

High-Pressure Lubricant Pump

Description

The major components of the high-pressure pump models in this series consist of a(n):

- air-operated motor
- lubricant pressure controller (pressurtrol)
- double-acting reciprocating pump tube.

The pressurtrol minimizes material pressure drop that occurs when the pump cycles. Refer to SER 319800-1.

Pump Assembly

These high-pressure (70:1 ratio) pumps are designed to deliver a range of greases [up to NLGI # 3] and operate directly from their original container.

Models 8540-B, 8549-B1, and 8549-C

Pump model 8540-B is designed with a pump tube length to accommodate 120-pound (50 kg) containers.

The 8549 series pumps are for 400-pound (180 kg) containers with model 8549-B1 including a bung adapter. See Figure 1.

Specifications

Air Motor

Piston Diameter x Stroke		Air Inlet	Max. Air Pressure *	
Inches	Centimeters		psi	Bars
3 x 1-5/8	76.2 x 41.3	1/4 " NPTF (f)	200	13.8

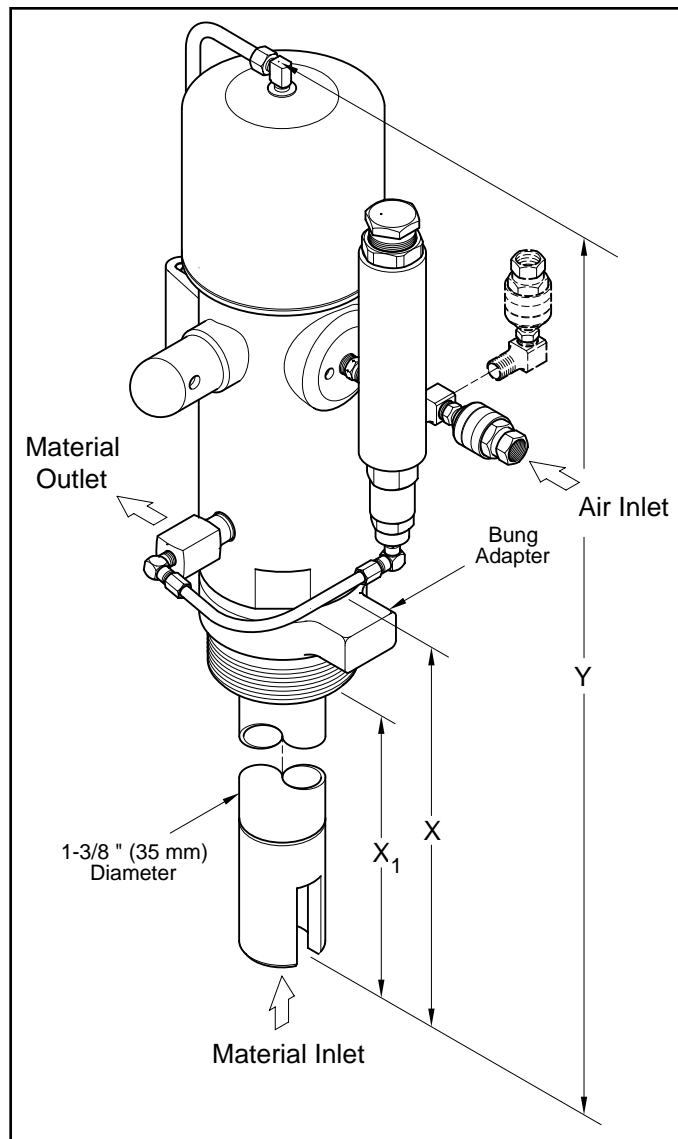
* With pressurtrol, [100 psi (6.9 Bars) without pressurtrol]
 For information on the air motor, refer to SER 324400-5

Pump Tube

Material Outlet	Max. Material Pressure		Max. Delivery/Minute (Approximate)*		Displacement per Cycle	
	psi	Bars	Ounces	Grams	in ³	cm ³
3/8 " NPTF (f)	7500	517	32	909	0.277	4.54

* For detailed information, refer to Figure 4

Table 1 Pump Assembly Specifications



Pump Model	Container Size		Bung Adapter	X (X ₁)		Y	
	lbs	kgs		Inches	Cm	Inches	Cm
8540-B	120	50		27-3/4	70.5	38-1/8	96.8
8549-B1	400	180	●	37 (35)	94 (89)	47-3/8	120.3
8549-C				37	94		

