Grease System Vendor Literature

Section 04-02-03

Komatsu has made every effort to make this manual as accurate as possible based on the information available at the time of publication and printing. Continuous improvement and advancement of product design may cause changes to machines, which may not have been included in this publication. Komatsu reserves the right to make changes and improvements at any time. To ensure the most current information, please contact your service center.

Vendor Literature

VL 12 - Lincoln FlowMaster Rotary Drive Hydraulic Pump Series “B”

VL 12A – Lincoln FlowMaster Rotary Driven Hydraulic Pump Model 85692 Series “A”

VL 12B – Lincoln FlowMaster Rotary Drive Hydraulic Pump Series “B” & “C”

VL 12C – Lincoln Flow Control Adjustment Recommendations Service Bulletin DC-2224

VL 12D – Lincoln Vent Valve Assembly Model 84619

VL 12E – Lincoln Vent Valve Assembly Model 84990

VL 12F – Lincoln In Line Filter Model 84004, 84239, 84528

VL 12G – Lincoln SL-V Injector Model 85770 Series “A”

VL 12H – Lincoln SL-V Injector model 85770 Series “B”

VL 12I – Lincoln FlowMaster Rotary Driven Hydraulic Pump Model 85846 Series “A”

VL 12J – Lincoln FlowMaster Rotary Driven Hydraulic Pump Model 85769, 85847 Series “A”

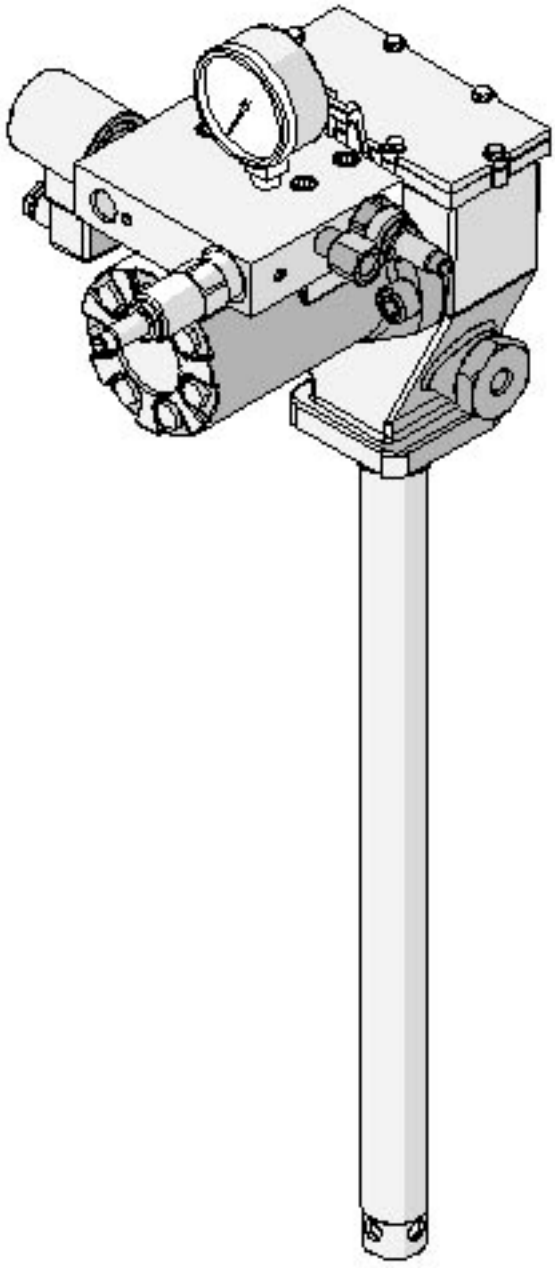
VL 12L Lincoln Centro Matic Lubricating System SL-V XL

NOTICE

- **Pressures and any adjustment specifications should be obtained from the specifications sheet located in Section 01 of the Service Manual.**

- **The pressures provided in the following vendor information are only for explanatory purposes.**
- **Part numbers should only be obtained from the specific machine Komatsu parts manual.**

FlowMaster™ Rotary Driven Hydraulic Pump
Models: 85480, 85481, 85482 and 85483
Series “B”



U.S. Patent No. 6,102676

Foreign Patent Pending

CE This pump conforms to the European Directive for Product Safety

Table of Contents

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. 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.

⚠ CAUTION

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

85480 - Pump for 120 pound drum (16 gallon)
85481 - Pump for 60 pound drum
85482 - Pump for 400 pound drum (55 gallon)
85483 - Pump for 5 gallon pail

General Description

The Lincoln Industrial rotary Hydraulic Pump is a fully hydraulically operated grease pump. Grease output is proportional to the hydraulic input flow. The pump is primarily designed for centralized lubrication systems such as the Single Line Parallel, Single Line Progressive and Two Line systems. An integrated pump control manifold is incorporated with the motor to control input flow and pressure. A 24 volt DC solenoid valve is also incorporated as a method to turn the pump **on** and **off**.

The pump is driven by the rotary motion of the hydraulic 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 pump is a positive displacement double acting pump as grease output occurs during both the up and down stroke of the pump.

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 hydraulic 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.

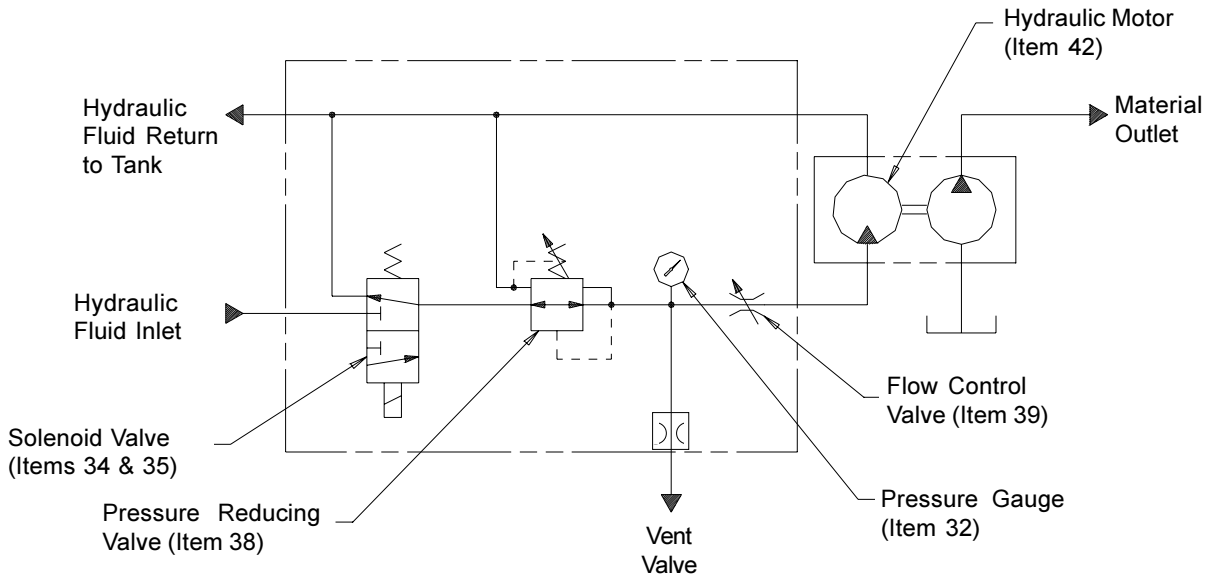


Illustration 1

Pump Performance and Specification

Supply inlet hydraulic pressure, maximum, PSIG (bar) - **3,500 (241)©**

Operating working hydraulic pressure , PSIG (bar) - **300 to 450 (20 to 32).**

Hydraulic Inlet Flow, GPM (l/min) - **Up to 7 (28)**

Pump Ratio with manifold - **9:1 at low inlet pressure (300 to 350 psi [20 to 25 bar]) and low inlet flow (below 2 gpm [7 lpm]) Pump ratio approaches 11.0:1 ratio at higher inlet pressure and flow.**

Operating Temperature, ºF (ºC)- **-20 to +150 (-10 to 65)**

Operating Voltage, VDC - **24**

Hydraulic Inlet Port, In - **SAE 4**

Tank Return Port, In - **SAE 6**

Pump Outlets, In - **1/4 NPTF**

Maximum Hydraulic Fluid Temperature, ºF, (ºC) - **250 (121)**

Weight, Lbs (Kg) - **36 (16)**

⚠ WARNING

Do not exceed 3,500 PSIG (241 bar)© maximum supply inlet hydraulic pressure. Exceeding the rated pressure may result in damage to system components and personal injury.

HYDRAULIC PUMP PERFORMANCE SPECIFICATIONS

Test conducted with Alvania NLGI # 2 Grade Grease

	Grease Output Cubic inches/min. (cm³/min.)				1,000 psi Backpressure (70 bar)		
	Hydraulic Flow Input						
Temperature F (Temperature C)	1 gpm (4 l/min)	2 gpm (8 l/min)	3 gpm (11 l/min)	4 gpm (15 l/min)	5 gpm (19 l/min)	6 gpm (23 l/min)	7gpm (26 l/min)
80 (27)	7 (115)	14 (229)	21 (344)	28 (459)	34 (557)	40 (656)	45 (737)
40 (4)	7 (115)	14 (229)	21 (344)	28 (459)	33 (541)	38 (623)	41 (642)
20 (-7)	6 (98)	13 (213)	17 (279)	22 (361)	28 (459)	32 (594)	36 (590)
0 (-18)	6 (98)	11 (180)	15 (245)	19 (310)	23 (376)	27 (442)	30 (491)
-10 (-23)	5 (82)	7 (115)	8 (131)	9 (148)	10 (164)	12 (197)	13 (213)
-20 (-29)	4 (66)	6 (98)	8 (131)	10 (164)	12 (197)	14 (229)	15 (245)

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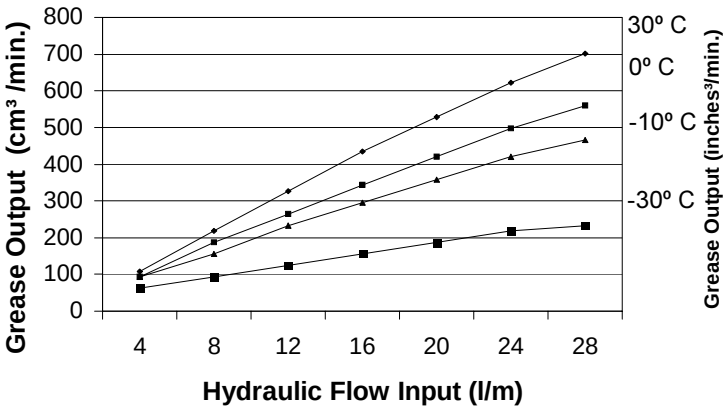
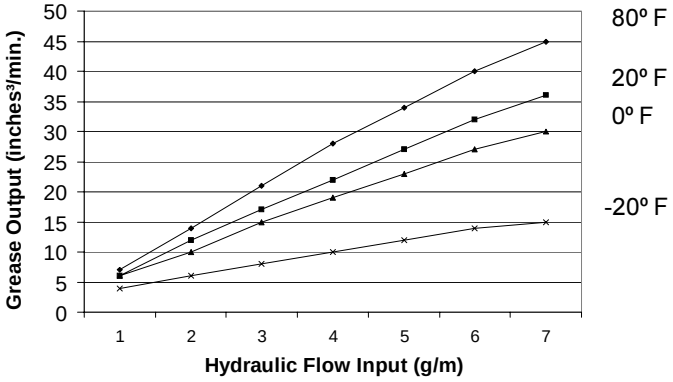
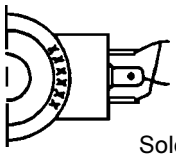
Grease Output vs. Hydraulic Input



Grease Output vs Hydraulic Input





24VDC Connections

No Connection to Center Lug

Solenoid Valve

Illustration 2

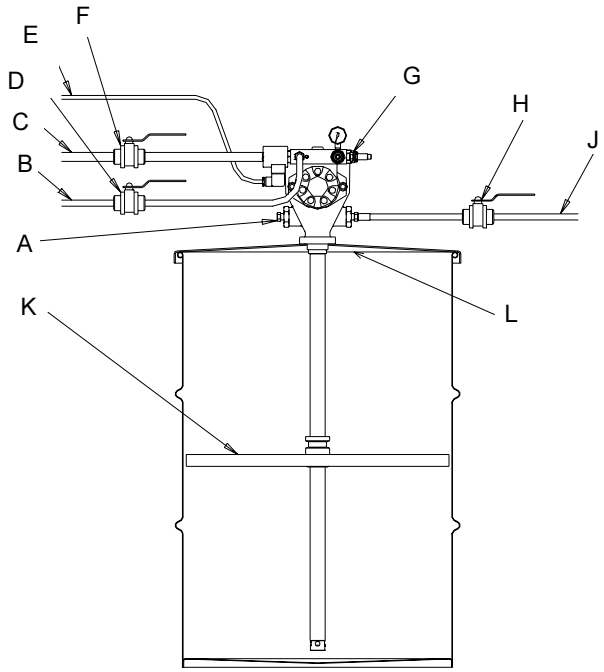


Illustration 3

A - Pump Outlet Plug
B - Hydraulic Supply Line
C - Hydraulic Return to Tank line (3/4" ID min.)
D - Supply Line Shut-off Valve
E - 24 VDC from Controller
F - Return Line Shut-off Valve (3/4" ID min.)
G - Vent Valve Port with Restrictor
H- Outlet Shut-off Valve
J - Material Supply Line
K - Follower Plate (85492 for 120 lb. drum only)
L - Drum Cover (83115 for 400 lbs., 84616 for 120 lbs.)

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.

The pump has flow and pressure controls integrated into the manifold (37). A normally closed **ON/OFF** Solenoid Valve (35) is also integrated into the manifold and will start or stop the pump operation.

1. Mount the pump securely on the drum cover so that it cannot move or vibrate during operation.
2. Attach hydraulic supply line to the **Inlet** and return line to the **Tank** ports.
3. Connect material supply line to the pump outlet. Plug the unused outlet on opposite side of the pump.
4. Install high pressure shut-off valve in the material supply line. (Required)
5. Connect 24 VDC power supply to the solenoid valve (35). See Illustration #1. Use connector plug (36) supplied with the pump.

NOTE: To install the pump Model 85481 as a replacement pump for 84961 used on Model 84944, use adapter/spacer kit© p/n 272013© with bolts p/n 50014, included in the pump package (see illustration #4).

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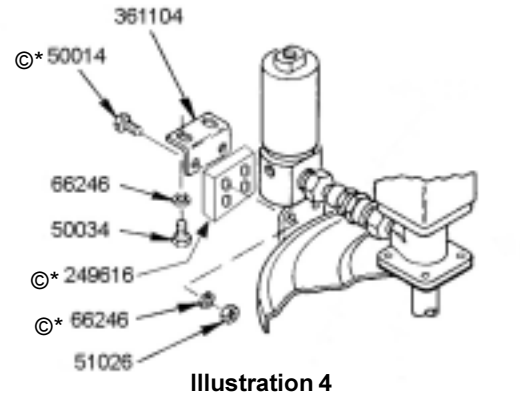

Illustration 4

* Included in Spacer Kit 272013©

⚠ WARNING

Mount the pump securely on the drum cover. Failure to do so could result in personal injury and equipment damage.

⚠ WARNING

Do not exceed 450 PSIG (32 bar) working hydraulic pressure. Use high pressure components to reduce risk of serious injury including fluid injection and splashing in the eyes or on the skin. All accessories connected to the pump outlet must have at least 5,000 PSIG (350 bar) minimum hydraulic pressure. All accessories connected to the pump inlet must have at least 3,500 PSIG (241 bar) minimum working pressure.

Operation

All pumps are factory set at 350 PSIG (24 bar) working inlet hydraulic pressure with a flow rate of 2.5 GPM (9.5 l/min). **Do not change the settings for the pump until after the start up procedure.**

1. Shut off the material supply line valve.
2. Turn on the hydraulic pressure.
3. Energize the solenoid **On/Off** valve.
4. Prime the pump by slowly opening the shut-off lubricant supply line valve. Make sure that all air has been expelled from the pump and even lubricant flow is achieved.
5. Adjust the pump pressure and flow to the desired application requirements. See **Pressure and Flow Control Valve Adjustment** for instructions to adjust pressure and flow, Do not exceed pump operating pressure of 450 PSIG (32 bar).
6. Always use the lowest pump output pressure and hydraulic fluid flow to obtain the desired results. This will reduce the pump wear.

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⚠ CAUTION

Do not exceed maximum operating temperature of the hydraulic fluid (200º F/93º C) . Never allow the pump to run dry of lubricant. A dry pump quickly speeds up, creating friction heat, which can damage the seals. Monitor the supply lubricant level and refill when necessary.

Setting the Pump Manifold Pressure and Flow Controls

The pressure must first be adjusted to insure the desired flow setting is achieved.

Pressure Control Valve Adjustment

- Loosen the lock nut on the Pressure control by turning the nut COUNTERCLOCKWISE.
- Turn the valve stem COUNTERCLOCKWISE until it no longer turns. The valve stem will unscrew until it reaches the stop. It will not come off. This is the minimum pressure setting, which is about 170 psi (12 bar).
- With the pump stalled against pressure, turn the Pressure Control Valve stem CLOCKWISE until the desired pressure is attained on the manifold Pressure Gage. (Do not exceed 450 PSI.
- Tighten the lock nut by turning CLOCKWISE.

Flow Control Valve Adjustment

- Loosen the lock nut on the Flow Control Valve by turning the nut COUNTERCLOCKWISE.
- Adjust the flow by turning the valve stem CLOCKWISE to reduce the flow and COUNTERCLOCKWISE to increase it. The Flow Control Valve can be turned in until the valve is completely closed, and out a maximum of 2 1/2 turns. The valve stem will not come out when fully open (unscrewed) as there is a stop at this position.
- After adjusting the flow to the desired setting, tighten the lock nut by turning it CLOCKWISE.

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.

Disassembly Procedure (See illustration #6)

Tools Required:

- Hex Bit Socket Wrenches (3/8" square drive) with 3/8" 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 four Socket Head Screws (33) and separate Manifold from the Hydraulic Motor (42).
2. Remove Pipe Plug (45) and drain the crankcase oil from the Pump Housing (46).
3. Remove six self-threading Screws (29) and remove the Housing Cover (30) and the Cover Gasket (31).
4. Remove Retaining Ring (57) and pull the Shovel Plug (56) from the Housing Tube (55).
5. Remove two Socket Head Screws (44) and separate the Hydraulic Motor (42) from the Pump Housing (46).
6. Remove two Outlet Pin Nuts (50) from the Pump Housing (46).
7. Remove the Pump Subassembly (1 through 28) from the Pump Housing (46). Pushing the subassembly up with a wooden or plastic rod 3/4 O.D. against the Check Seat Housing (28) is helpful.
8. Remove the Housing Tube (55) from the Pump Housing (46) by inserting a 3/4 rod through the inlet holes at the bottom of the Housing Tube (55) and unscrewing it.
9. Remove the Bronze Bearing (51), the O-Ring (52), and the Backup Washer (53) from the Housing Tube (55).
10. Remove the Crankrod Assembly (1 through 8) from the pump by unscrewing the Button Head Screws (12) and then pulling out the Wrist Pin Bushings (13).
11. Remove the Check Seat Housing (28) from the Reciprocating Tube (21). There is a 3/8 Allen Head socket in the throat of the Check Seat Housing (28) to facilitate removal.
12. Unscrew the Wrist Pin Anchor (14) from the Reciprocating Tube (21) and pull the Plunger Assembly (9 through 20) from the tube.
13. Using a 1/2" wooden or plastic rod, push the Cup Seal (22) and the Pump Cylinder (24) from the Reciprocating Tube (21).
14. Remove the Pump Plunger (20) from the Plunger Link Rod (17). A spanner wrench, which uses the holes in the Pump Plunger, is required.
15. Unscrew the Plunger Link Rod (17) from the Plunger Tube (11) and slide off the Cup Seal (16), the Backup Washer (15) and the Wrist Pin Anchor (14).
16. Unscrew the Plunger Tube (11) from the Outlet Pin (9).
17. To dismantle the Crankrod Assembly (1 through 8), remove Flat Head Screws (1) and the Inner and Outer Weights (2 & 3).
18. Remove the Retaining Rings (6) and press the Crank Eccentric (7) out of the Ball Bearing (8). Be sure to support the Ball Bearing (8) 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.
2. In the process of disassembly, examine the following components and replace if excessive wear is indicated: Ball Bearing (8), Crank Eccentric (7), Crankrod (5), Wrist Pin Bushings (13), Plunger Tube (11), Pump Plunger and Upper Check Parts (20, 19 and 18), Pump Cylinder (24), Check Seat Housing and Lower Check Ball (28 and 26), upper Bronze Bushing (51), Housing Tube (55), Shovel Plug (56), and Reciprocating Tube (21).
3. Assembly Procedure is the reverse of the Disassembly Procedure except for the following:
4. Install parts (22) through (28) into the Reciprocating Tube (21) after the plunger assembly (9 through 20) is installed.
5. Install the Pump Subassembly (1 through 28) into the pump Housing (46) before tightening the Housing Tube (55) to the Pump Housing (46). Be sure the Reciprocating Tube (21) is inserted through both bushings before tightening the Housing Tube (55).
6. 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.
7. Torque Specifications:
   A. Plunger Tube (11) to Outlet Pin (9) - 100 to 110 In.-Lbs.
   B. Button Head Screws (12) to Wrist Pin Anchor (14) 100 to 110 In.-Lbs.
   C. Plunger Tube (11) to Plunger Link Rod (17) - 100 to 110 In.-Lbs.
   D. Plunger Link Rod (17) to Pump Plunger (20) - 100 to 110 In.-Lbs.
   E. Flat Head Screws (1) to Outer Weight (2) - 100 - 110 In.-Lbs.
   F. Wrist Pin Anchor (14) to Reciprocating Tube (21) - 20 to 25 Ft.-Lbs.
   G. Check Seat Housing (28) to Reciprocating Tube (21) - 20 to 25 Ft.-Lbs.
   H. Outlet Pin Nut (50) to Pump Housing (47) - 30 to 35 Ft.-Lbs.
   I. Housing Tube (55) to Pump housing (47) - 20 to 25 Ft.-Lbs.

© 8. Fill crankcase with SAE 10W30 motor oil up to pipe plug (39) before fastening housing cover (30) and housing gasket (31).

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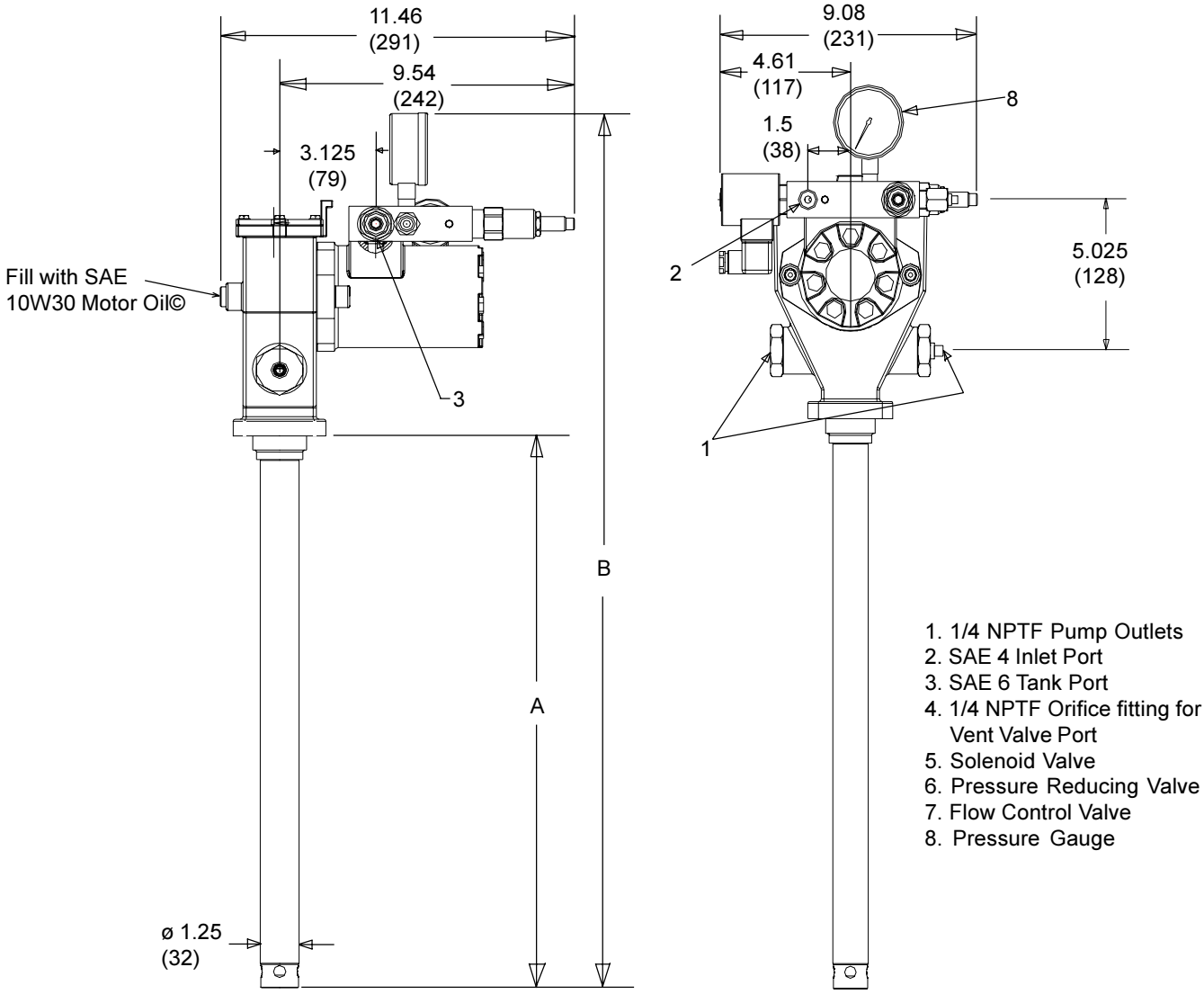

1. 1/4 NPTF Pump Outlets
2. SAE 4 Inlet Port
3. SAE 6 Tank Port
4. 1/4 NPTF Orifice fitting for Vent Valve Port
5. Solenoid Valve
6. Pressure Reducing Valve
7. Flow Control Valve
8. Pressure Gauge

MODEL	DIM "A" in (mm)	DIM "B" in (mm)
85480	27.50 (699)	38.56 (980)
85481	19.00 (483)	30.06 (764)
85482	34.00 (864)	45.06 (1145)
85483	13.69 (348)	24.75(629)

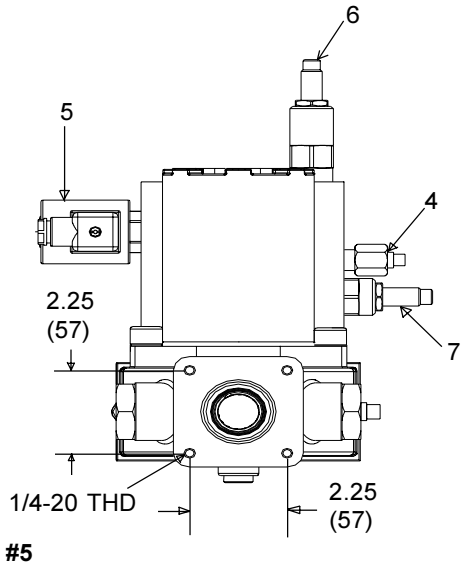

Illustration #5

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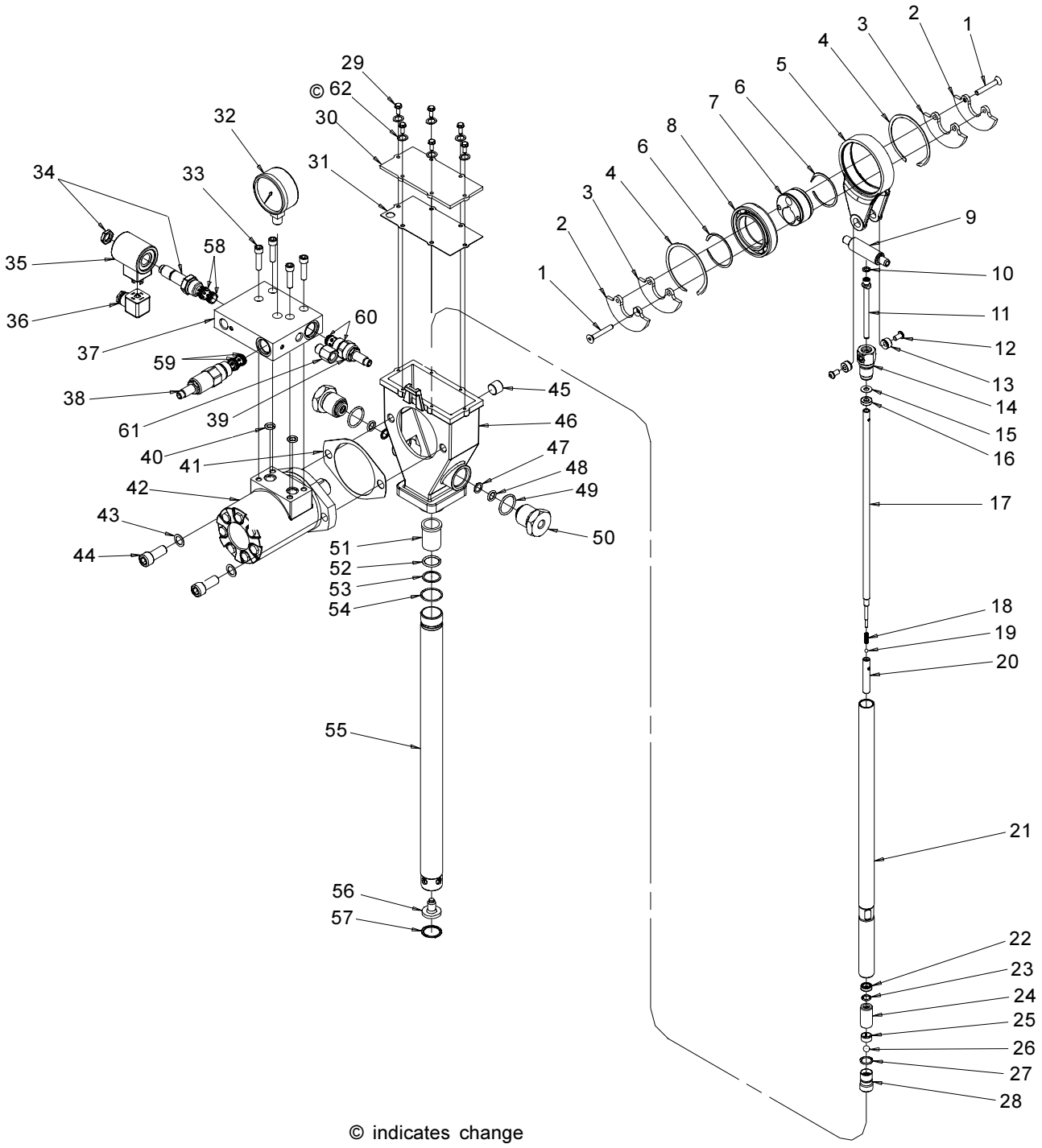

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Illustration #6

Repair Parts List

(Common to all Models)

Item No.	Qty	Description	All Models
1.	2	Flat Head Screw (1/4 x 1-3/4)	270635
2.	2	Outer Weight	270606
3.	2	Inner Weight	270605
4.	2	Retaining Ring	270609
5.	1	Crankrod	270665
6.	2	Retaining Ring	270608
7.	1	Crank Eccentric	270666
8.	1	Ball Bearing	270607
9.	1	Outlet Pin	270670
10.	1	O-Ring (Nitrile)	*
11.	1	Plunger Tube	270667
12.	2	Button Head Screw (1/4 x 1/2)	270634
13.	2	Wrist Pin Bushing	270668
14.	1	Wrist Pin Anchor	270669
15.	1	Backup Washer	*
16.	1	Cup Seal (Polyurethane)	*
17.	1	Plunger Link Rod	See Chart Below
18	1	Spring	270616
19.	1	Ball	66010
20.	1	Pump Plunger	270671
21.	1	Reciprocating Tube	See Chart Below
22.	1	Cup Seal (Polyurethane)	*
23.	1	O-Ring (Polyurethane)	*
24.	1	Pump Cylinder	270672
25.	1	Ball Cage	270675
26.	1	Ball	66001
27.	1	O-Ring (Nitrile)	*
28.	1	Check Seat	270664
29.	6	Self-Threading Screw (8 x 1/2)	270633
30.	1	Housing Cover	270629
31.	1	Cover Gasket (Nitrile)	*

Item No.	Qty	Description	All Models
32.	1	Pressure Gauge	270768
33.	4	Socket Head Screw (5/16 x 1-1/4)	270680
34.	1	Solenoid Valve Cartridge (Note #2)	270690
35.	1	Solenoid Valve Coil (24 VDC)	270691
36.	1	Solenoid Connector	242209
37.	1	Manifold	270771
38.	1	Pressure Reducing Valve (Note #3)	270692
39.	1	Flow Control Valve (Note #4)	270693
40.	2	O-Ring (Viton)	*
41.	1	Motor Gasket	*
42.	1	Hydraulic Motor (Note #1)	270676
43.	2	Washer	48548
44.	2	Socket Head Screw (1/2 x 1-1/4)	270658
45.	1	Pipe Plug (3/8 NPTF)	67417
46.	1	Pump Housing	270673
47.	2	Backup Ring (Polyurethane)	*
48.	2	O-Ring (Polyurethane)	*
49.	2	O-Ring (Nitrile)	*
50.	2	Outlet Pin Nut	270619
51.	1	Bronze Bearing	270674
52.	1	O-Ring (Polyurethane)	*
53.	1	Backup Washer	*
54.	1	O-Ring (Nitrile)	*
55.	1	Housing Tube	See Chart Below
56.	1	Shovel Plug	270707
57.	1	Retaining Ring	270705
58.	1	Seal Kit (Nitrile)	270687
59.	1	Seal Kit (Nitrile)	270688
60.	1	Seal Kit (Nitrile)	270689
61.	1	Orifice Fitting	270735
©62.	6	Gasket	252986
		Soft parts Kit	270663

Repair Parts List

(Non-common items)

Item No.	Qty.	Description	Model 85480	Model 85481	Model 85482	Model 85483
17	1	Plunger Link Rod	270648	270614	270645	270641
21	1	Reciprocating Tube	270649	270617	270646	270642
55	1	Housing Tube	270659	270660	270661	270662

* 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).

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Troubleshooting

Condition	Possible Cause	Corrective Action
Pump does not run.	No pressure on gauge (32): - Closed Supply line shut off valve. - No power to solenoid valve (34). - Faulty Solenoid (35). - Pressure Reducing Valve (38) is set too low. - Insufficient Hydraulic Fluid supply.	Open shut-off valve. Correct electrical fault. Replace solenoid (35). Reset Pressure Reducing Valve (38). Check hydraulic supply for proper pressure and flow.
	Pressure is shown on gauge (32): - Closed fluid outlet line. - Flow Control Valve is fully closed. - Pump is stalled due to grease backpressure.	Check outlet line and clear obstructions. Readjust valve to 3/4 turn open. Check vent valve in system.
	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.	Insufficient hydraulic fluid supply.	Check hydraulic supply and adjust flow using valve 39.
	Inlet pressure too low.	Increase pressure using valve 38.
	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 Pipe Plug (45) from Pump Housing (46). Oil level should be at the bottom of the Pipe Plug opening. Add 10W30 motor oil until the crankcase is full.
	Worn wrist pin bushing 13.	Check the bushings and replace if necessary.

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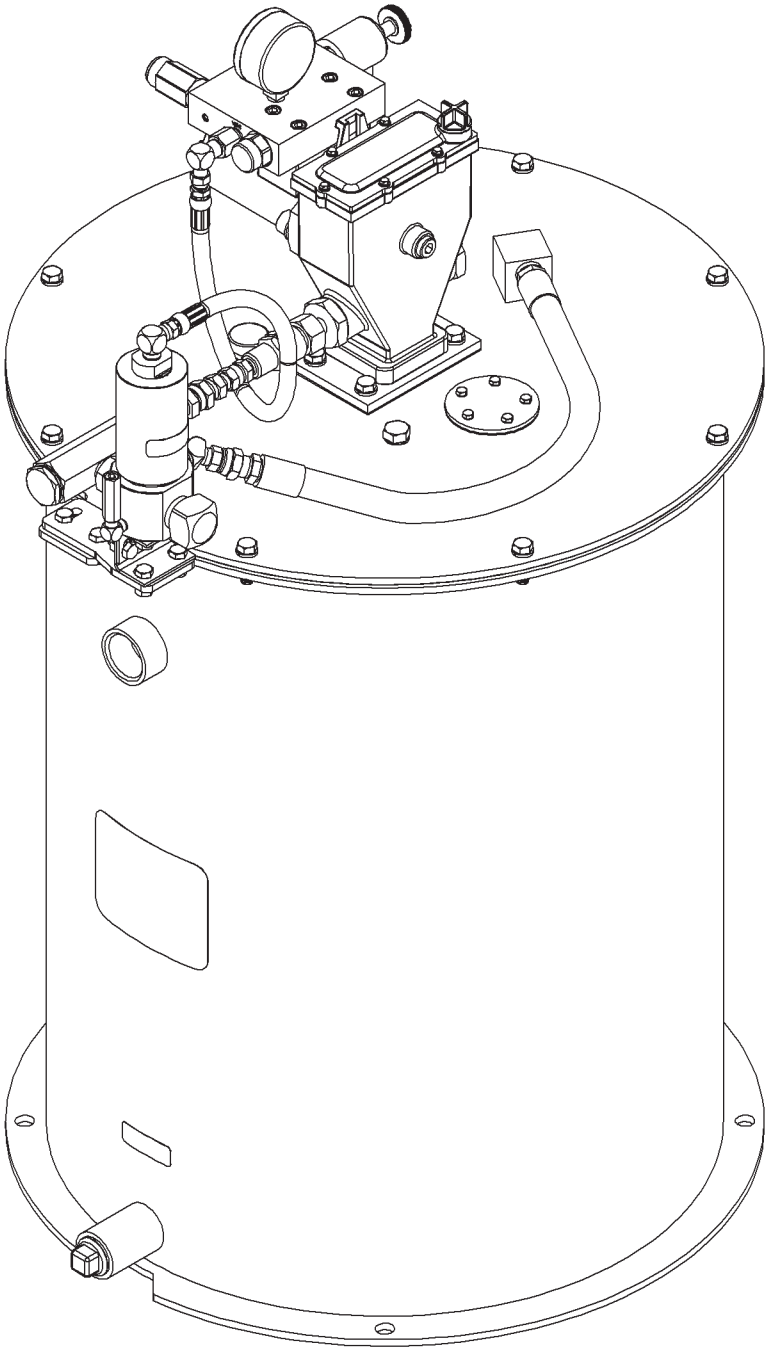
LINCOLN®

FlowMaster™ Rotary Driven Hydraulic Pump
Model 85692
Series “A”



VL 12A

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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

This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Please refer to the operation manual, Section C8, Pages 319 series for all other safety considerations.

PRODUCT SPECIFICATIONS

Supply inlet hydraulic pressure, maximum, PSIG (bar) -	**3,000 (206)**
Operating working hydraulic pressure, PSIG (bar) **-**	**325 (22)**
Max. output pressure, PSIG (bar) -	**3000 (206)**
Hydraulic inlet flow, GPM (l/min) -	**1.5 (5.7)**
Pump ratio with manifold -	**9:1**
Ambient oper. temp. ºF (ºC) -	**-20 to +150 (-29 to +66)**
Operating voltage, VDC -	**24**
Hydraulic inlet port, In -	**SAE 4**
Tank return port, In -	**SAE 6**
Maximum hydraulic fluid temp., ºF (ºC) -	**250 (121)**
Container capacity , Lbs (Kg) -	**240 (109))**

⚠ WARNING

Do not exceed 3,000 PSIG (206 bar) maximum supply inlet hydraulic pressure or 3500 PSIG (241 bar) maximum outlet pressure. Exceeding the rated pressures may result in damage to system components and personal injury.

DESCRIPTION

General Description

Model 85692 is a pumping unit designed to operate a Centro-Matic® lubrication system. The unit includes a vent valve to relieve the line pressure to recharge the injectors. FlowMaster™ Rotary Driven Hydraulic Pump includes pressure reducing valve, flow control valve and solenoid operated (24 VDC) **"On"** and **"Off"** valve. A 24 volt DC solenoid valve with a manual override is standard. This unit has factory preset flow and pressure control valves which are not adjustable. A follower plate and electronic level sensor are included.

The FlowMaster pump is fully automatic when used with Model 85530 Controller and a pressure switch. The FlowMaster pump is double acting, dispensing lubricant on both the **"Up"** and **"Down"** strokes. This unit is designed to be used with SL-V, SL-1, SL-11, SL-32 and SL33 series injectors or a combination of these.

Appropriate Use

- The pump on this unit is exclusively designed to pump and dispense lubricants using hydraulic power only.
- 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.

SYSTEM OPERATION

Operation with Model 85530 System Controller

When Model 85530 times out, it will initiate a lube cycle. The solenoid is energized to deliver hydraulic pressure to the pump and vent valve. Pump begins dispensing lubricant through injectors to the bearings.

When all bearings have received lubricant, pressure rises in the system to actuate the pressure switch. When pressure switch actuates, the control is reset to de-energize the solenoid valve cutting off hydraulic oil pressure to the pump and vent valve. Pump stops, pressure vents and pressure switch de-actuates. Control begins timing toward next lube event.

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INSTALLING THE PUMP

Place the unit in the approximate location making sure that electric and hydraulic power connections are accessible. Mark center locations of the four holes at the bottom of the reservoir. Then drill four 9/16" (14 mm) holes. The use of 1/2" (12 mm) bolts will offer some flexibility in securing the reservoir to the equipment.

Lubricant outlet of pump should be connected to system with suitable hose capable of 3,000 PSI (207 bar) working pressure. Hydraulic inlet connection should be made with at least 3/8" (9 mm) I. D. hose with a working pressure rating greater than the maximum hydraulic pressure to be applied. Hydraulic return to tank connection line should be 3/4" (19 mm) I. D. hose or pipe.

There are no adjustments to be made to the pump. The flow rate is factory set to 2.0 GPM (7.61 l/min.). Pressure is preset to 300 PSIG (20.7 bar). These are not adjustable.

PUTTING PUMP INTO OPERATION

Filling Reservoir

- To bulk fill the reservoir, remove the lower pipe plug from the side of the reservoir. Attach the appropriate bulk-filling pump to the lower inlet (1 NPT). Fill reservoir until the grease level gauge indicates it is full or until grease appears at the top 1-1/4 NPT vent high level port. Remove the bulk-filling pump. Replace pipe plug.

⚠ WARNING

When filling the reservoir, caution should be used as extreme pressure can cause damage to the reservoir or serious personal injury.

MAINTENANCE & REPAIR

General Maintenance

- Keep area around pump clean. Clean off filling port area prior to filling reservoir. Clean area around filler after filling as lubricants will attract dirt.
- Keep lubricants clean and free of dirt and debris.
- When replacing grease pails be especially careful to prevent any foreign matter from entering the grease pail or contaminating the grease, as it adheres to the pump.

In Case of System Malfunction (See Trouble Shooting Chart Page 8)

- Use the **Trouble Shooting Charts** to determine where to look if problems occur.
- See the sections below for replacement and repair of specific areas of the check valve, vent valve or safety unloader valve.
- Each part is identified with a number keyed to the matching part on the illustrated views.
- General recommendations of tools required are also specified in each step.
- Pay particular attention to the **Warning** statements to prevent personal injury and possible damage to pump components.

Outlet Check Service (See Illustration on Page 6)

The pump will not build up sufficient lubricant pressure if the outlet check (3) is fouled. Foreign material may lodge beneath the Check Ball (58) or between check disc (55) and the seat of bushing assembly (54). Sealing surfaces of the seat must form a perfect seal. Clean parts or replace if pitted, worn or scored.

1. Turn off and disconnect the hydraulic and electric power supply to the pump assembly.
2. Standard tools required are a bench mounted vice, a set of open end wrenches ranging from 7/16" to 1-1/2", a large 24" (600 mm) adjustable wrench and a smaller 10" (254 mm) adjustable wrench.
3. Remove bolts and lock washers (39 & 42).
4. Loosen adapter union (4). Set vent valve assembly to the side.
5. Remove entire outlet check assembly (3) by loosening adapter (2) from pump outlet.
6. Remove adapter (2) from outlet check assembly (3).
7. Remove outlet connector (59) from bushing (54).
8. Remove ball check seat (52) from outlet connector (59).
9. Inspect all check components (54, 55, 56, 58) for presence of foreign material, scoring and or other damage, which may cause internal leakage. Replace components if damage is found.
10. If foreign material is present, clean components and reassemble. Be sure to always replace gaskets (53) & (57) whenever vent valve is disassembled. Reverse the above procedure to reassemble. Torque check assembly to 100 ft.-lbs. (13.5 N-M).

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Vent Valve Service (See Illustration on Page 6)

1. Turn off and disconnect the hydraulic and electrical power supply to the pump assembly.
2. Standard tools required are a bench mounted vice, a set of open end wrenches ranging from 7/16" to 1-1/2", a large 24" (600 mm) adjustable wrench and a smaller 10" (254 mm) adjustable wrench.
3. Remove vent valve assembly (10) from unit.
4. Hold base (66) of vent valve in vice so that vice jaws are gripping flats machined on base.
5. Remove hydraulic cylinder (60). Remove piston and packing (61) from cylinder. If oil leakage was evident from side of hydraulic cylinder then replace packing.
6. Remove packing assembly (63). If grease leakage was evident from side of hydraulic cylinder, then replace packing assembly.
7. Inspect needle (62) and valve seat (64). If foreign matter is lodged and is keeping the needle from sealing in valve seat, clean and inspect for damage. If seat appears damaged by nicks, grooves or scouring it should be replaced. Remove valve seat (64) from valve body (66) by placing a ¾" open end wrench onto the flats and loosening the seat. The use of an adjustable wrench in place of the open end wrench may be necessary due to the accessibility of the seat.
8. Replace the valve seat (64) if damaged. Also be sure to remove and replace the gasket (65) below the seat.
9. Reassembly is the reverse of the above procedure. Needle (62) and hydraulic cylinder (60) inside diameter should be coated with oil or grease to assist in assembly.
10. Upon reassembly tighten valve seat (64) into body (66) using 25 ft-lbs. (39 N-M). Tighten hydraulic cylinder (60) onto valve body (66) using 100 ft-lbs. (135 N-M)

Safety Unloader Valve (See Page 5)

Safety unloader valve (37) is not serviceable and should be replaced if malfunction is apparent. Upon reassembly, tighten to 10 ft-lbs. (13.5 N-M).

