

How to properly replace the motor on the following models; Standard, Bulldog, and Bison.



STANDARD MODELS

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

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

<u>Procedures</u>	<u>Page</u>
Important Features	2
1 Phase Motor Replacement	3
3 Phase Motor Replacement	4
3 Phase Motor Startup	14



BULLDOG MODELS

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

<u>Procedures</u>	<u>Page</u>
Important Features	6
1 Phase Motor Replacement	7
3 Phase Motor Replacement	8
3 Phase Motor Startup	14



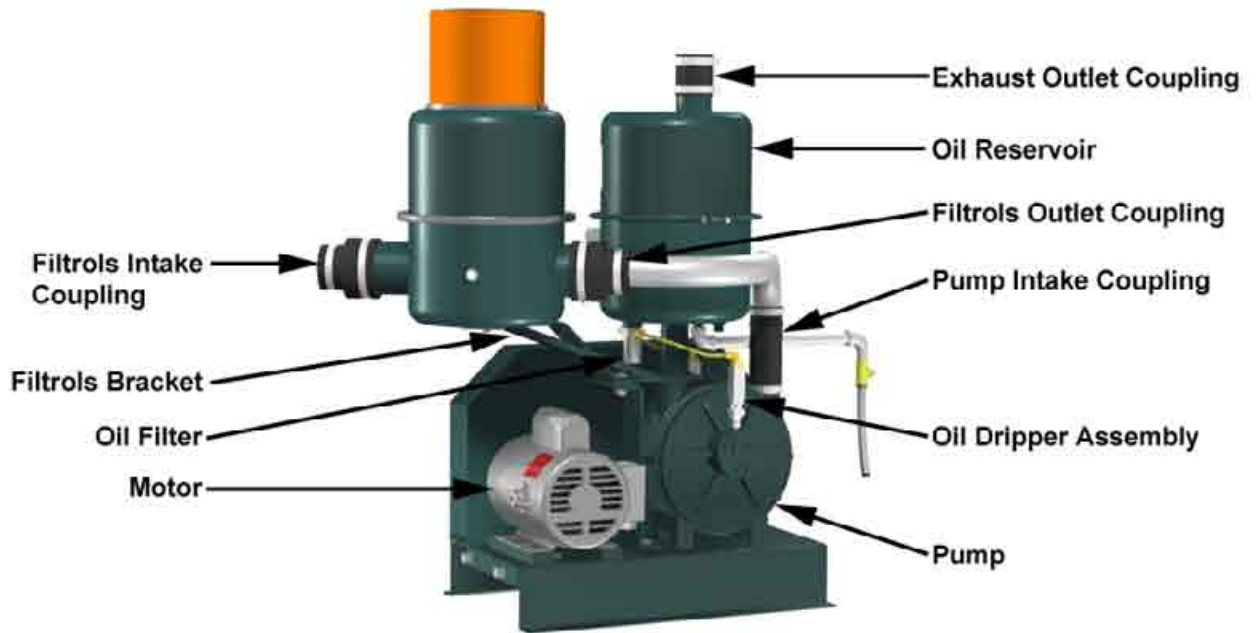
BISON MODELS

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

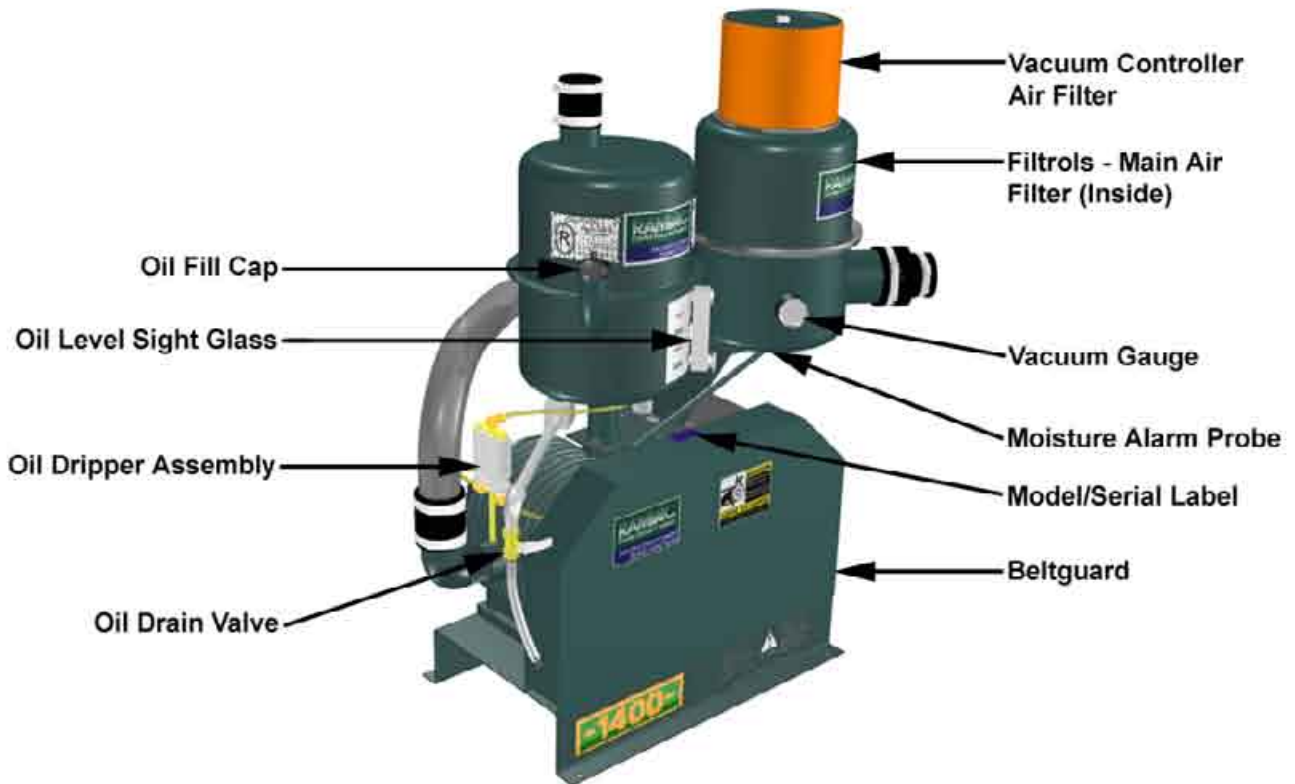
<u>Procedures</u>	<u>Page</u>
Important Features	10
1 Phase Motor Replacement	11
3 Phase Motor Replacement	12
3 Phase Motor Startup	14

STANDARD

Standard Models Important Features



Standard 550



Standard 1400

STANDARD

1 Phase Motor Replacement

How to replace a 1 phase motor on Standard models.

1. Secure disconnect.
2. Move vacuum unit into an open area if needed.
3. Disconnect motor wires from 2T1, 4T2, and motor ground in Electrols.
Remove motor wire from cord grip.
4. Remove belt guard.
5. Loosen all four motor mounting bolts $\frac{1}{2}$ turn from full tight.
6. Loosen belt tension bolts and remove belt(s).

Note pulley and hub orientation for proper installation.

7. Remove motor pulley.
 - a. **Set Screw Pulleys:**
 - i. Loosen motor pulley set screws and remove pulley.
 - b. **Taper Lock Pulley:**
 - i. See “*Taper Lock Pulley Remove and Replace*” procedure in the “*Belt Replacement, Alignment, and Tensioning Service Instruction*”.
