ALEMITE®

Service Guide

318200-1
318200-2
318200-3
318200-4

Air Motor

Description

The air motors in the model 318200 series power a variety of 40 to 1 ratio pumps. The pump models are the 711 and 331388 series.

Overview of Non-Divorced Pumps

The pump tubes that connect to these motors are of a non-divorced design.

Non-divorced pumps contain a packing group that fits directly into the lower portion of the motor. This packing group is designed to prevent product from entering the pneumatic portion of the motor.

Product is distributed through an outlet in the body of the air motor. See **Figure 1**.

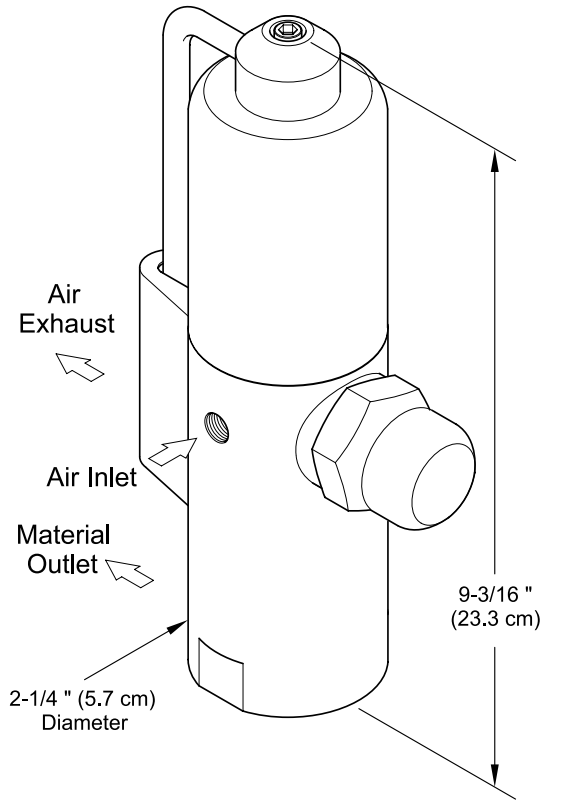
Pump tube separation requires that the pump tube (with attached components) be unthreaded from the air motor body.

Model 318200 Series

The difference between the models in the 318200 series motors is illustrated in **Figure 1**.

Model 318200-1 contains an obsolete body and piston rod for the 3-stack packing group. This model can be updated to the current model (318200-4) with the purchase of the current body and piston rod along with a molded base packing group kit.

Only the molded base packing group kit is needed to update models 318200-2 and 318200-3. See **Figure 2**.



Air Motor Model	Body & Piston Rod		Lower Packing Group	
	Short (for 3-Packings)	Current	Flat (Obsolete)	Molded
318200-1	●		●	
318200-2 *		●	●	
318200-3 *		●	●	
318200-4		●		●

Refer to **Figure 3** for details on the lower packing group.
* The difference between these models is the color of the cylinder.

Figure 1 *Air Motor Model 318200 Series*

Specifications

Piston Diameter x Stroke		Air Inlet	Material Outlet	Maximum Air Pressure	
Inches	Centimeters			psi	Bars
2-7/16 x 1-5/8	6.2 x 4.1	1/4 " NPSI (f)	3/8 " NPTF (f)	200	13.8

