

SERVICE MANUAL BULLETIN

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

SMB-186

ISSUE DATE: Sep 20 2019

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 checked="" type="checkbox"/> Xcelsior®	<input type="checkbox"/> MiDi®	<input type="checkbox"/> Invero®	<input type="checkbox"/> ALL	
FUEL TYPE	<input type="checkbox"/> Diesel	<input checked="" type="checkbox"/> Diesel/Electric	<input type="checkbox"/> CNG	<input type="checkbox"/> LNG	<input type="checkbox"/> ALL
	<input checked="" type="checkbox"/> Fuel Cell	<input checked="" type="checkbox"/> Trolley/Electric	<input checked="" type="checkbox"/> Battery/Electric		
SUBJECT	Direct Drive Scroll Air Compressor - Powerex				
SECTION TITLE	PM - PREVENTIVE MAINTENANCE				
DETAILS	<p>This bulletin provides revised information for the Preventive Maintenance on the Powerex Direct Drive air compressor.</p> <p>This information supersedes any prior information on this subject already provided in your New Flyer Service Manual. Make this Service Bulletin available to service personnel to inform them of changed information.</p>				

1. DIRECT DRIVE SCROLL COMPRESSOR

1.1. Preventive Maintenance Guide

Intervals are based on the manufacturer's recommendations which are expressed in compressor operating hours.

Intervals listed in this bulletin were converted from compressor operating hours to mileage using an average vehicle speed of 12.5 mph and a compressor duty cycle of 50%. Adjust the service interval according to actual operating conditions.

Compressors operating in a hot dusty environment will need more frequent servicing.

PREVENTIVE MAINTENANCE GUIDE					
12,000 mi. (19,300 km)	Yearly	48,000 mi. (77,250 km)	96,000 mi. (154,500 km)	120,000 mi. (193,000 km)	400,000 mi. (644,000 km)
Compressor Air Filter Inspection (500 hrs.)	Compressor Orbital Scroll Bearing Lubrication	Compressor Air Filter Replacement (2,500 hrs.)	Compressor Fan & Duct Seal Cleaning (4,000 hrs.)	Motor Bearing Lubrication (5,500 hrs.)	Discharge Valve Replacement (16,000 hrs.)
			Crank Pin Bearing Lubrication (4,000 hrs.)		
			Compressor Tip & Dust Seal Replacement (4,000 hrs.)		
			Heat Insulation Pipe Replacement (4,000 hrs.)		

1.2. 12,000 Miles (19,300 km) Preventive Maintenance

1.2.1. Compressor Air Filter Inspection

Inspect the air compressor air filter element.

1. Remove air filter cover.
2. Inspect filter element for contamination.
3. Reinstall filter element and replace cover.

1.3. Yearly Preventive Maintenance

1.3.1. Compressor Orbital Scroll Bearing Lubrication



Maintenance of high voltage equipment must be performed by qualified personnel only. Refer to your New Flyer Service Manual for safety requirements. Ensure that the High Voltage Interlock and Battery Disconnect switches are set to the OFF position and locked-out and tagged-out.

Lubricate the orbital scroll (OS) bearing yearly. Lubricate the bearing in the spring before the high summer temperatures.

If the compressor needs to be removed from the vehicle to access the lubrication port, refer to Section 8 of your New Flyer Service Manual for removal procedure.

1. Wipe off around dust cap. Remove plastic dust cap for orbital scroll bearing grease fitting. See “Fig. 1: Orbital Scroll Bearing Lubrication” on page 3.
2. Rotate compressor coupling with a screw driver until grease fitting lines up with lubrication port.
3. Obtain a grease gun kit with special adapters and grease.

NOTE:

Contact New Flyer Parts for information on the grease gun kit with special adapters and grease cartridge.

NOTE:

Pump grease gun to eliminate air from the extension adapter before use.

4. Apply three full pumps of the grease gun to deliver the correct amount of grease to the bearings.

NOTE:

Each pump of the grease gun delivers 0.65 grams of grease.

