

Low-Pressure Transfer Pump

Description

The major components of model 9916-A transfer pump consist of an air-operated motor (equipped with a shut-off valve) and a pump tube. The air motor connects directly to the double-acting reciprocating pump tube.

This low-pressure (1:1 ratio) transfer pump is designed to deliver a range of light weight oils including gear lubricants.

Mounting

This pump mounts directly onto original containers or bulk tanks that have a 2 " NPTF bung fitting. The required length downtube screws directly into the 1-1/2 " NPTF female threads in the valve body.

As an alternative, the pump can also mount to a wall (with the use of a wall bracket) and be used with an optional suction hose. See **Table 2** for details.

Also, the pump screws directly onto two different size threaded standpipes [1-1/2 " NPTF (m) or 2 " NPTF (f)].

Specifications

Air Motor

Piston Diameter x Stroke		Air Inlet	Maximum Air Pressure	
Inches	Centimeters		psi	Bars
3 x 3-5/16	7.6 x 8.4	1/4 " NPTF (f)	150	10.3

For details on the air motor, refer to Service Guide SER 339413

Pump Tube

Max. Material Pressure		Delivery/Minute (Approximate) *		Material Outlet	
psi	Bars	Gallons	Liters	w/Bushing	w/o Bushing
150	10.3	16	60.6	1/2 " NPTF (f)	3/4 " NPTF (f)

* For detailed information, refer to **Figure 3**.