Table 1 *Air Motor Model 318200 Series Specifications*

Alemite, LLC
167 Roweland Avenue, Johnson City, Tennessee 37601
www.alemite.com

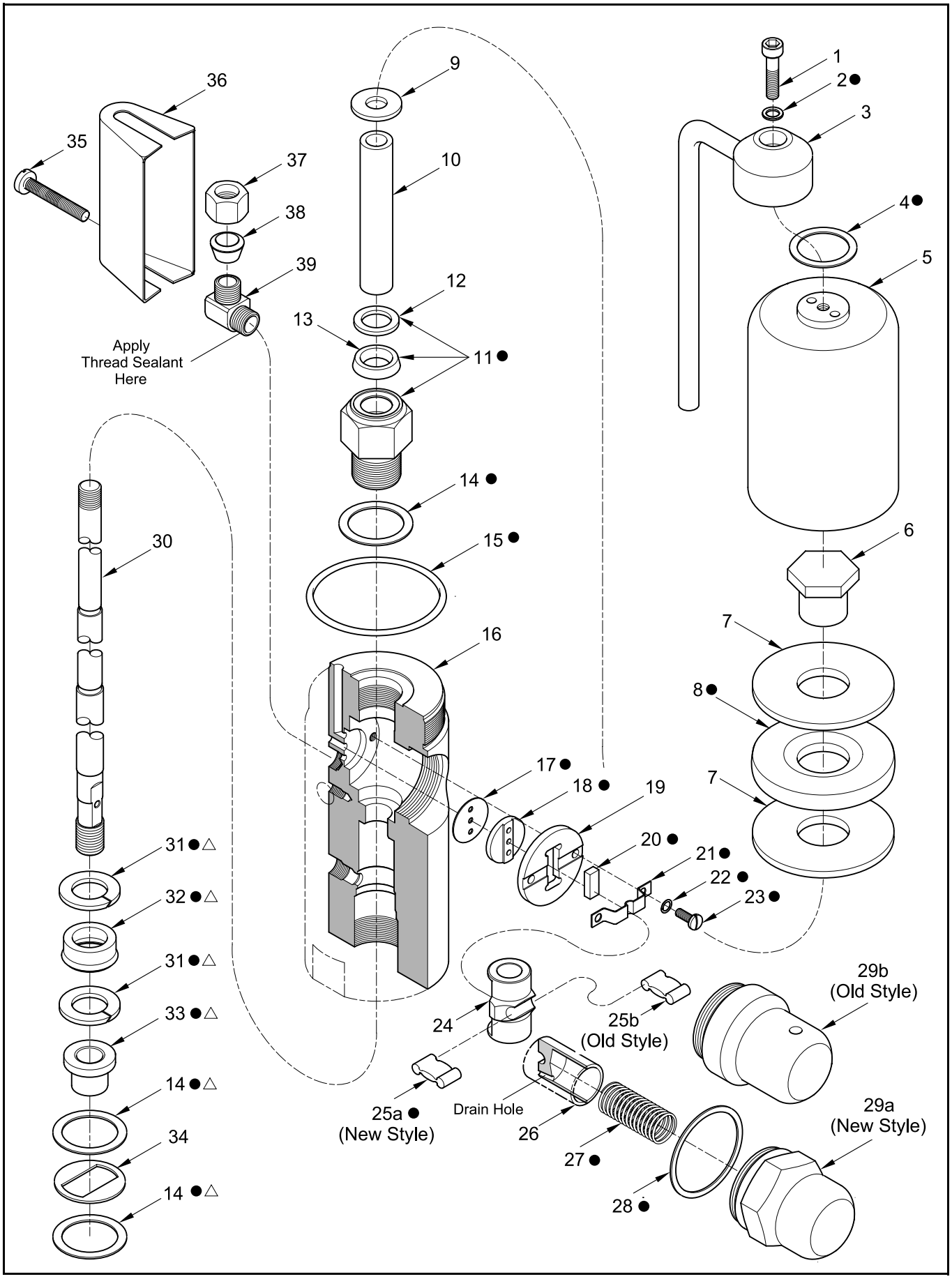


Figure 2 *Air Motor Model 318200-4 - Exploded View*

Item No.	Part No.	Description	Qty	Notes		Numeric Order Part # (Item #)
1		Screw, Cap, 1/4 " -20 x 3/4 "	1			53776 (14)
2		Washer, 1/4 "	1	●		*76486* (23)
3	317525	Cap and Tube Assembly	1			*76899* (22)
4	317530	Gasket, 0.786 " ID	1	●		170290 (35)
5	317501-4	Cylinder	1			171009-35 (15)
6	317504	Nut, Piston, 5/16 " -24	1			*171590* (1)
7	317503	Washer, 0.515 ID	2			*172190-1* (32)
8	317531	Packing	1	●		314670 (13)
9		Washer, 0.323 " ID	1			314671 (12)
10	317505	Spacer	1			317501-4 (5)
11		Packing Assembly	1	●	Includes Items 12-13	317503 (7)
12	314671	Washer (Leather) 1/2 " ID	1			317504 (6)
13	314670	Packing, 0.460 " ID x 0.780 " OD	1			317505 (10)
14	53776	Gasket (Aluminum) 0.755 " ID	3	● △	Quantity of 2 in △ Kit	*317509* (18)
15	171009-35	O-Ring, 1-15/16 " ID x 2-1/8 " OD	1	●		*317510* (11)
16	327796	Body	1			317511 (19)
17	317513	Gasket (Rubber-Coated Fabric)	1	●		317513 (17)
18		Seat, Valve	1	●		*317517* (29b)