Figure 1 Pump Models 8540-B, and 8549 Series Model 8549-B1 Shown

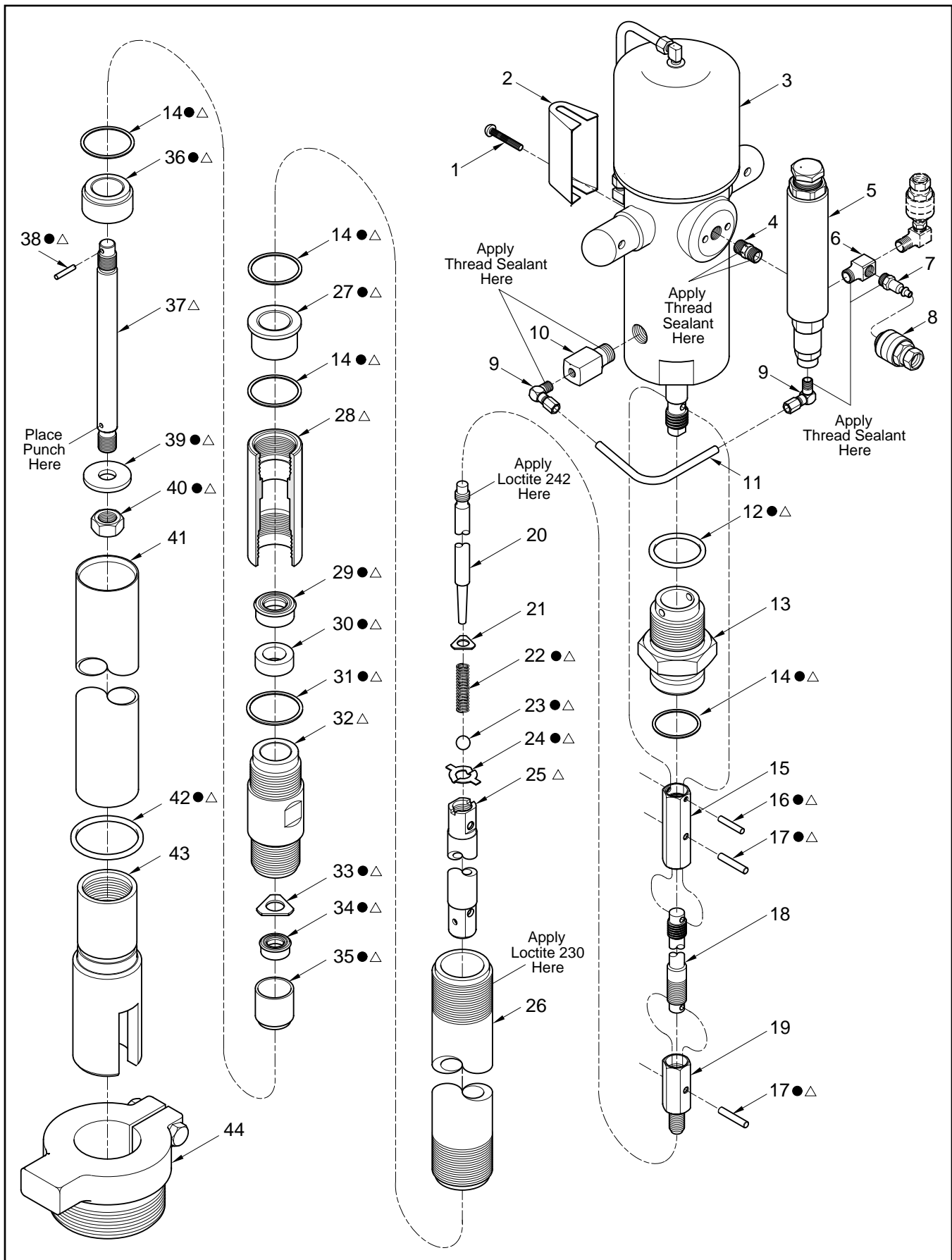


Figure 2 High-Pressure Lubricant Pump Models 8540-B and 8549 Series - Exploded View

Item No.	Part No.	Description	Qty	Notes	Numeric Order Part # (Item #)
1	170292	Screw, Machine 8-32 x 1-1/4 " Long	1		43748 (6)
2	321085	Muffler	1		51017 (14)
3		Motor Assembly, Air	1	See SER 324400-5	131168 (38)
4	327033	Adapter, 1/4 " NPTF (m)	1		170292 (1)
5	319800-1	Pressurtrol	1	See SER 319800-1	171000-20 (42)
6	43748	Body, Angle, 1/4 " NPTF (m) and (f)	1		171013-12 (12)
7	328034	Connector, Air, 1/4 " NPTF (m)	1		171700-12 (23)
8	328030	Coupler, Air, 1/4 " NPTF (f)	1		172190-9 (29)
9	338507	Fitting, 90 °, 3/16 " Tube x 1/8 " NPTF (m)	2		172190-10 (34)
10	324971	Adapter, 3/8 " PTF (f) x 3/8 " NPTF (m)	1		317536 (24)
11	324443	Tube, 3/16 " OD	1		317549 (33)
12	171013-12	O-Ring, 1-1/8 " ID x 1-1/4 " OD	1	● Δ	319800-1 (5)
13	324805	Adapter	1		320704-1 (18)
14	51017	Gasket (Aluminum)	4	● Δ	320704-3 (18)
15	320974	Coupling	1		320705 (19)
16	320971	Pin, 0.088 " Dia. x 41/64 " Long	1	● Δ	320712 (40)
17	320975	Pin, 0.120 " Dia. x 41/64 " Long	2	● Δ	320713 (39)
18	320704-1	Rod, 17.75 " Long	1		Model 8540-B 320716 (36)
	320704-3	Rod, 27.06 " Long	1		Model 8549-B1, -C 320718 (20)
19	320705	Coupling	1		320719 (22)
20	320718	Stop, Ball	1		328030 (8)
21	321605	Washer	1		328034 (7)
22	320719	Spring, 0.75 " Long	1	● Δ	320971 (16)
23	171700-12	Ball, 3/16 " Dia.	1	● Δ	320974 (15)
24	317536	Washer, Locking	1	● Δ	320975 (17)
25	330332	Piston	1	Δ	321085 (2)
26	337392	Tube, 21.25 " Long	1		Model 8540-B 321605 (21)
	337392-2	Tube, 30.42 " Long	1		Model 8549-B1, -C 324400-5 (3)
27		Bearing (Brass)	1	● Δ	324437 (43)
28	337391	Retainer	1	Δ	324438-1 (41)
29		Seal, 0.540 " ID x 0.914 " OD	1	● Δ	324438-2 (41)
30		Bearing (Brass)	1	● Δ	324443 (11)
31		Gasket (Aluminum) 1.08 " ID	1	● Δ	324805 (13)
32	337388	Extension	1	Δ	324971 (10)
33	317549	Washer, Stop	1	● Δ	326750 (44)
34		Seal, 0.282 " ID x 0.532 " OD	1	● Δ	327033 (4)
35	337995	Body, Valve	1	● Δ	330329 (37)
36	320716	Seat, Valve	1	● Δ	330332 (25)
37	330329	Rod, 3.91 " Long	1	Δ	330334 (31)
38	131168	Pin, 1/16 " Dia. x 0.50 " Long	1	● Δ	337388 (32)
39	320713	Disc, Primer	1	● Δ	337389 (30)
40	320712	Nut, Elastic Stop, 12- 28	1	● Δ	337391 (28)
41	324438-1	Tube, Follower, 25-9/16 " Long	1		Model 8540-B 337392 (26)
	324438-2	Tube, Follower, 34-11/16 " Long	1		Model 8549-B1, -C 337392-2 (26)
42	171000-20	O-Ring, 1-1/16 " ID x 1-5/16 " OD	1	● Δ	337393 (27)
43	324437	Body, Primer	1		337995 (35)
44	326750	Adapter, Bung, 2 " NPTF (m)	1		Model 8549-B1 338507 (9)

