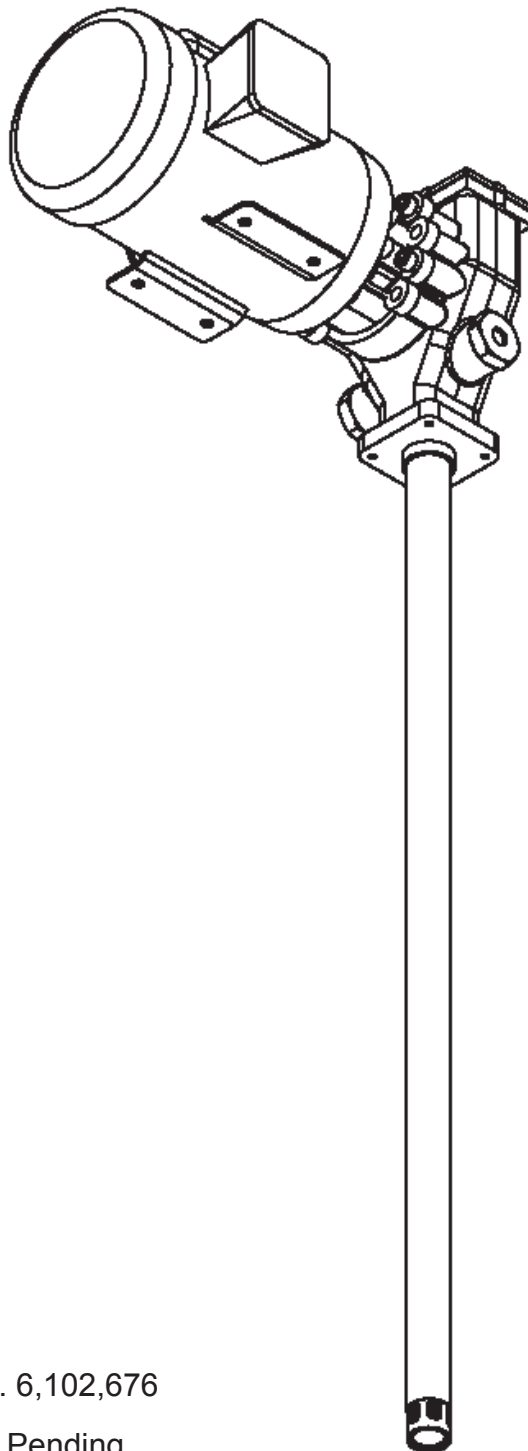


**FlowMaster® Rotary Driven Electric Pump, 120/230 VAC
Models: 85598 (400#) and 85599 (120#)
Series "A"**



U.S. Patent No. 6,102,676

Foreign Patent Pending



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Safety

Read and carefully observe these operating instructions before unpacking and operating the pump! The pump must be operated, maintained and repaired exclusively by persons familiar with the operating instructions. Local safety regulations regarding installation, operation and maintenance must be followed.

Operate this pump only after safety instructions and this service manual are fully understood.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Safety Instructions

This equipment generates very high grease pressure. Extreme caution should be used when operating this equipment as material leaks from loose or ruptured components can inject fluid through the skin and into the body causing serious bodily injury. Adequate protection is recommended to prevent splashing of material onto the skin or into the eyes. If any fluid appears to penetrate the skin, get emergency medical care immediately. Do not treat as a simple cut. Tell attending physical exactly what fluid was injected.

Inspection

If overpressurizing of the equipment is believed to have occurred, contact the factory authorized warranty and service center nearest you for inspection of the pump.

Specialized equipment and knowledge is required for repair of

this pump. Contact the factory authorized warranty and service center nearest you for repair or adjustments other than maintenance specified in this manual.

Annual inspection by the factory authorized warranty and service center nearest you is recommended.

A list of factory authorized warranty and service centers is available upon request at www.lincolnindustrial.com

Damaged Pumps

Any pump that appears to be damaged in any way, is badly worn or operates abnormally, shall be removed from use until repairs are made. Contact the factory authorized warranty and service center nearest to you for repairs.

Description

A newer version of the FlowMaster pump was introduced in July of 2008. These units incorporate the following improvements:

- * Bushing & plunger seals used along with elastomer cup seals for longer life and better high temperature operation.
- * A crankcase oil dipstick
- * Hardened and ground section on the reciprocating tube for longer life and better crankcase oil control.
- * Hardened and ground pivot pin bushings with a tighter fit into the pivot pin anchor.
- * Improved pivot pin fastener with deeper Allen hex socket.

All of the improved parts can be used with the older model pumps, so the upgraded parts and subassemblies will now be supplied to repair older model pumps. Please see the "Maintenance and Repair" section for a list of the new repair kits and their proper application.

85598 - 400 pound pump, 360RPM maximum, 5,000 psi max. pressure rating

85599 - 120 pound pump, 360 RPM maximum, 5,000 psi max pressure rating

General Description

The Lincoln Industrial rotary A/C electric pump uses a 120-230 VAC dual voltage motor and a single stage planetary gear drive. Grease output is proportional to the pump RPM. The pump is primarily designed for centralized lubrication systems such as the Single Line parallel, Single Line Progressive and Two Line systems.

The pump is driven by the rotary motion of the electric motor. Rotary motion is converted to reciprocating motion through an eccentric crank mechanism. The reciprocating action causes the pump cylinder to move up and down. The unit is a positive displacement double acting pump as grease output occurs during both the up and down stroke.