19	317511	Retainer, Valve	1			*317518* (28)
20		Slide, Valve	1	●		317522 (34)
21		Retainer, Spring	1	●		317523-1 (30)
22		Lockwasher, 8	2	●		317524 (27)
23		Screw, 8 -32 x 3/8 "	2	●		317525 (3)
24	321645	Shuttle	1			317529 (36)
25a	320737	Toggle (New Style)	1	●	Use w/ New Style Cap Only	317530 (4)
25b		Toggle (Old Style)	1		Use w/ Old Style Cap Only	317531 (8)
26	321457	Plunger	1			*317532* (9)
27	317524	Spring	1	●		320737 (25a)
28		Gasket, 1.443 " ID	1	●		321457 (26)
29a	340099	Cap (New Style)	1		Use w/ New Style Toggle Only	321645 (24)
29b		Cap (Old Style)	1		Use w/ Old Style Toggle Only	*321646* (25b)
30	317523-1	Rod, Piston	1			327796 (16)
31		Washer, Split (Nylon) 0.435 " ID	2	● △		*328301-5* (37)
32		Seal, 0.430 " ID x 0.780 " OD	1	● △		*328302-5* (38)
33		Spacer	1	● △		328306-52
34	317522	Washer (Brass) 0.718 " ID	1			*331256* (20)
35	170290	Screw, 8 -32 x 1 "	1			*331257* (21)
36	317529	Cover	1			*331841* (39)
	328306-52	Fitting, Compression	1		Includes Items 37-39	*337137* (31)
37		Nut, Compression, 1/2 " -24	1			*337138* (33)
38		Ferrule, 5/16 "	1			340099 (29a)
39		Elbow, 1/2 " -24 x 1/8 " NPTF	1			*381431* (2)

Legend:

Part numbers left blank (or in *italics*) are not available separately

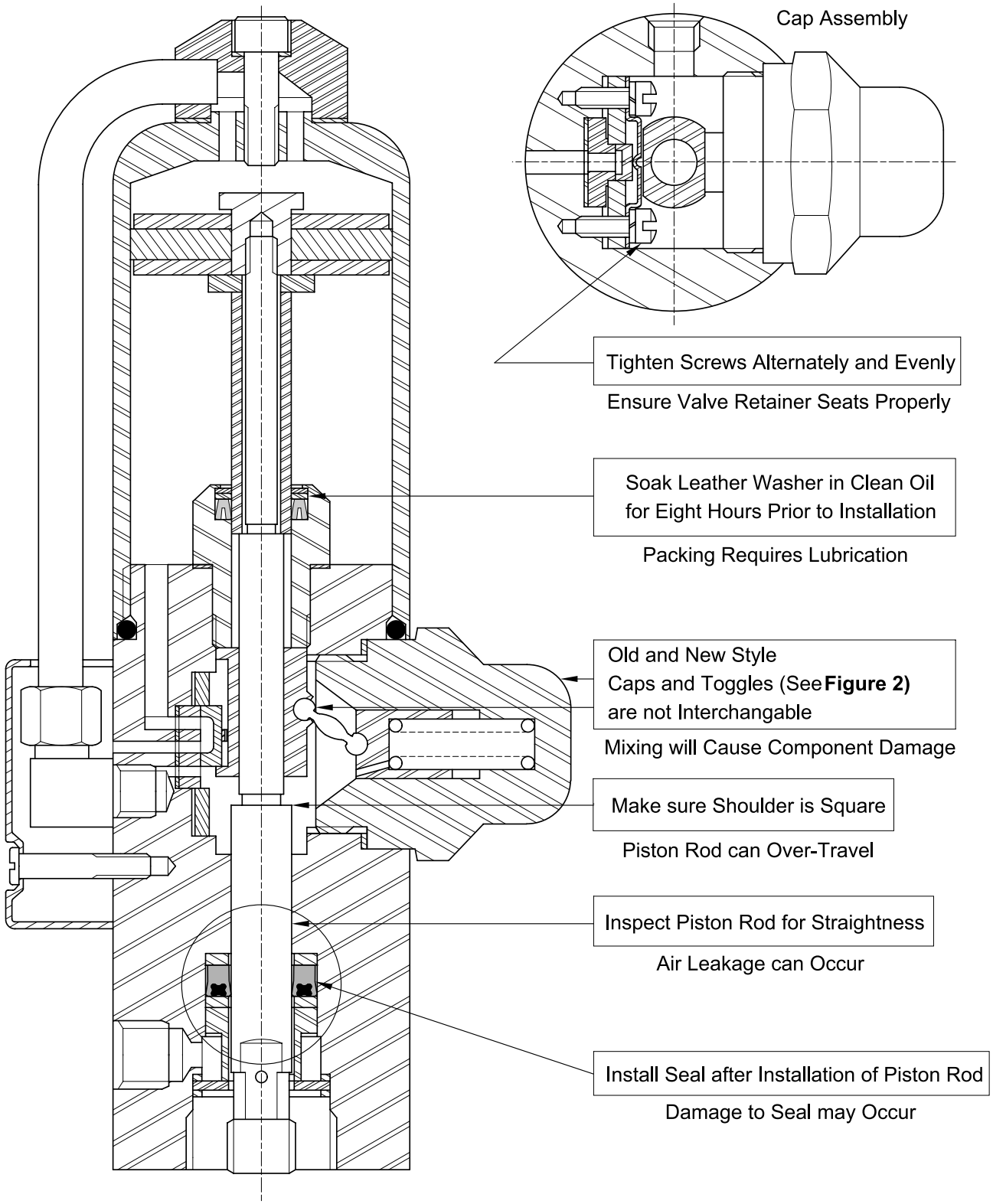
● △ designates a repair kit item

Repair Kits

Part No.	Kit Symbol	Description
398638-4	●	Kit, Major Repair (Includes protective sleeve)
398602-2	△	Kit, Base Packing Group (Includes protective sleeve)
393530-1		Kit, Seal [Includes five (5) of item **32**]

Service Hints

Refer to the Overhaul Procedures for Details



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 motor. 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 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

Separate Pump from Air Motor

1. Clamp the Air Motor assembly horizontally in a soft-jaw vise.

CAUTION

Support the Pump Tube assembly during removal. Damage to components can occur.

2. Unscrew the Pump Tube [with attached components] from the Air Motor.
3. Pull on the Pump Tube to expose the Coupling.
4. Remove the upper Pin that secures the air motor Piston Rod to the Coupling.
5. Unscrew the Coupling from the air motor Piston Rod.
   - Rotate the entire Pump Tube assembly.

Air Motor

Cap Assembly

6. Unscrew Cap (**29**) from Body (**16**).
   - Remove Gasket (**28**).
7. Remove Spring (**27**).
8. Remove Plunger (**26**) from Toggle (**25**).
9. Remove the Toggle from Shuttle (**24**).

Cylinder and Body Assembly

10. Remove Screw (**35**) that secures Cover (**36**) to the Body.
    - Remove the Cover.
11. Loosen Compression Nut (**37**) from Elbow (**39**).
12. Remove Screw (**1**) and Washer (**2**) that secures Cap and Tube Assembly (**3**) to Cylinder (**5**).
    - Remove the Cap and Tube Assembly from the Cylinder.
13. Remove Gasket (**4**).
14. Unscrew the Cylinder from the Body.
15. Remove O-Ring (**15**) from the Body.
16. Expose the flats on the lower portion of Piston Rod (**30**).
17. Grip the flats of the Piston Rod and unscrew Piston Nut (**6**) from the Piston Rod.
18. Remove Washer (**7**), Packing (**8**) and additional Washer (**7**) from the Piston Nut.
19. Remove Washer (**9**) and Spacer (**10**) from the Piston Rod.
20. Unscrew Packing Assembly (**11**) from the Body.
    - Remove Gasket (**14**).
21. Remove the Piston Rod from the Body.
22. Remove the Shuttle from the Body.
23. Remove Gasket (**14**), Washer (**34**), and additional Gasket (**14**) from the Body as required.
24. Remove Spacer (**33**) from the Body.