5. Remove grease gun and reinstall plastic dust cap.

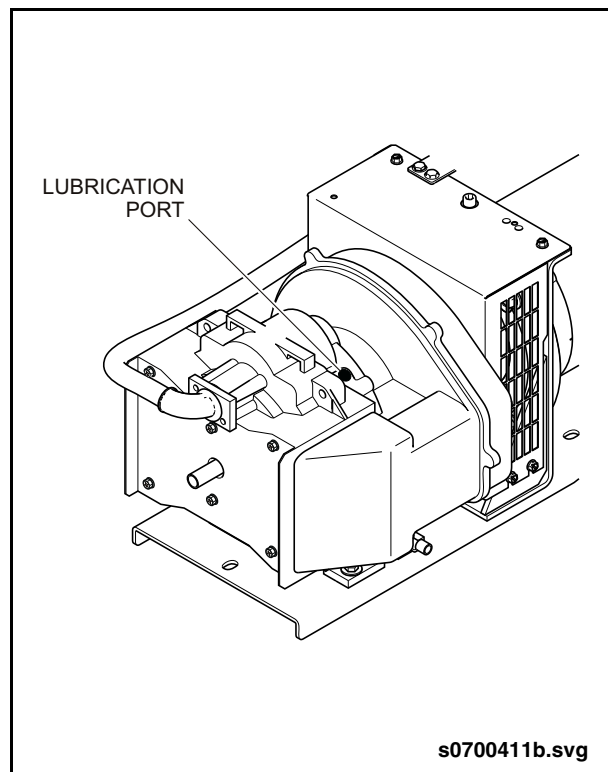


Fig. 1: Orbital Scroll Bearing Lubrication

**1.4. 48,000 Miles (77,250 km)
Preventive Maintenance**

1.4.1. Compressor Air Filter Replacement

- Replace the air filter element.
- Remove the fixed scroll cover and clean the cooling fins using compressed air. See "Fig. 2: Scroll Compressor Filter Replacement" on page 4.

**1.5. 96,000 Miles (154,500 km)
Preventive Maintenance**

**1.5.1. Air Compressor Cleaning, Lubrication
& Parts Replacement**



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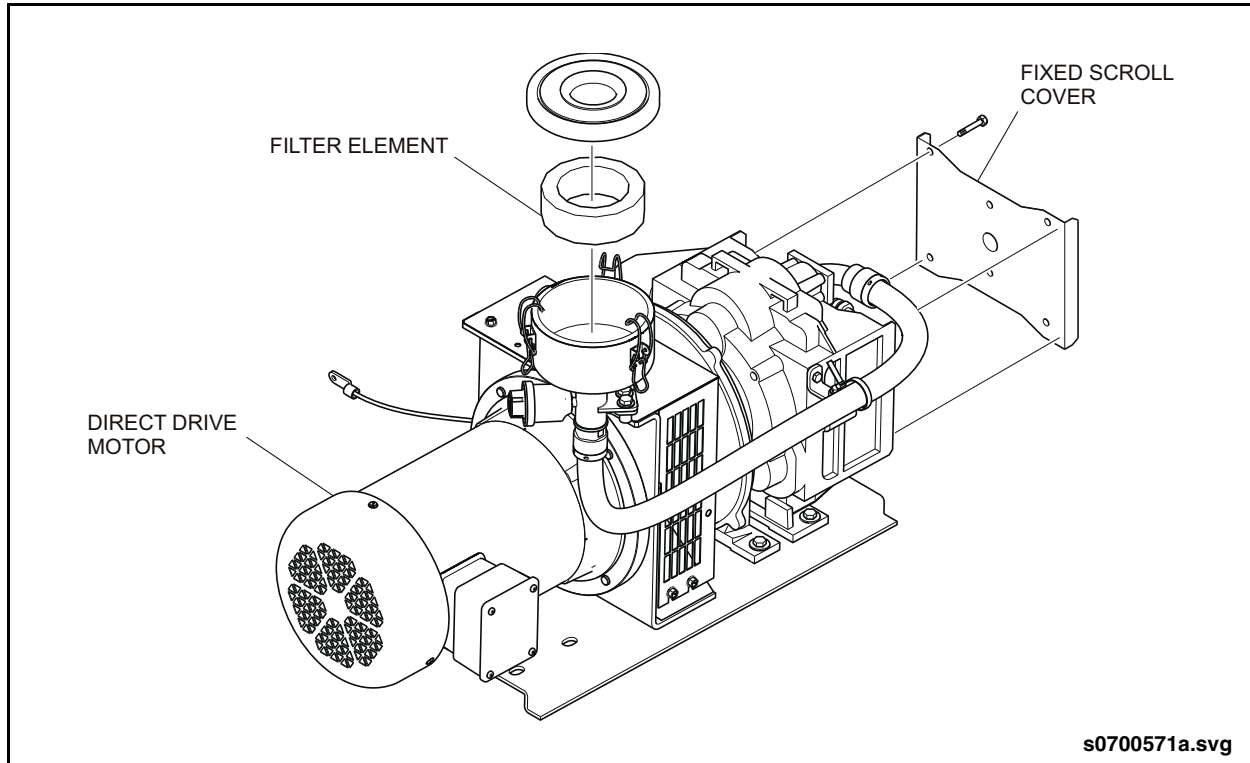


Fig. 2: Scroll Compressor Filter Replacement

1.5.2. Compressor Fan & Duct Seal Cleaning

Remove the blower fan cover and clean the compressor fins and fan using compressed air. Wipe the fan duct interior with a clean cloth.