During the down stroke, the pump cylinder is extended into the grease. Through the combination of shovel action and vacuum generated in the pump cylinder chamber, the grease is forced into the pump cylinder. Simultaneously, grease is discharged through the outlet of the pump. The volume of grease during intake is twice the amount of grease output during one cycle. During the upstroke, the inlet check closes, and one half of the grease taken in during the previous stroke is transferred through

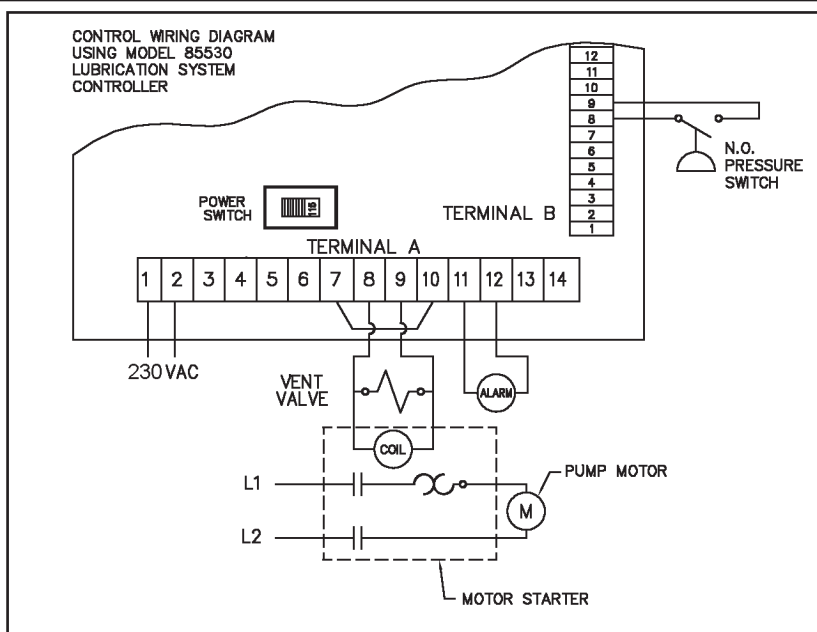


Illustration 1

the outlet check and discharged to the outlet port. Typical output of the pump is shown on page 3.

Appropriate Use

- All pump models are exclusively designed to pump and dispense lubricants using 120 VAC or 230 VAC electric power, depending on how the motor is wired.
- The maximum specification ratings should not be exceeded.
- Any other use not in accordance with instructions will result in loss of claims for warranty and liability.

Pump Performance and Specification

Operating Temperature, °F (°C)-	-40 to +150 (-40 to 65)
Operating Voltage, VAC -	120, 230
Frequency	50/60 Hz
Pump Outlets, In -	1/4 NPTF
Weight, Lbs (Kg) -	50 (23)
Max. Outlet Pressure -	5,000 PSI



WARNING

Do not exceed maximum rated outlet pressure for these pumps. Exceeding rated pressure may result in damage to system components and personal injury.

AC ELECTRIC PUMP

PERFORMANCE SPECIFICATIONS

CUBIC IN/MIN Test conducted with NLGI #1©

Grade Grease at 1000 psi Backpressure

TEMPERATURE °F (°C)	350 RPM
80 (27)	6.7
40 (4)	6.4
20 (-7)	6.1

Installing the Pump

Typical installation is shown only as a guide for selecting and installing system components. Contact your Lincoln Industrial representative for assistance in designing a system to suit your specific needs.

The pump was tested in light weight oil which was left in to protect the pump from corrosion. Flush the pump before connecting it to the system to prevent contamination of the grease with residual oil.

1. Mount the pump securely on the drum cover so that it cannot move or vibrate during operation.
2. Connect material supply line to the pump outlet. Install Safety Unloader Valve (such as 272722) (Item A, Illustration 4, Page 4) to the outlet on the opposite side of the pump to ensure the maximum pressure is always below 5,000© psi.
3. Install high pressure shut-off valve in the material supply line. (Required) (Item C, Illustration 4, Page 4)
4. Connect 120 VAC or 230 VAC power supply to the solenoid valve (35). (See Illustration #1.)
5. Wire the motor for the proper line voltage (see Illustration 2). Be sure to fuse the motor as recommended in Illustration 3.
6. Mount the motor to the drum cover using the auxiliary mount.

Mount the pump securely on the drum cover. Failure to do so could result in personal injury and equipment damage. Always install a relief valve in the pump outlet to insure pump pressure is below 5,000 PSI. Use high pressure components to reduce risk of serious injury including fluid injection and splashing in the eyes or on the skin.

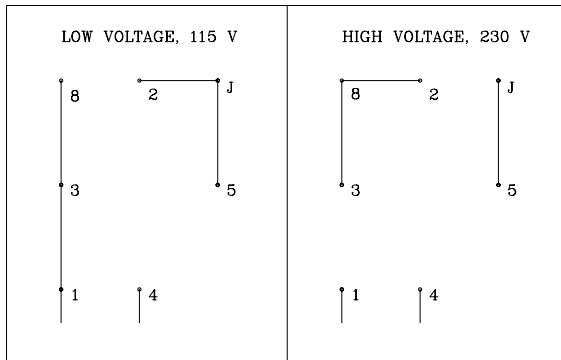


Illustration 2

ELECTRIC FLOWMASTER PUMP		
120 (230) VAC, 5:1 gear ratio, 85588 & 85589		
BACK PRESSURE (PSI)	RPM	CURRENT DRAW (AMPS @ 120 (230) VAC)*
0	95	1 (.5)
1000	92	2.6 (1.3)
2000	92	3.7 (1.8)
3000	92	5.1 (2.5)
4000	92	6.5 (3.3)
5000	92	7.8 (3.9)

* A field installed fuse of 15 amps@ 120 VAC (8 amps @ 230 VAC) is recommended.

