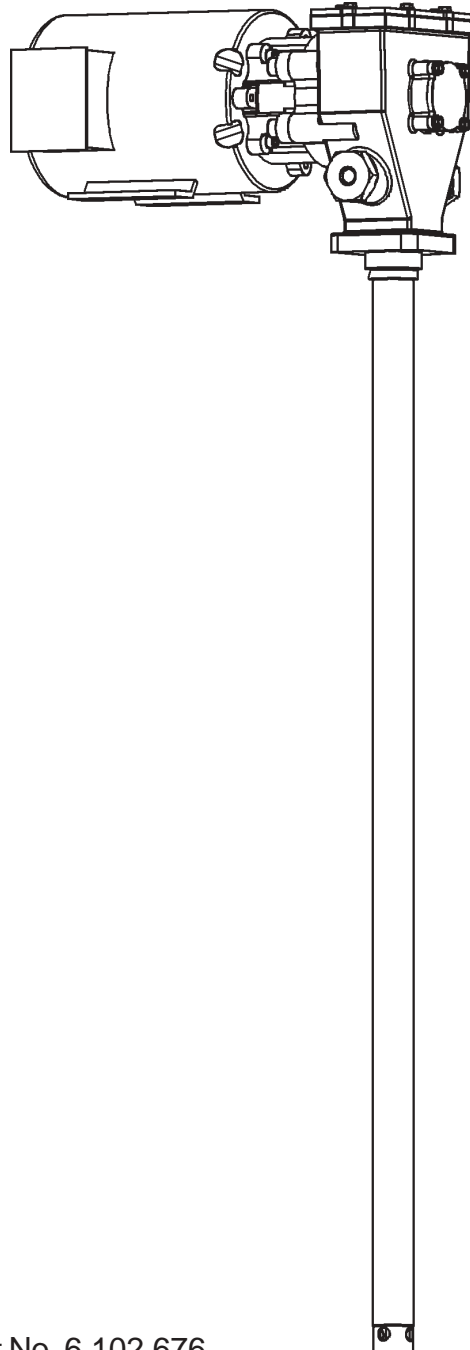


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**FlowMaster™ Rotary Driven Electric Pump, 120/230 VAC  
Models: 85588 and 85589  
Series "A"**



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

Foreign Patent Pending

## Table of Contents

	Page
Safety.....	2
Description.....	2
Appropriate Use.....	2
Pump Performance and Specifications.....	3
Installing the Pump.....	4
Operation.....	5
Maintenance and Repair.....	5
Pump Dimensions.....	7
Repair Parts List.....	9
Trouble Shooting.....	10

### 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.

### 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

85588 - 400 pound pump, 360RPM maximum, 5,000 psi max. pressure rating

85589 - 120 pound pump, 360 RPM maximum, 5,000 psi max pressure rating

### General Description

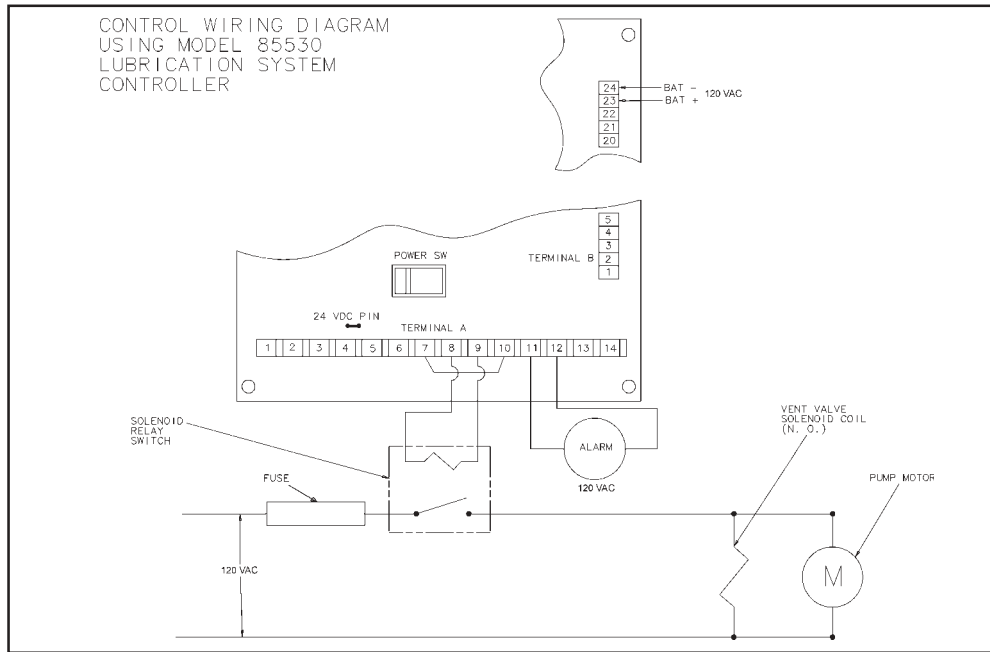
The Lincoln Industrial rotary A/C electric pump uses a 120-230 VAC dual voltage motor and a single stage planetary gear drive. Grease output is proportional to the pump RPM. The pump is primarily designed for centralized lubrication systems such as the Single Line parallel, Single Line Progressive and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