Table 1 Model 9916-A Specifications

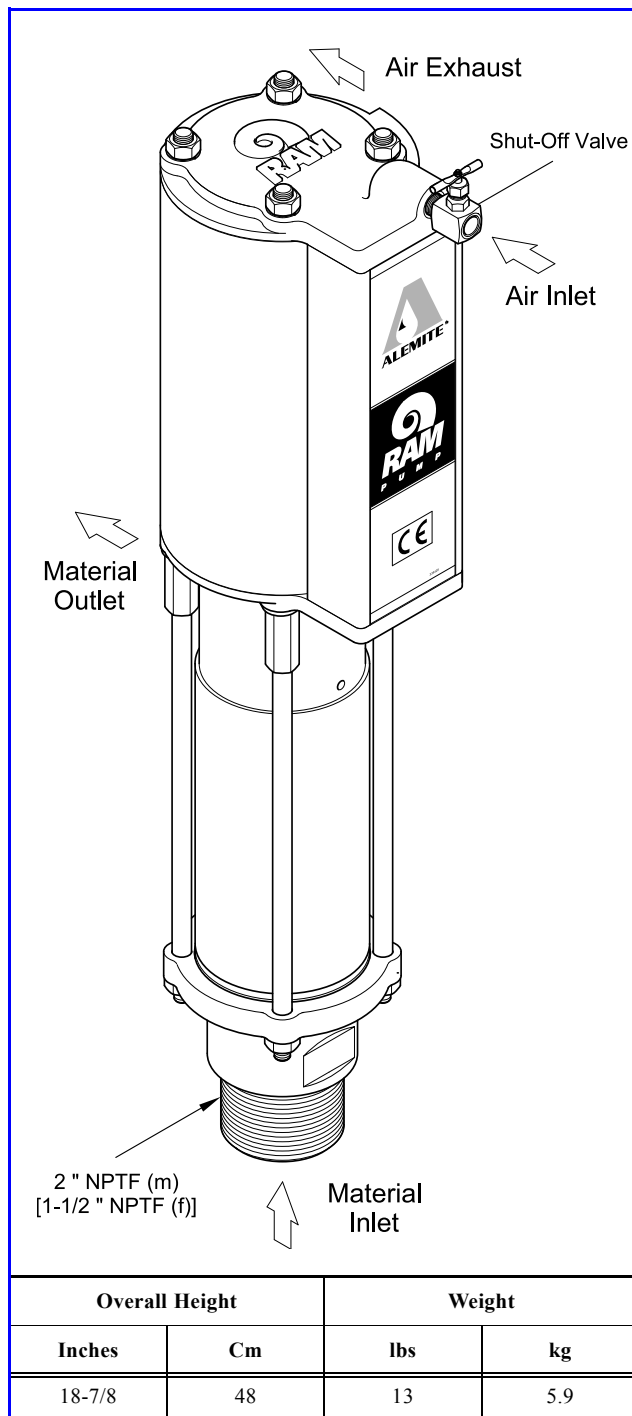


Figure 1 Low-Pressure Transfer Pump Model 9916-A

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

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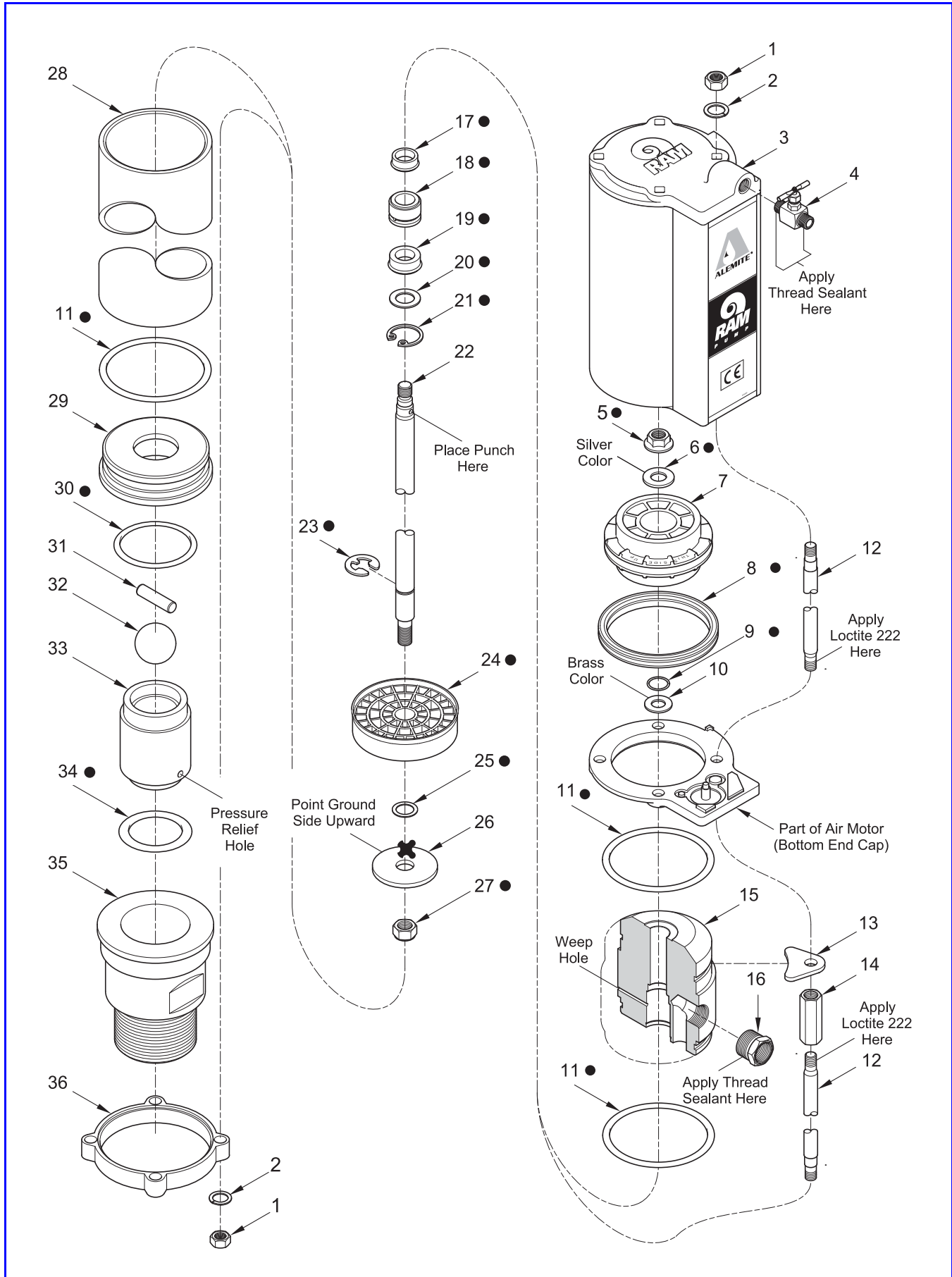