Illustration 3

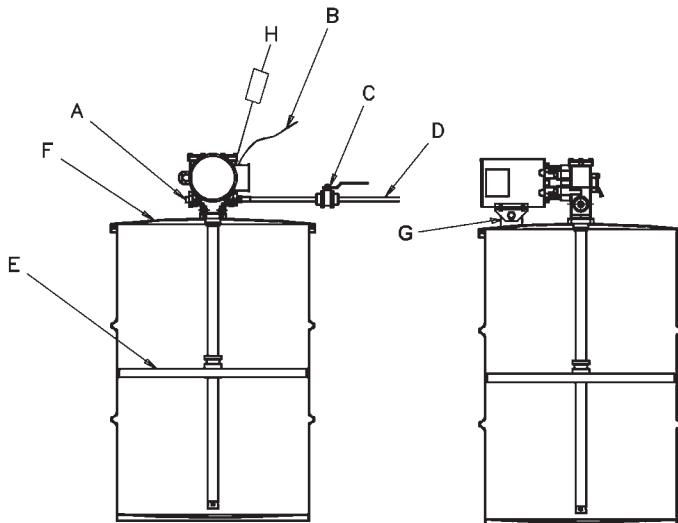


Illustration 4

- A - Safety Unlader 272722
- B - 120 VAC or 230 VAC
- C - Outlet Shut-off Valve
- D - Material Supply Line
- E - Follower Plate (85492 for 120 lb. drum only)
- F - Drum Cover (85475 for 400 lbs., 85474 for 120 lbs.)
- G - Auxillary Motor Mount
- H - Field Installed Fuse

CAUTION

AC motor requires an auxillary mount. Do not operate the pump without properly mounting the motor to the drum cover.

Operation

1. Remove the pump outlet line.
2. With the pump in a full container of lubricant, energize the pump. Make sure all air has been expelled from the pump and even lubricant flow is achieved.
3. Reattach the pump outlet line.
Never allow the pump to run dry of lubricant. Monitor the supply lubricant level and refill when necessary.

Maintenance and Repair

To reduce the risk of an injury from injection, splashing fluid or moving parts, relieve hydraulic and outlet pressure before servicing or repairing the pump.

WARNING

Always use Lincoln Industrial parts for service and repair.

Crankcase Oil Service Interval Recommendations

- Check the oil level after every 750 hours of machine operation, or every month.
- Change the oil after every 2,000 hours of machine operation or every year.
- Use SAE 10W30 motor oil in all units used in an ambient temperature between 150 to -40°F. For ambient temperatures between 50 to -70°F, use Mobil Arrow HFA Low Temperature oil.
- Oil level should be at the dot on the dipstick (middle of the crankshaft) using 10W30 motor oil (15 oz.).

