

How to replace the pump and pump seals on the Standard, Bulldog and Bison models. Seal the pump elbow on the Bulldog. Replace the vanes and endplate sealing on the Bulldog and Bison Models.



STANDARD MODELS

- 550
(955.xxxx.xxx)
- 1400*
(914.xxxx.xxx)

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*Note: Instructions relating to Standard 1400 models also apply to Standard 1200 and 2800 models.



BULLDOG MODELS

- 550
(855.xxxx.xxx)
- QT
(809.xxxx.xxx)
- QT E
(809E.xxxx.xxx)

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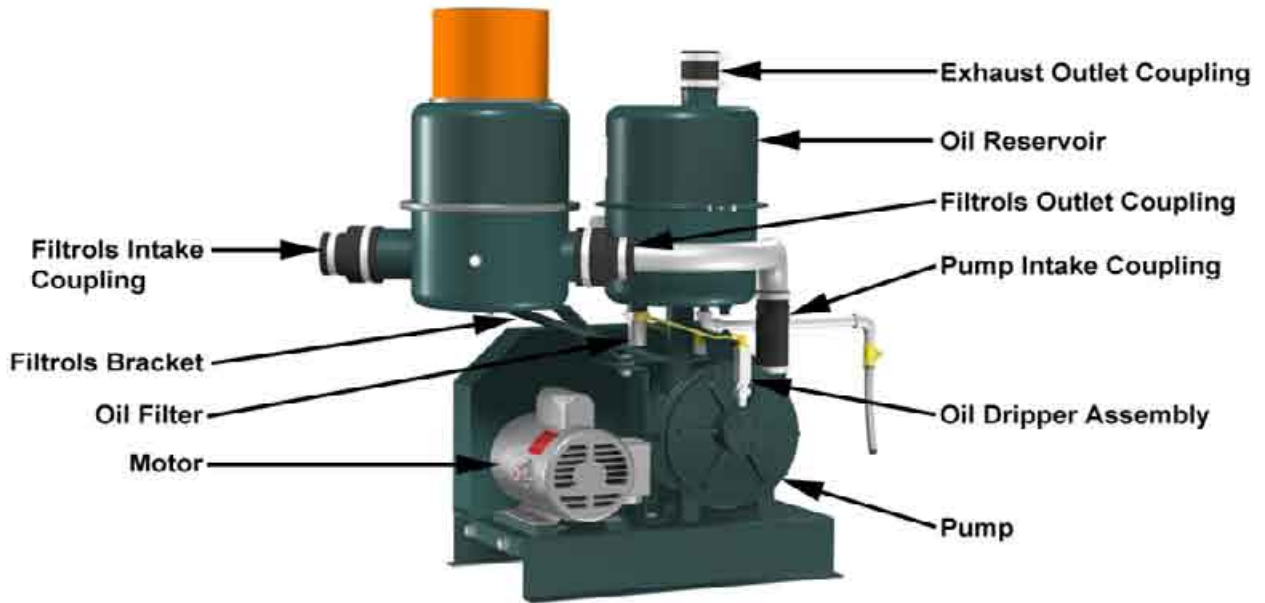
BISON MODELS

- BISON
(818.xxxx.xxx)
(826.xxxx.xxx)
- BISON E
(818E.xxxx.xxx)
(826E.xxxx.xxx)

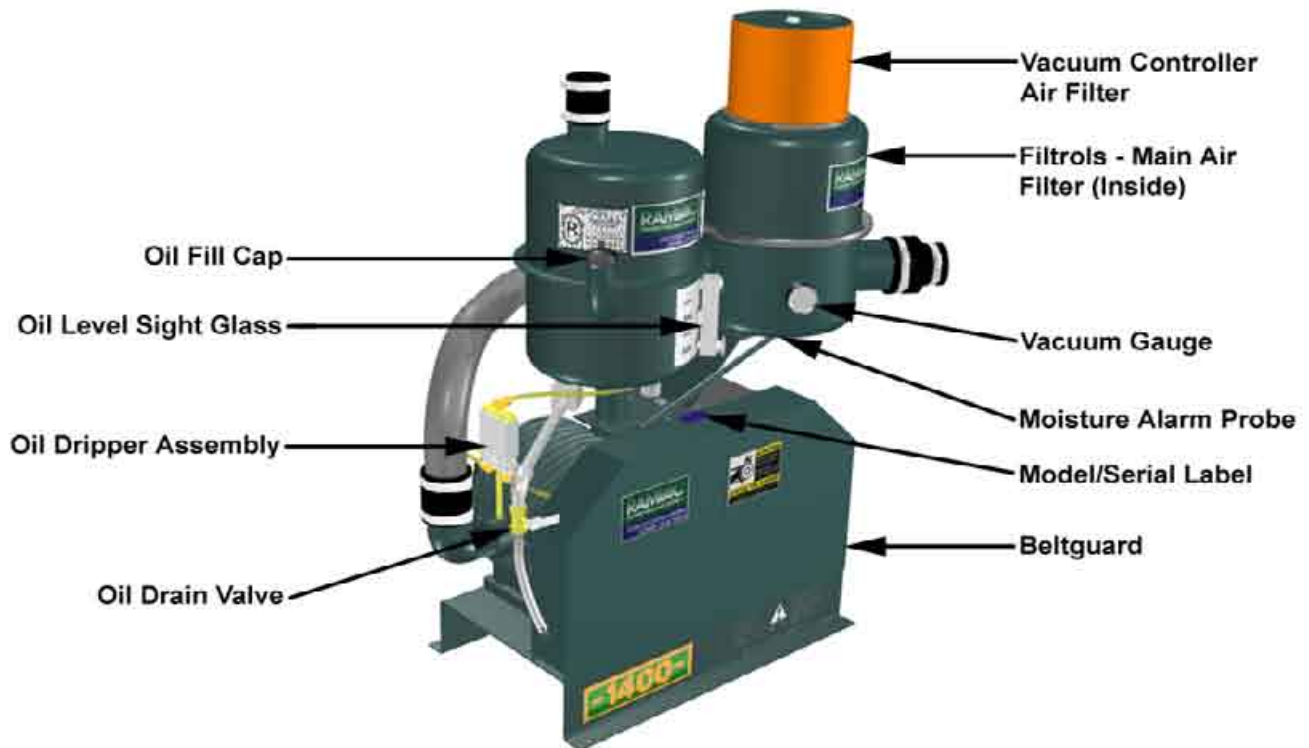
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STANDARD

Standard Models Important Features



Standard 550



Standard 1400

STANDARD

Pump Replacement

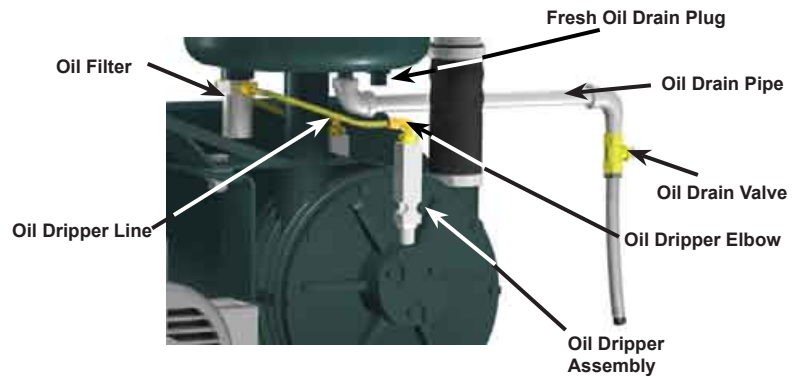
How to replace a pump on Standard Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Loosen pump intake and Filtrals outlet coupling. Remove filtrals intake pipe.
4. Disconnect the moisture probe and oil switch (if present).
5. Remove Filtrals and set aside.
6. Remove beltguard.
7. Drain fresh and used oil from oil reservoir.
8. Remove oil drain pipe. Plug to prevent drips.
9. Disconnect oil line(s) from oil filter assembly.
10. Loosen 2" locknut at oil reservoir/pump junction. A Dremel tool with cutting blade or chisel may be needed to break locknut spot weld.
 - a. **Standard 1400** – Disconnect oil dripper assembly and elbows connected to pump and set aside.
11. Using a long pry bar, unscrew oil reservoir from pump, keeping oil reservoir upright to minimize oil drips.
12. Loosen bolt on Filtrals bracket until it can lift and turn off pump exhaust.
13. Loosen four motor mounting bolts 1/2 turn from full tight. Loosen belt tension bolts. Remove belt(s).

