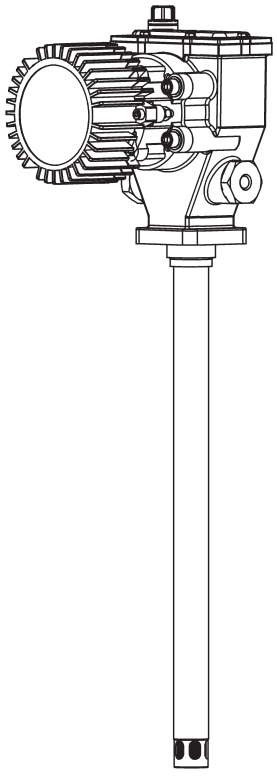
LINCOLN

Installation and maintenance guide

FlowMaster 24 V DC Rotary driven electric pump

Models 85552, 85553, 85554, 85566, 85567, 85568, 85569, 85587, 85591, 274873, 275560, 275626, 275663 and 277560 Series “B”



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Page	**298Q**

U.S. Patents 8,102,676 and 6,872,161

Foriegn 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.

⚠ CAUTION

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

⚠ WARNING

Indicates a hazardous situation which, if not avoided will result in death or serious 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 physician exactly what fluid was injected.

Inspection

If over pressurizing 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

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 hex head 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 refer to the **maintenance and repair section**, **page 12** for a list of the new repair kits and their proper application.

- 85552 - Pump for 5 gallon *(18 liter)* pail, speed range 5 to 50 rpm maximum pressure rating 5,000 psi *(345 bar)*.
- 85553 - Pump for 120 lb. *(54 kg)* drum, speed range 5 to 50 rpm, pressure rating 5,000 psi *(345 bar)*.
- 85554 - Pump for 60 lb. *(27 kg)* drum, speed range 9 to 93 rpm, maximum pressure rating 5,000 psi *(345 bar)*.
- 85566 - Pump for 120 lb. *(54 kg)* drum used on wayside rail lubricators, speed range 9 to 93 rpm, maximum pressure rating 5,000 psi *(345 bar)*.
- 85567 - Pump for 60 lb. *(27 kg)* drum, speed range 36 to 360 rpm, maximum pressure rating 5,000 psi *(345 bar)*.
- 85568 - Pump for 90 and 120 lbs. *(41 and 54 kg)* drum, speed range 36 to 360 rpm, maximum pressure rating 5,000 psi *(345 bar)*.
- 85569 - Pump for 5 gallon *(18 liter)* pail, speed range 9.5 to 100 rpm, maximum pressure rating 2,500 psi *(172 bar)*.
- 85591 - Pump for 400 lb. *(181 kg)* drum, speed range 9 to 93 rpm, maximum pressure rating 5,000 psi *(345 bar)*.
- 85587 - Pump for 5 gallon *(18 liter)* pail, used on wayside rail lubricators, speed range 9 to 93 rpm.
- 274873- Pump for 5 gallon *(18 liter)* pail, 7:1 ratio, 6,000 psi *(414 bar)*, 25 to 260 rpm, used on hose reel pump assemblies.
- 275560 - Pump for 90 and 120 lbs. *(41 and 54 kg)* drum. Speed range 36 to 360 rpm, maximum pressure rating 5,000 psi *(345 bar)*.
- 275636 - Pump for 60 lb. *(27 kg)* drum 7:1 ratio.
- 275663 - Pump for 60 lb. *(27 kg)* drum, speed range 36 to 360 rpm, maximum pressure rating 5,000 psi *(345 bar)*.
- 277560 - Pump for 55 lb *(25 kg)* drum, speed range 9 to 93 rpm, maximum 5,000 psi *(345 bar)*.

General description

The Lincoln Industrial rotary DC electric pump uses a 24 V DC motor and either a single a two 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 4**.

Appropriate use

- All pump models are exclusively designed to pump and dispense lubricants using 24 V DC electric power.
- 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 specification

Operating temperature	–40 to +150 °F *(–40 to +66 °C)*
Operating voltage	24 V DC (18 V DC min., 32 V DC max.)[1]
Motor	1/3 HP (0.25 kw)
Current draw, A	→ **tables 2**, **3**, **4** and **5**
Output/pump cycle	0.07 cu. in. *(1.51 cu. cm)*
Pump performance	→ **table 1**
Pump outlets	1/4 in. NPT female
Weight	30 lbs. *(13.3 kg)*

[1] Motor controller will shut motor off outside voltage limits

⚠ WARNING

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

⚠ WARNING

Pumps are not equipped with a high pressure shut-off valve.

Table 1

Electric pump performance specifications. Output in cu. in/min (cu. cm/min).

Test conducted with Alvania NLGI #2 grade grease at 1000 psi *(69 bar)* backpressure

Temperature °F *(°C)*	50 rpm	100 rpm	150 rpm	200 rpm	250 rpm	300 rpm	350 rpm
80 *(27)*	3.5 *(57)*	7 *(115)*	10.5 *(172)*	14 *(229)*	17.5 *(287)*	21 *(344)*	24.5 *(401)*
40 *(4)*	3.5 *(57)*	7 *(115)*	10.5 *(172)*	14 *(229)*	17.5 *(287)*	21 *(344)*	24.5 *(401)*
20 *(–7)*	3 *(49)*	6 *(98)*	9 *(147)*	12 *(197)*	15 *(246)*	18 *(295)*	21 *(344)*
0 *(–18)*	3 *(49)*	6 *(98)*	9 *(147)*	12 *(197)*	15 *(246)*	18 *(295)*	21 *(344)*
–10 *(–23)*	2.5 *(41)*	5 *(82)*	7.5 *(123)*	10 *(164)*	12.5 *(205)*	15 *(246)*	17.5 *(287)*

Installing the pump

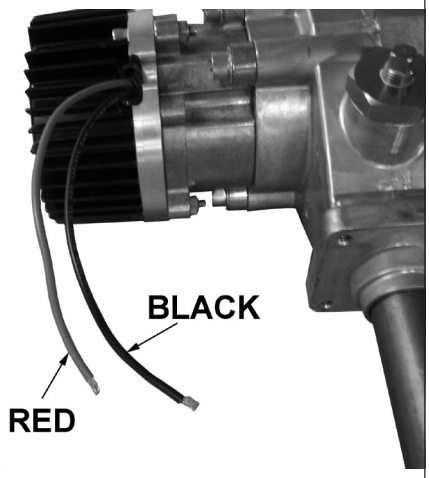
Typical installation is shown only as a guide for selecting and installing system components. Contact your Lincoln Industrial representative for assistance in designing a system to suit your specific needs.

The pump was tested in lightweight 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.

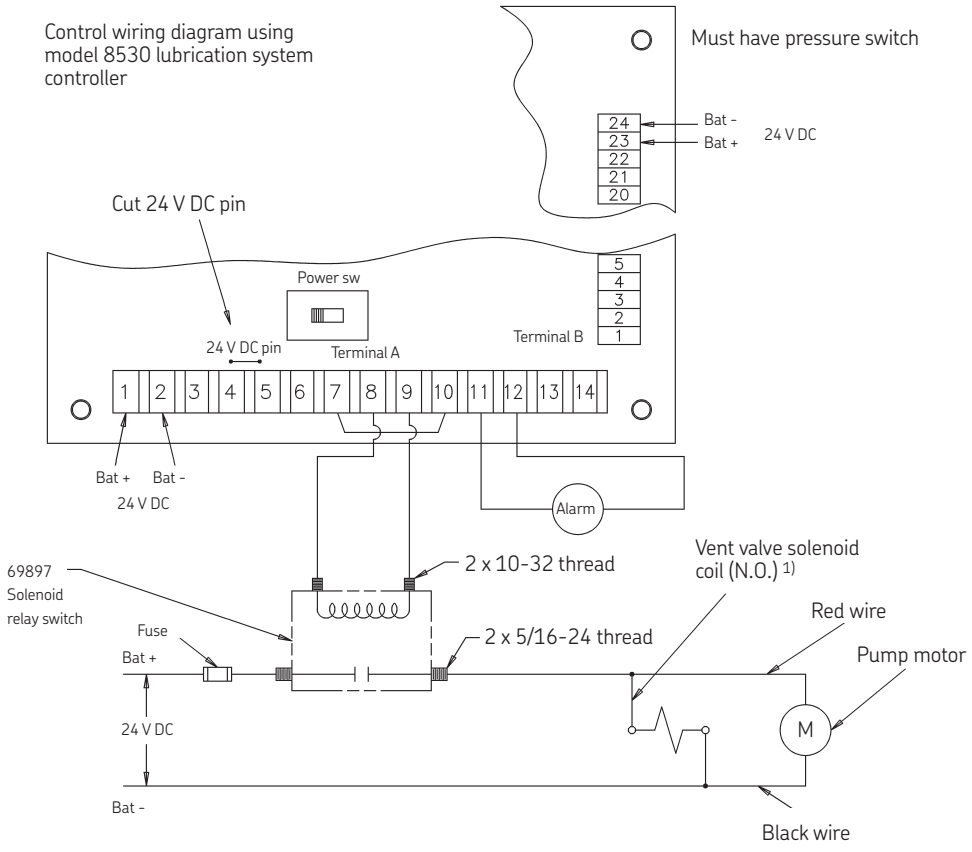
1 Mount the pump securely on the drum cover so that it cannot move or vibrate during operation.
2 Connect material supply line to the pump outlet. Install a safety unloader (**A**) (**→fig. 2**, **page 8**) such as **272722** (4000 psi *[276 bar]*) or **272572** (2500 psi *[172 bar]*), to outlet on opposite side of the pump.
3 Install high pressure shut-off valve (**C**) (**→fig. 2**, **page 8**) in the material supply line (required).
4 Wire the pump motor and vent valve (if used) (**→ fig. 1B**, **page 6**).
5 Connect power to motor leads. Be sure to connect red motor lead to the positive side of the circuit (**→ fig. 1A**). Fuse the motor as recommended in **tables 2**, **3**, **4**, **5** and **6.**