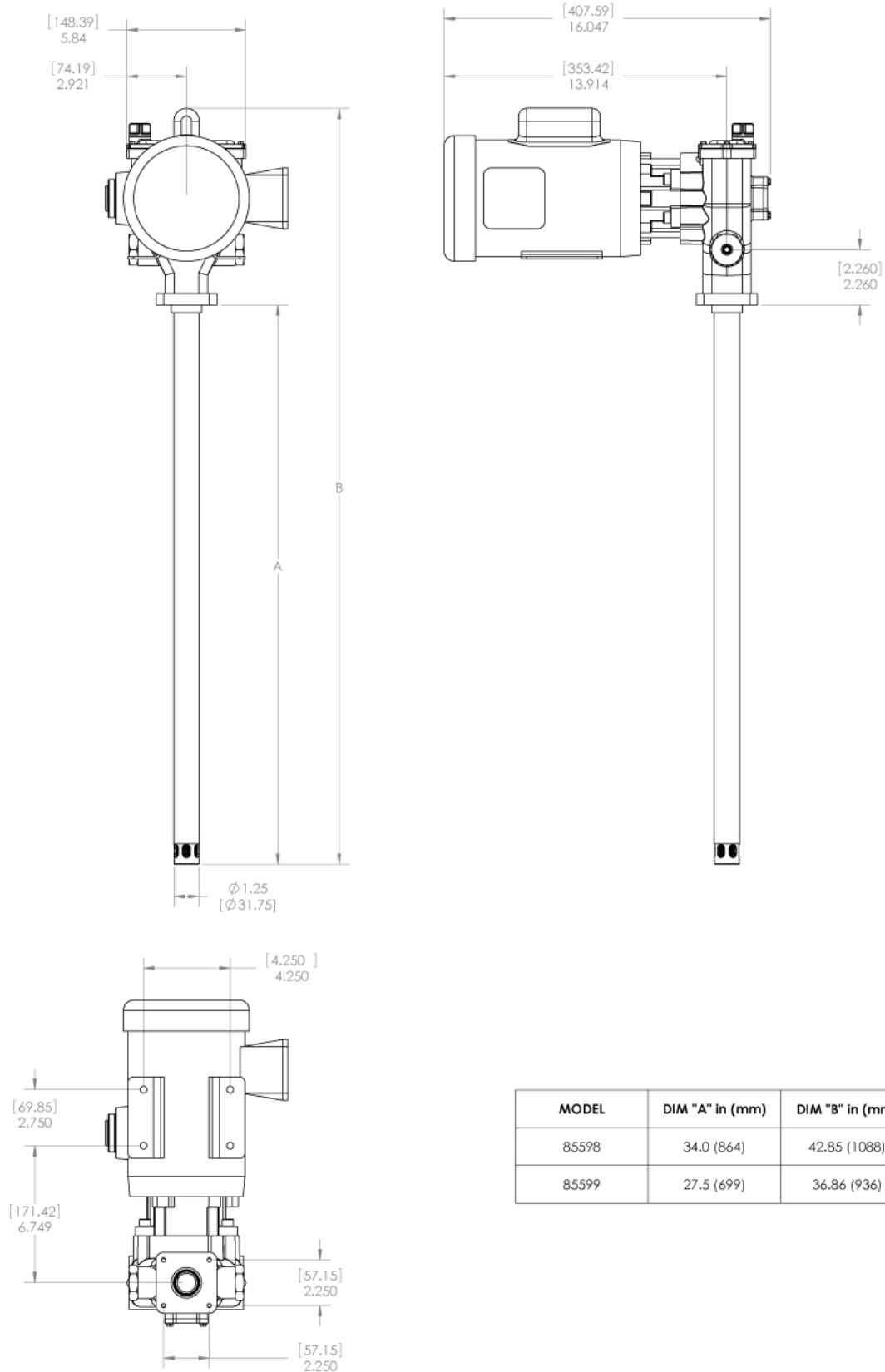


Illustration #5

Troubleshooting

Condition	Possible Cause	Corrective Action
Pump does not run.	Pump is seized or damaged.	Dismantle the pump and repair defective or seized component. See disassembly and assembly procedure.
Pump speeds up or runs erratically.	Low level of grease or reservoir is empty	Refill reservoir.
	Follower plate is stuck and separated from grease.	Check follower plate and container for damage.
	Pump piston or checks are worn.	Disassemble the pump and repair.
Pump runs, but output is low.	Pump speed set too low.	Increase motor speed setting.
	Faulty inlet (25, 27), faulty discharge check (18, 19) or damaged o-rings (26).	Replace faulty components.
Weepage from housing cover 30.	Cup seal (15) or O-Ring (13b) wore out.	Check the seals and replace if necessary.
Pump becomes noisy.	No crank case oil.	Add crank case oil. Remove crankcase cover (30a) from Pump Housing (67). Oil level should be at the middle of the crankshaft (37). Check dipstick to verify. If unit is used in cold climates, use Mobil Arrow HFA Hydraulic Oil in crankcase.
	Worn wrist pin bushing (12).	Check the bushings and replace if necessary.
Pump dies not build pressure.	Foreign material holding lower check open.	Dismantle & clear check. Consider installing inlet strainer (272180) before returning pump to service.
Motor runs, but no pump outlet.	Gearset or adapter shaft stripped or broken.	Dismantle and replace damaged part.



Tools Required for Maintenance, Repair and Adjustment

- 7/16" open end wrench
- 1-1/2" open end wrench
- 3/4 open end wrench
- 12" crescent wrench
- 1/8 Allen wrench
- 5/32 Allen wrench
- 1/4 Allen wrench
- 5/16 Allen wrench
- 3/8 Allen wrench
- 1/4 drive socket
- 1/4 socket
- 5/16 socket
- Flat blade screwdriver .10" wide and .025" thick
- Pick to remove seals and spiral retaining rings
- Small snap ring pliers
- Special tool kit 276275
- Phillips Screwdriver
- 1/2 Allen Wrench
- Hammer
- Torque Wrench (Ft/lbs and In/lbs)
- Hex Allen Socket Adapters (Req;d to torque Allen Screws)
- Loctite 242 Medium Strength Thread Lock or Equivalent
- Loctite 222MS Threadlock or Equivalent

FlowMaster™ Rotary Driven Electric Pump Maintenance and Repair



1. Using a shortened 5/16 allen wrench, remove the four gearbox assembly mounting screws (item 46). (Reassembly: Torque to 20-25 Ft. Lbs. (27.1 - 33.9 Nm).)



4. Remove O-ring seal from gearbox (Item 44). (Reassembly recommendations: replace O-ring.)



1a. Remove AC motor (Item 50) and gearbox assembly (Items 43-48).



5. Remove shaft coupler (Item 49).



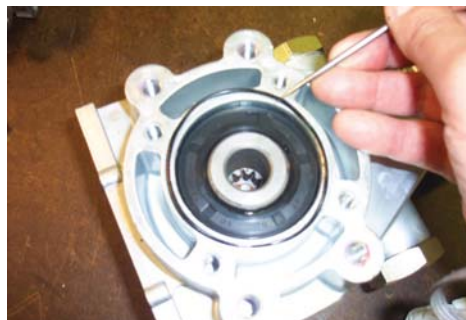
2. Remove motor mounting screws (Item 51). (Reassembly: torque to 100-110 in. lbs. (11.3 - 12.4 Nm).)



6. Remove adaptor shaft (item 41).



3. Remove gearbox assembly (Items 43-48).



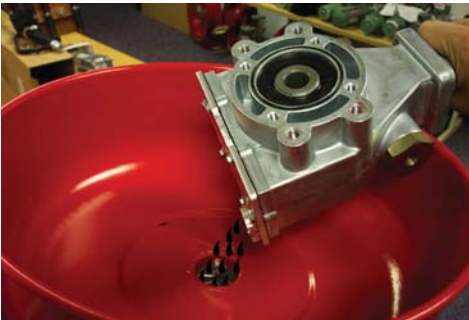
7. Remove gearbox O-ring seal (Item 44). (Reassembly recommendation: replace O-ring)



8. Remove dipstick (Item 30b).



12. Remove bearing cover screws (Item 66) with lockwashers (Item 65). (Reassembly torque: 32-38 in. lbs. (3.6 - 4.3 Nm).)



9. Drain oil (reassembly recommendations: use SAE 10W30 motor oil filled to dipstick mark (15 oz.).)



13. Remove bearing cover (Item 64).



10. Remove housing cover screws (Item 28). (reassembly recommendations: replace screw gaskets(item 29))



14. Remove bearing cover O-ring (Item 63). (Reassembly recommendations: replace bearing cover O-ring.)



11. Remove housing cover (item 30) and Gasket (Item 31). (Reassembly recommendation: replace gasket)



15. Note C-clip location on shaft (Item 62).

FlowMaster™ Rotary Driven Electric Pump Maintenance and Repair



16. Remove clip.



20. Pump shaft will drop inside the support pipe when it clears the pump assembly.



17. Using 2 1/2" dia. steel pipe included in the special tool kit (276275), support the front housing seal and bearing as shown.



18. Support crankrod as shown with a stack of washers or other spacer of the proper thickness.



19. Drive out the pump shaft (Item 37) using nylon rod included in special tool kit (276275).



21. Loosen outlet pin nuts (Item 32). (Reassembly torque: 30-35 Ft. Lbs. (40.7 - 47.5 Nm).)



22. Remove outlet nuts (item 32) from both sides of pump. (Reassembly recommendation: use Loctite 242 or equivalent on outlet nut threads.



23. Remove spiral retaining ring (item 59) from housing tube.

24. Remove shovel plug (Item 58) and spacer (Item 56b) from housing tube.

FlowMaster™ Rotary Driven Electric Pump Maintenance and Repair



25. Push pump element (items 1 through 27) out of housing tube with nylon rod included in tool kit (276275) and hammer. (Reassembly recommendation: replace pump element in housing tube with housing tube slightly loose, then torque housing tube (Item 56a) to pump housing (Item 73) to 20-25 Ft. Lbs.