The Safety Unloader (37) is set to open at 3,750 to 4,250 PSI lubricant pressure. If pressure Switch fails to operate and shut off hydraulic supply to pump, the Safety Unloader will open at approximately 4,000 PSI to relieve lubricant supply line pressure (Safety Unloader is preset and cannot be adjusted.)

Bare Pump Assembly (Model 85694)

Refer to Operation Manual (C8, Page 339 series) for operating instructions and maintenance procedures for the bare pump assembly.

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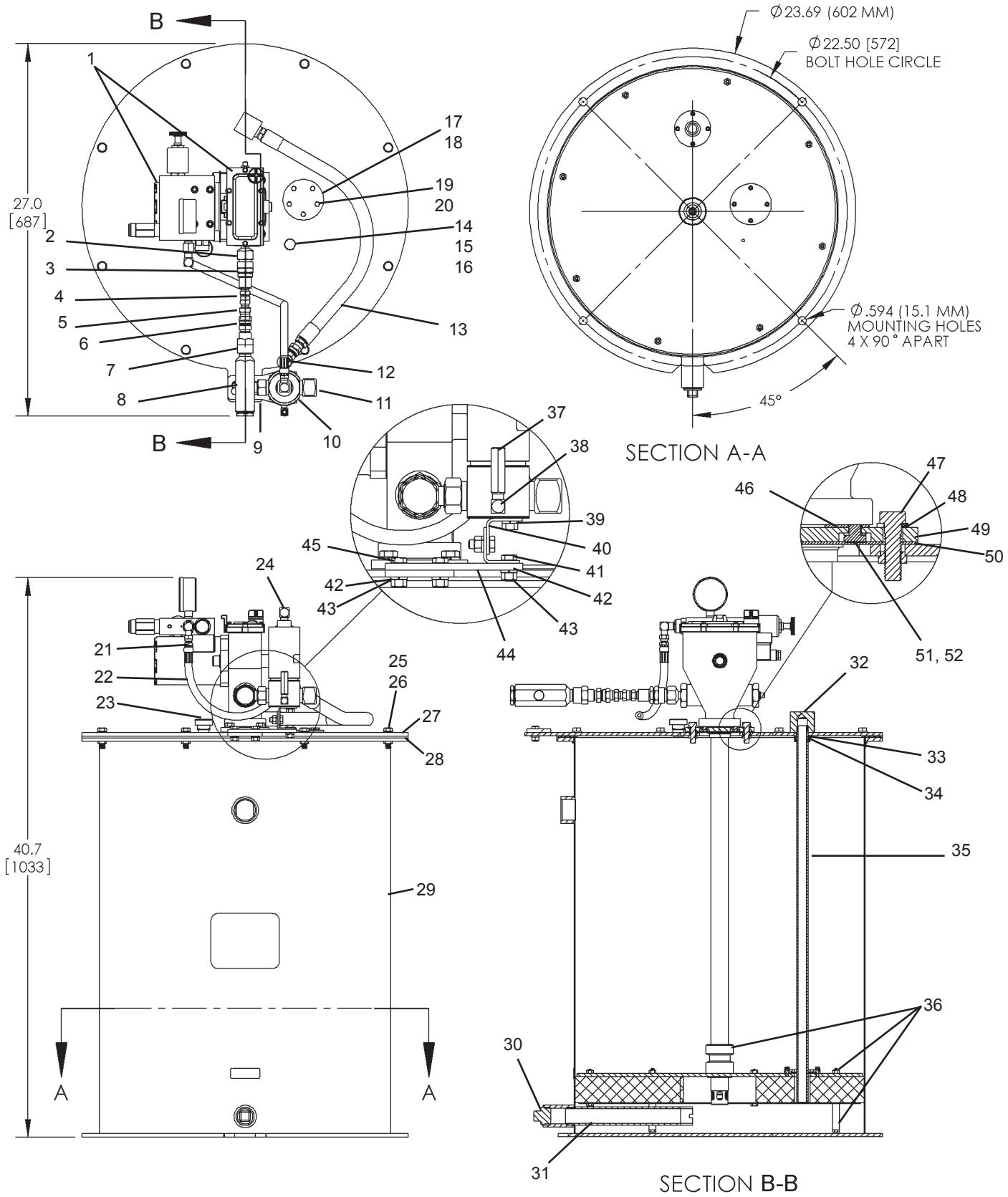
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BOLT HOLE CIRCLE
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MOUNTING HOLES
4 X 90° APART
45°
SECTION A-A
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SECTION B-B

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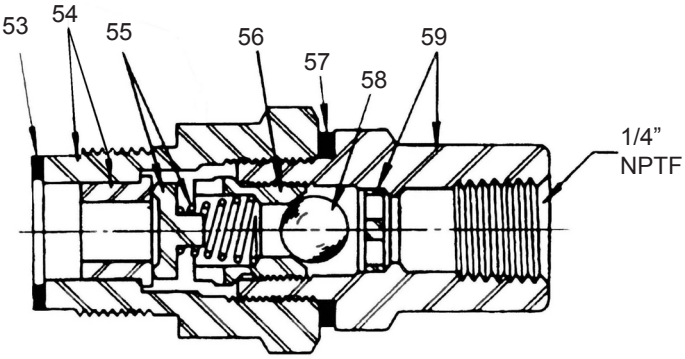
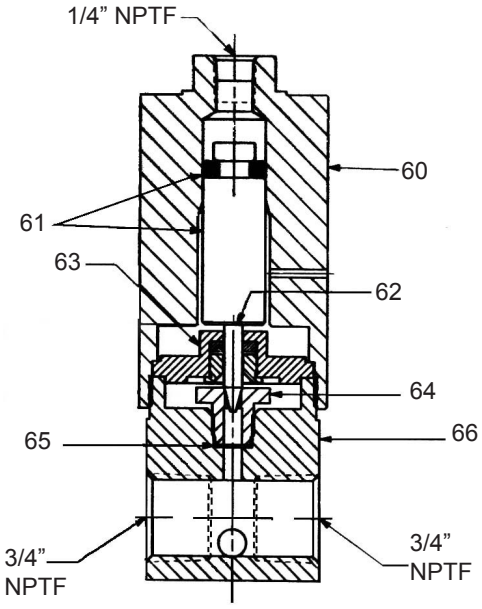
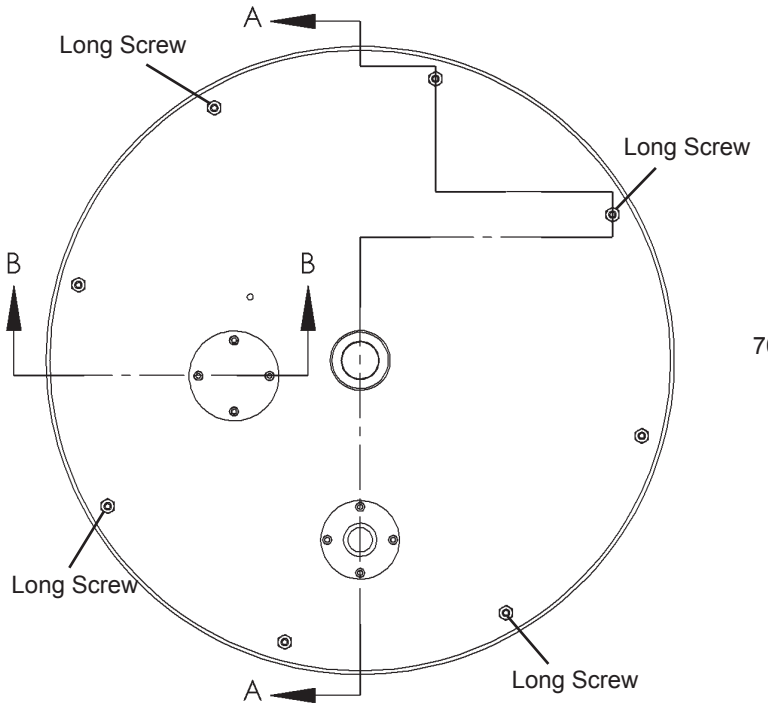
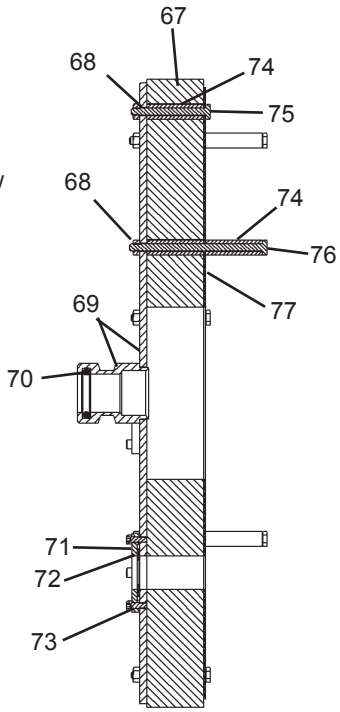


Outlet Check Assembly (3)

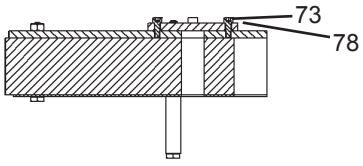


Vent Valve (10)





SECTION A-A



SECTION B-B

Follower Assembly (36)

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SERVICE PARTS

Item No.	Qty.	Description		Item No.	Qty.	Description	
1	1	Bare Pump Assembly		40	2	Bracket	
2	1	Adapter		41	4	Hex Head Screw, 5/16-18 x 3/4	
3	1	Outlet Check Assembly		42	8	Lock Washer, 5/16	
4	1	Adapter Union		43	6	Hex Nut, 5/16-18	
5	1	Reducer Nipple		44	1	Bracket	
6	1	Adapter Union		45	2	Hex Head Screw, 5/16-18 x 7/8	
7	1	Reducing Coupling		46	1	Gasket	
8	1	Filter		47	4	Hex Head Screw, 3/8-16 x 1-1/4	
9	1	Reducer Nipple		48	4	Lock Washer, 3/8	
10	1	Vent Valve Assembly		49	1	Mounting Plate	
11	1	Elbow		50	1	Gasket	
12	1	Elbow		51	4	Hex Head Screw, 1/4-20 x 3/4	
13	1	Vent Hose		52	4	Lock Washer, 1/4	
14	1	Hex Head Screw, 1/2-20 x 3/4		53	1	Gasket	
15	1	Gasket		54	1	Outlet Check Bushing	
16	1	Jam Nut, 1/2-20		55	1	Pump Check Disc Ass'y	
17	1	Cover		56	1	Ball Check Seat	
18	1	Gasket		57	1	Gasket	
19	5	Hex Head Screw, 10-24 x 5/8		58	1	Steel ball (3/8" Dia.)	
20	5	Lock Washer, #10		59	1	Outlet Connector	
21	1	Adapter		60	1	Hydraulic Cylinder	
22	1	Hydraulic Hose		61	1	Piston	
23	1	Vent Fitting		62	1	Needle	
24	1	Elbow		63	1	Viton Packing Ass'y	
25	8	Hex Head Screw, 3/8-16 x 1-1/4		64	1	Valve Seat	
26	8	Lock Washer, 3/8		65	1	Check Seat gasket	
27	1	Drum Cover		66	1	Valve Body	
28	1	Gasket		67	1	Follower Foam	
29	1	Container Assembly		68	8	Lock Nut, 1/4-20	
30	1	Pipe Plug, 1" NPT		69	1	Weighted Follower Plate	
31	1	Extension Tube		70	1	O-Ring	
32	1	Vent Elbow		71	1	Wiper Cover	
33	1	Gasket		72	1	Gasket	
34	1	Hex Nut		73	8	Soc Head Screw, 10-24 x 1/2	
35	1	Vent pipe		74	12	Spacer	
36	1	Follower Assembly		75	4	Hex Head Screw, 1/4-20 x 2-1/2	
37	1	Safety Unloader Ass'y		76	4	Hex Head Screw, 1/4-20 x 4-1/2	
38	1	Elbow		77	1	Follower Plate	
39	2	Hex Head Screw, 5/16-18 x 1/2		78	1	Follower Cover	

* Suggested service replacement components.

+ Sold as an assembly. Individual parts not available.

TROUBLESHOOTING

CONDITION	POSSIBLE CAUSE	CORRECTIVE ACTION
Pump does not operate.	No hydraulic power to pump.	Turn on or connect hydraulic supply to pump.
	No pressure on gauge: - Closed Supply line shut off valve. - No power to solenoid valve. - Faulty Solenoid. - Insufficient Hydraulic Fluid supply. Pressure is shown on gauge on pump manifold. - Closed Fluid outlet line. - Pump is stalled due to grease backpressure.	 Open shut-off valve. Correct electrical fault. Replace solenoid. Check hydraulic supply for proper pressure and flow. Check outlet line and clear obstructions. Check vent valve in system.
	Pump is seized or damaged.	Dismantle the pump and repair defective or seized component. See pump service page.
Pump runs excessively.	Pump tube malfunction.	Refer to pump service page.
	Outlet check damage or contamination.	Repair check or remove contamination.
	Vent valve damage or contamination.	Repair vent valve or remove contamination.
	System component leaking.	Repair leaks.
	Vent valve not recieving proper pressure to keep it closed.	Orifice fitting plugged.
	Injector bypassing.	Repair injectors.
Pump speeds up or runs erratically.	Low level of grease or reservoir is empty.	Refill reservoir.
	Pump piston or checks are worn.	Refer to pump service sheet.
Pump runs, but output is low.	Insufficient hydraulic fluid supply.	Check hydraulic supply and adjust flow.
	Faulty inlet or discharge check valve in pump.	Replace faulty components. See pump service page.
Lubricant leaking from safety unloader valve.	Pressure of system set too high.	Adjust pressure switch setting.
	Safety unloader damaged or contaminated.	Replace safety unloader.
Lubricant leaking from weep hole in vent valve.	Vent valve lubricant seal damaged.	Replace lubricant seal.

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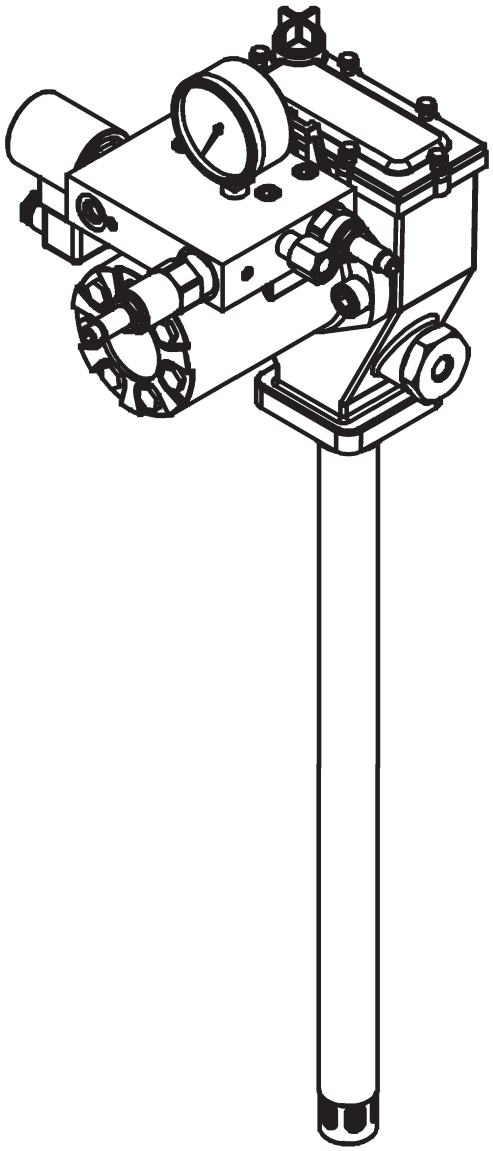
FlowMaster® Rotary Driven Hydraulic Pump
FlowMaster® Pumpe mit Hydraulik-Umlaufantrieb
Models/Modelle: 85480 (120#), 85481 (60#), 85482(400#), 85483 (5 Gal.), 85247 (120#)
Series “C”
Models/Modelle: 85610 (400#), 85586 (400#), 85484 (60#), 274055 (60#)
Series “B”



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

Austrailian Patent 754511
Australisch 754511

This pump conforms to the European Directive for Product Safety
Diese Pumpe entspricht der europäischen Vorschrift für Produktsicherheit

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Safety

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.

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

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.

85733 - Pump for 120 pound drum (16 gallon)
85732 - Pump for 60 pound drum
85734 - Pump for 400 pound drum (55 gallon)
85731 - Pump for 5 gallon pail
85247 - Similar to 85480, but with a manual override
85610 - Low Temperature Pump for 400 lb. drum (55 gallon)
85586 - Heavy Duty pump for 400 lb. drum
274055 - Same as 85481 with Solenoid Cable Assembly

General Description

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 hydraulic power.
- The maximum specification ratings should not be exceeded.

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- Any other use not in accordance with instructions will result in loss of claims for warranty and liability.

Do not exceed 3,500 PSIG (241 bar) maximum supply inlet hydraulic pressure. Exceeding the rated pressure may result in damage to system components and personal injury.

Pump Performance and Specification

Supply inlet hydraulic pressure, maximum, PSIG (bar) -	**3,500 (241)**
Operating working hydraulic pressure , PSIG (bar) -	**300 to 450 (20 to 32).**
Hydraulic Inlet Flow, GPM (l/min) -	**Up to 7 (28)**
Pump Ratio with manifold -	**9:1 at low inlet pressure (300 to 350 psi [20 to 25 bar]) and low inlet flow (below 2 gpm [7 lpm]) Pump ratio approaches 11.0:1 ratio at higher inlet pressure and flow.**
Operating Temperature, ºF (ºC)-	**-20 to +150 (-29 to 65)**
Operating Voltage, VDC -	**24**
Hydraulic Inlet Port, In -	**SAE 4**
Tank Return Port, In -	**SAE 6**

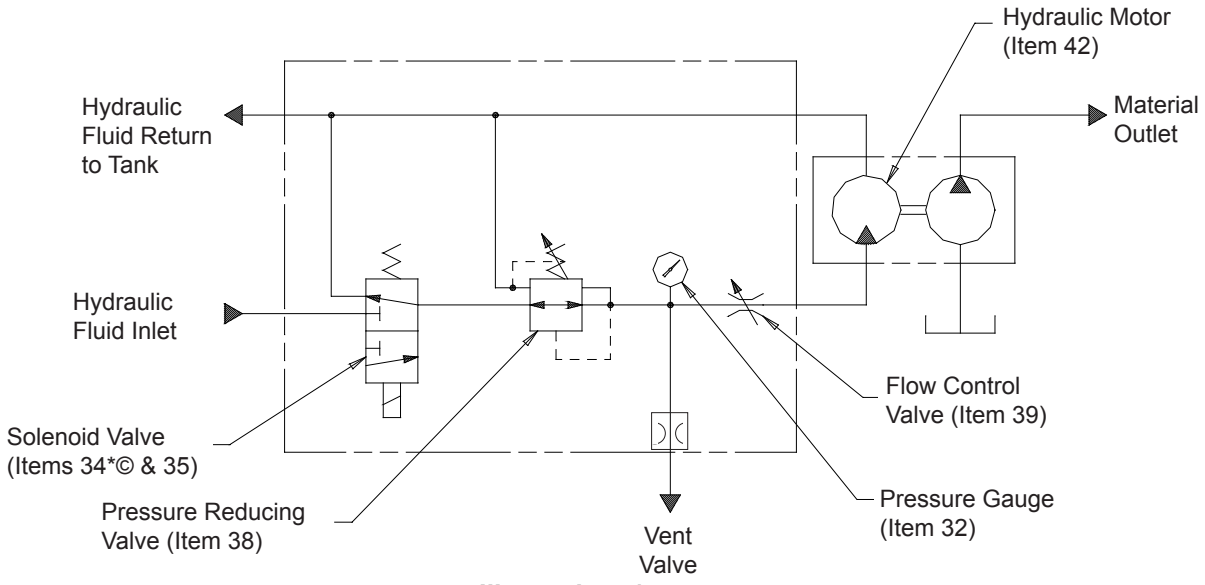
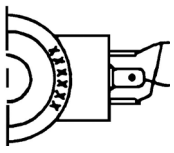


Illustration 1

Pump Outlets, In -	**1/4 NPTF**
Maximum Hydraulic Fluid Temperature, ºF, (ºC) -	**250 (121)**
Weight, Lbs (Kg) -	**36 (16)**



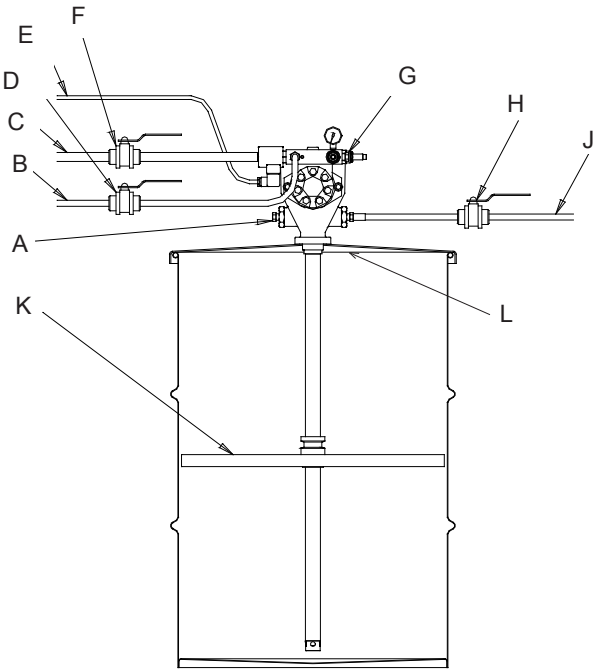
24VDC Connections

No Connection to Center Lug

Solenoid Valve

Illustration 2

VL 12B



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.

The pump has flow and pressure controls integrated into the manifold (76). A normally closed **ON/OFF** Solenoid Valve (74) is also integrated into the manifold and will start or stop the pump operation.

1. Mount the pump securely on the drum cover so that it cannot move or vibrate during operation.
2. Attach hydraulic supply line to the **Inlet** and return line to the **Tank** ports.
3. Connect material supply line to the pump outlet. Plug the unused outlet on opposite side of the pump.
4. Install high pressure shut-off valve in the material supply line. (Required)
5. Connect 24 VDC power supply to the solenoid valve (74). See Illustration #1. Use connector plug (75) supplied with the pump.

NOTE: To install the pump Model 85481 as a replacement pump for 84961 used on Model 84944, use adapter/spacer kit p/n 272013 with bolts p/n 50014, included in the pump package (see illustration #4).

HYDRAULIC PUMP PERFORMANCE SPECIFICATIONS							
Test conducted with Alvania NLGI # 2 Grade Grease							
	Grease Output				1,000 psi Backpressure		
	Cubic inches/min. (cm^3/min.)				(70 bar)		
		Hydraulic Flow Input					
Temperature F	1 gpm	2 gpm	3 gpm	4 gpm	5 gpm	6 gpm	7gpm
(Temperature C)	(4 l/min)	(8 l/min)	(11 l/min)	(15 l/min)	(19 l/min)	(23 l/min)	(26 l/min)
80	7	14	21	28	34	40	45
(27)	(115)	(229)	(344)	(459)	(557)	(656)	(737)
40	7	14	21	28	33	38	41
(4)	(115)	(229)	(344)	(459)	(541)	(623)	(642)
20	6	13	17	22	28	32	36
(-7)	(98)	(213)	(279)	(361)	(459)	(594)	(590)
0	6	11	15	19	23	27	30
(-18)	(98)	(180)	(245)	(310)	(376)	(442)	(491)
-10	5	7	8	9	10	12	13
(-23)	(82)	(115)	(131)	(148)	(164)	(197)	(213)
-20	4	6	8	10	12	14	15
(-29)	(66)	(98)	(131)	(164)	(197)	(229)	(245)

*Solenoid valve with manual override standard on Model 85247, 85670 and 85675 optional on other models.
2) 85610 Operating Temperature, ° F(°C) is -70 to 150 (-57 to 65)

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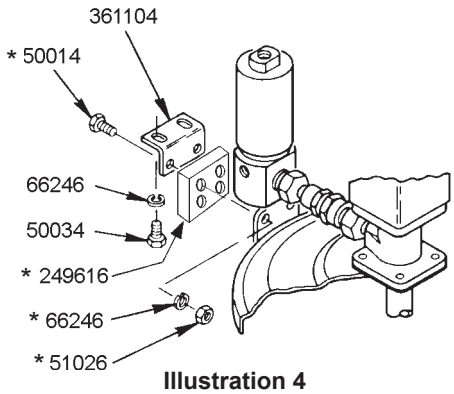

Illustration 4

* Included in Spacer Kit 272013

⚠ WARNING

Mount the pump securely on the drum cover. Failure to do so could result in personal injury and equipment damage.

⚠ WARNING

Do not exceed 450 psig (32 bar) working hydraulic pressure. Use high pressure components to reduce risk of serious injury including fluid injection and splashing in the eyes or on the skin. All accessories connected to the pump outlet must have at least 5,000 psig (350 bar) minimum hydraulic operating pressure. All accessories connected to the pump inlet must have at least 3,500 psig (241 bar) minimum working pressure.

Operation

All pumps are factory set at 350 psig (24 bar) working inlet hydraulic pressure with a flow rate of 2.5 GPM (9.5 l/min). **Do not change the settings for the pump until after the start up procedure.**

1. Shut off the material supply line valve.
2. Turn on the hydraulic pressure.
3. Energize the solenoid **On/Off** valve.
4. Prime the pump by slowly opening the shut-off lubricant supply line valve. Make sure that all air has been expelled from the pump and even lubricant flow is achieved.
5. Adjust the pump pressure and flow to the desired application requirements. See **Pressure and Flow Control Valve Adjustment** for instructions to adjust pressure and flow, Do not exceed pump operating pressure of 450 psig (32 bar).
6. Always use the lowest pump output pressure and hydraulic fluid flow to obtain the desired results. This will reduce the pump wear.

⚠ CAUTION

Do not exceed maximum operating temperature of the hydraulic fluid (250º F/121º C) . Never allow the pump to run dry of lubricant. A dry pump quickly speeds up, creating friction heat, which can damage the seals. Monitor the supply lubricant level and refill when necessary.

Setting the Pump Manifold Pressure and Flow Controls

The pressure must first be adjusted to insure the desired flow setting is achieved.

Pressure Control Valve Adjustment

- With hydraulic pressure applied, stop the pump by turning the flow control clockwise until completely closed.
- Loosen the lock nut on the Pressure Control by turning the nut COUNTERCLOCKWISE.
- Turn the valve stem COUNTERCLOCKWISE until it no longer turns. The valve stem will unscrew until it reaches the stop. It will not come off. This is the minimum pressure setting, which is about 170 psi (12 bar).
- With the pump stalled against pressure, turn the Pressure Control Valve stem CLOCKWISE until the desired pressure is attained on the manifold Pressure Gage. (Do not exceed 450 psi (31 bar)). A pressure of 350 psi (24 bar) is recommended.
- Tighten the lock nut by turning CLOCKWISE.

Flow Control Valve Adjustment

- Loosen the lock nut on the Flow Control Valve by turning the nut COUNTERCLOCKWISE.
- Adjust the flow by turning the valve stem CLOCKWISE to reduce the flow and COUNTERCLOCKWISE to increase it. The Flow Control Valve can be turned in until the valve is completely closed, and out to adjust pump speed. RECOMMENDED SETTING - 1/4 to 1/2 open.
- After adjusting the flow to the desired setting, tighten the lock nut by turning it CLOCKWISE.

See Chart on Page 30

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 Aero HFA Low Temperature oil.
- Oil level should be at dot on dipstick (middle of crankshaft) using 10W30 motor oil (15 oz.).

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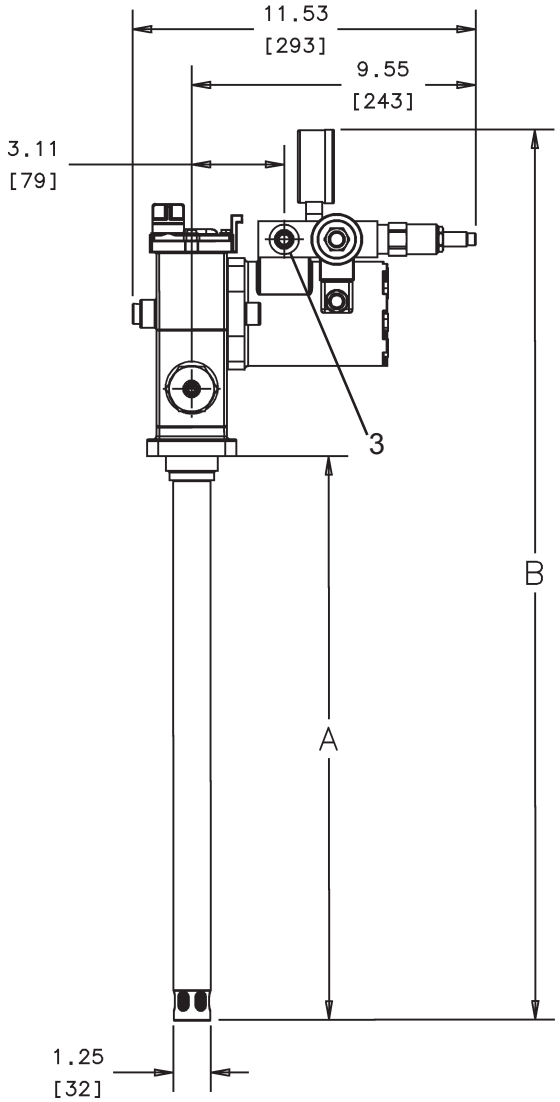

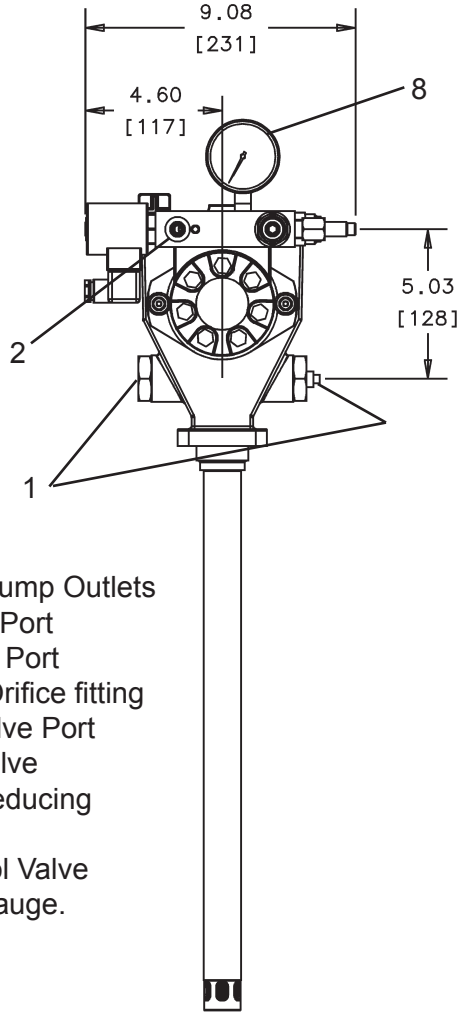

1. 1/4 NPTF Pump Outlets
2. SAE 4 Inlet Port
3. SAE 6 Tank Port
4. 1/4 NPTR Orifice fitting for Vent Valve Port
5. Solenoid Valve
6. Pressure Reducing Valve
7. Flow Control Valve
8. Pressure Gauge.

MODEL	DIM "A" in (mm)	DIM "B" in (mm)
85480	27.50 (699)	38.56 (980)
85481	19.00 (483)	30.06 (764)
85482	34.00 (864)	44.94 (1142)
85483	13.69 (348)	24.75(629)
85247	27.50 (699)	38.56 (980)
85586	34.18 (868)	45.12 (1146)
85610	34.00 (864)	45.06 (1145)
85670	27.5 (699)	38.56 (980)
85675	19.00 (483)	30.06 (764)
274055	19.00 (483)	30.06 (764)

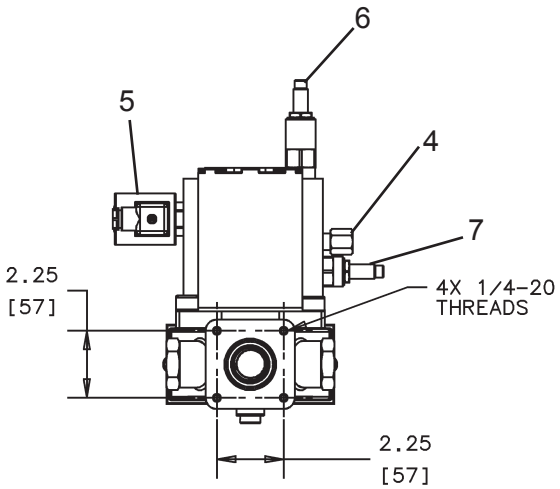

Illustration 5

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Troubleshooting

Condition	Possible Cause	Corrective Action
Pump does not run.	No pressure on gauge (72): - Closed Supply line shut off valve. - No power to solenoid valve (73). - Faulty Solenoid (74). - Pressure Reducing Valve (77) is set too low. - Insufficient Hydraulic Fluid supply.	 Open shut-off valve. Correct electrical fault. Replace solenoid (74). Reset Pressure Reducing Valve (77). Check hydraulic supply for proper pressure and flow.
	Pressure is shown on gauge (72): - Closed Fluid outlet line. - Flow Control valve is fully closed. - Pump is stalled due to grease backpressure.	 Check outlet line and clear obstructions. Readjust valve to 3/4 turn open. Check vent valve in system.
	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	Refill reservoir.
	Pump piston or checks are worn.	Disassemble the pump and repair.
Pump runs, but output is low.	Insufficient hydraulic fluid supply.	Check hydraulic supply and adjust flow using valve (70).
	Inlet pressure too low.	Increase pressure using valve (77).
	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 Pipe Plug (67a) from Pump Housing (67). Oil level should be at the bottom of the Pipe Plug opening. For Models 85480, 85481, 85482, 85483 and 85247. Check dipstick to verify. Mobil Arrow HFA Hydraulic Oil until the crankcase is full.
	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 strainer (272180). before returning pump to service.

Lincoln Industrial Standard Warranty

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 therefrom 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 MERCHANTIBILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

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 & Co. KG, Walldorf, Germany, for your warranty rights.

Lincoln Industrial 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 94000 LFR series (94100, 94300, 94500) 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-
LFM Series Oil Meters (Lincoln Fluid Meter), LFV (Lincoln Fluid Valves), AOD (Air-Operated Diaphragm Pumps)-
Lincoln warrants the LFM meter series (908/912 series), the Lincoln Fluid valve (708/712 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.

Lincoln Industrial Contact Information

To find Lincoln Industrial's Nearest Service Center call one of the following numbers, you may also use our website

Customer Service 314-679-4200
Website lincolnindustrial.com

Americas:
One Lincoln Way
St. Louis, MO 63120-1578
USA
Phone +1.314.679.4200
Fax +1.800.424.5359

Europe /Africa/Middle East
Lincoln GmbH
Heinrich-Hertz-Str. 2-8
69190 Walldorf - Germany
Phone/Fax +49.6227.33-0/-259
www.lincolnindustrial.de

Asia/Pacific:
51 Changi Business Park
Central 2
#09-06 The Signature
Singapore 486066
Phone +65.6588.0188
Fax +65.6588.3438

VL 12B

FlowMaster® Pumpe mit Hydraulik-Umlaufantrieb

Inhaltsverzeichnis

Sicherheit

Diese Betriebsanleitung sorgfältig lesen, bevor die Pumpe ausgepackt und in Betrieb genommen wird! Die Pumpe darf ausschließlich von Personen bedient, gewartet und repariert werden, die diese Betriebsanleitung genau kennen. Die lokalen Sicherheitsvorschriften betreffend Installation, Bedienung und Wartung müssen befolgt werden.

Die Pumpe darf nur in Betrieb genommen werden, nachdem Sie sich mit den Sicherheitshinweisen und dieser Betriebsanleitung genau vertraut gemacht haben.

⚠ WARNUNG

zeigt eine möglicherweise gefährliche Situation an, deren Nichtbeachtung zu tödlichen oder schweren Verletzungen führen kann.

⚠ VORSICHT

zeigt eine möglicherweise gefährliche Situation an, deren Nichtbeachtung zu leichteren oder mittelschweren Verletzungen führen kann.

Sicherheitshinweise

Dieses Gerät erzeugt sehr hohen Schmierdruck. Beim Betrieb dieses Gerätes ist äußerste Vorsicht geboten, da bei Leckage aus gelösten oder geborstenen Komponenten Flüssigkeit herausspritzen und die Haut durchdringen kann, die weitere, beträchtliche Körperschäden zur Folge hat. Um zu verhindern, daß Material auf die Haut oder in die Augen gelangen kann, empfehlen wir angemessene Schutzmaßnahmen zu treffen.

⚠ VORSICHT

Hautverletzungen umgehend medizinisch versorgen lassen und nicht wie eine harmlose Schnittwunde behandeln. Dem Arzt genau erklären, um welche Flüssigkeit es sich handelt.

Inspektion

Falls der Verdacht besteht, daß das Gerät einem Überdruck ausgesetzt war, den nächsten Vertragshändler benachrichtigen und die Pumpe überprüfen lassen.

Für die Reparatur dieser Pumpe sind Spezialwerkzeuge und spezielle Kenntnisse erforderlich. Reparaturen und Einstellungen, die über die in diesem Handbuch beschriebenen Wartungsarbeiten hinausgehen, durch den nächsten Vertragshändler vornehmen lassen.
Jährliche Inspektionen durch den nächsten Vertragshändler werden empfohlen.

Eine Liste der vom Hersteller autorisierten Vertragshändler ist auf Wunsch erhältlich.

Beschädigte Pumpen

Eine Pumpe, die beschädigt zu sein scheint, stark abgenutzt ist oder nicht vorschriftsmäßig funktioniert, darf nicht weiter betrieben werden, bis eine Reparatur vorgenommen wurde. Reparaturen vom nächsten Vertragshändler vornehmen lassen.

Beschreibung

Eine neuere Version der FlowMaster Pumpe wurde im Juni 2008 eingeführt. Diese Geräte enthalten die folgenden Verbesserungen:

- Buchsen & Kolbendichtungen werden zusammen mit Elastomer Napfdichtungen verwendet, um längeres Leben und besseren Betrieb in hohen Temperaturen sicherzustellen.
- Ölmessstab für das Kurbelwellengehäuse
- Gehärteter und geschliffener Teil des Kolbens für längeres Leben und bessere Kontrolle des Kurbelwellengehäuseöls
- Gehärtete und geschliffene Gelenkbolzenbuchsen, die enger in den Gelenkbolzenanker passen.
- Bessere Gelenkbolzenbefestigung mit tieferer Sechskantfassung für den Inbusschlüssel

85480 - Pumpe für 120 lb. Fass (EN13008 OH-NC 62 l- de 382 mm)
85481 - Pumpe für 60 lb. Behälter
85482 - Pumpe für 400 lb. Fass (EN 209 OH-NC 216 l)
85483 - Pumpe für 5 Gal. Hobbock
85247 - wie 85480, jedoch Magnetventil mit Handbetätigung
85610 - wie 85482, jedoch Ausführung für Tieftemperatur-Einsatz
85586 - Hochleistungspumpe für 400 lb. Fass (EN 209 OH-NC 216 l)
274055 - Selben wie 85481 mit Solenoid-Kabel.

Allgemeine Beschreibung

Die FlowMaster Pumpe mit hydraulischem Umlaufantrieb von Lincoln Industrial ist eine völlig hydraulisch betriebene Fettpumpe. Die Schmierstoff-Fördermenge ist proportional zur antriebsseitigen Durchflußmenge an Hydrauliköl. Die Pumpe ist hauptsächlich zur Verwendung in Zentralschmiersystemen, wie Einleitungs-, Progressiv- und Zweileitungssystem, ausgelegt.
Ein Pumpensteuerblock ist integriert und mit dem Hydraulikmotor verbunden. Er dient zur Regelung von Durchflußmenge und Druck. Weiterhin ist zum EIN-/Aus-Schalten des Pumpenantriebes ein 24 Volt DC Magnetventil eingebaut. Ein 24 Volt Gleichstrommagnetventil mit manueller Übersteuerung ist in Modell 85247 Standard und ist als Option erhältlich für andere Modelle."

Die Pumpe wird durch den Hydraulikmotor angetrieben, dessen Rotationsbewegung durch einen Exzenter-Kurbelmechanismus in eine oszillierende Bewegung umgesetzt wird, durch die der Pumpenzylinder auf und ab bewegt wird. Die Pumpe ist eine doppelt wirkende Verdrängerpumpe und fördert daher den Schmierstoff beim Auf- und Abwärtshub.

Während der Abwärtbewegung taucht der Pumpenzylinder in den Schmierstoff ein. Das vom Pumpenzylinder erzeugte Vakuum, unterstützt durch eine schaufelartige Bewegung, saugt den Schmierstoff in die Pumpenzylinderkammer. Gleichzeitig wird während dieses Hubes Schmierstoff aus dem Förderauslaß der Pumpe verdrängt. Die Pumpe saugt das doppelte Schmierstoffvolumen an, welches bei einem Hub aus dem Pumpenauslaß verdrängt wird.
Während des Aufwärtshubes schließt das Einlaßrückschlagventil und vom vorangegangenen Hub wird die andere Hälfte des angesaugten Schmierstoffes durch das Auslaßrückschlagventil hindurch aus dem Pumpenauslaß verdrängt.
Das für die Pumpe charakteristische Fördermengenverhältnis ist auf Seite 4 dargestellt.

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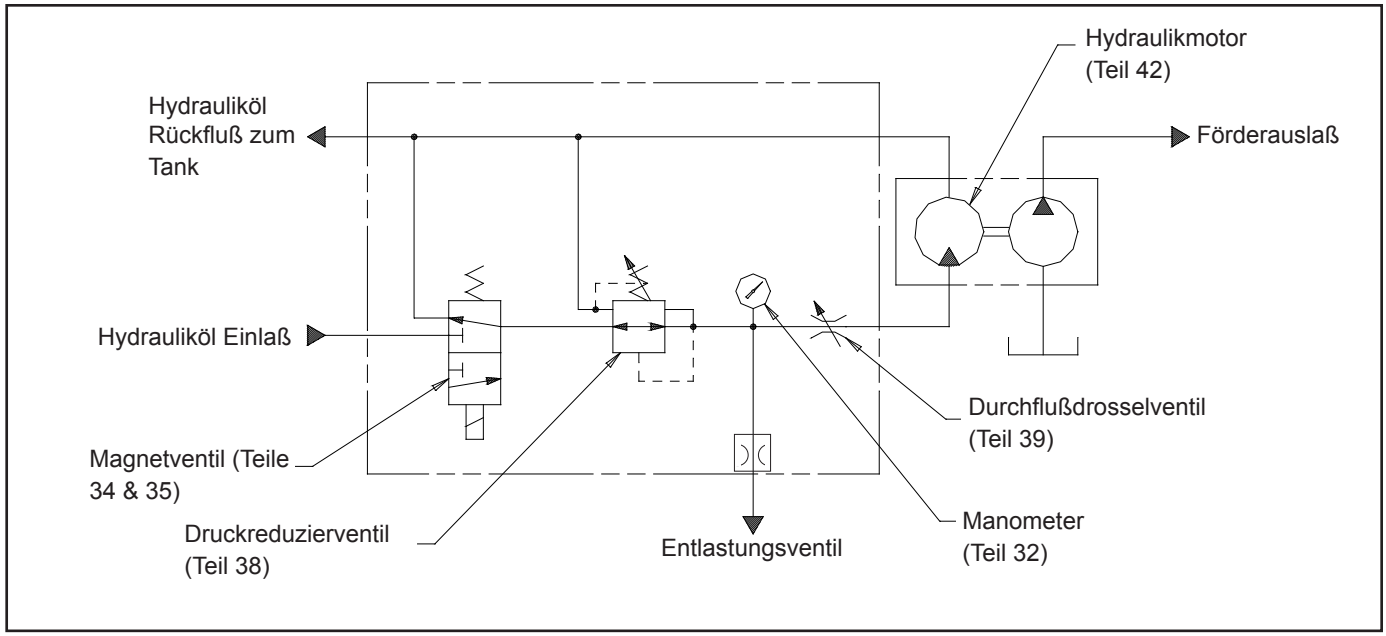
FlowMaster® Pumpe mit Hydraulik-Umlaufantrieb

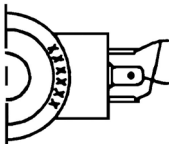
Bestimmungsgemäße Verwendung

- Alle Pumpenmodelle sind für hydraulischen Antrieb ausgelegt und sind ausschließlich zur Förderung von Schmierstoffen bestimmt.
- Die maximalen Grenzwerte dürfen nicht überschritten werden.
- Jeglicher andere Gebrauch, der diesen Instruktionen nicht entspricht, führt zum Verlust aller Garantieansprüche.

Technische Daten

Hydraulik-Eingangsdruck, maximal PSIG (bar)	**3,500 (241)**
Hydraulik-Arbeitsdruck PSIG (bar)	**300 bis 450 (20 bis 32).**
Hydr.Eingangs-Volumenstrom gpm (l/min)	**bis zu 7 (28)**
Druckübersetzungsverhältnis der Pumpe mit Steuerblock	**9:1** **bei hydr. Betriebsdruck 300-350 PSI (20-25 bar) und Eingangs-Volumenstrom <2 gpm (<7 l/min) bis zu 11:1** **bei höherem hydr. Betriebs-druck und Volumenstrom.**
Betriebstemperatur °F (°C)	**-20 bis +150 (-29 bis +65)**
Betriebsspannung, V DC	**24**
Hydr. Einlaßanschluß -	**SAE 4 (7/16-20 UNF-2B)**
Hydr. Rücklaufanschluß -	**SAE 6 (9/16-18 UNF-2B)**
Pumpenauslässe -	**1/4“ NPTF**
Maximale Temperatur der Hydraulikflüssigkeit °F, (°C) -	**250 (121)**
Gewicht, lbs (kg) -	**36 (16)**





24V DC Anschlüsse

Kein Anschluß zum mittleren Kabelkopf

Magnetventil

⚠ WARNUNG

Maximalen Hydraulik-Eingangsdruck von 3500 PSIG (241 bar)© nicht überschreiten. Überschreiten des Nenndrucks kann zu Schaden an Systemteilen und zu Körperverletzung führen.