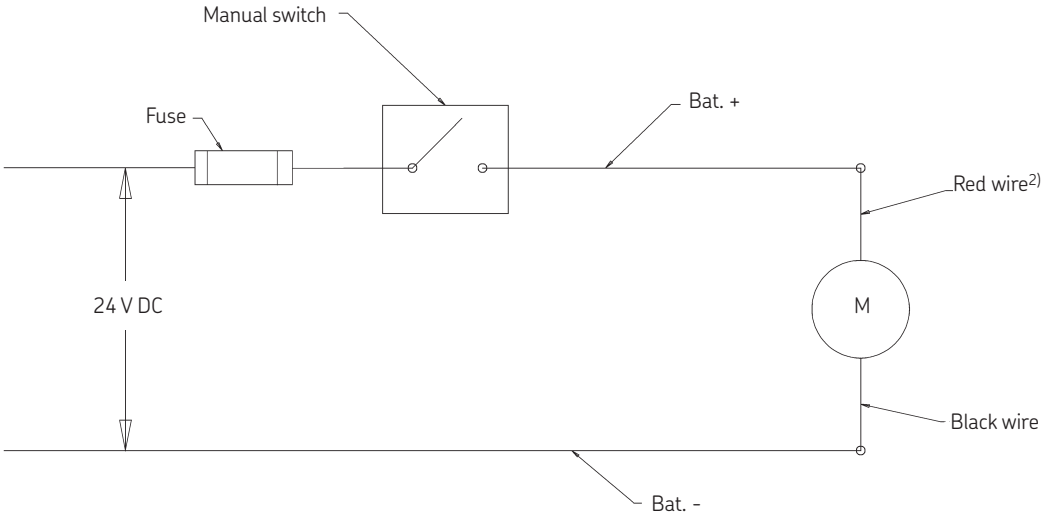
Notice
The motor is polarity sensitive and will not run if improperly wired.

Fig. 1A



Top figure – pump with controller
Bottom figure– pump without controller





1) Note: if a third wire is present (green/yellow) it can be clipped and removed and it is not necessary as a ground wire.
2) Note: be sure to connect red motor lead to the positive side of the circuit. The motor is polarity sensitive and will not run if improperly wired.

⚠ 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 ensure pump pressure is below 5,000 psi *(345 bar)* or 2,500 psi *(172 bar)* for Model 85569. Use high pressure components to reduce risk of serious injury including fluid injection and splashing in the eyes or on the skin.

Table 2

Electric FlowMaster Pump
24 V DC, 5:1 gear ratio
85567, 85568, 275560 and 275663

Backpressure psi *(bar)*	rpm	Draw (A)[1)]
0 *(0)*	375	2
1000 *(69)*	350	4.5
2000 *(138)*	325	7.3
3000 *(207)*	300	9.6
4000 *(276)*	280	12
5000 *(345)*	250	15.3

[1)] A field installed fuse of 20 A is recommended

Table 3

Electric FlowMaster Pump
24 V DC, 17.8:1 gear ratio, 2 stage, 85569

Backpressure psi *(bar)*	rpm	Draw (A)[1)]
0 *(0)*	107	1.28
1000 *(69)*	105	2
2000 *(138)*	103	2.75
2500 *(272)*	100	3.2

[1)] A field installed fuse of 5 A is recommended

Table 4

Electric FlowMaster Pump
24 V DC, 34:1 gear ratio
2 stage, 85552 and 85553

Backpressure psi *(bar)*	rpm	Draw (A)[1)]
0 *(0)*	58.2	1.16
1000 *(69)*	57.6	1.57
2000 *(138)*	57.0	2.10
3000 *(207)*	56.5	2.62
4000 *(276)*	55.9	3.20
5000 *(345)*	55.4	4.20

[1)] A field installed fuse of 6 A is recommended

Table 5

Electric FlowMaster Pump
24 V DC, 19:1 gear ratio, 2 stage
85554, 85566, 85587, 85591 and 277560

Backpressure psi *(bar)*	rpm	Draw (A)[1)]
0 *(0)*	105	1.28
1000 *(69)*	103	2.03
2000 *(138)*	101	2.96
3000 *(207)*	99	3.68
4000 *(276)*	98	4.83
5000 *(345)*	96	6.47

[1)] A field installed fuse of 10 A is recommended

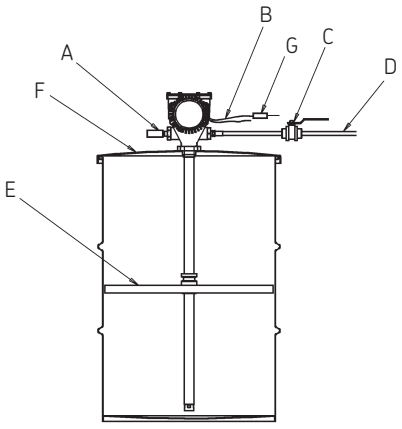
Table 6

Electric FlowMaster Pump
24 V DC, 7:1 gear ratio, 274873 and 275626

Backpressure psi *(bar)*	rpm	Draw (A)[1)]	Output cu. in. (cu. cm)
0 *(0)*	268	2.0	18.8 *(308)*
1000 *(69)*	255	4.0	17.8 *(292)*
2000 *(138)*	239	7.2	16.7 *(274)*
3000 *(207)*	224	8.2	15.6 *(256)*
4000 *(276)*	210	10.0	14.7 *(241)*
5000 *(345)*	200	12.3	14.0 *(229)*

[1)] A field installed fuse of 20 A is recommended

Fig. 2



A - Safety Unloader 272722 or 272572
B - 24 VDC from Controller
C- Outlet Shut-off Valve
D - Material Supply Line
E - Follower Plate (85492 for 120 lb. *[54 kg]*)
F - Drum Cover (84616 for 120 lb. *[54 kg]*)
G - Field Installed Fuse

Operation

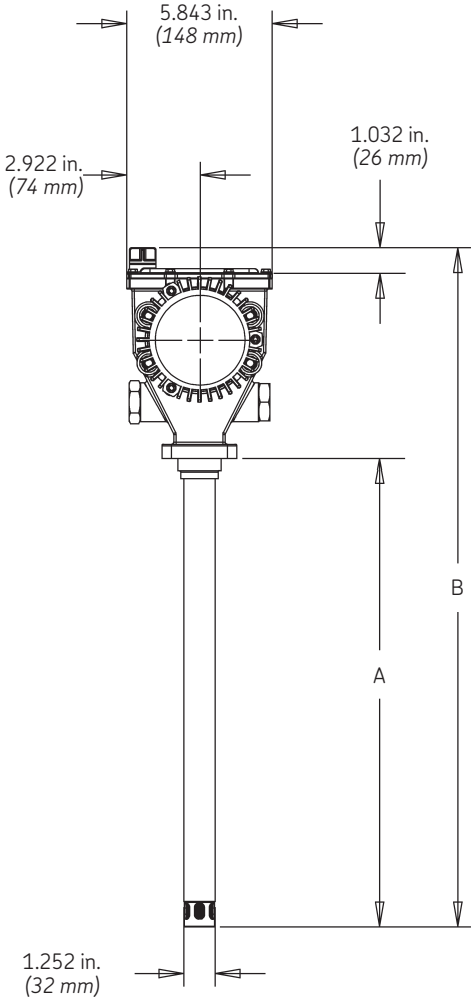
⚠ WARNING

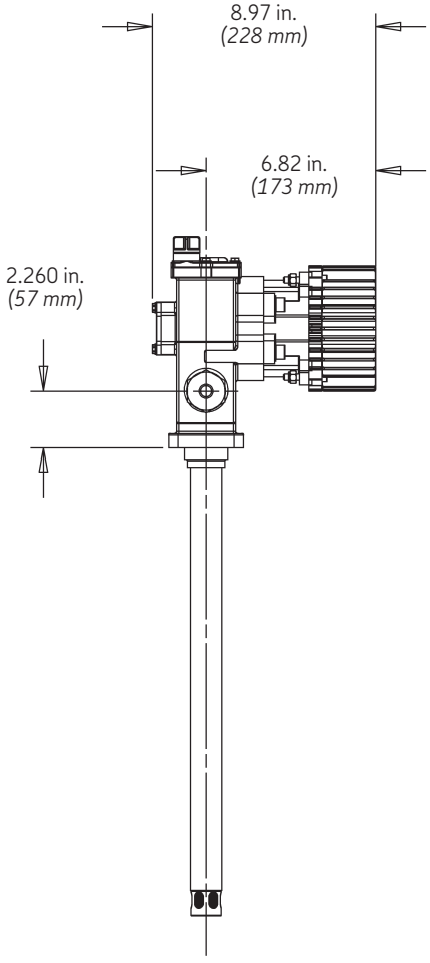
All pumps are set to run at full speed. **Do not change the settings for the pump until after the start up procedure.**