26. Pull pump element free of housing.



27. Remove housing tube (Item 56a). (Reassembly Torque: 20 to 25 Ft. Lbs.(27.1 - 33.9 Nm).)



28. Exploded view of housing tube (Item 56a), spacer (Item 56) and Shovel Plug (Item 58).



29. Remove bronze bushing (Item 52).



30. Remove oil seal O-ring (Item 53) and backup washer (Item 59). (Reassembly recommendation: replace O-ring seal and backup washer, backup washer must be placed in tube first, then the O-ring.)



31. Remove wrist pin bushing screws (Item 11). (Reassembly torque: 100-110 in. lbs. (11.3 - 12.4 Nm).) Reassembly recommendations: use Loctite 242 or equivalent on screw threads).



32. View of wrist pin bushing (Item 12).



33. Press out wrist pin bushing (Item 12) with 5/16-24 bolt (from 276275 kit), needed since pivot bushings often stick in wrist pin anchor (Item 13a).



34. Remove wrist pin bushing (Item 12).



35. Remove crankrod and eccentric assembly (Items 1-7).



36. Loosen wrist pin anchor (Item 13a). (Reassembly torque: 20 - 25 Ft. Lbs. (27.1 - 33.9 Nm).)



37. Remove wrist pin anchor (Item 13a). (Reassembly recommendations: replace O-ring seal (Item 13b), be sure threads on wrist pin anchor (Item 13a) are clean and free of all oil or other fluids.)



38. View of plunger tube and plunger tube bushing assembly (Items 10, 10a, 10b, 10c and 10d).

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39. Loosen plunger tube (Item 10). (Reassembly torque: 100-110 in. lbs. (11.3 - 12.4 Nm).)



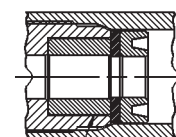
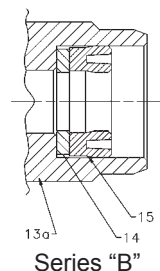
43. Pull cup seal (Item 15) out of wrist pin anchor (Item 13a).



40. Remove plunger tube (Item 10) and associated parts. (Reassembly recommendations: replace O-ring (Item 10c) on bushing (Item 10a). Use Loctite 242 or equivalent on plunger tube threads.)



44. Remove cup seal (Item 15) and backup washer (Item 14). (Reassembly recommendations: replace cup and seal and backup washer. See detail below for orientation)



SPACER
275376
TO UPGRADE
SERIES "A"



41. View of bushing assembly (Items 10 through 10d) removed.



42. View of wrist pin anchor (Item 13a) showing upper cup seal (Item 15) and nylon back up washer (Item 14).



45. Hold outlet pin (Item 8) and plunger tube (Item 10) in vise.



46. Loosen plunger tube (Item 10) from outlet pin (Item 8). (re-assembly torque: 100-110 in.-lbs. (11.3 - 12.4 Nm).)



50. Remove C-clip (Item 10d).



47. Remove plunger tube (Item 10). (Ressembly recommendations; replace o-ring (item 9). use Loctite 242 or equivalent on plunger tube threads.)



51. Remove O-ring (Item 10c).



48. Remove O-ring (Item 9).



52. Remove backup washer (Item 10b).



49. View of O-ring (Item 9) removed.



53. View of upper bushing and seals (Items 10-10d).

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54. Loosen check seal housing (Item 27) with 3/8 Allen wrench. (Reassembly torque: 20-25 ft. lbs.(27.1 - 33.9 Nm).)



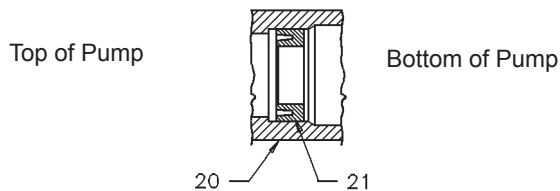
55. Check seat housing assembly (Item 27) and associated parts removed. (Reassembly recommendations: replace O-ring seal (Item 26). Apply Loctite 242 or equivalent to check seat housing threads.)



56. Remove ball cage (Item 24), check ball (Item 25) and O-ring seal (Item 26) from check seat housing (Item 27).



57. Remove plunger and bushing assembly (Item 19) from reciprocating tube (Item 20). (Reassembly recommendations: replace O-ring seal (Item 26.) Remove lower cup (Item 21) from reciprocating tube (Item 20). (Reassembly recommendations; replace lower cup seal. See detail for orientation.) Remove pump bushing (19a) from pump plunger (19).



58. To remove lower plunger, using special tool provided in kit 276275.



59. With the tool in place, insert the pin from tool kit (276275) through the tool and into the plunger outlet hole.



60. Remove plunger (Item 19). (Reassembly torque: 100-110 in. lbs. (11.3 - 12.4 Nm).) (Reassembly recommendations: use Loctite 242 or equivalent on plunger threads).



61. Push out check ball (Item 18) and check spring (Item 17).

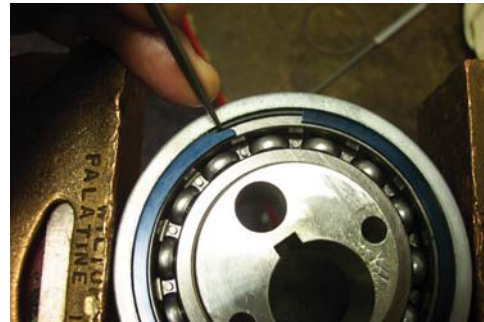


62. Clamp crank rod/eccentric assembly (Items 1-7) in vise.

FlowMaster™ Rotary Driven Electric Pump Maintenance and Repair



63. Loosen flat head screw (Item 1). (Reassembly torque: 100-110 in. lbs.)



66. Remove inner and outer retaining ring (Item 5 and Item 3) from both sides.



64. Remove flat head screws (Items 1). (Reassembly recommendation: use loctite 242 on screw threads).



65. With both flat head screws removed, remove counterbalance weights (Item 2).



67. Place assembly on 2" schedule 40 pipe.



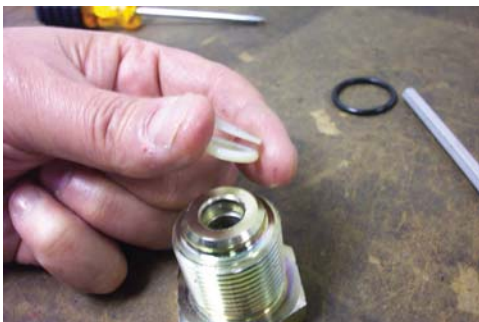
68. Drive crank eccentric (Item 6) out of ball bearing (Item 7).