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Schmierstoff-Förderleistung vs. Hydraulik-Volumenstrom

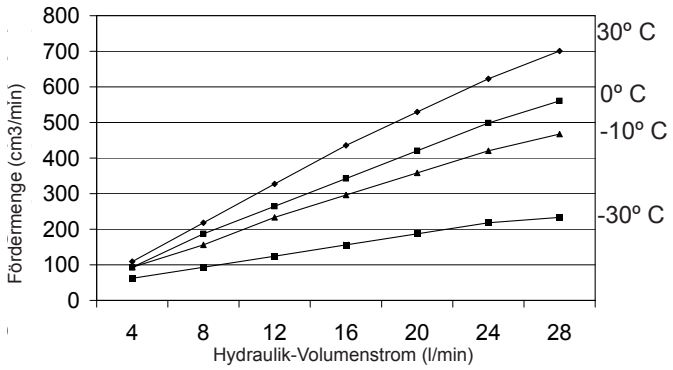
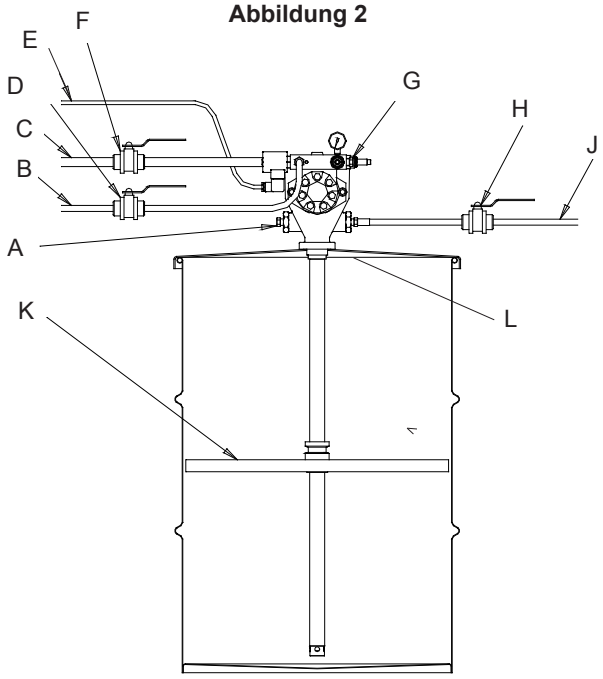


Abbildung 2



A - Pumpenauslaß-Stopfen
B - Hydraulik-Druckleitung
C - Hydraulik-Rücklaufleitung zum Tank mindestens 3/4“ (19 mm) I.D.
D - Absperrventil (Hydr. Druckleitung)
E - 24V DC Steuerleitung
F - Absperrventil (Hydr. Rücklaufleitung) mindestens 3/4“ (19 mm) I.D.
G - Abgang mit Drossel (für Entlastungsventil)
H - Absperrventil (Förderleitung)
J - Förderleitung
K - Folgeplatte (85492 passend für 120 lb. Faß)
L - Faßdeckel (83115 für 400 lbs., 84616 für 120 lbs.)

Installation der Pumpe

Die hier beschriebene typische Installation wird nur als Richtlinie für die Auswahl und Installation der Komponenten gezeigt. Der Vertreter der Firma Lincoln Industrial hilft Ihnen, ein System zusammenzustellen, das Ihren speziellen Anforderungen entspricht.

Die Funktionsprüfung der Pumpe wurde mit dünnflüssigen Öl durchgeführt, welches zum Korrosionsschutz im Pumpenrohr belassen wurde. Wenn das Schmierfett nicht durch Ölreste kontaminiert werden darf, Pumpe vor dem Anschluß an das System spülen.

Die Pumpe hat im Verteilerblock (37) integrierte Durchfluß- und Druckregler sowie ein stromlos geschlossenes Magnetventil (35). Bei EIN/AUS-Schaltung des Magnetventils wird die Pumpe gestartet oder gestoppt.

1. Pumpe standsicher auf dem Faßdeckel montieren, so daß diese nicht vibrieren und sich nicht lösen kann.
2. Die Hydraulik-Druckleitung an den Eingang mit der Bezeichnung **INLET** am Verteilerblock anschließen. Die Rücklaufleitung an den Abgang mit der Bezeichnung **TANK** am Verteilerblock anschließen.
3. Förderleitung an einen der beiden Pumpenauslässe anschließen. Den gegenüberliegenden, unbenutzten Auslaß verschließen.
4. Das erforderliche Hochdruck-Absperrventil in die Förderleitung einbauen.
5. 24V DC Leitung mit dem Magnetventil (35) verkabeln. Siehe Abbildung Nr. 1. Die mit der Pumpe mitgelieferte Leitungsdose (36) für den Anschluß verwenden.

HINWEIS: Soll bei Modell 84944 die Pumpe 84961 durch Pumpenmodell 85481 ersetzt werden, so sind Adapter/Abstandsstück Nr. 249616 sowie Schrauben Nr. 50014 zu verwenden, welche im Pumpenpaket mitgeliefert werden. (Siehe Abbildung Nr. 4).

LEISTUNGSDATEN DER PUMPE							
Der Test wurde mit Schmierfett Alvania NLGI # 2 durchgeführt.							
	Fettfördermenge				bei Gegendruck		
	cu. inch/min (cm³/min)				1000 PSI (70 bar)		
	Hydrauliköl-Volumenstrom						
	1 gpm	2 gpm	3 gpm	4 gpm	5 gpm	6 gpm	7gpm
Temperatur °F (°C)	(4 l/min)	(8 l/min)	(11 l/min)	(15 l/min)	(19 l/min)	(23 l/min)	(26 l/min)
80 (27)	7	14	21	28	34	40	45
	(115)	(229)	(344)	(459)	(557)	(656)	(737)
40 (4)	7	14	21	28	33	38	41
	(115)	(229)	(344)	(459)	(541)	(623)	(642)
20 (-7)	6	13	17	22	28	32	36
	(98)	(213)	(279)	(361)	(459)	(594)	(590)
0 (-18)	6	11	15	19	23	27	30
	(98)	(180)	(245)	(310)	(376)	(442)	(491)
-10 (-23)	5	7	8	9	10	12	13
	(82)	(115)	(131)	(148)	(164)	(197)	(213)
-20 (-29)	4	6	8	10	12	14	15
	(66)	(98)	(131)	(164)	(197)	(229)	(245)

*Magnetventil mit manueller Übersteuerung ist Standard an Modell 85247, 85670 und 85675 für andere Modelle auf Wunsch erhältlich.
2)Betriebstemperatur für Modell 85610, °F (°C), ist –70 bis 150 (-57 bis 65).

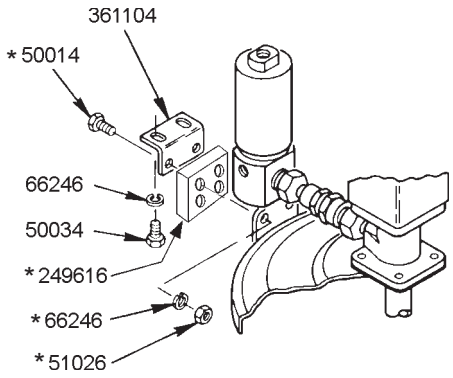


Abbildung 4

* Enthalten im Abstandsstücksatz 272013

⚠ WARNUNG

Pumpe sicher auf dem Deckel montieren. Eine Nichtbefolgung könnte Verletzungen von Personen und Sachschäden zur Folge haben.

Hydraulikarbeitsdruck von 450 PSIG (32 bar) nicht überschreiten. Hochdruckkomponenten verwenden, um das Risiko schwerer Verletzungen, einschließlich Eindringen von Flüssigkeit in die Haut und Spritzen von Flüssigkeit in die Augen oder auf die Haut zu vermeiden. Alle Zusatzgeräte, die an den Pumpe Anschluß angeschlossen werden, müssen mindestens 5.000 PSIG (Stab 350) einen minimalen hydraulischen funktionierenden Druck haben. Alle Zusatzgeräte, die mit dem Pumpeneinlaß verbunden sind, müssen mindestens für einen Druck von 3500 PSIG (241 bar) geeignet sein.

Betrieb

Alle Pumpen sind werkseitig auf 350 PSIG (24 bar) Hydraulik-Arbeitsdruck und 2.5 gpm (9,5 l/min) Volumenstrom eingestellt. **Diese Einstellungen der Pumpe dürfen erst nach dem Inbetriebnahmeverfahren geändert werden.**

1. Absperrventil in der Förderleitung schließen.
2. Hydraulikdruck einschalten.
3. Spannung an das EIN/AUS Magnetventil anlegen.
4. Beim Anfahren der Pumpe das Absperrventil langsam öffnen. Sicherstellen, daß Luft völlig aus der Pumpe verdrängt wurde und nur noch Schmierstoff austritt.
5. Pumpendruck und -Fördermenge den Anforderungen der betreffenden Anwendung entsprechend einstellen. Instruktionen über das Justieren von Druck und Durchfluß siehe Einstellen von Druck und Durchfluß am Pumpen-Steuerblock. Maximalen hydr. Arbeitsdruck von 450 PSIG (32 bar) nicht überschreiten.
6. Stets mit dem geringst möglichen Pumpendruck und hydr. Förderstrom, der zu dem gewüschten Ergebnis führt, arbeiten. Das verringert die Abnutzung der Pumpe.

⚠ VORSICHT

Maximale Betriebstemperatur der Hydraulikflüssigkeit 250°F (121°C) nicht überschreiten. Die Pumpe niemals ohne Schmierstoff trocken laufen lassen. Trockenlauf der Pumpe erzeugt Reibungshitze, wodurch die Dichtungen beschädigt werden können. Füllstand überwachen und nötigenfalls Schmierstoff nachfüllen.

Einstellen von Druck und Durchfluß am Pumpen-Steuerblock

Zuerst muß der Druck eingestellt werden, um sicherzustellen, daß die gewünschte Durchflußeinstellung erreicht werden kann.

Justieren des Druckreduzierventils

- Waehrend die hydraulische Pumpe laeuft, schliessen Sie das Durchflussregelventil, indem Sie dieses im Uhrzeigersinn drehen, bis die Pumpe stoppt.
- Kontermutter an der Druckregulierung durch Drehung entgegen Uhrzeigersinn lösen.
- Den Ventilschaft entgegen Uhrzeigersinn drehen, bis sich dieser nicht mehr weiterdrehen läßt. Der Ventilschaft läßt sich bis zu seinem Anschlag herausdrehen, kann aber nicht herausgeschraubt werden. Dies ist die Mindestdruckeinstellung, die etwa 170 PSIG (12 bar) beträgt.
- Wenn die Pumpe durch Staudruck im Stillstand ist, den Ventilschaft der Regulierung im Uhrzeigersinn drehen, bis der gewünschte Druck am Manometer des Steuerblockes angezeigt wird. 450 PSI (32 bar) nicht überschreiten. Ein Druck von 24 bar ist empfehlenswert.
- Kontermutter durch Drehen im Uhrzeigersinn wieder anziehen.

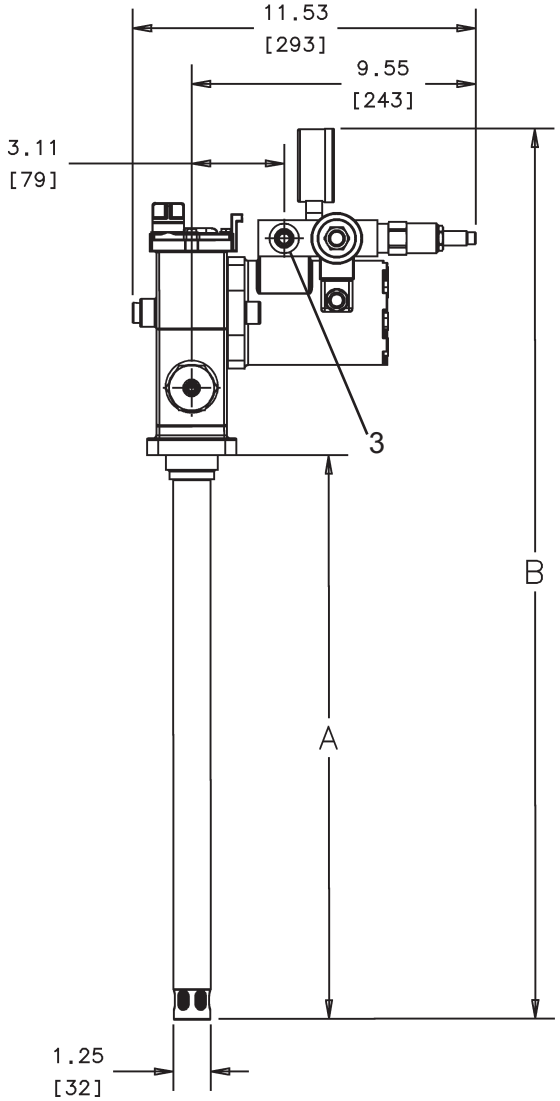
Justieren des Durchflußdrosselventils

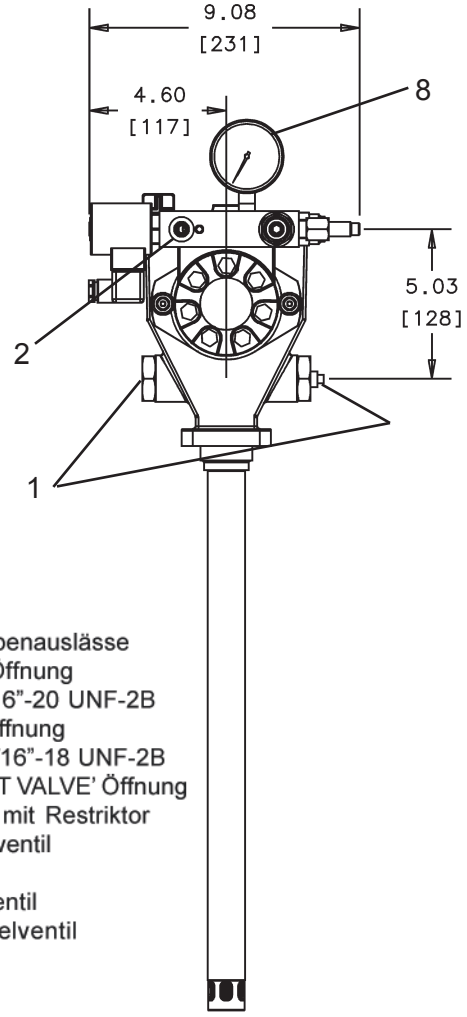
- Kontermutter an der Durchflußregulierung durch Drehung entgegen Uhrzeigersinn lösen.
- Einstellung durch Drehung des Schaftes der Durchflußregulierung: Drehung im Uhrzeigersinn vermindert den Durchfluß. Das Ventil ist im vollständig eingedrehtem Zustand vollständig gerschlossen. Die emptohlene einstellung zur Regulieren des Durchflusses beträgt 1/4 dis 1/2 umdriehung des schaftes.
- Nach Abschluß der Durchflußjustierung und Einstellung auf die gewünschte Durchflußmenge, Kontermutter durch Drehen im Uhrzeigersinn wieder anziehen.

Sehen Sie Diagramm auf Seite 30.

Empfehlungen für die Intervalle zur Kurbelgehäuseölwartung

- Den Ölstand nach jeweils 750 Betriebsstunden oder monatlich prüfen.
- Einen Ölwechsel nach jeweils 2000 Betriebsstunden oder einmal jährlich vornehmen.
- SAE 10W30 Motoröl verwenden für alle Maschinen, die in Umgebungstemparaturen von 150 bis –40 °F benutzt werden. Bei Umgebungstemperaturen von 50 bis –70 °F MOBIL AERO HFA Niedrigtemperaturöl benutzen.
- Der Ölstand soll sich am Punkt auf dem Ölmessstab befinden (in der Mitte der Kurbelwelle). 10W30 Motoröl verwenden (15 oz.).





1. ¼" NPTF Pumpenauslässe
2. SAE 4 'INLET' Öffnung
   Hydr. Einlaß 7/16"-20 UNF-2B
3. SAE 6 'TANK' Öffnung
   Hydr. Auslaß 9/16"-18 UNF-2B
4. 1/4 "NPTF 'VENT VALVE' Öffnung
   Anschlußstück mit Restriktor
   für Entlastungsventil
5. Magnetventil
6. Druckreduzierventil
7. Durchflußdrosselventil
8. Manometer

Modell	Maß "A" Zoll (mm)	Maß "B" Zoll (mm)
85480	27.50 (699)	38.56 (980)
85481	19.00 (483)	30.06 (764)
85482	34.00 (864)	44.94 (1142)
85483	13.69 (348)	24.75(629)
85247	27.50 (699)	38.56 (980)
85586	34.18 (868)	45.12 (1146)
85610	34.00 (864)	45.06 (1145)
85670	27.50 (699)	38.56 (980)
85675	19.00 (483)	60.06 (764)
274005©	19.00 (483)	60.06 (764)

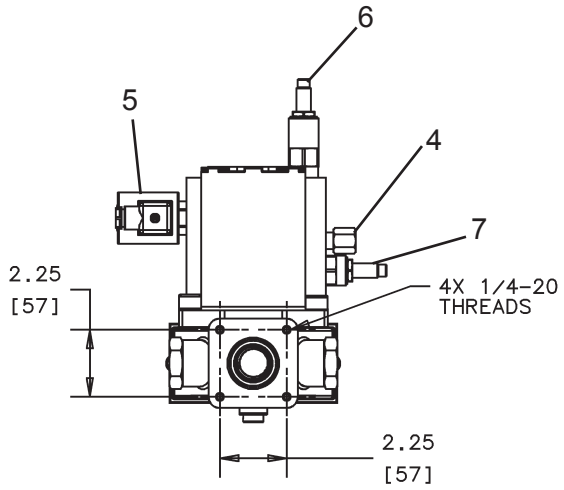


Abbildung 5

VL 12B

FEHLERSUCHE

Störung	Mögliche Ursache	Behebung
Pumpe läuft nicht	Manometer (72) zeigt keinen Druck an: - Absperrventil der Zufuhrleitung geschlossen. - Am Magnetventil (74) liegt keine Spannung an. - Magnetventil-Spule (74) defekt. - Druckreduzierventil (77) zu niedrig eingestellt - Mangelhafte Hydraulikflüssigkeitszufuhr.	 Absperrventil öffnen. Elektrischen Fehler beheben. Magnetventil-Spule (74) ersetzen. Druckreduzierventil (77) justieren. Hydraulikversorgung auf richtigen Druck und Fluß hin prüfen.
	Manometer (72) zeigt Druck an: - Hydr. Auslaßleitung ist geschlossen - Durchflußdrosselventil ist völlig geschlossen - Pumpe wurde durch Aufbau von Gegendruck in der Schmierstoff-Förderleitung angehalten.	 Auslaßleitung prüfen u. Restriktionen beseitigen. Ventil um eine ¾ Drehung öffnen. Entlastungsventil im System prüfen
	Pumpe festgefressen oder beschädigt	Pumpe demontieren und schadhafte oder festgefressene Komponenten reparieren. Siehe Anleitung zur Demontage und Re-Montage.
Pumpe erhöht Arbeitsgeschwindigkeit oder läuft ungleichmäßig.	Schmierstoff-Füllstand zu gering oder Behälter leer.	Behälter auffüllen.
	Folgeplatte verklemmt und liegt nicht einwandfrei oben auf dem Fett auf.	Folgeplatte und Behälter auf Beschädigungen hin untersuchen.
	Pumpenkolben oder Rückschlagventile sind abgenutzt.	Pumpe demontiern und instandsetzen.
Pumpe läuft, aber die Fördermenge ist gering.	Hydr. Volumenstrom zu gering.	Hydraulikzufuhr prüfen und Zufluß am Durchflußdrosselventil (70) regulieren.
	Hydr. Eingangsdruck zur Pumpe ist zu niedrig.	Druck am Druckreduzierventil (77) erhöhen.
	Schadhafter Einlaß (25, 27) oder schadhaftes Auslaßrückschlagventil (18, 19, 20)	Schadhafte Komponenten ersetzen.
Leckage am Gehäusedeckel (30).	Dichtung (15) oder O-Ring (34) sind abgenutzt	Dichtungen überprüfen und nötigenfalls ersetzen.
Pumpe erzeugt laute Geräusche.	Kein Öl im Kurbelgehäuse	Kurbelgehäuse befüllen. Dazu Rohrstopfen (67a) aus dem Pumpengehäuse (67) schraubem und Motoröl 10W30 einfüllen. Das Kurbelgehäuse ist voll aufgefüllt, wenn der Ölspiegel den unteren Rand des Gewindeloches für den Rohrstopfen erreicht. Bei Modellen 85480, 85481, 85482, 85483 und 85247 10W30 Motoröl einfüllen, bis das Kurbelgehäuse voll ist. Bei Modell 85610 leichtes Mobil Arrow HFA Hydrauliköl einfüllen, bis das Kurbelgehäuse voll ist.
	Buchsen (12) abgenutzt.	Buchsen überprüfen u. nötigenfalls ersetzen.
Die Pumpe baut keinen Druck auf.	Ein Fremdkörper hält das untere Rückschlagventil offen.	Auseinanderbauen und Rückschlagventil säubern. Eventuell das Sieb (272180) einbauen, bevor die Pumpe wieder in Betrieb genommen wird.

VL 12B

Lincoln Industriestandard-Garantie

BESCHRÄNKTE GARANTIE

Die Firma Lincoln garantiert, dass von Lincoln hergestellte und gelieferte Produkte für eine Zeitspanne von einem (1) Jahr nach dem Verkaufsdatum frei von Material- und Verarbeitungsfehlern sind, ausschließlich aller speziellen, verlängerten oder beschränkten von Lincoln veröffentlichen Garantien. Stellt sich während dieser Garantieperiode heraus, dass ein Produkt fehlerhaft ist, so wird es gemäß Lincolns ausschließlicher Entscheidung kostenlos repariert oder ersetzt.

Diese Garantie beruht auf der Voraussetzung, dass ein von Lincoln autorisierter Vertreter das Produkt als fehlerhaft bezeichnet. Für Reparatur oder Ersatz muss der Kunde das Produkt auf seine Kosten, zusammen mit dem Kaufbeweis, innerhalb der Garantiezeit an ein von Lincoln autorisiertes Garantie- und Kundendienstzentrum schicken.

Diese Garantie bezieht sich nur auf den ersten Käufer. Sie gilt nicht für Produkte, die durch Unfall, Überbelastung, Missbrauch, falschen Gebrauch, Vernachlässigung, falsche Installierung oder scheuerndes und korrodierendes Material beschädigt wurden, oder für Produkte, welche von Personen, die nicht von Lincoln autorisiert waren, geändert oder repariert wurden. Diese Garantie gilt nur für Geräte, die in genauer Übereinstimmung mit den schriftlichen, von Lincoln oder seinem autorisierten Personal am Standort gelieferten Anweisungen und Empfehlungen installiert, betrieben und gewartet werden.

DIESE GARANTIE IS EXKLUSIV UND STEHT ANSTELLE ALLER ANDEREN GARANTIEN, SEIEN SIE AUSDRÜCKLICH GEGEBEN ODER STILLSCHWEIGEND ANGENOMMEN, EINSCHLIESSLICH DER GARANTIE FÜR HANDELSÜBLICHKEIT ODER BRAUCHBARKEIT FÜR EINEN BESTIMMTEN ZWECK, JEDOCH NICHT BESCHRÄNKT AUF DIESE.

In keinem Fall ist Lincoln haftbar für Zufalls- oder Nachfolgeschäden. Die Haftbarkeit der Firma Lincoln für Schadensersatzansprüche für Verluste oder Schäden, die sich durch den Verkauf, Wiederverkauf oder die Verwendung eines Produktes von Lincoln ergeben, kann in keinem Fall den Kaufpreis übersteigen. Manche Gerichtsbarkeiten erlauben den Ausschluss oder die Begrenzung des Schadensersatzanspruches für Zufalls- oder Nachfolgeschäden nicht, daher kann es sein, dass die oben erläuterte Begrenzung oder der Ausschluss für Sie nicht gilt.

Diese Garantie gibt Ihnen spezielle Rechte. Sie besitzen möglicherweise noch andere Rechte, die je nach Gerichtsbarkeit verschieden sein können.

Kunden, die sich nicht in der westlichen Hemisphäre oder Ostasien befinden: Bitte wenden Sie sich an Lincoln GmbH & Co. KG, Walldorf, Deutschland, wenn Sie Fragen über Ihre Garantierechte haben.

Lincoln Industrial Kontaktinformation

Um das nächstgelegene Kundendienstzentrum zu finden,
rufen Sie die folgende Nummer an. Sie können auch unsere Website benutzen

Kundendienst: USA 314-679-4200
Website: lincolnindustrial.com

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Fax +49.6227.33.259

Asia/Pacific:
51 Changi Business Park
Central 2
#09-06 The Signature
Singapore 486066
Phone +65.6588.0188
Fax +65.6588.3438

Web site:
www.lincolnindustrial.com

VL 12B

Tools Required for Maintenance, Repair and Adjustment

- 7/16” open end wrench
- 1-1/2” open end wrench
- 3/4 open end wrench
- 12” cresent 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 222 MS Thread Lock or Equivalent.

Zur Wartung, Reparatur und Einstellung benötigte Werkzeuge.

- 7/16” Gabelschlüssel
- 1-1/2” Gabelschlüssel
- 3/4“ Gabelschlüssel
- 12“ einstellbarer Schlüssel
- 1/8 Innensechskantschlüssel
- 5/32 Innensechskantschlüssel
- 1/4 Innensechskantschlüssel
- 5/16 Innensechskantschlüssel
- 3/8 Innensechskantschlüssel
- 1/4“ Antriebsnuss
- 1/4“ Nuss
- 5/16“ Nuss
- Ein flacher Schraubenzieher .10 Zoll breit und .025 Zoll dick
- Picke zum Entfernen von Dichtungen und Spiralhalteringen
- kleine Federringzange
- Spezialwerkzeugsatz 276275
- Kreuzschlitzschraubenzieher
- ½ Zoll Inbusschlüssel
- Hammer
- Drehmomentschlüssel (Fußpfunde und Zollpfund)
- Sechskant-Inbussockeladapter (benötigt, um Inbusschrauben festzuziehen)
- Loctite 242 (oder Äquivalent) Schraubensicherung, mittlere Stärke
- Loctite 222 (oder Äquivalent) Schraubensicherung, mittlere Stärke

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

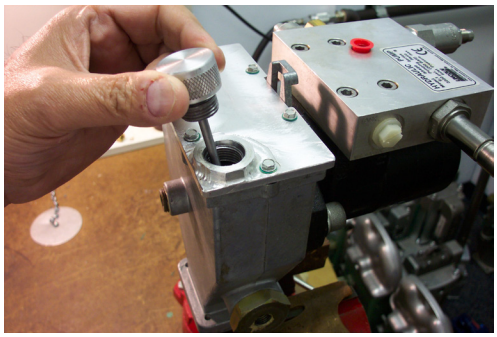
Always use Lincoln Industrial parts for service and repair.

Wartung und Reparatur

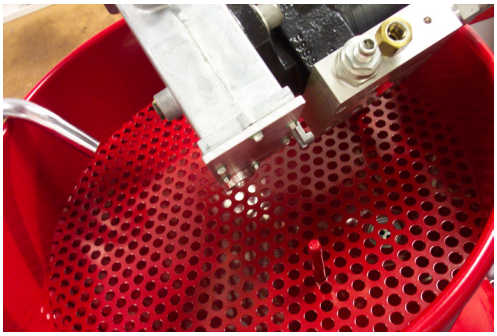
Bevor Wartungsarbeiten oder Reparaturen vorgenommen werden, muß der Druck aus den Pumpen- und Zufuhrleitungen abgelassen werden, um die Gefahr einer Verletzung durch eindringende oder verspritzte Flüssigkeit oder bewegliche Maschinenteile zu verringern.

⚠ WARNUNG

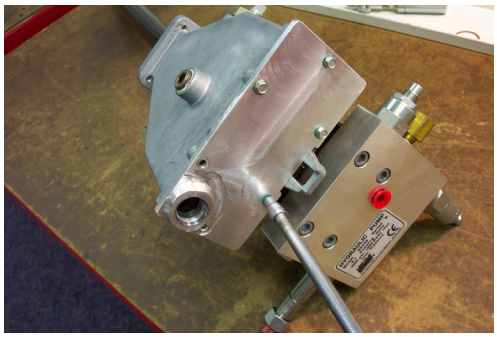
Für Wartung und Reparaturen immer Lincoln Industrial Teile benutzen.



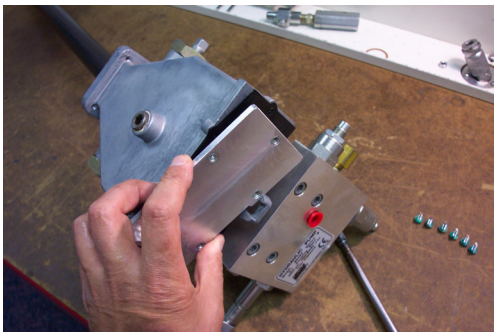
1) Remove dip stick (Item 30a). (Reassembly torque: 10 - 15 in. lbs. (1.1 - 1.7 Nm).)
1) entfernen Badstock (Einzelteil 30a). (Wiederversammlung-drehkraft: 1,1 - 1,7 Nm (10 - 15 inch lbs).)



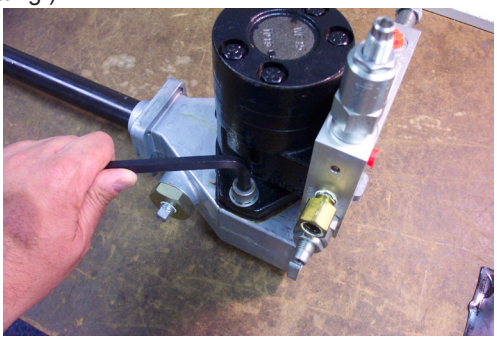
2) Drain crankcase oil (reassembly recommendations: use SAE 10w30 motor oil filled to dipstick mark (15 oz.)).
2) lassen Kurbelkastenöl ab (Wiederversammlungempfehlungen: benutzen Sie das SAE 10w30 Bewegungsöl, das zur Ölmeßstabmarkierung gefüllt wird (15 oz.)).



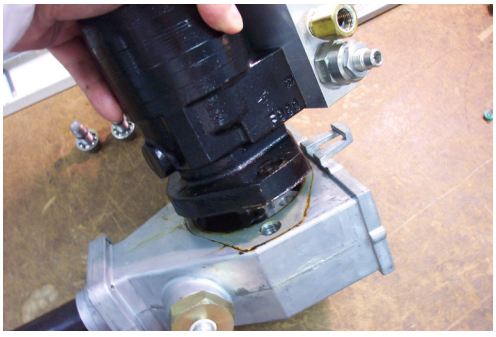
3) Remove housing cover screws (Item 28). (Reassembly torque: 10 - 15 in.lbs. (1.1 - 1.7 Nm).) (Reassembly recommendations: replace screw gaskets, Item 29).
3) entfernen das Mit einem Schlauch bespritzen der Abdeckung Schrauben (Einzelteil 28). (Wiederversammlungdrehkraft: 1,1 - 1,7 Nm(10 - 15 in.lbs.) (Reassmelby Empfehlungen: ersetzen Sie Schraube Dichtungen, Einzelteil 29).



4) Remove housing cover (Item 30) and gasket (Item 31). (Reassembly recommendations; replace gasket.)
4) entfernen Gehäuseabdeckung (Einzelteil 30) und Dichtung (Einzelteil 31). (Wiederversammlungempfehlungen; ersetzen Sie Dichtung.)

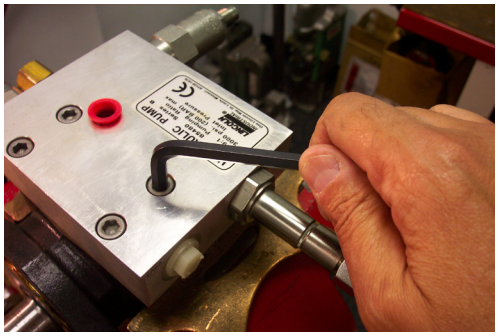


5) Remove the two hydraulic motor mounting screws and lock washer (Items 51 & 51a). (Reassembly torque: 50 - 55 Ft. Lbs. (67.8 - 74.5 Nm).) (Reassembly recommendations: Use service removable thread locking compound such as Loctite 242, or equivalent.
5) entfernen die zwei hydraulischen Bewegungsbefestigungsschrauben und Federring (Einzelteile 51 u. 51a). (Wiederversammlungdrehkraft: 67,8 - 74,5 Nm (50 - 55 Ft. Lbs.).) (Wiederversammlungempfehlungen: Verwenden Sie das entfernbare Gewinde des Services, das Mittel wie Loctite 242 verriegeln, oder Äquivalent.

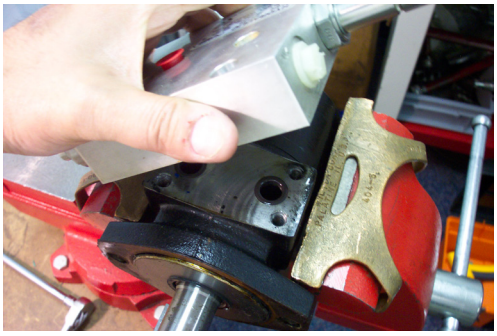


6) Remove hydraulic motor (Item 50) and gasket (Item 69). (Reassembly recommendations: Replace gasket and use gasket dressing such as Loctite 510, Loctite Aviation sealant 30516 or equivalent.)
6) entfernen hydraulischen Motor (Einzelteil 50) und Dichtung (Einzelteil 69). (Wiederversammlungempfehlungen: Ersetzen Sie Dichtung und benutzen Sie die Dichtung, die wie Loctite 510, Loctite-Luftfahrtdichtungsmittel 30516 oder Äquivalent. ankleidet)

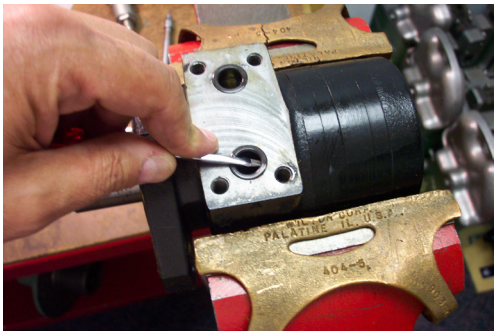
VL 12B



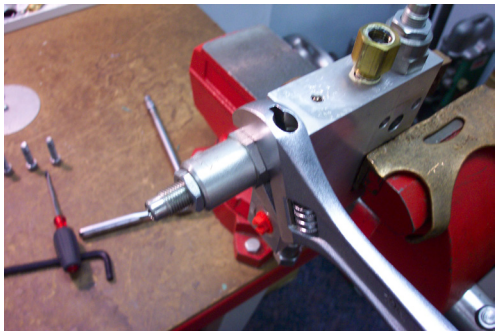
7) Remove four manifold mounting screws (Item 71). (Reassembly torque: 20 - 25 Ft. Lbs. (27.1 - 33.9 Nm).)
7) entfernen vier vielfältige Befestigungsschrauben (Einzelteil 71). (Wiederversammlungdrehkraft: 27,1 - 33,9 Nm (20 - 25 Ft. Lbs.).)

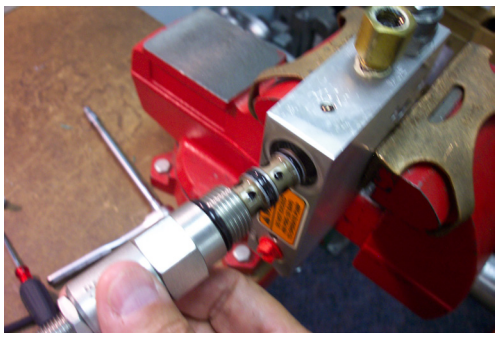


8) Remove manifold assembly (Items 70 through 78). (Reassembly recommendation: Replace O-rings, Item 68).
8) entfernen Verteilerbaugruppe (Einzelteile 70 bis 78). (Wiederversammlungempfehlung: Ersetzen Sie O-Ringe, Einzelteil 68).

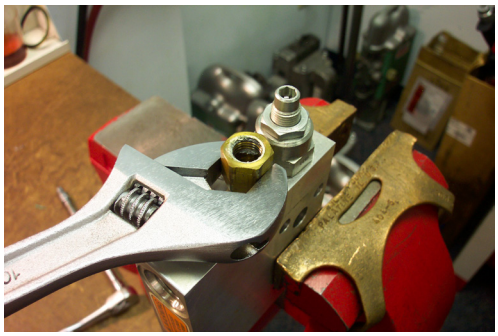


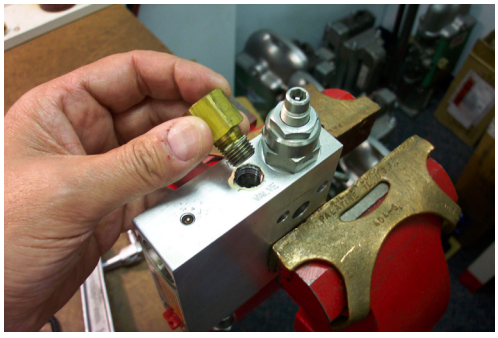
9) Remove O-rings (Item 68).
9) Entfernen O-Ringe (Einzelteil 68).





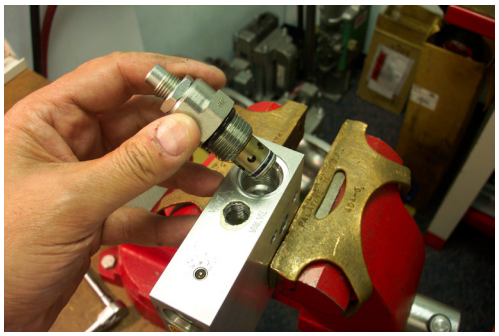
10) Remove pressure reducing valve (Item 77). (Reassembly torque: 20 - 25 Ft. Lbs.(27.1 - 33.9 Nm).)
10) entfernen Druckminderventil (Einzelteil 77). (Wiederversammlungdrehkraft: 27,1 - 33,9 Nm (20 - 25 Ft. Lbs.).)



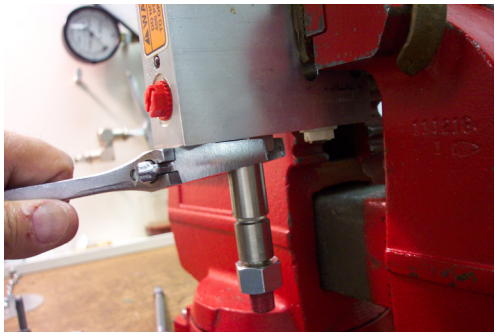


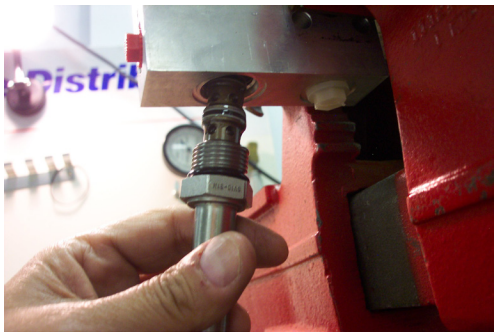
11) Remove orifice fitting (Item 78). (Reassembly torque: 20 - 25 Ft. Lbs. (27.1 - 33.9 Nm), or enough to seal pipe threads.) (Reassembly recommendations: use Loctite 592 pipe thread sealant, or equivalent.
11) entfernen Öffnung Befestigung (Einzelteil 78). (Wiederversammlungdrehkraft: 27,1 - 33,9 Nm(20 - 25 Ft. Lbs) oder genug zum Versiegeln Rohrgewinde.) (Wiederversammlungempfehlungen: verwenden Sie Rohr-Gewindedichtungsmittel des Loctites 592 oder Äquivalent.

VL 12B

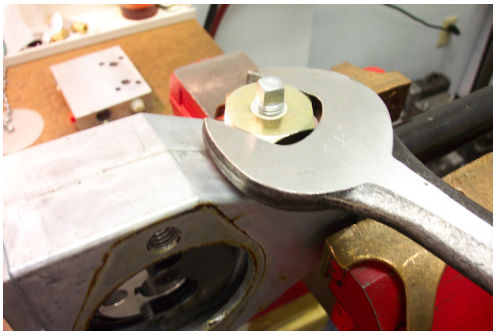


12) Remove hydraulic flow control (Item 70). (Reassembly torque: 20 - 25 Ft. Lbs. (27.1 - 33.9 Nm).)
12) entfernen hydraulische Steuerung des Datenflusses (Einzelteil 70). (Wiederversammlungdrehkraft: 27,1 - 33,9 Nm (20 - 25 Ft. Lbs.).)





13) Remove hydraulic solenoid valve (Item 73). (Reassembly torque: 20 - 25 Ft. Lbs. (27.1 - 33.9 Nm).)
13) entfernen hydraulisches Magnetventil (Einzelteil 73). (Wiederversammlungdrehkraft: 27,1 - 33,9 Nm (20 - 25 Ft. Lbs.).)



14) Remove the two outlet pin nuts (Item 32). (Reassmebly torque: 30 - 35 Ft. Lbs.(40,7 - 47,5 Nm).) (Reassembly recommendations: Use Loctite242 or equivalent on outlet nut threads).
14) entfernen die zwei Anschlußnüsse (Einzelteil 32). (Reassmebly Drehkraft: 40,7 - 47,5 Nm (30 - 35 Ft. Lbs.).) (Wiederversammlungempfehlungen: Verwenden Sie Loctite242 oder Äquivalent auf Anschlußnußgewinden).

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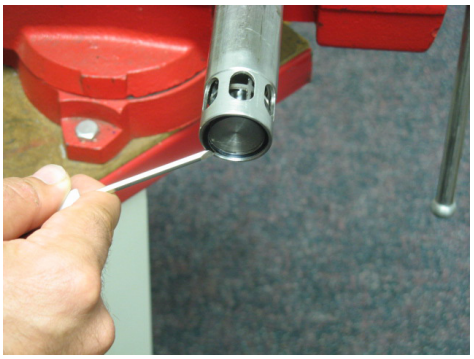
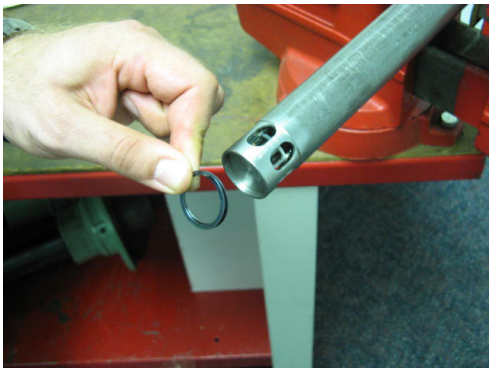
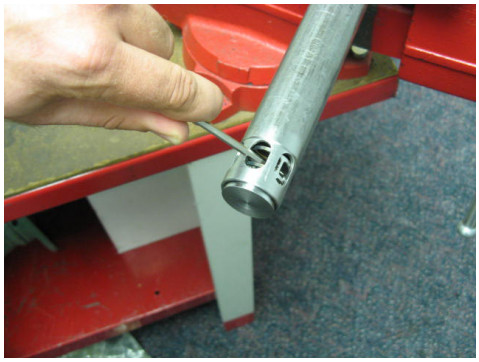
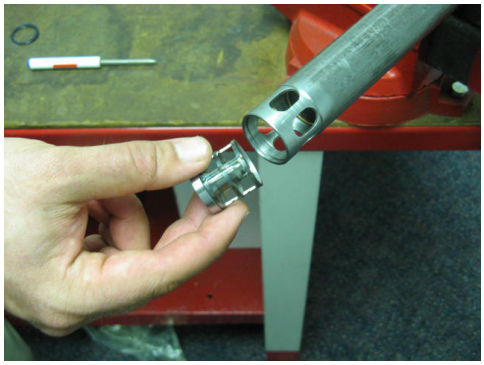


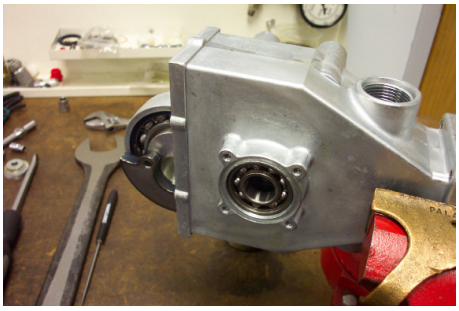


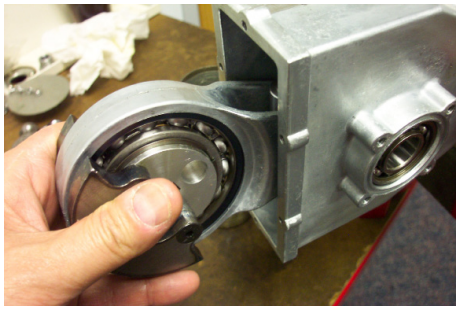
15. Remove spiral retaining ring (item 59) from housing tube.
15 Entfernen Sie Seegerring der Spirale (Einzelteil 59) vom Gehäuseschlauch.



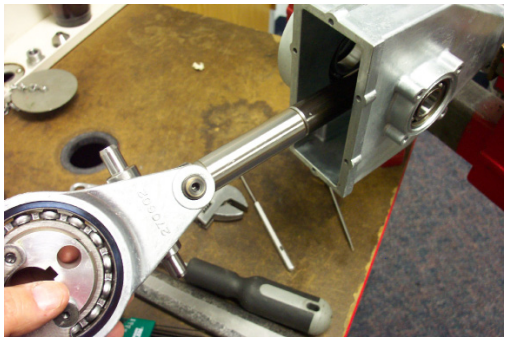


16. Remove shovel plug (Item 58) and spacer (Item 56b) from housing tube.
16. Entfernen Sie Schaufelstecker (Einzelteil 58) und Eingang Schirm (Einzelteil 56b) vom Gehäuseschlauch.