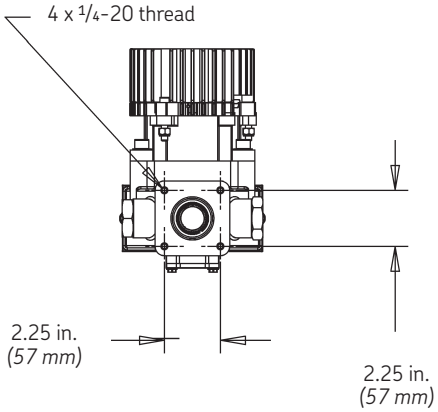
1. Remove the pump outlet line.
2. With the pump in a full container of lubricant, energize the pump. Make sure all air has been expelled from the pump and even lubricant flow is achieved.
3. Reattach the pump outlet line. Never allow the pump to run dry of lubricant. Monitor the supply lubricant level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

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 –40 to 150 °F *(–40 to 66 °C)*. For ambient temperatures between –70 to 50 °F *(–57 to 10 °C)*, 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. *[443 ml]*).







Dimensions

Model	Dim "A" in. *(mm)*	Dim "B" in. *(mm)*
85552, 85569, 85587, 274873, 275626	13.69 *(348)*	22.28 *(566)*
85554, 85567, 275663	19.00 *(483)*	27.63 *(702)*
85553, 85566, 85568. 275560	27.50 *(699)*	36.03 *(915)*
85591	34.00 *(864)*	42.44 *(1,078)*
277560	15.68 *(389)*	23.29 *(592)*

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**, **27**), faulty discharge check (**18**, **19**) or damaged O-ring (**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 crankcase oil.	Add crankcase oil. Remove crankcase cover (**30**) from Pump Housing (**67**). Oil level should be at the middle of the crankshaft (**37**). Check dipstick (**30a**) 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 does 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 output.	Gearset or adapter shaft stripped or broken.	Dismantle and replace damaged part.

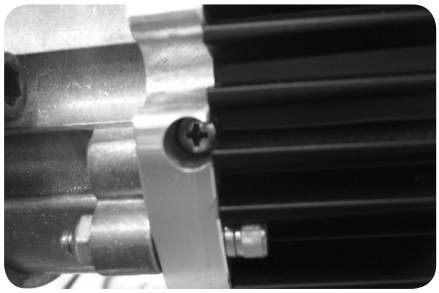
Tools required for maintenance, repair and adjustment

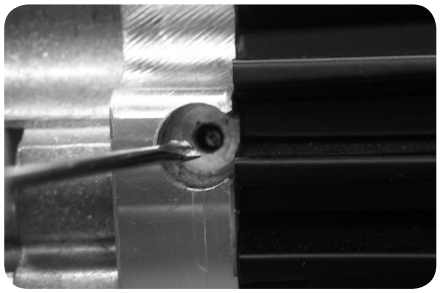
- 7/16 in. *(11 mm)* open end wrench
- 1 1/2 in. *(38 mm)* open end wrench
- 3/4 in. *(19 mm)* open end wrench
- 12 in. *(305 mm)* cresent wrench
- 1/8 in. *(3 mm)* hex head wrench
- 5/32 in. *(4 mm)* hex head wrench
- 1/4 in. *(7 mm)* hex head wrench
- 5/16 in. *(8 mm)* hex head wrench
- 3/8 in. *(10 mm)* hex head wrench
- 1/4 in. *(7 mm)* drive socket
- 1/4 in. *(7 mm)* socket
- 5/16 in. *(8 mm)* socket
- Flat blade screwdriver 0.10 in. *(3 mm)* wide and 0.025 in. *(1 mm)* thick
- Pick to remove seals and spiral retaining rings
- Small snap ring pliers
- Special tool kit 276275
- Phillips screwdriver
- 1/2 in. *(13 mm)* hex head wrenches
- Hammer
- Torque wrench (ft.lbf. and in.lbf.)
- Hex head socket adapters (req'd to torque hex head screws)
- Locktite 242 medium strength thread lock or equivalent.
- Loctite 222MS thread lock or equivalent

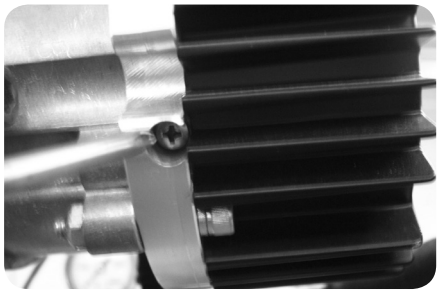
Setting the pump speed

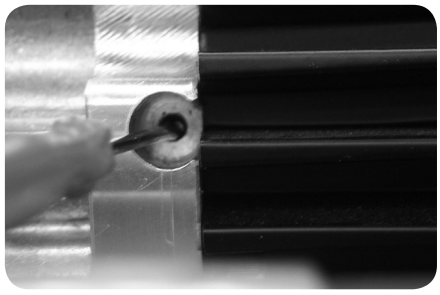
The motor used in the 24 V DC FlowMaster pump is equipped with a built-in speed control. The pump speed is factory set to the maximum setting, but is easily changed in the field as follows:

1 Locate the speed adjustment screw on the pump motor. It is located under a cover screw 120° away from power cord.

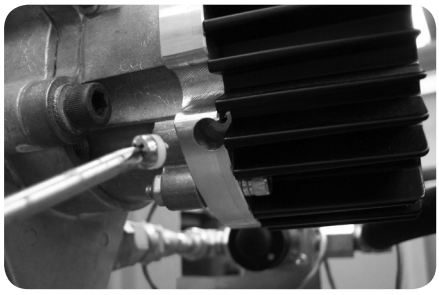




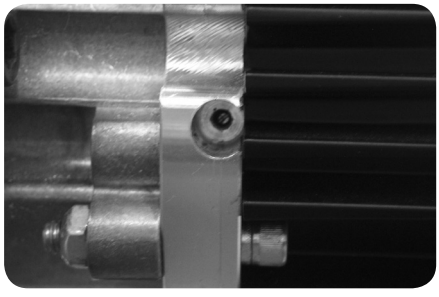




2 Remove the cover screw by turning it counterclockwise with a phillips screwdriver. Take care not to lose the white plastic seal washer under the screw head.



3 Remove the phillips head screw.



4 Note the small brass potentiometer adjustment screw.

5 Using a flat blade screwdriver with a 0.10 in. *(3 mm)* wide and 0.025 in. *(1 mm)* thick tip, adjust the screw counterclockwise to reduce the motor speed. The screw has no stops and has a total travel of 30 turns. Do not reduce the motor speed below 200 rpm. (Divide motor speed by the gear ratio for pump speed.) Refer to **page 3** for speed recommendations for each model number.

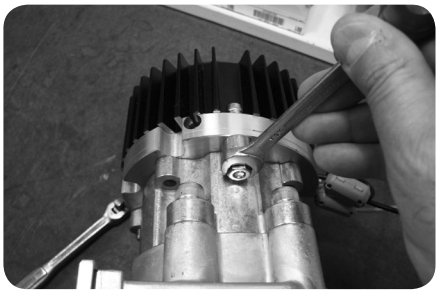
6 Reinstall phillips head cover screw when adjustment is complete.

Maintenance and repair

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

⚠ WARNING

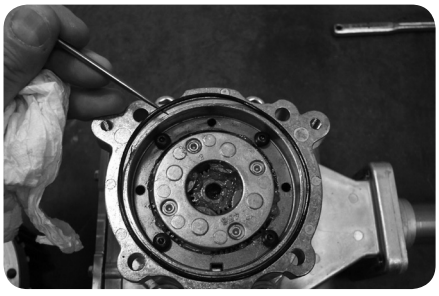
Always use Lincoln Industrial parts for service and repair.



