



# SERVICE MANUAL BULLETIN

This Service Manual Bulletin is prepared by the Publications Department of New Flyer Industries Canada ULC. Refer to details below.

## SMB-147

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APPLICABILITY					
VEHICLE LENGTH	<input type="checkbox"/> 30ft.	<input type="checkbox"/> 35ft.	<input type="checkbox"/> 40ft.	<input type="checkbox"/> 60ft.	<input checked="" type="checkbox"/> ALL
VEHICLE TYPE	<input type="checkbox"/> High Floor	<input checked="" type="checkbox"/> Low Floor	<input type="checkbox"/> Invero®	<input checked="" type="checkbox"/> Xcelsior®	<input type="checkbox"/> ALL
FUEL TYPE	<input type="checkbox"/> Diesel	<input type="checkbox"/> Electric	<input type="checkbox"/> Diesel/Electric		<input checked="" type="checkbox"/> ALL
	<input type="checkbox"/> CNG	<input type="checkbox"/> LNG			
SUBJECT	EMP Radiator - Preventive Maintenance				
SECTION TITLE	PM - PREVENTIVE MAINTENANCE				
DETAILS	<p>This bulletin provides revised OEM information on the preventive maintenance requirements for the EMP radiator.</p> <p>This bulletin supersedes all prior information on this subject already provided in your New Flyer Service Manuals. Make this Service Bulletin available to service personnel to inform them of changed information.</p>				

## 1. Weekly Preventive Maintenance

### 1.1. Radiator

Test the function of the fan reverse switch and LED indicator on a weekly basis or any time service work is being performed in the engine compartment. Operating the fan reverse switch will not only clear debris from the radiator core, but will also confirm operation of the LED indicator which is used to display diagnostic fault codes. If any active fault codes are indicated, refer to Section 6 of your New Flyer Service Manual for troubleshooting and vendor information.

## 2. Quarterly Preventive Maintenance

### 2.1. Radiator

#### NOTE:

*The inspection interval is dependent on local operating conditions. Exposure to harsh conditions such as salt, dirt, and debris may require more frequent inspections. Operating in a less harsh environment, in combination with regular fan reversal operation, may allow for extended inspection intervals.*

Inspect and clean the radiator on a quarterly basis or more frequently if operating under harsh conditions.

#### 2.1.1. Inspection

1. Check hose connections and tighten clamps as necessary. Cracked, swollen or deteriorated hoses must be replaced.
2. Check radiator and charge air cooling cores for leaks and for accumulation of dirt which obstructs air passage. As required, operate the fan reverse button on the engine gauges panel to assist in removing debris from the cores. Repair all cooling system leaks immediately.
3. Inspect the radiator mounting hardware and tighten mounting bolts when necessary.
4. Inspect for clearance between fan blades and radiator core and fan shroud.

5. Inspect air recirculation seals at baffles around radiator assembly. Seals must be in good condition.
6. Inspect fan blades for cracks, broken tips, or other damage.
7. Inspect charge air cooler hoses and piping for leaks, holes, cracks, or loose connections.
8. Inspect the fan main harness and system controller electrical connectors to ensure they are clean and properly connected. Ensure harness is properly routed and secured. Open the connectors and inspect terminals for dirt or corrosion. Clean as necessary with contact cleaner and a stiff bristle brush. Reapply a small amount Dow Corning DC4 dielectric grease on the top of the female connector and reconnect.
9. Repair or replace any defective part. Refer to Section 6 of your New Flyer Service Manual for procedure.

#### 2.1.2. Power Washing



**DO NOT use excessive pressure or place washer wand within close proximity to radiator/CAC core when power washing otherwise damage to the fins could result. Use a pressure of less than 1200 psi to power wash and maintain a minimum distance of 9 inches from the cores. DO NOT direct power wash at product or safety labels.**



**The use of steam cleaning or pressure washing equipment can force moisture into electrical connectors and cause corrosion of the terminals. Avoid directing high pressure spray toward any electrical connectors.**

#### NOTE:

*Sodium Chloride (rock salt), Calcium Chloride, and Magnesium Chloride are salts used for road surface treatment during the winter months in areas prone to freezing. These salts are highly corrosive and can accumulate on the radiator assembly and*

*must be removed on a regular basis (monthly when salts are applied to the roads).*

Power wash the fan side and heat exchanger side of the radiator in accordance with the following instructions. Use an effective detergent, following manufacturer's instructions, and then flush out the cleanser using the reverse fan cycle and low pressure clean water.

1. Clean the exterior of the radiator from the engine compartment side on an "as required" basis. Use power wash equipment at reduced pressures, not exceeding 1200 psi, and maintain a safe distance, no closer than 9 inches from the heat exchanger.
2. Clean the exterior of the radiator from the streetside of the vehicle on an "as required" basis. Close the screened radiator door and maintain a minimum distance of 12 inches between the wand of the pressure washing equipment and the screened door. Reduce power washing equipment to not exceed 1200 psi.

**NOTE:**

*If the radiator cannot be satisfactorily cleaned to provide proper airflow across the core, then the unit will need to be removed from the vehicle for soaking and cleaning. Refer to 5. "Two Year Preventive Maintenance" on page 5 in this section for cleaning procedure.*

**2.1.3. Grounding Wires**

**NOTE:**

*The radiator and coolant tubes are grounded to the vehicle frame to minimize any corrosion resulting from electro-potential differences between dissimilar metals and exposure to electrolytic (salt) solutions. It is important that these grounding connections be maintained.*

- Inspect the coolant supply and return tubes and ensure that the stainless steel clamps with ground wires are clean, free of corrosion, and securely attached to the tubes.



