Service Guide

9668

Medium-Pressure Stub Pump

Description

The major components of the model 9668 stub pump consists of an air-operated motor and a pump tube. The air motor connects directly to the double-acting reciprocating pump tube.

This medium-pressure stub pump (5:1 ratio) is designed to deliver all grades of oil. The pump's bung adapter [2 " NPTF (m)] * allows installation directly onto original containers or bulk tanks.

Pump Extensions

Extensions that screw directly into the pump's material inlet allow the pump to accommodate different size drums and tanks. Extensions are accessory items and are not included with the pump. See **Table 2**.

Specifications

Air Motor

Piston Diameter x Stroke		Air Inlet	Maximum Air Pressure	
Inches	**Centimeters**		**psi**	**Bars**
2-15/16 x 3	7.5 x 7.6	1/4 " NPTF (f)	150	10.3
For details on the air motor, refer to Service Guide SER **338066-A1**				

Pump Tube

Material Inlet	Material Outlet	Max. Material Pressure		Delivery/Minute (Approximate)*		Displacement per Cycle	
		psi	**Bars**	**Gallons**	**Liters**	**In ^{3}**	**Cm ^{3}**
1-1/2 " NPTF	1/2 " NPTF	750	52	7	26.5	7.2	118
* For detailed information, refer to **Figure 3**							

Table 1 *Medium-Pressure Stub Pump Specifications*

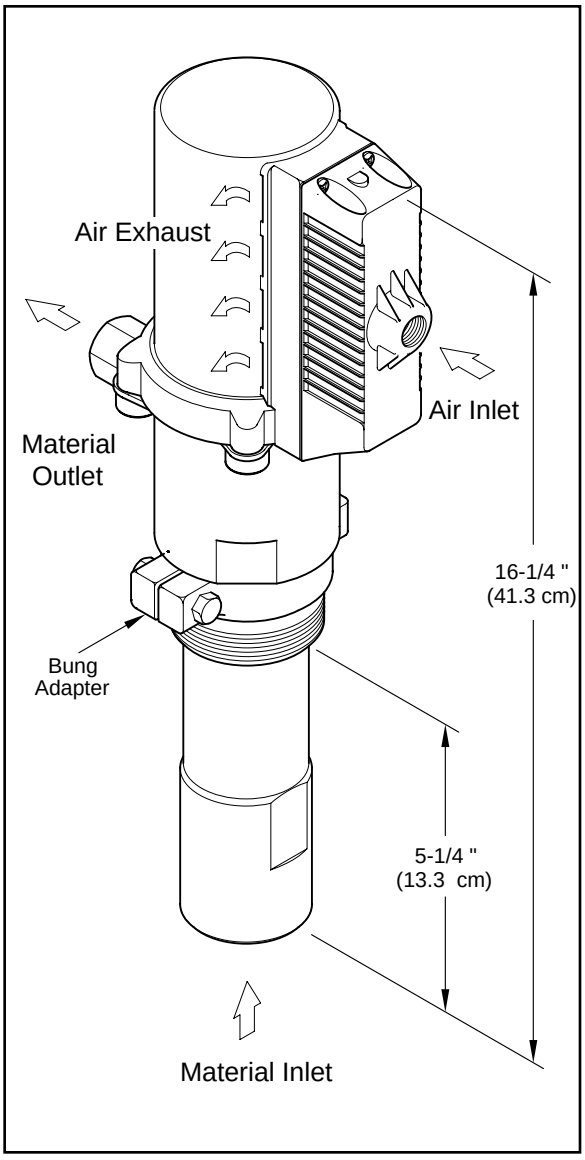

Figure 1 *Medium-Pressure Stub Pump Model 9668*

* Certain packages that incorporate this pump do not include the bung adapter.