8. Remove motor mounting bolts and defective motor.
9. Install motor on base with motor mounting bolts previously removed.
10. Replace shaft key. Properly orientate pulley and pulley hub on motor shaft. *Do not tighten set screws or hub screws.*
11. Place belts over pump and motor pulleys.
12. Tension and align belt. See “*Belt Replacement, Alignment and Tensioning Service Instructions*”.
13. Connect motor wires with proper orientation as noted.
14. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings.

1 Phase Gray Box Electrols

Note: Gray Box Electrols have several variations



Motor Ground Lug

Cord Grip

Motor Wires 2T1,
4T2, Motor Ground

Standard 550 Motor Bolts



Motor Mounting
Bolts (4)

Belt Tension Bolts

STANDARD

3 Phase Motor Replacement

How to replace a 3 phase motor on Standard models.

1. Secure disconnect.
2. Move vacuum unit into an open area if needed.

Note location and orientation of motor wires for proper installation.

3. Disconnect motor wires from 2T1, 4T2, 6T3, and motor ground in Electrols. Remove wire from cord grip.
4. Remove belt guard.
5. Loosen all four motor mounting bolts $\frac{1}{2}$ turn from full tight.
6. Loosen belt tension bolts and remove belts.

Note pulley and hub orientation for proper installation.

7. Remove motor pulley.

a. **Set Screw Pulleys:**

- i. Loosen motor pulley set screws and remove pulley.

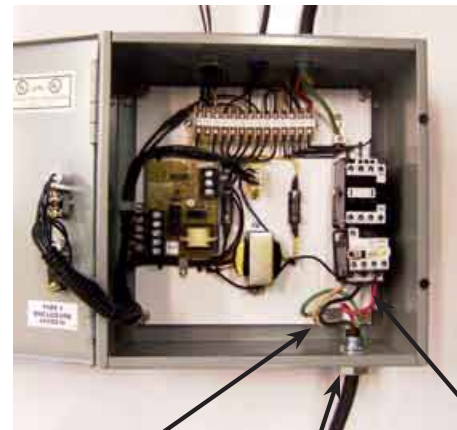
b. **Taper Lock Pulley:**

- i. See “*Taper Lock Pulley Remove and Replace*” procedure in the “*Belt Replacement, Alignment, and Tensioning Service Instruction*”.