69. Drive ball bearing (Item 7) out of crank rod (Item 4).



70. Remove O-Ring seal (Item 33) from outlet nut (Item 32).



71. Remove O-ring seal (Item 34) and backup washer (Item 35) from outlet nut (Item 32). Note the position of the backup-washer in photo.

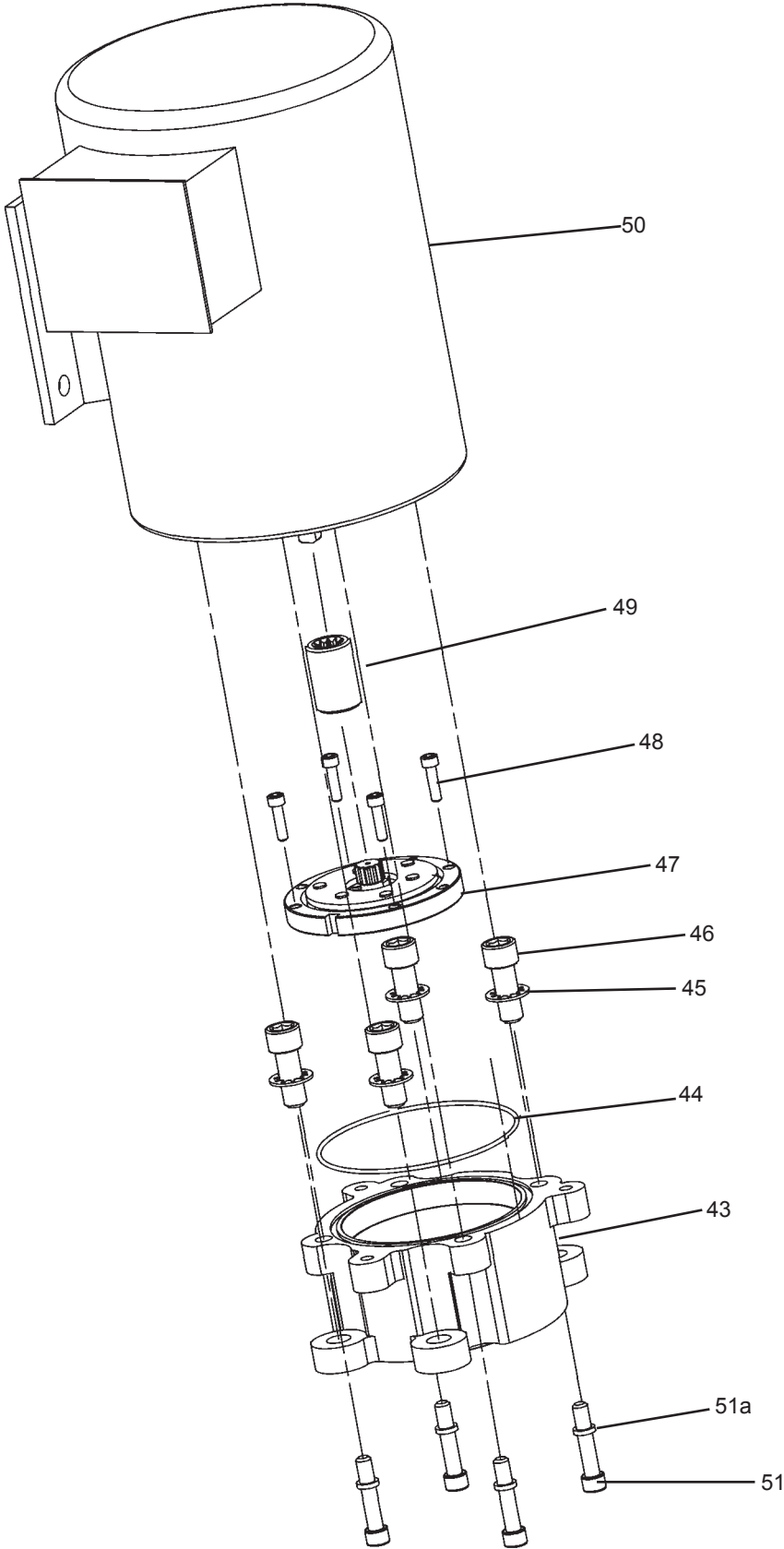


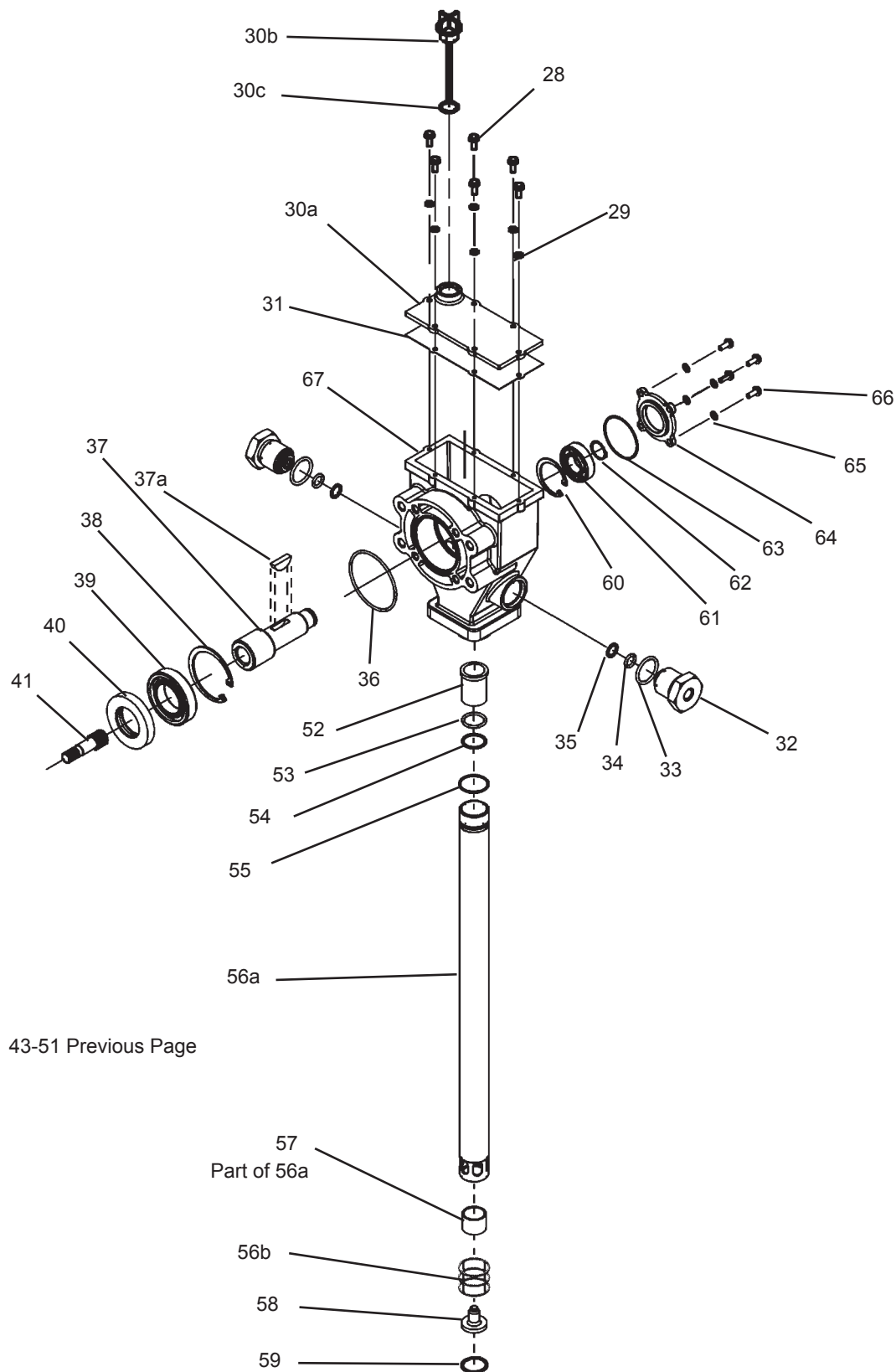