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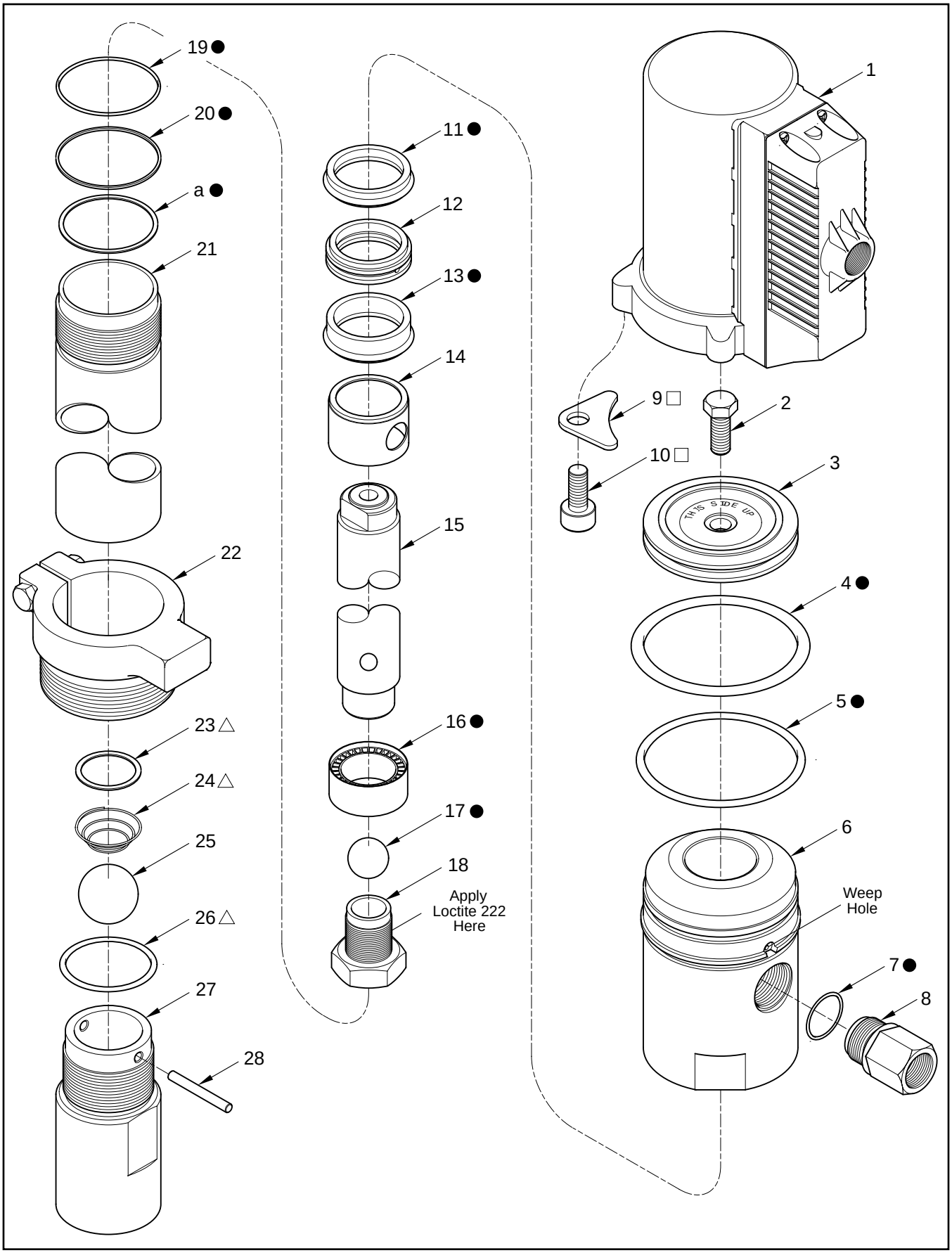


