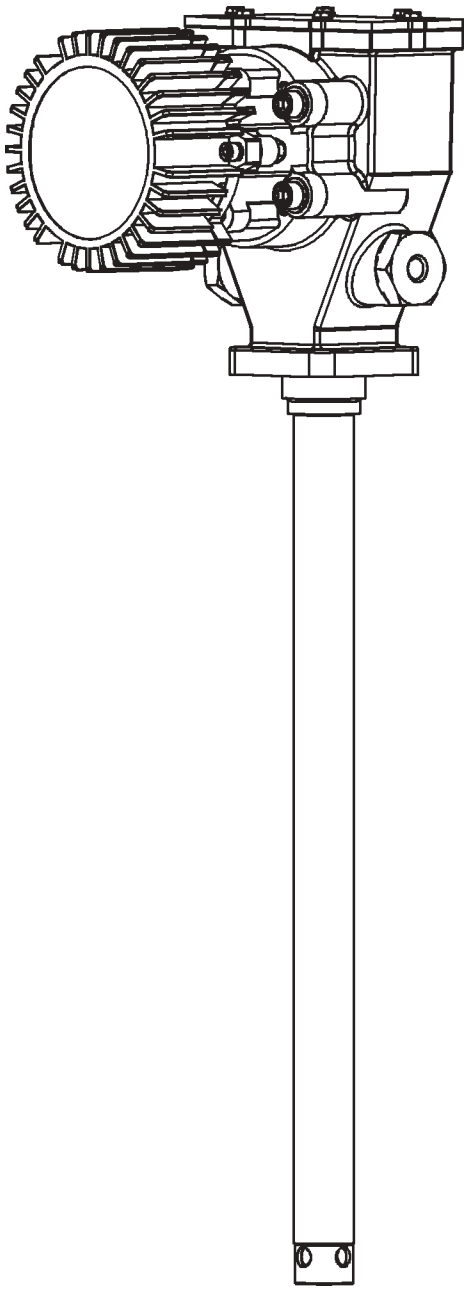
FlowMaster™ Rotary Driven Electric Pump, 24 VDC
Models: 85567, 85568 and 85599
Series “A”



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

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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.

⚠ WARNING

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

⚠ CAUTION

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.

⚠ CAUTION

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

85567 - Pump for 60 pound drum, 360 RPM maximum, maximum pressure rating 5,000 psi
85568 - Pump for 90 and 120 lbs. drum, 360 RPM maximum, maximum pressure rating 5,000psi
85569 - Pump for 5 gallon pail, 100 RPM maximum maximum pressure rating 2,500 psi.

General Description

The Lincoln Industrial rotary DC electric pump uses a 24VDC motor and either a single a double 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. The pump motor employs an integral speed control capable of reducing pump speed to 10% of its maximum value.

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 24 VDC 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.