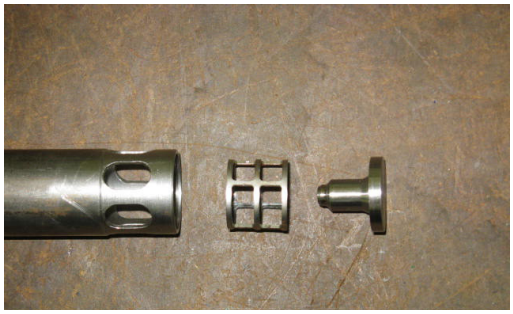


17. Push pump element (items 1 through 27) out of housing tube with nylon rod and hammer included in tool kit (276275). (Reassembly recommendation: replace pump element in housing tube with housing tube slightly loose, then torque housing tube (Item 56a) to pump housing (Item 73) to 20-25 Ft. Lbs. (27.1 - 33.9 Nm).)
17. Drücken Sie Pumpe Element (Einzelteile 1 bis 27) aus Gehäuseschlauch mit Nylonstange und Hammer heraus eingeschlossen im Werkzeuginstallationssatz (276275). (Wiederversammlungempfehlung: ersetzen Sie Pumpe Element im Gehäuse tobe mit dem losen Gehäuseschlauch etwas, drehen Sie dann Gehäuseschlauch (Einzelteil 56a) um Gehäuse (Einzelteil 73) zu 27.1 - 33.9 Nm (20-25 Ft Lbs.).)



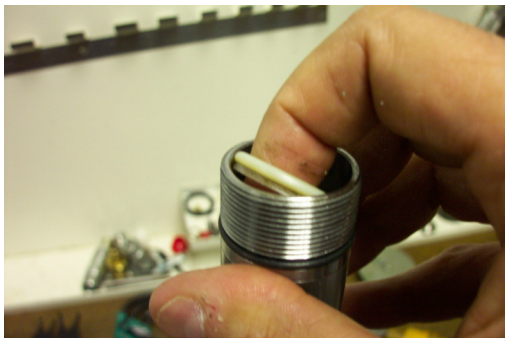
18. Pull pump element free of housing.
18. Das Pumpenelement aus dem Gehäuse ziehen.

19. Remove housing tube (Item 56a). (Reassembly Torque: 20 to 25 Ft. Lbs.(27.1 - 33.9 Nm).)
19. Entfernen Sie Gehäuseschlauch (Einzelteil 56a). (Wiederversammlung-Drehkraft: 27,1 - 33,9 Nm (20 - 25 Ft. Lbs.).)



20. Exploded view of housing tube (Item 56a), spacer (Item 56b) and Shovel Plug (Item 58).
2b. Explosionsdarstellung des Gehäuseschlauches (Einzelteil 56a), des Eingang Schirmes (Einzelteil 56b) und des Schaufel-Steckers (Einzelteil 58).

21. Remove bronze bushing (Item 57).
21. Entfernen Sie Bronzebuchse (Einzelteil 57).



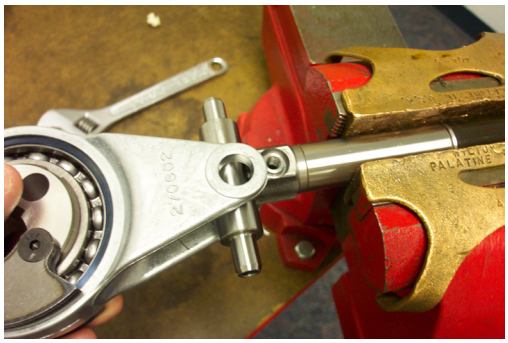
22. Remove oil seal O-ring (Item 53) and backup washer (Item 54). (Reassembly recommendation: replace O-ring seal and backup washer. Backup washer must be placed in tube first, then the O-ring.)
22. Entfernen Sie Öldichtung O-Ring (Einzelteil 53) und Aushilfsshaser (Einzelteil 54). (Wiederversammlungempfehlung: ersetzen Sie O-Ring Dichtung und Unterstützungsunterlegscheibe, Aushilfsunterlegscheibe muß gesetzter n Schlauch zuerst sein, legt dann den O-Ring in Schlauch.)

23. 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).
23. Entfernen Sie Handgelenkstift Buchse Schrauben (Einzelteil 11). (Wiederversammlungdrehkraft: 11,3 - 12,4 Nm (100-110 inch lbs.).) Wiederversammlungempfehlungen: verwenden Sie Loctite 242 oder Äquivalent auf Schraube Gewinden).

24. View of wrist pin bushing (Item 12).
24. Ansicht des Handgelenkstiftes Buchse (Einzelteil 12).

25. Press out wrist pin bushing (Item 12) with 5/16-24 bolt, (from kit 276275) needed since pivot bushings often stick in wrist pin anchor (Item 13a).
25. Pressen Sie Handgelenkstift Buchse (Einzelteil 12) mit dem Schraubbolzen 5/16-24 heraus (vom Satz Nr. 276276), der seit Gelenkbuchsen häufig Stock im Handgelenkstift Anker (Einzelteil 13a) erforderlich ist.

26. Remove wrist pin bushing (Item 12).
26. Entfernen Sie Handgelenkstift Buchse (Einzelteil 12).



27. Remove crankkrod and eccentric assembly (Items 1-7).
27. Entfernen Sie crankkrod und Exzenterversammlung (Einzelteile 1-7).

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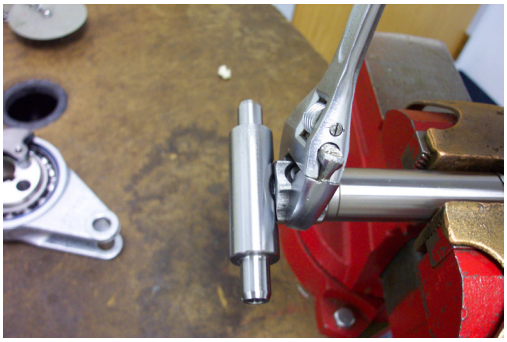
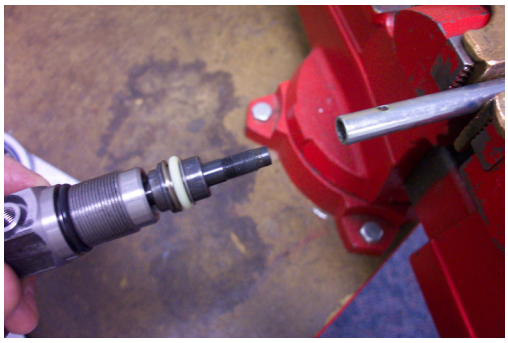


28. Loosen wrist pin anchor (Item 13a). (Reassembly torque: 20 - 25 Ft. Lbs. (27.1 - 33.9 Nm).)
28 Lösen Sie Handgelenkstift Anker (Einzelteil 13a). (Wiederversammlungdrehkraft: 27,1 - 33,9 Nm (20 - 25 Ft. Lbs.).)

29. 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.)
29. Entfernen Sie Handgelenkstift Anker (Einzelteil 13a). (Reassemblly Empfehlungen: ersetzen Sie O-Ring Dichtung (Einzelteil 13b), seien Sie sicher, daß Gewinde auf Handgelenkstift Anker (Einzelteil 13a) sauber und von allem Öl oder von anderen Flüssigkeiten. frei sind)

30. View of plunger tube and plunger tube bushing assembly (Items 10, 10a, 10b, 10c and 10d).
30. Ansicht des Spulenkernschlauches und der Spulenkernschlauchbuchse (Einzelteile 10, 10a, 10b, 10c und 10d).

31. Loosen plunger tube (Item 10). (Reassembly torque: 100-110 in. lbs. (11.3 - 12.4 Nm)).
31. Lösen Sie Spulenkernschlauch (Einzelteil 10). (Wiederversammlungdrehkraft: 11,3 - 12,4 Nm (100-110 inch lbs.).)

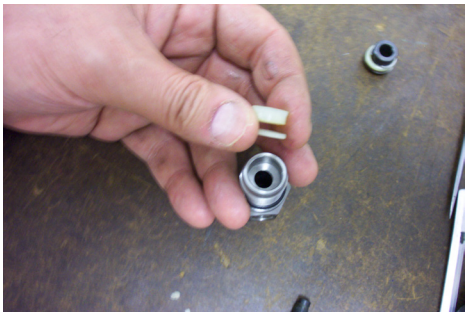


32. Remove plunger tube (Item 10) and associated parts. (Reassembly recommendations: replace O-ring (Item 10c) on bushing (Item 10a). Use Loctite 242 or equivalent on plunger tube threads.)
32. Entfernen Sie Spulenkernschlauch (Einzelteil 10) und verbundene Teile. (Wiederversammlungempfehlungen: ersetzen Sie O-Ring (Einzelteil 10c) auf dem Lushing (Einzelteil 10a). Verwenden Sie Loctite 242 oder Äquivalent auf Spulenkernschlauchgewinden.)

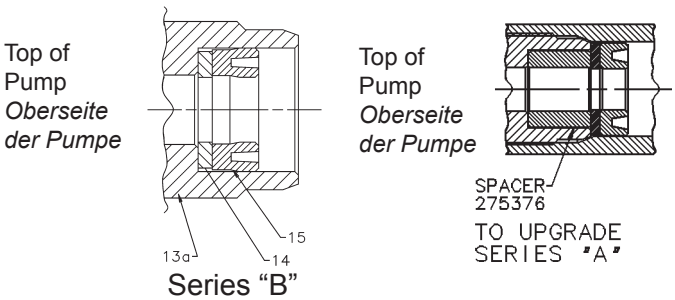
33. View of bushing assembly (Items 10 through 10d) removed.
33. Ansicht der Buchse (Einzelteile 10 durchgehende 10d) entfernt.

34. View of wrist pin anchor (Item 13a) showing upper cup seal (Item 15) and nylon back up washer (Item 14).
34. Ansicht des Handgelenkstiftes Anker (Einzelteil 13a) obere Schale Dichtung (Einzelteil 15) und Nylonstützscheibe (Einzelteil 14) zeigend.

35. Pull cup seal (Item 15) out of wrist pin anchor (Item 13a).
35. Ziehen Sie Schale Dichtung (Einzelteil 15) Handgelenkstift Anker heraus (Einzelteil 13a).

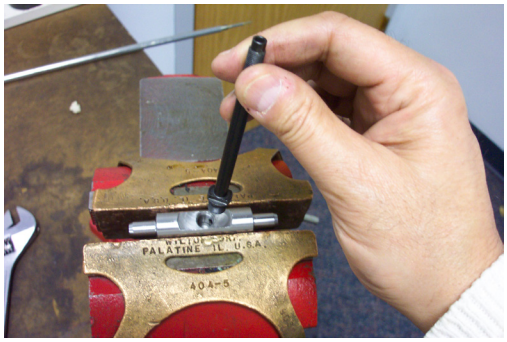


36. Remove cup seal (Item 15) and backup washer (Item 14). (Reassembly recommendations: replace cup and seal and backup washer. See detail below for orientation.)
36. Enlevez le joint de tasse (article 15) et la rondelle de secours (article 14). (recommandations de remontage : remplacez la rondelle de tasse et de joint et de protection.)



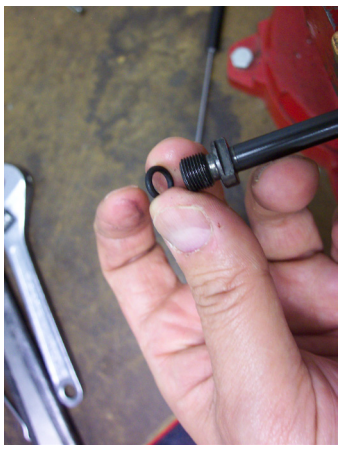
37. Hold outlet pin (Item 8) and plunger tube (Item 10) in vise.
37. Halten Sie Anschlußstift (Einzelteil 8) und Spulenkernschlauch (Einzelteil 10) im Kolben.

38. Loosen plunger tube (Item 10) from outlet pin (Item 8). (reassembly torque: 100-110 in.-lbs. (11.2 - 12.4 Nm).)
38. Lösen Sie Spulenkernschlauch (Einzelteil 10) vom Anschlußstift (Einzelteil 8). (Wiederversammlungdrehkraft: 11,2 - 12,4 Nm (100-110 in.-lbs.).)

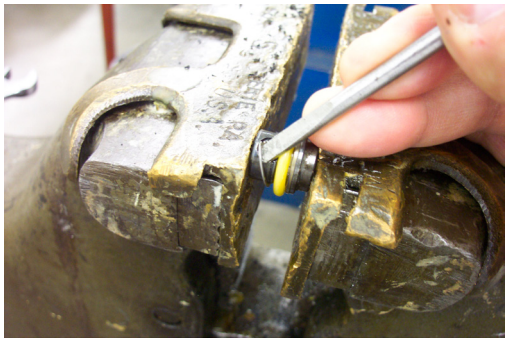


39. Remove plunger tube (Item 10). (Reassembly recommendations; replace o-ring (item 9). Use Loctite 242 or equivalent on plunger tube threads.)
39. Entfernen Sie Spulenkernschlauch (Einzelteil 10). (Ressembly Empfehlungen; ersetzen Sie O-Ring (Einzelteil 9). verwenden Sie Loctite 242 oder Äquivalent auf Spulenkernschlauchgewinden.)

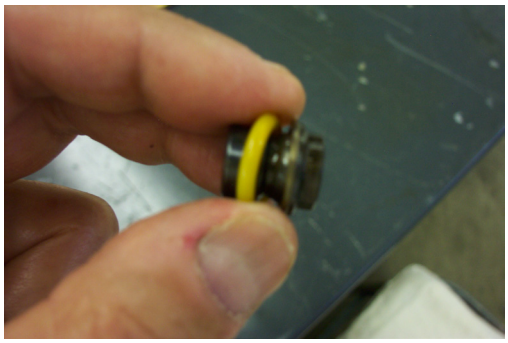
40. Remove O-ring (Item 9).
40. Entfernen Sie O-Ring (Einzelteil 9).



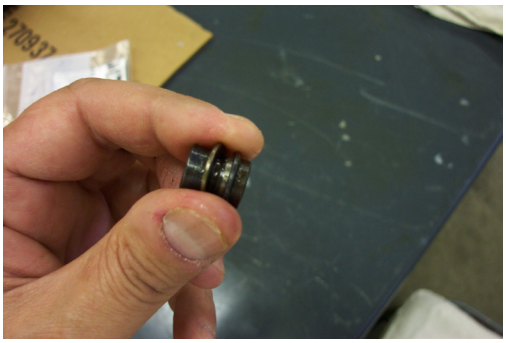
41. View of O-ring (Item 9) removed.
41. Ansicht des O-Ringes (Einzelteil 9) entfernte.



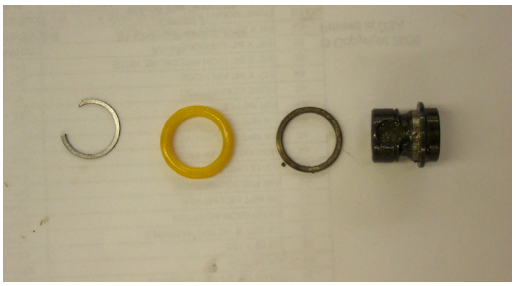
42. Remove C-clip (Item 10d).
42. Entfernen Sie C-Clip (Einzelteil 10d).



43. Remove O-ring (Item 10c).
43. Entfernen Sie O-rinb (Einzelteil 10c).



44. Remove backup washer (Item 10b).
44. Entfernen Sie Aushilfsunterlegscheibe (Einzelteil 10b).



45. View of upper bushing and seals (Items 10-10d).
45. Ansicht der oberen Buchse und der Dichtungen (Einzelteile 10-10d).

46. Loosen check seal housing (Item 27) with 3/8 Allen wrench. (Reassembly torque: 20-25 ft. lbs. (27.1 - 33.9 Nm).)
46. Lösen Sie Überprüfung Dichtungsgehäuse (Einzelteil 27) mit 3/8 Inbusschlüssel. (Wiederversammlungdrehkraft: 27.1 - 33.9 Nm (20-25 ft. lbs.).)

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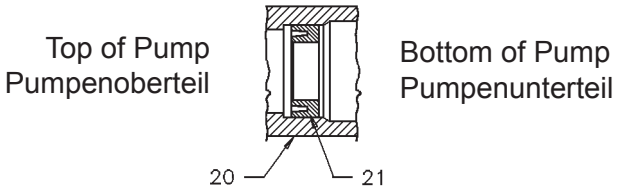
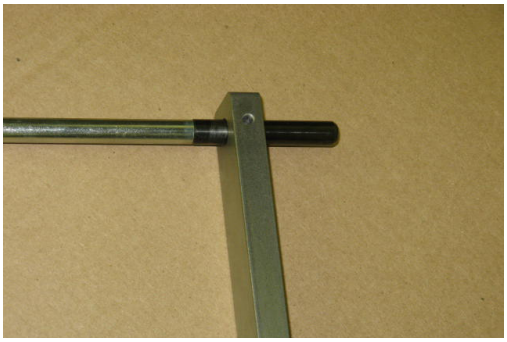
47. Check seat housing assembly (Item 27) and associated parts removed. (Reassembly recommendations: replace O-ring seal (Item 26). Apply Loctite 242 or equivalent to check seat housing threads.)
47. Überprüfen Sie Sitzgehäuse (Einzelteil 27) und die verbundenen entfernten Teile. (Wiederversammlungempfehlungen: ersetzen Sie O-Ring Dichtung (Einzelteil 26). Wenden Sie Loctite 242 oder Äquivalent an den Überprüfung Sitzgehäusegewinden.) an.

48. Remove ball cage (Item 24), check ball (Item 25) and O-ring seal (Item 26) from check seat housing (Item 27).
48. Entfernen Sie Kugelrahmen (Einzelteil 24), Überprüfung Kugel (Einzelteil 25) und O-Ring Dichtung (Einzelteil 26) vom Überprüfung Sitzgehäuse (Einzelteil 27).

49. Remove lower bushing (Item 19a) from reciprocating tube (Item 20). (Reassembly recommendations: replace O-ring seal (Item 26.) Remove lower cup (Item 21) from reciprocating tube (Item 20). (Reassembly recommendation: replace lower cup seal. See below for orientation). Remove pump bushing (Item 19a) from pump plunger (Item 19).
49. Entfernen Sie unterere Buchse (Einzelteil 19a) von austauschendem Schlauch (Einzelteil 20). (Empfehlung zum Wiederzusammenbau: die untere Topfdichtung ersetzen. Ausrichtung siehe unten). Entfernen Sie unterere Schale (Einzelteil 21) von austauschendem Schlauch (Einzelteil 20). Pumpenbuchse (Teil 19a) vom Pumpenplunger (Teil 19) entfernen.





50. To remove lower plunger, use special tool provided in Tool Kit 276275.
50. Zur Entfernung des unteren Plungers das Spezialwerkzeug benutzen, das im Werkzeugsatz 276275 enthalten ist.

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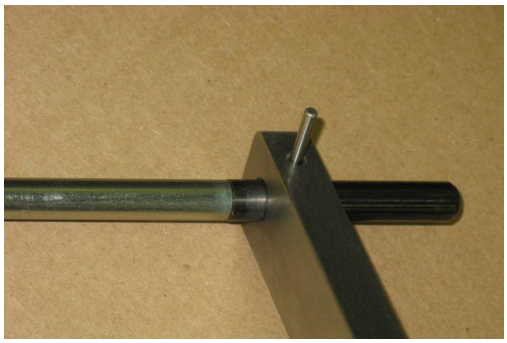
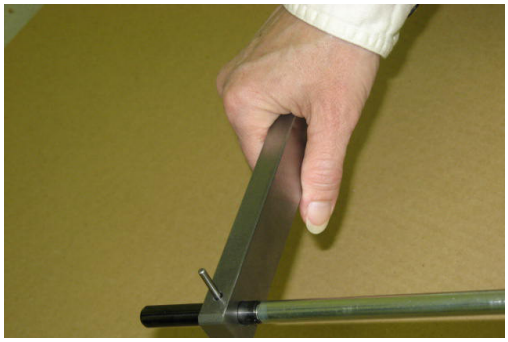
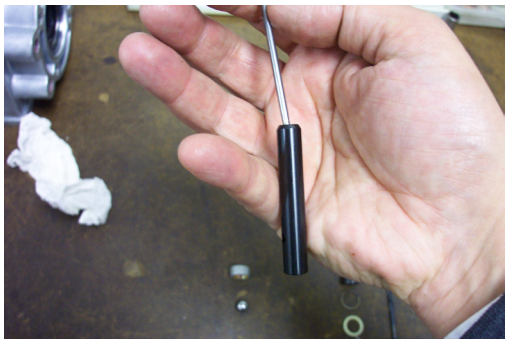


51. With the tool in place, insert the pin included in tool kit (276275) through the tool and into the plunger outlet hole.
51. Wenn das Werkzeug richtig angebracht ist, den im Satz (276275) enthaltenen Stift durch das Werkzeug und in das Plungerauslassloch einführen.



52. Remove plunger (Item 19). (Reassembly torque: 100-110 in. lbs. (11.3 - 12.3 Nm)) (Reassembly recommendations: use Loctite 242 or equivalent on plunger threads)
52. Entfernen Sie Spulenkern (Einzelteil 19) mit Schlüssel. (Wiederversammlungdrehkraft: 11,3 - 12,4 Nm (100-110 inch lbs.).) (Wiederversammlungempfehlungen: verwenden Sie Loctite 242 oder Äquivalent auf Spulenkerngewinden)



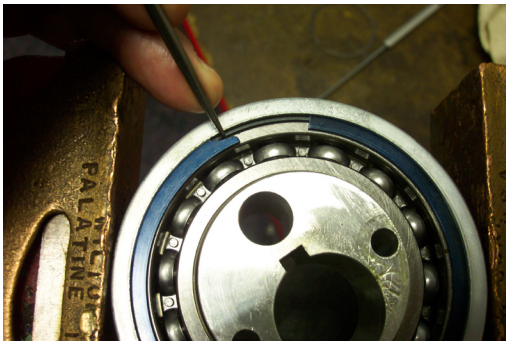
53. Push out check ball (Item 18) and check spring (Item 17).
53. Schieben Sie Überprüfung Kugel (Einzelteil 18) hinaus und überprüfen Sie Frühling (Einzelteil 17).

54. Clamp crank rod/eccentric assembly (Items 1-7) in vise.
54. Reizbare rod/eccentric Klemmplatte (Einzelteile 1-7) im Kolben.

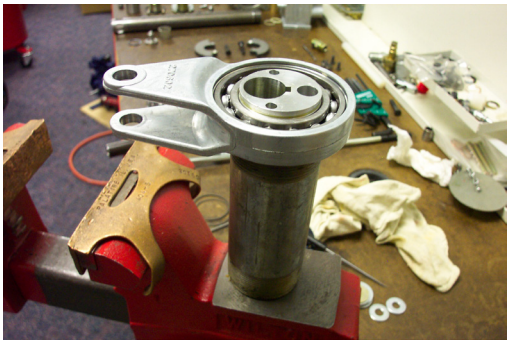
55. Loosen flat head screw (Item 1). (Reassembly torque: 100-110 in. lbs. (11.3 - 12.4 Nm).)
55. Lösen Sie flache Hauptschraube (Einzelteil 1). (Wiederversammlungdrehkraft: 11,3 - 12,4 Nm (100-110 inch lbs.).)

56. Remove flat head screws (Items 1). (Reassembly recommendation: use Loctite 242 on screw threads).
56. Entfernen Sie flache Hauptschrauben (Einzelteile 1). (Wiederversammlungempfehlung: benutzen Sie Loctite 242 auf Schraube Gewinden).

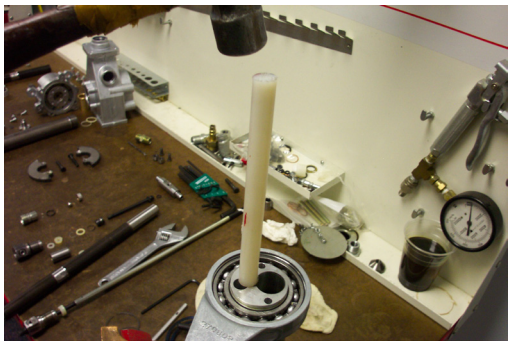
57. With both flat head screws removed, remove counterbalance weights (Item 2).
57. Wenn beide flachen Hauptschrauben entfernt sind, entfernen Sie Ausgleichsdämpfergewichte (Einzelteil 2).



58. Remove inner and outer retaining ring (Item 5 and Item 3) from both sides.
58. Entfernen Sie inneren und äußeren Seegerring (Einzelteil 5 und Einzelteil 3) von beiden Seiten.

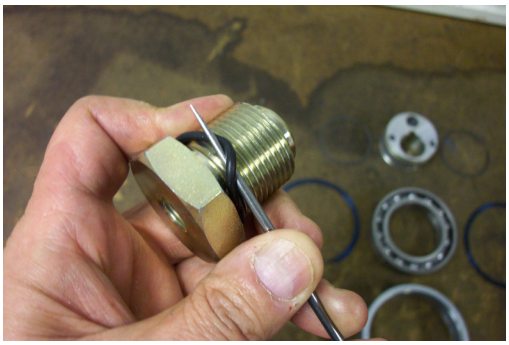


59. Place assembly on 2 1/2” dia. steel pipe included in tool kit.
59. Die Baugruppe auf das 2 ½ Zoll Durchmesser Stahlrohr setzen, das im Werkzeugsatz enthalten ist.



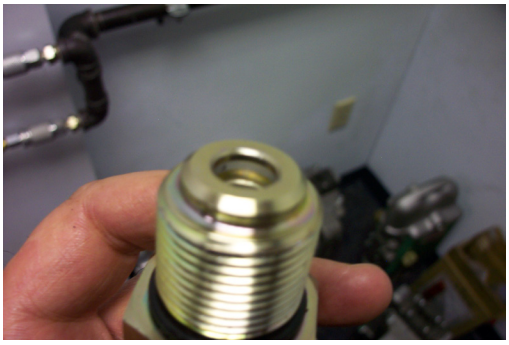
60. Drive crank eccentric (Item 6) out of ball bearing (Item 7).
60. Fahren Sie Exzentriker (Einzelteil 6) aus kugellager (Einzelteil 7) heraus.

61. Drive ball bearing (Item 7) out of crank rod (Item 4).
61. Fahren Sie kugellager (Einzelteil 7) aus reizbarer Stange (Einzelteil 4) heraus.



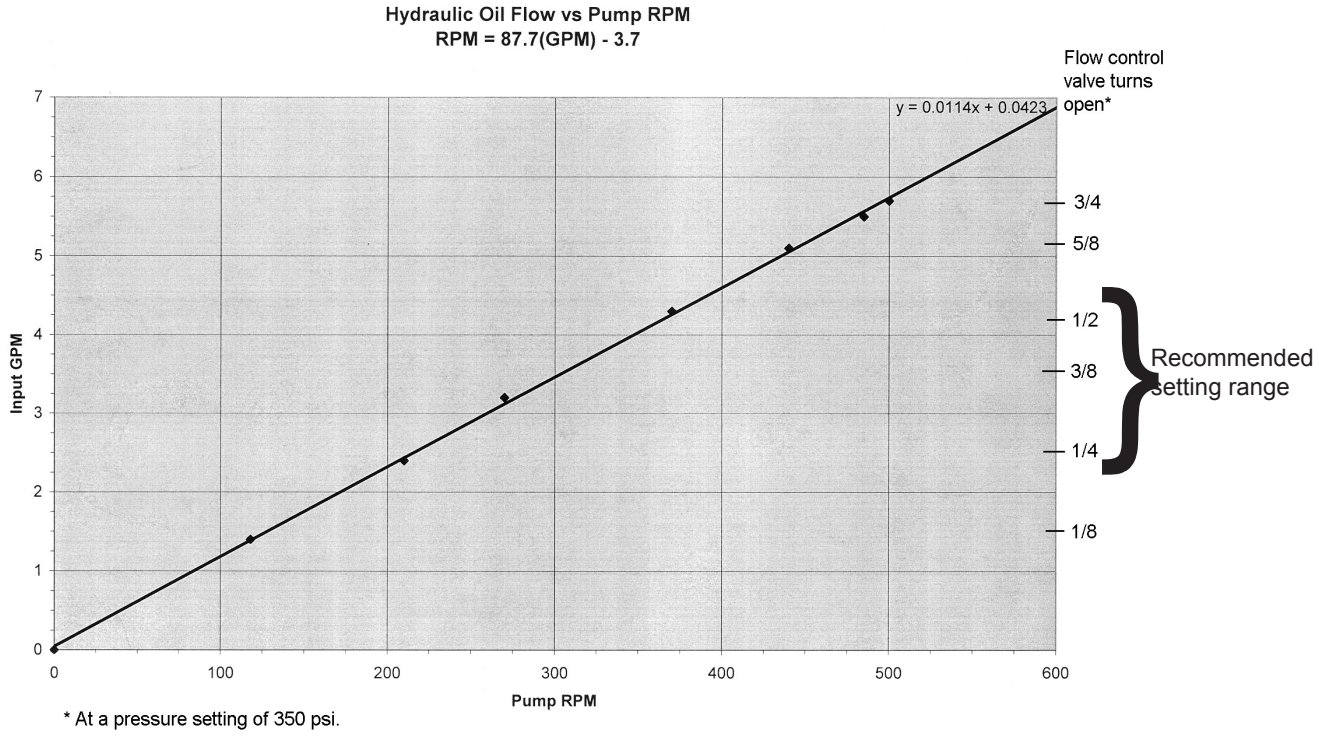
62. Remove O-Ring seal (Item 33) from outlet nut (Item 32).
62. Entfernen Sie O-Ring Dichtung (Einzelteil 33) von der Anschlußnuß (Einzelteil 32).

63. 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.
63. Entfernen Sie O-Ring Dichtung (Einzelteil 34) und Aushilfsunterlegscheibe (Einzelteil 35) von der Anschlußnuß (Einzelteil 32). Merken Sie die Position des backupwasher im Foto.

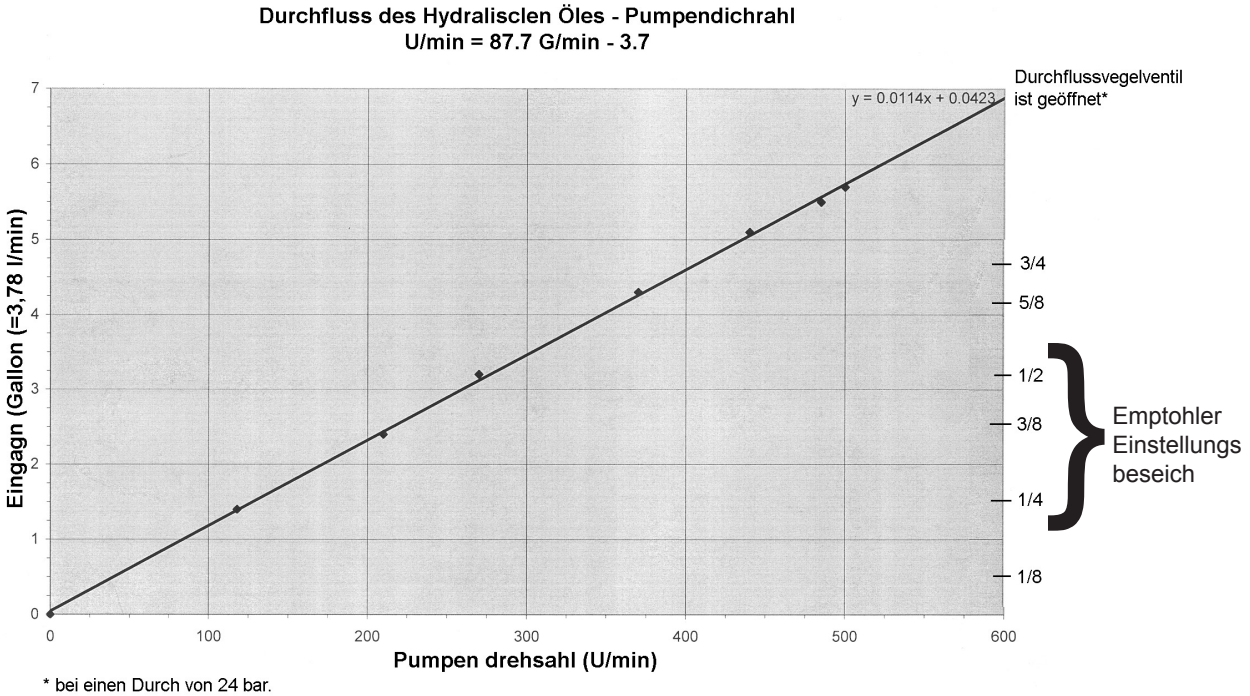


64. Reassembly recommendations: To install the O-ring (Item 34) and backupwasher (Item35) most easily, install the backup washer first.
64. Wiederversammlungempfehlungen: Um den O-Ring (Einzelteil 34) und backupwasher (Item35) leicht anzubringen, bringen Sie die Aushilfsunterlegscheibe zuerst an.

65. 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.
65. Und ziehen Sie dann Zehe O-Ring (Einzelteil 34) unter die Aushilfsunterlegscheibe, pushingup die abschließende Ausbuchtung des O-Ringes mit einer stumpfen Stange ein.



* At a pressure setting of 350 psi.



* bei einen Durch von 24 bar.

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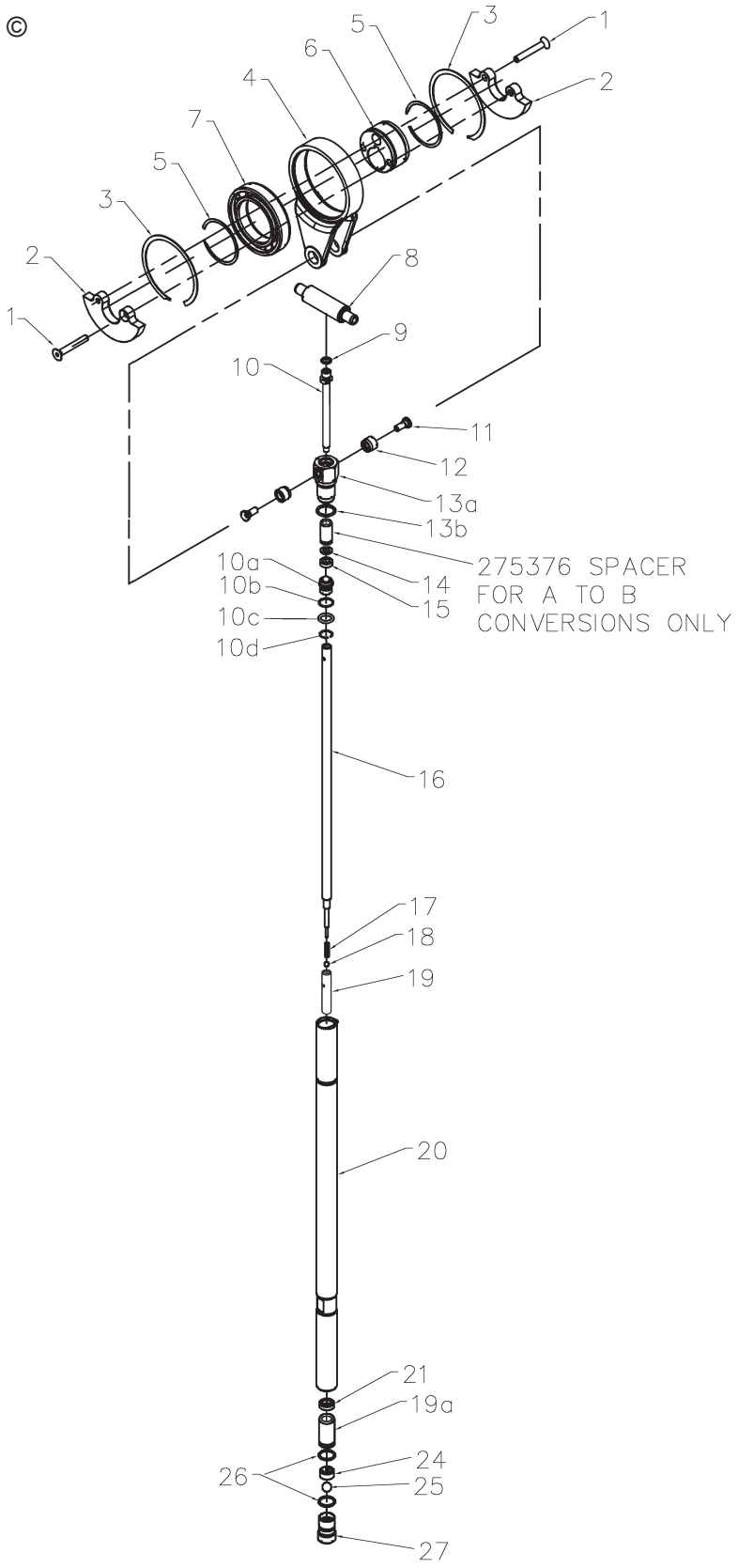
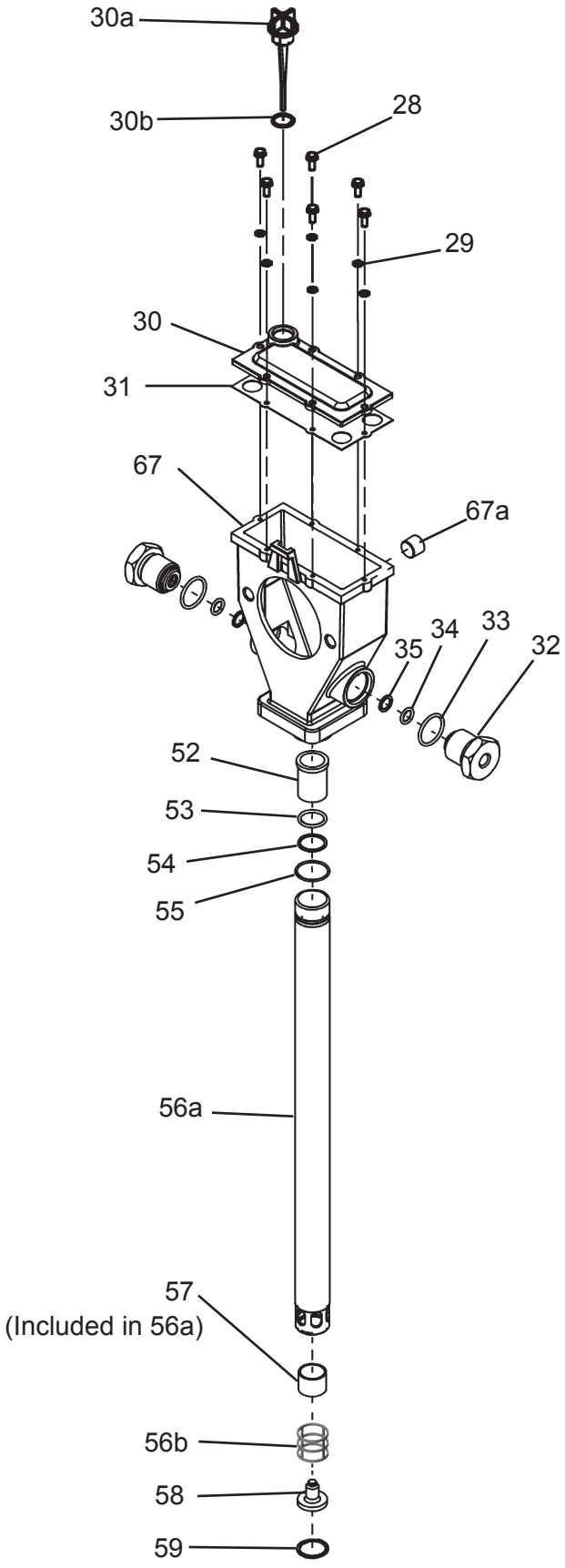
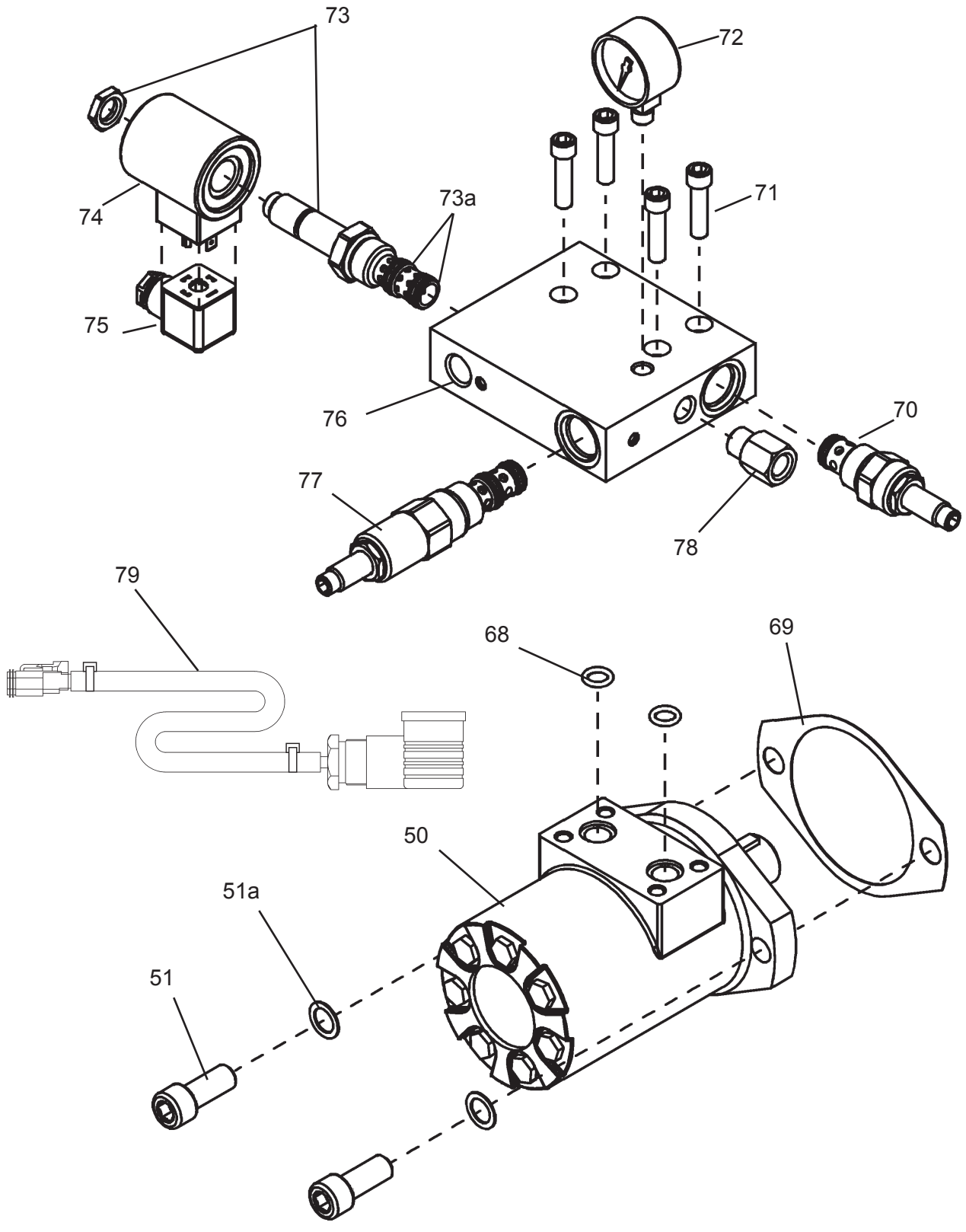


© Indicates change
© Zeigt Änderung an

VL 12B


30a
30b
28
29
30
31
67
67a
35
34
33
32
52
53
54
55
56a
57
(Included in 56a)
56b
58
59

VL 12B



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Repair Parts
(for all models)

Item No.	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	275619
10a	1	Plunger Bushing	274993
10b	1	Steel Back-up Ring	274997 1)*
10c	1	O-ring	1)
10d	2	Retainer clip	274996 1)*
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 Chart on Next Page
17	1	Spring	1)
18	1	Ball	1)
19	1	Pump Plunger	275002
19a	1	Pump Bushing	Included in Item 19
20	1	Reciprocating Tube	See Chart on Next Page
21	1	Cup Seal (Polyurethane)	1)
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)*
30*	1	Housing cover	275009
30a*	1	Dipstick	275369*
30b*	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)
50	1	Hydraulic Motor Kit (Includes Gasket (Item 69) and 2x O-Ring (Item 68))	274054
51	2	Socket Head Screw (1/2 x 1-1/4)	270658
51a	2	Washer	271501
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	See Chart on Next Page
56b	1	Spacer	276279
57	1	Bronze Bushing	Included in 56a
58	1	Shovel Plug	270707
59	1	Retaining Ring	270705
67	1	Pump Housing	270673
67a	1	Pipe Plug (3/8 NPTF)	67417
68	1	O-Ring (Viton)	1)
69	1	Motor Gasket	1)
70	1	Flow Control Valve (Includes Seal Kit 70a)	See Chart on Next Page
70a	1	Seal Kit (Nitrile)	270689
71	4	Socket Head Screw (5/16 x 1-1/4)	270680
72	1	Pressure Gauge	270768
73	1	Solenoid Valve Cartridge (Includes Seal Kit 73a)	See Chart on Next Page
73a	1	Seal Kit (Nitrile)	270687
74	1	Solenoid Coil (24 VDC)	270691
75	1	Solenoid Coil Connector	242209
76	1	Manifold	270771
77	1	Pressure Reducing Valve (Includes Seal Kit 77a)	See Chart on Next Page
77a	1	Seal Kit (Nitrile)	270688
78	1	Orifice Fitting	270735
79	1	Solenoid Cable Assembly	See Chart on Next Page
	1	Inlet Strainer	272180 2)
1)		Repair Kit	275383

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Repair Parts List

(Non-common items)