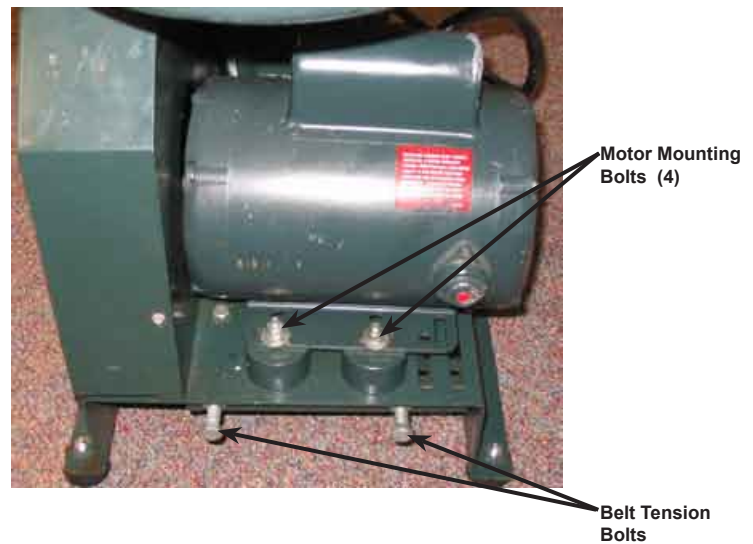
Note pulley orientation for proper installation.

14. Remove pump pulley.
 - a. **Set Screw Pulleys:**
 - i. Loosen pulley set screws and remove pump pulley.
 - b. **Taper Lock Pulley:**
 - i. See "Taper Lock Pulley Repair and Replace" procedure in the "Belt Replacement, Alignment, and Tensioning Service Instruction".
15. Remove pump mounting bolts and defective pump.
16. Removal and Installation of dripper assemblies.
 - a. **Standard 550**
 - i. Remove oil dripper assemblies from defective pump.
 - ii. Apply Loctite 565 to oil dripper assemblies and install on replacement pump.
 - b. **Standard 1400**
 - i. Disconnect oil line fittings from oil dripper elbows. Remove oil dripper assembly and dripper elbows from defective pump
 - ii. Apply Loctite 565 to oil dripper assembly and oil dripper elbows. Install on replacement pump.

Standard 550 Oil Assembly



Standard 550 Motor Bolts

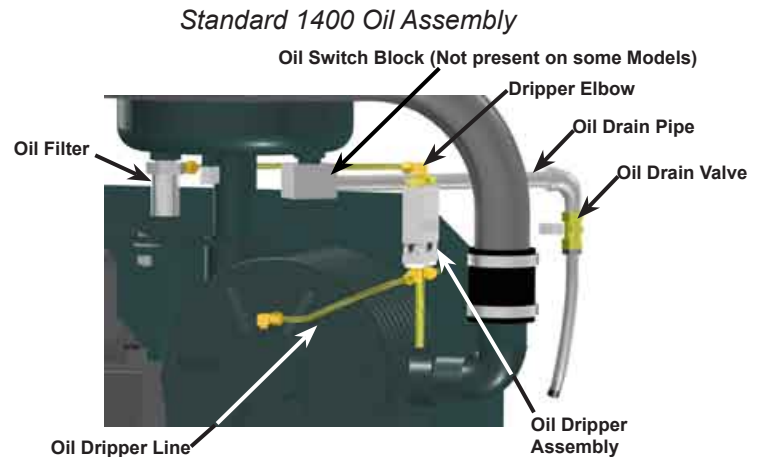


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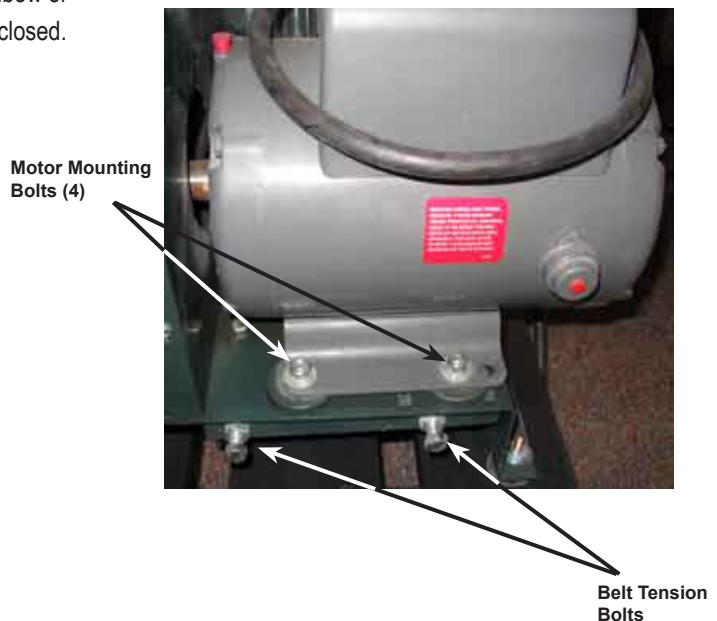
STANDARD

Pump Replacement (continued)

17. Install pump on base with pump mounting bolts previously removed.
Tighten bolts to 70 ft-lbs.
18. Install shaft key and properly orientate pulley on pump shaft.
 - a. **Set Screw Pulley**
 - i. Apply Loctite 243 to pulley set screws.
 - ii. Torque pulley set screws to 150 inch-pounds.
 - b. **Taper Lock Pulley**
 - i. Torque hub bolts to 75 inch-pounds.
 - ii. Apply Loctite 290 to pulley hub bolts.
19. Apply a drop of Loctite 290 to pump shaft on front of pulley hub at shaft key.
20. Install belt(s) on pump and motor pulleys.
21. See "Belt Replacement, Alignment and Tensioning Service Instruction" to align and tension belt.
22. Install beltguard.
23. Install Filtrols support bracket on pump exhaust and tighten down bolt.
24. Thoroughly Clean threads and apply Loctite 565 to bottom 1" of oil reservoir pipe threads.
25. Thread oil reservoir pipe into pump exhaust and tighten until oil filter is centered over Filtrols support bracket.
26. Apply Loctite 565 on threads and tighten down locknut.
27. Apply Loctite 565 to drain pipe threads. Install drain pipe into elbow or oil switch block. Be sure oil drain hose is plugged and valve is closed.
28. Reconnect oil line(s) to oil filter assembly on oil reservoir.
29. Install Filtrols onto support bracket.
30. Install moisture probe and reconnect oil switch (if present).
31. Install Filtrols intake pipe between Filtrols outlet coupling and pump intake coupling. Tighten clamps.
32. Fill oil reservoir to proper level.
33. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.