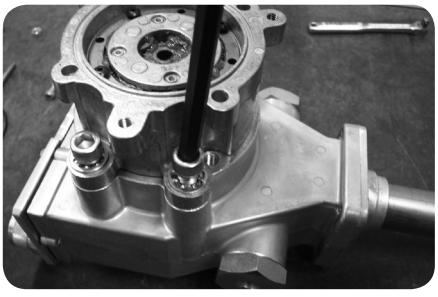
1 Remove three jam nuts (**42**). Reassembly: torque to 100 to 110 in.lbf. *(11 to 12 Nm)*.

2 Remove three motor mounting screws (**51**) with lockwashers (**51a**). Reassembly: torque to 100 to 110 in.lbf. *(11 to 12 Nm)*.

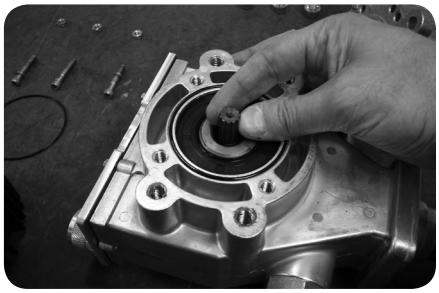
3 Remove motor (**50**).



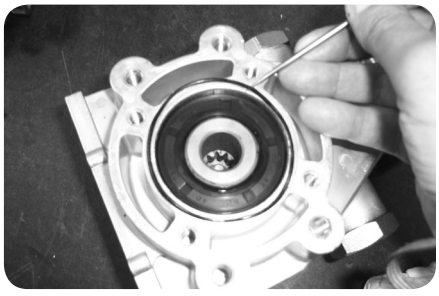
4 Remove motor o-ring (**44**) and seal. Reassembly recommendation: replace o-ring.



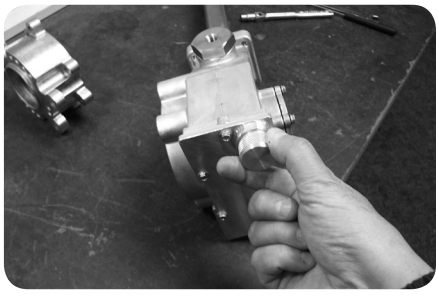
5 Remove gear box mounting screws (**46**) with lockwashers (**45**). Reassembly: torque to 20 to 25 ft.lbf. *(27 to 34 Nm)*.



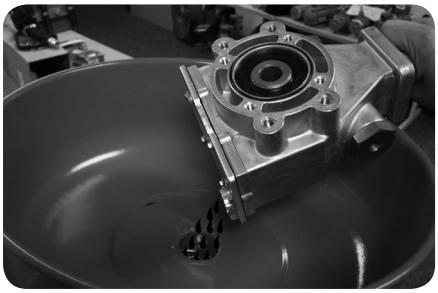
6 Remove adaptor shaft (**41**).



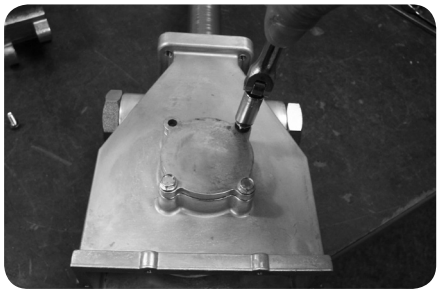
7 Remove gearbox o-ring seal (**36**). Reassembly recommendation: replace o-ring.



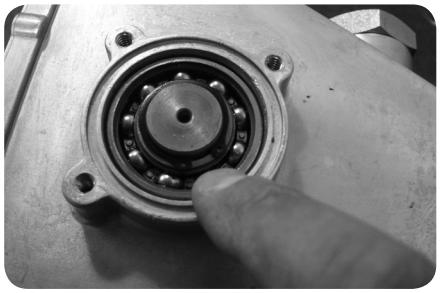
8 Remove dipstick (**30a**).



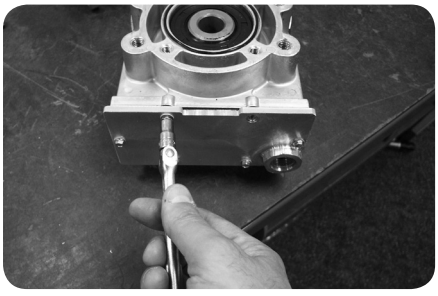
9 Drain oil. Reassembly recommendations: use SAE 10W30 motor oil filled to dipstick mark (15 oz. *[443 ml]*).



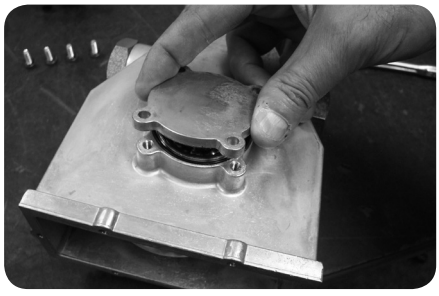
12 Remove bearing cover screws (**66**) with lockwashers (**65**). Reassembly torque: 32 to 38 in.lbf. *(3,6 to 4,3 Nm)*.



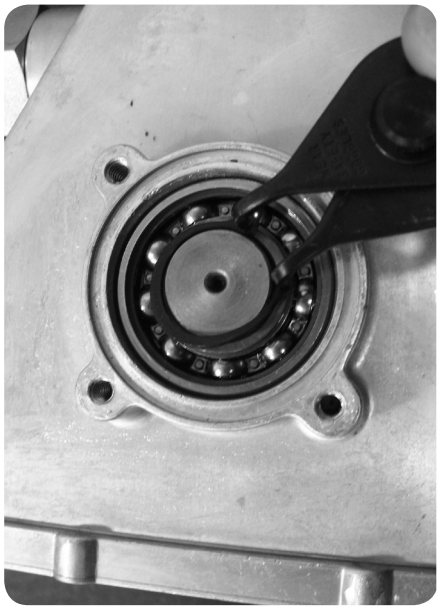
15 Note c-clip location on shaft (**62**).



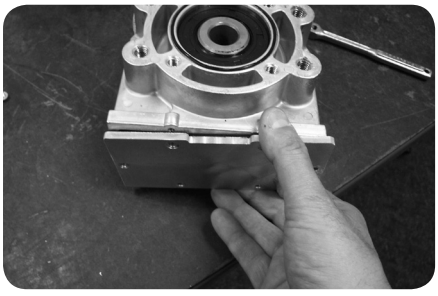
10 Remove housing cover screws (**28**). Reassembly torque 10 to 15 in.lbf. *(1 to 2 Nm)*. Reassembly recommendations: replace screw gaskets.



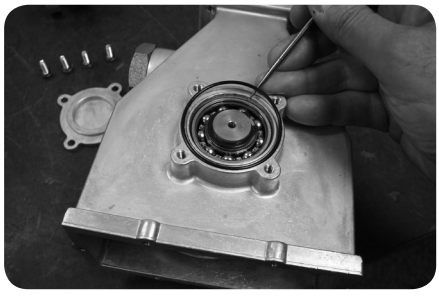
13 Remove bearing cover (**64**).



16 Remove clip.



11 Remove housing cover (**30**) and gasket (**31**). Reassembly recommendation: replace gasket.



14 Remove bearing cover o-ring (**63**). Reassembly recommendations: replace bearing cover o-ring.

17 Using 2 1/2 in. *(64mm)* diameter steel pipe, provided in tool kit (**276275**), support the front housing seal and bearing as shown.

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

19 Drive out the pump shaft (**37**) using 5/8 in. *(16 mm)* nylon rod provided in tool kit (**276275**).

20 Pump shaft (**37**) will drop inside the support pipe when it clears the pump assembly.

21 Loosen outlet pin nuts (**32**). Reassembly torque: 30 to 35 ft.lbf. *(41 to 47 Nm)*.

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

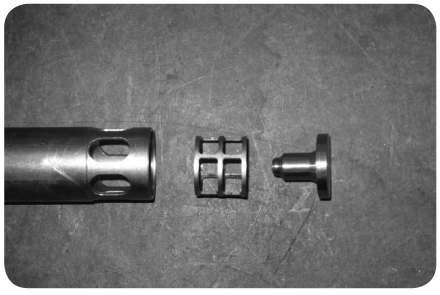
23 Remove spiral retaining ring (**59**) from housing tube.

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

25 Push pump element (**1** through **27**) out of housing tube with nylon rod and hammer (included in tool kit 276275). Reassembly recommendation: replace pump element in housing tube with housing tube slightly loose, then torque housing tube (**56a**) to pump housing (**67**) to 20 to 25 ft.lbf. *(27 to 34 Nm)*.