8. Remove motor mounting bolts and defective motor.
9. Install motor on base with motor mounting bolts previously removed.
10. Replace shaft key. Properly orientate pulley and pulley hub on motor shaft. *Do not tighten set screws or hub screws.*
11. Place belts over pump and motor pulleys.
12. Tension and align belt. See “*Belt Replacement, Alignment and Tensioning Service Instructions*”.
13. Connect motor wires with proper orientation as noted.
14. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrals intake hose couplings.
15. Perform “*3 Phase Motor Start-up*” procedure.

3 phase Gray Box Electrols

Note: Gray Box Electrols have several variations



Motor Ground Lug

Cord Grip

Motor Wires 2T1, 4T2, 6T3, Motor Ground

Standard 1400 Motor Bolts



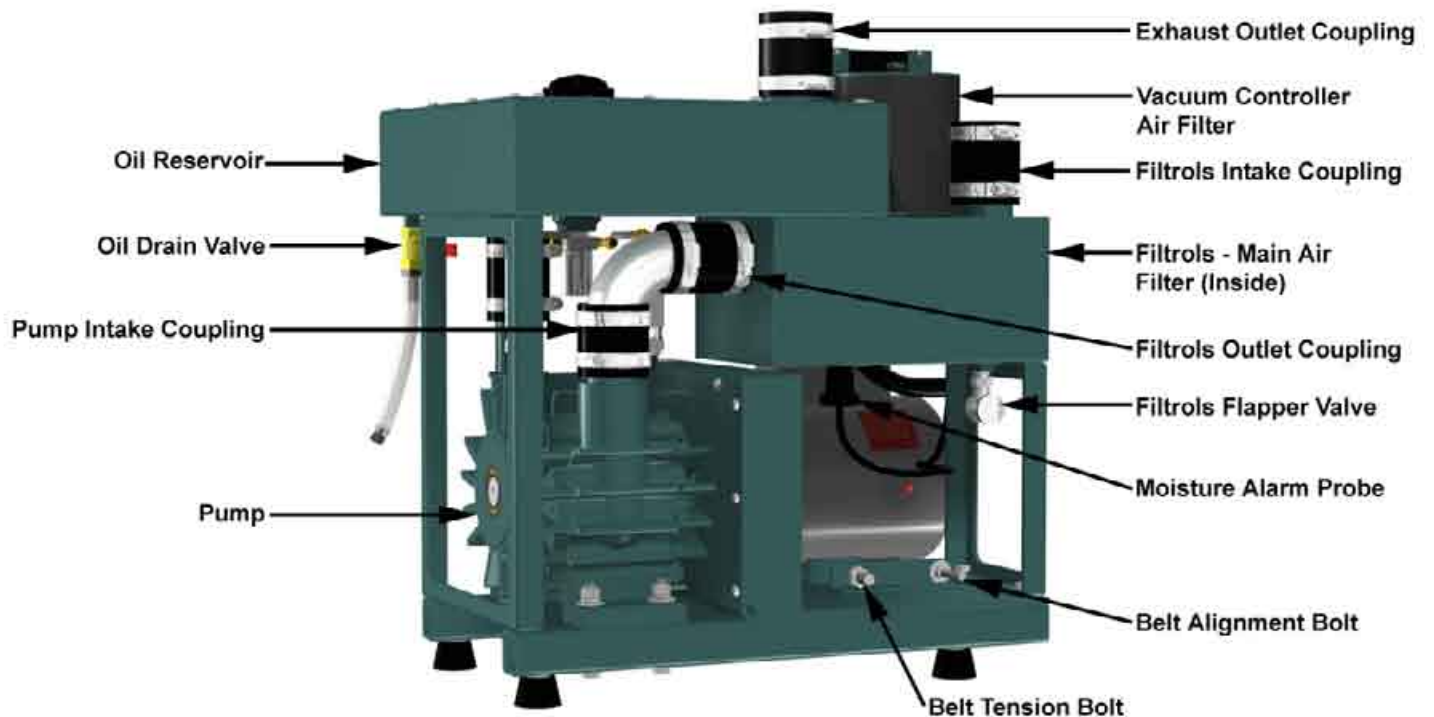
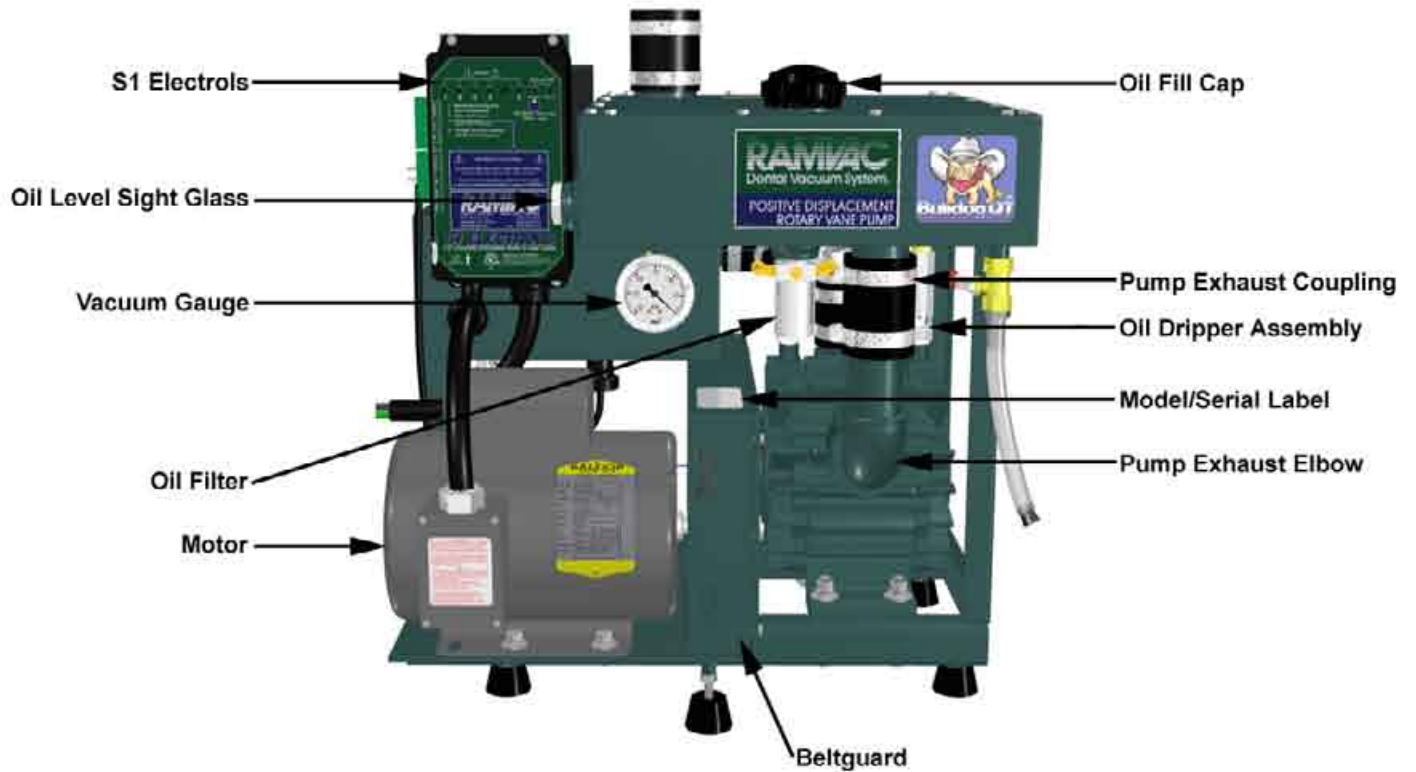
Motor Mounting Bolts (4)