**Illustration 1**

## Pump Performance and Specification

Operating Temperature, °F (°C)-	<b>-40 to +150 (-40 to 65)</b>
Operating Voltage, VAC -	<b>120, 230</b>
Pump Outlets, In -	<b>1/4 NPTF</b>
Weight, Lbs (Kg) -	<b>45 (20)</b>
Max. Outlet Pressure -	<b>5,000 PSI</b>

## WARNING

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

## 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.

## AC ELECTRIC PUMP

### PERFORMANCE SPECIFICATIONS

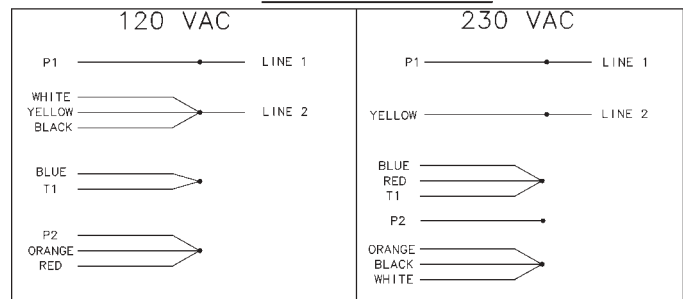
CUBIC IN/MIN Test conducted with Alvania NLGI#2 Grade Grease at 1000 psi Backpressure

TEMPERATURE DEG F (DEG C)	350 RPM
80 (27)	24.5
40 (4)	24.5
20 (-7)	21

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) 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)
4. Connect 120 VAC or 230 VAC power supply to the solenoid valve (35). (See Illustration #1.)
5. Wire the motor for the proper voltage and connect motor power lines. Be sure to fuse the motor as recommended in Illustration 3 (See illustration #2).
6. Mount the motor to the drum cover using the auxillary 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.