Figure 2 Low-Pressure Transfer Pump Model 9916-A - Exploded View

Item No.	Part No.	Description	Qty	Notes	Numeric Order Part # (Item #)
1		Nut, 1/4 " -20	8		12369 (2)
2		Washer, Lock, 1/4 "	8		14536 (6)
3		Motor Assembly, Air	1	See SER 339413	77650 (1)
4	319391	Valve, Shut-Off	1		51929 (27)
5	339513	Nut, Flange, 3/8 " -24	1	●	170710 (23)
6		Washer, 3/8 " ID x 7/8 " OD	1	●	X171000-7 (9)
7	339429	Piston, Air	1		X171000-109 (34)
8	X171008-37	Quad-Ring, 2-5/8 " ID x 3 " OD	1	●	X171003-3 (30)
9	X171000-7	O-Ring, 3/8 " ID x 1/2 " OD	1	●	X171003-10 (11)
10	338109	Washer, 3/8 " ID x 3/4 " OD	1		171006-17 (21)
11	X171003-10	O-Ring, 2-3/4 " ID x 3 " OD	3	●	X171008-37 (8)
12	339489	Rod, Tie	8		171700-56 (32)
13	339412	Keeper	4		172190-24 (17)
14		Coupling	4		172190-26 (19)
15	339495	Body, Outlet	1		319391 (4)
16	320531	Bushing, 3/4 " NPTF (m) x 1/2 " NPTF (f)	1		320531 (16)
17		Seal, 1/2 " ID x 3/4 " OD	1	●	323474 (20)
18		Ring, Lantern (Brass)	1	●	323726 (31)
19		Seal, 1/2 " ID x 7/8 " OD	1	●	338072 (18)
20		Washer	1	●	338109 (10)
21		Ring, Retaining, Internal	1	●	338259 (26)
22	338589	Rod	1		338271 (24)
23		Ring, Retaining, External	1	●	338272 (25)
24	338271	Piston, Fluid (Nylon)	1	●	338283 (36)
25		Gasket (Aluminum)	1	●	338589 (22)
26	338259	Plate (Stainless Steel)	1		339412 (13)
27		Nut, Elastic Stop, 3/8 " -24	1	●	339413 (3)
28	339494	Cylinder	1		339429 (7)
29	339493	Stop	1		339489 (12)
30	X171003-3	O-Ring, 1-7/8 " ID x 2-1/8 " OD	1	●	339490 (14)
31	323726	Pin, 1/4 " Dia. x 1-5/16 " Long	1		339491 (35)
32	171700-56	Ball	1		339492 (33)
33	339492	Seat	1		339493 (29)
34	X171000-109	O-Ring, 1-5/16 " ID x 1-11/16 " OD	1	●	339494 (28)
35	339491	Body, Valve	1		339495 (15)
36	338283	Ring	1		339513 (5)

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

Repair Kits

Part No.	Kit Symbol	Description
393711	●	Kit, Major Repair (Includes tube of 393590 Teflon Grease)
393530-24		Kit, Seal [includes five (5) of item number 17]
393530-26		Kit, Seal [includes five (5) of item number 19]

Accessories

Extension Description	Drum		Tank	
	16-Gallon	55-Gallon	250-Gallon Bench-Top	275-Gallon Obround
V-Cut	338147-3	338147-4	338147-8	338147-9
Threaded at both ends *	338246-3	338246-4	338246-8	338246-5
* NOTE: For use with low level cut-off valve part number 321206				
Additional Accessories				
Low Level Cut-Off Valve	321206			
Siphon Kit	SWA 306			
Wall Bracket	325749			
Metal Discharge Hose (4-Feet)	338360			

Table 2 Model 9916-A Accessory Components

Performance Curves

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 gallons (liters) 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).