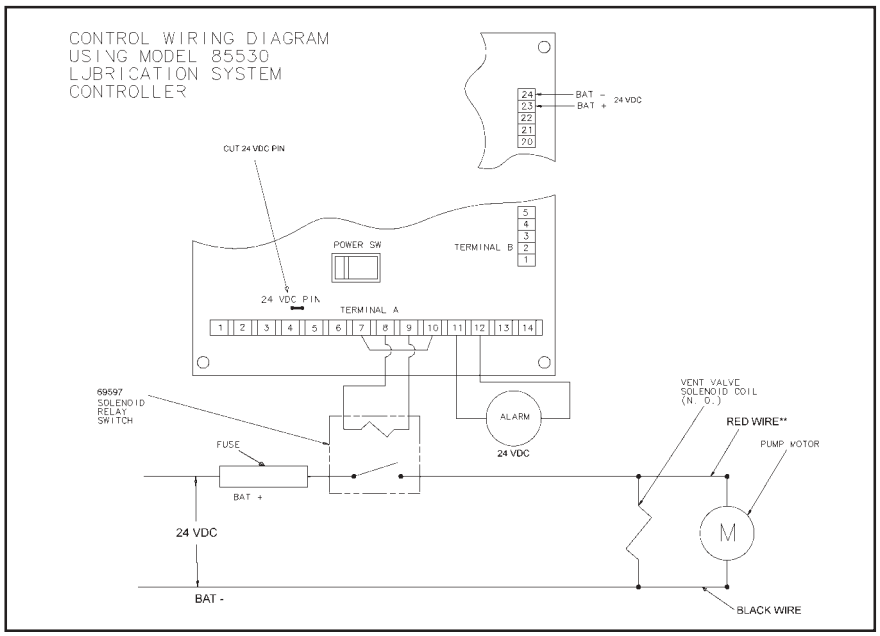


Illustration 1

Pump Performance and Specification

Operating Temperature, ºF (ºC)-	**-40 to +150 (-40 to 65)**
Operating Voltage, VDC -	**24 (18 MIN., 37 MAX)***
Pump Outlets, In -	**1/4 NPTF**
Weight, Lbs (Kg) -	**30 (13.3)**

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.

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 a safety unloader (such as 272722) to outlet on opposite side of the pump.
3. Install high pressure shut-off valve in the material supply line. (Required)
4. Connect 24VDC power supply to the solenoid valve (35). (See Illustration #1.)
5. Connect power to motor leads. Be sure to connect red motor lead to the positive side of the circuit. The motor is polarity sensitive and will nto run if improperly wired. Fuse the motor as recommended in Tables 2 & 3.

WARNING

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.

* Motor controller will shut motor off outside voltage limits.
** Motor will not run unless the red wire is connected to the positive terminal. It is polarity sensitive.

ELECTRIC PUMP PERFORMANCE SPECIFICATIONS

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

TEMPERATURE DEG F (DEG C)	50 RPM	100 RPM	150RPM	200 RPM	250 RPM	300 RPM	350 RPM
80 (27)	3.5	7	10.5	14	17.5	21	24.5
40 (4)	3.5	7	10.5	14	17.5	21	24.5
20 (-7)	3	6	9	12	15	18	21
0 (-18)	3	6	9	12	15	18	21
-10	2.5	5	7.5	10	12.5	15	17.5

Table 1

ELECTRIC FLOWMASTER PUMP		
24 VDC, 5:1 gear ratio, 85567 & 85568		
BACK PRESSURE (PSI)	RPM	CURRENT DRAW (AMPS)*
0	375	2
1000	350	4.5
2000	325	7.3
3000	300	9.6
4000	280	12
5000	250	15.3

* A field installed fuse of 20 amps is recommended.

Table 2

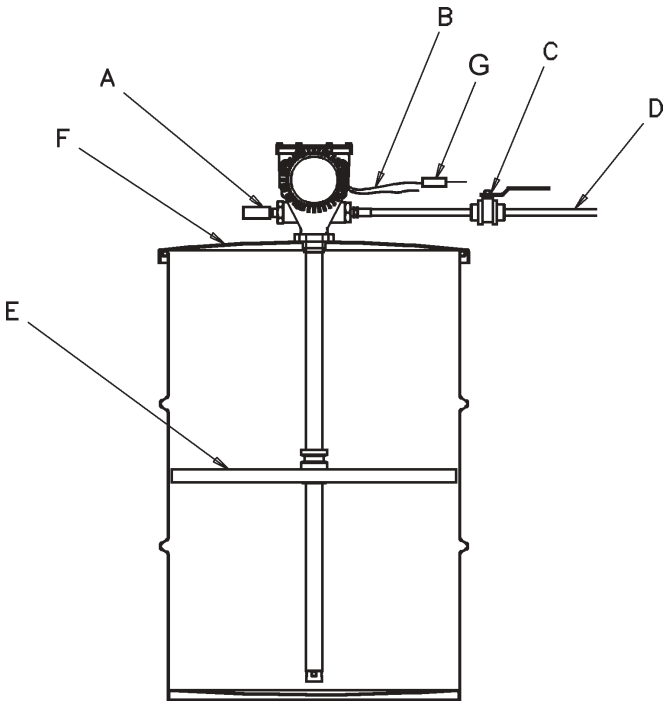


Illustration 2

A - Safety Unloader 272722
B -24 VDC from Controller
C- Outlet Shut-off Valve
D - Material Supply Line
E - Follower Plate (85492 for 120 lb. drum only)
F - Drum Cover (83115 for 400 lbs., 84616 for 120 lbs.)
G - Field Installed Fuse