NOTE: Obsolete models contain a packing group that consists of different components.

25. Remove Split Washer (**31**), Seal (**32**), and additional Split Washer (**31**) from the Body.

26. Remove Screws (**23**) and Lockwashers (**22**) that secure Spring Retainer (**21**) to the Body.
    • Remove the Spring Retainer.

27. Remove Valve Slide (**20**) and Valve Retainer (**19**) from the Body.

28. Remove Valve Seat (**18**) and Gasket (**17**) from the Body.

29. Unscrew the Elbow from the Body as required.

Clean and Inspect

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

1. Clean all metal parts in a cleaning solvent. The solvent should be environmentally safe.

2. Inspect all parts for wear and/or damage.
   • Replace as necessary.

3. Inspect the large diameter of Piston Rod (**30**) and the inside diameter of Cylinder (**5**) closely for score marks.
   • Replace as necessary.

4. Inspect the Piston Rod for straightness.
   • Roll the Piston Rod on a flat surface by hand.

5. Closely inspect the mating surfaces of Valve Seat (**18**) and Valve Slide (**20**). Ensure a smooth and clean contact is obtained.
   • Replace with a kit if necessary.

Assembly

NOTE: Prior to assembly, certain components require lubrication. Refer to **Table 2** for details.

Cylinder and Body Assembly

NOTE: Refer to **Figure 2** and **Figure 3** for component identification on all assembly procedures.

1. Install Gasket (**17**) and Valve Seat (**18**) into Body (**16**).
   • Make sure the holes are in alignment.

2. Install Valve Retainer (**19**) [grooved side out] onto the Valve Seat.

3. Install Valve Slide (**20**) [concave side first] into the opening of the Valve Retainer and onto the Valve Seat.

4. Position Spring Retainer (**21**) onto the Slide Valve and Valve Retainer.

5. Install Screws (**23**) and Lockwashers (**22**) that secure the Spring Retainer to the Body.

   IMPORTANT: Make sure to tighten the Screws alternately and evenly. This prevents the Valve Retainer from seating improperly on the Valve Seat.

6. Measure the amount of force required to move the Valve Slide on the Valve Seat.

   NOTE: The Valve Slide should begin to move with approximately 8 ounces (227 gms) of force. As required, bend the Spring Retainer in the proper direction to adjust the tension on the Valve Slide.

7. Install Shuttle (**24**) [flat side first] into the Body and onto the Valve Slide.

Item No.	Description	Item No.	Description
Clean Oil			
12	Washer (Leather) 1/2 " ID [Soak 8 hours at room temperature]	15	O-Ring, 1-15/16 " ID x 2-1/8 " OD
13	Packing, 0.460 " ID x 0.780 " OD	32	Seal, 0.430 " ID x 0.780 " OD
Viscous H Lubricant			
5	Cylinder - Inside Bore	24	Shuttle - Inside Diameter and Toggle Sockets
8	Packing - Outside Diameter	26	Plunger - Outside Diameter and Toggle Socket
16	Body - 1/4 oz. (7 gms) in Cavity	27	Spring - Coated
20	Valve Slide - Surface in Contact with Spring Retainer	29	Cap - Inside Bore
NOTE: Part number 398030 is a 2 ounce (57 gm) tube of Viscous H Lubricant			