Belt Tension Bolts

NOTES

BULLDOG

Bulldog Models Important Features



BULLDOG

1 Phase Motor Replacement

1 Phase Gray Box Electrols *Note: Gray Box Electrols have several variations*

How to replace a 1 phase motor on Bulldog models.

1. Secure disconnect.
 2. Move vacuum unit into an open area if needed.
- Note location and orientation of motor wires for proper installation.*
3. Disconnect motor wires.

a. **Gray Box Electrols:**

- i. Disconnect motor wires from 2T1, 4T2, and motor ground in Electrols and remove wire from cord grip.

b. **S1 Electrols:**

- i. Remove four cover screws and remove cover.
 - ii. Disconnect motor wires from M1, L1, and GND in S1 Electrols.
 - iii. Loosen cord grip fitting on motor junction box.
 - iv. Carefully remove wires from conduit leaving the conduit attached to the S1 Electrols.
4. Remove belt guard.
 5. Loosen all four motor mounting bolts ½ turn from full tight.
 6. Loosen belt tension bolt and belt alignment bolt (if present).
 7. Remove motor mounting bolts and defective motor.
- Note pulley orientation for proper installation.*
8. Loosen motor pulley set screws and remove motor pulley.
 9. Replace shaft key. Properly orientate motor pulley on motor shaft.
Do not tighten set screws.
 10. Position motor on base.
 11. Place belt over pump and motor pulleys.
 12. Install motor mounting bolts previously removed.
 13. Tension and align belt. See "Belt Replacement, Alignment and Tensioning Service Instructions".
 14. Connect motor wires with proper orientation as noted.