Standard 1400 Motor Bolts



STANDARD

Front Seal Replacement

How to replace the front pump seal on Standard Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Remove beltguard and set aside.
4. Loosen motor mounting bolts 1/2 turn from full tight.
5. Loosen belt tension bolts. Remove belt(s).

Note pulley orientation for proper installation.

6. Remove pump pulley
 - a. **Set Screw Pulleys:**
 - i. Loosen pulley set screws and remove pump pulley.
 - b. **Taper Lock Pulley:**
 - i. See “*Taper Lock Pulley Repair and Replace*” procedure in the “*Belt Replacement, Alignment, and Tensioning Service Instruction*”.
7. Remove key from keyway.

Note seal orientation for proper installation.

8. If outer seal present, carefully remove seal with seal puller or flat screwdriver and discard. Do not damage shaft or bore surfaces.
9. Remove and discard snap ring and inner seal. Do not damage shaft or bore surfaces
10. Thoroughly clean shaft and bore in endplate.
- Note: The new seal replaces both old seals and snap ring.*
11. Lubricate new seal with wheel bearing grease or similar lubricant.
12. Properly orientate seal and place in endplate.
13. Gently tap seal into place evenly all the way to bearing.
14. Replace shaft key and properly orientate pulley on pump shaft.

- a. **Set Screw Pulley**
 - i. Apply Loctite 243 to pulley set screws.
 - ii. Torque pulley set screws to 150 inch-pounds.
 - b. **Taper Lock Pulley**
 - i. Torque hub bolts to 75 inch-pounds.
 - ii. Apply Loctite 290 to pulley hub bolts.
15. Apply a drop of Loctite 290 to pump shaft on front of pulley hub at shaft key.
 16. Install belt(s) on pump and motor pulleys.
 17. See “*Belt Replacement, Alignment and Tensioning Service Instruction*” to align and tension belt.
 18. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.



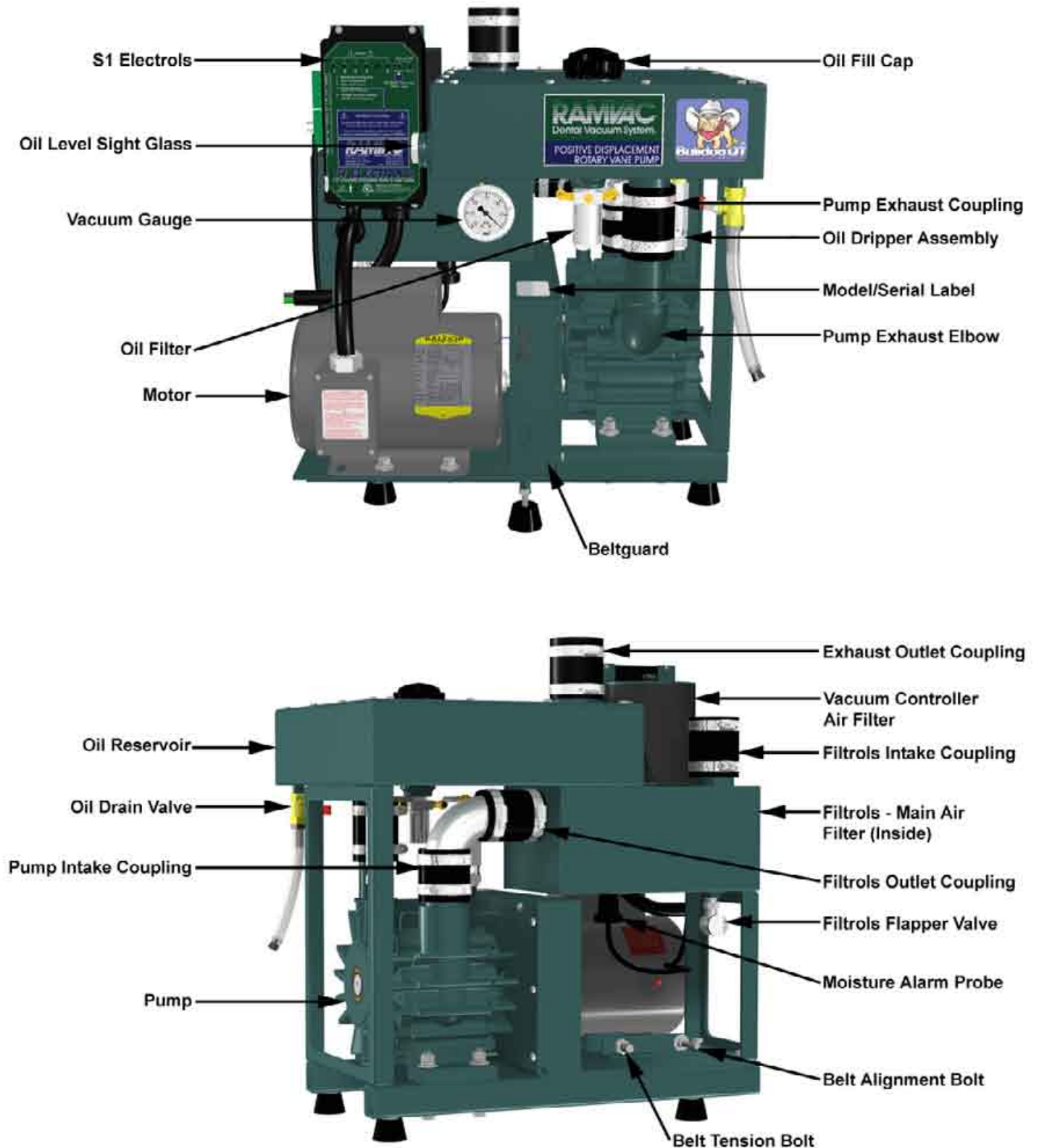
Outer Seal Removal



Inner Snap Ring and Seal Removal

BULLDOG

Bulldog Models Important Features



BULLDOG

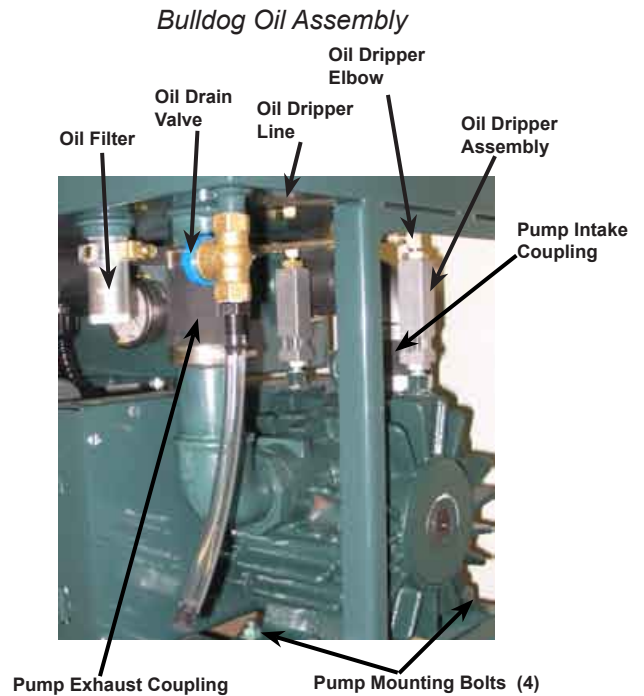
Pump Replacement

How to replace a pump on Bulldog 550, Bulldog QT and Bulldog QT E models.