ELECTRIC FLOWMASTER PUMP		
24 VDC, 17.8:1, gear ratio, 2-stage 85569		
BACK PRESSURE (PSI)	RPM	CURRENT DRAW (AMPS)*
1000	105	2
2000	103	2.75
2500	100	3.2

* A field installed fuse of 5 amps is recommended.

Table 3

Operation

⚠ WARNING

All pumps are set to run at fill speed. **Do not change the settings for the pump until after the start up procedure.**

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 event 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.

Setting the Pump Speed

The motor used in the 24 VDC FlowMaster Pump is equipped with a built-in speed control. THe pump speed is factory set to the maximum setting. Changing the speed is easily adjusted in the field as follows:

1. Locate the speed asjustment screw on the pump motor. It is located under a cover screw 120° away from the power wires) on the motor body.
2. Using a small flat blade screwdriver turn the screw counter-clockwise to reduce (clockwise to increase) the motor speed. The screw has no stops and has a total travel of 15 turns. The minimum motor speed is 170 RPM. (Divide this speed by the gear ratio to get the pump speed.
3. The adjustment can be done with the pump stopped or running. It may be helpful to run the pump with the outlet line detached to monitor pump outlet as the pump speed is adjusted. Be sure to bleed the pressure from the outlet line slowly before removing it.

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

Open Housing Cover (30) to check the oil after every 100 hours of operation. The crankcase should be filled to the center of the pumpshaft. Change the oil after every 500 hours of operation. Use SAE 10W30 motor oil in all units.

Disassembly Procedure (See illustration #6)

