NEW FLYER

SERVICE MANUAL BULLETIN

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

SMB-147B

ISSUE DATE: Feb 16 2016

APPLICABILITY					
VEHICLE LENGTH	☐ 30ft.	☐ 35ft.	☐ 40ft.	☐ 60ft.	■ ALL
VEHICLE TYPE	■ Xcelsior®	☐ MiDi®	☐ Invero®		☐ ALL
	■ Low Floor	☐ High Floor			
FUEL TYPE	☐ Diesel	☐ Diesel/Electric	☐ CNG	☐ LNG	■ ALL
	☐ Fuel Cell	☐ Trolley/Electric	☐ Battery/Electric		
SUBJECT	EMP Radiator - Preventive Maintenance				
SECTION TITLE	PM - PREVENTIVE MAINTENANCE				
INITIAL DETAILS	This bulletin provides revised OEM information on the preventive maintenance requirements for the EMP radiator. 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.				
REV B DETAILS	SMB147 dated Jul 31 2015 has been revised to: ❒ Provide additional Quarterly inspection requirements. ❒ Add new electrical connector inspection at the 6,000 mile interval. ❒ Add new dielectric grease locations/quantities.				

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 radiator and surrounding area for evidence of corrosion as follows:
   a. Inspect the steel fan shroud that encloses the radiator for paint damage or evidence of corrosion. Prime and repaint exposed surfaces as necessary.

   ☞NOTE:

   Stones and road debris may chip the powder coating on the steel fan shroud and provide the potential for corrosion to begin. If unprotected steel and a salt solution are allowed to remain on the system, then the aluminum heat exchanger may also suffer corrosive damage due to stray voltage.

   b. Inspect the lower mounting bracket for corrosion and accumulation of debris. Clean, prime, and repaint as necessary.
   c. Inspect the bottom of the radiator and drain plug for evidence of corrosion. Clean, prime, and repaint as necessary.
   d. Inspect the surrounding structural tubing for evidence of corrosion. Clean, prime, and repaint as necessary.
9. Repair or replace any defective part. Refer to Section 6 of your New Flyer Service Manual for procedure.

2.1.2. Power Washing

CAUTION

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.

CAUTION

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.

☞NOTE:

Use a cleaning solution approved for effective removal of road grime and safe for aluminum. In winter months use a solution that is effective for the removal of road salts used in the area.

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 7 *in this bulletin for cleaning procedure.*

2.1.3. Grounding (Bonding) 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 all ground wires for wear or frayed insulation.
- ❒ 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.

⚠CAUTION

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

3.1.1. Radiator Power & Ground Studs

☞NOTE:

This inspection interval is dependent on operating conditions and exposure to road salts. Adjust inspection interval to suit conditions.

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 5.
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 dielectric 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. Refer to 3.1.3. “Grease Requirements” on page 6 for grease quantity requirements.

☞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.

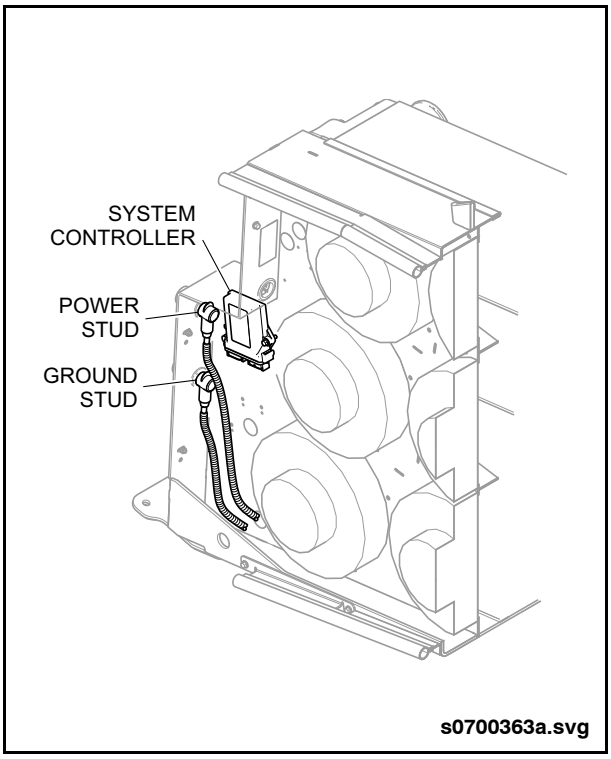

Fig. 1: Radiator Inspection

3.1.2. Radiator Electrical Connectors

☞NOTE:

This inspection interval is dependent on operating conditions and exposure to road salts. Adjust inspection interval to suit conditions.

1. Inspect the fan main harness, ignition, CAN, and system controller electrical connectors to ensure they are clean and properly connected.
2. Ensure harness is properly routed and secured.
3. Open the connectors and inspect terminals for dirt or corrosion. Clean as necessary with contact cleaner and a stiff bristle brush.
4. Reapply a small amount Dow Corning DC4 dielectric grease to the harness side of the connector and reconnect. Refer to 3.1.3. “Grease Requirements” on page 6 for grease quantity requirements.

3.1.3. Grease Requirements

Use an acid brush to apply a thin coat of clean dielectric grease to the harness side of the connector.

☞NOTE:

The fan connectors on systems with 15" fans do not require dielectric grease.

GREASE REQUIREMENTS	
LOCATION	**GREASE QUANTITY (grams)**
Power/Ground Studs with 1 1/8" Dia. Boots	5.0 g
Power/Ground Studs with 1 1/2" Dia. Boots	10.0 g
TMC & CAN Connectors	1.0 g
LED/Pushbutton Connector	0.75 g
Ignition Connector	0.50 g
11" Fan Connector	1.25 g
15" Fan Connector	None

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.