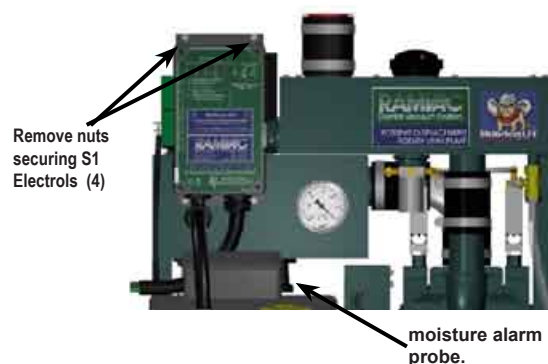
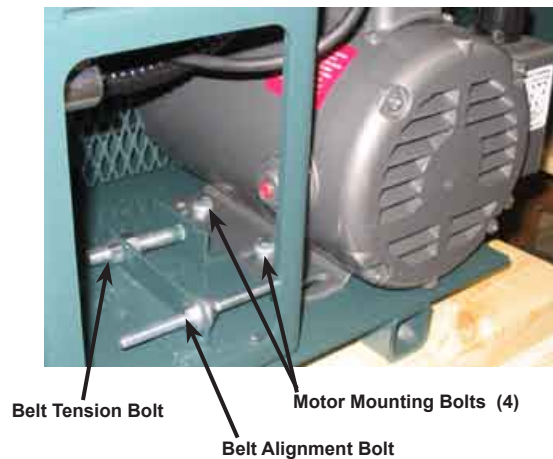
1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Loosen oil filter cannister to stop oil flow to oil dripper lines.
4. Disconnect oil dripper lines from oil dripper elbows. Leave brass poly-nuts on oil dripper lines. Prepare for oil drip.
5. Loosen bottom hose clamps on the pump intake and pump exhaust couplings.
6. Remove moisture alarm probe.
7. **Bulldog QT E Models:** Remove nuts securing the S1 Electrols and set S1 Electrols aside.
8. Remove all oil reservoir leg bolts. Remove oil reservoir.
9. Remove belt guard.
10. Loosen four motor mounting bolts 1/2 turn from full tight.
11. Loosen belt tension bolt and belt alignment bolt (if present). Remove belt.

Note pulley orientation for proper installation.

12. Loosen pump pulley set screws and remove pulley.
13. Remove pump mounting bolts and defective pump.
14. Install new pump on base with pump mounting bolts previously removed.
 - a. **Bulldog 550 Models** tighten to 70 ft-lbs.
 - b. **Bulldog QT and Bulldog QT E Models** tighten to 35 ft-lbs.
15. Install shaft key and properly orientate pulley on pump shaft.
 - a. Apply Loctite 243 to pulley set screws.
 - b. Torque pulley set screws to 150 inch-pounds.
16. Apply a drop of Loctite 290 to pump shaft on front of pulley at shaft key.
17. Install belt on pump and motor pulleys.
18. See "Belt Replacement, Alignment and Tensioning Service Instruction" to align and tension belt.
19. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrals intake hose couplings. Reconnect wiring.



Bulldog Motor Bolts



BULLDOG

Pump Elbow Reseal

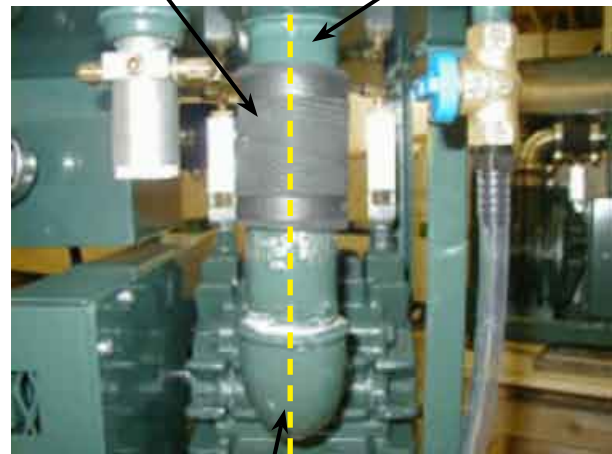
How to reseal the pump elbow on Bulldog QT and Bulldog QT E Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Loosen clamps on pump exhaust hose coupling.
4. Slide pump exhaust coupling up pump exhaust pipe until out of the way. If needed, secure top clamp to hold in place.
5. Remove pump exhaust pipe from pump exhaust coupling and pump exhaust elbow, taking care to keep wrench off **unpainted** area and threads.
6. Scrape off paint around pump exhaust elbow locknut, loosen locknut, and remove pump exhaust elbow.
7. Thoroughly clean threads in pump exhaust port.
8. Thoroughly clean threads on pump exhaust elbow and pump exhaust elbow locknut.
9. Apply Loctite 565 to elbow threads.
10. Install pump exhaust elbow and locknut, lining up with oil reservoir exhaust manifold.
11. Thoroughly clean threads on pump exhaust pipe.
12. Apply Loctite 565 to pump exhaust pipe threads.
13. Install pump exhaust pipe into pump exhaust coupling and pump exhaust elbow. Tighten, taking care to keep wrench off **unpainted** area and threads.
14. Make sure pump exhaust pipe is lined up with oil reservoir exhaust manifold and tighten pump exhaust elbow locknut.
15. Reposition pump exhaust coupling into original position, secure hose clamps. Allow Loctite to dry.
16. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.



Pump Exhaust Pipe
Pump Exhaust Elbow
Pump Exhaust Elbow Locknut

Pump Exhaust Coupling
Oil Reservoir Exhaust Manifold



Line up pump exhaust pipe with oil reservoir exhaust manifold

BULLDOG

Front Seal Replacement

How to replace the front pump seal on the Bulldog QT and Bulldog QT E Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Remove beltguard and set aside.
4. Loosen motor mounting bolts 1/2 turn from full tight.
5. Loosen belt tension bolt and belt alignment bolt (if present).

Remove belt.

Note pulley orientation for proper installation.

6. Loosen pulley set screws, remove pulley, and shaft key.

Note orientation and depth of seal for proper installation.

7. Carefully remove the seal with seal puller or flat screwdriver and discard. Do not damage shaft or bore surfaces.
8. Thoroughly clean shaft and bore in endplate.
9. Lubricate new seal with wheel bearing grease or similar lubricant.
10. Properly orientate seal in endplate.
11. Gently tap seal into place at proper depth.
12. Install shaft key and properly orientate pulley on pump shaft.
 - a. Apply Loctite 243 to pulley set screws.
 - b. Torque pulley set screws to 150 inch-pounds.
13. Apply a drop of Loctite 290 to pump shaft on front of pulley at shaft key.
14. Install belt on pump and motor pulleys.
15. See "Belt Replacement, Alignment and Tensioning Service Instruction" to align and tension belt.
16. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.

Front Seal Replacement



Bulldog Motor Bolts



Belt Tension Bolt

Belt Alignment Bolt

Motor Mounting bolts (4)

Rear Seal Replacement

How to replace the rear pump seal on the Bulldog QT and Bulldog QT E Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
Note seal orientation and depth for proper installation.
3. Carefully remove the seal with a seal puller or flat screwdriver and discard. Do not damage shaft or bore surfaces.
4. Thoroughly clean shaft and bore in endplate .
5. Lubricate new seal with wheel bearing grease or similar lubricant.
6. Properly orientate seal in endplate.
7. Gently tap seal into place at proper depth.
8. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.