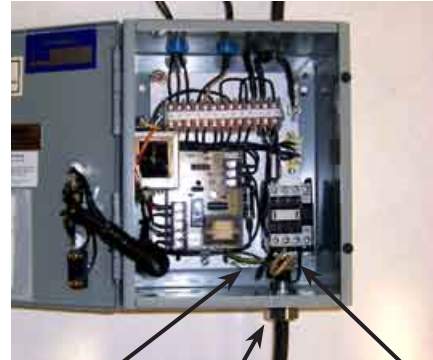
a. **Gray Box Electrols:**

- i. Reverse step 3a.

b. **S1 Electrols:**

- i. Reverse step 3b.

15. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrals intake hose couplings.



Motor Ground Lug
Cord Grip
Motor Wires 2T1, 4T2, and Motor Ground

S1 Electrols

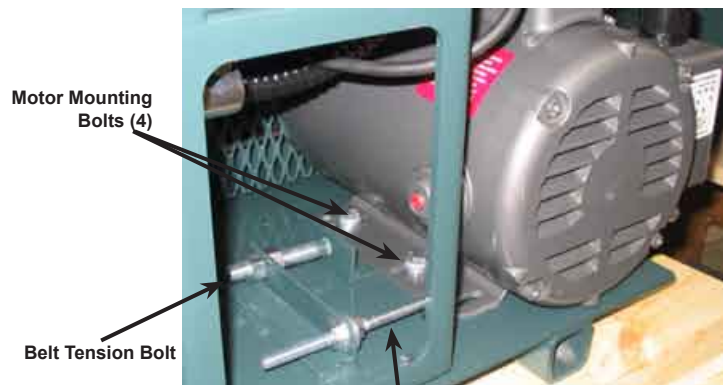


Motor Wires
GND, M1, L1



Loosen Cord Grip Fitting

Bulldog Motor Bolts



Motor Mounting
Bolts (4)

Belt Tension Bolt

Belt Alignment Bolt

BULLDOG

3 Phase Motor Replacement

How to replace a 3 phase motor on Bulldog models.

1. Secure disconnect.
2. Move vacuum unit into an open area if needed.
Note location and orientation of motor wires for proper installation.

3. Disconnect motor wires from 2T1, 4T2, 6T3, and motor ground in gray box Electrols. Remove wire from cord grip.

4. Remove belt guard.
5. Loosen all four motor mounting bolts $\frac{1}{2}$ turn from full tight.
6. Loosen belt tension bolt and belt alignment bolt (if present).
7. Remove motor mounting bolts and defective motor.

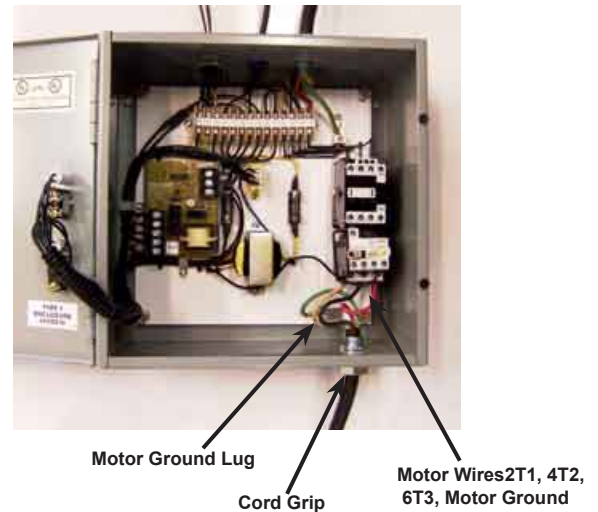
Note pulley orientation for proper installation.

8. Loosen motor pulley set screws and remove motor pulley.
9. Replace shaft key. Properly orientate pulley on motor shaft.
Do not tighten set screws.

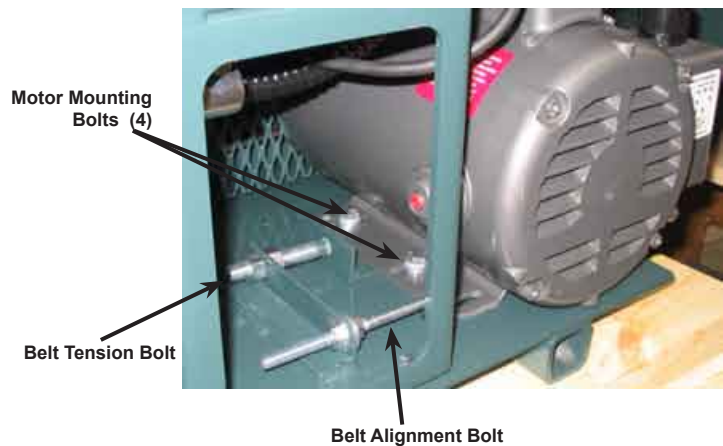
10. Position motor on base.
11. Place belt over pump and motor pulleys.
12. Install motor mounting bolts previously removed.
13. Tension and align belt. See "Belt Replacement, Alignment and Tensioning Service Instructions".
14. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings.
15. Connect motor wires with proper orientation as noted.
16. Perform "3 Phase Motor Start-up" procedure.