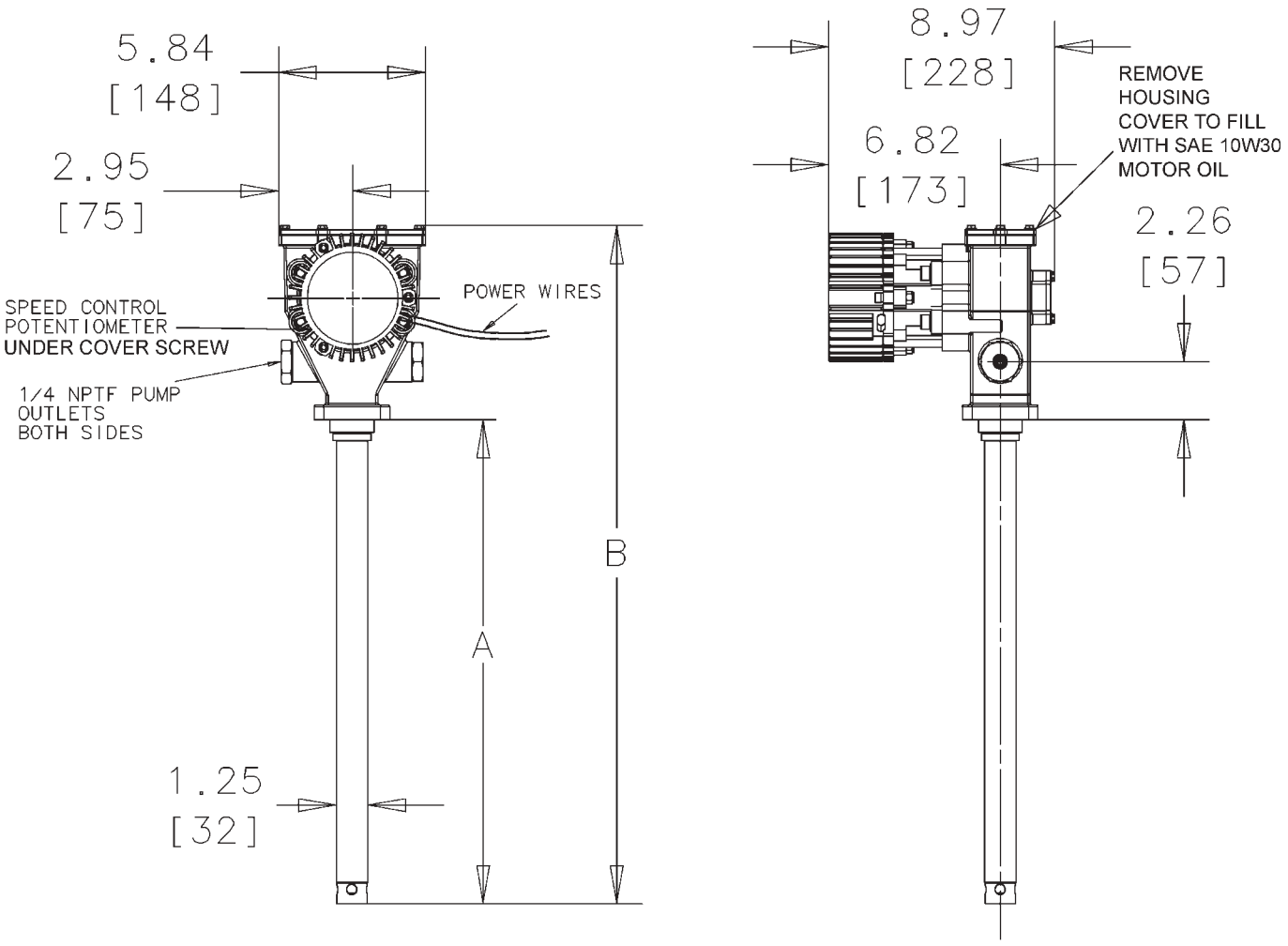
Tools Required:

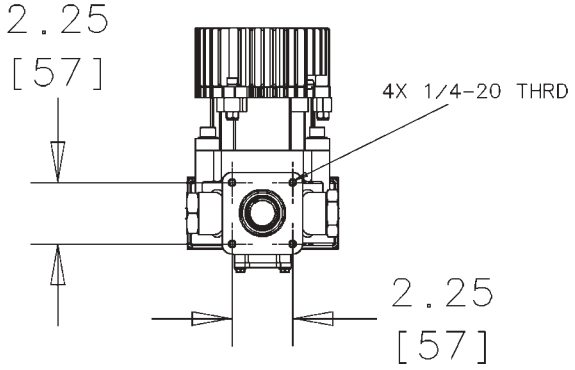
- Hex Bit Socket Wrenches (3/8" square drive) with 3/8" hex, 5/16" hex, 5/32" hex, 1/4" hex.
- 3/8" O.D. Steel Rod
- 12" Crescent Wrench
- Spanner Wrench (for 3/8" diameter tube, 1/8" pin)
- 1/2" to 3/8" square drive adapter
- Torque wrench (1/2" square drive, 0 - 50 ft-lb capacity)
- Torque wrench (3/8" 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 removing the three jam nuts (42) and unscrewing the 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 or 67) 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 (1through 7) to prevent binding while the shaft is pushed out.
9. Remove the two outlet pin nuts (32) from the housing (73).
10. Remove the pump subassembly (1 through 27) from the pump housing (73). 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 (73) 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.

Pump Assembly Procedure

1. When the pump is dissembled, 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 (73) before tightening the housing tube (56) to the pump housing (73). Be sure the reciprocating tube (20) is inserted through both bushings before tightening the housing tube (56).
6. When pressing the pump shaft in (item 37), support the inner race of the rear ball bearing (item 60) and the crank assembly (items 1 through 7) to insure proper assembly.
7. If replacing the pump shaft ball bearings (items 38 & 60), support the housing (item 73) 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 10W30 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 Arrow HFA Low Temperature Oil. This oil stay fluid even at -70°.