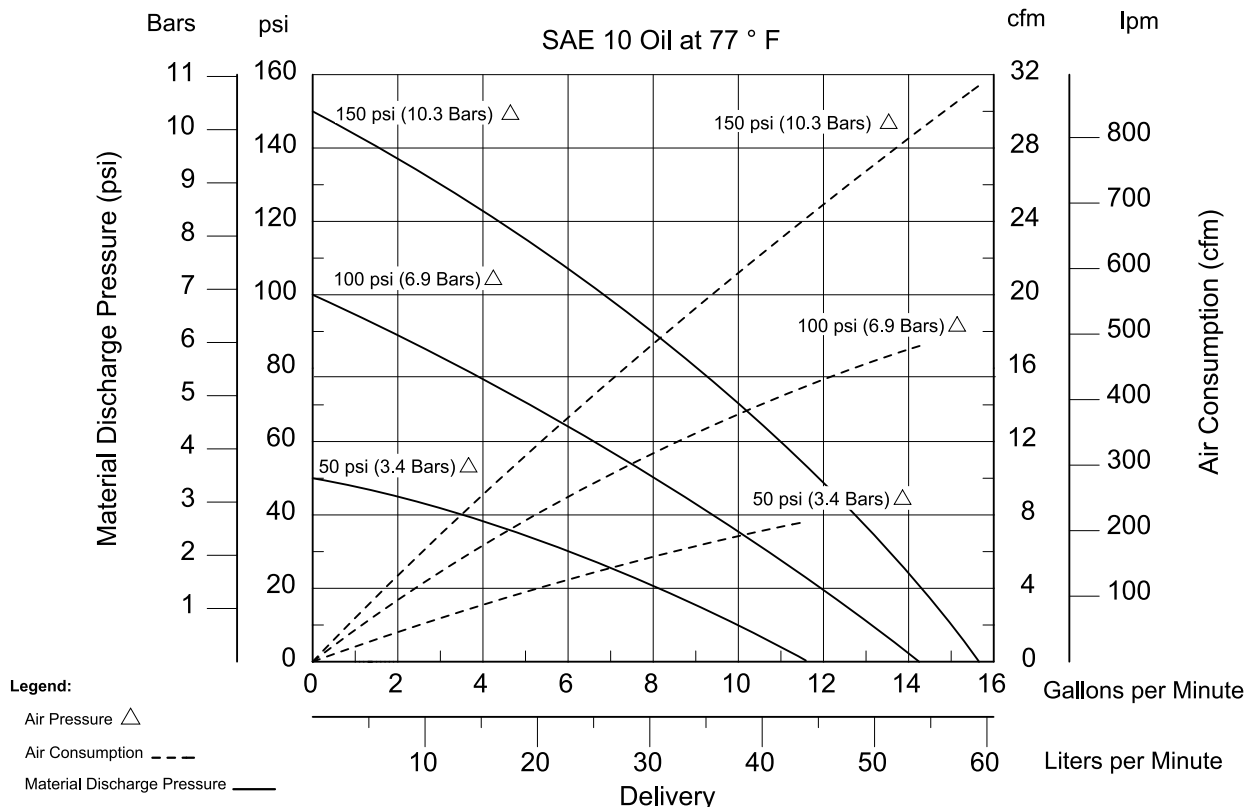


Figure 3 Delivery versus Discharge Pressure and Air Consumption

Overhaul

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

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.

Disassembly

Separate Air Motor from Pump Tube

1. Clamp the pump assembly in a soft-jaw vise at Valve Body (35).
2. Remove Nuts (1) and Lock Washers (2) that secure Air Motor Assembly (3) to the pump assembly.

NOTE: The bottom end cap of the Air Motor Assembly remains on the pump tube during the next procedure.

3. With a side-to-side motion, pull the Air Motor Assembly from Body (15) and off Tie Rods (12).

NOTE: The following three (3) steps are performed only as required.

4. Unscrew the Adapter from Shut-Off Valve (4).
5. Unscrew the Shut-Off Valve from the Air Motor Assembly.

Pump Assembly

***IMPORTANT:** The following procedures do not separate Tie Rods (12) from Couplings (14), Keepers (13), the bottom end cap of the air motor and Outlet Body (15).*

These components should remain assembled when possible.

Valve Body and Stop Assembly

6. Remove Nuts (1) and Lock Washers (2) that secure Ring (36) to the pump assembly.
 - Remove the Ring from Valve Body (35).

NOTE: The Valve Body [with internal components] separates from Stop (29).