1.5.3. Crank Pin Bearing Lubrication

1. Remove scroll compressor assembly from vehicle. Refer to Section 8 of your New Flyer Service Manual for removal procedure.
2. Remove the six attaching fasteners and separate the fixed scroll assembly from the orbital scroll assembly.
3. Obtain a grease gun kit with special adapters and grease.

NOTE:

Contact New Flyer Parts for information on the grease gun kit with special adapters and grease cartridge.

NOTE:

Pump grease gun to eliminate air from the extension adapter before use.

4. Locate the three grease fittings on the crank pin bearing and apply seven full pumps of the grease gun to deliver the correct amount of grease to the bearings. See [“Fig. 3: Crank Pin Bearing Lubrication”](#) on page 5.

NOTE:

Each pump of the grease gun delivers 0.65 grams of grease.

5. Reinstall all removed parts.

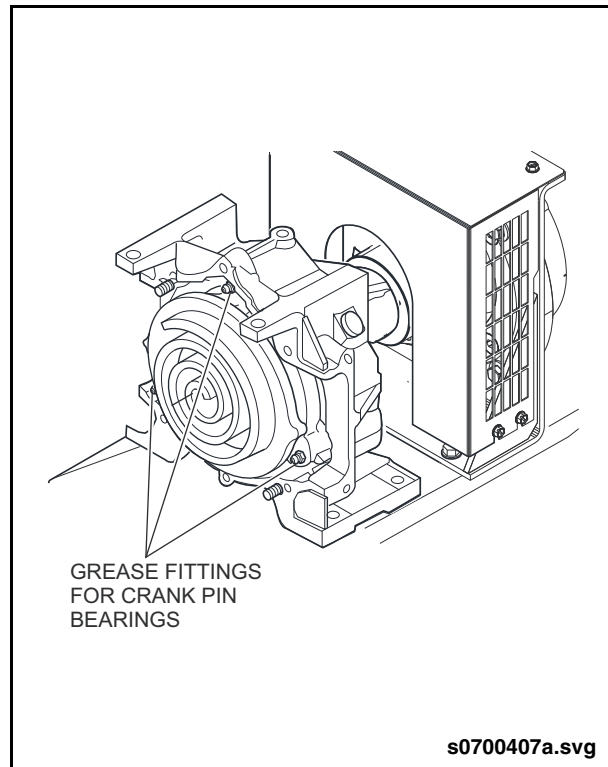


Fig. 3: Crank Pin Bearing Lubrication

1.5.4. Compressor Tip & Dust Seal Replacement

1. Remove the scroll compressor assembly from the vehicle. Refer to Section 8 of your New Flyer Service Manual for removal procedure.
2. Remove the hardware from fixed scroll assembly and separate from orbital scroll assembly. See [“Fig. 4: Scroll Compressor Assembly”](#) on page 6.
3. Remove old seal. Clean scroll using a clean cloth and compressed air.

NOTE:

Tip seals for fixed scroll and orbital scroll have opposing seal cut angles. To distinguish between fixed scroll and orbital scroll seals. See [“Fig. 5: Seal Identification”](#) on page 7.

4. Insert tip seal with lip of the seal (grooved bottom) facing bottom of scroll seal groove. Ensure lip faces center of scroll. See [“Fig. 6: Orbital Scroll Seal Installation”](#) on page 7.



During seal installation, it is important to verify that a notch in the seal has been achieved. Follow the procedures carefully to prevent seal movement during installation.

5. Insert a new high pressure tip seal from the center of the orbital scroll as follows:
 - a. Make sure there is no gap at the tip, and that the low pressure seal contacts the high pressure seal inside the scroll groove.
 - b. Insert approximately half of the low pressure seal and then remove it to verify that a notch in the seal has been achieved. See “Fig. 7: Seal Installation” on page 7.
 - c. Reinstall the portion of the seal removed previously and complete the installation of the remainder of the seal.
 6. Repeat steps 4 & 5 for fixed scroll seal.
 7. Remove the dust seal and backup tube on outermost side of fixed scroll set.
 8. Insert new backup tube in fixed scroll set. Orient split in tube to the 6 o'clock position. See “Fig. 8: Backup Tube Installation” on page 7.
 9. Insert new dust seal on backup tube. Face seamed section of dust seal at the 3 o'clock position. See “Fig. 9: Dust Seal Installation” on page 8.
- NOTE:**
DO NOT allow dust seal or tip seal to fall out of position during installation.
10. Reassemble fixed scroll set to orbital scroll.
 11. Install and lightly tighten the six retaining fasteners. Rotate crankshaft and confirm it rotates smoothly.
 12. Torque the fasteners in two stages.
 - First Stage - 17 in-lb.
 - Second Stage - 265 in-lb.