## WIRING DIAGRAMS

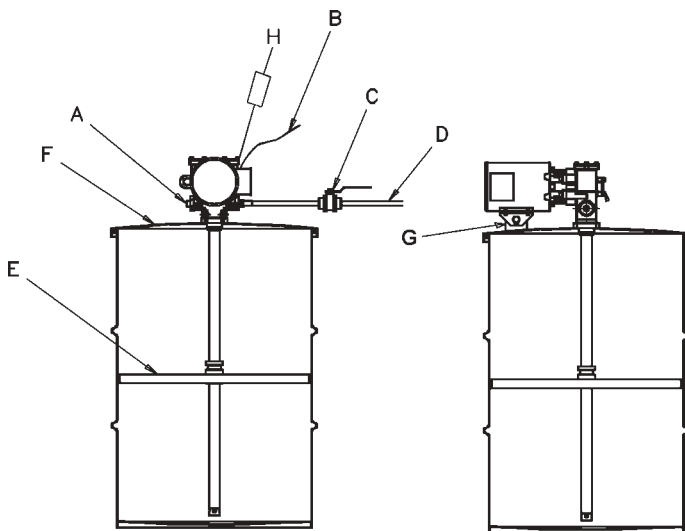


**Illustration 2**

ELECTRIC FLOWMASTER PUMP		
120 (230) VAC, 5:1 gear ratio, 85588 & 85589		
BACK PRESSURE (PSI)	RPM	CURRENT DRAW (AMPS @ 120 (230) VAC)*
0	360	1 (.5)
1000	350	1.70 (.88)
2000	350	2.50 (1.30)
3000	350	3.20 (1.67)
4000	350	3.9 (2.00)
5000	350	4.6 (2.4)

\* A field installed fuse of 5 amps @ 120 VAC (3 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 - Auxiliary Motor Mount
- H - Field Installed Fuse

**! CAUTION**

AC motor requires an auxiliary 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

Relieve pressure from the pump and supply lines before servicing or repairing the pump, to reduce the risk of an injury from injection, splashing fluid or moving parts.

**! WARNING**

Always use Lincoln Industrial parts for service and repair.