Vane Replacement

How to replace the Vanes on the Bulldog QT and Bulldog QT E Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Loosen the oil filter cannister to stop the oil flow.
4. Disconnect the oil line on the rear endplate.
Note: Refer to "Belt replacement, Alignment, and Tensioning Service Instruction" for the next step.
5. Remove Belts.
 - a. See "Belt Replacement, Alignment, and Tensioning" procedure to remove the belt.
6. Remove rear endplate bolts.
7. Carefully remove the rear endplate and set aside.
Note vane orientation in rotor. Each vane slot contains 2 pieces.
8. Remove the vanes from the rotor.
9. Lubricate the replacement vane pieces with oil.
Note: Vane pieces have a rounded edge on one side.
10. Install the vanes into the rotor slots with the rounded edge of the vane to the outside edge of the rotor.

Caution: Do not force vanes into rotor slots.

11. See "Endplate Resealing" to seal endplate.
12. See "Belt Replacement, Alignment and Tensioning Service Instruction" to align and tension belt.
13. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.

Endplate Sealing

How to reseal the Endplates on the Bulldog QT and Bulldog QT E Models.

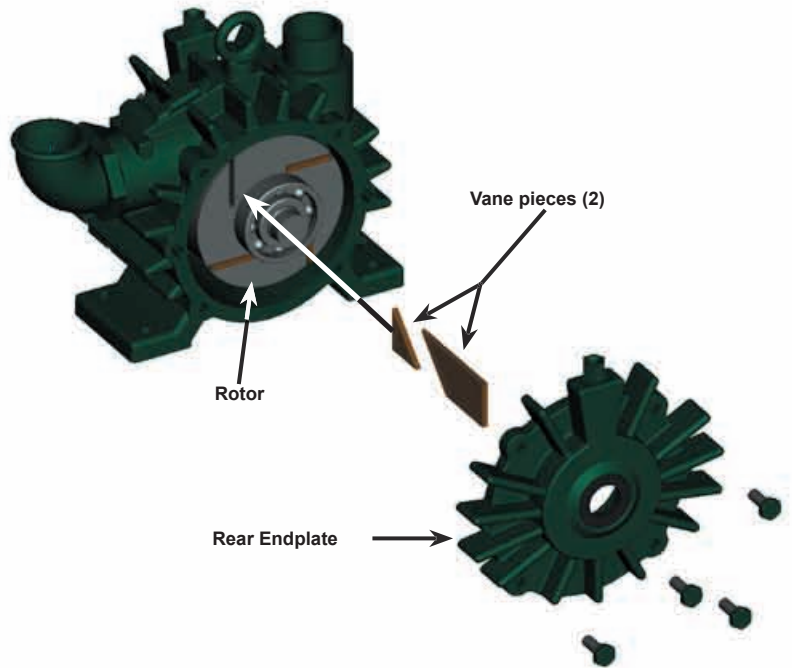
Note: When one or both of the pump endplates have been removed for any reason:

1. Use Permatex Anaerobic Gasket Maker.

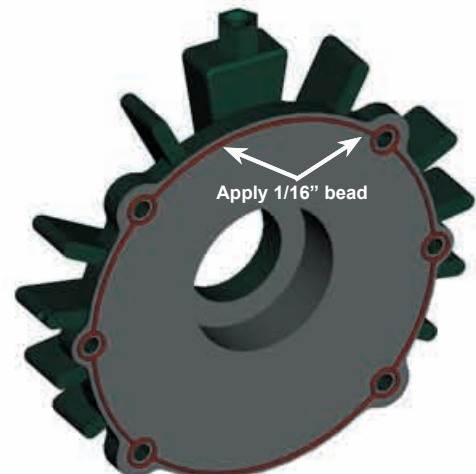
Important: Excess gasket maker that is squeezed into the rotor chamber from tightening the endplate will lock the rotor.

2. Use anaerobic gasket maker very sparingly in a constant 1/16" bead around the center to outer edge of the sealing surface. Go completely around the alignment pins and bolt holes.
3. Mount the endplate. Using crossing pattern, tighten bolts to 35 foot pounds..

Vane Replacement

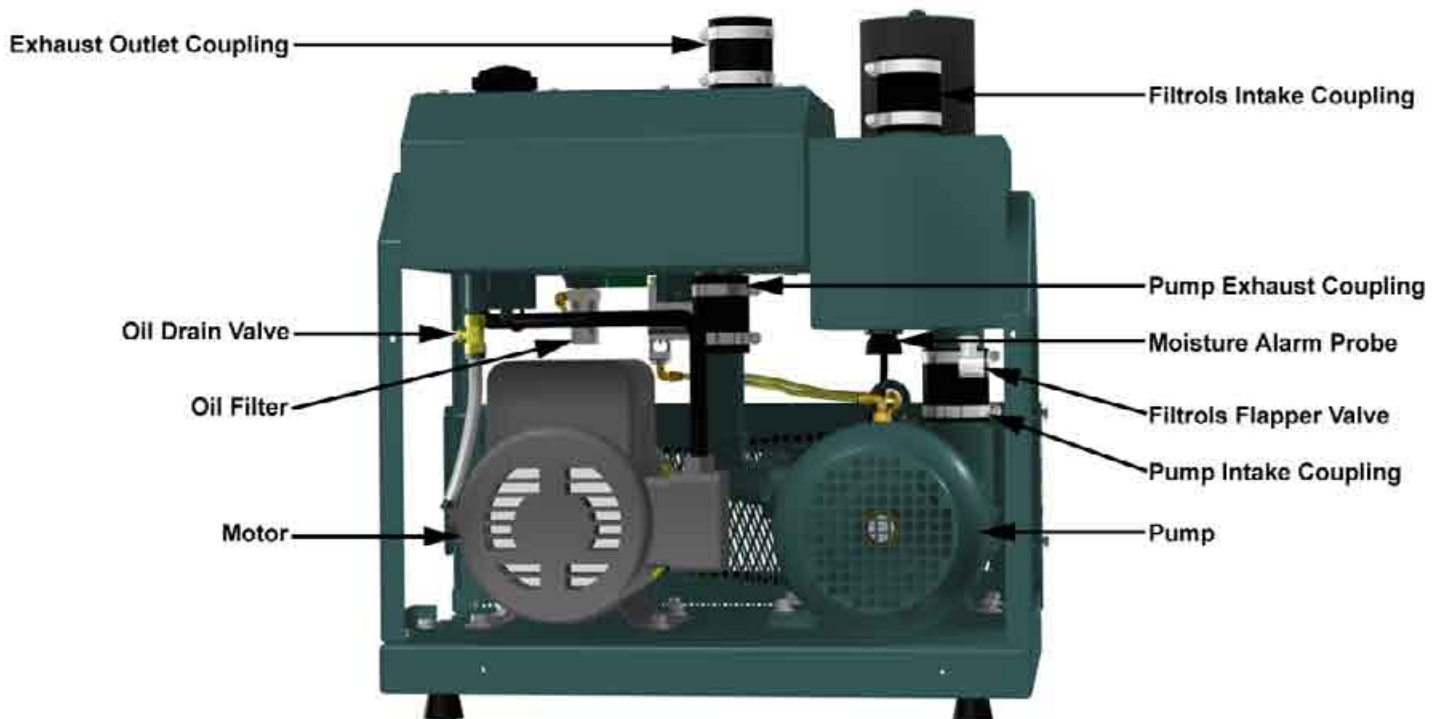


Endplate Sealing



BISON

Bison Models Important Features



BISON

Pump Replacement

How to replace a pump on the Bison and Bison E Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Loosen oil filter cannister to stop oil flow to oil dripper lines.
4. Disconnect oil dripper lines from pump. Leave brass poly-nuts on dripper lines. Prepare for oil drip.
5. Loosen bottom hose clamps on the pump intake and pump exhaust couplings.
6. **Bison Models with Gray Box Electrols.**
 - a. Remove moisture probe. Disconnect spade connectors from moisture probe chord.
7. **Bison Models with S1 Electrols.**
 - a. Disconnect the "12DE34" connector and the "56JK78" connector from S1 Electrols.
 - b. Remove the nuts securing the S1 Electrols. Remove S1 Electrols and set aside.
8. Remove belt guard.
9. Remove all oil reservoir leg bolts. Remove oil reservoir.
10. Loosen motor mounting bolts 1/2 turn from full tight.
11. Loosen belt tension bolts and remove belts.