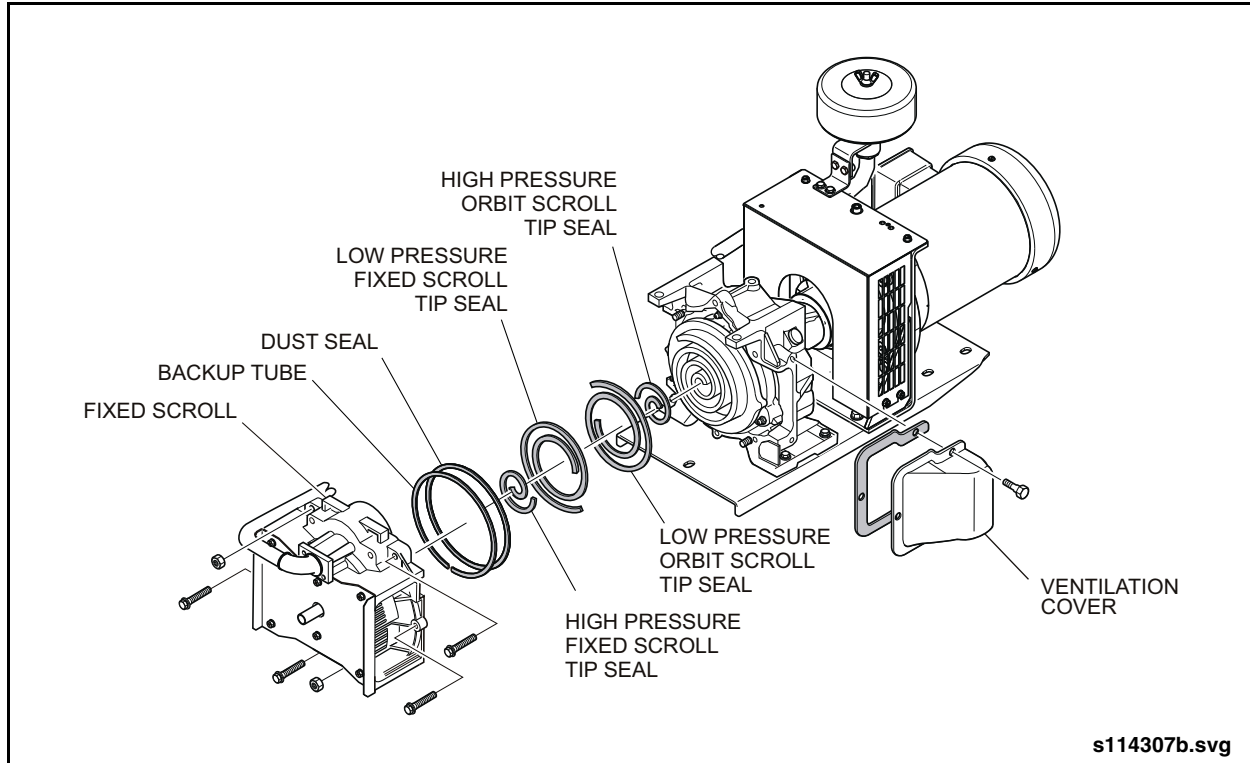


Fig. 4: Scroll Compressor Assembly

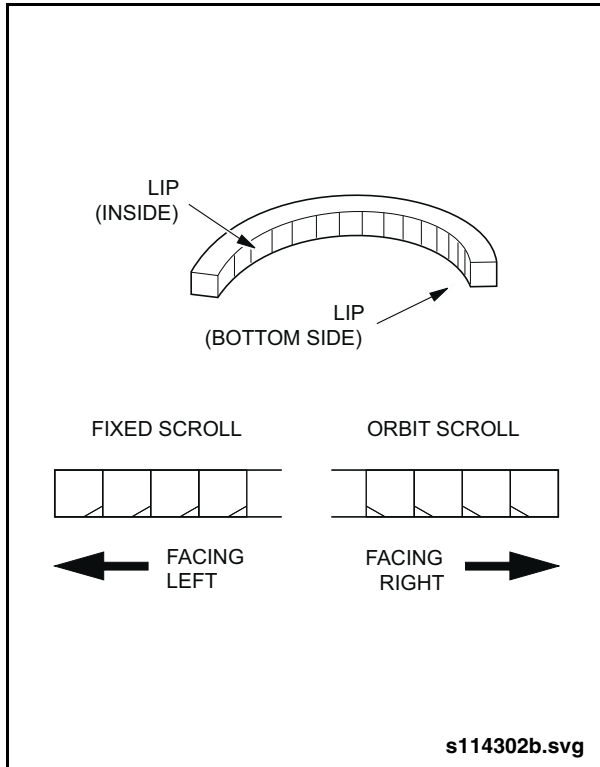


Fig. 5: Seal Identification

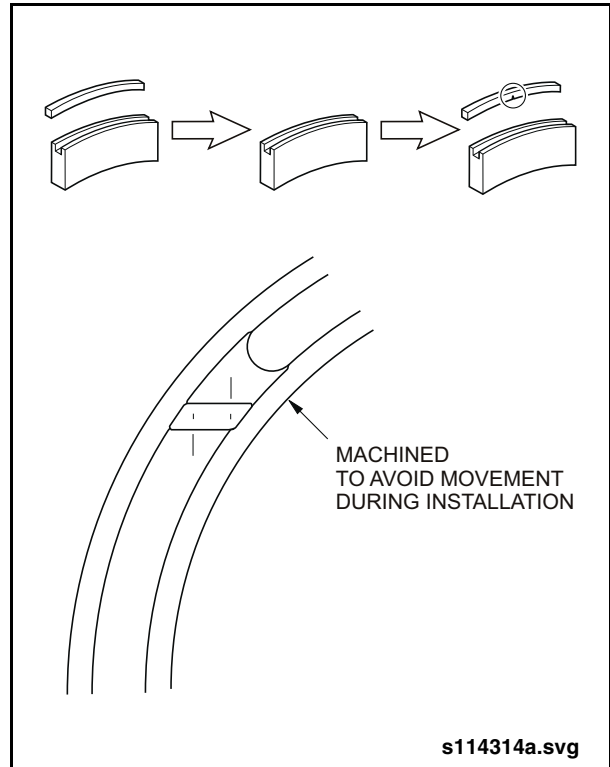


Fig. 7: Seal Installation

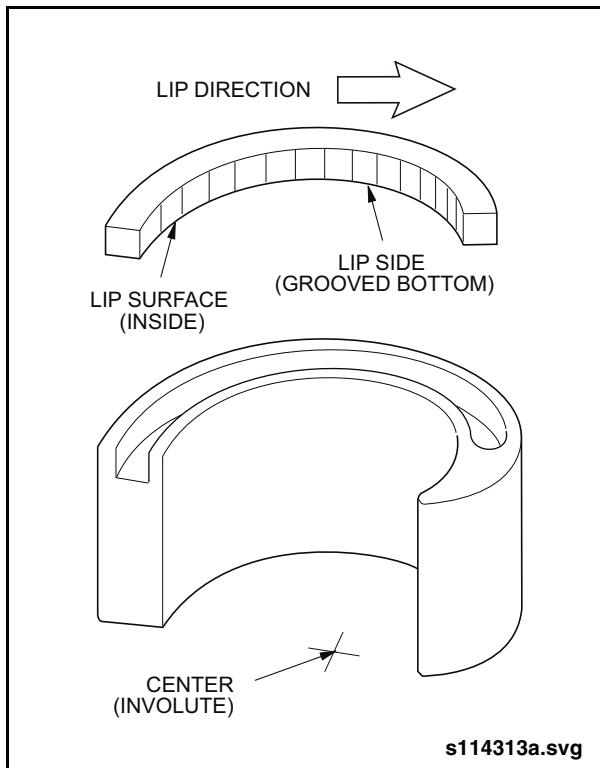


Fig. 6: Orbital Scroll Seal Installation

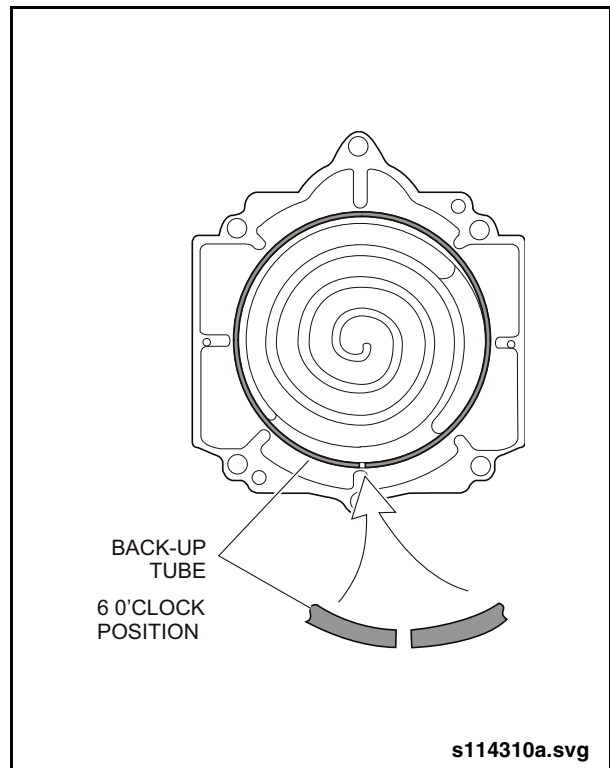


Fig. 8: Backup Tube Installation

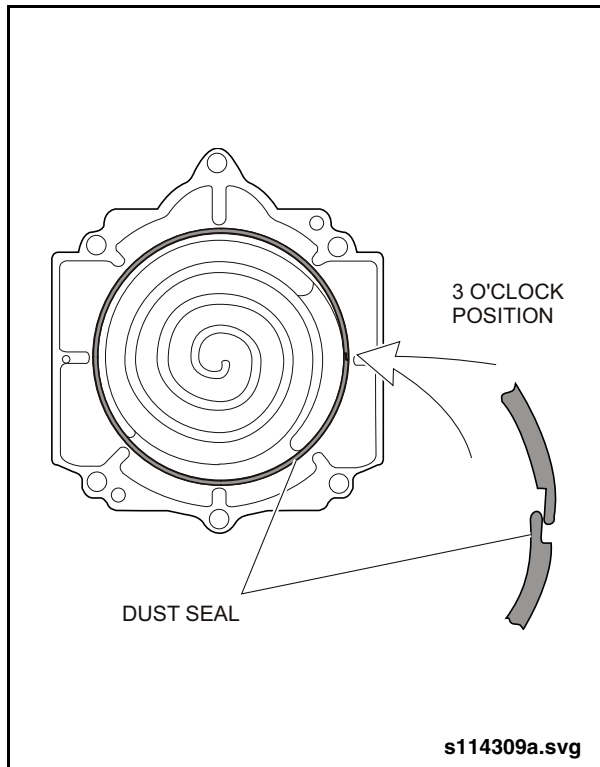


Fig. 9: Dust Seal Installation

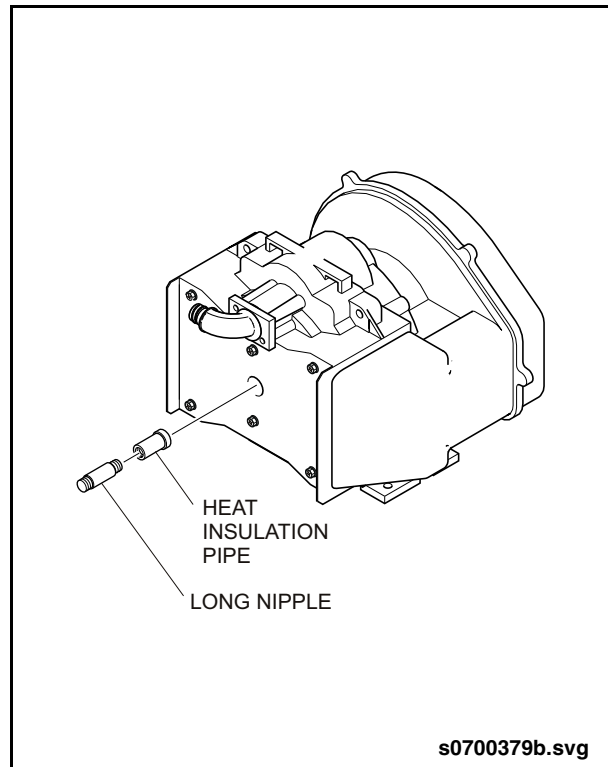


Fig. 10: Heat Insulation Pipe

1.5.5. Heat Insulation Pipe Replacement

1. Set the Battery Disconnect switch to the OFF position.
2. Drain the vehicle air system.
3. Disconnect the discharge lines and fittings from the long nipple on the compressor.