MODEL	DIM "A" in (mm)	DIM "B" in (mm)
85567	27.50 (699)	35.00 (889)
85568	19.00 (483)	26.60 (676)
85569	13.69 (348)	21.25 (540)

Illustration #3

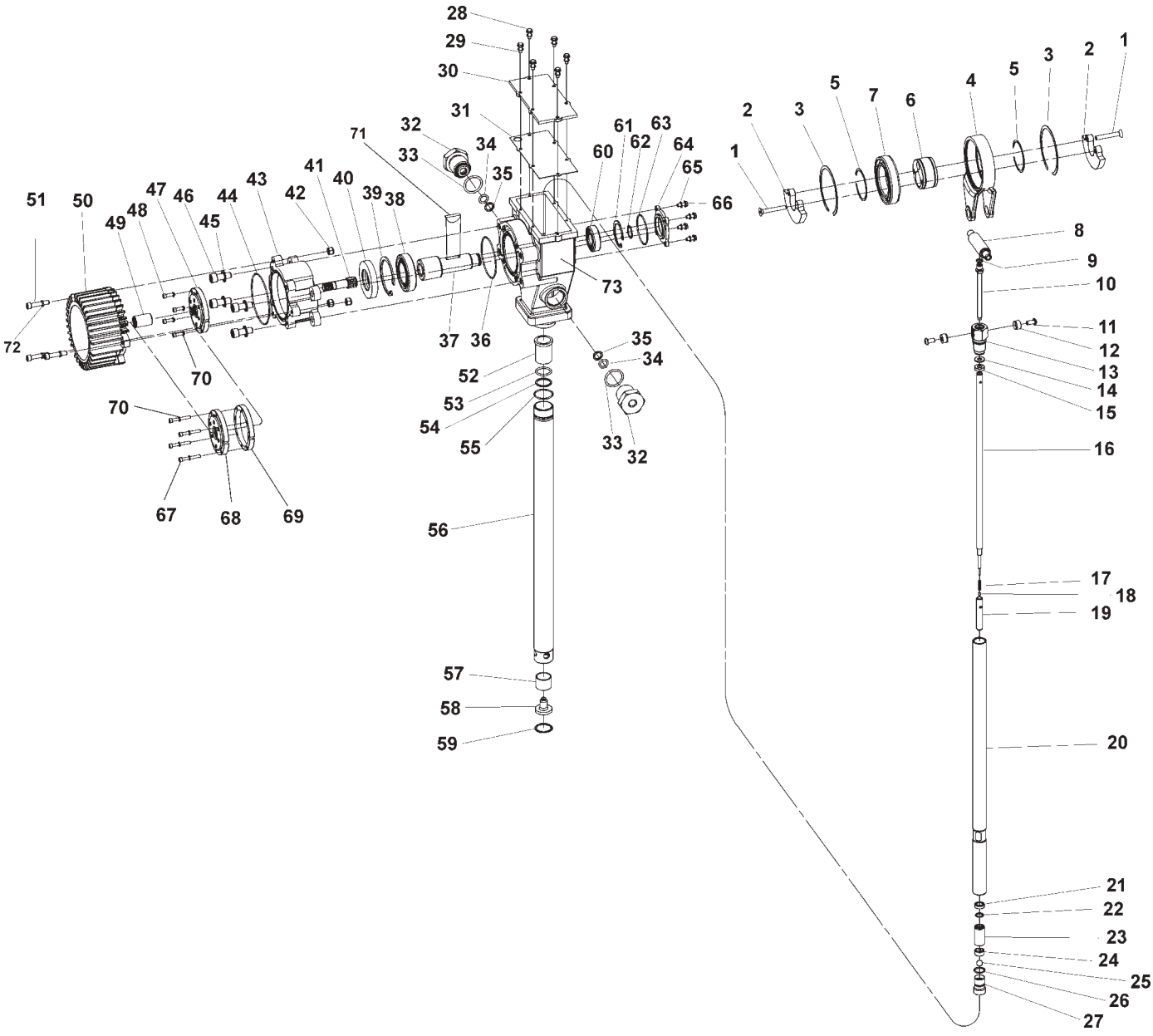


Illustration #4

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	36	1	O-Ring	272567
				37	1	Pump Shaft	272548
2	2	Counter Weight	272197	38	1	Ball Bearing	272556
3	2	Retaining Ring	270609	39	1	Retaining Ring	272561
4	1	Crankrod	270665	40	1	Shaft Seal	272554
5	2	Retaining Ring	270608	41	1	Adaptor Shaft	272546
6	1	Crank Eccentric	270666	42	3	Nut - 1/4-20	51304
7	1	Ball Bearing	270607	43	2	Gearbox Housing	272541
8	1	Outlet Pin	270670	44	1	O-Ring	272544
9	1	O-Ring (Nitrile)	*	45	4	Lock Washer	272566
10	1	Plunger Tube	270667	46	4	Screw	272564
11	2	Button Head Screw (1/4 x 1/2)	270634	47	1	Gear Set	See Chart Below
				48	4	Screw	272574
12	2	Wrist Pin Bushing	270668	49	1	Motor Coupler	272709
13	1	Wrist Pin Anchor	270669	50	1	Motor	272545
14	1	Backup Washer	*	51	3	Screw	272568
15	1	Cup Seal (Polyurethane)	*	52	1	Bronze Bearing	270674
				53	1	O-Ring (Polyrethane)	*
16	1	Plunger Link Rod	See Chart Below	54	1	Backup Washer	*
17	1	Spring	270616	55	1	O-Ring (Nitrile)	*
18	1	Ball	66010	56	1	Housing Tube	See Chart Below
19	1	Pump Plunger	270671	57	1	Bronze Bushing	270637
20	1	Reciprocating Tube	See Chart Below	58	1	Shovel Plug	270707
21	1	Cup Seal (Polyurethane)	*	59	1	Retaining Ring	270705
				60	1	Ball Bearing	272555