26 Pull pump element free of housing.

27 Remove housing tube (**56a**). Reassembly torque: 20 to 25 ft.lbf. *(27 to 34 Nm)*.

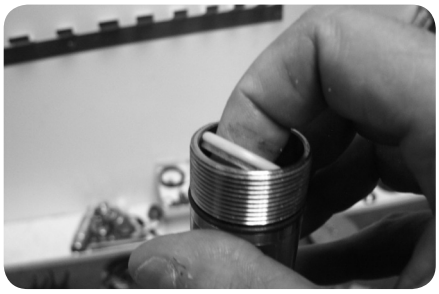


28 Exploded view of housing tube (**56a**), spacer (**56b**) and shovel plug (**58**).

29 Remove bronze bushing (**57**).

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

35 Remove crankkrod and eccentric assembly (**1** to **7**).



30 Remove oil seal o-ring (**53**) and backup washer (**54**). Reassembly recommendation: replace o-ring seal and backup washer. Backup washer must be placed in tube first, then the o-ring).

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

36 Loosen wrist pin anchor (**13a**). Reassembly torque: 20 to 25 ft.lbf. *(27 to 34 Nm).*

31 Remove wrist pin bushing screws (**11**). Reassembly torque: 100 to 110 in.lbf. *(11 to 12 Nm).* Reassembly recommendations: use Loctite 242 or equivalent on screw threads.

34 Remove wrist pin bushing (**12**).

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

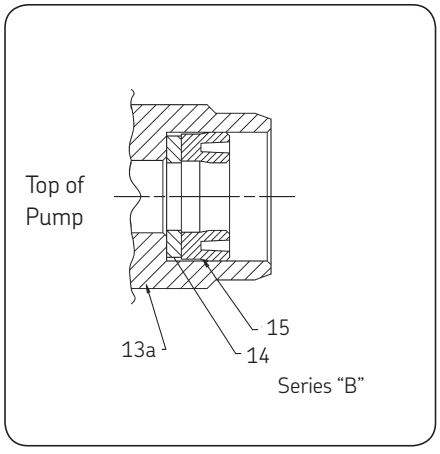
38 View of plunger tube and plunger tube bushing assembly (**10**, **10a**, **10b**, **10c** and **10d**).

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

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

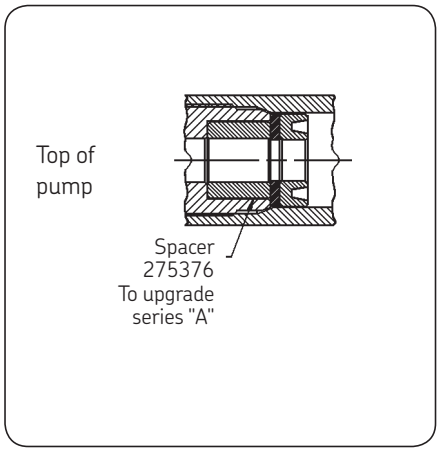
39 Loosen plunger tube (**10**). Reassembly torque: 100 to 110 in.lbf. *(11 to 12 Nm).*

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



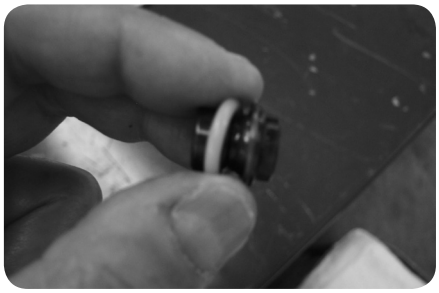
40 Remove plunger tube (**10**) and associated parts. Reassembly recommendations: replace o-ring (**10c**) on bushing (**10a**). Use Loctite 242 or equivalent on plunger tube threads.)

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



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

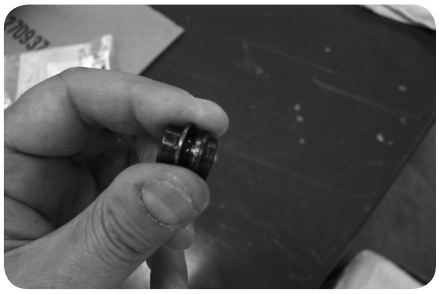
48 Remove o-ring (**9**).



51 Remove o-ring (**10c**)[1].

46 Loosen plunger tube (**10**) from outlet pin (**8**). Reassembly torque: 100 to 110 in.lbf. *(11 to 12 Nm)*.

49 View of o-ring (**9**) removed.



52 Remove backup washer (**10b**)[1].

47 Remove plunger tube (**10**). Reassembly recommendations; replace o-ring (9). Use Loctite 242 or equivalent on plunger tube threads.).

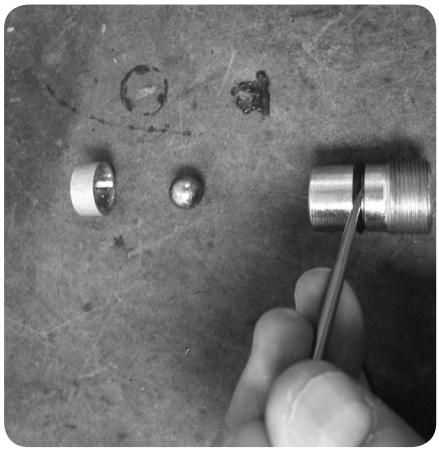
50 Remove c-clip (**10d**).

53 View of upper bushing and seals (**10** through **10d**)[1].

[1] Series "A" pump does not have bushing and seals (**10a** through **10d**). Follow instructions for reassembly to series "B" pump.

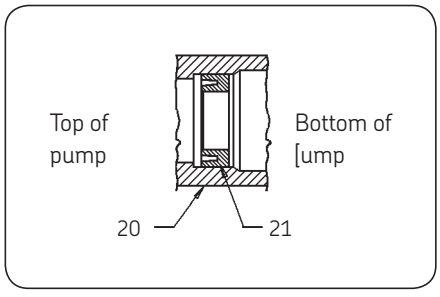
54 Loosen check seal housing (**27**) with 3/8 in. *(10 mm)* hex head wrench. Reassembly torque: 20 to 25 ft.lbf. *(27* to *34 Nm)*.

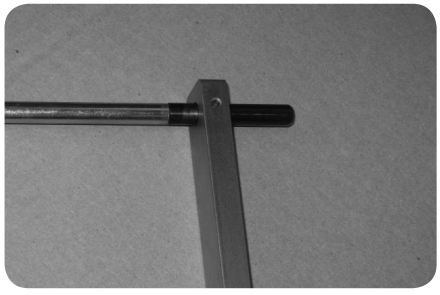
55 Check seat housing assembly (**27**) and associated parts removed. Reassembly recommendations: replace o-ring seal (**26**). Apply Loctite 242 or equivalent to check seat housing threads.



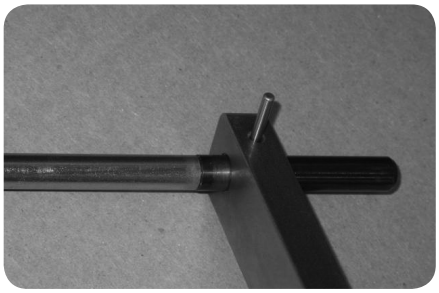
56 Remove ball cage (**24**), check ball (**25**) and o-ring seal (**26**) from check seat housing (**27**).

57 Remove lower bushing (**9**) from reciprocating tube (**20**). Reassembly recommendations: replace o-ring seal (**26**). Remove lower cup (**21**) from reciprocating tube (**20**). Reassembly recommendations: replace lower cup seal see below for orientation. Remove pump bushing (**19a**) from pump plunger (**19**).

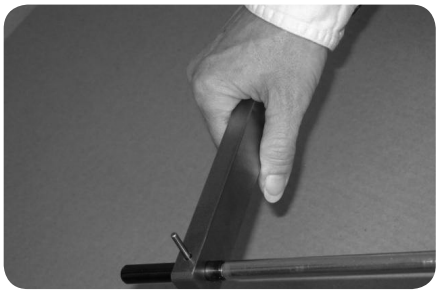




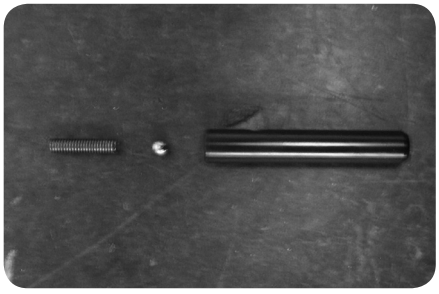
58 To remove lower plunger use special tool provided in the special tool kit (**276275**).



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



60 Remove plunger (**19**). Reassembly torque: 100 to 110 in.lbf. Reassembly recommendations: use Loctite 242 or equivalent on plunger threads).



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

62 Clamp crank rod/eccentric assembly (**1** through **7**) in vise.

63 Loosen flat head screw (**1**). Reassembly torque: 100 to 110 in.lbf. *(11 to 12 Nm)*.

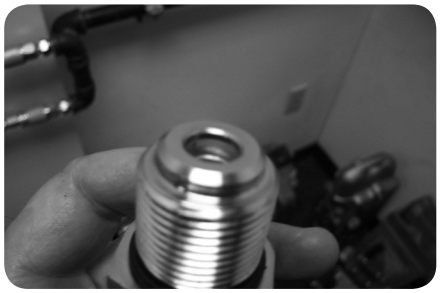
64 Remove flat head screws (**1**). Reassembly recommendation: use Loctite 242 on screw threads.