Table 2 *Lubricated Components*

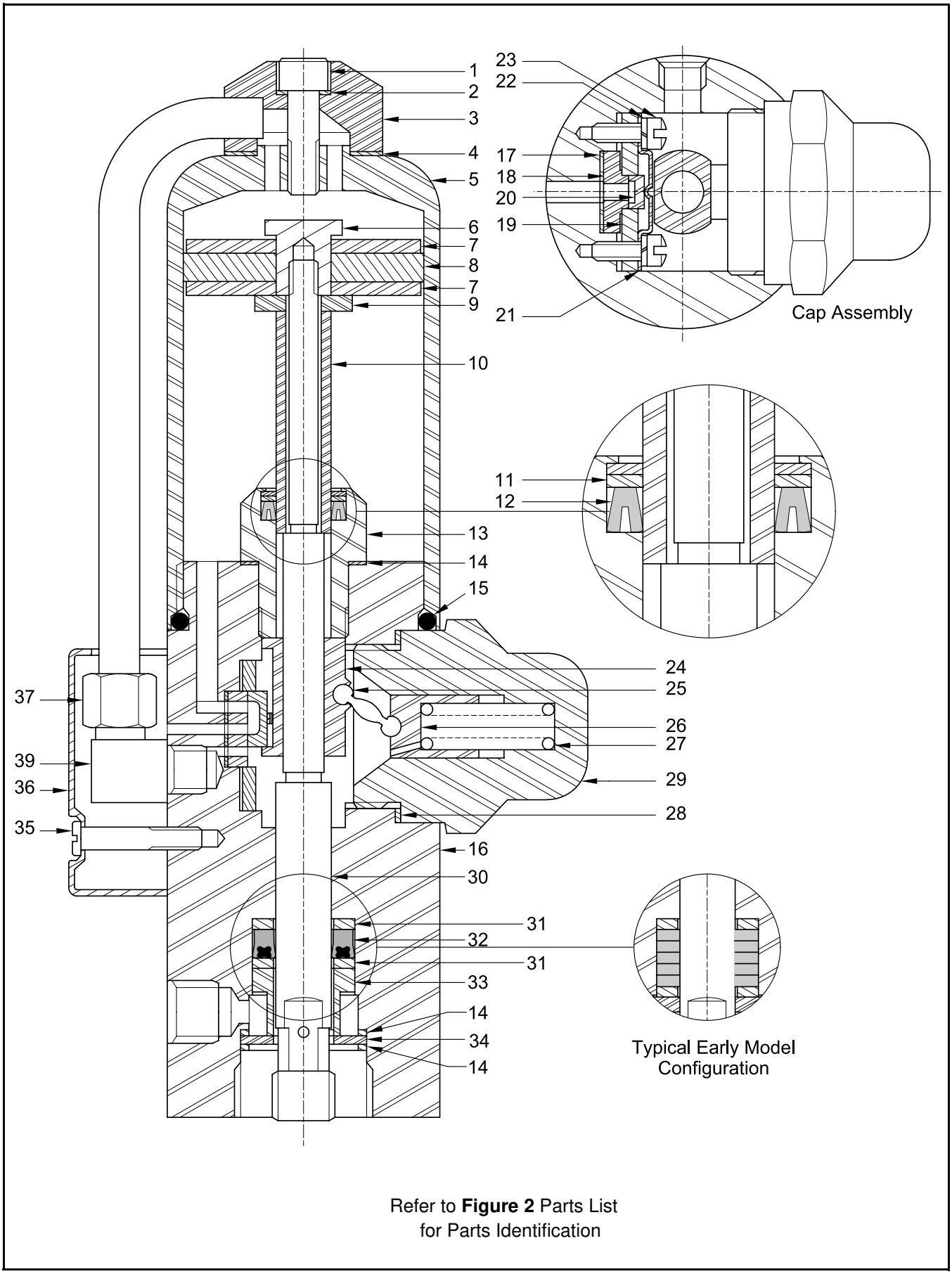


Figure 3 *Air Motor Model 318200-4 - Section View*

8. Install Piston Rod (**30**) [small diameter first] into the bottom of the Body and through the Shuttle.

9. Install Gasket (**14**) onto the Body.

   IMPORTANT: Position the Piston Rod until the uppermost chamfer is flush with the top of the Body. This prevents damage to the Seal in the Packing Assembly.

10. Install Packing Assembly (**11**) onto the Piston Rod and into the Body.
    - Tighten the Packing Assembly securely to properly crush the Gasket.