Figure 2 *Medium-Pressure Stub Pump Model 9668- Exploded View*

Item No.	Part No.	Description	Qty	Notes		Numeric Order Part # (Item #)
1		Motor Assembly, Air	1		See SER **338066-A1**	171000-14 (7)
2		Screw, 3/8 " -24 x 3/4 "	1			*171000-103* (4)
3	338111	Piston, Air	1			171003-10 (5)
4		O-Ring, 2-5/8 " ID x 3 " OD	1	●		171009-31 (26)
5	171003-10	O-Ring, 2-3/4 " ID x 3 " OD	1	●		*171009-51* (19)
6	338089	Body	1			*171700-36* (17)
7	171000-14	O-Ring, 3/4 " ID x 15/16 " OD	1	●		171892 (10)
8	338057	Adapter, Outlet	1			*172190-22* (11)
9		Keeper	4	□		*172190-23* (13)
10		Capscrew, 5/16 " -18 x 1/2 "	4	□		172270-13 (25)
11		Seal, 1-5/16 " ID x 1-9/16 " OD	1	●		*172409* (2)
12	338060	Bearing (Brass)	1			323693 (a)
13		Seal, 1-5/16 " ID x 1-11/16 " OD	1	●		323707 (18)
14	338059	Spacer	1			323713 (28)
15	338106	Rod	1			323778 (27)
16	338120	Piston (Nylon)	1	●		326750-B1 (22)
17		Ball, 9/16 " Dia.	1	●		*335481* (24)
18	323707	Seat, Valve	1			*335483* (23)
19		O-Ring, 1-7/8 " ID x 2 " OD	1	●		*338041* (9)
20		Ring, Back-Up	1	●		338057 (8)
21	338090	Tube	1			338059 (14)
22	326750-B1	Adapter, Bung, 2 " NPTF (m)	1			338060 (12)
23		Washer, 1-1/8 " OD	1	△		338066-A1 (1)
24		Spring, Tapered	1	△		338089 (6)
25	172270-13	Ball, 1-1/16 " Dia	1			338090 (21)
26	171009-31	O-Ring, 1-11/16 " ID x 1-7/8 " OD	1	△		*338091* (20)
27	323778	Valve, Foot	1			338106 (15)
28	323713	Pin, 1/4 " Dia. x 1-25/32 " Long	1			338111 (3)
Kit Component for Early Model Pumps						338120 (16)
a	323693	Gasket (Aluminum)	1	●		

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

Repair Kits

Part No.	Kit Symbol	Description
393571-1	●	Kit, Repair (for Upper Pump Tube Assembly) [Includes tube of 393590 Teflon Grease]
393572	△	Kit, Repair (for Lower Pump Tube Assembly)
393641	□	Kit, Repair, Air Motor Keeper and Screw
393530-22		Kit, Seal [includes five (5) of item number **11**]
393530-23		Kit, Seal [includes five (5) of item number **13**]

Accessories

Extensions for various size containers are indicated below.

Extension Description	Drum			Tank	
	16-Gallon	55-Gallon	200/205 liter	250-Gallon Bench-Top	275-Gallon Obround
V-Cut	338147-1	338147-2		338147-3	338147-7
Threaded at both ends *	338246-1	338246-2		338246-3	338246-6
*** NOTE**: For use with low level cut-off valve part number 321206					

Table 2 *Medium-Pressure Stub Pump Model 9668 Accessories*

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).