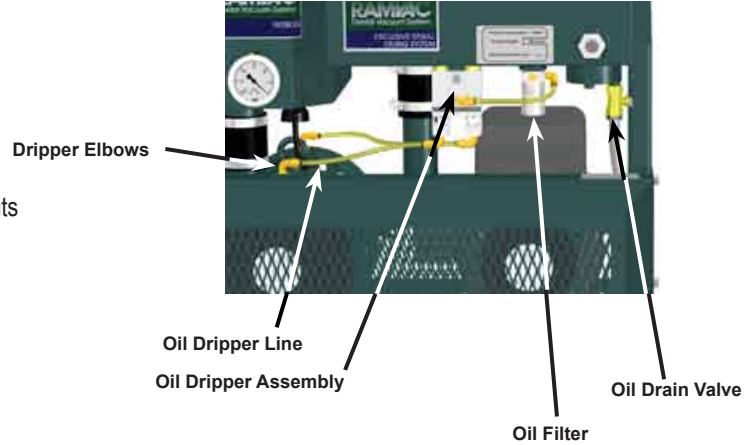
Note pulley orientation for proper replacement.

12. Remove pump pulley.
 - a. See "Taper Lock Pulley Repair and Replace" procedure in the "Belt Replacement, Alignment, and Tensioning Service Instruction".

Note dripper elbow orientation for proper replacement.

13. Remove dripper elbows from old pump and install on new pump.
14. Remove pump mounting bolts and defective pump.
15. Install pump on base with pump mounting bolts previously removed. Do not tighten bolts.
16. Install shaft key and properly orientate pulley on pump shaft.
 - a. Torque pulley hub bolts to 75 inch pounds.
 - b. Apply Loctite 290 to pulley hub bolts.
17. Apply a drop of Loctite 290 to pump shaft on front of pulley hub at shaft key.
18. Place straight edge against pulley face and align with front edge of base to square pump on base frame.
19. Tighten pump mounting bolts.
20. Install belts on pump and motor pulleys.
21. See "Belt Replacement, Alignment and Tensioning Service Instruction" to align and tension belt.
22. Install oil reservoir. Reverse step 3 thru step 9.
23. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrils intake hose couplings. Reconnect wiring.

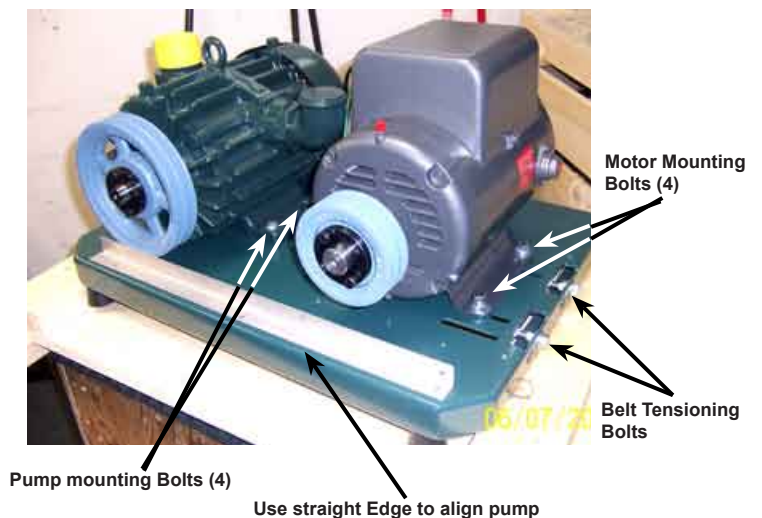
Bison Oil Assembly



S1 Electrols



Bison Pump Alignment



Front Seal Replacement

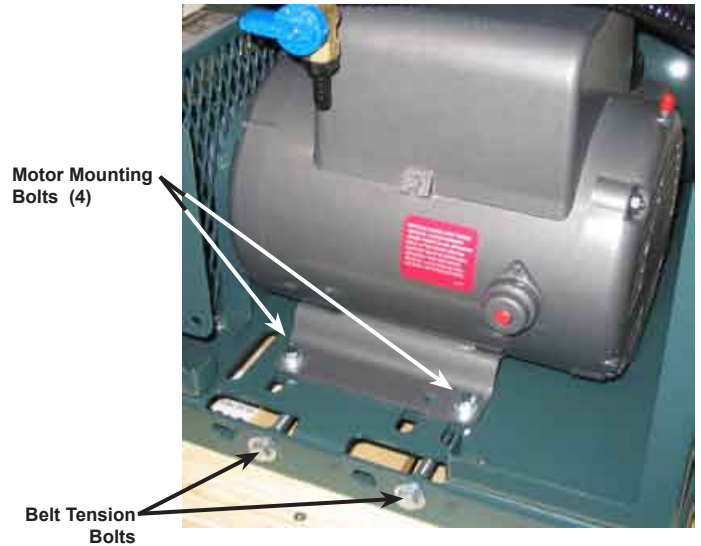
How to replace the front pump seal on the Bison and Bison E Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Remove beltguard and set aside.
4. Loosen motor mounting bolts 1/2 turn from full tight.
5. Loosen belt tension bolts and remove belts.
6. Remove pump pulley.
 - a. See “*Taper Lock Pulley Repair and Replace*” procedure in the “*Belt Replacement, Alignment, and Tensioning Service Instruction*”.
7. Remove shaft key.

Note seal orientation and depth for proper installation.

8. Carefully remove the seal with seal puller or flat screwdriver and discard. Do not damage shaft or bore surfaces.
9. Thoroughly clean shaft and bore in endplate.
10. Lubricate new seal with wheel bearing grease or similar lubricant.
11. Properly orientate seal in endplate.
12. Gently tap seal into place at proper depth.
13. Install shaft key and properly orientate pulley on pump shaft.
 - a. Torque pulley hub bolts to 75 inch pounds.
 - b. Apply Loctite 290 to pulley hub bolts.
14. Apply a drop of Loctite 290 to pump shaft on front of pulley hub at shaft key.
15. Install belts on pump and motor pulleys.
16. See “*Belt Replacement, Alignment and Tensioning Service Instruction*” to align and tension belt.
17. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrils intake hose couplings. Reconnect wiring.

Bison Motor Bolts



Rear Seal Replacement

How to replace the rear pump seal on the Bison and Bison E Models .

1. Secure Disconnect.
 2. Move vacuum unit into open area if needed..
 3. Remove fan shroud.
 4. Lock pump pulley with screwdriver to prevent turning.
 5. Remove fan and lock washer (*right hand threads*).
- Note seal orientation and depth for proper installation.*
6. Carefully remove the seal with a seal puller or flat screwdriver and discard. Do not damage shaft or bore surfaces.
 7. Thoroughly clean shaft and bore in endplate.
 8. Lubricate new seal with wheel bearing grease or similar lubricant.
 9. Properly orientate seal in endplate.
 10. Gently tap seal into place at proper depth.
 11. Place Loctite 243 on fan bolt threads
 12. Reinstall fan and lock washer.
 13. Replace fan shroud.
 14. Remove screwdriver from pump pulley.
 15. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.