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

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

67 Place assembly on 2 1/2 in. dia. steel pipe included in tool kit (**276275**).

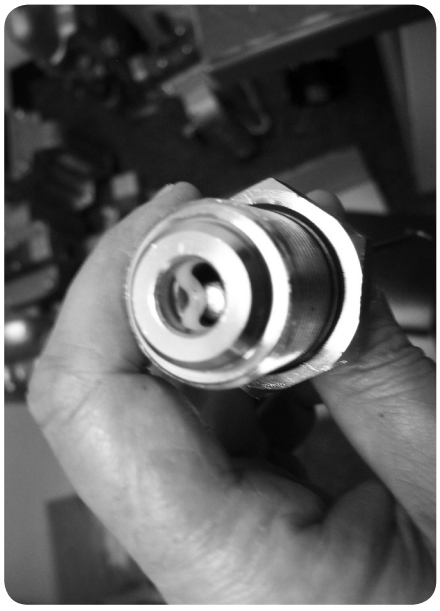
70 Remove O-Ring seal (Item 33) from outlet nut (Item 32).



72 Reassembly recommendations: To install the o-ring (**34**) and backup washer (**35**) most easily, install the backup washer first.

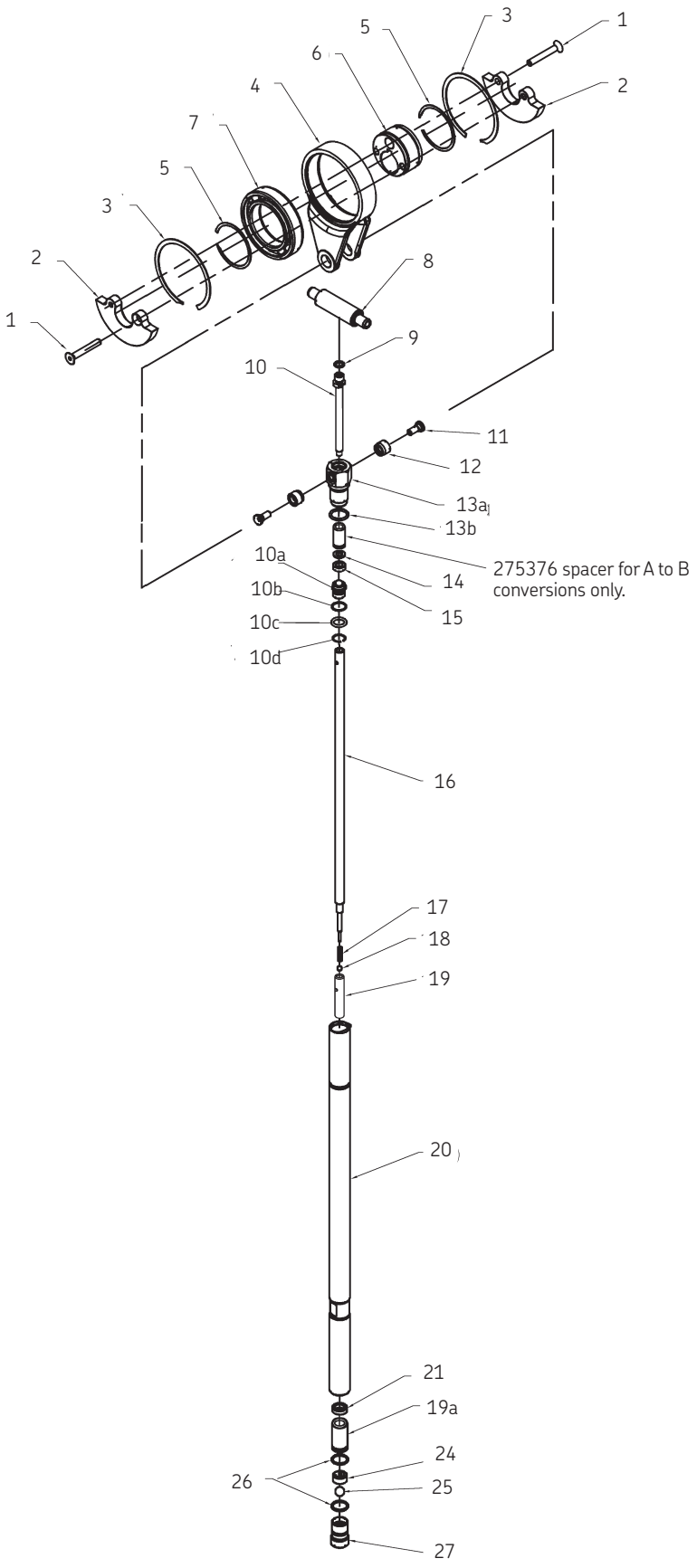
68 Drive crank eccentric (**6**) out of ball bearing (**7**).