Legend:
Part numbers left blank (or in *italics*) are not available separately
● Δ designates a repair kit item

Repair Kits

Part No.	Kit Symbol	Description	Notes
393514	●	Kit, Major Repair	
393516	Δ	Kit, Conversion	See Page 4
393530-9		Kit, Seal [includes five (5) of item number 29]	
393530-10		Kit, Seal [includes five (5) of item number 34]	

Early Model Pumps

The earlier versions of these model pumps did not contain seals in the tube assembly. The Piston and Lower Rod cycled in “select-fit” bores. See **Figure 3**.

Any earlier model pump that has not been repaired since 1983 requires a 393516 conversion kit.

Conversion Kit

NOTE: In addition to the contents within the kit, the existing pump tube must be replaced. See **Table 2** for the appropriate part number.

Install the Kit

To reassemble the pump with the conversion kit, follow the procedures outlined in the section entitled **Assembly**.

Pump Model	Pump Tube	
	Part No.	Length
8540-B	337392	21.25 "
8549 Series	337392-2	30.42 "

Table 2 Pump Model Comparison with Pump Tube

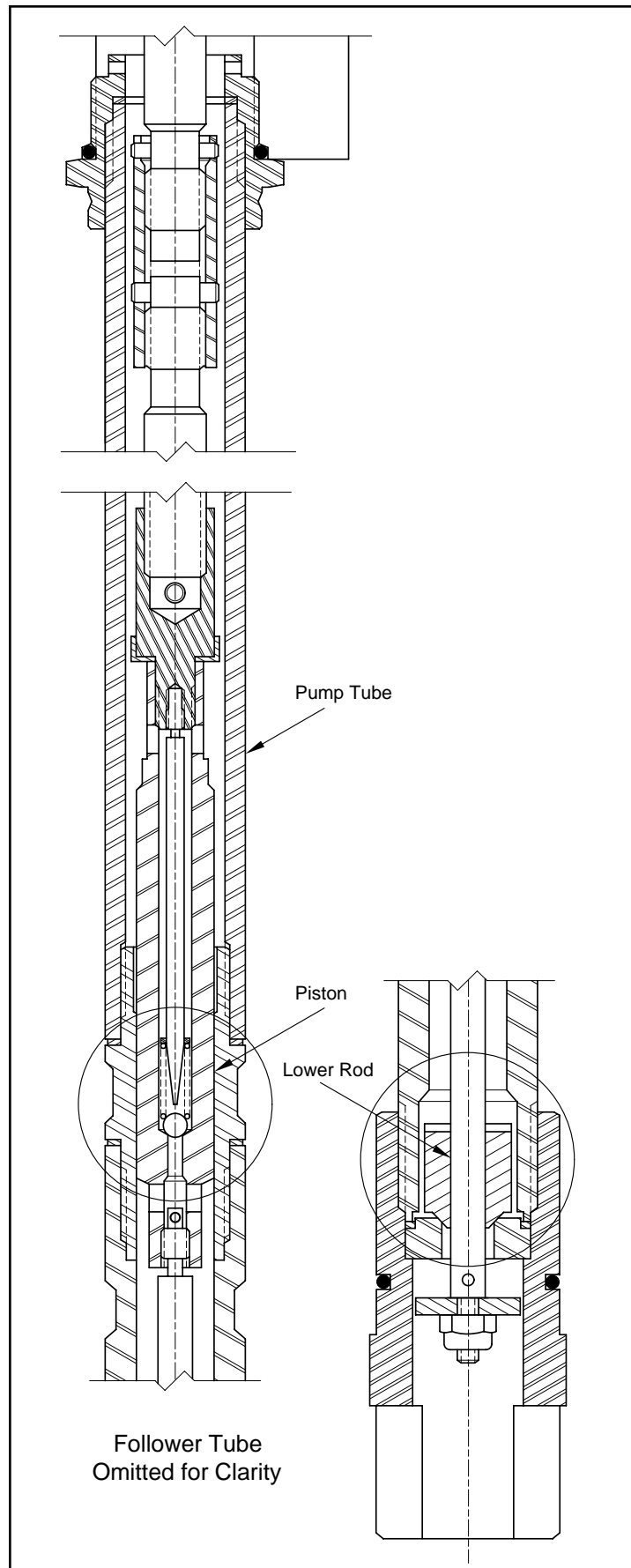


Figure 3 Early Model Pump Tubes - Section View

Accessories

Model Number	Container Size	Follower	Cover	Bung Adapter
8540-B	120 lbs	338802	338371	326750
	50 kg	338993	338983	
8549-B1	400 lbs	338911	318040-4	Included with Model
	180 kg	338994	338984	
8549-C	400 lbs	338911	318040-4	326750
	180 kg	338994	338984	

Table 3 Pump Models 8540-B and 8549 Series Accessories

Performance Chart

A pump's ability to deliver material is based on the pressure (psi/Bars) and quantity (cfm/lpm) of air supplied to the motor and the amount of material discharge [back] pressure to be overcome within the system.

This chart contains curves based on three different air pressures. The curves relate delivery in ounces (grams) per minute (X axis) to air consumption in cubic feet (liters) per minute (right Y axis) and to material discharge pressure in psi/Bars (left Y axis).