BISON

Vane Replacement for Bison

Model 818.XXXX.XX

How to replace the Vanes on the Bison

818.XXXX.XX Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Loosen the oil filter cannister to stop the oil flow.
4. Remove fan shroud screws (2) and fan shroud.
5. Lock pump pulley with screwdriver to prevent turning.
6. Remove fan and lock washer (*right hand threads*).
7. Disconnect the oil line on the rear endplate.

Note: Refer to "Belt replacement, Alignment, and Tensioning Service Instruction" for the next step.

8. Remove Belts.
 - a. See "Belt Replacement, Alignment , and Tensioning" procedure to remove the belts.
9. Remove rear endplate bolts.

10. Carefully remove the rear endplate and set aside.
Note vane orientation in rotor. Each vane slot contains 2 pieces.

11. Remove the vanes from the rotor.

12. Lubricate the replacement vane pieces with oil.

Note: Vane pieces have a rounded edge on one side.

13. Install the vanes into the rotor slots with the rounded edge of the vane to the outside edge of the rotor.

Caution: Do not force vanes into rotor slots.

14. See "Endplate Sealing" to seal endplate.

15. Place Loctite 243 on fan bolt threads.

16. Install fan and lock washer.

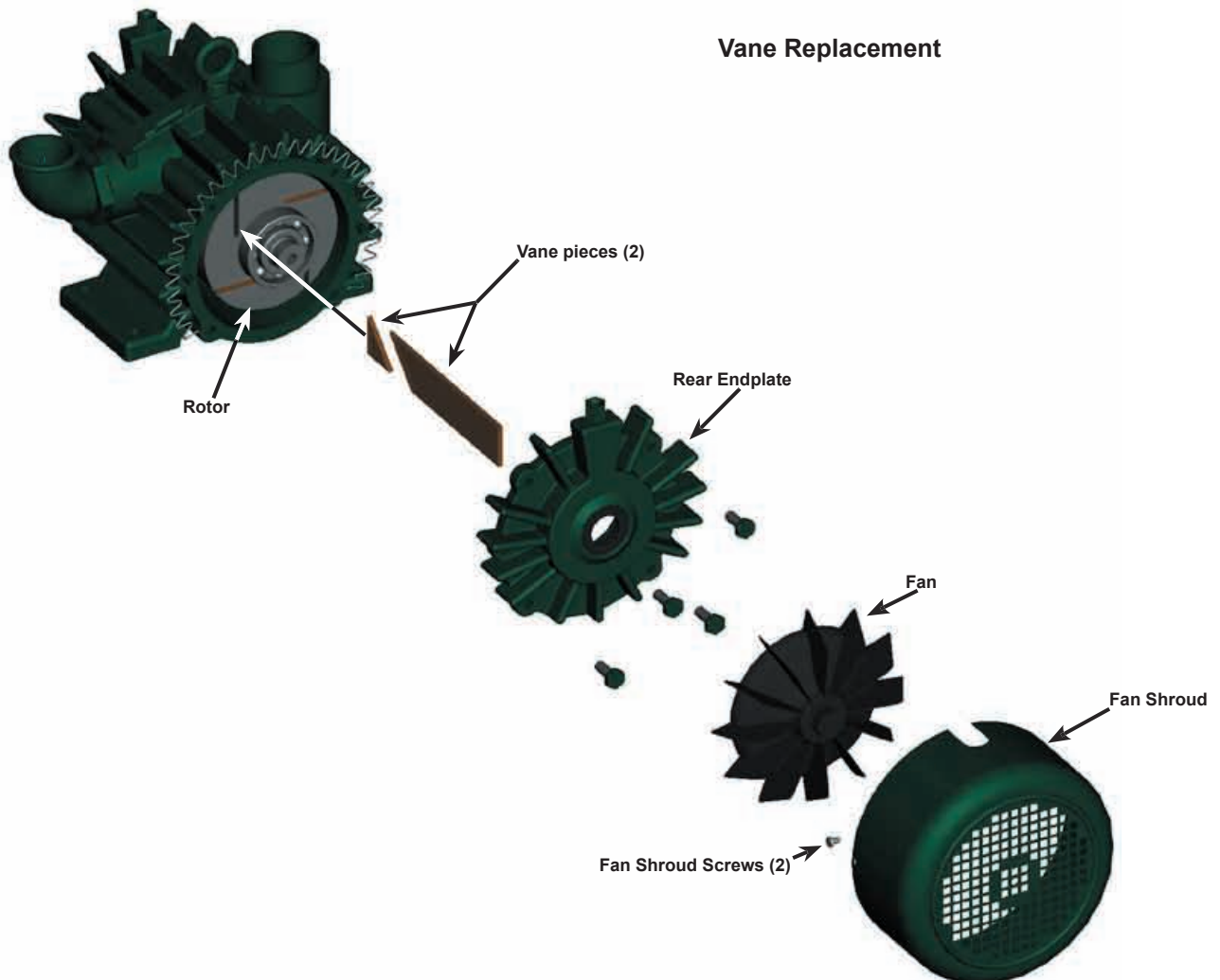
17. Replace fan shroud.

18. Connect oil line to rear endplate.

19. Tighten the oil cannister to resume oil flow.

20. See "Belt Replacement, Alignment and Tensioning Service Instruction" to align and tension belt.

21. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrals intake hose couplings. Reconnect wiring.



Vane Replacement

Endplate Sealing

How to seal the Endplates on the RAMVAC Bison Vacuum Pumps.

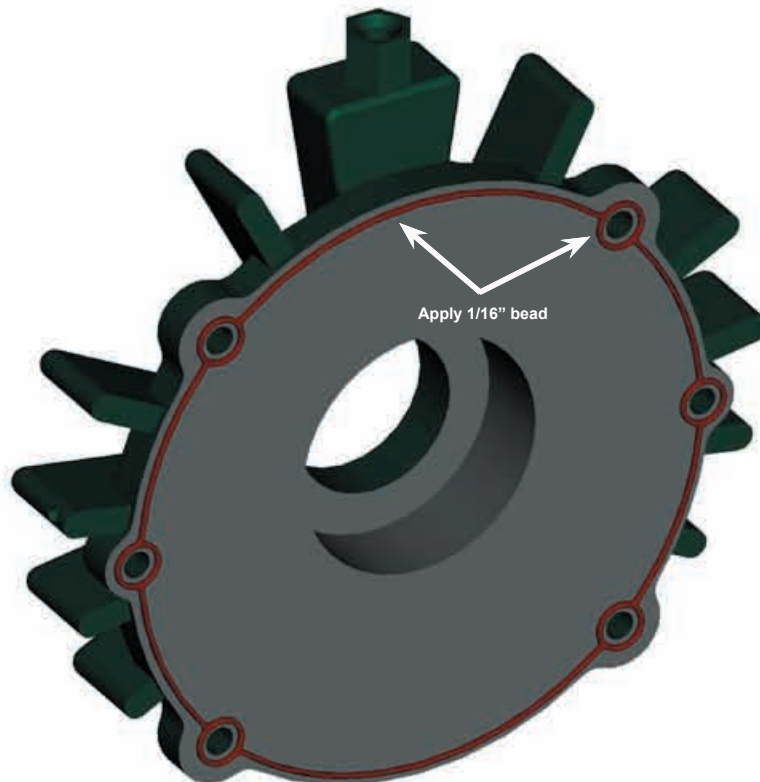
Note: When one or both of the pump endplates have been removed for any reason:

1. Use Permatex Anaerobic Gasket Maker.

Caution: Excess gasket maker that is squeezed into the rotor chamber from tightening the endplate will lock the rotor.