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



73 Then feed the o-ring (**34**) under the backup washer, pushing up the final bulge of the o-ring with a blunt rod.

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


1
2
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13a
13b
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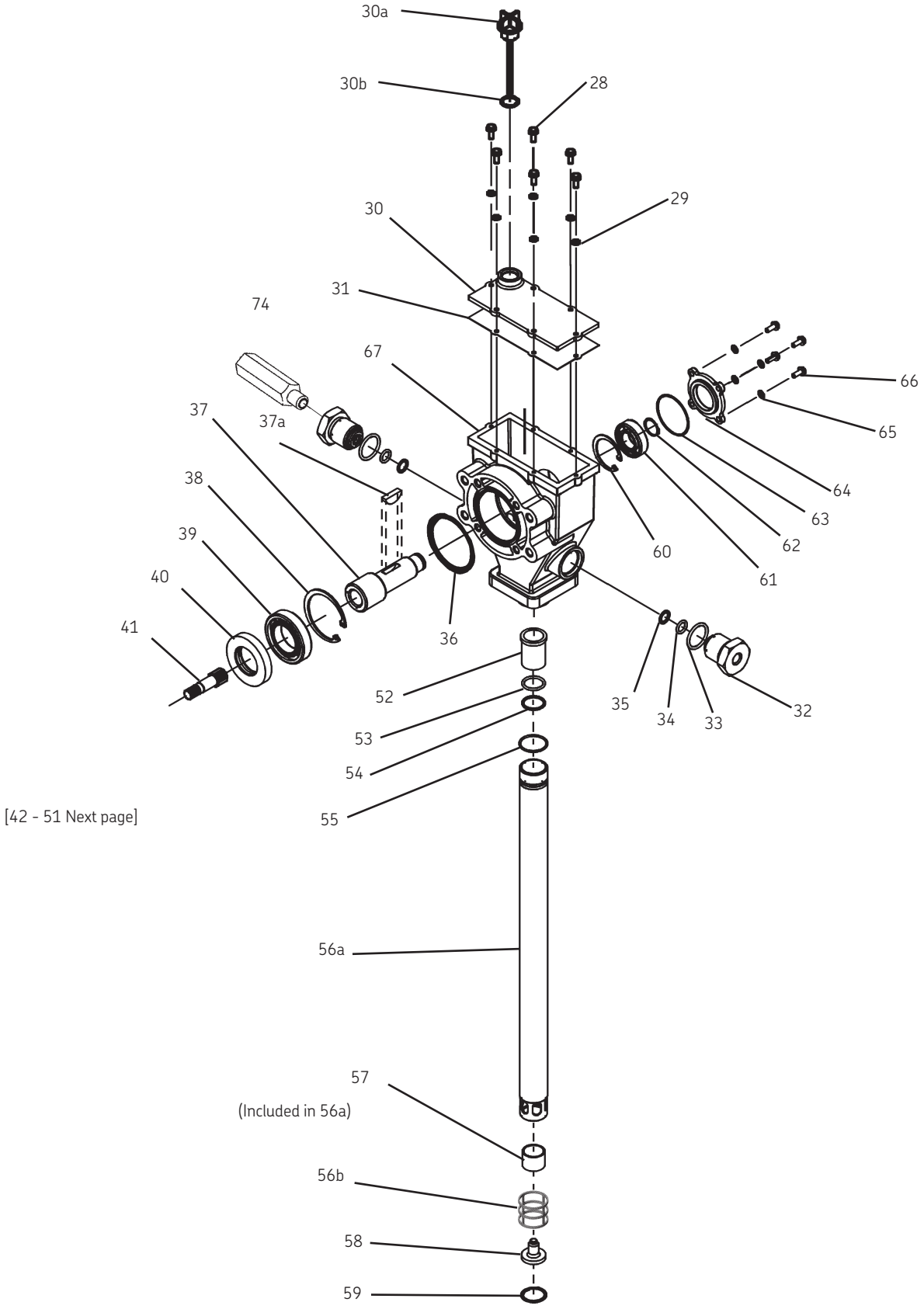
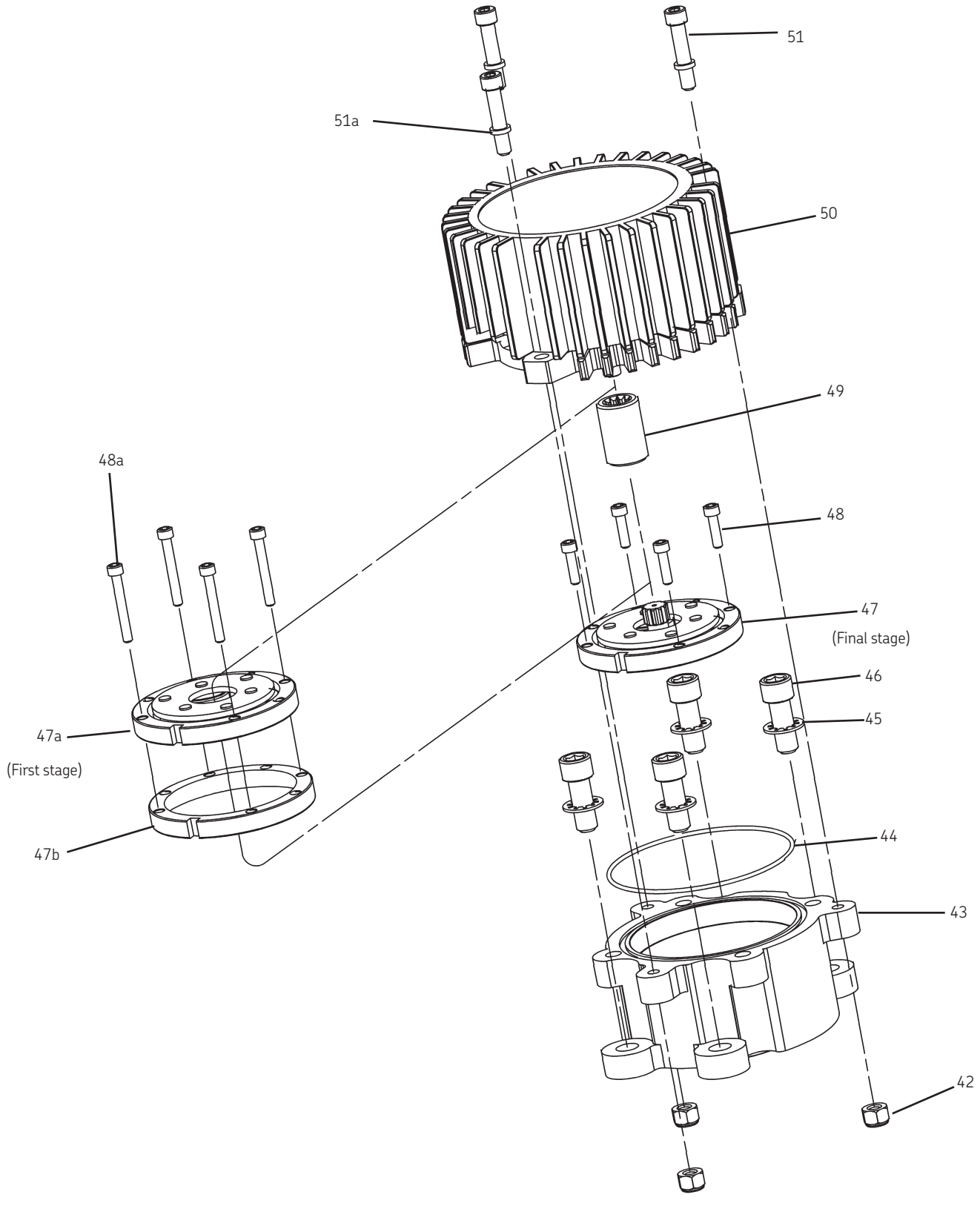
20
21
19a
24
25
26
27
10a
10b
10c
10d
275376 spacer for A to B conversions only.



[42 - 51 Next page]


51
51a
50
49
48a
48
47
(Final stage)
46
45
47a
(First stage)
47b
44
43
42

Repair parts

Item	Qty.	Description	All models
1	2	Flat head screw, 1/4 x 1 3/4	270635
2	2	Counter weight	272197
3	2	Retaining ring	270609
4	1	Crankrod	270665
5	2	Retaining ring	270608
6	1	Crank eccentric	270666
7	1	Ball bearing	270607
8	1	Outlet pin	270670
9	1	O-ring (nitrile)	1)
10	1	Plunger tube	2)
10a	1	Plunger bushing	2)
10b	1	Steel back-up ring	1)2)
10c	1	O-ring	1)2)
10d	2	Retainer clip	1)2)
11	2	Pivot screw	275006
12	2	Wrist pin bushing	275005
13a	1	Wrist pin anchor	274992
13b	1	O-ring	1)
14	1	Backup washer	1)
15	1	Cup seal (polyurethane)	1)
16	1	Plunger link rod	See table below
17	1	Spring	1)
18	1	Ball	1)
19	1	Pump plunger	275002
19a	1	Pump bushing	3)
20	1	Reciprocating tube	See table below
21	1	Cup seal (polyurethane)	1)
22		Not used	
23		Not used	
24	1	Ball cage	272179
25	1	Ball	1)
26	2	O-ring (nitrile)	1)
27	1	Check seat	270664
28	6	Self-threading screw, #8 x 1/2	270633
29	6	Gaskets (screw)	252986[1)]
30a	1	Housing cover	275009
30b	1	Dipstick	275369
30c	1	O-ring	1)
31	1	Cover gasket (nitrile)	1)
32	2	Outlet, pin-nut	270619
33	2	O-ring	1)
34	2	O-ring	1)
35	2	Backup washer	1)
36	1	O-ring	272567[1)]
37	1	Pump shaft	272548
37a	1	Woodruff key	272560
38	1	Retaining ring	272561
39	1	Ball bearing	272556
40	1	Shaft seal	272554[1)]
41	1	Adapter shaft	272546
42	3	Nut, 1/4-20	51304
43	1	Gearbox housing	272541
44	1	O-ring	272544[1)]
45	4	Lock washer	272566
46	4	Screw	272564
47	1	Gear set	See table below
47a	1	Gear set	See table below
47b	1	Gearset spacer	272547[4)]
48	4	Screw	272574[5)]
48a	4	Screw	272552[4)]
49	1	Motor coupler	272709[5)]
50	1	Motor	272545
		Motor (model 274873 only)	276642
51	3	Screw	50051
51a	3	Lock washer	272569
52	1	Bronze bearing	270674
53	1	O-ring (polyrethane)	1)
54	1	Backup washer	1)
55	1	O-ring (nitrile)	1)
56a	1	Housing tube	→ **chart**, **page 26**
56b	1	Spacer	276279
57	1	Bronze bushing	6)
58	1	Shovel plug	270707
59	1	Retaining ring	270705
60	1	Ball bearing	272555
61	1	Retaining ring	272562
62	1	Retaining ring	272563
63	1	O-ring	272559[1)]
64	1	Bearing cover	272549
65	4	Lock washer	66051
66	4	Screws	272557
67	1	Pump housing	272540
1)		Repair kit	275383

1) ncluded in 275383 Soft Parts Kit.
2) Parts included in kits 275186 & 275188.
3) Part is included in item number **19**.
4) Used on 2 stage gearboxes only.
5) Used on single stage gearbox only.
6) Part is included in item number **56a**.

Non-common repair parts

Item No.	Qty.	Description	Model 85552 5 gal (19 l)	Model 85553 120 lbs. (54 kg)	Model 85554 60 lbs. (27 kg)	Model 85566 120 lbs. (54 kg)	Model 85567 60 lbs. (27 kg)
16	1	Plunger link rod	270641	270648	270614	270648	270614
20	1	Reciprocating tube	275010	275018	275022	275018	275022
56a	1	Housing tube	275189	275191	275190	275191	275190
47	1	Gear set (final stage)	272584 (7:1)	272584 (7:1)	272663 (5:1)	272663 (5:1)	272663 (5:1)
47a	1	Gear set (first stage)	272585 (5:1 Sintered)	272585 (5:1 Sintered)	272543 (4:1 Sintered)	272543 (4:1 Sintered)	N/A
74	1	Safety unloader	272572	272722	272722	272722	272722

Item No.	Qty.	Description	Model 85568 90 and 120 lb (41 and 54 kg)	Model 85569 5 gal (19 l)	Model 85587 5 gal (19 l)	Model 85591 400 lb (181 kg)	Model 274873 5 gal (19 l)
16	1	Plunger link rod	270648	270641	270641	270645	270641
20	1	Reciprocating tube	275018	275010	275010	275158*	275010
56a	1	Housing tube	275191	275189	275189	270647	275189
47	1	Gear set (final stage)	272663 (5:1)	272542 (5:1 Sintered)	272663 (5:1)	272663 (5:1)	272584 (7:1)
47a	1	Gear set (first stage)	N/A	272543 (4:1 Sintered)	272543 (4:1 Sintered)	272543 (4:1 Sintered)	N/A
74	1	Safety unloader	272722	272722	272722	272722	274833