Item No.	Qty.	Description	Model 85247 (120 lb)	Model 85480 (120 lb)	Model 85481 (60 lb)	Model 85482 (400 lb)	Model 85483 (5 gal)
16	1	Plunger Link Rod	270648	270648	270614	270645	270641
20	1	Reciprocating Tube	275018	275018	275022	275158	275010
56a	1	Housing Tube	275191	275191*	275190*	275192*	275189
70	1	Flow Control Valve	270693	270693	270693	270693	270693
73	1	Solenoid Valve Cartridge	270678	270678	270678	270678	270678
77	1	Pressure Reducing Valve	270692	270692	270692	270692	270692
79	1	Solenoid Cable Assembly	None	None	None	None	None

Item No.	Qty.	Description	Model 85484* (60 lb)	Model 85586 (400 lb)	Model 85610 (400 lb)	Model 274055 (60 lb)
16	1	Plunger Link Rod	270614	270645	270645	270614
20	1	Reciprocating Tube	275022	272176	275158	275022
56a	1	Housing Tube	275190	275189	275192	275190*
70	1	Flow Control Valve	273491	272178	270693	270693
73	1	Solenoid Valve Cartridge	270678	270678	270678	270678
77	1	Pressure Reducing Valve	277831	272177	270692	270692
79	1	Solenoid Cable Assembly	None	None	None	273502

1) Included in 275383 Soft Parts Kit

2) The inlet strainer fits all FlowMaster models

* Indicates change

Ersatzteilliste
(für alle Modelle)

TN	ANZ	BESCHREIBUNG	ALLE MODELLE	TN	ANZ	BESCHREIBUNG	ALLE MODELLE
1	2	Flacher Schraubenzieher, (1/4 x 1-3/4)	270635	32	2	Auslass, Stiftmutter	270619
2	2	Gegengewicht	272197	33	2	O-Ring	1)
3	2	Haltering	270609	34	2	O-Ring	1)
4	1	Kurbelstange	270665	35	2	Stützunterlegscheibe	1)
5	2	Haltering	270608	50	1	Satz für hydraulischen Motor (enthält Dichtung (Teil 69) und 2 O-Ringe (Teil 68))	274054
6	1	Kurbelexzenter	270666				
7	1	Kugellager	270607	51	2	Innensechskantschraube (1/2 x 1-1/4)	270658
8	1	Auslassstift	270670	51a	2	Unterlegscheibe	271501
9	1	O-Ring (Nitril)	1)	52	1	Bronzelager	270674
10	1	Kolbenrohr	275619	53	1	O-Ring (Polyurethan)	1)
10a	1	Kolbenbuchseã	274993	54	1	Stützunterlegscheibe	1)
10b	1	Stahlstützring ã	274997[1]*	55	1	O-Ring (Nitril)	1)
10c	1	O-Ring	1)	56a	1	Gehäuserohr	Siehe Tabelle auf der nächsten Seite
10d	2	Halteklammer	274996[1]*	56b	1	Einlasssieb	276279
11	2	Gelenkschraube	275006	57	1	Bronzebuchse	Included in 56a
12	2	Kolbenbolzenbuchse	275005	58	1	Schaufelstecker/Schaufelstopfen	270707
13a	1	Kolbenbolzenanker	274992	59	1	Haltering	270705
13b	1	O-Ring	1)	67	1	Pumpengehäuse	270673*
14	1	Stützunterlegscheibe	1)	67a	1	Rohrstopfen (3/8 NPTF)	67417
15	1	Topfdichtung (Polyurethan)	1)	68	1	O-Ring (Viton)	1)
16	1	Kolbenverbindungsstange	Siehe Tabelle auf der nächsten Seite	69	1	Motordichtung	1)
17	1	Feder	270616	70	1	Flussregelungsventil (mit Dichtungssatz 70a)	Siehe Tabelle auf der nächsten Seite
18	1	Kugel	66010	70a	1	Dichtungssatz (Nitril)	270689
19	1	Pumpenkolben & Buchse	275002	71	4	Innensechskantschraube (5/18 x 1-1/4)	270680
19a	1	Kolbenrohr	Eingeschlossen in Einzelteil 19				
20	1	Topfdichtung	Siehe Tabelle auf der nächsten Seite	72	1	Druckmesser	270768
21	1	(Polyurethan)	1)	73	1	Magnetventileinsatz (mit Dichtungssatz 73a)	Siehe Tabelle auf der nächsten Seite
24	1	Kugelkäfig	272179	73a	1	Dichtungssatz (Nitril)	270687
25	1	Kugel	66001	74	1	Magnetspule (24 VDC)	270691
26	2	O-Ring (Nitril)	1)	75	1	Magnetspulenverbindung	242209
27	1	Rückschlagventilsitz	270664	76	1	Verteiler	270771
28	6	Gewindeschneidende Schraube (#8 x ½)	270633	77	1	Druckminderungsventil (mit Dichtungssatz 77a)	Siehe Tabelle auf der nächsten Seite
29	6	Dichtungen (Schraube)	252986[1]*	77a	1	Dichtungssatz (Nitril)	270688
30	1	Gehäuseabdeckung	275009	78	1	Drosselanschlussstück	270735
30a	1	Messstab	275008	79	1	Magnetkabelbaugruppe	Siehe Tabelle auf der nächsten Seite
30b	1	O-Ring	1)		1	Einlasssieb	272180[2]
31	1	Abdeckungsdichtung (Nitril)	1)		1)	Reparatur-Installationssatz	275383

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Ersatzteilliste

(Nicht gemeinsame Teile)

Liste der Reparaturteile

(Spezialteile)

Teilno.	Anz.	Beschreibung	Modell 85247 (120 lb)	Modell 85480 (120 lb)	Modell 85481 (60 lb)	Modell 85482 (400 lb)	Modell 85483 (5 gal)
16	1	Kolbenverbindungsstange	270648	270648	270614	270645	270641
20	1	Pumpenkolbenrohr	275018	275018	275022	275158	275022
56a	1	Gehäuserohr	275191	275191*	275190*	275192*	275190
70	1	Durchflussregelungsventil	270693	270693	270693	270693	273491
73	1	Magnetventileinsatz	270678	270678	270678	270678	270678
77	1	Druckminderungsventil	270692	270692	270692	270692	277831
79	1	Magnetkabelbaugruppe	None	None	None	None	None

Teilno.	Anz.	Beschreibung	Modell 85484* (60 lb)	Modell 85586 (400 lb)	Modell 85610 (400 lb)	Modell 274055 (60 lb)
16	1	Kolbenverbindungsstange	270614	270645	270645	270614
20	1	Pumpenkolbenrohr	275022	272176	275158	275022
56a	1	Gehäuserohr	275194	275189	275192	275190*
70	1	Durchflussregelungsventil	270693	272178	270693	270693
73	1	Magnetventileinsatz	270678	270678	270678	270678
77	1	Druckminderungsventil	270692	272177	270692	270692
79	1	Magnetkabelbaugruppe	None	None	None	273502

1) Enthalten im 275383 Weichteilesatz

2) Das Einlasssieb passt in alle FlowMaster Modelle

© Zeigt Änderung an

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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, 32, 36 to 52, 58 to 67	No kit – parts identical for Series A and Series B.
*9, 10, 10a, 10b, 10c, 10d, 14 and15	275186 - Upper Bushing & Plunger Kit
17, 18, 19, 19a, 21, 24, 25, 26 , 27 and 56b	275187 - Lower Bushing & Plunger Kit
11, 12, 13a, 13b, 275376 Spacer	275188 Pivot Pin/Anchor Kit
20	Reciprocating Tube. See chart Page 35 for Series B
28, 29, 30, 30a, 30b, and 31	275381 - Housing Cover Kit
56a and 57 (pressed into 56a)	Housing Tube. See chart Pg. 35 Series B
Repair Kit	275383 Repair Kit

*Item 9 is assembled to Item 10.

Kits to convert Series “A” to Series “B” Pumps

		Consists of				
Size	Kit	Repair Kits (See Above)	Housing Cover Kit	Reciprocating Tube Kit	Housing Tube Kit	Plunger Link Rod Kit
5 GAL	276580	275186, 275187, 275188, 275383	275381	275010	275189	270641
90-120#	276581	275186, 275187, 275188, 275383	275381	275018	275191	270648
60#	276582	275186, 275187, 275188, 275383	275381	275022	275190	270614
400#	276583	275186, 275187, 275188, 275383	275381	275158	275192	270645

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Repair Kit Selection Chart

Repair Series B Only

Item #	Kit #
1 to 8, 28 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, 24, 25, 26, 27 and 56b	275187 - Lower Bushing & Plunger Kit
9, 13b, 14, 15, 17, 18, 21, 25, 26, 30b, 31, 33, 34, 35, 53, 54 and 55	275383 - Repair Kit

* Item 9 is assembled to Item 10.

Reparatursatz-Auswahltabelle

Umbau von Pumpen der A Serie zu B-Serie Pumpen
- Serviceblatt der A Serie benötigt zum Auseinanderbau
- Serviceblatt der B Serie benötigt zum Zusammenbau

Teilnummer	**Reparatursatz Nummer**
1 bis 8, 32, 36 bis 52, 58 bis 67	Kein Satz – die Teile für Serie A und Serie B sind identisch
*9, 10, 10a, 10b, 10c, 10d, 14, 15	275186 – Obere Buchse & Kolbensatz
17, 18, 19, 19a, 21, 24, 25, 26, 27 und 56b	275187 – Untere Buchse & Kolbensatz
20	Für die Teilnummer des Kolbenrohrs siehe Tabelle auf Seite 37, Serie B
28, 29, 30 30a, 30b und 31	275381 – Gehäusedeckelsatz
Teile 56a, und 57 (in Teil 56a eingepresst)	Gehäuseschlauch Siehe Tabelle Seite 37, Serie B (Plus Distanzscheibe 276279)
Reparatur-Installationssatz	275383 Reparatur-Installationssatz
11, 12, 13a, 13b, 275376 Einlassieb	275188 Drehzapfen/Anker-Installationssatz

*Teil 9 wird zu Teil 10 zusammengebaut.

Sätze zum Umbau von Pumpen der Serie „A“ zu solchen der Serie „B“

		Bestehend aus				
Größe	Satz	Reparatursätze (Siehe oben)	Gehäuse-deckelsatz	Hubkolben-rohrsatz	Gehäuse-rohrsatz	Kolbenverbindungs stange
5 GAL	276580	275186, 275187, 275188, 275383	275381	275010	275189	270641
90-120#	276581	275186, 275187, 275188, 275383	275381	275018	275191	270648
60#	276582	275186, 275187, 275188, 275383	275381	275022	275190	270614
400#	276583	275186, 275187, 275188, 275383	275381	275158	275192	270645

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Reparatursatz Auswahltabelle

Nur Reparatur der B Serie

Teilnummer	Satz Nummer
1 bis 8, 28 bis 30a, 39 bis 52, 56a bis 67	Nicht in Sätzen enthalten. Einzeln bestellen, falls benötigt
*9, 10, 10a, 10b, 10c, 10d, 14 and 15	275186 – Obere Buchse & Kolbensatz
11, 12, 13a, (Abstandsstück 275376 nicht verwenden)	275188 – Gelenkbolzen & Ankersatz
17, 18, 19, 19a, 21, 24, 25, 26, 27 and 56b	275187 - Untere Buchse & Kolbensatz
9, 13b, 14, 15, 17, 18, 21, 25, 26, 30b, 31, 33, 34, 35, 53, 54, 55,	275383 - Reparatursatz

*Teil 9 wird zu Teil 10 zusammengebaut.

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TECHNICAL SERVICE BULLETIN

Bulletin Number: DC-2224 **Date:** 3/28/2008

Affected Model(s): Centro-Matic® FlowMaster® Hydraulic Pumps

Subject: Flow Control Valve Adjustment Recommendations

Inline with our goal of continuous improvement to our product line, many hours of engineering research and lab time have been dedicated to the subject products. This research was done as a result of sporadic reports of ongoing failure modes and shorter than expected pump service life.

From our research, we found that the Flow Control Valve adjustment on the manifold was routinely being set at "1 full turn open" during the manufacturing process. At a recommended Pressure Control Valve setting of 350 PSI, the hydraulic oil flow was approaching levels of over 6 GPM. With these settings, we found that the pump was running much faster than required and therefore reducing the service life of the pump.

As of February 1, 2008 (pump date code XE/XT) manufacturing procedures were updated and the Flow Control Valve is being set at "¼ turn open". We recommend that any pump placed in service prior to this date be adjusted to "¼-1/3 turn open". **PLEASE NOTE: The Flow Valve should never be adjusted to more than "½ turn open" for normal operating conditions.** This simple adjustment has proven that it will prevent early failures previously associated with operating the pumps at excessive speeds.

Extenuating circumstances may dictate a faster speed, but overall performance of the pumps might be affected. Careful consideration should be given prior to adjusting to faster than recommended pump speeds.

The changes noted above will be made to the "Setting the Pump Manifold Pressure and Flow Controls" section of the owner/operators manual. To expedite getting these details to you, I have attached a copy of the changes:

Setting the Pump Manifold Pressure and Flow Controls

The pressure must first be adjusted to insure the desired flow setting is achieved.

Pressure Control Valve Adjustment

- With hydraulic pressure applied, stop the pump by turning the flow control clockwise until completely closed.
- Loosen the lock nut on the Pressure control by turning the nut COUNTERCLOCKWISE.
- Turn the valve stem COUNTERCLOCKWISE until it no longer turns. The valve stem will unscrew until it reaches the stop. It will not come off. This is the minimum pressure setting, which is about 170 psi (12 bar).
- With the pump stalled against pressure, turn the Pressure Control Valve stem CLOCKWISE until the desired pressure is attained on the manifold Pressure Gage. (Do not exceed 450 PSI (31 bar)). A pressure of 350 PSI (24 bar) is recommended.
- Tighten the lock nut by turning CLOCKWISE.

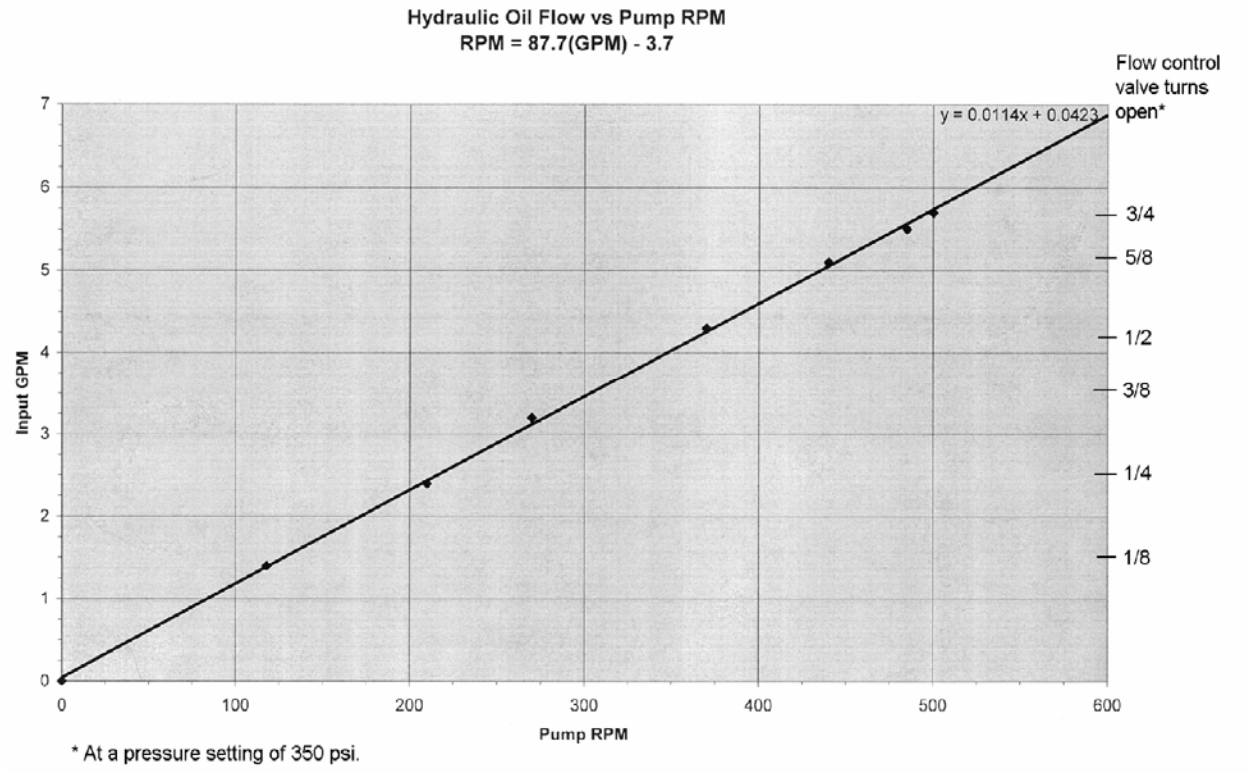
Flow Control Valve Adjustment

- Loosen the lock nut on the Flow Control Valve by turning the nut COUNTERCLOCKWISE.
- Adjust the flow by turning the valve stem CLOCKWISE to reduce the flow and COUNTERCLOCKWISE to increase it. The Flow Control Valve can be turned in until the valve is completely closed, and out to adjust pump speed.

  RECOMMENDED SETTING - 1/4 to 1/3 (no more than 1/2 open)

  - After adjusting the flow to the desired setting, tighten the lock nut by turning it CLOCKWISE.

For your information, I have also attached a performance chart that will be included in the new owner/operator manual. It details “Hydraulic Oil Flow vs. Pump RPM”. It illustrates hydraulic oil flow at various settings of the Flow Control Valve. At “¼ turn open” the hydraulic oil flow is over 2 GPM and the pump RPM is approximately 210. At “½ turn open” the hydraulic oil flow is over 4 GPM, and the pump RPM is approximately 370. Our extensive research has shown us that the oil flow at ¼ turn open is more than enough for normal applications. Any speed higher than this should be carefully considered with the understanding that the increased grease output gained will be offset by possible earlier failures and shorter than expected service life of the pump.



For system design reference, each RPM of the FlowMaster pump will give a grease output of .07 cubic inches/minute. Therefore, with the Flow Control Valve set at "¼ turn open", the grease output will be approximately 14.7 cubic inches/minute. A "1/3 open" setting will yield approximately 17.5 cubic inches/minute, and a "½ open" setting will yield approximately 26 cubic inches/minute.

A common misconception by operators is that in colder temperatures, increasing the pump speed (i.e., opening the Flow Control Valve more) will increase the grease flow in the supply line to the injectors In fact, the opposite is true and will only increase the supply line pressure near the pump. By using the correct grease viscosity in cold climates, the Flow Control Valve should not need adjustment.

For applications where the ability to adjust the pump's hydraulic inlet pressure and flow is not desired, Lincoln offers non-adjustable control valves. The fixed Pressure Control Valve is Part Number 273444 and is preset at 350 PSI. The fixed Flow Control Valve is Part Number 273443 and is preset to 2.0 GPM.

As always, if you have any questions or concerns regarding this bulletin, please do not hesitate to call Lincoln Technical Services at 314/679-4200, ext. 4782, or fax us at 314/679-HELP (4357).

Regards,

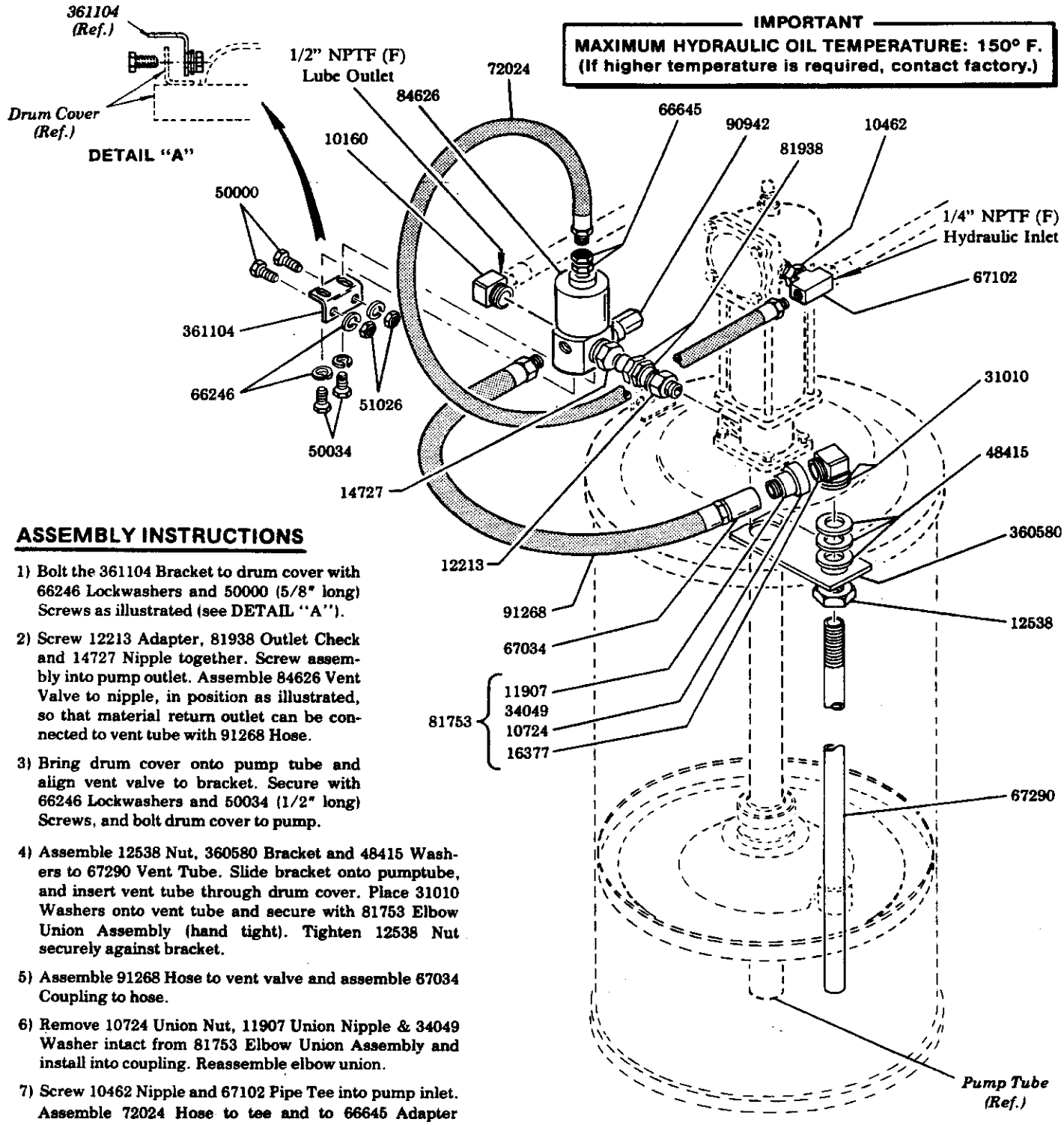
Barry Frankum
Manager, Lincoln Technical Service

VENT VALVE ASSEMBLY

FOR OFF-HIGHWAY TYPE MINING MACHINERY

120 LB. DRUM

Model 84619



IMPORTANT

MAXIMUM HYDRAULIC OIL TEMPERATURE: 150° F.
(If higher temperature is required, contact factory.)

ASSEMBLY INSTRUCTIONS

1) Bolt the 361104 Bracket to drum cover with 66246 Lockwashers and 50000 (5/8" long) Screws as illustrated (see DETAIL "A").

2) Screw 12213 Adapter, 81938 Outlet Check and 14727 Nipple together. Screw assembly into pump outlet. Assemble 84626 Vent Valve to nipple, in position as illustrated, so that material return outlet can be connected to vent tube with 91268 Hose.

3) Bring drum cover onto pump tube and align vent valve to bracket. Secure with 66246 Lockwashers and 50034 (1/2" long) Screws, and bolt drum cover to pump.

4) Assemble 12538 Nut, 360580 Bracket and 48415 Washers to 67290 Vent Tube. Slide bracket onto pumptube, and insert vent tube through drum cover. Place 31010 Washers onto vent tube and secure with 81753 Elbow Union Assembly (hand tight). Tighten 12538 Nut securely against bracket.

5) Assemble 91268 Hose to vent valve and assemble 67034 Coupling to hose.

6) Remove 10724 Union Nut, 11907 Union Nipple & 34049 Washer intact from 81753 Elbow Union Assembly and install into coupling. Reassemble elbow union.

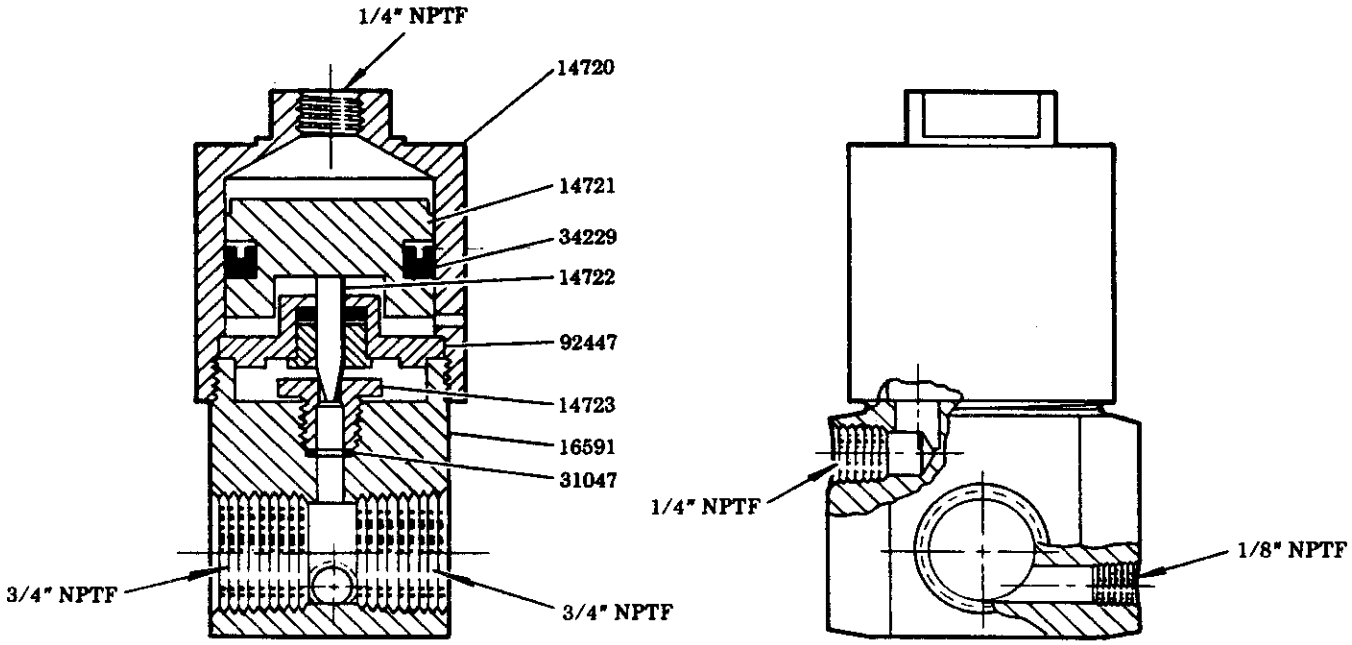
7) Screw 10462 Nipple and 67102 Pipe Tee into pump inlet. Assemble 72024 Hose to tee and to 66645 Adapter Union installed in top of vent valve.

8) Screw 10160 Elbow & 90942 Safety Unloader into vent valve.

LINCOLN
A DIVISION OF McNEIL CORPORATION
One Lincoln Way
St. Louis, MO 63120-1578
(314) 679-4200

L-FEB-86

84626
VENT VALVE ASSEMBLY



SERVICE PARTS

PART	QUAN.	DESCRIPTION	PART	QUAN.	DESCRIPTION
10160	1	Elbow	50000	2	Screw
10462	1	Nipple	50034	2	Screw
10724	1	Union nut	51026	2	Nut
11907	1	Union nipple	66246	4	Lockwasher
12213	1	Adapter	66645	1	Adapter union
12538	1	Nut	67034	1	Coupling
14720	1	Air cylinder	67102	1	Pipe tee
14721	1	Piston	67290	1	Vent tube
14722	1	Needle	72024	1	Hose
14723	1	Valve seat	81753	1	Elbow union assembly
14727	1	Nipple	81938	1	Outlet check
16377	1	Check housing	84626	1	Vent valve assembly
16591	1	Valve body	90942	1	Safety unloader
31010	2	Washer (copper)	91268	1	Hose
31047	1	Check seat gasket	92447	1	Packing
34049	1	Washer	360580	1	Bracket
34229	1	Packing	361104	1	Bracket
48415	3	Washer (steel)			

RETAIN THIS INFORMATION FOR FUTURE REFERENCE

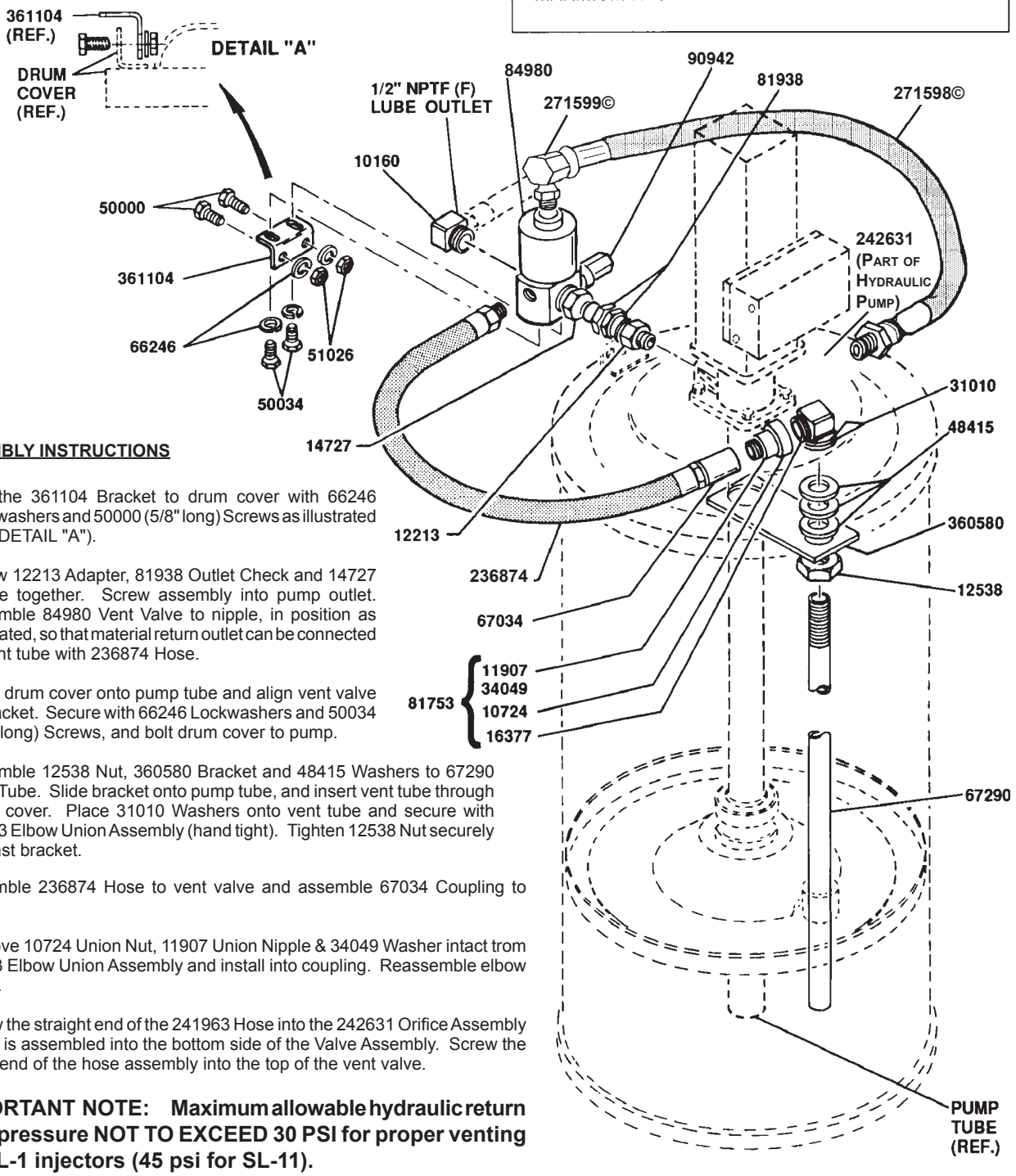
When ordering replacement parts, list: Part Number, Description, Model Number, and Series Letter.

LINCOLN ST. LOUIS provides a Distributor Network that stocks equipment and replacement parts. A list of Authorized Service Departments will be furnished upon request.

MODEL 84990
VENT VALVE ASSEMBLY

FOR OFF-HIGHWAY TYPE MINING MACHINERY 120 LB. DRUM

IMPORTANT
MAXIMUM HYDRAULIC OIL TEMPERATURE: 210° F.



ASSEMBLY INSTRUCTIONS

1) Bolt the 361104 Bracket to drum cover with 66246 Lockwashers and 50000 (5/8" long) Screws as illustrated (see DETAIL "A").

2) Screw 12213 Adapter, 81938 Outlet Check and 14727 Nipple together. Screw assembly into pump outlet. Assemble 84980 Vent Valve to nipple, in position as illustrated, so that material return outlet can be connected to vent tube with 236874 Hose.

3) Bring drum cover onto pump tube and align vent valve to bracket. Secure with 66246 Lockwashers and 50034 (1/2" long) Screws, and bolt drum cover to pump.

4) Assemble 12538 Nut, 360580 Bracket and 48415 Washers to 67290 Vent Tube. Slide bracket onto pump tube, and insert vent tube through drum cover. Place 31010 Washers onto vent tube and secure with 81753 Elbow Union Assembly (hand tight). Tighten 12538 Nut securely against bracket.

5) Assemble 236874 Hose to vent valve and assemble 67034 Coupling to hose.

6) Remove 10724 Union Nut, 11907 Union Nipple & 34049 Washer intact trom 81753 Elbow Union Assembly and install into coupling. Reassemble elbow union.

7) Screw the straight end of the 241963 Hose into the 242631 Orifice Assembly which is assembled into the bottom side of the Valve Assembly. Screw the other end of the hose assembly into the top of the vent valve.

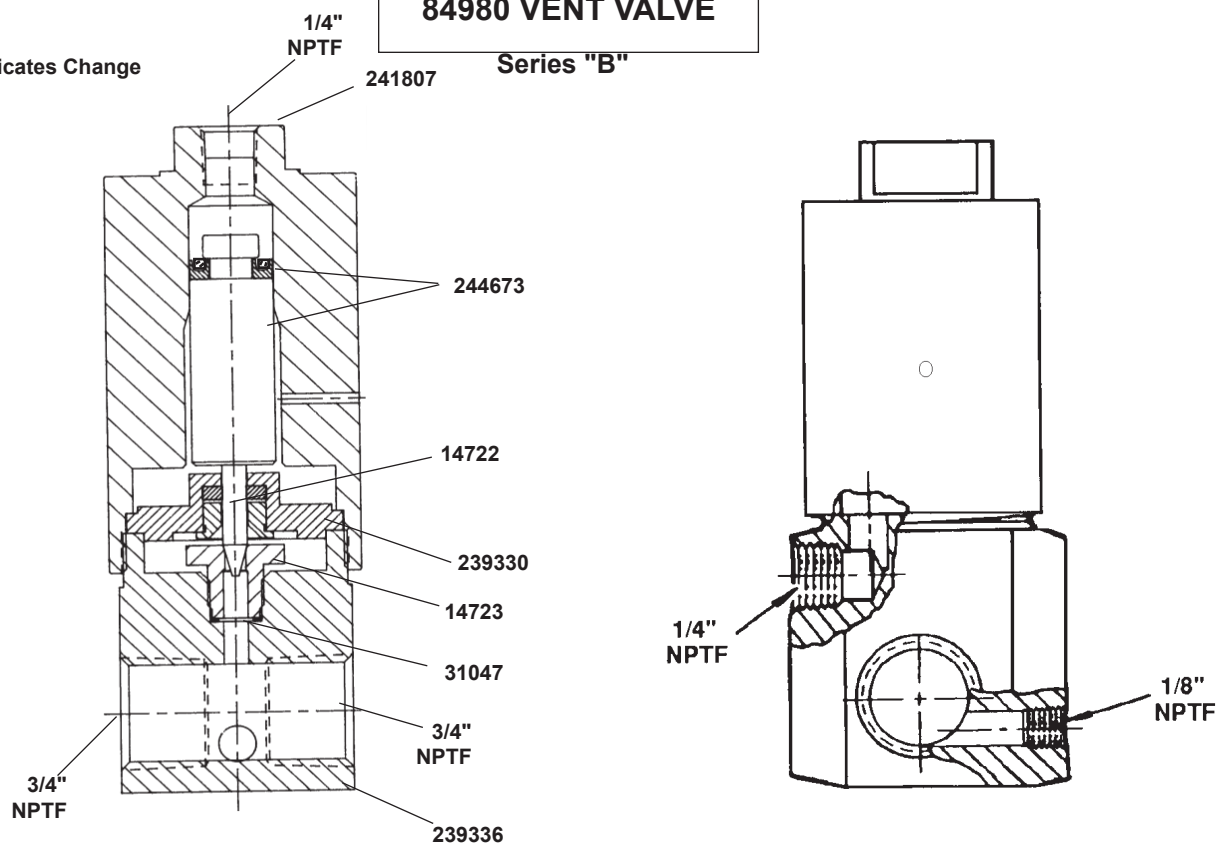
IMPORTANT NOTE: Maximum allowable hydraulic return line pressure NOT TO EXCEED 30 PSI for proper venting of SL-1 injectors (45 psi for SL-11).

8) Screw 10160 Elbow & 90942 Safety Unloader into vent valve.

84980 VENT VALVE

Series "B"

© Indicates Change



SERVICE PARTS

Part	Qty.	Description	Part	Qty.	Description
10160	1	Elbow	66246	4	Lockwasher
10724	1	Union nut	67034	1	Coupling
11907	1	Union nipple	67290	1	Vent tube
12213	1	Adapter	81753	1	Elbow union assembly
12538	1	Nut	81938	1	Outlet check
14722	1	Needle	90942	1	Safety unloader
14723	1	Valve seat	273233©	1	Hose
14727	1	Nipple	239330	1	Packing assembly
16377	1	Check housing	239336	1	Valve body
31010	2	Washer (copper)	241807	1	Cylinder
31047	1	Check seat gasket	244673*	1	Piston & U-Cup Assy.
34049	1	Washer	360580	1	Bracket
48415	3	Washer (steel)	271598	1	Hose assembly
50000	2	Screw	271599	1	Adapter Elbow
50034	2	Screw	361104	1	Bracket
51026	2	Nut			

*Sold only as an assembly. Individual parts not available.

© Indicates change

©Model 84980 Hydraulic Vent Valve Assembly

This procedure should be performed if any of the following conditions are occuring:

1) The pump is running excessively.
2) The pump is not developing the proper pressure.
3) The system pressure is not venting or relieving.
4) Hydraulic fluid is leaking from the weep hole of the 241807 vent valve cylinder.
5) The lubricant being pumped is leaking from the weep hole in the 241807 vent valve cylinder.

©Cleaning and/or Repairing Instructions

1) Turn off and disconnect the hydraulic supply to the pump assembly.
2) Standard tools required are a set of open end wrenches ranging from 7/16” to 1 1/2”, a large open 24” adjustable wrench, a smaller 10” adjustable wrench and a bench mounted vice.
3) Remove the delivery hose, vent hose, hydraulic supply hose and all mounting hardware and remove the vent valve assembly from the pump.
4) Hold the 239336 Valve body in a bench vice by the flats that are machined on the base of the valve body.
5) Remove the 241807 Cylinder. Remove the 244673 Piston & U-Cup Assembly from the 241807 Cylinder. If hydraulic fluid is leaking from the weep hole in the 241807 Cylinder (see condition 4 above), replace the 244673 Piston & U-Cup, reassemble the Vent Valve and reconnect to the pump assembly, or continue as follows:
6) Remove 239330 Packing Assembly. If the lubricant being dispensed is leaking from the weep hole in the 241807 Cylinder (see condition 5 above), replace this packing assembly, reassemble the Vent Valve and reconnect to the pump assembly, or continue as follows:
7) Inspect 14722 Needle and 14723 Valve seat. If foreign matter is lodged in the area and is keeping the needle from sealing in the valve seat, clean thoroughly using mineral spirits or oleum and inspect for damage. If seat appears damaged by nicks, grooves or scoring it should be replaced. Remove the valve seat from the body using a 3/4” open end wrench.
8) Replace the valve seat if damaged. Be certain to remove and replace the 31047 Check seat gasket below the seat.
9) Reassemble the Vent Valve Assembly by reversing the above procedure. The 14722 Needle and the inside diameter of the 241807 Cylinder should be coated with grease to assist in assembling.
10) During reassembly, tighten the 14723 Valve seat into the 239336 Valve body using 25 ft-lb and tighten the 241807 Cylinder onto the 239336 Valve body using 100 ft-lbs.

© Indicates change

RETAIN THIS INFORMATION FOR FUTURE REFERENCE

When ordering replacement parts, list: Part Number, Description, Model Number, and Series Letter.

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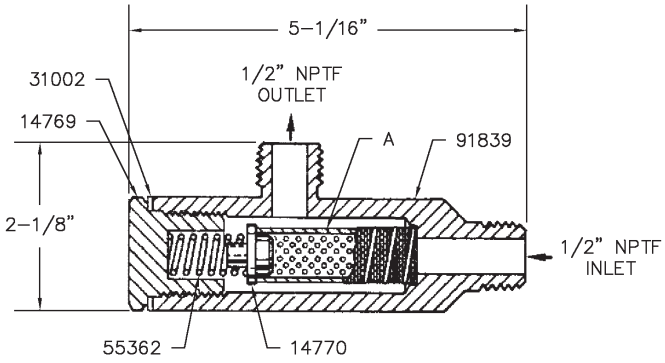
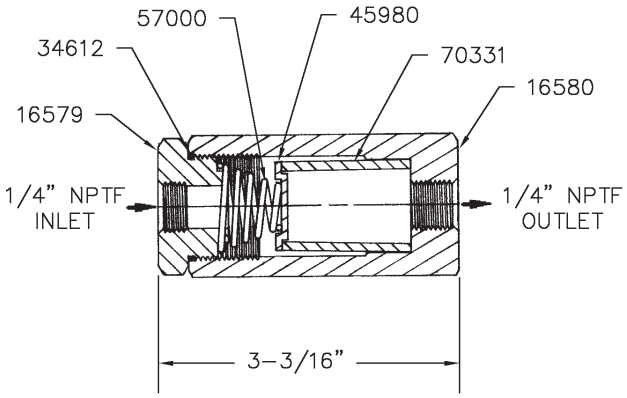


MODEL 84004
(For use with petroleum or synthetic based oil or grease.)
A - 69524 filter element

MODEL 84528
(for use with grease per NLGI recommended practice.)
A - 328073 filter element

SERVICE PARTS FOR ALL MODELS

PART	DESCRIPTION	PART	DESCRIPTION
14769	Plug	45980	Retainer
14770	Filter plug	55382	Spring
16579	Enclosure Screw	57000	Spring
16580	Filter Body	69524	Filter Element
31002	Gasket	70331	Filter Element
34612	O-ring	91839	Body



MODEL 84239
(For use with petroleum or synthetic base oils.)

SPECIFICATIONS

Max. Operating Pressure - 3500 psi
84004 Filter Element • 140 micros (100 mesh screen)
84528 Filter Element • 567© micros (30© mesh screen)

- CAUTION -

A BLOCKED FILTER CAN DISINTEGRATE UNDER PRESSURE AND DAMAGE AN ENTIRE CENTRO-MATIC SYSTEM.

Remove and inspect filter element every 30 days. Vent system pressure before removing filter plug to inspect filter element. Clean thoroughly with solvent or replace if necessary.

On abnormal pressure raise, for example when the filter is clogged, the filter plug (item 4) can unseat, thus allowing unfiltered flow of lubricant from the outlet of the filter body.

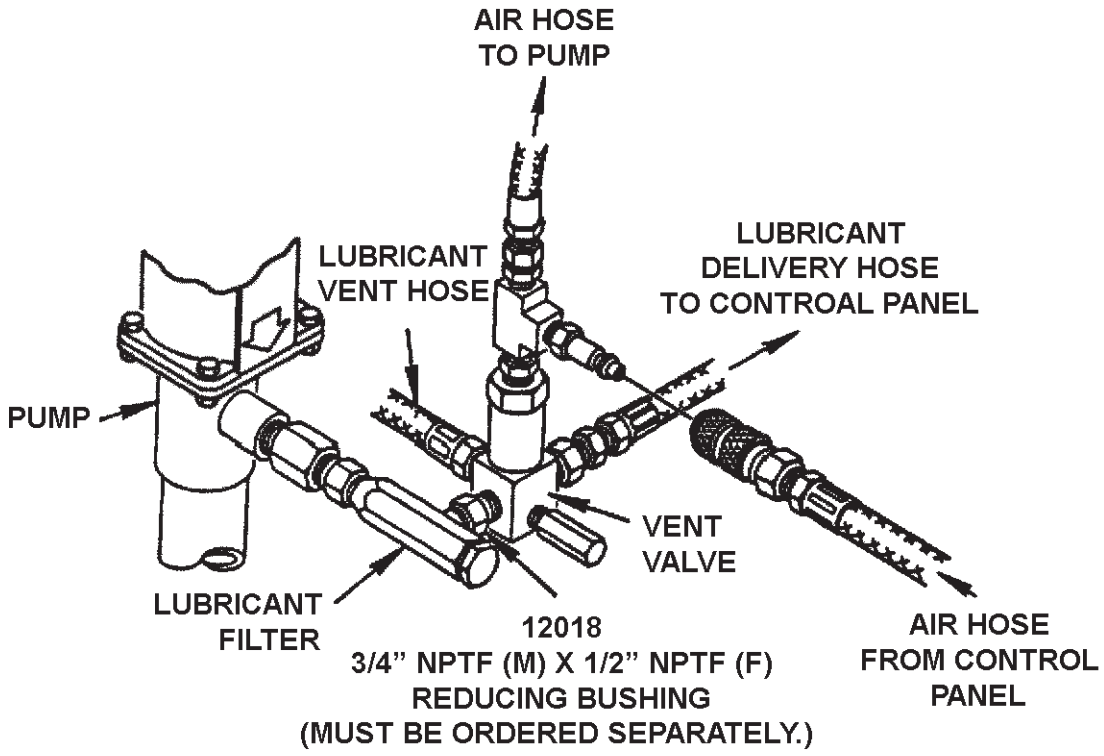
- IMPORTANT -

Should a system begin to develop higher than normal operating pressures, the filter element should be checked for contamination. Clean filter element with solvent or replace if necessary.