4. Unthread the long nipple from the compressor housing. See "Fig. 10: Heat Insulation Pipe" on page 8.
5. Pull out the heat insulation insert.
6. Install a new heat insulation insert. Installation is the reverse of removal.

1.6. 120,000 miles (193,000 km) Preventive Maintenance

1.6.1. Motor Bearing Lubrication



Maintenance of high voltage equipment must be performed by qualified personnel only. Refer to your New Flyer Service Manual for safety requirements. Ensure that the High Voltage Interlock and Battery Disconnect switches are set to the OFF position and locked-out and tagged-out.

1. Locate the grease fittings at either end of the motor and wipe the fitting and surrounding area clean.

NOTE:

If a plug is installed at this location, remove it and replace with a grease fitting.

2. Remove the motor housing drain plugs, located on the bottom of the housing at either end.

3. Add 5.0 grams of Mobil Polyrex EM grease.
4. Run the motor for 15 minutes.
5. Reinstall the grease drain plugs.

1.7. 400,000 miles (644,000 km) Preventive Maintenance

1.7.1. Air Compressor Replacement



Maintenance of high voltage equipment must be performed by qualified personnel only. Refer to your New Flyer Service Manual for safety requirements. Ensure that the High Voltage Interlock and Battery Disconnect switches are set to the OFF position and locked-out and tagged-out.