### Crank Case Oil

Check the oil after every 100 hours of operation or monthly. The crankcase should be filled to the center of the pump shaft. Change the oil after every 500 hours of operation. Use SAE 10W30 motor oil in all units.

### Disassembly Procedure (See illustration #6)

#### Tools Required:

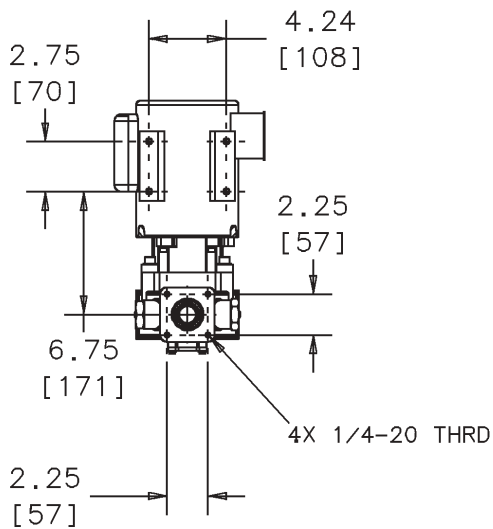
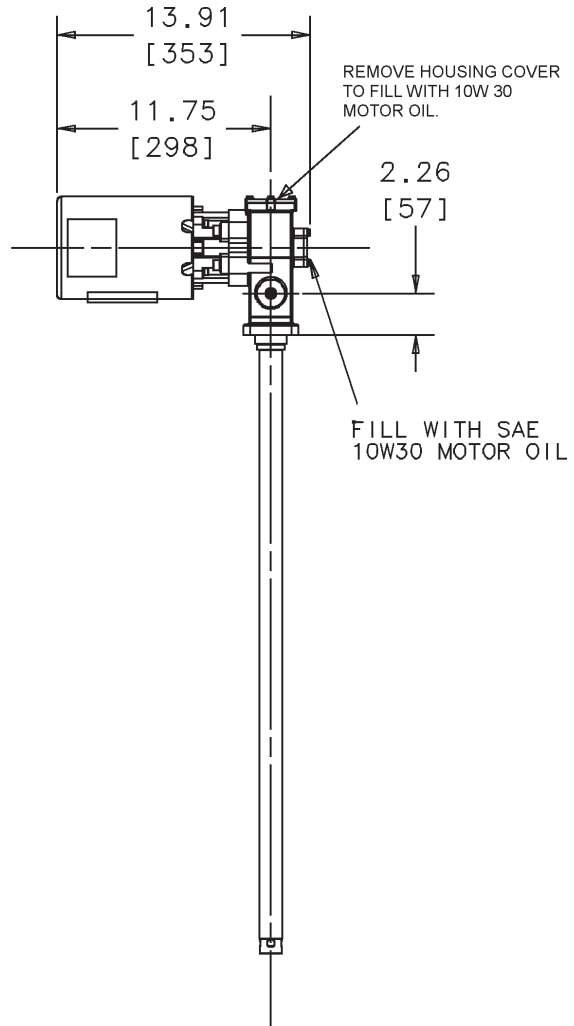
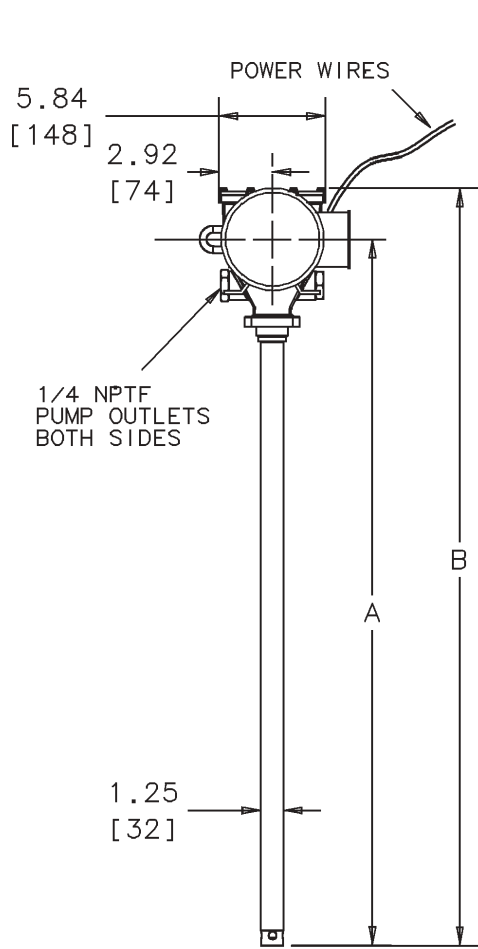
- Hex Bit Socket Wrenches (3/8" square drive) with 3/8" hex, 5/16" hex, 5/32" hex, 1/4" hex.
- 3/8" O.D. Steel Rod
- 12" Crescent Wrench
- Spanner Wrench (for 3/8" diameter tube, 1/8" pin)
- 1/2" to 3/8" square drive adapter
- Torque wrench (1/2" square drive, 0 - 50 ft-lb capacity)
- Torque wrench (3/8" square drive, 0 - 120 in-lb capacity)
- 1/4" nut driver
- Screwdriver (flat blade, 1/8" blade width)