72. Reassembly recommendations: To install the O-ring (Item 34) and backupwasher (Item35) most easily, install the backup washer first.



73. And then feed the O-ring (Item 34) under the backup washer, pushing up the final bulge of the O-ring with a blunt rod.

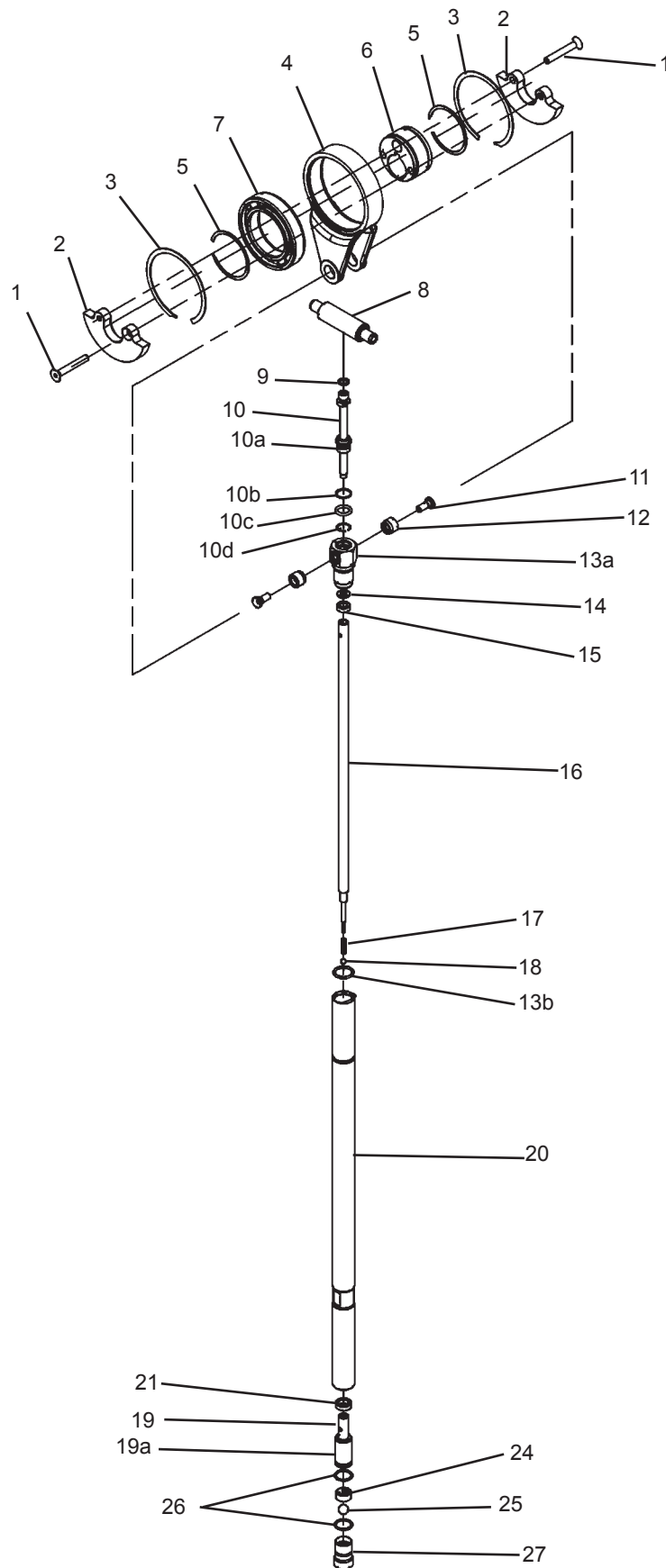
FlowMaster™ Rotary Driven Electric Pump
Maintenance and Repair