Item No.	Qty.	Description	Model 275560 90 lbs. (41 kg)	Model 275626 60 lbs. (27 kg)	Model 275663 60 lbs. (27 kg)	Model 277560 55 lbs. (25 kg)
16	1	Plunger link rod	270648	270614	270614	277554
20	1	Reciprocating tube	275018	270642	275022	277562
56a	1	Housing tube	275191	278189	275190	277563
47	1	Gear set (final stage)	272663 (5:1)	272584 (7:1)	272663 (5:1)	272663 (5:1)
47a	1	Gear set (first stage)	N/A	N/A	N/A	272543 (4:1 Sintered)
74	1	Safety unloader	272722	272722	272722	272722

***** Indicates change

Repair kit selection table

Converting series A to series B pumps

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

Repair kit selection

Item	Kit number
1 to 8, 32, 36 to 52, 58 to 67	No kit – parts identical for series A and series B.
9[1], 10, 10a, 10b, 10c, 10d, 14, 15	275186 - Upper bushing & plunger kit
17, 18, 19, 19a, 21, 24, 25, 26, 27 and 56B	275187 - Lower bushing & plunger kit
20	See chart for reciprocating tube p/n on page 26 for series B
28, 29, 30, 30a, 30b, and 31	275381 - Housing cover kit
56a and 57 (pressed into 56a)	Housing tube kits (chart) see chart pg. 26 series B (plus 276279 spacer)
Repair kit	275383 Repair kit
11, 12, 13a, 13b, 275376 Spacer	275188 Pivot pin/anchor kit

[1] Item number **9** is assembled to item number **10**.

Kits to convert series "A" to series "B" pumps

Size	Kit	Consists of Repair kits (see above)	Housing cover kit	Reciprocating tube kit	Housing tube kit	Plunger kink rod kit
5 gal *(19 l)*	276580	275186, 275187, 275188, 275383	275381	275010	275189	270641
90 and 120 lb (*41* and *54 kg)*	276581	275186, 275187, 275188, 275383	275381	275018	275191	270648
60 lbs. *(27 kg)*	276582	275186, 275187, 275188, 275383	275381	275022	275190	270614
400 lbs. *(181 kg)*	276583	275186, 275187, 275188, 275383	275381	275158	275192	270645

Repair Series B Only

Repair kit selection

Item	Kit number
1 to 8, 28 to 30a, 36 to 52, 56a to 67	Not in kits, order individually if needed
9[1], 10, 10a, 10b, 10c, 10d, 14, 15	275186 - Upper bushing & plunger kit
11, 12, 13a, 13b (do not use spacer # 275376)	275188 - Pivot pin & anchor kit
17, 18, 19, 19a, 21, 24, 25, 26, 27, 56b	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

[1] Item number **9** is assembled to item number **10**.

Declaration of Conformity as Defined by Machinery Directive 98/37/EC

This is to declare that the design of the DC FlowMaster Lubrication Pump in the version supplied by us complies with the provision of the Directive 98/37/EC.

Applied Harmonized Standards:

EN 292-1	Safety of Machinery Part 1 Basic Terminology , Methodology.
EN 292-2	Safety of Machinery Part 2 Technical Principles and Specifications.
EN 809	Pumps and Pump Units for Liquid Safety Requirements
EN 60204-1	Safety of Machinery Electrical Equipment of Machines Part 1: General Requirements
EN 60034-1	Rotating electrical machines - Part 1: Rating and performance

Declaration of Conformity According to EMV Directive 93/68 EEC

We declare that the model of the DC FlowMaster Lubrication Pump in the version supplied by us complies with the provision of the Directive 93/68 EEC.

Applied Harmonized Standards:

EN 50081-1	Electromagnetic Compatibility Generic Emission Standard Part 1: Residential, Commercial and Light Industry.
EN 50082-2	Electromagnetic Compatibility Generic Immunity Standard Part 2: Industrial Environments.

Paul Conley, P.E.

Signature — Paul Conley , PE, Chief Engineer

Septmber 5, 2012

Date

Lincoln industrial standard warranty

Standard limited warranty

Lincoln warrants the equipment manufactured and supplied by Lincoln to be free from defects in material and workmanship for a period of one (1) year following the date of purchase, excluding there from any special, extended, or limited warranty published by Lincoln. If equipment is determined to be defective during this warranty period, it will be repaired or replaced, within Lincoln's sole discretion, without charge.

This warranty is conditioned upon the determination of a Lincoln authorized representative that the equipment is defective. To obtain repair or replacement, you must ship the equipment, transportation charges prepaid, with proof of purchase to a Lincoln Authorized Warranty and Service Center within the warranty period.

This warranty is extended to the original retail purchaser only. This warranty does not apply to equipment damaged from accident, overload, abuse, misuse, negligence, faulty installation or abrasive or corrosive material, equipment that has been altered, or equipment repaired by anyone not authorized by Lincoln. This warranty applies only to equipment installed, operated and maintained in strict accordance with the written specifications and recommendations provided by Lincoln or its authorized field personnel.

This warranty is exclusive and is in lieu of any other warranties, express or implied, including, but not limited to, the warranty of merchantability or warranty of fitness for a particular purpose. Warranty on items sold by Lincoln, but not manufactured by Lincoln are subject to the warranty consideration, if any, of their manufacturer (such as hoses, hydraulic and electric motors, electrical controllers, etc.) Assistance in making such warranty claims can be offered as required.

In no event shall Lincoln be liable for incidental or consequential damages. Lincoln's liability for any claim for loss or damages arising out of the sale, resale or use of any Lincoln equipment shall in no event exceed the purchase price. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, therefore the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights. You may also have other rights that vary by jurisdiction.

Customers not located in the Western Hemisphere or East Asia: Please contact Lincoln GmbH and Co. Kg, Walldorf, Germany, for your warranty rights.

Special limited warranties

Special limited 2 year warranty sl-v series, single injectors-85772, 85782, and replacement injectors-85771, 85781

Lincoln warrants the SL-V Injector series to be free from defects in material and workmanship for two (2) years following the date of purchase. If an injector model (single or replacement) is determined to be defective by Lincoln, in its sole discretion, during this warranty period, it will be repaired or replaced, at Lincoln's discretion, without charge.

Special limited 5 year warranty series 20, 25, 40 bare pumps, pmv bare pumps, heavy duty and 94000 series bare reels

Lincoln warrants series 20, 25, 40 bare pumps, PMV bare pumps, heavy duty (82206), mini bench (81133, 81323), and all 94000 LFR series (single arm and dual arm) bare reels to be free from defects in material and workmanship for five (5) years following the date of purchase. If equipment is determined by Lincoln, in its sole discretion, to be defective during the first year of the warranty period, it will be repaired or replaced at Lincoln's discretion, without charge. In years two (2) and three (3), the warranty on this equipment is limited to repair with Lincoln paying parts and labor only. In years four (4) and five (5), the warranty on this equipment is limited to repair with Lincoln paying for parts only.

Special limited 5 year warranty-limited oil meters, limited fluid control valves, aod (air-operated diaphragm pumps)

Lincoln warrants the 712 series control valves, 912 series lube meters, electronic lube meters (980. 981, 982 series), our nniversal inline digital meters (812/813 series), and our AOD pump offering to be free from defects in material and workmanship for five (5) years following the date of purchase. If either is determined to be defective by Lincoln, in its sole discretion, during the warranty period, they will be repaired or replaced, at Lincoln's discretion, without charge.

Special DEF (diesel exhaust fluid) limited warranty

DEF products are warranted to be free from defects in material and workmanship for a period of one (1) year following the date of purchase. The following exceptions to the standard warranty period are in effect:

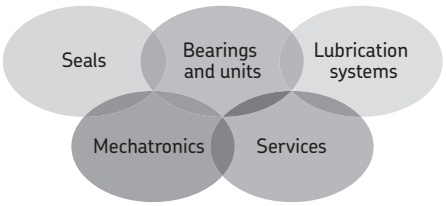
- **85700-30/85700-50 DEF hose reels (bare reel only),**
  277251/277252 AC DEF pumps, and 277256 and 277257 DEF meters are warranted for two (2) years from date of purchase.

- **85623 DEF AOD (air operated diaphragm) pumps**
  are covered under the standard five (5) year AOD pump warranty.

If either is determined to be defective by Lincoln, in its sole discretion, during the warranty period, they will be repaired or replaced, at Lincoln's discretion, without charge.

Lincoln Industrial contact information

To find Lincoln Industrial's nearest service center call one of the following number;
customer service 314-679-4200
or you may also use our website
www.lincolnindustrial.com



The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

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