SPECIFICATIONS

Max. Operating Pressure - 6000 psi
Filter Element • 10 micron (sintered bronze)

© Indicates change



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Germany
Phone +49.6227.33.0
Fax +49.6227.33.259

Asia/Pacific:
51 Changi Business Park
Central 2
#09-06 The Signature
Singapore 486066
Phone +65.6588.0188
Fax +65.6588.3438

Web site:
www.lincolnindustrial.com

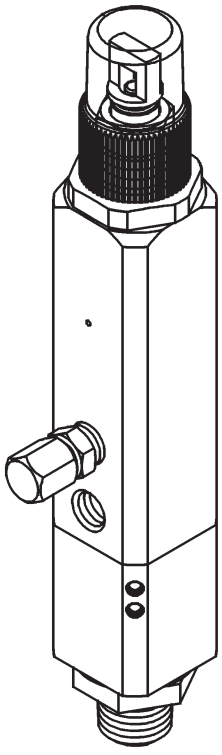
Model No. 85770-1, -2, -3, -4, -5, -6, 85771, 85772
85780-1, -2, -3, -4, -5, -6, 85781 and 85782
85785-1, -2, -3, -4, -5, -6, -7, -8, -9, -10
SL-V INJECTOR
Series "A"

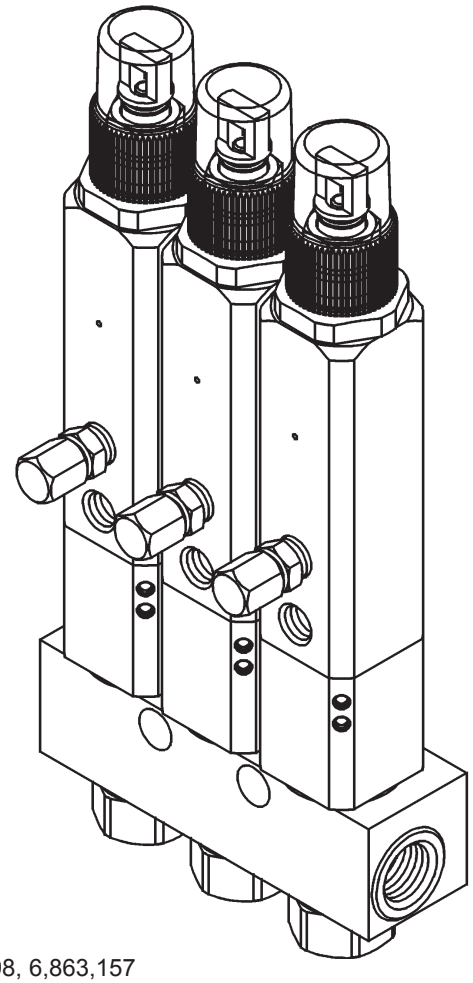
SINGLE AND MANIFOLD TYPE INJECTORS
for dispensing fluid lubricants and greases not exceeding Lincoln ventmeter viscosity of 600 psi.

SPECIFICATIONS
Minimum operating pressure – 1850 psi [128 bar]
Maximum operating pressure – 6000 psi [413 bar]
Recommended operating pressure – 2500 psi [172 bar]
Maximum vent (recharge) pressure – 1000 psi [69 bar]
Temperature Range - -40°F to 180°F [-40°C - 80°C]
Lubricant output (adjustable):

SL-V - 0.015 to 0.080 cu. in. [0.25 to 1.31 ccm]
SL-V XL - 0.015 to 0.305 cu. in. [0.25 to 5.00 ccm]

Injectors can be mounted in any position and can be used in circuits with SL-1, SL-11, SL-32 and/or SL33 injectors.





U.S Patent Number 6,705,432, 6,810,998, 6,863,157
Foreign Patents Pending

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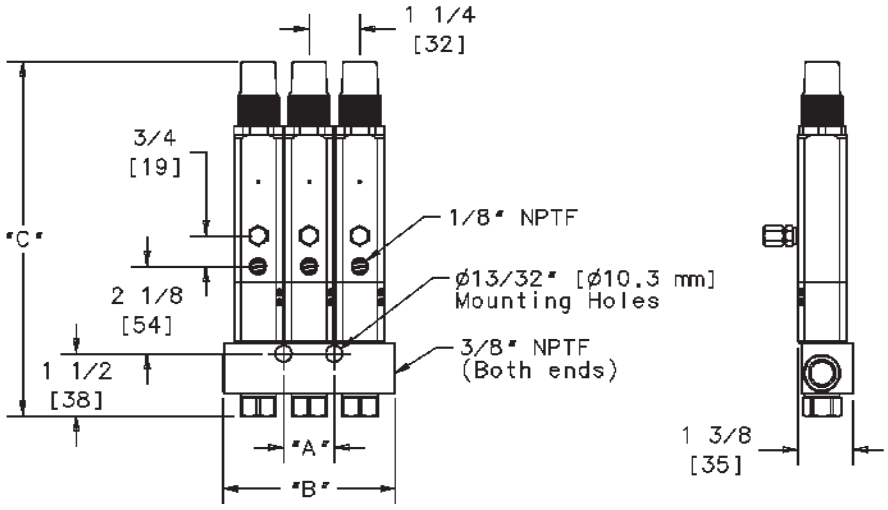
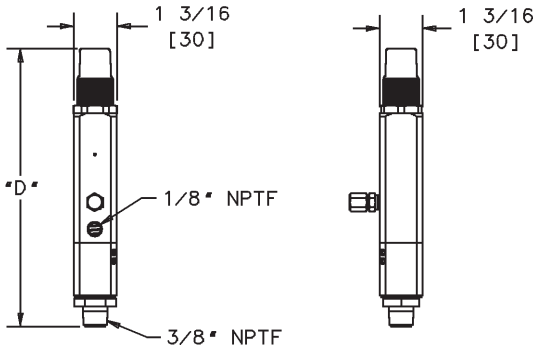


MANIFOLD TYPE INJECTORS

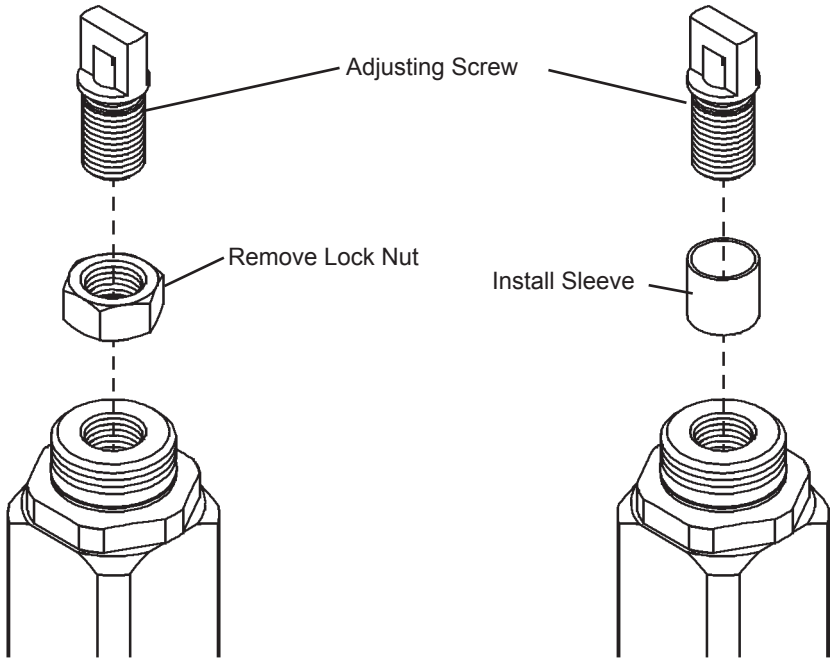
Injector	Model	Type	Dimension "A"		Dimension "B"		Dimension "C"	
			in.	[mm]	in.	[mm]	in.	[mm]
SL-V	85770-1	Single Injector Manifold	*	*	2-1/2	[63.5]	8-3/4	[222]
	85770-2	Two Injector Manifold	*	*	3	[76.2]		
	85770-3	Three Injector Manifold	1-1/4	[31.8]	4-1/4	[108]		
	85770-4	Four Injector Manifold	2-1/2	[63.5]	5-1/2	[140]		
	85770-5	Five Injector Manifold	3-3/4	[95.3]	6-3/4	[171]		
	85770-6	Six Injector Manifold	5	[127]	8	[203]		
	85771	Replacement Injector	N/A		N/A			
SL-V XL	85780-1	Single Injector Manifold	*	*	2-1/2	[63.5]	11-3/16	[284]
	85780-2	Two Injector Manifold	*	*	3	[76.2]		
	85780-3	Three Injector Manifold	1-1/4	[31.8]	4-1/4	[108]		
	85780-4	Four Injector Manifold	2-1/2	[63.5]	5-1/2	[140]		
	85780-5	Five Injector Manifold	3-3/4	[95.3]	6-3/4	[171]		
	85780-6	Six Injector Manifold	5	[127]	8	[203]		
	85781	Replacement Injector	N/A		N/A			

* Single Mounting Hole



Single Unit Injectors

Injector	Model	Type	Dimension "D"	
			in.	[mm]
SL-V	85772	Single Unit Injector	7-3/4	[191]
SL-V XL	85782	Single Unit Injector	10-3/16	[248]



SPECTRUM ADJUSTMENT SYSTEM

The spectrum adjustment system consists of a set of color-coded anodized aluminum sleeves that provide an easy way to adjust the output of the injectors and gives a clear indication of the output setting. This allows for easy system installation and preventative maintenance.

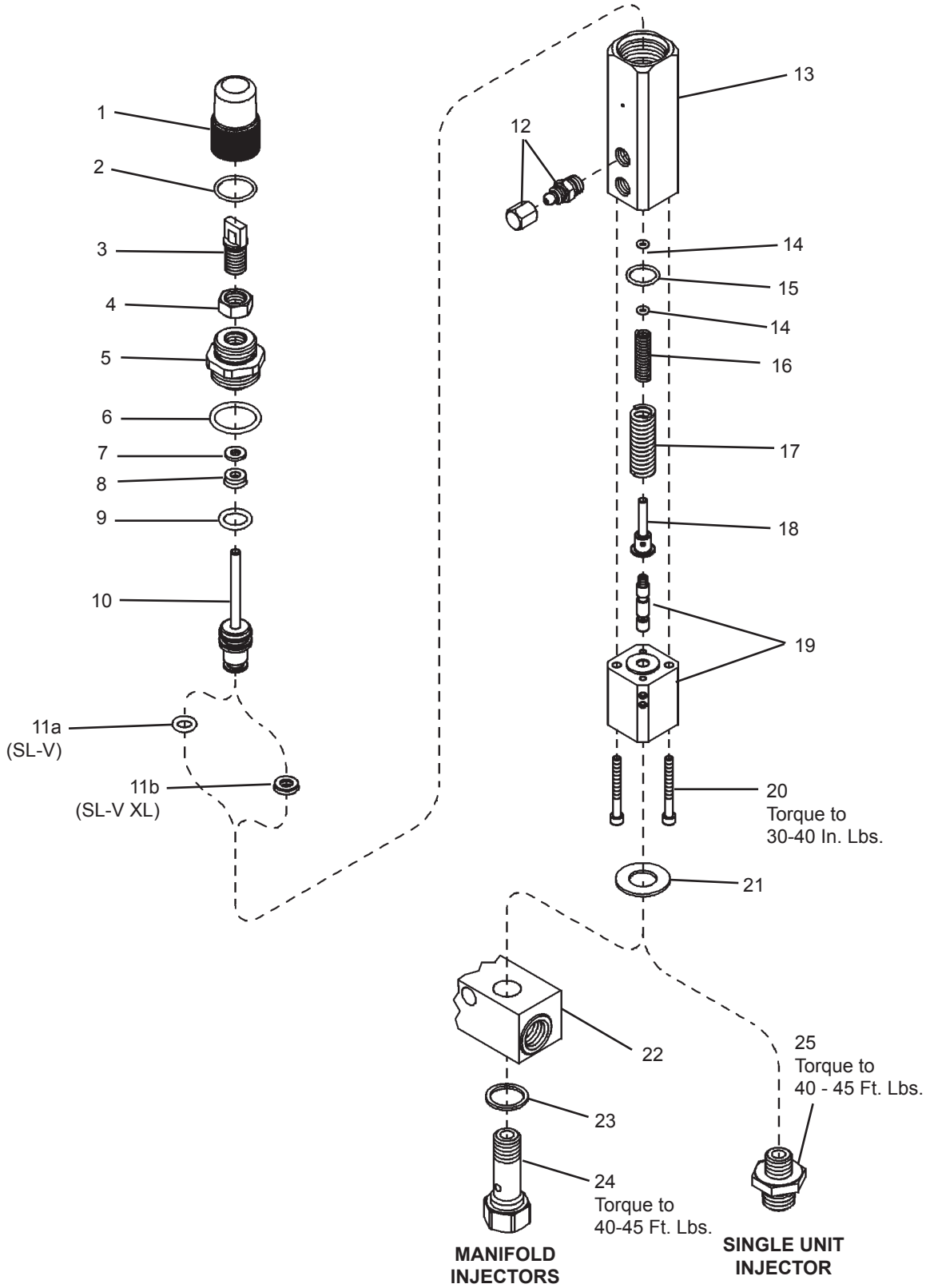
To install a spectrum adjustment sleeve:
Remove and discard the Lock Nut (Item 4), place Sleeve onto Adjusting Screw (Item 3) and tighten.

SL-V SPECTRUM ADJUSTMENT SLEEVES

Part #	Output in^3	Output (cc)	Ratio from Minimum Ouput	Ratio from Maximum Output	Sleeve Color
N/A	0.015	(0.25)	1	0.2	N/A
85785-1	0.03	(0.50)	2	0.4	Red
85785-2	0.045	(0.75)	3	0.6	Silver
85785-3	0.06	(1.00)	4	0.8	Gold
85785-4	0.075	(1.25)	5	1.0	Green

SL-V XL SPECTRUM ADJUSTMENT SLEEVES

Part #	Output in^3	Output (cc)	Ratio from Minimum Output	Ratio from Maximum Output	Sleeve Color
N/A	0.015	(0.25)	1	0.050	N/A
85785-1	0.03	(0.50)	2	0.100	Red
85785-2	0.045	(0.75)	3	0.150	Silver
85785-3	0.06	(1.00)	4	0.200	Gold
85785-4	0.075	(1.25)	5	0.250	Green
85785-5	0.112	(1.87)	7.5	0.375	Black
85785-6	0.15	(2.50)	10	0.500	Purple
85785-7	0.188	(3.12)	12.5	0.625	Blue
85785-8	0.225	(3.75)	15	0.750	Orange
85785-9	0.262	(4.37)	17.5	0.875	Brown
85785-10	0.3	(5.00)	20	1.000	Yellow

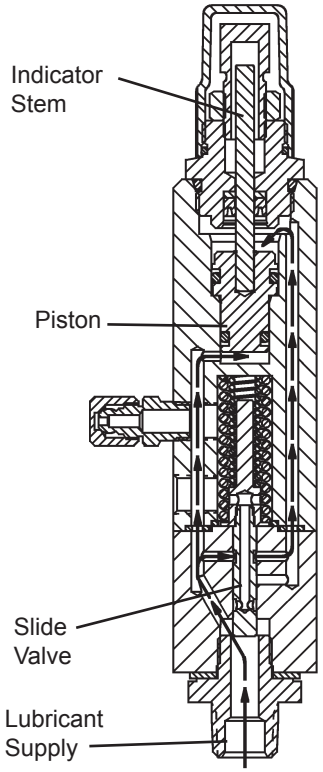

1
2
3
4
5
6
7
8
9
10
11a
(SL-V)
11b
(SL-V XL)
12
13
14
15
14
16
17
18
19
20
Torque to
30-40 In. Lbs.
21
22
23
24
Torque to
40-45 Ft. Lbs.
25
Torque to
40 - 45 Ft. Lbs.
MANIFOLD
INJECTORS
SINGLE UNIT
INJECTOR

SERVICE PARTS

Item No.	Description	Qty.	Part No.	
			SL-V	SL-V XL
1	Protective Cap (polycarbonate)	1	273088	273089
2	O-ring (nitrile)	1	*	
3	Adjusting Screw	1	272803	272819
4	Lock Nut	1	11624	
5	Piston Stop Plug	1	273090	273091
6	O-ring	1	*	
7	Backup Washer	1	*	
8	U-cup (polyurethane)	1	*	
9	O-ring (polyurethane)	1	*	
10	Piston Assembly	1	273092	273987
11a	O-ring (polyurethane)	1	*	N/A
11b	U-cup (polyurethane)	1	N/A	*
12	Fitting Assembly	1	90471	
13	Injector Body	1	273094	273095
14	O-ring (fluorocarbon)	2	*	
15	O-ring (fluorocarbon)	1	*	
16	Spring	1	*	
17	Spring	1	*	
18	Spring Seat	1	272798	
19	Body and Plunger Assy.	1	273096	
20	Socket Head Screw (8-32 x 1-1/2)	2	272796	
21	Gasket	1	*	
22	Single Injector Manifold	1	12658	
	Two Injector Manifold	1	11962	
	Three Injector Manifold	1	11963	
	Four Injector Manifold	1	11964	
	Five Injector Manifold	1	11965	
	Six Injector Manifold	1	246965	
23	Gasket	1	*	
24	Adapter Bolt	1	273097	
25	Adapter	1	273098	

* Included in 272970 Repair Kit

SL-V Injector Operation



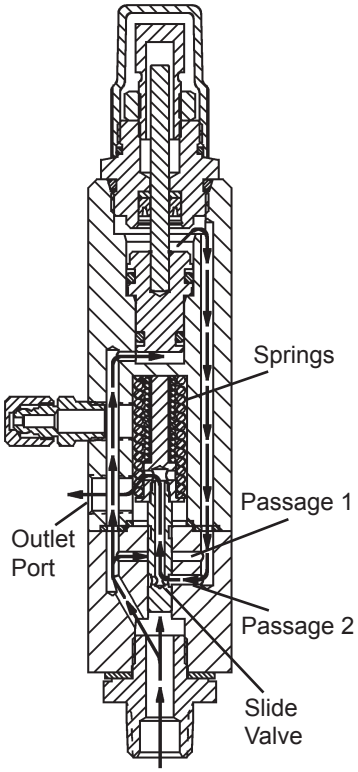
STAGE 1

Stage 1

The injector starts in its normal or rest position. Incoming lubricant is directed through the slide valve to both sides of the piston. The pressure of the incoming lubricant acting on both sides of the piston causes the piston to move downward against the shoulder and fills the measuring chamber. The indicator stem is fully retracted away from the stop of the adjusting screw.

Stage 2

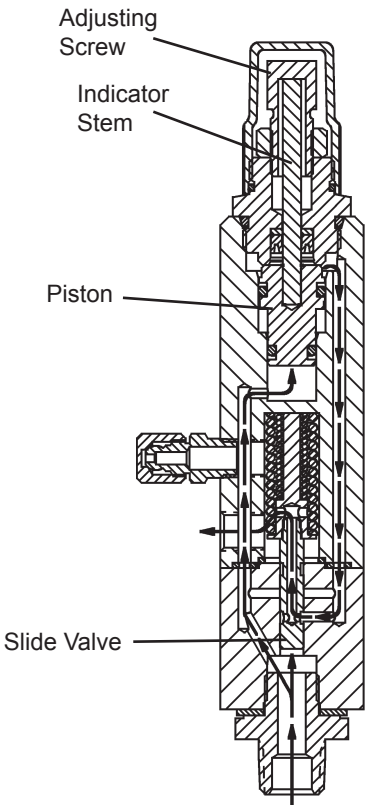
Further increase in pressure causes the slide valve to move against the force of the springs. As the slide valve moves, it closes passage 1 and opens passage 2 to the outlet port. The pressure of the incoming lubricant is now acting only upon the bottom of the piston. The incoming lubricant displaces the piston which forces the lubricant in the measuring chamber to be dispensed through passage 2, through the slide valve and through the outlet port to the lube point.



STAGE 2

Stage 3

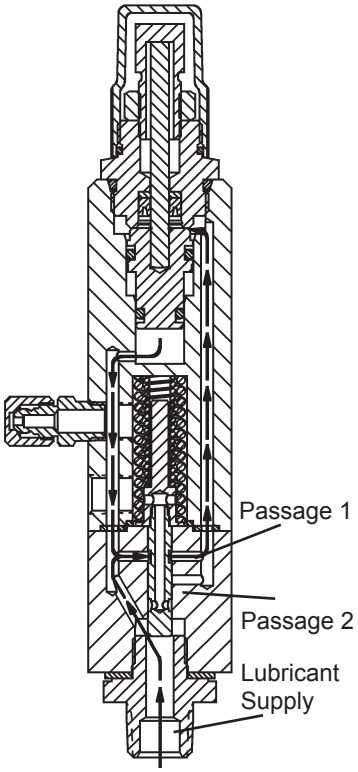
The piston will dispense lubricant until the indicator stem hits the stop of the adjusting screw. The volume of lubricant dispensed can be adjusted by limiting the travel of the piston. The piston and slide valve remain in this position until the lubricant pressure in the supply line is vented.



STAGE 3

Stage 4

As the pressure in the supply line vents to 1000 psig [69 bar], the slide valve moves downward and closes passage 2 and opens passage 1. The lubricant pressure in the supply line is now acting upon both sides of the piston causing it to move downward. As the piston moves downward, a volume of lubricant flows from the underside of the piston, past the slide valve, through passage 1 and to the upper side of the piston. Since the volume on top of the piston is greater than the volume under the piston, an additional volume of lubricant flows from the supply line to the upper side of the piston. This volume of lubricant leaving the supply line causes the pressure to drop very quickly. The piston may or may not fully return to the shoulder, depending upon the volume of lubricant in the supply line. The injector is now ready for the next cycle.



STAGE 4

Lincoln Industrial Standard Warranty

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 therefrom 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 MERCHANTIBILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

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 & Co. KG, Walldorf, Germany, for your warranty rights.

Lincoln Industrial Special Limited Warranty

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.

Lincoln Industrial Contact Information

To find Lincoln Industrial's Nearest Service Center

Call one of the following numbers, you may also use our wbsite

Customer Service - 314-679-4200
Website - www.lincolnindustrial.com

Declaration by the manufacturer as defined by machinery directive 89/392/EEC Annex IIB

Herewith we declare that the supplied model of

SL-V

is intended to be incorporated into machinery covered by this directive and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive.

Applied harmonized standards in particular:

EN292 T1/T2
prEN 809

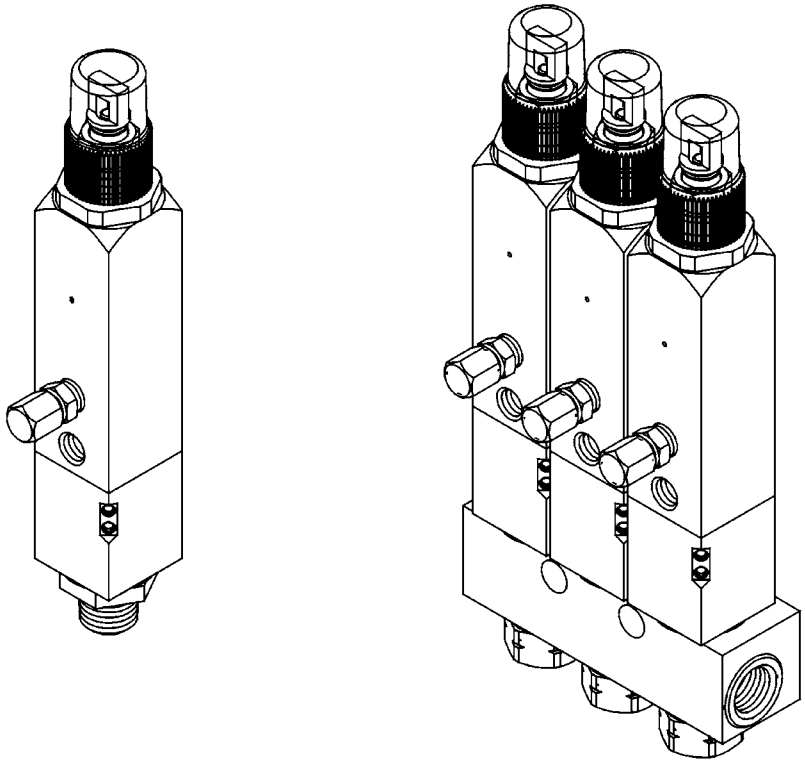
Paul H. Conley

Paul Conley,
Chief Engineer

LINCOLN

SL-V injector

Model No. 85770-1, -2, -3, -4, -5, -6, 85771, 85771HF, 85772, 85780-1, -2, -3, -4, -5, -6, 85781 and 85782 85785-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, Series “B”



U.S Patent Number 6,705,432, 6,810,998, 6,863,157, 6,986,407
Foreign Patents Pending

Version	**01**
Date of issue	**July 2012**
Form number	**404436**
Section	**C8**
Page	**301F**

⚠ WARNING

Read manual prior to installation or use of this product. Keep manual nearby for future reference. Failure to follow instructions and safety precautions can result in death or serious injury.

SKF

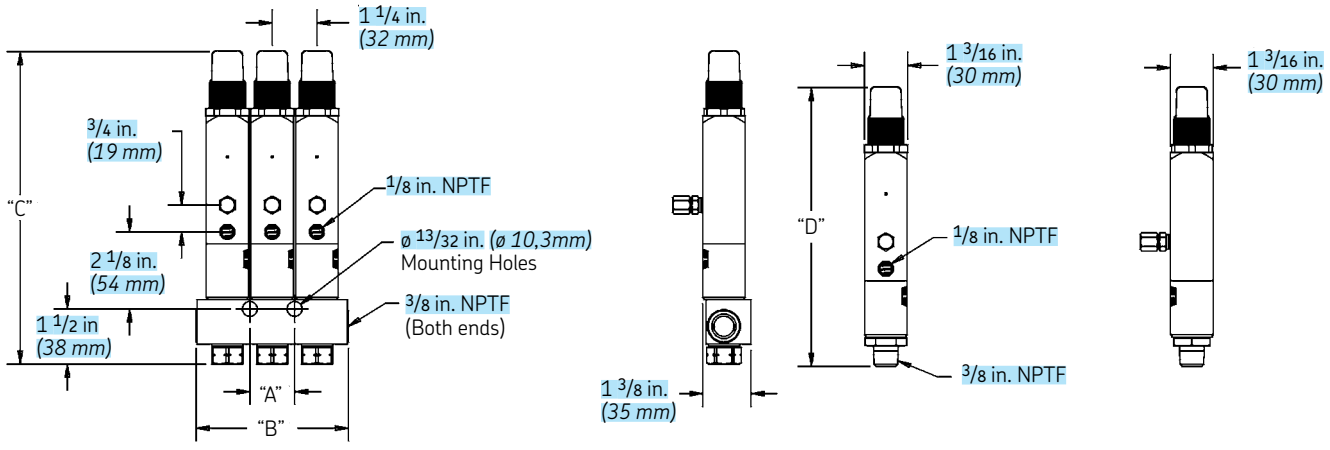
Single and manifold type injectors

for dispensing fluid lubricants and greases not exceeding Lincoln ventmeter viscosity of 600 psi.

Specifications

Minimum operating pressure	1850 psi *(128 bar)*
Maximum operating pressure	6000 psi *(413 bar)*
Recommended operating pressure	2500 psi *(172 bar)*
Maximum vent (recharge) pressure	1000 psi *(69 bar)*
Temperature Range	–40 to 180 °F *(–40 to 80 °C)*
Lubricant output (adjustable)	SL–V – 0.015 to 0.080 in.^{3} *(0,25 to 1,31 cm^3)* SL–V XL – 0.015 to 0.305 in.^{3} *(0,25 to 5,00 cm^3)*

Injectors can be mounted in any position and can be used in circuits with SL-1, SL-11, SL-32 and/or SL33 injectors.



Manifold type injectors **Single unit injectors**

Dimensions

Manifold type injectors

Injector	Model	Type	Dimension "A"	Dimension "B"	Dimension "C"
	85770-1	Single injector manifold	[1]	2 1/2 in. (63,5 mm)	
	85770-2	Two injector manifold	[1]	3 in. (76,2 mm)	
	85770-3	Three injector manifold	1 1/4 in. (31,8 mm)	4 1/4 in. (108 mm)	
SL-V	85770-4	Four injector manifold	2 1/2 in. (63,5 mm)	5 1/2 in (140 mm)	8 3/4 in. (222 mm)
	85770-5	Five injector manifold	3 3/4 in. (95,3 mm)	6 3/4 in (171 mm)	
	85770-6	Six injector manifold	5 in. (127 mm)	8 in. (203 mm)	
	85771	Replacement injector	N/A	N/A	
	85771HF	Replacement injector hexavalent free	N/A	N/A	
	85780-1	Single injector manifold	[1]	2 1/2 in. (63,5 mm)	
	85780-2	Two injector manifold	[1]	3 in. (76,2 mm)	
	85780-3	Three injector manifold	1 1/4 in (31,8 mm)	4 1/4 in. (108 mm)	
SL-V XL	85780-4	Four injector manifold	2 1/2 in. (63,5 mm)	5 1/2 in (140 mm)	11 3/16 in. (284 mm)
	85780-5	Five injector manifold	3 3/4 in. (95,3 mm)	6 3/4 in (171 mm	
	85780-6	Six injector manifold	5 in. (127 mm)	8 in. (203 mm)	
	85781	Replacement injector	N/A	N/A	

[1] Single mounting holes

Single unit injectors

Injector	Model	Type	Dimension "D"
SL-V	85772	Single unit injector	7 3/4 in. (191 mm)
SL-V XL	85782	Single unit injector	10 3/16 in. (248 mm)

Spectrum adjustment system

The spectrum adjustment system consists of a set of color-coded anodized aluminum sleeves that provide an easy way to adjust the output of the injectors and gives a clear indication of the output setting. This allows for easy system installation and preventative maintenance.

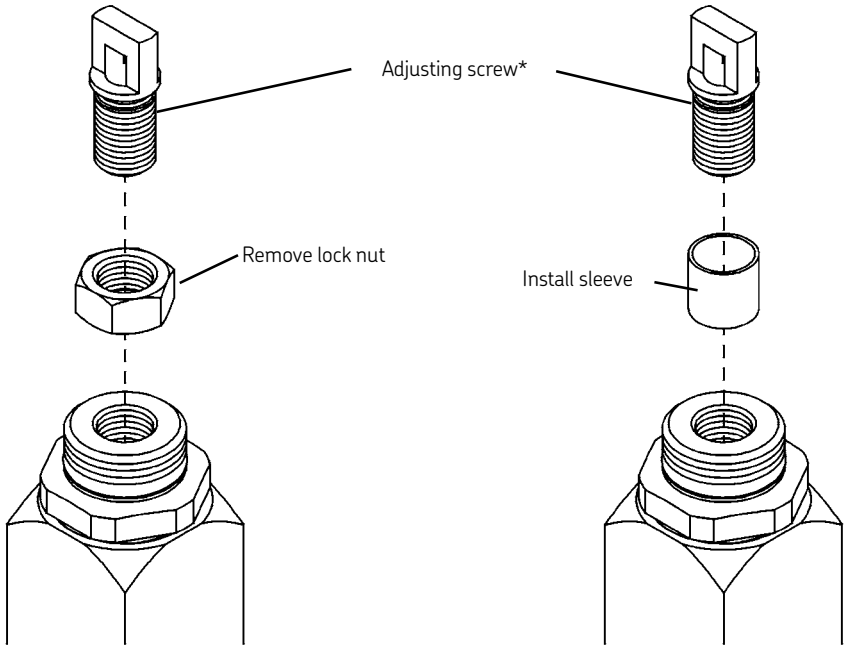
To install a spectrum adjustment sleeve
Remove and discard the Lock Nut (**4**), place Sleeve onto Adjusting Screw (**3**) and tighten.

Note
Inconsistent or much smaller grease output can be a result of improper injectors installation.

In smaller systems or in applications where injectors are installed close to a high output pump, it is important that line pressure in the system is not increased quickly. When pressurizing the system, allow the measuring pistons of the injectors to move fully downward to reload for the next lubrication cycle.

Lincoln recommends a length of high pressure hose be added between the pump and injectors to slow down the pressure increase.

Contact Lincoln technical service department for the length and size of the hose. Emphasizes useful hints and recommendations as well as information for efficient and trouble-free operation.



* After installing sleeve, torque adjusting screw to 45 to 55 in. lbf (*5 to 6 Nm*).

SL-V Spectrum adjustment sleeves

Part No.	Output	Ratio from minimum output	Ratio – maximum output	Sleeve color
N/A	0.015 in.³ *(0,25 cm³)*	1	0.2	N/A
85785-1	0.030 in.³ *(0,50 cm³)*	2	0.4	Red
85785-2	0.045 in.³ *(0,75 cm³)*	3	0.6	Silver
85785-3	0.060 in.³ *(1,00 cm³)*	4	0.8	Gold
85785-4	0.075 in.³ *(1,25 cm³)*	5	1.0	Green

SL-V XL pectrum adjustment sleeves

Part No.	Output	Ratio from minimum output	Ratio from maximum output	Sleeve color
N/A	0.015 in.³ *(0,25 cm³)*	1	0.050	N/A
85785-1	0.030 in.³ *(0,50 cm³)*	2	0.100	Red
85785-2	0.045 in.³ *(0,75 cm³)*	3	0.150	Silver
85785-3	0.060 in.³ *(1,00 cm³)*	4	0.200	Gold
85785-4	0.075 in.³ *(1,25 cm³)*	5	0.250	Green
85785-5	0.112 in.³ *(1,87 cm³)*	7.5	0.375	Black
85785-6	0.150 in.³ *(2,50 cm³)*	10	0.500	Purple
85785-7	0.188 in.³ *(3,12 cm³)*	12.5	0.625	Blue
85785-8	0.225 in.³ *(3,75 cm³)*	15	0.750	Orange
85785-9	0.262 in.³ *(4,37 cm³)*	17.5	0.875	Brown
85785-10	0.300 in.³ *(5,00 cm³)*	20	1.000	Yellow

Adjustment procedure for the SL-V type injectors:

SL-V Injectors

1 Remove the protective cap.
2 Loosen the locknut and turn approximately one extra turn towards the loose position.
3 While holding the locknut turn the adjusting screw clockwise all the way down until it is finger tight. At this point the output will be 0.015 in.³ *(0.246 cm³)*.
4 Now turn the adjusting screw back out counter clockwise to achieve your required output. Each turn out will add 0.014 in.³ *(0.229 cm³)* and with an approximate 5 turns adjustment the maximum output will be 0.080 in.³ *(1.311 cm³)*.
5 Tighten lock nut to a torque of 90 to 110 in-lbf. *(10 to12 Nm)*.
6 Install protective cap.

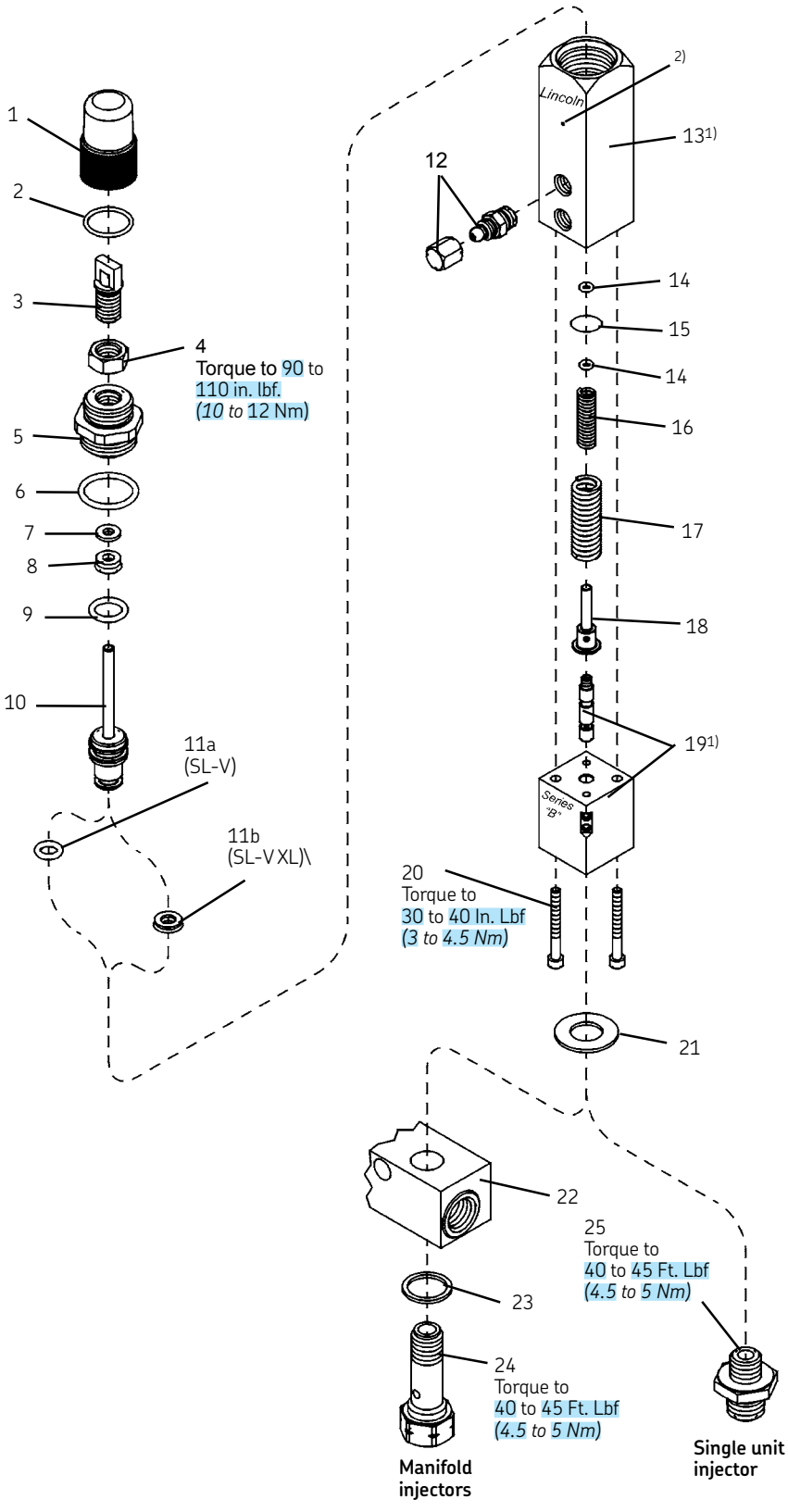
SL-V XL Injectors

1 Follow the first three instructions for SL-V injectors.

Now turn the adjusting screw back out counter clockwise to achieve your required output. Each turn out will add 0.014 in.³ *(0.229 cm³)* and with an approximate 20.5 turns adjustment the maximum output will be .305 in.³ *(5 cm³)*

2 Tighten lock nut to a torque of 90 to 110 in-lbf. *(10 to12 Nm)*.
3 Install protective cap.

Note
The "weep" becomes a "leak" when the amount of grease increases each time the injector cycles. When this occurs it is an indication that the injector requires attention and should be serviced soon.



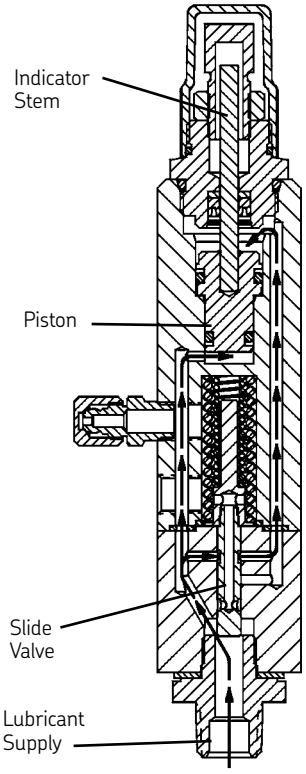
1) Etched surfaces of components **13** and **19** must be aligned and face to the front of the manifold assembly.
2) The SL-V injector is designed with a "weep" hole which indicates worn or damaged internal seals. Please refer to the Centromatic system planning manual for a more detailed description of this design characteristic. The "weeping" which occurs is a slow release of grease which may bypass the lower seal over many cycles. This "weeping" may always be present to a small amount on all of the injector.

Service parts

Item no.	Description	Qty	Part no. SL-V	SL-V hexavalent free	SL-V XL
1	Protective cap (polycarbonate)	1	[1]	[1]	273089
2	O-ring (nitrile)	1	[1] [2]	[1] [2]	[2]
3	Adjusting screw	1	272803	272803–HF	272819
4	Lock nut	1	11624	11624–HF	11624
5	Piston stop plug	1	273090	273090–HF	273091
6	O-ring	1	[2]	[2]	[2]
7	Backup washer	1	[2]	[2]	[2]
8	U-cup (polyurethane)	1	[2]	[2]	[2]
9	O-ring (polyurethane	1	[2]	[2]	[2]
10	Piston assembly	1	273092	273092–HF	273987
11a	O-ring (polyurethane)	1	[2]	[2]	N/A
11b	U-cup (polyurethane)	1	N/A	N/A	[2]
12	Fitting assembly	1	90471	90471–HF	90471
13	Injector body	1	275330	275330–HF	275331
14	O-ring (fluorocarbon)	2	[2]	[2]	[2]
15	O-ring (fluorocarbon)	1	[2]	[2]	[2]
16	Spring	1	[2]	[2]	[2]
17	Spring	1	[2]	[2]	[2]
18	Spring seat	1	272798	272798	272798
19	Body and plunger assembly	1	275332	275332–HF	275332
20	Sockety head screws (8-32 x 1 ½ in.)	2	272796	272796	272796
21	Gasket	1	[2]	[2]	[2]
22	Single injector manifold	1	12658	N/A	12658
	Two injector manifold	1	11962	N/A	11962
	Three injector manifold	1	11963	N/A	11963
	Four injector manifold	1	11964	N/A	11964
	Five injector manifold	1	11965	N/A	11965
	Six injector manifold	1	246965	N/A	246965
23	Gasket	1	[2]	[2]	[2]
24	Adapter bolt	1	273097	273097–HF	273097
25	Adapter	1	273098	N/A	273098

[1] Included in 278209 cap kit.
[2] Included in 272970 repair kit.

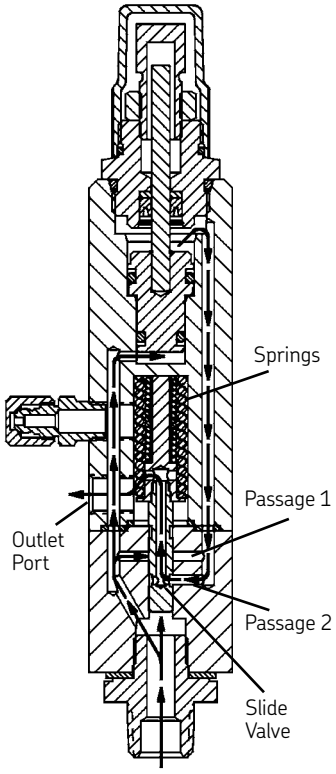
SL-V injector operation



Stage 1

Stage 1

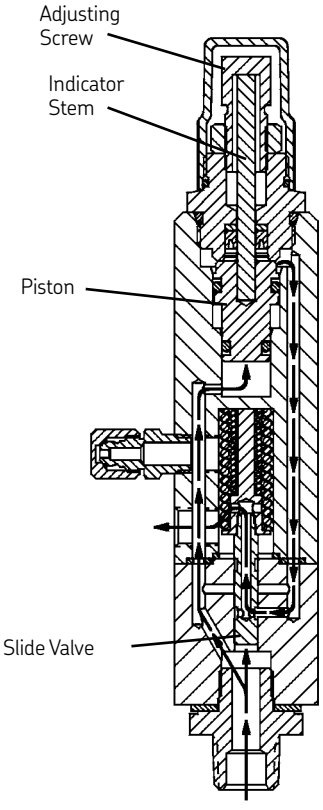
The injector starts in its normal or rest position. Incoming lubricant is directed through the slide valve to both sides of the piston. The pressure of the incoming lubricant acting on both sides of the piston causes the piston to move downward against the shoulder and fills the measuring chamber. The indicator stem is fully retracted away from the stop of the adjusting screw.



Stage 2

Stage 2

A further increase in pressure causes the slide valve to move against the force of the springs. As the slide valve moves, it closes passage 1 and opens passage 2 to the outlet port. The pressure of the incoming lubricant is now acting only upon the bottom of the piston. The incoming lubricant displaces the piston which forces the lubricant in the measuring chamber to be dispensed through passage 2, through the slide valve and through the outlet port to the lube point.



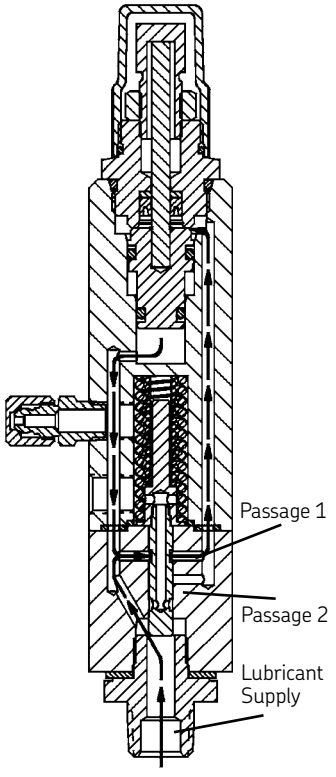
Stage 3

Stage 3

The piston will dispense lubricant until the indicator stem hits the stop of the adjusting screw. The volume of lubricant dispensed can be adjusted by limiting the travel of the piston. The piston and slide valve remain in this position until the lubricant pressure in the supply line is vented.