1.7.2. Discharge Valve Replacement

1. Set the Battery Disconnect switch to the OFF position.
2. Drain the vehicle air system.
3. Locate the discharge valve on the outlet side of the compressor. See "Fig. 11: Air Compressor Discharge Valve" on page 9.
4. Disconnect the signal line and exhaust line from the discharge valve.
5. Unthread the discharge valve from the discharge fitting.
6. Place discharge valve in a vise and remove the signal line connector and the exhaust line nipple.
7. Install a new discharge valve. Installation is the reverse of removal.

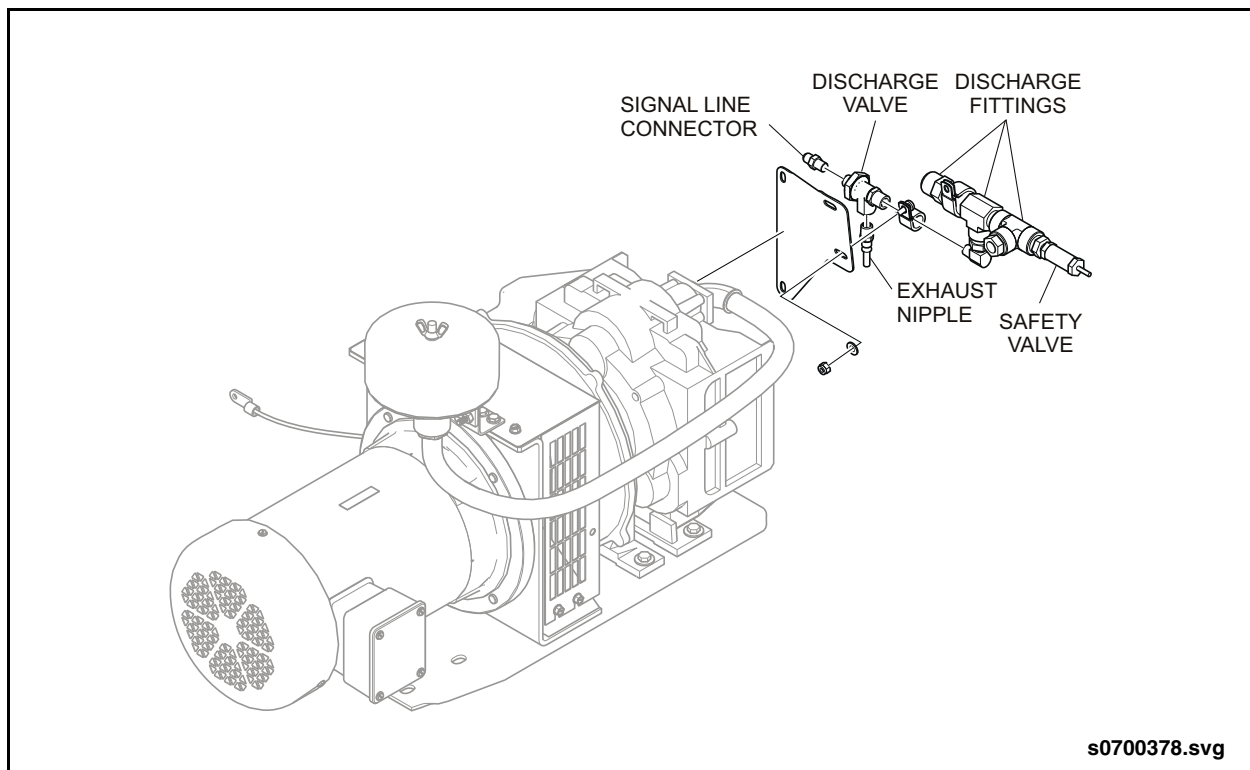


Fig. 11: Air Compressor Discharge Valve

1.7.2.1. Coupling Removal

1. Set the Battery Disconnect switch to the OFF position.
2. Drain the vehicle air system.
3. Remove the air compressor coupling guard to gain access to the coupling. See "Fig. 12: Air Compressor Coupling" on page 10.



DO NOT loosen the setscrew that secures the drive hub to the compressor shaft.

4. Remove the three socket head screws that secure the coupling rubber element radially to the motor shaft.

NOTE:

The hub is keyed to the compressor shaft and secured with a setscrew. The relative

position of the hub and compressor shaft must be maintained.

NOTE:

DO NOT loosen the four hex head bolts that secure the motor adapter ring to the faceplate.

5. Support the weight of the motor and loosen the inner set of flat socket head screws that hold the motor to the adapter ring.
6. Carefully pull the motor straight back to disengage the coupling.
7. Remove the three socket head screws that axially secure the rubber coupling element to the compressor hub.