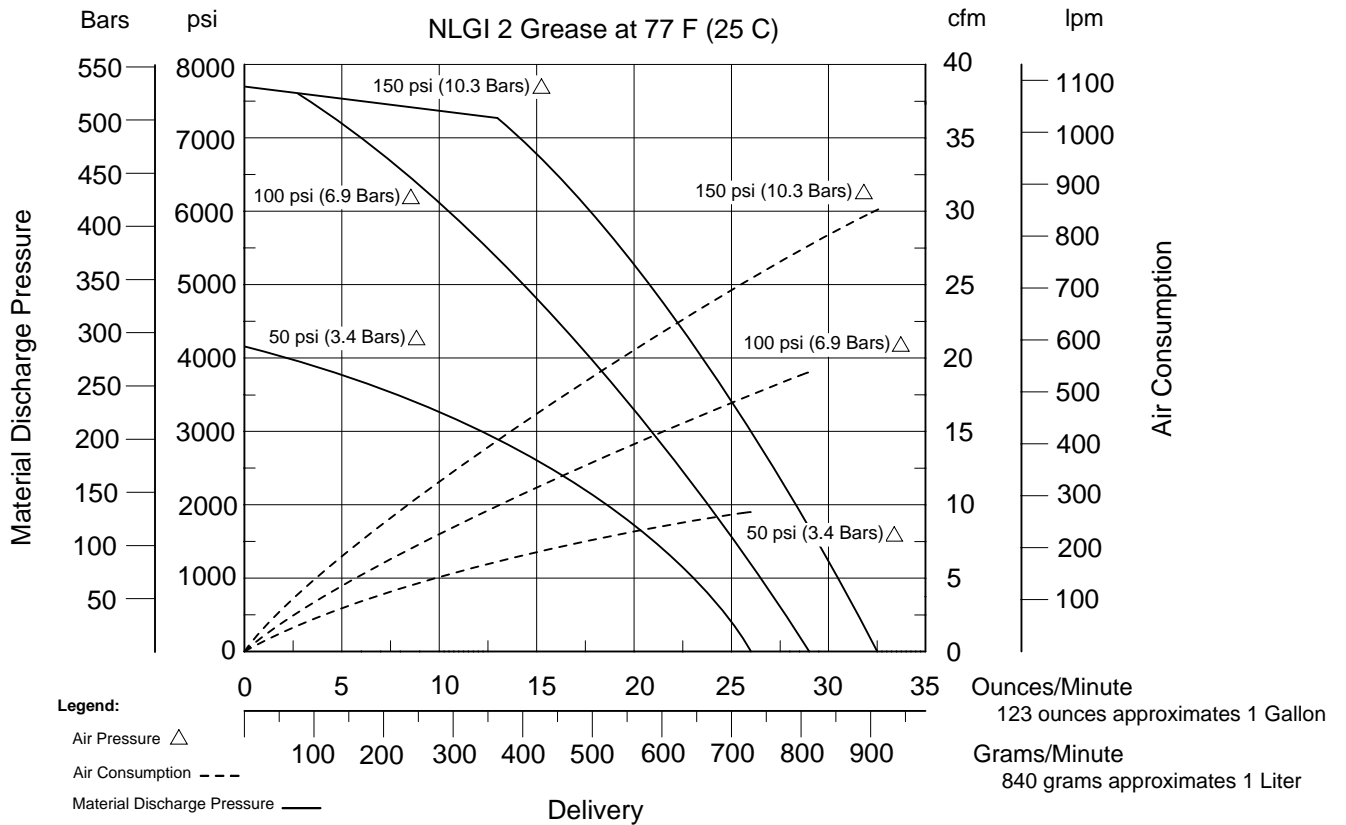


Figure 4 Delivery versus Discharge Pressure and Air Consumption

Service Hints

Refer to the Overhaul Procedures for Details

Replace Air Motor Packing Group at Pump Overhaul

Refer to Air Motor Service Guide for Details

Make Sure Adapter is Flush with Air Motor Base

Air Motor Packing Group
may Contain Improper Components

Apply Loctite 242 to Ball Stop at Initial Assembly

Ball Check may not Operate Properly

Check to Ensure Ball Seats Properly in Piston

Leakage can Occur

Check to Ensure Ball Moves a Minimum of 1/8 " (3.2 mm)

Pump may not Prime

Check to Ensure the O-Ring is Installed

Follower Plate will not Operate Correctly

Do not Overtighten the Nut

Damage to the Pin may Occur

IMPORTANT: Prior to performing any maintenance procedure, the following safety precautions must be observed. Personal injury may occur.



WARNING

Do not use halogenated hydrocarbon solvents such as methylene chloride or 1,1,1-trichloroethane in this pump. An explosion can result within an enclosed device capable of containing pressure when aluminum and/or zinc-plated parts in the pump come in contact with halogenated hydrocarbon solvents.

Release all pressure within the system prior to performing any overhaul procedure.

- **Disconnect the air supply line from the pump motor.**
- **Into an appropriate container, operate the control valve to discharge remaining pressure within the system.**

Never point a control valve at any portion of your body or another person. Accidental discharge of pressure and/or material can result in injury.

Read each step of the instructions carefully. Make sure a proper understanding is achieved before proceeding.

Overhaul

NOTE: Refer to **Figure 2** for component identification on all overhaul procedures.

Disassembly

1. Secure the pump assembly in a soft-jaw vise at Adapter (13).

NOTE: Secure model 8549-B1 at Bung Adapter (44).

2. Extend Rod (37) to end of Primer Body (43).
 - Apply air to the motor as necessary.
3. Gently remove Nut (40) from the Rod.
 - Use an appropriate size punch in the hole of the Rod to prevent rotation. See **Figure 2**.
4. Remove Primer Disc (39) from the Rod.
5. Push the Rod into the Primer Body.

Pump Tube (Outer Components)

6. Rotate the Primer Body.
 - Use a large wrench or other suitable tool.

NOTE: The pump tube will break at one of three places. Unscrew the separated portion from the inner components of the pump tube assembly.

7. Remove Follower Tube (41) [assembly] from the inner tube assembly.
8. Unscrew the air motor from Adapter (13).
 - Rotate the air motor assembly.
9. Remove O-Ring (12) from the Adapter.

NOTE: If the pump was not leaking at the top of Tube (26), do not separate the Adapter from the Tube. Components are locked with Loctite 222.

10. Unscrew Tube (26) from the Adapter as required.
 - Remove Gasket (14).
11. Clamp Retainer (28) horizontally in a soft-jaw vise.
12. Unscrew the Primer Body from Extension (32).
13. Remove O-Ring (42) from the Primer Body.

IMPORTANT: Remove Valve Seat (36) squarely from the Primer Body. Should the Valve Seat cock during removal, realign and start again. Gasket (14) may interfere.

14. Remove Valve Seat (36) from the Primer Body.
15. Remove Gasket (14) from the Valve Seat.
16. Unscrew the Extension from the Retainer.
17. Remove Gasket (31) from the Extension.
18. Remove Valve Body (35) from the Extension.
 - Remove Stop Washer (33).
19. Remove Seal (34) from the Valve Body.
20. Remove Bearing (30) and Seal (29) from the Retainer.
21. Unscrew Tube (26) from the Retainer.
22. Remove Gasket (14), Bearing (27), and additional Gasket (14) from the Retainer.

Pump Tube (Inner Components)

23. Remove Pin (16) that secures Coupling (15) to the air motor rod.
 - Unscrew the Coupling assembly from the air motor rod.
24. Clamp Coupling (19) in a soft-jaw vise.
25. Remove upper Pin (17) that secures Coupling (15) to Rod (18).
 - Unscrew the Rod from the Coupling.
26. Remove lower Pin (17) that secures Coupling (19) to the Rod.
 - Unscrew the Rod from the Coupling.
27. Remove Pin (38) that secures Piston (25) to Rod (37).
 - Unscrew the Rod from the Piston.
28. Straighten the tabs on Locking Washer (24).
29. Unscrew Piston (25) from the Coupling.
30. Remove the Locking Washer from the Piston.
31. Remove Ball (23) from the Piston.
32. Remove Spring (22) and Washer (21) from Ball Stop (20).

NOTE: Separate the Ball Stop from the Coupling only if the connection is loose.
33. Unscrew the Ball Stop from the Coupling as needed.