3 Phase Gray Box Electrols

Note: Gray Box Electrols have several variations



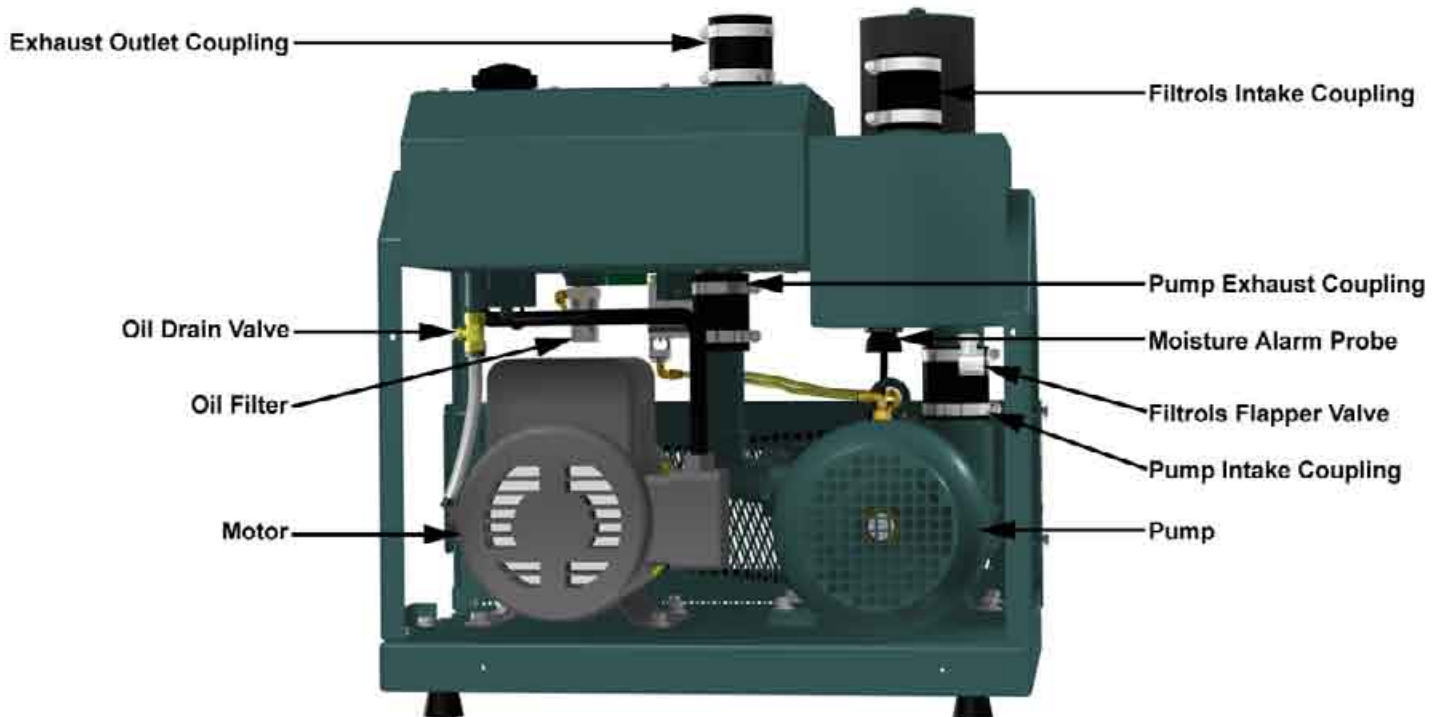
Bulldog Motor Bolts



NOTES

BISON

Bison Models Important Features



1 Phase Motor Replacement

How to replace a 1 phase motor on Bison models

1. Secure disconnect.
2. Move vacuum unit into an open area if needed.

Note location and orientation of motor wires for proper installation.

3. Disconnect motor wires.
 - a. **Gray Box Electrols:**
 - i. Disconnect motor wires from 2T1, 4T2, and motor ground in Electrols and remove wire from cord grip.
 - b. **S1 Electrols:**
 - i. Remove cover screws and cover from S1 Electrols.
 - ii. Disconnect motor wires from M1, L1, and GND in S1 Electrols.
 - iii. Loosen cord grip on motor junction box and remove conduit.
 - iv. Carefully remove wires from conduit leaving the conduit attached to the S1 Electrols.
4. Remove belt guard.
5. Loosen all four motor mounting bolts $\frac{1}{2}$ turn from full tight.
6. Loosen belt tension bolts and remove belts.

Note pulley and hub orientation for proper installation.