7. Remove Pin (31) and Ball (32) from the Seat.
8. Remove the Seat from the Valve Body.
9. Remove O-Ring (34) from the Valve Body.
10. Remove Stop (29) from Cylinder (28).
11. Remove O-Ring (30) and O-Ring (11) from the Stop.

Cylinder Assembly

12. Remove Cylinder (28) from the Outlet Body.

Air Piston Assembly

13. Remove Nut (5) and Washer (6) that secures Air Piston (7) to Rod (22).

NOTE: Place an appropriate size punch or other suitable tool into the hole of the Rod.

14. Remove the Air Piston from the Rod.
15. Remove Quad-Ring (8) from the Air Piston.
16. Remove O-Ring (9) and Washer (10) from the Rod.

Rod and Fluid Piston Assembly

17. Remove the Rod (with attached components) from the Outlet Body.
18. Remove lower Nut (27) that secures Fluid Piston (24) to the Rod.

NOTE: Place an appropriate size punch or other suitable tool into the hole of the Rod.
19. Remove Plate (26), Gasket (25), and the Fluid Piston from the Rod.
20. Remove Retaining Ring (23) from the Rod as needed.

Outlet Body Assembly

21. Remove both O-Rings (11) from the Outlet Body.
22. Remove Retaining Ring (21), Washer (20), Seal (19), Lantern Ring (18), and Seal (17) from the Outlet Body.
23. Unscrew Bushing (16) from the Outlet Body as required.

Clean and Inspect

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 Air Piston (7) and Fluid Piston (24) for fatigue cracks.
 - Replace as necessary.
4. Inspect Rod (22) closely. Use a magnifying glass to detect any score marks on the Rod.
 - Replace as necessary.

5. Closely inspect the mating surfaces of all check valve components for any imperfections. Ensure a smooth and clean contact is obtained when assembled.

EXAMPLE: Place Ball (32) into Seat (33). Fill the Seat with solvent. Make sure no leakage occurs.

Assembly

NOTE: Prior to assembly, certain components require lubrication. Refer to **Table 3** for details.

Pump Tube Assembly

NOTE: Refer to **Figure 4** for a section view of the pump tube assembly.

IMPORTANT: The following procedures begin with the Outlet Body assembled to the bottom end cap of the air motor, Keepers (13), Couplings (14), and Tie Rods (12).

*Should this subassembly require replacement, make sure to apply Loctite 222 to the 45 ° stepped end of the Tie Rods that engage the Coupling. See **Figure 2**.*

Outlet Body Assembly

1. Install and seat Seal (17) [stem end first], Lantern Ring (18) [stepped end first], Seal (19) [stem end first], and Washer (20) into the bottom of Outlet Body (15).
2. Secure the components with Retaining Ring (21).
 - Make sure the Retaining Ring seats properly in the groove.

Item No.	Description	Item No.	Description
Clean Oil			
9	O-Ring, 3/8 " ID x 1/2 " OD	19	Seal, 1/2 " ID x 7/8 " OD
11	O-Ring, 2-3/4 " ID x 3 " OD	30	O-Ring, 1-7/8 " ID x 2-1/8 " OD
17	Seal, 1/2 " ID x 3/4 " OD	34	O-Ring, 1-5/16 " ID x 1-11/16 " OD
Magnalube-G Teflon Grease			
8	Quad-Ring, 2-5/8 " ID x 3 " OD		
Coat the Inside Diameter of the Air Motor Assembly			