Pressurtrol

34. Remove Air Coupler (8) from Air Connector (7).
35. Loosen both Fittings (9) that secure Tube (11).
36. Loosen Pressurtrol (5) from Adapter (4).
 - Remove the Tube from the Fittings.
37. Unscrew the Pressurtrol from the Adapter.
 - Remove the Adapter from Air Motor (3) as needed.
38. Unscrew the Fitting from the Pressurtrol as needed.
39. Unscrew Angle Body (6) from the Pressurtrol as needed.
40. Unscrew Air Connector (7) from the Angle Body as needed.
41. Unscrew the additional Fitting from Adapter (10) as needed.
42. Remove the Adapter from the Air Motor as needed.

Clean and Inspect

NOTE: Use the appropriate repair kit for replacement parts. Make sure all the components are included in the kit and in good condition before discarding used parts.

1. Clean all metal parts in cleaning solvent. The solvent should be environmentally safe.
2. Inspect all parts for wear and/or damage.
 - Replace as necessary.
3. Inspect Piston (25) closely. Use a magnifying glass to detect any wire draw marks.
 - Replace as necessary.
4. Closely inspect the mating surfaces of all components for any imperfections. Ensure a smooth and clean contact is obtained when assembled.

EXAMPLE: Place Ball (23) into Piston (25). Fill the Piston with solvent. Make sure no leakage occurs.

Assembly

NOTE: Prior to assembly, certain components require lubrication in clean oil. Refer to **Table 4** for details.

Pump Tube (Inner Components)

NOTE: Refer to **Figure 5** for a section view of the pump tube assembly.

1. Place Ball (23) into Piston (25).

NOTE: If the Ball Stop was previously locked with Loctite 242, skip step 2.
2. Screw and seat Ball Stop (20) [with Loctite 242] into Coupling (19).
 - Follow the thread sealant manufacturer's recommendations.
 - Tighten securely.
3. Install Washer (21) and Spring (22) onto the Ball Stop.

Item No. on Figure 2	Description
12	O-Ring, 1-1/8 " ID x 1-1/4 " OD
29	Seal, 0.540 " ID x 0.914 " OD
34	Seal, 0.282 " ID x 0.532 " OD
42	O-Ring, 1 " ID x 1-1/4 " OD