7. Loosen pulley hub screws and remove motor pulley.
 - a. See "Taper Lock Pulley Remove and Replace" procedure in the "Belt Replacement, Alignment, and Tensioning Service Instruction"
8. Remove motor mounting bolts and defective motor.
9. Install motor on base with motor mounting bolts previously removed.
10. Replace shaft key and properly orientate pulley and pulley hub on motor shaft. *Do not tighten hub screws.*
11. Place belts over pump and motor pulleys.
12. Tension and align belt. See "Belt Replacement, Alignment and Tensioning Service Instructions".
13. Connect motor wires with proper orientation as noted.
 - a. **Gray Box Electrols:**
 - i. Reverse step 3a.
 - b. **S1 Electrols:**
 - i. Reverse step 3b.
14. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings.

1 Phase Gray Box Electrols

Note: Gray Box Electrols have several variations



Motor Ground Lug
Cord Grip
Motor Wires 2T1, 4T2
Motor Ground

S1 Electrols

Remove Cover
Screws (4)



Motor Wires
L1, M1, GND
Cord Grip

Bison Motor Bolts

Motor Mounting
Bolts (4)

Motor Tension
Bolts



3 Phase Motor Replacement

How to replace a 3 phase motor on Bison models

1. Secure disconnect.
2. Move vacuum unit into an open area if needed.

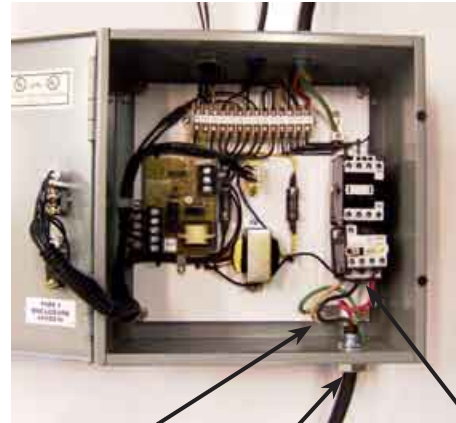
Note location and orientation of motor and control wires for proper installation.

3. Disconnect motor wires.
 - a. **Gray Box Electrols:**
 - i. Disconnect motor wires from 2T1, 4T2, 6T3 on motor overload and motor ground in Electrols. Remove wire from cord grip
 - b. **S1 Electrols with Motor Starter:**
 - i. Disconnect motor wires from 2T1, 4T2, 6T3, motor ground and motor control wires from C1, C2, C3 in motor starter.
 - ii. Loosen cord grip fitting on motor starter. Remove wires and conduit.
 - iii. Remove cover screws and cover from S1 Electrols.
 - iv. Pull motor wires and motor control wires into S1 Electrols.
 - v. Disconnect motor GND wire from S1 Electrols.
 - vi. Loosen cord grip fitting on motor junction box and remove conduit.
 - vii. Pull motor wires out of S1 Electrols conduit.

4. Remove belt guard.
 5. Loosen all four motor mounting bolts ½ turn from full tight.
 6. Loosen belt tension bolts and remove belts.
- Note pulley and hub orientation for proper installation.*
7. Loosen pulley hub screws and remove motor pulley.
 - a. See “Taper Lock Pulley Remove and Replace” procedure in the “Belt Replacement, Alignment, and Tensioning Service Instruction”
 8. Remove motor mounting bolts and defective motor.
 9. Install motor on base with motor mounting bolts previously removed.
 10. Replace shaft key. Properly orientate pulley and pulley hub on motor shaft. *Do not tighten pulley hub screws.*
 11. Place belts over pump and motor pulleys.
 12. Tension and align belt. See “Belt Replacement, Alignment and Tensioning Service Instructions”.
 13. Connect wires with proper orientation as noted..

- a. **Gray Box Electrols:**
 - i. Reverse step 3a.
 - b. **S1 Electrols with Motor Starter:**
 - i. Reverse step 3b.
14. Replace vacuum unit in original spot. Reattach exhaust outlet and Filtrols intake hose couplings.
 15. Perform “3 Phase Motor Start-up” procedure.

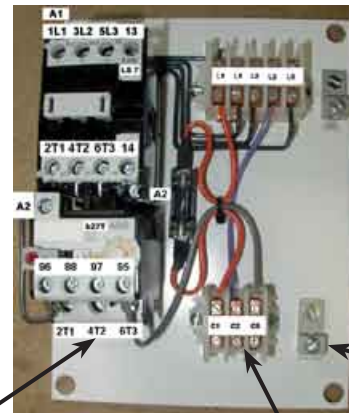
3 Phase Gray Box Electrols
Note: Gray Box Electrols have several variations