**The fan shroud must not be grounded to the vehicle frame unless the coolant pipes are also grounded.**

- Inspect the aft side of the radiator shroud to ensure that the ground wire connection is clean, free of corrosion, and securely attached.
- Inspect the three ground wire connection points on the streetside main frame rail to ensure that the connections are not corroded and are securely attached.

**2.1.4. System Diagnostic Data**

Observe any inactive faults on EMP cooling systems equipped with diagnostic capabilities. Connect the EMPower Connect Service tool to the vehicle diagnostic port and record any inactive faults. Clear faults and check for any recurring faults at subsequent inspections.

### 3. 6,000 Miles (9,600 km) Preventive Maintenance

#### 3.1. Radiator

1. Locate the power and ground studs on the radiator and pull boots back from pass-through stud. See “Fig. 1: Radiator Inspection” on page 4.
2. Wipe grease and any debris from the ring terminal and stud area. Observe if the grease is discolored. If the grease is discolored, thoroughly degrease the area before proceeding.
3. Examine the assembly and if corrosion is found, disassemble the ring terminal from the stud and clean the ring terminals and studs with a brass wire brush. Replace any hardware that shows signs of accelerated corrosion. Reassemble and torque to specification. Refer to Section 6 of your New Flyer Service Manual for assembly torque.
4. Apply 5 grams (5 cc or 1 tsp) of di-electric grease to the power and ground studs on both sides of the pass-through stud. Slide protective rubber boots over exposed nuts and studs. Ensure that the vehicle side power and ground boot is securely snapped onto the bushing to form a seal.

 **NOTE:**

Use Dow Corning DC-4 Electrical Insulating Compound or equivalent. Use a squeeze tube to dispense 5 grams (which is nearly enough to fill the insulation boot) directly onto the stud or into the boot. If grease is dispensed into the boot, squeeze the boot after covering the stud to ensure the grease is worked onto all surfaces of the stud components.

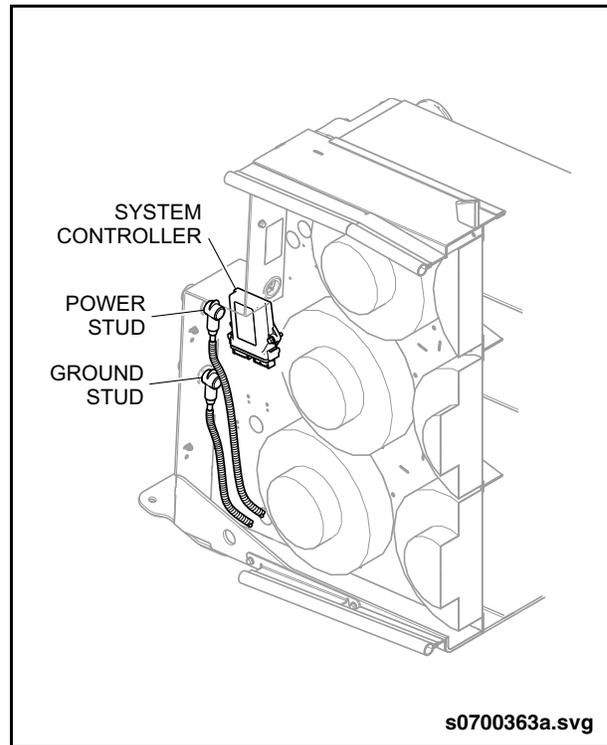


Fig. 1: Radiator Inspection

### 4. Yearly Preventive Maintenance

#### 4.1. Radiator

Inspect the radiator on a yearly basis as follows:

- Inspect the main positive and negative power cables for wear or frayed insulation. Ensure the protective rubber boots are in place and in good condition.
- Check the main power cable connections for tightness and torque to 20 ft-lb. (27 Nm) if necessary.
- Inspect the condition of the inner and outer nylon bushings on the main power cable pass-through studs.
- Inspect main wiring harness and connections to TMC controller and all fans.
- Inspect fuses and fuse holders.
- Inspect support structure for any damage or loose mounting hardware.



## 5. Two Year Preventive Maintenance

### 5.1. Radiator

#### 5.1.1. Radiator External Cleaning

Use the following procedure to remove any buildup of mud, salt, sand, road oils, brake lining dust, or tire rubber/carbon black from the exterior surface of the radiator:

 **NOTE:**

*The interval at which the radiator is removed for a soak cleaning may be adjusted to suit the actual operating environment and radiator condition.*

1. Remove the radiator from the vehicle. Refer to Section 6 of your New Flyer Service Manual for removal and installation procedures.
2. Soak the radiator for 24 hours in a hot (150°F) non-caustic detergent solution with all fittings plugged.

3. Use low pressure spray equipment with cleaning solvent to clean the fin louvers.
4. Final rinse with clear water and air dry.
5. Inspect cooling fins and straighten to the original geometry using needle nose pliers or a fin comb.

#### 5.1.2. Radiator Internal Cleaning

 **NOTE:**

*Refer to Cummins Operation and Maintenance Manual and Cummins Coolant Requirements and Maintenance Bulletin 3666132 for detailed cleaning and flushing procedures if performing a complete cooling system flush. Otherwise proceed with following instructions if cleaning is restricted to the radiator only.*

1. Flush the core with an aluminum compatible system flush solvent, following manufacturer's instructions.
2. Rinse with clean water and air dry.