Stage 4

As the pressure in the supply line vents to 1,000 psi *(69 bar)*, the slide valve moves downward and closes passage 2 and opens passage 1. The lubricant pressure in the supply line is now acting upon both sides of the piston causing it to move downward. As the piston moves downward, a volume of lubricant flows from the underside of the piston, past the slide valve, through passage 1 and to the upper side of the piston. Since the volume on top of the piston is greater than the volume under the piston, an additional volume of lubricant flows from the supply line to the upper side of the piston. This volume of lubricant leaving the supply line causes the pressure to drop very quickly. The piston may or may not fully return to the shoulder, depending upon the volume of lubricant in the supply line. The injector is now ready for the next cycle.



Stage 4

Declaration by the manufacturer as defined by machinery directive 89/392/EEC Annex IIB

Herewith we declare that the supplied model of

SL-V

is intended to be incorporated into machinery covered by this directive and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive.

Applied harmonized standards in particular:

EN292 T1/T2
prEN 809

Paul H. Conley

Paul Conley,
Chief Engineer

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 Universal 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
Website lincolnindustrial.com

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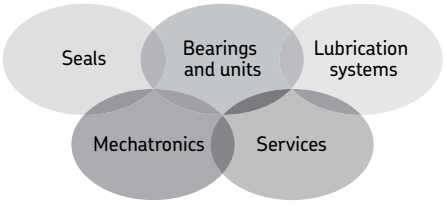


The Power of Knowledge Engineering

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.

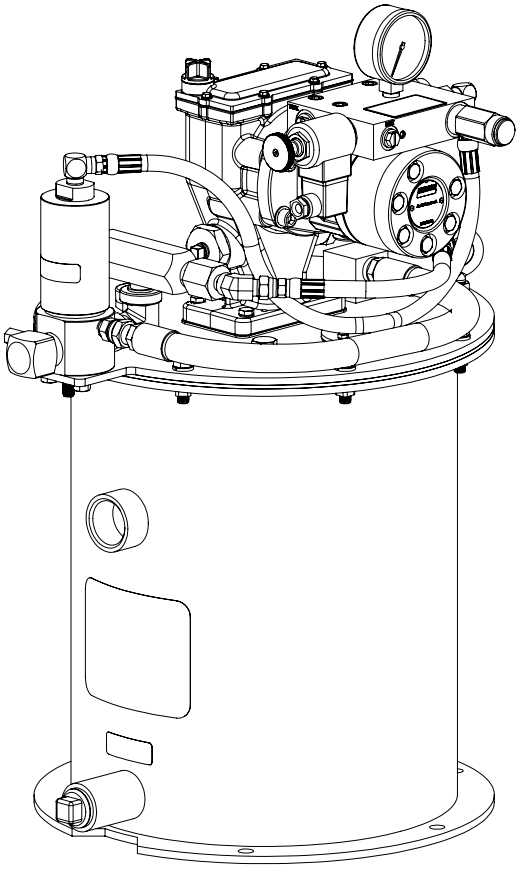
SKF **PUB LS/I1 13010 EN.US** · July 2012 · **Form** 404436

Printed in USA on environmentally friendly paper.

LINCOLN

FlowMaster II rotary driven hydraulic pump

Model 85846, series “A”



Date of issue	**July 2014**
Form number	**404644**
Section	**C8**
Page	**385B**

SKF

Table of contents

Safety

Do not unpack or operate this pump without reading, understanding and observing the operating instructions.

Do not allow personnel to operate, maintain or repair this pump that have not read and understood the operating instructions.

Follow all local safety regulations regarding installation, operation and maintenance.

⚠ WARNING

Indicates a hazardous situation which, if not avoided will result in death or serious injury. Please refer to the 85847 operation manual, section C8, page 375, series for all other safety considerations

⚠ WARNING

Do not exceed 3,000 psi *(207 bar)* maximum supply inlet hydraulic pressure or 3,600 psi *(248 bar)* maximum outlet pressure.

Exceeding the rated pressures may result in death or personal injury.

Description

General description

The model 85846 is a pumping unit designed to operate a Centro–Matic lubrication system. This unit includes a vent valve to relieve the line pressure to recharge the injectors. FlowMaster II rotary driven hydraulic pump includes pressure reducing valve, flow control valve and solenoid operated 24 V DC “on” and “off” valve.

The FlowMaster II pump is fully automatic when used with Model 85530 controller and a pressure switch. The FlowMaster II pump is double acting, dispensing lubricant on both the “up” and “down” strokes. This unit is designed to be used with SL-V, SL-1, SL-11, SL-32 and SL33 series injectors or a combination of these.

Appropriate use

- Do not use any power other than hydraulic to pump and dispense lubricants.
- Do not exceed the maximum specification ratings.
- Any other use not in accordance with instructions will result in loss of claims for warranty and liability.

Product specification

Supply inlet hydraulic pressure, maximum	3000 psi *(207 bar)*
Operating working hydraulic pressure	325 psi *(22 bar)*
Maximum output pressure	3250 psi *(224 bar)*
Hydraulic inlet flow	1.5 gallons/min. *(5,7 liters/min.)*
Pump ratio with manifold	10:1
Ambient operating temperature	–40 to +150 °F *(–40 to +66 °C)*
Operating voltage	24 V DC
Hydraulic inlet port, in.	SAE 4
Tank return port, in.	SAE 6
Maximum hydraulic fluid temperature	200 °F *(93 °C)*
Container capacity	40 lbs *(18 kg)*

System operation

Operation with model 85530 system controller

When model 85530 times out, it will initiate a lube cycle. The solenoid is energized to deliver hydraulic pressure to the pump and vent valve. The pump begins dispensing lubricant through injectors to the bearings.

When all bearings have received lubricant, pressure rises in the system to trigger the pressure switch. When the pressure switch has been triggered, the control is reset to cut off power to the solenoid valve, stopping the flow of hydraulic oil pressure to the pump and vent valve.

The pump stops, pressure vents and the pressure switch is de–activated. Control begins timing toward next lube event.

Installing the pump

Place the unit in the approximate location making sure that electric and hydraulic power connections are accessible.

Mark center locations of the six holes at the bottom of the reservoir.
Drill six 1/2 in. *(13 mm)* holes. The use of 7/16 in. *(10 mm)* bolts will offer flexibility in securing the reservoir to the equipment.

Connect lubricant outlet of the pump to the system with hose capable of 3,500 psi *(241 bar)* working pressure.

Make hydraulic inlet connection with at least 3/8 in. *(9 mm)* ID hose capable of at least 3,000 psi *(207 bar)* operating pressure. Use hydraulic return to tank connection line of 3/4 in. *(19 mm)* ID hose or pipe.

Refer to the 85847 operation manual, **section C8**, **page 375**, series for setting the pump pressure and flow control.

Putting pump into operation

Filling reservoir

- Remove the lower and upper pipe plugs from the side of the reservoir. Attach the appropriate bulk-filling pump to the lower inlet (1 NPT). Fill reservoir until grease appears at the top 1 1/4 NPT vent high level port. Remove the bulk filling pump. Replace both pipe plugs.

⚠ WARNING

Use caution when filling the reservoir, Extreme pressure can cause death or serious personal injury.

Maintenance and repair

General maintenance

- Keep area around pump clean. Clean off filling port area prior to filling reservoir. Clean area around filler after filling as lubricants will attract dirt.
- Keep lubricants clean and free of dirt and debris.

In case of system malfunction

- Use the **trouble shooting charts (page 11)** to determine where to look if problems occur.
- See the sections below for placement and repair of specific areas of the check valve, vent valve or safety unloader valve.
- Each part is identified with a number keyed to the matching part on the illustrated views.
- General recommendations of tools required are also specified in each step.
- Obey all **WARNING** statements to prevent personal injury.
- Notices provide information that are there to prevent damage to pump components.

Outlet check service

The pump will not build up sufficient lubricant pressure if the outlet check (**4**) is fouled. Foreign material may lodge beneath the check ball (**48**) or between check disc (**45**) and the seat of bushing assembly (**44**). Sealing surfaces of the seat must form a tight seal. Clean parts or replace if pitted, worn or scored. (See **figures 1** and **2 pages 5** and **6**).

1. Turn off and disconnect the hydraulic and electric power supply to the pump assembly.
2. Standard tools required are a bench mounted vice, a set of open end wrenches ranging from 7/16 in. To 1 1/2 in., a large 24 in. *(600 mm)* adjustable wrench and a smaller 10 in. *(254 mm)* adjustable wrench.
3. Remove hose (**6**).
4. Remove outlet check assembly (**4**) and adapter (**3**) by loosening adapter (**3**) from elbow (**2**).
5. Remove adapter (**3**) from outlet check assembly (**4**).
6. Remove outlet connector (**49**) from bushing (**44**).
7. Remove ball check seat (**46**) from outlet connector (**49**).
8. Inspect all check components (**44, 45**, **46**, **48**) for presence of foreign material, scoring and or other damage, which may cause internal leakage. Replace components if damage is found.
9. If foreign material is present, clean components and reassemble. Be sure to always replace gaskets (**43**) and (**47**) whenever vent valve is disassembled.
10. Reverse the above procedure to reassemble.
11. Torque check assembly to 100 ft. lbf. *(135 Nm)*.

Vent valve service

See **fig. 1** and **3**, **pages 5** and **6**.

1. Turn off and disconnect the hydraulic and electrical power supply to the pump assembly.
2. Standard tools required are a bench mounted vice, a set of open end wrenches ranging from 7/16 in. To 1 1/2 in., a large 24 in. *(600 mm)* adjustable wrench and a smaller 10 in. *(254 mm)* adjustable wrench.
3. Loosen vent hose (**7**) and supply hose (**6**) and hydraulic hose (**10**).
4. Remove bolts and lock washers (**30** and **31**). Remove vent valve.
5. Hold base of vent valve in vice to remove elbows (**28, 32** and **34**).
6. Turn vent valve in vice so that vice jaws are gripping flats machined on base of vent valve.
7. Remove hydraulic cylinder (**50**).
8. Remove piston and packing (**51**) from cylinder. If oil leakage was evident from side of hydraulic cylinder, replace packing.
9. Remove packing assembly (**53**). If grease leakage was evident from side of hydraulic cylinder, then replace packing assembly.
10. Inspect needle (**52**) and valve seat (**54**). If foreign matter is lodged and is keeping the needle from sealing in valve seat, clean and inspect for damage. If seat appears damaged by nicks, grooves or scouring it should be replaced.
11. Remove valve seat (**54**) from valve body (**56**) by placing a 3/4 in. open end wrench onto the flats and loosening the seat. The use of an adjustable wrench in place of the open end wrench may be necessary due to the accessibility of the seat.
12. Replace the valve seat (**54**) if damaged. Also be sure to remove and replace the gasket (**55**) below the seat.
13. Reassembly is the reverse of the above procedure. Needle (**52**) and hydraulic cylinder (**50**) inside diameter should be coated with oil or grease to assist in assembly.
    Note: elbow (**32**) must be facing down.
14. Upon reassembly tighten valve seat (**54**) into body (**56**) using 25 ft.lbf. *(39 Nm)*. Tighten hydraulic cylinder (**50**) onto valve body (**56**) using 100 ft.lbf. *(135 Nm)*

Follower

If follower foam appears to be damaged or does not wipe the sides of the container effectively service may be necessary (see **fig. 1** and **5**, **page 5** and **6**).

1. Disconnect hydraulic supply from pump.
2. Remove the six bolts (**22**), lock washers (**15**) and eyebolts (**17**) that attach the cover to the reservoir.
3. Lift the pump, vent valve and cover assembly out of the reservoir.
4. Remove the entire follower assembly from the reservoir.
5. Wipe off the excess grease from the follower assembly.
6. Loosen and remove the eight nuts (**67**) on top of the follower.
7. Remove the follower weight (**66**) and foam (**68**).
8. Replace the foam with a new one.
9. Reassemble in the reverse of the above procedure making sure that the long bolts are staggered with the small ones and that they extend below the follower.

Safety unloader valve

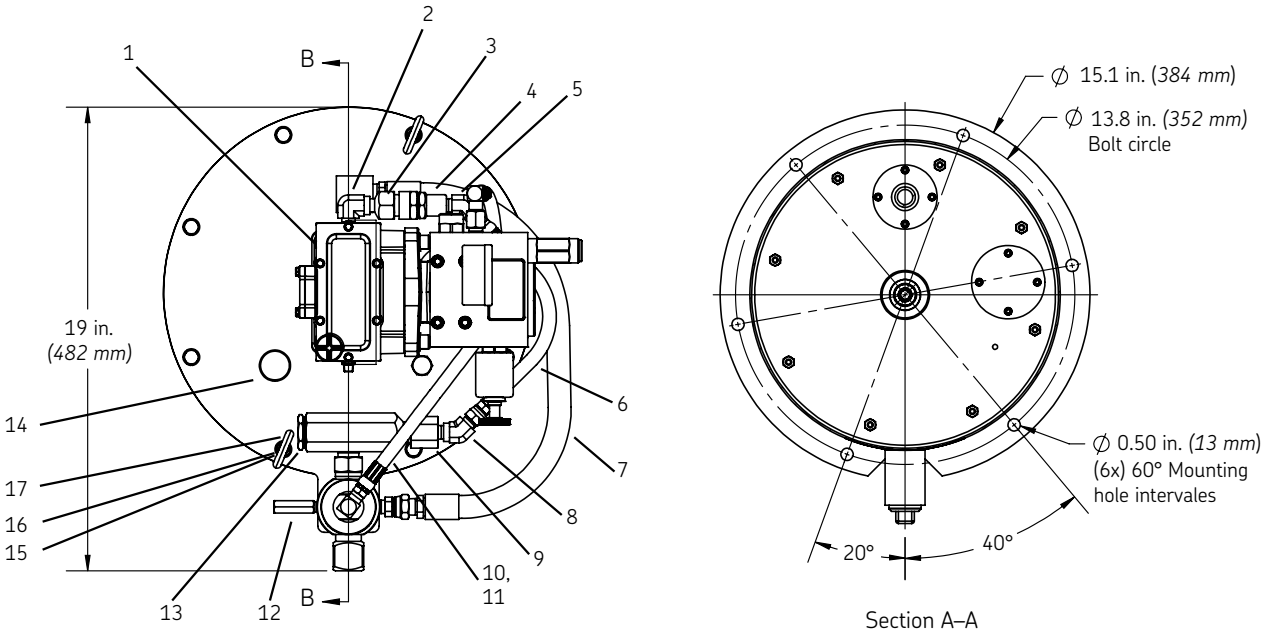
Safety unloader valve (**12**) (see **fig. 1**, **page 5**) is not serviceable and should be replaced if malfunction is apparent. Upon reassembly, tighten to 10 ft.lbf. *(13,5 Nm)*.

The safety unloader (**12**) is set to open at 4,750 to 5,250 psi *(328* to *362 bar)* lubricant pressure. If pressure switch fails to operate and shut off hydraulic supply to pump, the safety unloader will open at approximately 5,000 psi *(345 bar)* to relieve lubricant supply line pressure (safety unloader is preset and cannot be adjusted.)

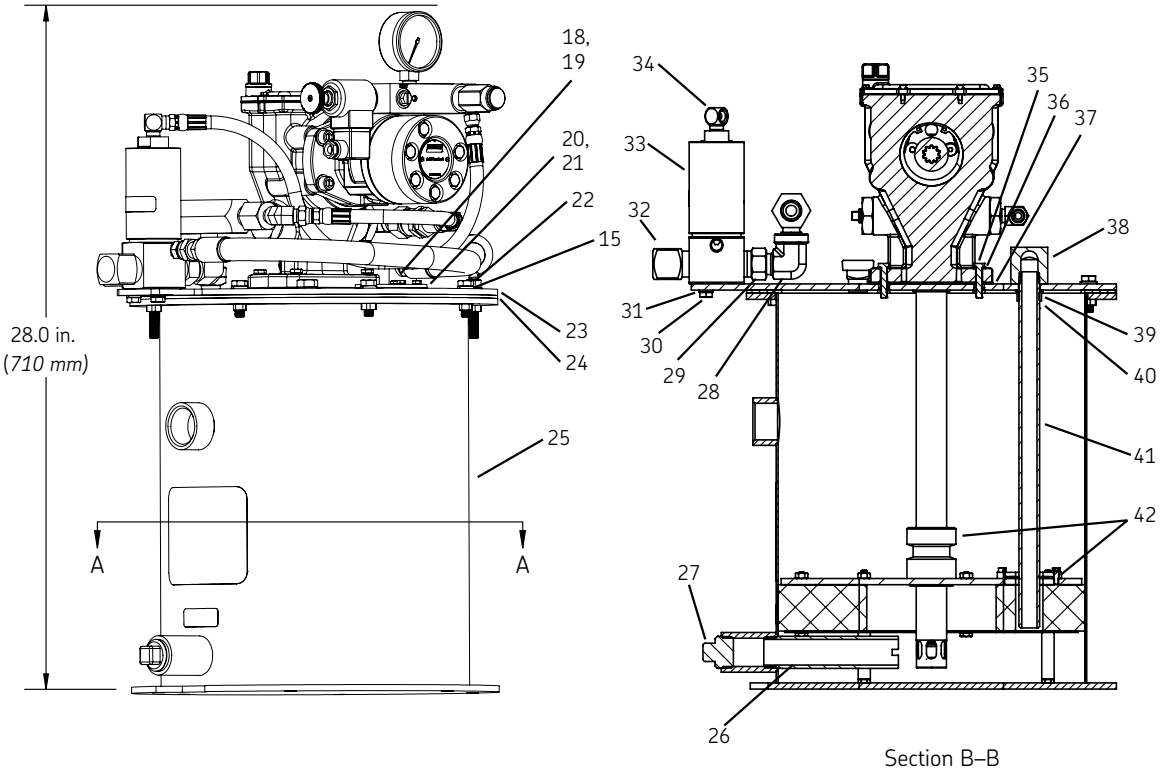
Bare pump assembly

Please refer to the operation manual (**C8**, **Page 375 series**) for the bare pump assembly (**1**) (see **fig. 1** ,**page 5**).

Fig. 1



Section A–A



Section B–B

Fig. 2

Outlet check assembly (4)

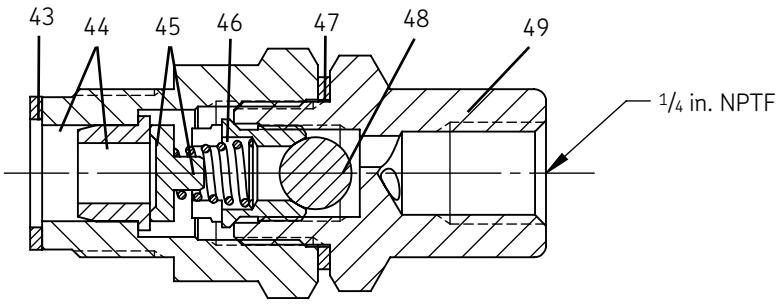


Fig. 4

Cover plug

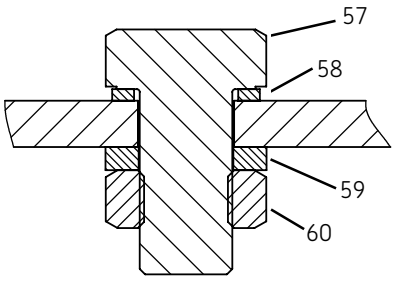


Fig. 3

Hydraulic vent valve (33)

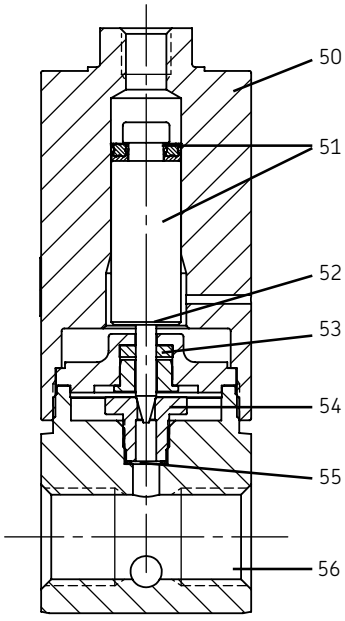
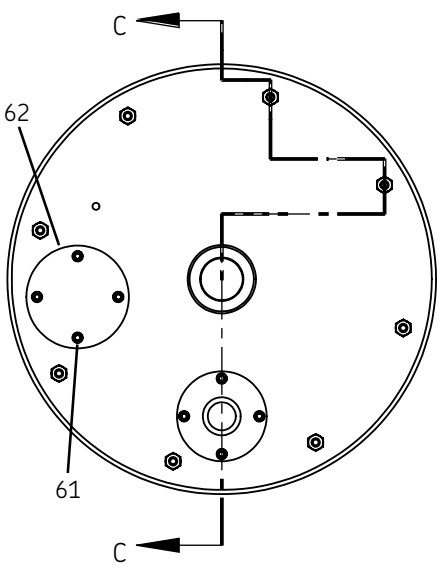
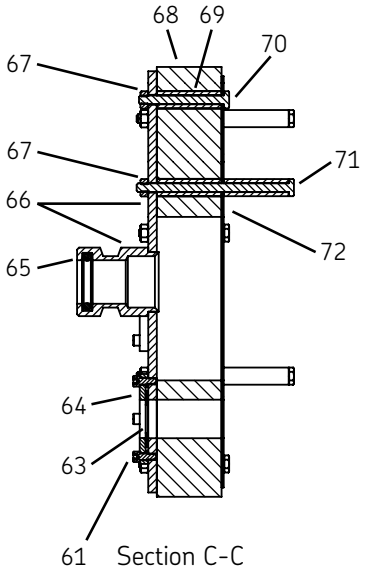


Fig. 5

Follower assembly (42)





Service parts

Item	Description	Qty.	Item	Description	Qty.
1	Bare pump assembly	1	37	Gasket	1
2	Elbow, 1/4 NPTF	1	38	Vent elbow	1
3	Adapter	1	39	Gasket	1
4	Outlet check assembly	1	40	Hex nut	1
5	Adapter elbow	1	41	Vent pipe	1
6	Hose assembly	1	42	Follower assembly	1
7	Vent hose	1	43	Gasket	1
8	Elbow 1/4 NPTF	1	44	Outlet check bushing	1
9	Adapter	1	45	Pump check disc assembly	1
10	Hydraulic hose	1	46	Ball check seat	1
11	Plastic helix	1	47	Gasket	1
12	Safety unloader	1	48	Steel ball (3/8 diameter)	1
13	Filter	1	49	Outlet connector	1
14	Vent fitting	1	50	Hydraulic cylinder	1
15	Lock washer, 3/8	8	51	Piston	1
16	Hex nut, 3/8-16	2	52	Needle	1
17	Eyebolt	2	53	Viton packing assembly	1
18	Hex head screw, 10-24 x 5/8	5	54	Valve seat	1
19	Lock washer, #10	5	55	Check seat gasket	1
20	Cover	1	56	Valve Body	1
21	Gasket	1	57	Hex head screw, 1/2-20 x 1	1
22	Hex head screw, 3/8-16 x 1-1/4	6	58	Gasket	1
23	Drum cover	1	59	Lock washer, 1/2	1
24	Gasket	1	60	Jam nut, 1/2-20	1
25	Container assembly	1	61	Socket head screw, 10-24 x 1/2	8
26	Extension tube	1	62	Follower Cover	1
27	Pipe plug, 1" NPT	1	63	Gasket	1
28	Elbow, 1/2 NPTF	1	64	Wiper cover	1
29	Reducer nipple	1	65	O-ring	1
30	Hex head screw, 5/16-18 x 3/4	2	66	Weighted follower plate	1
31	Lock washer, 5/16-18	2	67	Lock nut, 1/4-20	8
32	Elbow	1	68	Follower Foam	1
33	Vent valve assembly	1	69	Spacer	12
34	Elbow	1	70	Hex head screw, 1/4-20 x 2-1/2	4
35	Hex head screw, 1/4-20 x 1-1/4	4	71	Hex head screw, 1/4-20 x 4-1/2	4
36	Lock washer, 1/4-20	4	72	Follower plate	1

[1] Suggested service replacement components.
[2] Sold as an assembly. Individual parts not available.
[3] See owner's manual page C8-375 series for pump details.

Troubleshooting

Condition	Possible cause	Corrective action
Pump does not operate.	No hydraulic power to pump.	Turn on or connect hydraulic supply to pump.
	No pressure on gauge: • Closed supply line shut off valve. • No power to solenoid valve • Faulty solenoid • Pressure reducing valve is set too low. • Insufficient hydraulic fluid supply.	 Open shut-off valve Correct electrical fault. Replace solenoid. Reset pressure reducing valve. Check hydraulic supply for proper pressure and flow.
	Pressure is shown on gauge on pump manifold. • Closed fluid outlet line. • Flow control valve is fully closed. • Pump is stalled due to grease back pressure.	 Check outlet line and clear obstructions. Readjust flow control valve to one turn open. Check vent valve in system.
	Pump is seized or damaged.	Dismantle the pump and repair defective or seized component. See pump service page.
Pump runs excessively.	Pump tube malfunction.	Refer to pump service page.
	Outlet check damage or contamination.	Repair check or remove contamination.
	Vent valve damage or contamination.	Repair vent valve or remove contamination.
	System component leaking.	Repair leaks.
	Vent valve not receiving proper pressure to keep it closed.	Orifice fitting plugged.
	Injector bypassing.	Repair injectors.
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.	Refer to pump service sheet.
Pump runs, but output is low.	Insufficient hydraulic fluid supply.	Check hydraulic supply and adjust flow.
	Inlet pressure too low.	Increase pressure at pressure control valve.
	Faulty inlet or discharge check valve in pump.	Replace faulty components. See pump service page.
Lubricant leaking from safety unloader valve.	Pressure of system set too high.	Adjust pressure switch setting.
	Safety unloader damaged or contaminated.	Replace safety unloader.
Lubricant leaking from weep hole in vent valve.	Vent valve lubricant seal damaged.	Replace lubricant seal.

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, replacement injectors-85771, 85781 and FlowMaster II

Lincoln warrants the SL-V Injector series and FlowMaster II "pump only" models 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) or FlowMaster II pump 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 universal 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 01-314-679-4200
or you may also use our website
www.lincolnindustrial.com

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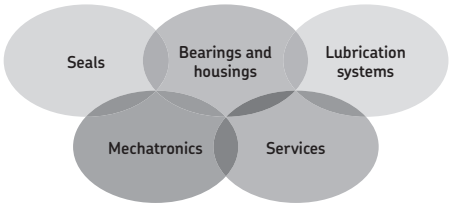

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These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

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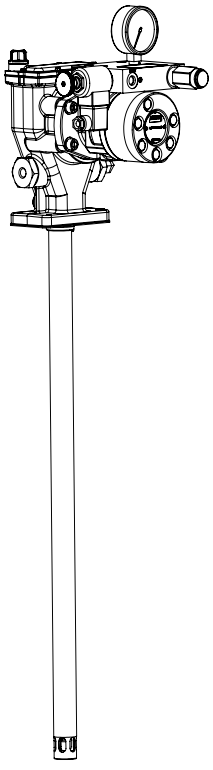
Operation, assembly, disassembly and troubleshooting guide

FlowMaster II rotary driven hydraulic pump, series “A”

85769, 120 lbs.
85847, 40 lbs.



Date of issue	**January 2014**
Form number	**404534C**
Section	**C8**
Page	**375B**

⚠ DANGER

Read manual prior to installation or use of this product. Keep manual nearby for future reference. Failure to follow instructions and safety precautions may result in death or serious injury.

SKF

Contents

Safety

Read and carefully observe these installation instructions before installing/operating/troubleshooting the assembly. The assembly must be installed, maintained and repaired exclusively by persons familiar with the instructions.

Install the assembly only after safety instructions and this guide have been read and are completely understood.

Adequate personal protection must be used to prevent splashing of material on the skin or in the eyes.

Always disconnect power source (electricity, air or hydraulic) from the pump when it is not being used.

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. If any fluid appears to penetrate the skin, seek attention from a doctor immediately.

Do not treat injury as a simple cut. Tell attending doctor exactly what type of fluid was injected.

Any other use not in accordance with instructions will result in loss of claim for warranty or liability.

- Do not misuse, over-pressurize, modify parts, use incompatible chemicals, fluids, or use worn and/or damaged parts.
- Do not exceed the stated maximum working pressure of the pump or of the lowest rated component in your system.
- Always read and follow the fluid manufacturer's recommendations regarding fluid compatibility, and the use of protective clothing and equipment.
- Failure to comply may result in personal injury and/or damage to equipment.

Explanation of signal words for safety

⚠

This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ **SAFETY INSTRUCTIONS**

Safety instruction signs indicate specific safety-related instructions or procedures.

⚠ **DANGER**

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

⚠ **WARNING**

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

⚠ **CAUTION**

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

Use of this manual

Overview

This service page details the procedure that must be followed while installing, operating and repairing the FlowMaster II rotary driven hydraulic pump.

All required parts, tools, and equipment needed to complete the operation of the FlowMaster II rotary driven hydraulic pump are defined and listed within this manual. Review of the parts list and nomenclature is recommended before starting disassembly or operation.

Appropriate use

All pump models are exclusively designed to pump and dispense lubricants using hydraulic power. The specifications are shown in **table 1** for the pump.
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.

General description and information

The FlowMaster II rotary driven hydraulic pump is a fully hydraulically operated adjustable grease pump.

A 24 V DC solenoid valve is incorporated as a method to turn the pump on and off.

On this model the pressure gauge is optional and may or may not be shown in the graphics in this manual.

Table 1 details the grease output in proportion to the hydraulic input, which is affected by temperature.

Grease output is proportional to the hydraulic input flow. The pump is primarily designed for centralized lubrication systems such as the single line parallel. Single line progressive and two line systems. An integrated pump control manifold is incorporated with the input flow and pressure.

The pump is driven by the rotary motion of the hydraulic 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.

Fig. 1, **page 5** is the hydraulic schematic showing the key sub-assemblies of the pump. **Fig. 3**, **page 7** depicts the actual location of those items.

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.

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

Damaged pumps

Do not use any pump that appears to be damaged, badly worn or operates abnormally.

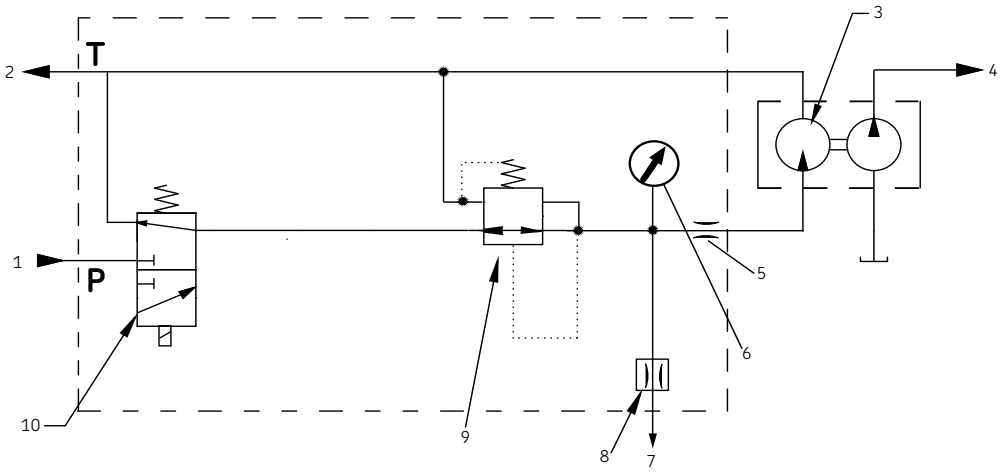
Remove the pump from service and contact the factory authorized warranty and service center nearest you for repairs. A listing of authorized warranty and service centers is available upon request.

Table 1

Pump specifications

Hydraulic inlet flow	1.5 U.S. gpm *(5,7 liters/min.)*
Operating temperature	–40 to 150 °F *(–40 to 65 °C)*
Operating working hydraulic pressure	360 psi *(25 bar)*
Solenoid voltage, for the on/off solenoid	24 V DC
Hydraulic inlet port, in	SAE 4
Tank return port, in	SAE 6
Supply inlet hydraulic pressure	Maximum 3,000 psi *(206 bar)*
Pump outlets, in	1/4 in. NPTF
Maximum hydraulic fluid temperature	250 °F *(121 °C)*
Pump ratio with manifold	10:1

Fig. 1



Call out	Nomenclature
1	Hydraulic fluid inlet port SAE 4 ORB
2	Hydraulic fluid return to tank SAE 6 ORB
3	Hydraulic motor
4	Lube outlets 0.25 in. NPTF
5	Flow control valve
6	Pressure gauge
7	Hydraulic fluid to vent valve
8	Orifice 0.013 in. *(0.33 mm)* diameter
9	Pressure reducing valve
10	Solenoid valve

Diagram 1

Grease output vs. temperature at 1.5 U.S. gpm (*5,7 liters/min.*) hydraulic flow rate

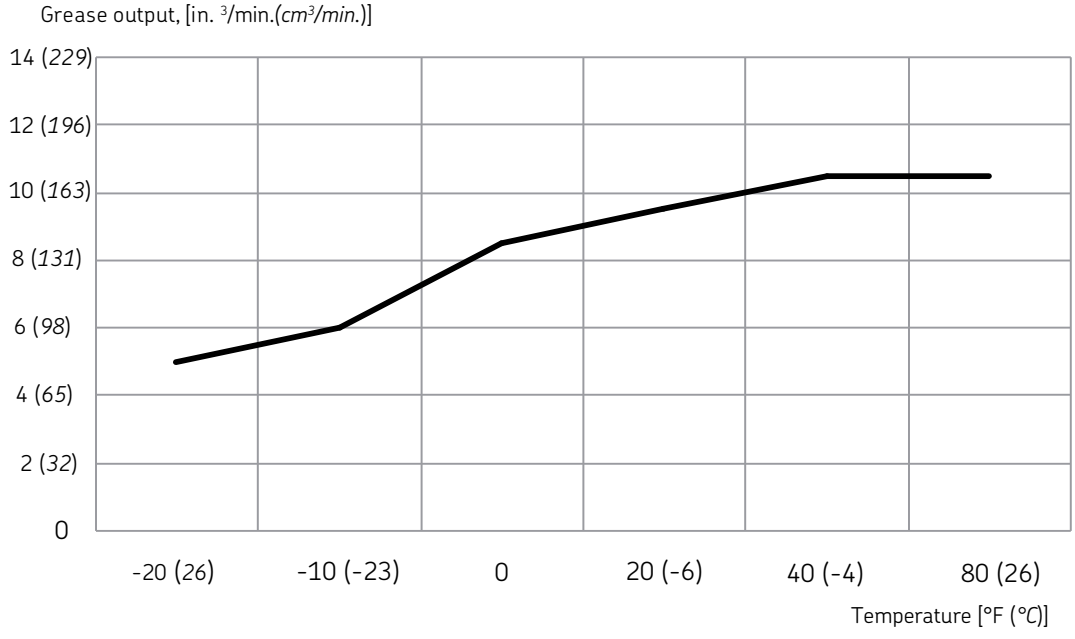
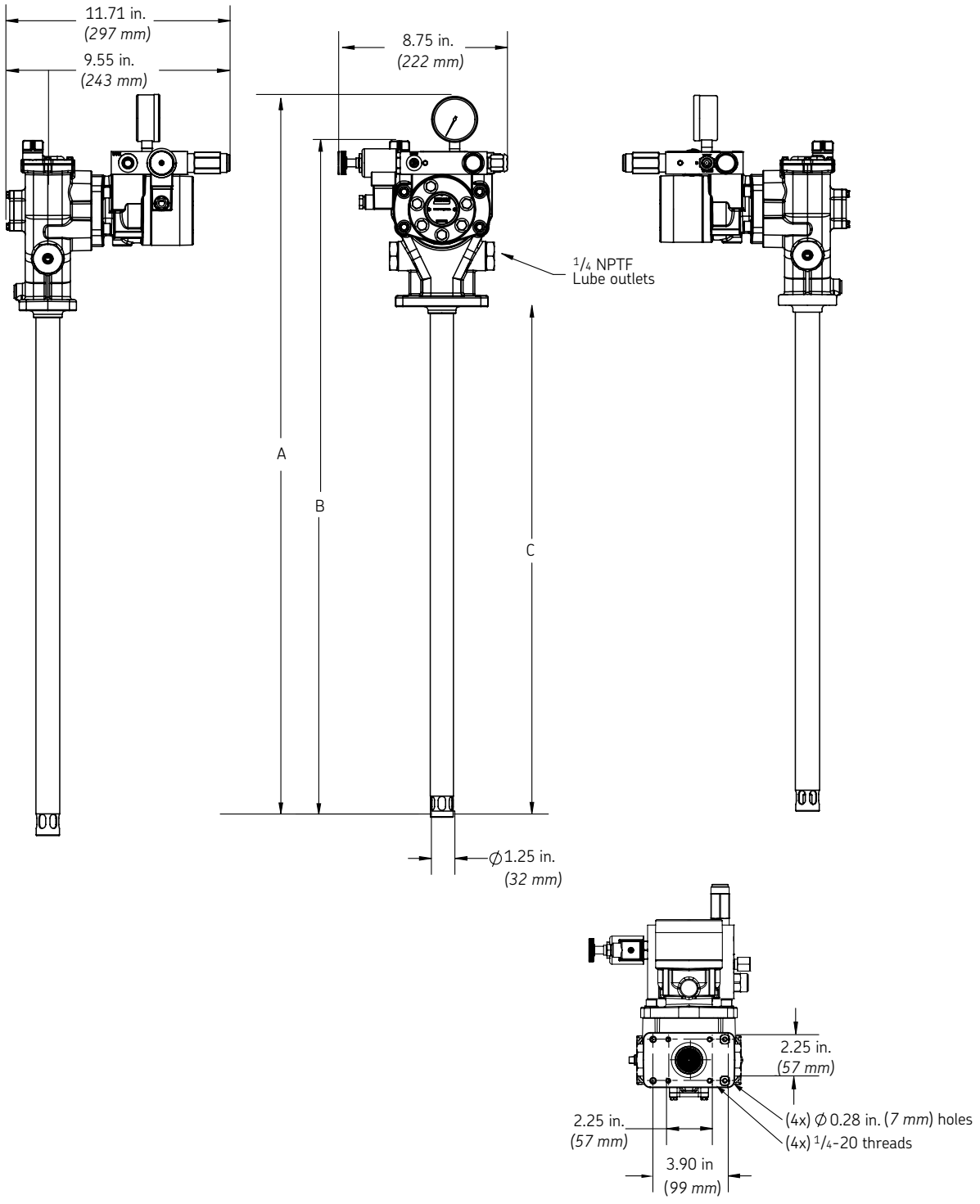


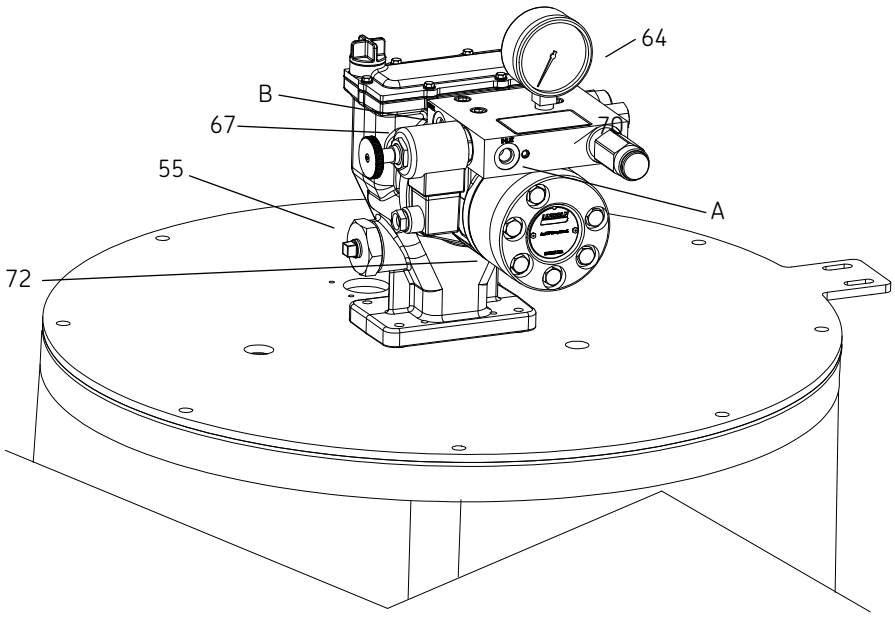
Fig. 2

Pump dimensions



Model	Dimension A in. (*mm*)	Dimension B in. (*mm*)	Dimension C in. (*mm*)
85847	27.10 (*688*)	24.69 (*627*)	15.76 (*400*)
85769	38.90 (*988*)	36.49 (*927*)	27.56 (*700*)

Fig. 3



Call out	Nomenclature
A	Hydraulic fluid inlet port SAE 4 ORB
B	Hydraulic fluid return tank SAE 6 ORB
72	Hydraulic motor
70	Pressure reducing valve
69	Flow regulator
67	Solenoid valve
64	Pressure gauge
55	Lube outlets 1/4 NPTF

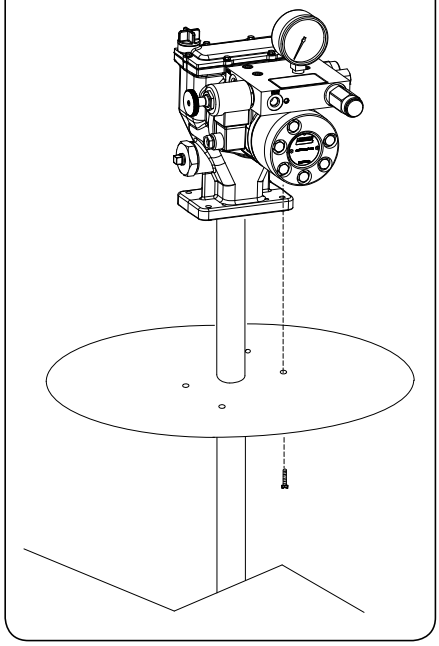
Installing the Pump

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.

The pump has flow and pressure controls integrated into the manifold (**66**) which are not adjustable by the user. A normally closed on/off solenoid valve (**67** and **68**) is also integrated into the manifold and will start or stop the pump operation. A manual override is on the pump that will allow starting and stopping of the pump.

1. Mount the pump securely on the drum cover so that it cannot move or vibrate during operation. Refer to **fig. 4**.
2. Attach hydraulic supply line to the inlet and return line to the manifold ports.
3. Connect material supply line to the pump outlet.
4. Plug the unused outlet on the opposite side of the pump.
5. Install high pressure shut-off valve in the material supply line. (Required).
6. Connect a 24 V DC power supply to the solenoid coil (**74**), using the supplied plug.

Fig. 4



Notice

If it is necessary to drill mounting holes into reservoir cover, refer to **fig. 2** for hole pattern and dimensions.

Operation

⚠ WARNING

Do not exceed 400 psi *(27 bar)* working hydraulic pressure. Use high pressure components to reduce risk of serious injury including fluid injection and splashing in the eyes or on the skin.

All accessories connected to the pump outlet must have at least 5,000 psi *(344 bar)* minimum hydraulic operating pressure. All accessories connected to the pump inlet must have at least 3,000 psi *(206 bar)* minimum working pressure.

Failure to comply may result in personal injury.

Notice

All pumps are factory set at 360 psi *(25 bar)* working inlet hydraulic pressure, with a flow rate of 1.5 U.S. gallons/min. *(5,7 liters/min.)*. Settings are not adjustable.

Notice

Fig. 5 depicts the location of the operating valves for the pump.

1. Shut off the material supply line valve.
2. Turn on the hydraulic pressure.
3. Energize the solenoid on/off valve.
4. Prime the pump by slowly opening the shut-off lubricant supply line valve.
5. Purge air from the pump.
6. Verify lubricant is flowing evenly from the pump.

Notice

Do not exceed maximum operating temperature of the hydraulic fluid 250 °F *(121 °C)*.

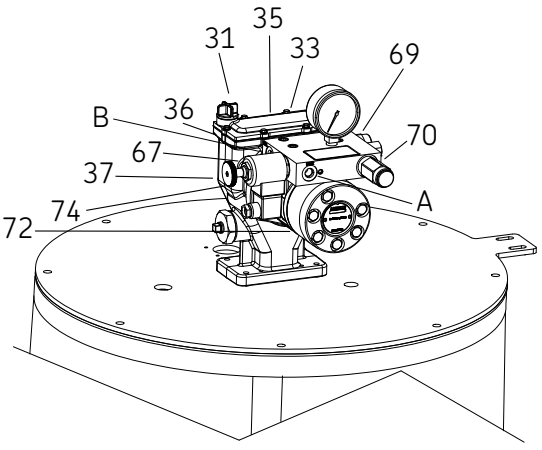
Never allow the pump to run dry of lubricant. A dry pump quickly speeds up, creating friction heat, which can damage the seals. Monitor supply lubricant level and refill when necessary.

Failure to comply may result in damage to equipment.

Crankcase oil service interval

- Check the oil level after every 750 hours of machine operation, or monthly.
- 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 of –40 to 150 °F *(–40 to 65 °C)*. For ambient temperatures of 50 to 70 °F *(10 to 21 °C)* use Mobil Aero HFA low temperature oil.
- Oil level should be at indicating dot on dipstick (middle of crankshaft).
- Use 10W30 motor oil 15 oz. *(0,44 l)*.

Fig. 5



Call out	Nomenclature
A	Hydraulic fluid inlet port SAE 4 ORB
B	Hydraulic fluid return to tank SAE 6 ORB
55	Lube outlet ¼ NPTF
64	Pressure gauge
69	Flow regulator
67	Solenoid valve with manual override
70	Pressure reducing valve
72	Hydraulic motor

Disassembly

Pump

1 Place pump into a vise.
2 Remove dipstick (**31**). Refer to **fig. 6**.
3 Drain crankcase oil.
4 Remove housing cover screws (**33**).
5 Remove housing cover (**35**) and gasket (**36**).
6 Remove the hydraulic motor mounting screws (**74**) and lock washers (**73**).
7 Remove hydraulic motor (**72**).
8 Remove manifold assembly mounting screws (**65**).
9 Remove manifold assembly (**66**).
10 Remove pressure reducing valve (**70**).
11 Remove flow regulator (**69**).
12 Remove solenoid valve cartridge (**67**).
13 Remove the outlet pin nuts (**55**) from both sides of the pump housing (**37**). Refer to **fig. 7**.
14 Using a blunt tool, remove the o-rings (**54**), (**53**) and back up washer (**52**) from outlet pin nuts (**55**).
15 Loosen the screws (**44**) holding the shaft cover (**46**) on the pump housing (**37**).
16 Remove the retaining ring (**48**) from the pump shaft (**40**).
17 Remove the pump shaft (**40**) by pushing the pump shaft on the retaining ring (**48**) side.
18 Remove the retaining ring (**63**) from the housing tube (**60**). Refer to **fig. 7**.
19 Remove the shovel plug (**62**) from the housing tube (**60**).
20 Remove the spiral retaining ring (**61**).
21 Loosen and remove the tube housing (**60**). Refer to **fig. 7**.
22 Remove the bronze bearing (**56**) from the tube housing (**60**). Refer to **fig. 8**.
23 Using a flat, blunt tool, remove the o-ring (**57**) from the tube housing (**60**).
24 Remove the back up washer (**58**) from the tube housing (**60**).

