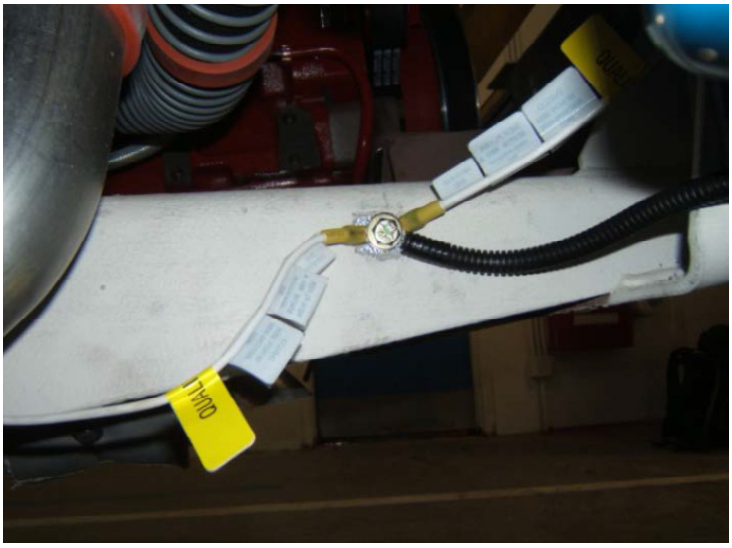

Figure 10: Common Ground Point on Bus Frame

18. If necessary, lower coach in accordance with the New Flyer Service Manual.
19. Turn the main battery disconnect switch to the “ON” position.

LABOUR ESTIMATE

	Operation	Men	Hours	Labour Time M X HR
1	Add EMP Radiator Ground Straps	1	0.5	0.5

PARTS REQUIRED

Item	Part Number	Description	Qty. per Coach	Units	Notes
1	6449008	Kit-EMP Radiator Ground Strap Rework	1	EA	Vpn 1370056042
2	6449313	Kit-EMP Radiator Ground Strap Hardware	1	EA	Vpn 1370049014