Motor Ground Lug Cord Grip Motor Wires 2T1, 4T2, 6T3, Motor Ground

Motor Starters

Note: Motor Starters have several variations



Motor Wires 2T1, 4T2, 6T3 Motor Control Wires C1, C2, C3 Motor Ground

S1 Electrols



Motor Control Wires

NOTES

3 PHASE MOTOR START-UP

3 Phase Motor Start-up

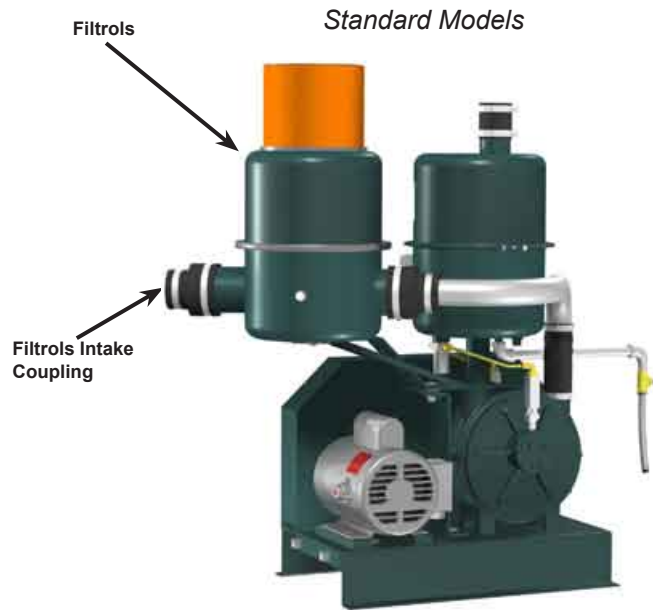
How to properly start a 3 phase unit the first time or after changes to motor, motor starter or Electrols.

1. Turn power on at disconnect.

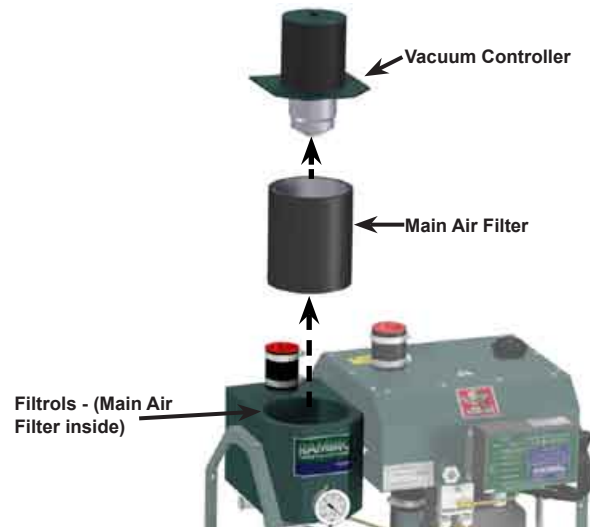
Caution: Pump has 50% chance of rotating backwards.

DO NOT ALLOW debris to enter pump.

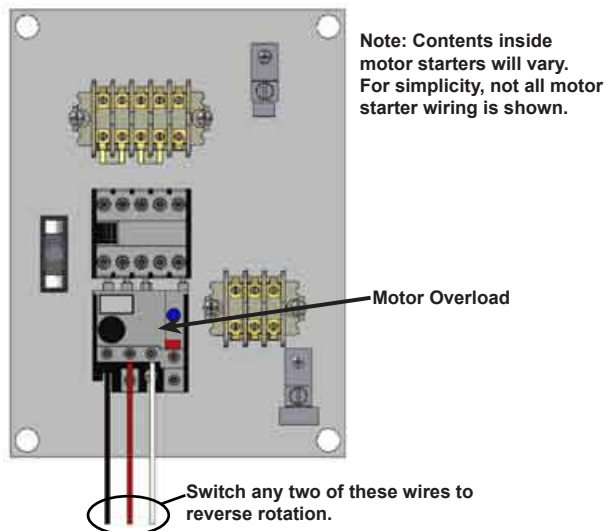
2. Check for correct pump rotation:
 - a. **Standard Models:**
 - i. Loosen Filtrols intake coupling and remove line.
 - ii. Place hand by Filtrols intake to determine airflow.
 - b. **Bulldog and Bison Models:**
 - i. Remove vacuum controller and main air filter from power unit.
 - ii. Place hand in Filtrols close to pump inlet to determine airflow.
3. Run vacuum unit long enough to determine airflow direction, then turn pump off.
 - a. If air blows out of inlet pipe:
 - i. Reverse any two motor wires on motor overload.
 - ii. Repeat step 3.
 - b. If air sucks into inlet pipe:
 - i. Clean any oil or debris out of Filtrols.
4. Complete 3 phase motor start-up
 - a. **Standard Models:** Re-install Filtrols inlet line
 - b. **Bulldog and Bison Models:** Re-install main air filter and vacuum controller.



Bison and Bulldog Models



Motor Starter



NOTES

NOTES



3100 First Avenue
Spearfish SD 57783 USA
Web: ramvac.com

Phone: 1-800-5-RAMVAC
1-605-642-4614
Fax: 1-605-642-3776

SOF_7.2.3-01-145
Effective Date: 21-Oct-05
Page 16 of 16