1. Remove the electric motor (50) by unscrewing the four mounting screws (51).
2. Remove the gear box assembly (43, 44 and 47) by removing the four mounting screws (46).
3. Remove four screws (48) and remove gearset(s) and spacer, if applicable.
4. Remove the shaft adapter (41). This part is removed by pulling it straight out of the pump shaft (37).
5. Remove the pump housing cover (30) and gasket (31). Drain the crankcase oil from the open housing.
6. Remove the bearing cover (64).
7. Remove the pump shaft snap ring (62).
8. While supporting against the pump shaft seal (40), press the pump shaft out of the assembly. Be sure to place a support shim under the crank assembly (1 through 7) to prevent binding while the shaft is pushed out.

9. Remove the two outlet pin nuts (32) from the housing (68).
  10. Remove the pump subassembly (1 through 27) from the pump housing (68). Pushing the subassembly up with a wooden or plastic rod 3/4 O.D. against the check seat housing (27) is helpful.
  11. Remove the housing tube (56) from the pump housing (68) by inserting a 3/4" rod through the inlet holes at the bottom of the housing tube (56) and unscrewing it.
  12. Remove the bronze bearing (52), the O-Ring (53) and the backup washer (54) from the housing tube (56).
  13. Remove the crankrod assembly (1 through 7) from the pump by unscrewing the button head screws (11) and then pulling out the wrist pin bushings (12).
  14. Remove the check seat housing (27) from the reciprocating tube (20). There is a 3/8 Allen head socket in the throat of the check seat housing (27) to facilitate removal.
  15. Unscrew the wrist pin anchor (13) from the reciprocating tube (20) and pull the plunger assembly (8 through 19) from the tube.
  16. Using a 1/2" wooden or plastic rod, push the cup seal (21) and the pump cylinder (23) from the reciprocating tube (20).
  17. Remove the pump plunger (19) from the plunger link rod (16). A spanner wrench, which uses the holes in the pump plunger, is required.
  18. Unscrew the plunger link rod (16) from the plunger tube (10) and slide off the cup seal (15), the backup washer (14) and the wrist pin anchor (13).
  19. Unscrew the plunger tube (10) from the outlet pin (8).
  20. To dismantle the crankrod assembly (1 through 7), remove flat head screws (1) and the counter weights (2).
  21. Remove the retaining rings (5) and press the crank eccentric (6) out of the ball bearing (7). Be sure to support the ball bearing (7) on the inner race.
- reciprocating tube (20) is inserted through both bushings before tightening the housing tube (56).
6. When pressing the pump shaft in (37), support the inner race of the rear ball bearing (60) and the crank assembly (1 through 7) to insure proper assembly.
  7. If replacing the pump shaft ball bearings (38 & 60), support the housing (68) inner wall behind the snap rings (39 & 61) when re-installing the bearing.
  8. Use loctite 242 (or similar product) medium strength thread lock on all torqued threaded connections. Extreme care must be exercised to prevent excess compound from flowing into critical areas such as clearance fits and ball check. Allow a minimum of 30 minutes cure time before operating the pump.
  9. Torque Specifications:
    - A. Plunger tube (11) to outlet pin (9) - 100 to 110 In.-Lbs.
    - B. Button head screws (11) to wrist pin anchor (13) 100 to 110 In.-Lbs.
    - C. Plunger tube (10) to plunger link rod (16) - 100 to 110 In.-Lbs.
    - D. Plunger link rod (16) to pump plunger (19) - 100 to 110 In.-Lbs.
    - E. Flat head screws (1) to counter weight (2) - 100 - 110 In.-Lbs.
    - F. Wrist pin anchor (13) to reciprocating tube (20) - 20 to 25 Ft.-Lbs.
    - G. Check seat housing (27) to reciprocating tube (20) - 20 to 25 Ft.-Lbs.
    - H. Outlet pin nut (32) to pump housing (73) - 30 to 35 Ft.-Lbs.
    - I. Housing tube (56) to pump housing (73) - 20 to 25 Ft.-Lbs.
    - J. Gearbox mounting screws (46) - 20-25 Ft.-Lbs.
    - K. Gearset mounting screws (48) - 60-70 In.-Lbs.
    - L. Motor mounting screws and jam nuts (51 & 42) - 100-110 In.-Lbs.
    - M. Bearing cover screws (66) - 32 -38 In. Lbs.
  10. Fill crankcase with SAE 10W 30 motor oil up to the center of the pump shaft (37) before fastening housing cover (30) and housing gasket (31). If pump will be used in very cold environments, use Mobil Assow HFA Low Temperature Oil. This oil stays fluid even at -70° F.

## Pump Assembly Procedure

1. When the pump is disassembled, it is recommended to replace all seals and gaskets, which are included in the 270663 repair kit. In addition, replace o-rings (44), (36) and (63).
2. In the process of disassembly, examine the following components and replace if excessive wear is indicated: ball bearing (7), crank eccentric (6), crankrod (4), wrist pin bushings (12), plunger tube (10), pump plunger and upper check parts (19, 18 and 17), pump cylinder (23), check seat housing and lower check ball (27 and 25), upper bronze bushing (52), housing tube (27), shovel plug (59), and reciprocating tube (20). Also check shaft seal (40).
3. Assembly Procedure is the reverse of the Disassembly Procedure except for the following:
4. Install parts (21) through (27) into the reciprocating tube (20) after the plunger assembly (8 through 19) is installed.
5. Install the pump subassembly (1 through 27) into the pump housing (68) before tightening the housing tube (56) to the pump housing (68). Be sure the



MODEL	DIM "A" in (mm)	DIM "B" in (mm)
85588	34.0 (864)	41.6 (1057)
85589	27.5 (699)	35.1 (892)