11. Install Spacer (**10**) onto the Piston Rod and into the Packing Assembly.

12. Install Washer (**9**) onto the Piston Rod.

13. Install Washer (**7**), Packing (**8**) and additional Washer (**7**) onto Piston Nut (**6**).

14. Screw the Piston Nut assembly onto the Piston Rod.
    - Grip the flats at the bottom of the Piston Rod and tighten the Piston Nut from 110 to 140 inch pounds (12.4 - 15.8 Nm).

15. Install O-Ring (**15**) onto the Body.

CAUTION

Install Cylinder (5) squarely over the Packing assembly. Thread damage can occur.

16. Carefully install Cylinder (**5**) over the Packing assembly.
    - Screw the Cylinder securely onto the Body.

17. Apply thread sealant to Elbow (**39**).

18. Screw the Elbow into the Body.
    - Tighten securely.
    - Make sure to orient the Elbow properly.

19. Slide Compression Nut (**37**) and Ferrule (**38**) onto the tube of Cap and Tube Assembly (**3**).

20. Install Gasket (**4**) onto the top of the Cylinder.

21. Position the Cap and Tube Assembly onto the Cylinder.
    - Make sure the Tube enters the Elbow.

22. Install Screw (**1**) and Washer (**2**) that secures the Cap and Tube Assembly to the Cylinder.
    - Tighten the Screw securely.

23. Tighten the Compression Nut securely.

Cap Assembly

*IMPORTANT: The Toggle in Repair Kit **398638-3** is **NOT** interchangeable with the old style Cap (w/ hole).*

24. Install Toggle (**25**) onto the Shuttle.

    *IMPORTANT: Make sure the drain hole on Plunger (**26**) points downward. See **Figure 2**.*

25. Install Plunger (**26**) onto the Toggle.

26. Install Spring (**27**) into the Plunger.

27. Install Gasket (**28**) onto Cap (**29**).

CAUTION

Do not cross-thread the Cap into the Body.

28. Screw the Cap into the Body.
    - Make sure the Spring aligns properly.
    - Tighten the Cap securely.

Body Assembly (Continued)

29. Install and seat Split Washer (**31**) onto the Piston Rod and into the Body.

30. Install and seat Seal (**32**) [heel end first] onto the Piston Rod and into the Body.
    - Use the protective sleeve included in the kit. See **Figure 4**.

31. Install and seat the additional Split Washer and Spacer (**33**) [large diameter first] into the Body.

32. Install and seat Gasket (**14**), Washer (**34**), and additional Gasket (**14**) into the Body.

33. Position Cover (**36**) [hole toward bottom] to the Body.

34. Install Screw (**35**) that secures the Cover to the Body.
    - Tighten the Screw securely.

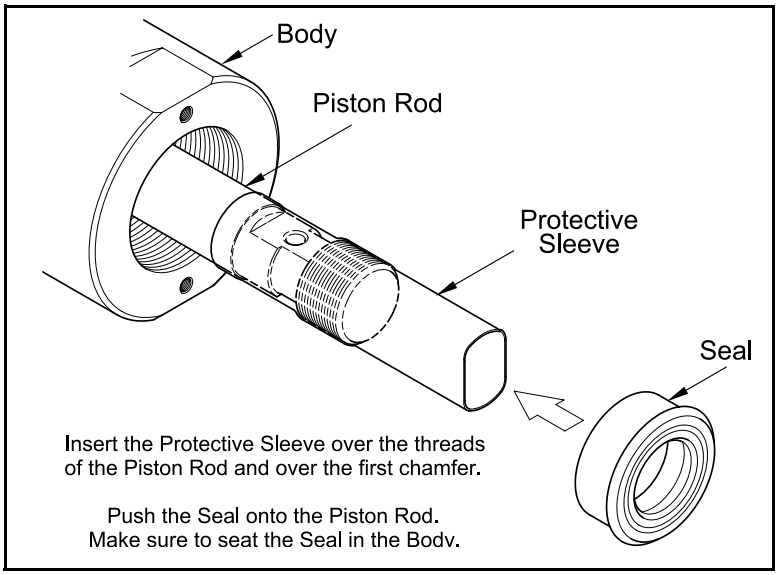


Figure 4 *Use of Kit Sleeve to Install Seal onto Piston Rod*

Connect Pump to Air Motor

35. Clamp the Air Motor horizontally in a soft-jaw vise.

36. Pull on the Pump Tube to expose the Coupling as necessary.

CAUTION

Support the Pump Tube assembly during installation. Damage to components can occur.