NOTE:

DO NOT remove or reposition the drive hub. DO NOT remove or reposition the motor mounting ring.

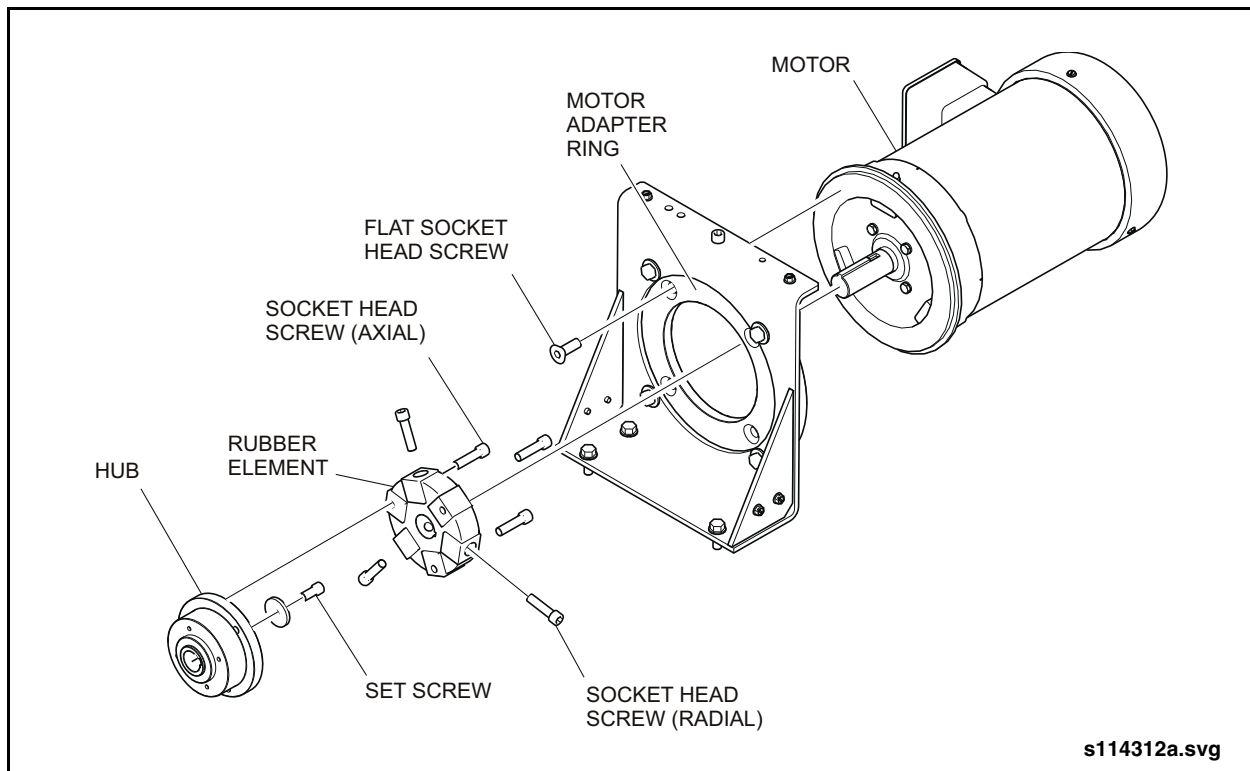


Fig. 12: Air Compressor Coupling

1.7.2.2. Coupling Installation

1. Position new rubber coupling onto compressor hub and install three socket head screws.

 **NOTE:**

Lubricate the body and under side of the three socket head screws with light oil or grease.

2. Torque bolts to 37 ft-lb. (50 Nm).

 **NOTE:**

DO NOT apply threadlocker or adhesives to the screw threads. DO NOT allow the element to become twisted when tightening the screws.

3. Carefully align and slide the motor onto the faceplate adapter ring.
4. Tighten the inner set of flat head socket screws that hold the motor to the adapter ring.
5. Install the three socket head screws that secure the coupling radially to the motor drive hub. Torque the screws to 37 ft-lb. (50 Nm).
6. Reinstall the coupling guard.
7. Set the Battery Disconnect switch to the ON position.
8. Start vehicle and check compressor operation.

2. FLUID & LUBRICATION GUIDE

2.1. Lubrication Chart

FLUID & LUBRICATION GUIDE				
ITEM	COMPONENT	PROCEDURE	INTERVAL	LUBE TYPE
1	Orbital Scroll Bearing	Lubricate Grease Fittings	Yearly	Powerex Grease
2	Crank Pin Bearing	Lubricate Grease Fittings	96,000 mi. (154,500 km) (4,000 hrs.)	Powerex Grease
3	Motor Bearing	Lubricate Grease Fittings	120,000 mi. (193,000 km) (5,500 hrs.)	Mobil Polyrex EM Grease