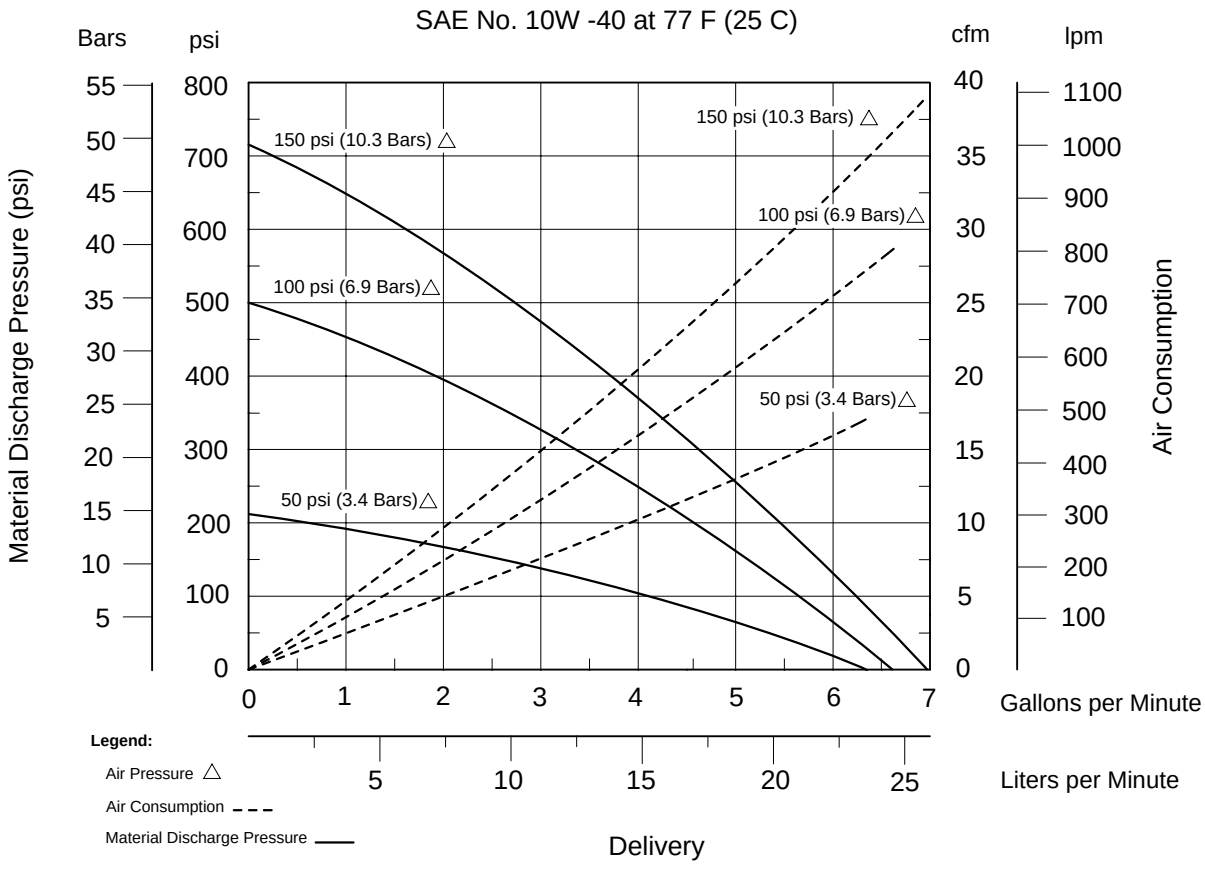
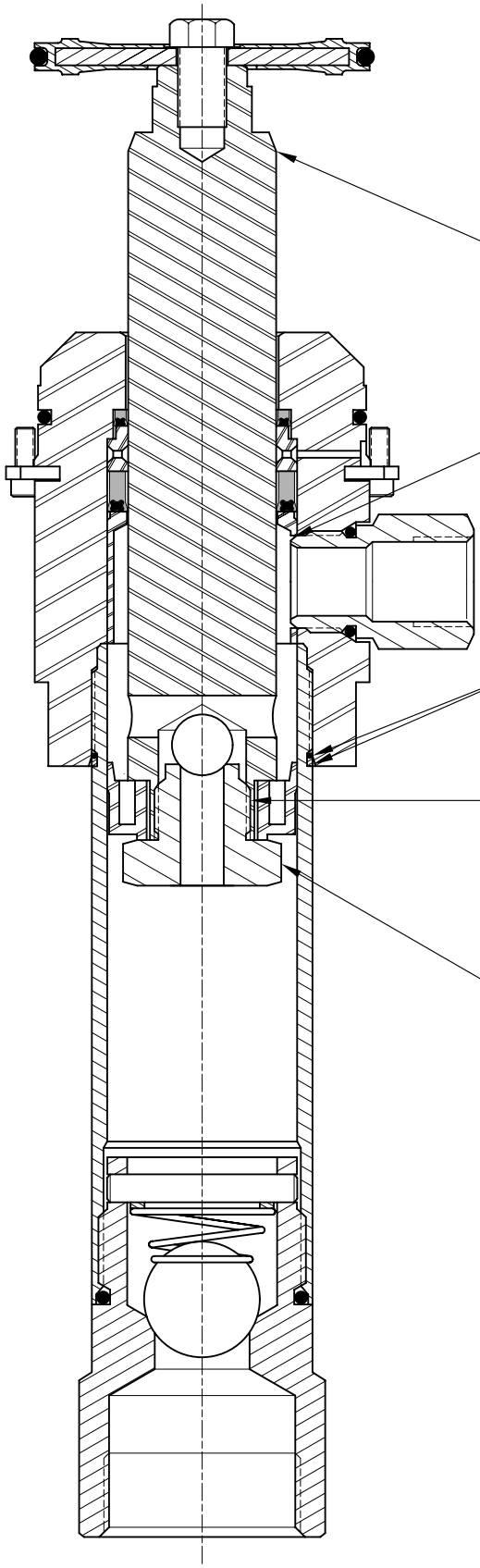