Table 4 Lubricated Components

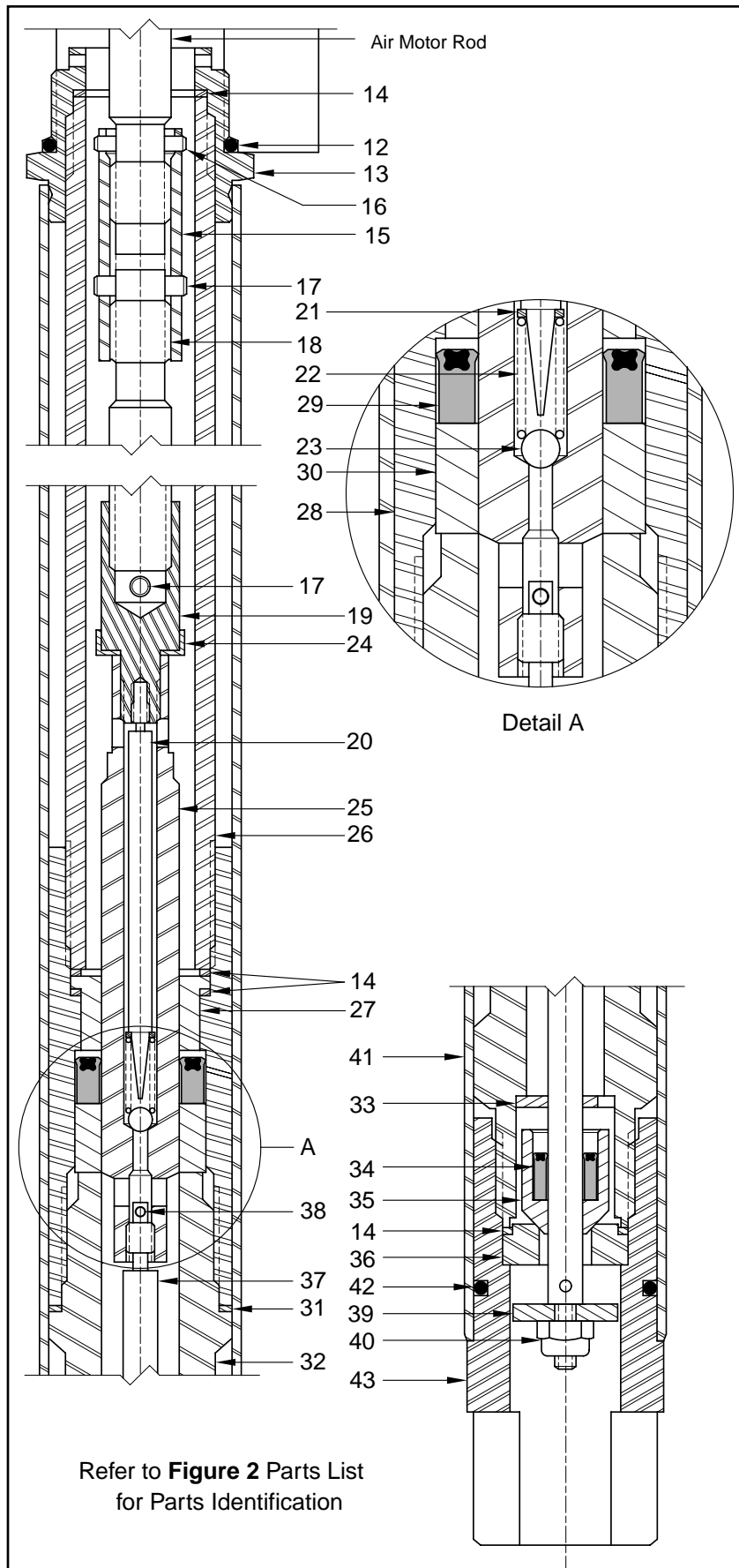


Figure 5 Pump Tubes 337384-A1, and B1 - Section View

4. Position Locking Washer (24) into the groove on the top of the Piston.
5. Screw the Coupling assembly into the Piston.
 - Tighten from 19 to 21 foot pounds (25.4 - 28.3 Nm).
 - Continue to tighten and align the nearest flat of the Coupling with the tabs on the Locking Washer.

***IMPORTANT:** Press on the Ball to ensure it moves a minimum of 1/8" (3.2 mm) prior to contact with the Ball Stop. Should the value be less, check to ensure the Ball Stop is fully seated in the Coupling.*

6. Bend the tabs of the Locking Washer upward onto the Coupling.
7. Screw Rod (37) into the Piston until the pin holes align.

NOTE: Use a spot of grease on all pins to prevent movement.

8. Install Pin (38).
9. Screw Rod (18) into Coupling (19) until the pin holes align.
 - Install Pin (17).
10. Screw Coupling (15) [end without counter-bore] onto the Rod until the pin holes align.
 - Install additional Pin (17).
11. Secure the air motor assembly in a soft-jaw vise.
12. Screw the Coupling assembly onto the air motor rod until the pin holes align.
 - Install Pin (16).

Pump Tube (Outer Components)

13. Install and seat Seal (29) [lips first] into the bottom of Retainer (28). See **Figure 2**.
14. Install and seat Bearing (30) into the bottom of the Retainer.
15. Install Gasket (31) onto the top of Extension (32).

16. Screw the Extension (Gasket end first) into the bottom of the Retainer.
 - Do not tighten at this time.
17. Install Gasket (14) into the top of the Retainer.
18. Install and seat Bearing (27) [small diameter first] and additional Gasket (14) into the top of the Retainer.
19. Screw Tube (26) into the top of the Retainer.
 - Do not tighten at this time.
20. Install and seat Gasket (14) into Adapter (13).

IMPORTANT: If a primer is used with Loctite 222, the curing time is greatly reduced.
21. Screw the Tube assembly [with Loctite 222] into the Adapter.
 - Follow the thread sealant manufacturer's recommendations.
 - Do not tighten at this time.
22. Install O-Ring (12) onto the Adapter.
23. Apply grease to Piston (25).
 - This will aid the installation process.

CAUTION

Install the outer component assembly onto the inner assembly with care. Damage to Seal (29) can occur.

24. Install the outer component assembly onto the inner assembly.