Table 3 Lubricated Components

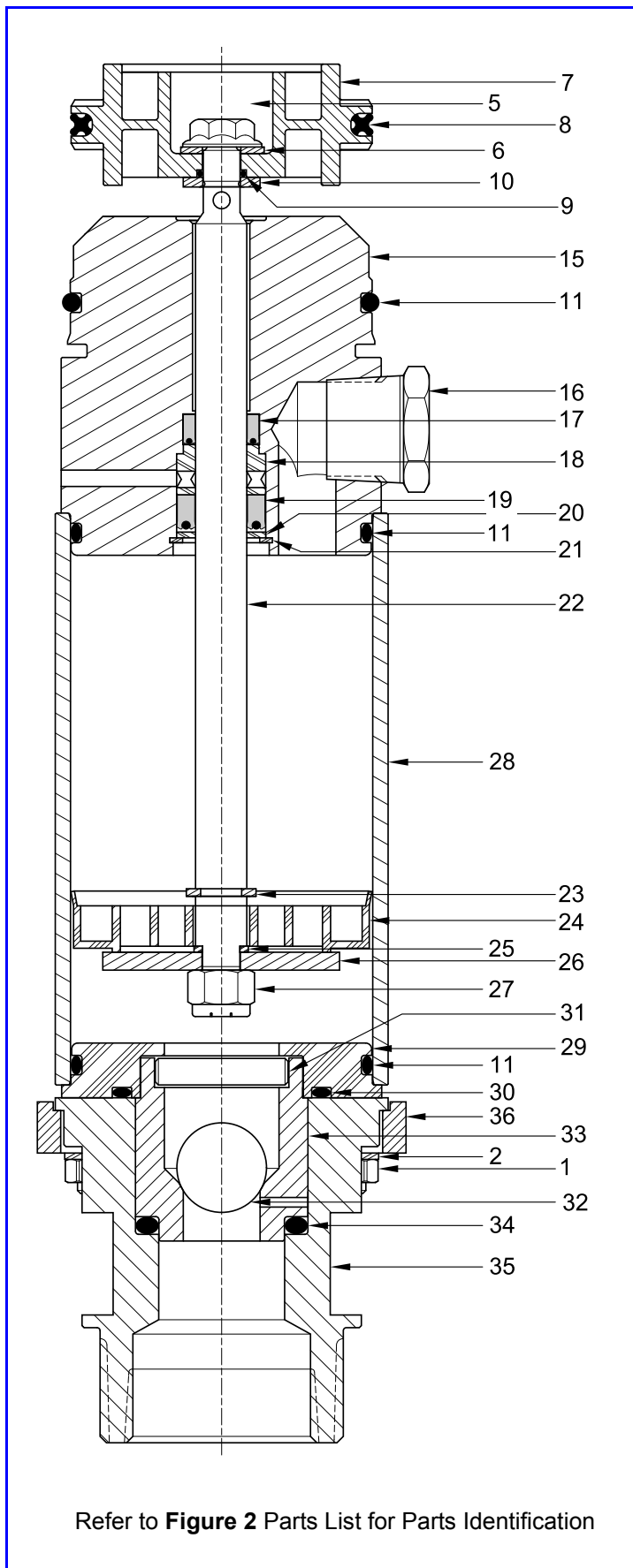


Figure 4 Pump Tube Assembly (w/o Air Motor) - Section View

3. Install O-Rings (**11**) onto both ends of the Outlet Body.

4. Screw Bushing (**16**) [with thread sealant] into the Outlet Body as required

- Tighten the Bushing securely.

Rod and Fluid Piston

5. Install Retaining Ring (**23**) onto Rod (**22**) as required.

*IMPORTANT: Make sure the ground side of Plate (**26**) contacts Fluid Piston (**24**).*

6. Install Fluid Piston (**24**) [segmented side first], Gasket (**25**), and Plate (**26**) [ground side first] onto the bottom of the Rod.

7. Install Nut (**27**) that secures the Plate to the Rod.

- Tighten the Nut securely.
- Place an appropriate size punch or other suitable tool into the hole of the Rod.

CAUTION

Install the Rod assembly into the Body with a twisting motion. Use care not to damage the Seals.

8. Install the Rod assembly into the bottom of the Outlet Body.

- Position the Fluid Piston flush with the bottom of the Body.

Air Piston

CAUTION

Use care not to switch Washers (6 and 10). Component damage can occur.

9. Install Washer (**10**) [brass color], O-Ring (**9**), and Air Piston (**7**) (observe THIS SIDE UP) onto the Rod.

10. Install Washer (**6**) [silver color] and Nut (**5**) that secures the Air Piston to the Rod.

- Tighten the Nut securely.
- Place an appropriate size punch or other suitable tool into the hole of the Rod.