Illustration #5

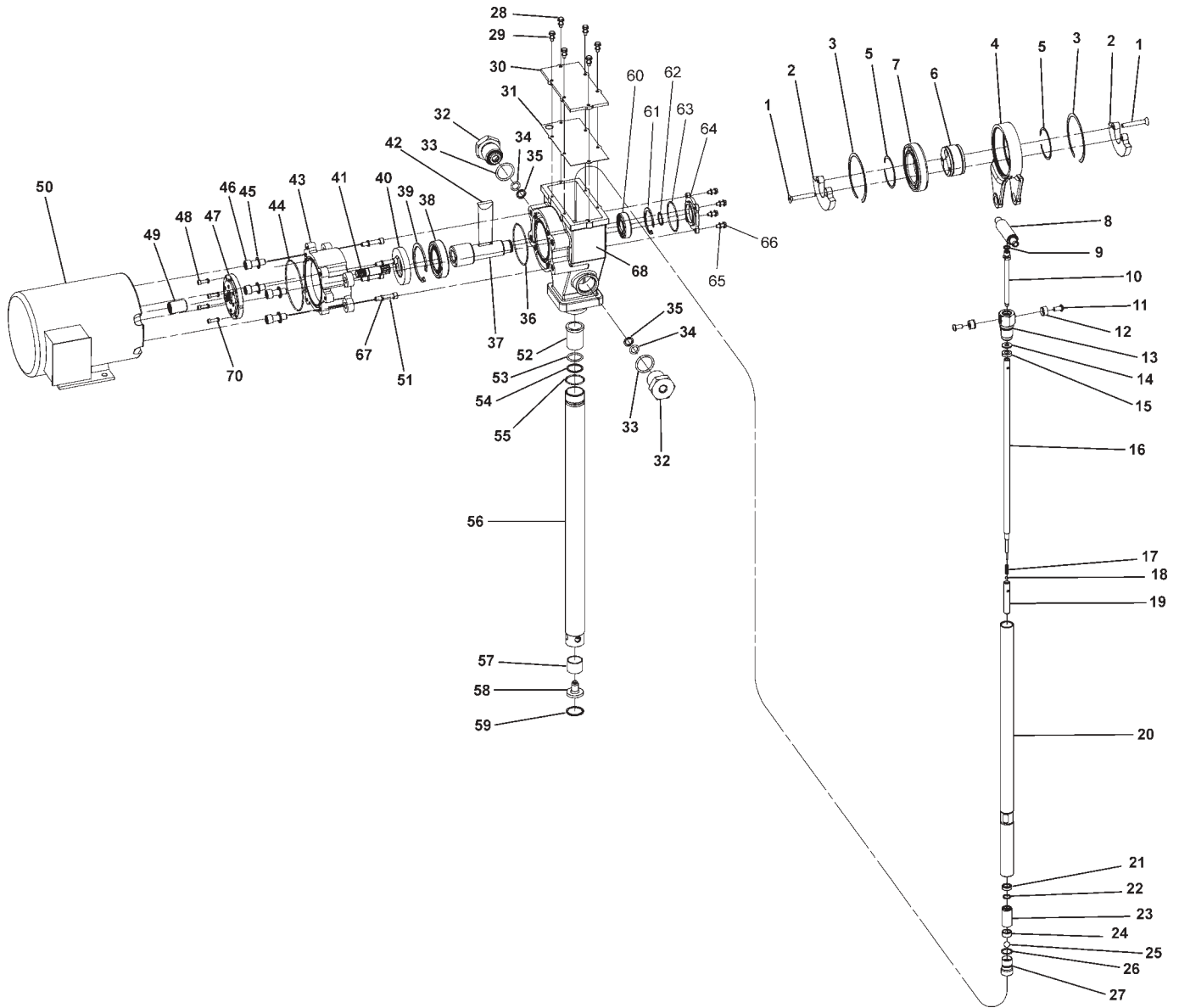


Illustration #6



## Repair Parts List (Common to all Models)

Item No.	Qty	Description	All Models	Item No.	Qty	Description	All Models
1	2	Flat Head Screw (1/4 x 1-3/4)	270635	32	1	Outlet, Pin-Nut	270619
				33	4	O-Ring	*
2	2	Counter Weight	272197	34	2	Backup Washer	*
3	2	Retaining Ring	270609	35	2	O-Ring	*
4	1	Crankrod	270665	36	1	O-Ring	272567
5	2	Retaining Ring	270608	37	1	Pump Shaft	272548
6	1	Crank Eccentric	270666	38	1	Ball Bearing	272556
7	1	Ball Bearing	270607	39	1	Retaining Ring	272561
8	1	Outlet Pin	270670	40	1	Shaft Seal	272554
9	1	O-Ring (Nitrile)	*	41	1	Adaptor Shaft	272546
10	1	Plunger Tube	270667	42	1	Woodruff Key	272560
11	2	Button Head Screw (1/4 x 1/2)	270634	43	2	Gearbox Housing	272541
				44	1	O-Ring	272544
12	2	Wrist Pin Bushing	270668	45	4	Lock Washer	272566
13	1	Wrist Pin Anchor	270669	46	4	Screw	272564
14	1	Backup Washer	*	47	1	Gear Set	272663
15	1	Cup Seal (Polyurethane)	*	48	4	Screw	272574
				49	1	Motor Coupler	272709
16	1	Plunger Link Rod	See Chart Below	50	1	Motor	272768
17	1	Spring	270616	51	4	Screw	272568
18	1	Ball	66010	52	1	Bronze Bearing	270674
19	1	Pump Plunger	270671	53	1	O-Ring (Polyurethane)	*
20	1	Reciprocating Tube	See Chart Below	54	1	Backup Washer	*
21	1	Cup Seal (Polyurethane)	*	55	1	O-Ring (Nitrile)	*
				56	1	Housing Tube	See Chart Below
22	1	O-Ring (Polyurethane)	*	57	1	Bronze Bushing	270637
				58	1	Shovel Plug	270707
23	1	Pump Cylinder	270672	59	1	Retaining Ring	270705
24	1	Ball Cage	270675	60	1	Ball Bearing	272555
25	1	Ball	66001	61	1	Retaining Ring	272562
26	1	O-Ring (Nitrile)	*	62	1	Retaining Ring	272563