 - Use a slight twisting motion to pass the Seal.
 - At the same time thread the Adapter into the base of the air motor.

IMPORTANT: Make sure the flange portion of the Adapter seats flush against the base of the air motor. Should a gap exist, inspect the components of the air motor packing group.
25. Install Stop Washer (33) into the Extension.
26. Install and seat Seal (34) [heel end first] into Valve Body (35).
27. Install the Valve Body assembly (Seal first) onto Rod (37).
 - Make sure the Valve Body assembly seats properly in the Extension.
28. Install Follower Tube (41) over the outer tube assembly.
29. Install O-Ring (42) onto Primer Body (43).

30. Install and seat Valve Seat (36) [large diameter first] into the Primer Body.
31. Install and seat Gasket (14) into the Primer Body.
32. Screw the Primer Body onto the Extension.
33. Place a large wrench or other suitable tool into the slot of the Primer Body.
 - Tighten all the components of the assembly securely.
 - Crush all Gaskets.
34. Extend Rod (37) from the Primer Body.
 - Apply air to the motor as necessary.
35. Install Primer Disc (39) onto the Rod.
36. Gently screw Nut (40) onto the Rod.
 - Use an appropriate size punch in the hole of the Rod to prevent rotation. See **Figure 2**.
 - Do not overtighten.

Model Dependent Step

37. Install Bung Adapter (44) onto the Follower Tube. [*model 8549-B1*].

Pressurtrol

38. Screw Fitting (9) [with thread sealant] and Angle Body (6) [with thread sealant] into the Pressurtrol.
 - Tighten each component securely.
 - Make sure to orient the components properly.
39. Screw Air Connector (7) [with thread sealant] into the Angle Body.
 - Tighten the Air Connector securely.
40. Screw Adapter (4) [with thread sealant] into Air Motor (3).
 - Tighten the Adapter securely.

IMPORTANT: Tighten the Pressurtrol just short of vertical. This allows the assembly of Tube (11).
41. Screw Pressurtrol (5) onto the Adapter [with thread sealant].
42. Screw Adapter (10) into the Air Motor.
 - Tighten the Adapter securely.
 - Make sure to orient the Adapter properly.
43. Screw additional Fitting (9) into the Adapter.
 - Tighten the Fitting securely.
 - Make sure to orient the Fitting properly.
44. Position Tube (11) into each Fitting.
45. Secure the Tube by rotating the Pressurtrol to vertical.
 - Tighten the Fittings to the Tube.
46. Install Air Coupler (8) onto the Air Connector.