11. Install Quad-Ring (**8**) onto the Air Piston.

Cylinder

12. Install Cylinder (28) onto the Outlet Body.
 - Use care passing the O-Ring.

Stop and Valve Body Assembly

13. Install O-Ring (11) onto Stop (29).
14. Install the Stop assembly into the Cylinder.
 - Use care passing the O-Ring.
15. Install O-Ring (34) onto Seat (33).
16. Install the Seat assembly into Valve Body (35).
17. Install Ball (32) and Pin (31) into the Seat.
18. Install Ring (36) onto the Valve Body assembly.
19. Install O-Ring (30) into the Stop.
20. Install the Seat, Valve Body, and Ring assembly into the Stop and onto the Tie Rods.
 - Make sure O-Ring (30) does not move.

CAUTION

Do not overtighten Nuts (1). Component damage can occur.

21. Install Lock Washers (2) and Nuts (1) that secure the Ring to the pump assembly.
 - Torque the Nuts in a crisscross pattern to 60 to 70 inch-pounds (6.8 - 7.9 Nm).

Attach Air Motor to Pump Assembly**CAUTION**

Install the RAM Air Motor Assembly with care. Damage to Quad-Ring (8) and/or O-Ring (11) can occur.

22. Install Air Motor Assembly (3) onto the Tie Rods and squarely onto the Outlet Body.
 - Make sure the inlet of the Air Motor is properly oriented.

HINT: With a circular motion press the entire circumference of the Quad-Ring into Air Piston (7) while gently applying downward pressure on the Air Motor Assembly.

CAUTION

Do not overtighten Flange Nuts (1). Component damage can occur.

23. Install Lock Washers (2) and Nuts (1) that secure the Air Motor Assembly to the pump assembly.
 - Torque the Nuts in a crisscross pattern to 60 to 70 inch-pounds (6.8 - 7.9 Nm).
24. Screw Shut-Off Valve (4) [with thread sealant] into the Air Motor Assembly as required
 - Tighten the Shut-Off Valve securely in the position required.

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** for details.

14. Check the motor for air leakage.

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

Installation

Additional items that should be incorporated into the air piping systems are listed in **Table 4**.

Part Number	Description
5604-2	Moisture Separator
7604-B	Regulator and Gauge

Table 4 Air Line Components

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 will not stall (cycles more than once or twice per hour)	<ol style="list-style-type: none"> 1. Pump requires break-in period 2. Pump leaking internally 3. Pump leaking externally 4. Distribution system leaking 	<ol style="list-style-type: none"> 1. Operate the pump against moderate fluid pressure for up to one hour 2. See Internal Leaks 3. See External Leaks 4. Correct leak
External Leaks		
Product leakage visible at weep hole in Outlet Body (15)	<ol style="list-style-type: none"> 1. Damaged Seal (19) 2. Damaged Rod (22) 	<ol style="list-style-type: none"> 1. Replace Seal (19) 2. Inspect Rod (22) and replace as necessary
Product leakage visible at top of Cylinder (28)	<ol style="list-style-type: none"> 1. Nuts (2) not sufficiently tight 2. Damaged O-Ring (11) 	<ol style="list-style-type: none"> 1. Tighten Nuts (2) that secure Ring (36) to the pump assembly 2. Replace O-Ring (11)
Product leakage visible at bottom of Cylinder (28)	<ol style="list-style-type: none"> 1. Nuts (2) not sufficiently tight 2. Damaged O-Ring (11) 3. Damaged O-Ring (30) 	<ol style="list-style-type: none"> 1. Tighten Nuts (2) that secure Ring (36) to the pump assembly 2. Replace O-Ring (11) 3. Replace O-Ring (30)
Air leakage at weep hole in Outlet Body (15)	Damaged Seal (17)	Replace Seal (17)
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 (32) and Seat (33) 2. Foreign material between Plate (26) and Fluid Piston (24) 3. Worn or damaged Ball (32) 4. Worn or damaged Seat (33) 5. Worn or damaged O-Ring (34) 6. Worn or damaged Plate (26) 7. Worn or damaged Fluid Piston (24) 8. Worn or damaged Cylinder (28) 	<p>Locate and eliminate source of foreign material.</p> <p>Disassemble pump tube, clean, inspect, and replace worn or damaged components</p>

Changes Since Last Printing

Removed 171000-103