22	1	O-Ring (Polyurethane)	*	61	1	Retaining Ring	272562
				62	1	Retaining Ring	272563
23	1	Pump Cylinder	270672	63	1	O-Ring	272559
24	1	Ball Cage	270675	64	1	Bearing Cover	272549
25	1	Ball	66001	65	4	Lock Washer	66051
26	1	O-Ring (Nitrile)	*	66	4	Screws	272557
27	1	Check Seat	270664	67	4	Screws	272552 (for 2 stage Gear Boxes)
28	6	Self-Threading Screw (8 x 1/2)	270633	68	1	Gearset	See Chart Below
29	6	Gaskets (Screw)	252986	69	1	Gearset Spacer	272541 (Used on 2 stage gearboxes only)
30	1	Housing Cover	270629				
31	1	Cover Gasket (Nitrile)	*	70	4	Lockwasher	272553
				71	1	Woodruff Key	272560
32	1	Outlet, Pin-Nut	270619	72	3	Lock Washers	272569
33	4	O-Ring	*	73	1	Pump Housing	272540
34	2	Backup Washer	*			Soft parts Kit	270663
35	2	O-Ring	*				

Repair Parts List

(Non-common items)

Item No.	Qty.	Description	Model 85569	Model 85567	Model 85568
16	1	Plunger Link Rod	270641	270614	270648
20	1	Reciprocating Tube	270642	270617	270649
56	1	Housing Tube	270643	270628	270650
47	1	Gear Set (Final Stage)	272542	272663	272663
68	1	Gear Set (First Stage)	272543	---	---

* 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.
	Incorrect Polarity	Check to ensure red motor lead is connected to the positive battery terminal.
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 dies 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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