2. Use anaerobic gasket maker very sparingly in a constant 1/16" bead around the center to outer edge of the sealing surface. Go completely around the alignment pins and bolt holes.
3. Mount the endplate. Using crossing pattern, tighten bolts to 35 foot pounds.

Endplate Sealing



BISON

Vane Replacement for Bison

Model 826.XXXX.XX

How to replace the Vanes on the Bison

826.XXXX.XX Models.

1. Secure Disconnect.
2. Move vacuum unit into open area if needed.
3. Remove fan shroud screws (2) and fan shroud.
4. Lock pump pulley with screwdriver to prevent turning.
5. Remove fan and lock washer (*right hand threads*).

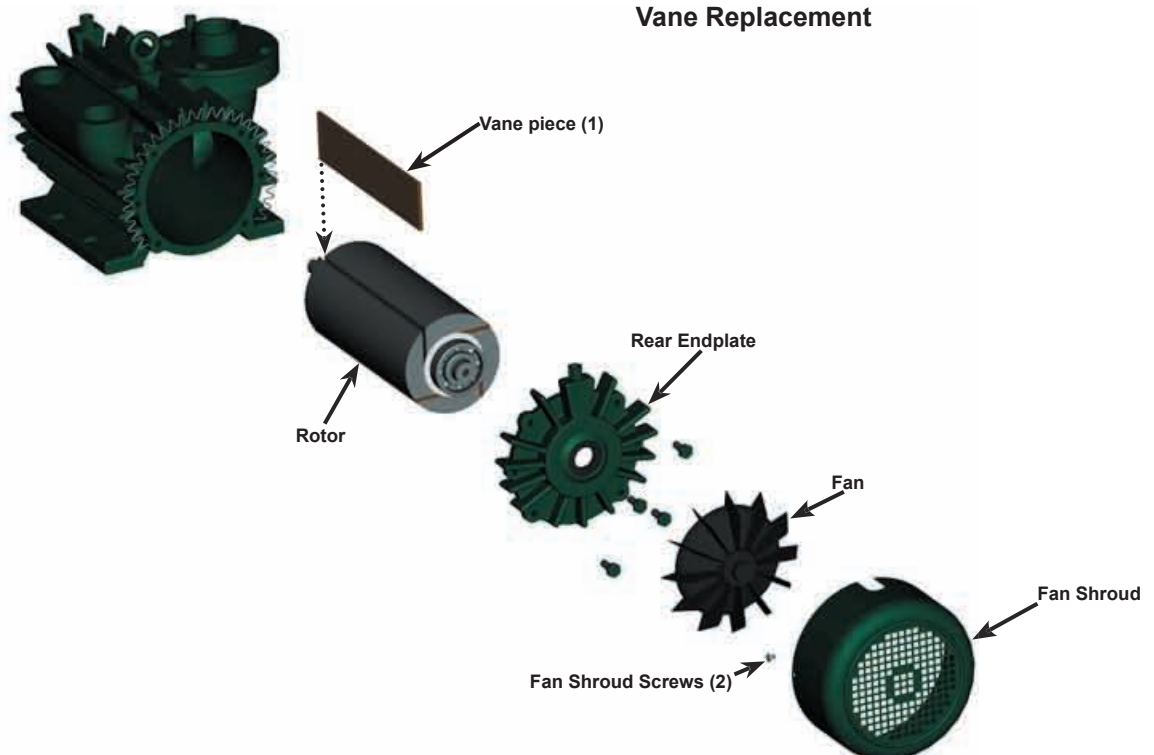
Note: Refer to "Belt replacement, Alignment, and Tensioning Service Instruction" for the next 2 steps.

6. Remove Belts.
 - a. See "Belt Replacement, Alignment, and Tensioning" procedure to remove the belts.
7. Remove pump pulley.
 - a. See "Taper Lock Pulley Remove and Replace" procedure to remove the pump pulley.
8. Remove shaft key and smooth any rough edges on shaft with emery cloth.
9. Loosen the oil filter cannister to stop the oil flow.
10. Disconnect the oil line from the rear endplate.
11. Remove rear endplate bolts.
12. Carefully remove the rear endplate and set aside. **Caution:** Seal damage may occur.

13. Carefully pull the rotor out of the pump housing.
Note vane orientation in rotor. Each vane slot contains 1 piece.
14. Remove the vanes from the rotor.
15. Lubricate the replacement vane pieces with oil.
16. With proper orientation install the vanes into the rotor slots.

Caution: Do not force vanes into rotor slots.

17. Carefully install rotor into pump housing. **Caution:** Seal damage may occur.
18. See "Endplate Sealing" to seal endplate.
19. Place Loctite 243 on fan bolt threads.
20. Install fan and lock washer.
21. Replace fan shroud.
22. Connect oil line to rear endplate.
23. Tighten the oil cannister to resume oil flow.
24. See "Belt Replacement, Alignment and Tensioning Service Instruction" to align and tension belt.
25. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings. Reconnect wiring.



Endplate Sealing

How to seal the Endplates on the RAMVAC Bison Vacuum Pumps.

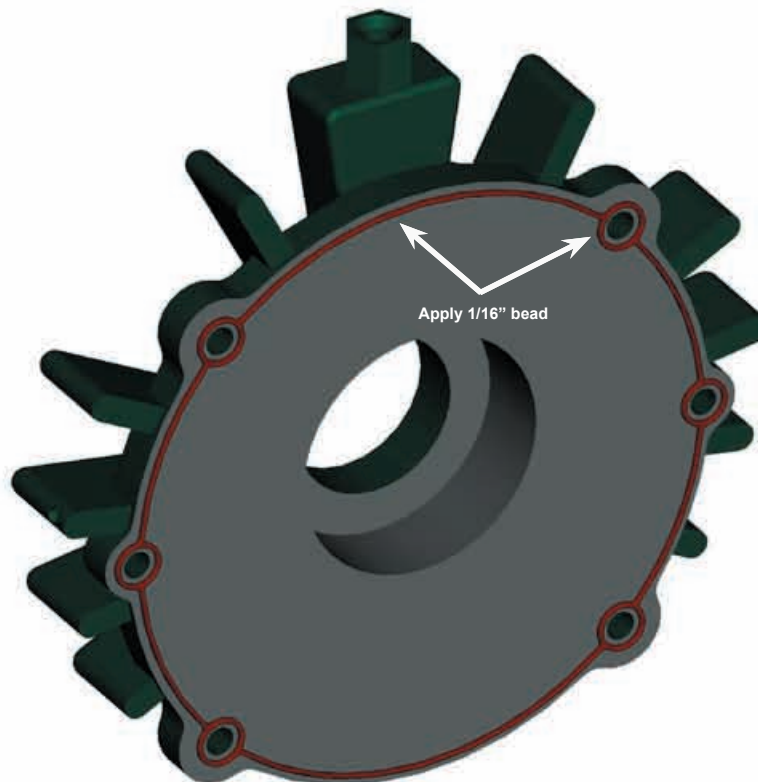
Note: When one or both of the pump endplates have been removed for any reason:

1. Use Permatex Anaerobic Gasket Maker.

Caution: Excess gasket maker that is squeezed into the rotor chamber from tightening the endplate will lock the rotor.

2. Use anaerobic gasket maker very sparingly in a constant 1/16" bead around the center to outer edge of the sealing surface. Go completely around the alignment pins and bolt holes.
3. Mount the endplate. Using crossing pattern, tighten the bolts to 35 foot pounds.

Endplate Sealing



Notes



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Effective Date: 07-Mar-08
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