Operation



WARNING

Do not exceed the lowest pressure rating of any component in the system.

Do not alter the design of the pump. Never install additional components to the outlet of the pressurtrol.

Never point a control valve at any portion of your body or another person. Lubricant discharged at high velocity can penetrate the skin and cause severe injury. Should any fluid appear to puncture the skin, get medical care immediately.

Ensure all components are in operable condition. Replace any suspect parts prior to operation. Personal injury can occur.

1. Make sure air pressure at the regulator reads zero.
2. Slowly supply air pressure [not to exceed 20 psi (1.4 Bars)] to the pump's motor.
 - The pump assembly should cycle.

If the pump assembly does not cycle, refer to the **Troubleshooting Chart** for details.

With air pressure at zero:

3. Connect a product hose to the pressurtrol's material outlet.
 - Direct the hose into an appropriate collection container.
4. Place the pump in grease.
5. Slowly supply air pressure to the pump's motor.
6. Allow the pump to cycle slowly until the system and grease is free of air.

If the pump assembly does not prime, refer to the **Troubleshooting Chart** for details.



WARNING

Should leakage occur anywhere within the system, disconnect air to the motor. Personal injury can occur.

With air pressure at zero:

7. Attach a control valve to the outlet hose of the pump.
8. Set the air pressure to 100 psi (6.9 Bar).
9. Operate the control valve into a container.
10. Allow the pump to cycle until the system and grease is once again free of air.
11. Shut off the control valve.
 - Visually inspect the pump for external leaks.
 - The pump should not cycle.

If the pump does not stall, refer to the **Troubleshooting Chart** for details.

12. Check the motor for air leakage.

If the motor leaks, refer to the **Air Motor Service Guide** for details.

Installation

Additional items that should be incorporated into the air piping system are illustrated in **Table 5**.

Part Number	Description
338860	Moisture Separator/Regulator & Gauge Combination
5604-2	Moisture Separator
7604-B	Regulator and Gauge
5904-2	Lubricator *

Table 5 *Air Line Components*

* Although the air motor is lubricated at the factory, the life of the motor can be extended with the use of a lubricator.

Troubleshooting Chart

Pump Indications	Possible Problems	Solution
Pump does not cycle	<ol style="list-style-type: none"> 1. Air motor not operating properly 2. Pump tube jammed and/or contains loose components 3. Insufficient air pressure 	<ol style="list-style-type: none"> 1. Inspect air motor and rebuild or replace as necessary 2. Rebuild pump tube 3. Increase air pressure
Pump will not prime	<ol style="list-style-type: none"> 1. Excessive cycling speed 2. Pump leaking internally 	<ol style="list-style-type: none"> 1. Reduce air pressure 2. See Internal Leaks
Pump cycles rapidly	Product source empty	Replenish product
Pump cycles continuously, or slowly (once or twice/hour)	<ol style="list-style-type: none"> 1. Pump leaking internally 2. Pump leaking externally 3. Distribution system leaking 	<ol style="list-style-type: none"> 1. See Internal Leaks 2. See External Leaks 3. Correct leak
External Leaks		
Product leakage visible at top of Adapter (13)	<ol style="list-style-type: none"> 1. Initial tightening of Adapter (13) to Air Motor Assembly (3) not sufficient 2. Damaged O-Ring (12) 	<ol style="list-style-type: none"> 1. Tighten Adapter (13) into Air Motor Assembly (3) 2. Replace O-Ring (12)
Product leakage visible at top of Follower Tube (41)	<ol style="list-style-type: none"> 1. Initial tightening of Tube (26) to Adapter (13) not sufficient 2. Initial tightening of Tube (26) to Retainer (28) not sufficient 3. Initial tightening of Extension (32) to Retainer (28) not sufficient 4. Initial tightening of Extension (32) to Primer Body (43) not sufficient 5. Gasket(s) (14) worn or improperly crushed 6. Gasket (31) worn or improperly crushed 	<ol style="list-style-type: none"> 1. Tighten Tube (26) into Adapter (13) 2. Tighten Tube (26) into Retainer (28) 3. Tighten Extension (32) into Retainer (28) 4. Tighten Extension (32) into Primer Body (43) 5. Replace Gasket(s) (14) 6. Replace Gasket (31)
Product leakage visible at bottom of Follower Tube (41)	Damaged O-Ring (42)	Replace O-Ring (42)
Internal Leaks		
Pump does not prime or cycles continuously, or slowly (once or twice/hour)	<ol style="list-style-type: none"> 1. Foreign material between Ball (23) and seat in Piston (25) 2. Foreign material between Valve Body (35) and Valve Seat (36) 3. Worn or damaged Ball (23) 4. Worn or damaged Piston (25) 5. Worn or damaged Spring (22) 7. Worn or damaged Valve Body (35) 8. Worn or damaged Valve Seat (36) 9. Worn or damaged Seal (29) 10. Worn or damaged Seal (34) 11. Worn or damaged Rod (37) 	<ol style="list-style-type: none"> 1. Locate and eliminate source of foreign material. 2. Disassemble pump tube, clean, inspect, and replace worn or damaged components.

Changes Since Last Printing
Initial Release