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FlowMaster™ Rotary Driven Electric Pump Maintenance and Repair





FlowMaster™ Rotary Driven Electric Pump Maintenance and Repair

Repair Parts List (Common to all Models)

Item No.	Qty	Description	All Models	Item No.	Qty	Description	All Models
1	2	Flat Head Screw	270635	32	2	Outlet, Pin-Nut	270619
2	2	Counter Weight	272197	33	2	O-Ring	*
3	2	Retaining Ring	270609	34	2	O-Ring	*
4	1	Crankrod	270665	35	2	Backup Washer	*
5	2	Retaining Ring	270608	36	1	O-Ring	272567
6	1	Crank Eccentric	270666	37	1	Pump Shaft	272548
7	1	Ball Bearing	270607	37a	1	Woodruff Key	272560
8	1	Outlet Pin	270670	38	1	Retaining Ring	272561
9	1	O-Ring (Nitrile)	*	39	1	Ball Bearing	272556
10	1	Plunger Tube	See Note 2	40	1	Shaft Seal	272554
10a	1	Plunger Bushing	See Note 2	41	1	Adapter Shaft	272546
10b	1	Steel Back-up Washer	See Note 2	43	2	Gearbox Housing	272541
10c	1	O-ring	See Note 2*	44	1	O-Ring	272544
10d	1	Retainer Clip	See Note 2	45	4	Lock Washer	272566
11	2	Pivot Screw	275006	46	4	Screw	272564
12	2	Wrist Pin Bushing	275005	47	1	Gear Set	272573
13a	1	Wrist Pin Anchor	274992	48	4	Screw	272574
13b	1	O-ring	*	49	1	Motor Coupler	272709**
14	1	Backup Washer	*	50	1	Motor	272702
15	1	Cup Seal (Polyurethane)	*	51	4	Screw	272568
16	1	Plunger Link Rod	See Chart Below	51A	3	Lock Washer	272569
17	1	Spring	*	52	1	Bronze Bearing	270674
18	1	Ball	*	53	1	O-Ring (Polyurethane)	*
19	1	Pump Plunger & Bushing	275002	54	1	Backup Washer	*
19a©	1	Pump Bushing	See Note 3	55	1	O-Ring (Nitrile)	*
20	1	Reciprocating Tube	See Chart Below	56a	1	Housing Tube	See Chart Below
21	1	Cup Seal (Polyurethane)	*	56b	1	Spacer	276279
24	1	Ball Cage	272179	57	1	Bronze Bushing	Note 1
25	1	Ball	*	58	1	Shovel Plug	270707
26	1	O-Ring (Nitrile)	*	59	1	Retaining Ring	270705
27	1	Check Seat	270664	60	1	Retaining Ring	272562
28	6	Self-Threading Screw (#8 x 1/2)	270633	61	1	Ball Bearing	272555
29	6	Gaskets (Screw)	252986	62	1	Retaining Ring	272563
30a	1	Housing Cover	275009	63	1	O-Ring	272559
30b	1	Dipstick	275008	64	1	Bearing Cover	272549
30c	1	O-ring	*	65	4	Lock Washer	66051
				66	4	Screws	272557
				67	1	Pump Housing	272540
				*		Repair Kit	275383

Repair Parts List (Non-common items)

Item No.	Qty.	Description	Model	Model
			85599 (120lb)	85598 (400lb)
16	1	Plunger Link Rod	270648	270645
20	1	Reciprocating Tube	275018	275158
56	1	Housing Tube	275191	275192
	1	Safety Unloader	272722	---

* Included in 275383 Soft Parts Kit.
Note 1: Part is included in item 56a.

Note 2: Parts included in kits 275186 & 275382.
Note 3: Part is included in item 19.

FlowMaster™ Rotary Driven Electric Pump Maintenance and Repair



Repair Kit Selection Chart

Converting Series A to Series B Pumps

- Series A Service page needed for teardown
- Series B Service page needed for re-assembly

Item #	Kit #
1 to 8, 24, 25, 27, 32, 36 to 52, 58 to 67	No kit – parts identical for Series A and Series B.
9, 10, 10a, 10b, 10c, 10d, 14, 15	275186 - Upper Bushing & Plunger Kit
17, 18, 19, 19a, 21, and 26	275187 - Lower Bushing & Plunger Kit
20	See chart for reciprocating tube P/N on page 23 for Series B
28, 29, 30, 30a, 30b, and 31	275381 - Housing Cover Kit
56a, 56b and 57 (pressed into 56a)	Housing tube kits (chart) See chart Pg. 23 Series B (Plus 276279 spacer)
Repair Kit	275383 Repair Kit



FlowMaster™ Rotary Driven Electric Pump

Repair Kit Selection Chart

Repair Series B Only

Item #	Kit #
1 to 8, 24 to 30a, 36 to 52, 56a to 67	Not in kits, order individually if needed
9, 10, 10a, 10b, 10c, 10d, 14, 15,	275186 - Upper Bushing & Plunger Kit
11, 12, 13a, (do not use spacer # 275376)	275188 - Pivot Pin & Anchor Kit
17, 18, 19, 19a, 21, 26,	275187 - Lower Bushing & Plunger Kit
9, 13b, 14, 15, 17, 18, 21, 25, 26, 30b, 31, 33, 34, 35, 53, 54, 55,	275383 - Repair Kit

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