Notice
Slight force may be necessary to remove the eccentric (**5**) and crank rod (**7**) from the housing (**37**). Tap on the crank rod (**7**) until the eccentric (**5**) is above the pump housing (**37**) and can be pulled from the pump housing (**37**).

Fig. 6

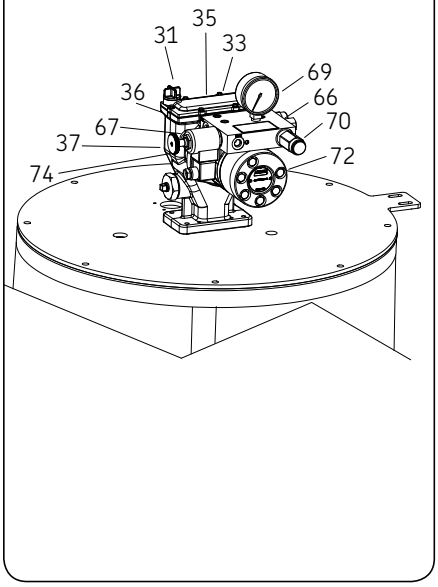


Fig. 7

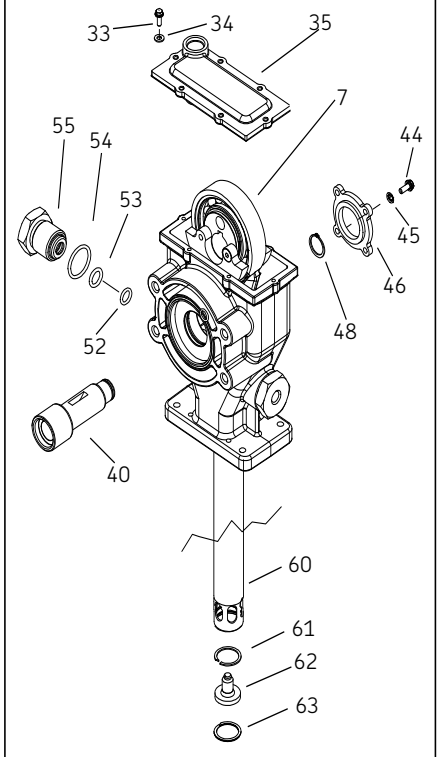
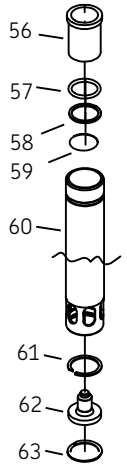


Fig. 8



25 Using a flat, blunt tool, remove the o-ring (**59**) from the tube housing (**60**).
26 Using a rubber mallet and piece of brass or other suitable piece of soft metal, tap on the crank rod (**7**) inside the housing (**37**).
27 Pull the eccentric (**5**) and crank rod (**7**) out of the top of the pump housing (**37**).

End of procedure.

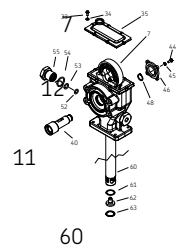
Crankrod and eccentric

1 Remove pivot screws (**11**) from the crankrod (**7**). Refer to **fig. 9**.

Notice
Wrist pin bushings (**12**) often stick in wrist pin anchor (**13**). It may be necessary to use a 5/16–24 bolt from kit **(276275)** to remove the wrist pin bushings (**12**).

2 Using a 5/16 in.–24 bolt, press out wrist pin bushing (**12**).
3 Loosen and remove the wrist pin anchor (**13**) from reciprocating tube (**25**). Refer to **fig. 10.**
4 Pull the cup seal (**16**) out of the wrist pin anchor (**13**).
5 Remove the steel backup ring (**17**).
6 Place the plunger link rod (**20**) in a vise.
7 Using an open ended wrench, loosen the plunger link rod (**20**) and remove from the outlet pin (**8**).
8 Remove the plunger link rod (**20**).
9 Remove the retainer clip (**19**) from the plunger link rod (**20**).
10 Using a blunt tool, remove the o-ring (**18**) from the plunger link rod (**20**).
11 Remove the back up washer (**15**) from the plunger link rod (**20**).
12 Remove the o-ring (**14**) from the plunger tube (**52**).
13 With the crank rod in a vise and using the special tool (**T1**) provided in tool kit, 276275 remove the plunger link rod (**20**). Refer to **fig. 11**.
14 Place the end of the plunger link rod (**20**) into the hole of the special tool (**T1**).

Fig. 9



15 Align the outlet hole of the plunger link rod (**20**) with the hole in the special tool (**T1**). Refer to **fig. 11**.
16 Insert the pin included in the tool kit (276275) through the tool and into the plunger link rod (**20**) outlet hole.
17 Turn the tool counter clockwise to loosen the lower bushing and plunger (**24**) from the plunger link rod (**20**).
18 Remove the plunger (**24**).
19 Remove the check rod from (**22**) the lower bushing and plunger (**24**).
20 Remove the ball (**23**) from the lower bushing and plunger (**24**).
21 Remove the spring (**21**) from the link rod (**20**).

End of procedure.

Fig. 11

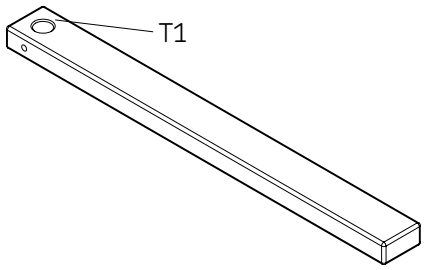
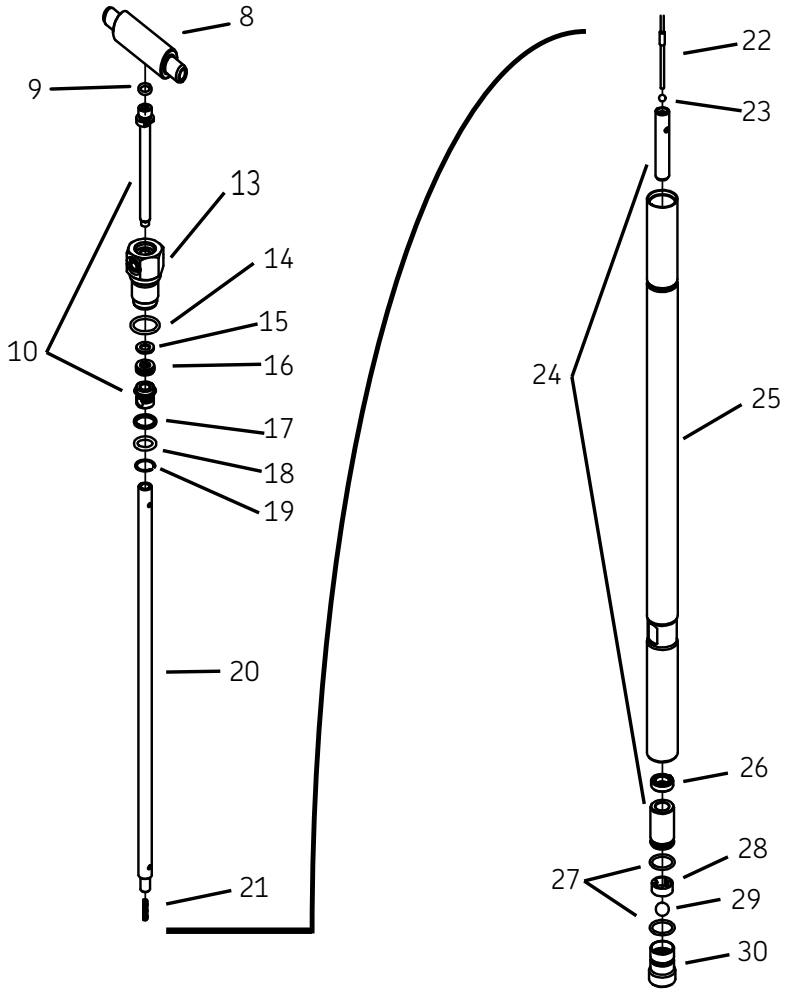


Fig. 10



Reciprocating tube

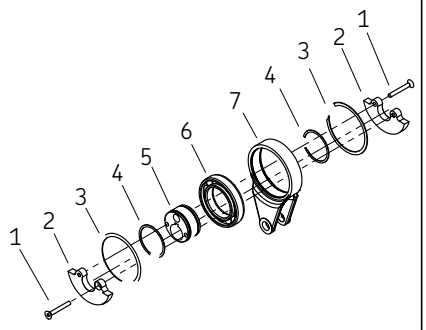
1. Loosen the check seat housing (**30**) with 3/8 in. *(9 mm)* hex head wrench. Refer to **fig. 11**.
2. Remove the check seat housing (**30**) from the reciprocating tube (**25**).
3. Remove the ball cage (**28**), check ball (**29**) and o-ring seal (**27**) from the check seat housing (**30**).
4. Remove the lower bushing (**24**) from the reciprocating tube (**25**).
5. Remove the lower cup seal (**26**) from the reciprocating tube (**25**).

Crankrod

1. Using a hex head wrench, loosen and remove the two flat head screws (**1**) from the eccentric (**5**). Refer to **fig. 12**.
2. Remove the counterbalance weights (**2**).
3. Remove the outer (**3**) and inner (**4**) retaining ring from both sides of the crank rod (**7**).
4. Place the crankrod (**7**) on the supplied 2 1/2 in. *(62 mm)* diameter steel pipe.
5. Drive the crank eccentric (**5**) out of the ball bearing (**6**).
6. Drive the ball bearing (**6**) out of the crank rod (**7**).

End of procedure.

Fig. 12



Assembly

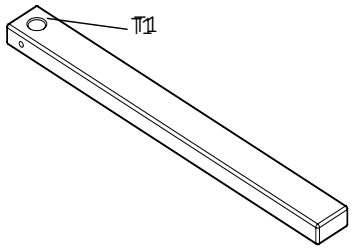
Crankrod and eccentric assembly

1. Place the crank rod (**7**) on the supplied 2 1/2 in. *(62 mm)* diameter steel pipe.
2. Refer to **fig. 13** and install the ball bearing assembly (**6**) into the crank rod (**7**).
3. Place the eccentric (**5**) in the ball bearing (**6**).
4. Place one end of the inner retaining ring (**4**) on top of the eccentric (**5**).
5. Squeeze the other end of the retaining ring (**4**) toward the center and slide retaining ring (**4**) into place.
6. Place one end of the outer retaining ring (**3**) on top of the inner retaining ring (**4**).
7. Squeeze the other end of the retaining ring (**4**) toward the center and slide retaining ring (**4**) into place.
8. Align the holes of the counter-balance weights (**2**) with the threaded holes of the eccentric (**5**) and place on the eccentric (**5**).
9. Insert the flat head screws (**1**) into the counter-balance weight (**2**) and torque the flat head screws (**1**) to a torque of 100–110 in.lbf. *(11,3–12,4 Nm)*.

Pump

1. Install the ball (**23**) into the lower bushing and plunger (**24**). Refer to **fig. 14**.
2. Insert the check rod (**22**) into the pump plunger (**23**).
3. Place the spring (**21**) onto the check rod (**22**).
4. Thread the plunger link rod (**20**) into the pump plunger (**24**).
5. Insert the lower bushing pump plunger (**24**) into the suppled tool.
6. Align the hole in the lower bushing pump plunger (**24**) with the hole in the tool (**T1**).
7. Insert the supplied pin into the hole of the tool (**T1**) and into the lower bushing pump plunger (**24**).
8. Torque the lower bushing pump plunger (**24**) to a torque of 110 to 125 in.lbf. *(12,4 to 14,1 Nm)*.
9. Install the steel back up ring (**17**) onto the threads of upper bushing and plunger end (**10**).
10. Slide the o-ring (**18**) onto the upper bushing and plunger end (**10**).
11. Install the retaining clip (**19**) on the upper bushing and plunger end (**10**).
12. Install the o-ring (**9**) on the upper bushing and plunger end (**10**).
13. Place the outlet pin (**8**) into a vise.
14. Apply Loctite 242 to the threads of the upper bushing and plunger end (**10**).

Fig. 15



15. Thread the upper bushing and plunger end (**10**) into the outlet pin (**8**).
16. Torque to 110 to 125 in.lbf. *(12,4 to 14,1 Nm)*.
17. Install the back-up washer (**15**) in the wrist pin anchor (**13**).
18. Place a new cup seal (**16**) inside the wrist pin anchor (**13**).
19. Clean the threads of the wrist pin anchor (**13**).
20. Install the o-ring (**14**) on the wrist pin anchor (**13**). Refer to **fig 14**.
21. Insert the upper bushing and plunger end (**10**) into the wrist pin anchor (**13**) and tighten.
22. Place the wrist pin anchor (**13**) in a vise.
23. Tighten the wrist pin anchor (**13**) to a torque of 20 to 25 ft.lbf. *(27 to 34 Nm)*.

Fig. 13

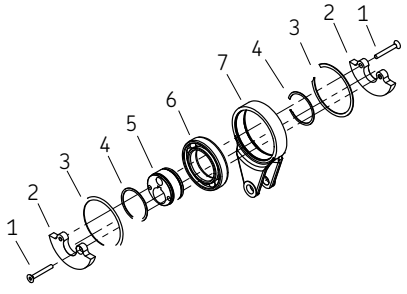
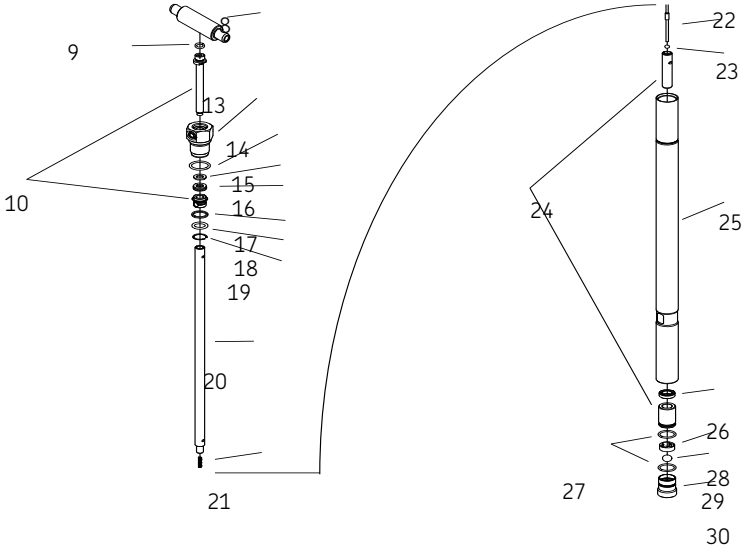
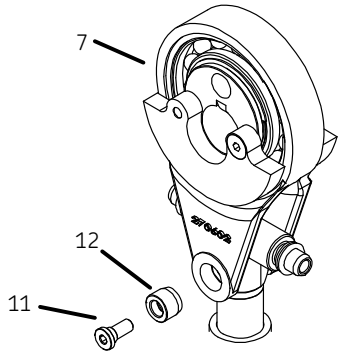


Fig. 14



24 With the wrist pin anchor (**13**) still in the vise, align the crankrod/eccentric assembly (**7**) holes with the wrist pin anchor (**13**) holes. Refer to **fig. 16**.
25 Install the wrist pin bushings (**12**) through the crank rod (**7**) and into the wrist pin anchor (**13**). Refer to **fig. 16**.
26 Apply Loctite 242 to the threads of the wrist pin bushing screws (**11**).
27 Insert and thread the wrist pin bushing screws (**11**) into the crankrod (**7**).
28 Torque bushing screws (**7**) to a torque of 110 to 125 in.lbf. *(12,4 to 14,1 Nm)*.
29 Install the cup seal (**26**) with the slotted side toward the center of the reciprocating tube (**25**).
30 Place a new o-ring (**27**) on the lower bushing and plunger (**24**).

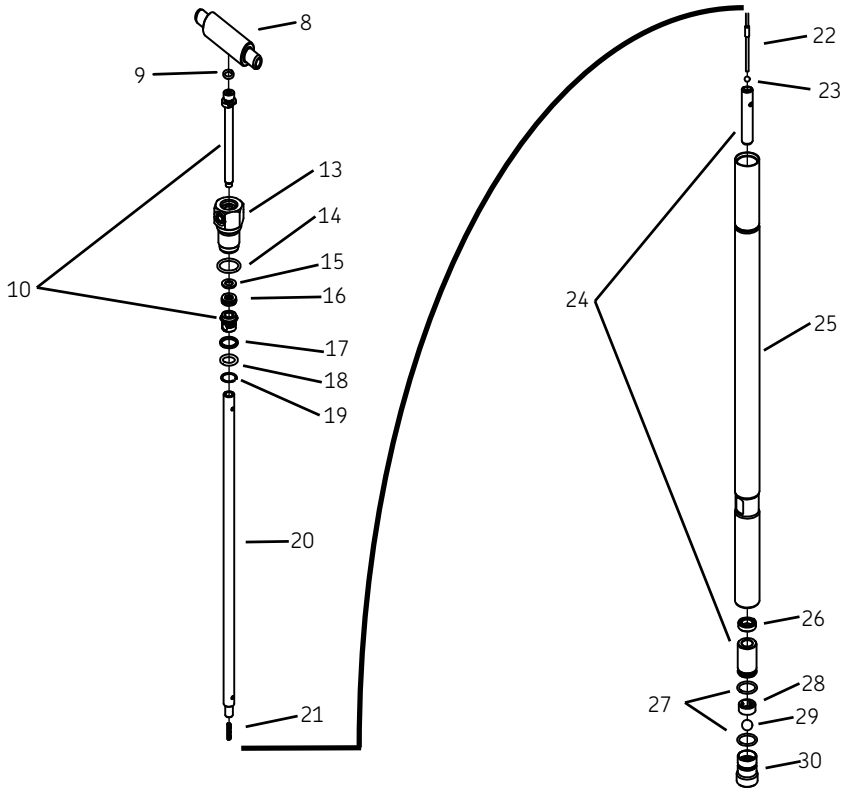
Fig. 16



31 Slide the lower bushing and plunger (**24**) into the reciprocating tube (**25**) with the o-ring (**27**) near the bottom of the reciprocating tube (**25**). Refer to **fig. 17**.
32 Install the steel check cage (**28**) into the reciprocating tube (**25**).
33 Install the ball (**29**) into the steel check cage (**28**).

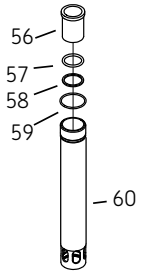
Notice
For ease of installation of the lower cup, use a small piece of tubing to slide the lower cup into the reciprocating tube and over the pump plunger.

Fig. 17



34 Install o-ring (**27**) onto check seat housing (**30**).
35 Apply Loctite 242 or equivalent to the threads of the check seat housing (**30**).
36 Thread the check seat housing (**30**) into the reciprocating tube (**25**) and tighten using a 3/8 in. *(9 mm)* hex key.
37 Torque to 20 to 25 ft.lbf. *(27 to 34 Nm)*.
38 Remove the crank rod (**7**) from the vise.

Fig. 18



39 Refer to **fig. 18** and insert the o-ring (**59**) into the housing tube (**60**).
40 Place the back up washer (**58**) into the housing tube (**60**).
41 Insert the o-ring (**57**) into the housing tube (**60**).
42 Insert the bronze bearing (**56**) into the housing tube (**60**).
43 Position the crankrod assembly (**7**) over the top of the pump housing (**37**) and lower into the pump housing (**37**).

Notice
Failure to align the key on the shaft and the key way in the eccentric will result in damage to equipment.

44 Align the crank rod (**7**) with the shaft (**40**) mounting hole. Refer to **fig. 19** and **fig. 20.**

45 While aligning the key (**39**) on the shaft (**40**) with the eccentric key way (**5**), slide the shaft (**40**) into the eccentric (**5**). Refer to **fig. 20**.

46 Install the retaining ring (**48**) on the shaft. (**40**).

Fig. 19

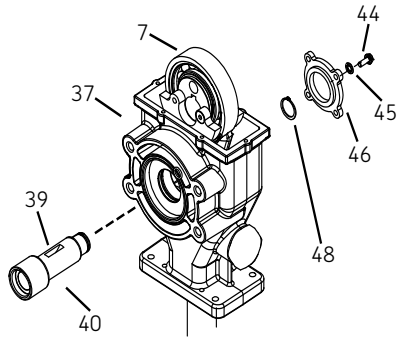
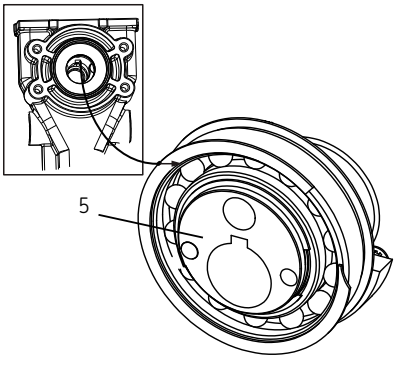


Fig. 20



47 Install the shaft cover (**46**) on the pump (**37**). Refer to **fig. 23**.

48 Insert and thread screws (**44**) with lock washers (**45**) into shaft cover (**46**) and pump housing (**37**).

49 Install new cover gasket (**36**) on pump housing (**37**). Refer to **fig. 21**.

50 Install the pump cover (**35**).

51 Install the screws (**33**) with o-rings (**34**) into the pump cover (**35**).

52 Torque the screws (**33**) to a torque of 10 to 15 in.lbf. *(1,1 to 1,6 Nm).*Insert and thread the housing tube (**60**) into the pump housing (**37**). Refer to **fig. 22**, **page 15**.

53 Install the hydraulic motor (**72**) on the pump housing (**37**).

54 Thread the hydraulic motor mounting screws (**74**) with lock washers (**73**) into the pump housing (**37**).

55 Torque the mounting screws (**74**) to a torque of 50 to 55 ft.lbf. (*67,8 to 74,5 Nm*). Refer to **fig. 22**, **page 15**.

56 Install the o-rings (**71**) in the motor (**72**). Refer to **fig. 22**.

57 Place the manifold (**66**) on the hydraulic motor (**72**).

58 Thread the four manifold mounting screws (**65**) into the manifold (**66**).

59 Torque the screws to 20 to 25 ft.lbf. *(27,1 to 33,9 Nm).*

60 Install the manual override solenoid valve (**67**) into the manifold (**66**).

61 Torque the solenoid valve (**67**) to a torque of 25 to 30 ft.lbf. *(33 to 40 Nm).*

62 Install the pressure reducing valve (**70**) in the manifold (**66**).

63 Torque the pressure reducing valve (**70**) to a torque of 35 to 40 ft. lbf. *(47 to 54 Nm).*

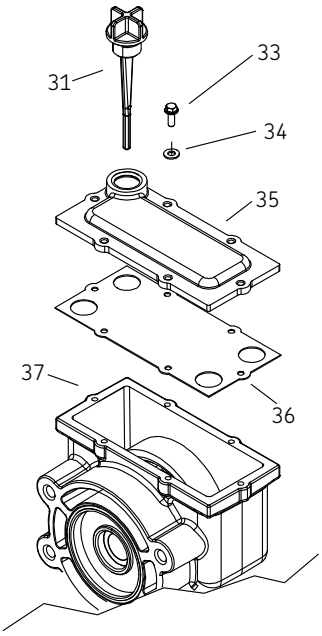
64 Install the flow regulator (**69**) into the manifold (**66**).

65 Torque the flow regulator (**69**) to a torque of 35 to 40 ft.lbf. *(47 to 54 Nm).*

66 Refer to **fig. 22**, **page 15** and torque the housing tube (**60**) to a torque of 20 to 25 ft.lbf. *(27,1 to 33,9 Nm).*

67 Refer to **fig. 22** and insert the retaining ring (**61**) into the second groove of the housing tube (**60**).

Fig. 21



68 Install the shovel plug (**62**) into the housing tube (**60**).

69 Install the spiral retaining ring (**63**).

70 Install the o-ring (**54**) in the outlet pin mounting hole groove of the pump housing (**37**), as shown in **fig. 22, page 15**.

71 Install the back up washer(**52**) inside the outlet pin nut (**55**).

72 Install the o-ring (**53**) inside the outlet pin nut (**55**).

73 Line up the outlet pin and thread the outlet pin nut (**55**) into the pump housing (**37**).

Notice
Refer to **page 8** crankcase oil service for oil recommendations.

74 Torque to 30 to 35 ft.lbf. *(40 to 47 Nm).*

75 Fill the crankcase with oil up to indicator dot on dipstick (**31**).

76 Install the crank case oil dip stick (**31**) and torque to 10 to 15 in.lbf. (*1,1 to 1,7 Nm).* Refer to **fig. 22**, **page 15**.

End of procedure.

Troubleshooting

Condition	Possible cause	Corrective action
Pump does not run	No pressure on gauge (**64**)	
	• Closed supply line shut off valve • No power to solenoid valve (**68**) • Faulty solenoid (**68**)	Open shut off valve Correct electrical fault Replace solenoid (**68**)
	• Insufficient hydraulic fluid supply	Check hydraulic supply for proper pressure and flow
	Pressure is shown on gauge (**64**) • Closed fluid outlet line • Pump is stalled due to grease back pressure • Pump is seized or damaged	 Check outlet line and clear obstructions Check vent valve in system 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 Follower plate is stuck and separated from grease Pump piston or checks are worn	Refill reservoir Check follower plate and container for damage Disassemble the pump and repair
Pump runs, but output is low	Insufficient hydraulic fluid supply Inlet pressure low Faulty inlet (**29**, **30**), faulty discharge check (**23**, **24**) or damaged o-ring (**27**)	Check hydraulic supply and adjust flow using valve (**69**) Increase pressure using valve (**70**) Replace faulty components
Weepage from housing cover (**35**)	Cup seal (**16**) or o-ring (**14**) wore out	Check seals and replace if necessary
Pump becomes noisy	Crankcase needs oil	Check dipstick (**31**) and fill with oil as required
Pump does not build pressure	Worn wrist pin bushing (**12**) Foreign material holding lower check open	Check the bushings and replace if necessary Dismantle and clear check Consider adding grease filter to system

Parts and tools

Tool list

7/16 in. open end wrench
1 1/2 in. open end wrench
3/4 in. open end wrench

12 in. adjustable wrench
1/8 in. hex head wrench
5/32 in. hex head wrench

1/4 in. hex head wrench
5/16 in. hex head wrench
3/8 in. hex head wrench

1/4 in. drive socket
1/4 in. socket
5/16 in. socket

Pick to remove seals and spiral retaining rings
Small snap ring pliers
Special tool kit 276275

Phillips screwdriver
1/2 in. hex head wrench
Hammer

Torque wrench ft.lbf. and in.lbf. *(Nm)*
Hex head socket adapters (required to torque hex head screws)
Loctite 242 medium strength thread lock or equivalent

Parts list

Item no.	Description	Quantity	Item no.	Description	Quantity
1	Flat head screw[1] (1/4–28 x 1 3/4)	2	39	Woodruff key	1
2	Counter weight	2	40	Pump shaft	1
3	Retaining ring	2	41	Retaining ring	1
4	Retaining ring	2	42	Ball bearing	1
5	Crank eccentric	1	43	Shaft seal	1
6	Ball bearing	1	44	Screws	4
7	Crank rod	1	45	Lock washer	4
8	Outlet pin	1	46	Bearing cover	1
9	O-ring (nitrile)	1	47	O-ring	1
10	Upper bushing and plunger	1	48	Retaining ring	1
11	Pivot screw	2	49	Ball bearing	1
12	Wrist pin bushing	2	50	Retaining ring	1
13	Wrist pin anchor	1	51	Drain plug	1
14	O-ring	1	52	Backup washer	2
15	Backup washer	1	53	O-ring	2
16	Cup seal (polyurethane)	1	54	O-ring	2
17	Steel back-up ring	1	55	Outlet pin nut	2
18	O-ring	1	56	Bronze bearing	1
19	Retainer clip	1	57	O-ring (polyurethane)	1
20	Plunger link rod	1	58	Backup washer	1
21	Spring	1	59	O-ring (nitrile)	1
22	Check rod	1	60	Housing tube	1
23	Ball 3/16	1	61	Retaining ring	1
24	Lower bushing and plunger	1	62	Shovel plug	1
25	Reciprocating tube	1	63	Retaining ring	1
26	Cup seal (polyurethane)	1	64	Pressure gauge	1
27	O-ring (nitrile)	2	65	Socket hd screw (5/16-18 x 1 1/4)	4
28	Ball cage	1	66	Manifold	1
29	Ball 3/16	1	67	Solenoid valve cartridge	1
30	Check seat	1	68	Din coil (24 V DC)	1
31	Dipstick with o-ring	1	69	Flow regulator	1
32	O-ring	1	70	Pressure reducing valve	1
33	Self-threading screw 8 x 1/2	6	71	O-ring (fluorocarbon)	2
34	Gasket (screw)	6	72	Hydraulic motor with o-rings	1
35	Housing cover	1	73	Lock washer (3/8)	4
36	Cover gasket (nitrile)	1	74	Socket hd screw (3/8-16 x 1 1/2)	4
37	Pump housing	1	75	Orifice fitting	1
38	O-ring	1	76	Din plug	1

Non-common repair parts

20	Plunger link rod
25	Reciprocating tube
60	Housing tube

[1)] Included in 275186 repair kit
[2)] Included in 277723 repair kit
* Indicates change.

Fig. IPB 1

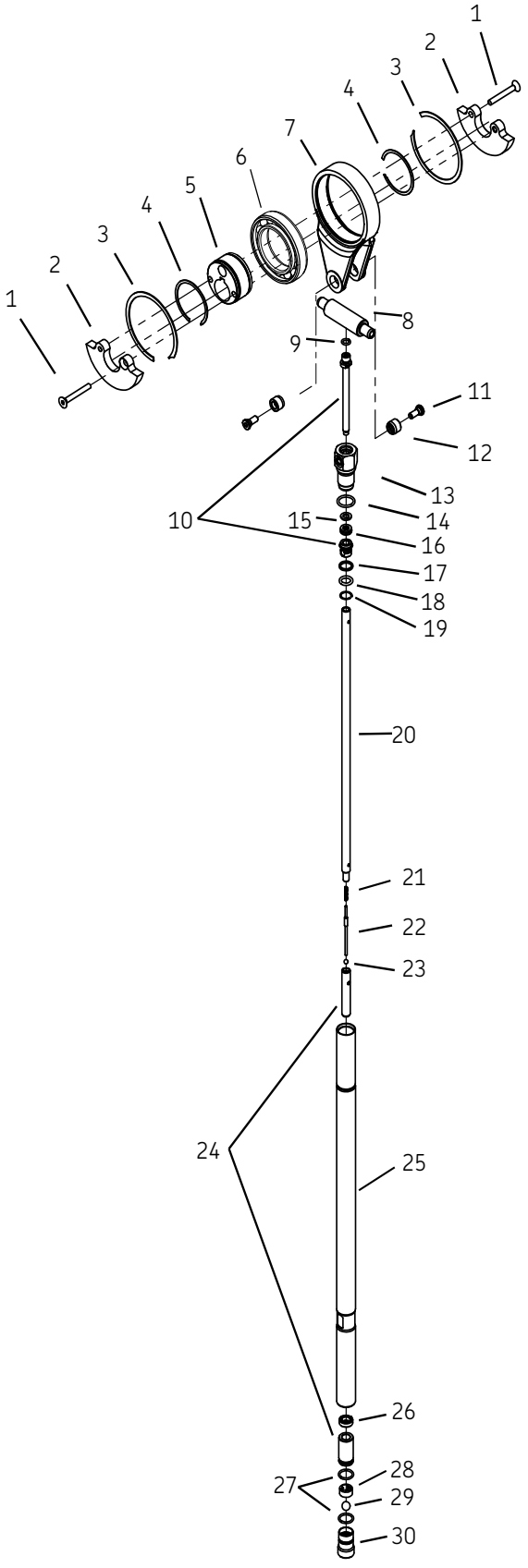

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Fig. IPB 2

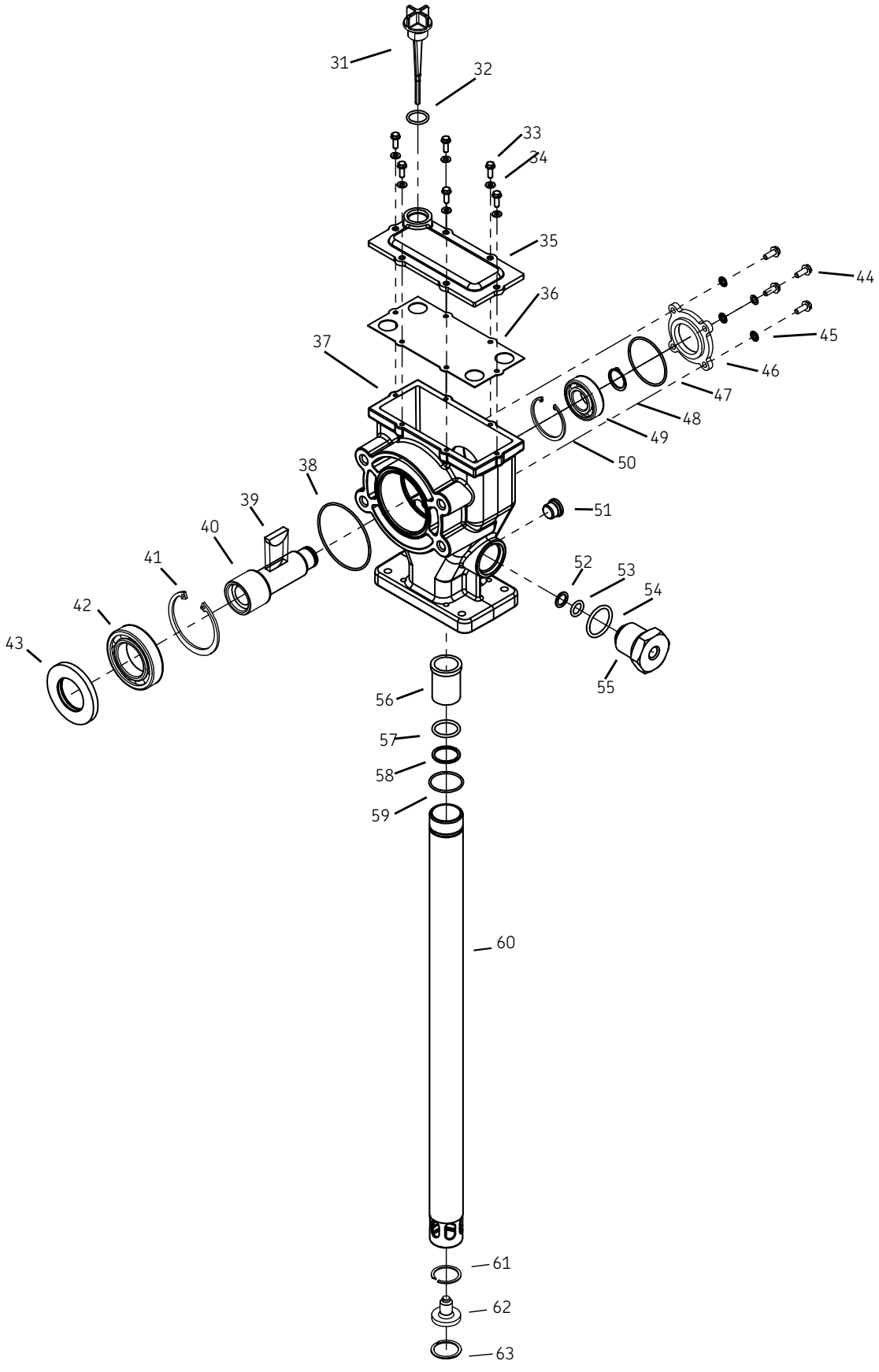
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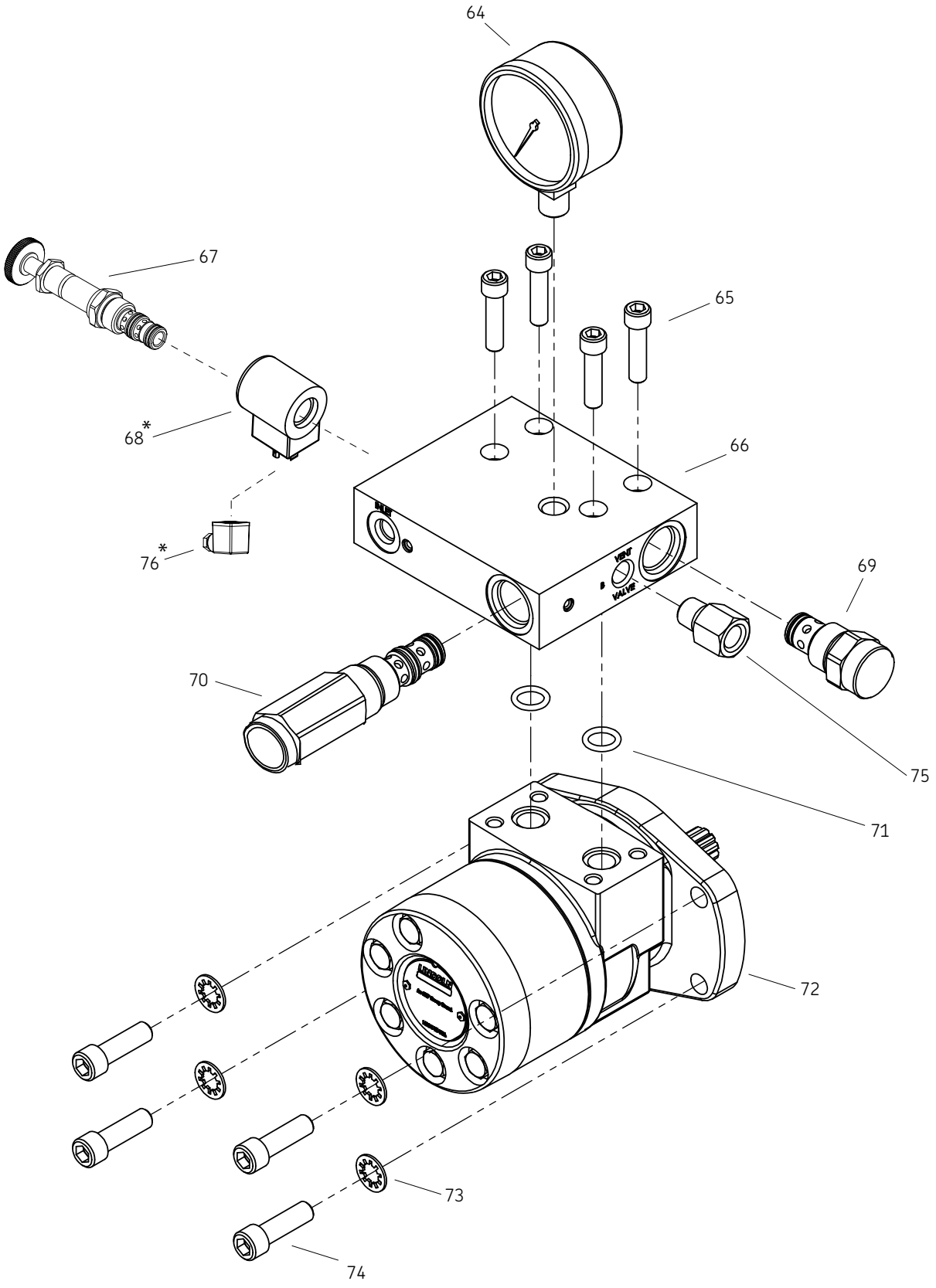
Fig. IPB 3



* Indicates change.

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.

Special limited warranties

Special limited 2 year warranty

SL-V series, single injectors-85772, 85782,replacement injectors-85771, 85781 and FlowMaster II 85731, 85732, 85733 and 85734

Lincoln warrants the SL-V Injector series and bare FlowMaster II "pump only" models 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) or "bare" FlowMaster II pump 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.

Lincoln Industrial contact information

To find Lincoln Industrial's nearest service center in the United States, call customer service at 314-679-4200. For international callers dial 01-314-679-4200. You may also use our website lincolnindustrial.com.

Declaration of conformity according to machinery Directive 89/392/EEC

This is to declare that the design of the FlowMaster II rotary driven hydraulic pump in the version supplied by Lincoln Industrial, One Lincoln Way, St. Louis, MO. 63120, U.S.A., complies with provisions of Directive 89/392/EEC.

Applied harmonized standards in particular:

EN 292-1 Safety of machinery part 1 Basic terminology, methodology

EN 292-2 Safety of machinery part 2 technical principles and specifications

EN 982 Safety of machinery, safety requirements for fluid power systems and their components, hydraulics,

EN 1050 Safety of machinery, principles for risk assessment

CE

Paul G. Conley

Paul G. Conley, Chief Engineer
December 16th, 2003

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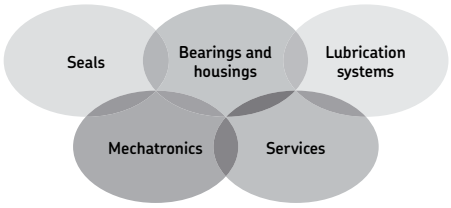


The Power of Knowledge Engineering
Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

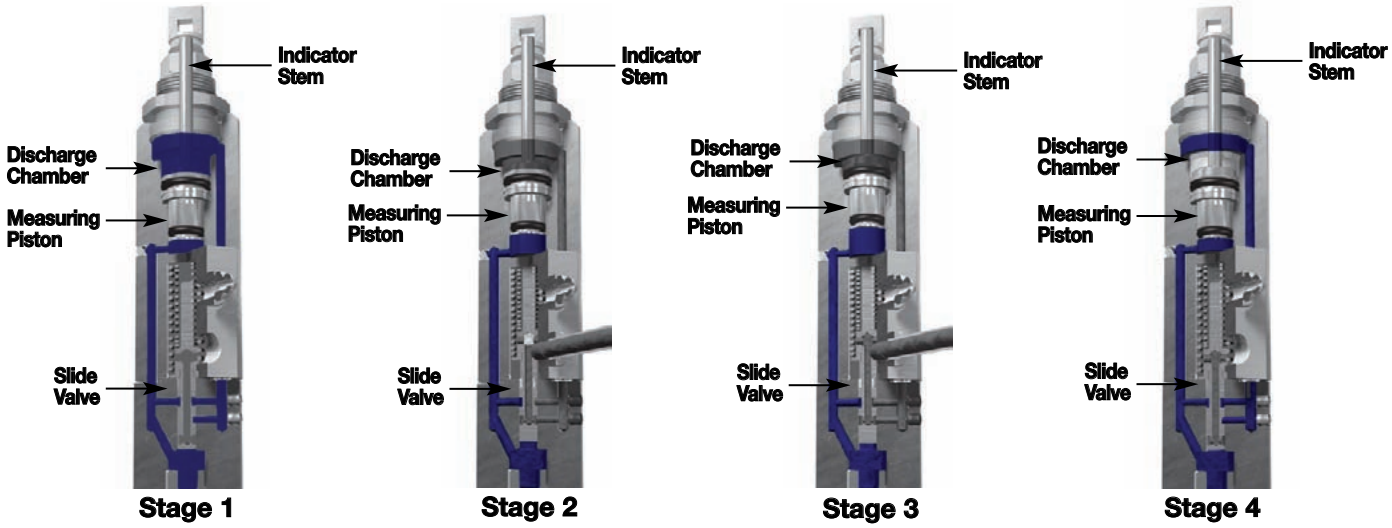
These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

SKF's global footprint provides SKF customers with uniform quality standards and worldwide product availability. Our local presence provides direct access to the experience, knowledge and ingenuity of SKF people.

SKF **PUB LS/I4 14406/R1 · EN** · April 2014 · **Form 404534C**

Basic Operating Principles of Centro-Matic® Injectors

Each Lincoln Centro-Matic injector can be manually adjusted to discharge the precise amount of lubricant each bearing needs. Injectors are mounted singly at each bearing, or grouped in a manifold with feedlines supplying lubricant to the bearings. In each case, injectors are supplied with lubricant under pump pressure through a single supply line. Two injector types are available: a top adjusting and a side adjusting. Both types can be used in the same circuit; their selection is made on the basis of bearing lubricant requirements.



SL-V, SL-V XL

Stage 1—The discharge chamber is filled with lubricant from the previous cycle. Under pressure of incoming lubricant, lubricant is directed to both sides of the measuring piston through the slide valve. The port to the bearing is closed in this position which prevents the measuring piston from moving. The indicator stem will be at its innermost position, having pulled away from the stop in the adjusting screw.

Stage 2—Pressure has built up and has moved the slide valve in position shown. This closes the flow passage to the upper side of the piston (larger diameter) while simultaneously opening the port to allow lubricant to flow out of the injector to the bearing. Pressure from the supply line continues to apply pressure to the lower portion of the measuring piston, which causes a pressure difference across the measuring piston thus allowing it to move upward.

Stage 3—Movement of the measuring piston is shown caused by the pressure on the lower side of the measuring piston dispensing lubricant out to the bearing. The indicator stem will move up against the stop in the adjusting screw when all lubricant has been delivered to the bearing.

Stage 4—As the pressure in the supply line is vented down to 1,000 psi, the slide valve moves back to its rest position. Flow of lubricant to the bearing is closed and simultaneously allows lubricant to flow to the upper (larger diameter) of the piston. The displacement of fluid on the lower side of the measuring chamber is also allowed by the slide valve to flow to the upper side of the piston. The injector is recharged by the residual pressure in the supply line to the upper portion of the measuring chamber.