27	1	Check Seat	270664	63	1	O-Ring	272559
28	6	Self-Threading Screw (8 x 1/2)	270633	64	1	Bearing Cover	272549
				65	4	Lock Washer	66051
29	6	Gaskets (Screw)	252986	66	4	Screws	272557
30	1	Housing Cover	270629	67	3	Lock Washers	272569
31	1	Cover Gasket (Nitrile)	*	68	1	Pump Housing	272540
						Soft parts Kit	270663

## Repair Parts List (Non-common items)

Item No.	Qty.	Description	Model 85588	Model 85589
16	1	Plunger Link Rod	270645	270648
20	1	Reciprocating Tube	270646	270649
56	1	Housing Tube	270647	270650

- \* Included in 270663 Soft Parts Kit.  
 1. Includes Gasket (Item 41) and O-Rings (Item 40).  
 2. Includes Seal Kit (Item 58).

3. Includes Seal Kit (Item 59).  
 4. Includes Seal Kit (Item 60).



## 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, 26, 27) or discharge check valve (18, 19, 20).	Replace faulty components.
Weepage from housing cover 30.	Cup seal (16) or O-Ring (48) wore out.	Check the seals and replace if necessary.
Pump becomes noisy.	No crank case oil.	Add crank case oil. Remove crankcase cover (30) from Pump Housing (73). Oil level should be at the middle of the crankshaft (37). Add 10W30 motor oil until the crankcase is full. If unit is used in cold climates, use Mobil Arrow HFA Hydraulic Oil in crankcase.
	Worn wrist pin bushing (13).	Check the bushings and replace if necessary.
Pump does not build pressure.	Foreign material holding lower check open.	Dismantle & clear check. Consider installing inlet screen 272180 before returning pump to service.
Motor runs, but no pump outlet.	Gearset or adapter shaft stripped or broken.	Dismantle and replace damaged part.



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