37. Screw the Coupling onto the air motor Piston Rod.
    - Rotate the entire Pump Tube assembly.

38. Install the Pin that secures the air motor Piston Rod to the Coupling.

39. Screw the Pump Tube securely into the Air Motor.

Pump Operation

WARNING

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

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 25 psi (1.7 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 pump's material outlet.
    - Direct the hose into an appropriate container.

4. Place the pump in the product to be dispensed.

5. Slowly supply air pressure to the pump's motor.

6. Allow the pump to cycle slowly until the system and product 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. Slowly supply 35 psi (2.4 Bars] air pressure to the pump's motor.

9. Operate the control valve into a container.

10. Allow the pump to cycle until the system and product is once again free of air.

11. Shut off the control valve.

12. Set the air pressure to 100 psi (6.9 Bar).

13. Visually inspect the pump for external leaks.
    - The pump should not cycle.

If the pump does not stall, refer to the **Troubleshooting Chart** in the **Pump Service Guide** for details.

14. Check the motor for air leakage.

If the motor leaks, refer to the **Troubleshooting Chart** for details.

Installation

Additional items that should be incorporated into the air piping system are listed in **Table 3**.

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

Table 3 *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

Indications	Possible Problems	Solution
Air Motor and/or Pump does not cycle	1. Insufficient air pressure 2. Air motor jammed and/or contains loose components 3. Pump tube jammed and/or contains loose components	1. Increase air pressure 2. Rebuild air motor 3. Rebuild pump tube
Pump Assembly		
Pump will not prime	1. Excessive cycling speed 2. Air leak before pump tube 3. Pump leaking internally	1. Reduce air pressure 2. Tighten connection 3. See Pump **SER Service Guide**
Pump cycles rapidly	Product source empty	Replenish product and inspect Air Motor
Air Motor		
External Leaks		
Air leakage at top of Cylinder (**5**)	1. Screw (**1**) not sufficiently tight 2. Worn or damaged Gasket (**4**)	1. Tighten Screw (**1**) 2. Replace Gasket (**4**)
Air leakage at bottom of Cylinder (**5**)	1. Worn or damaged O-Ring (**15**) 2. Worn or damaged Cylinder (**5**)	1. Replace O-Ring (**15**) 2. Replace Cylinder (**5**)
Air leakage at Cap and Tube Assembly (**3**)	1. Compression Nut (**37**) not sufficiently tight 2. Ferrule (**38**) not sealing properly	1. Tighten Compression Nut (**37**) 2. Replace Ferrule (**38**) and Cap and Tube Assembly (**3**)
Air leakage at Elbow (**39**)	Initial tightening of Elbow (**39**) to Body (**16**) not sufficient and/or no sealant	Apply a thread sealant to Elbow (**39**) and tighten
Air leakage at Cap (**29**)	1. Initial tightening of Cap (**29**) to Body (**16**) not sufficient 2. Damaged Gasket (**28**)	1. Tighten Cap (**29**) to Body (**16**) 2. Replace Gasket (**28**)
Air leakage at Seal (**32**)	1. Worn or damaged Seal (**32**) 2. Worn or damaged Piston Rod (**30**)	1. Replace Seal (**32**) 2. Replace Piston Rod (**30**)
Internal Leaks		
Air leakage felt at exhaust	1. Worn or damaged Packing (**13**) 2. Worn or damaged Packing (**8**) 3. Damaged Gasket (**17**) 4. Worn or damaged Valve Slide (**20**) 5. Worn or damaged Valve Seat (**18**) 6. Spring Retainer (**21**) improperly tensioned	1. Disassemble air motor, clean, inspect, and replace worn or damaged components. 2. Bend Spring Retainer (**21**) in the proper direction. Measure the amount of force required to move the Valve Slide on the Valve Seat.

Changes Since Last Printing

Changed Cap and Toggle