Figure 3 *Delivery versus Discharge Pressure and Air Consumption*



Service Hints

Refer to the Overhaul Procedures for Details

Inspect the Chamfer of the Rod for Roughness

Damage to Seals can Occur

Make Sure to Align the Hole in the Spacer with the Outlet Hole in the Body

Damage to Components can Occur

Ensure Rings are not Exposed After Tube Installation

Product Leakage can Occur

Apply Loctite 222 to the Threads of the Valve Seat

Valve Seat may Loosen

Do not Overtighten the Valve Seat into the Rod

Distortion of Nylon Piston can Occur

Overhaul

> **NOTE**: Refer to **Figures 2** and **3** 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 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 Bung Adapter (**22**).
2. Remove Capscrews (**10**) that secure Body (**6**) to the Air Motor assembly.
   - Remove Keepers (**9**) from the Body.
3. With a side-to-side motion, pull Air Motor Assembly (**1**) from the Body.
   - Lubricate O-Ring (**5**) with oil to ease separation.

Pump Tube

4. Remove O-Ring (**5**) from the Body.
5. Unscrew Adapter (**8**) from the Body.
6. Remove O-Ring (**7**) from the Adapter.
7. Unscrew Tube (**21**) [with Bung Adapter (**22**)] from the Body.
   - Remove the Bung Adapter from the Tube as required.
8. Remove O-Ring (**19**) and Back-Up Ring (**20**) from the Tube.
9. Remove Screw (**2**) that secures Air Piston (**3**) to Rod (**15**).
   - Remove the Air Piston from the Rod.
10. Remove O-Ring (**4**) from the Air Piston.
11. Pull the Rod assembly from the bottom of the Body.
12. Unscrew Valve Seat (**18**) from the Rod.
    - Remove Ball (**17**) and Nylon Piston (**16**).
13. Remove Spacer (**14**) and Seal (**13**) from the Body.
14. Remove Bearing (**12**) and Seal (**11**) from the Body.

Foot Valve Assembly

15. Unscrew Foot Valve (**27**) from Tube (**21**).
16. Remove O-Ring (**26**) from the Foot Valve.
17. Remove Pin (**28**) from the Foot Valve.
18. Remove Washer (**23**), Spring (**24**), and Ball (**25**) from the Foot Valve.

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 cleaning solvent. The solvent should be environmentally safe.
2. Inspect all parts for wear and/or damage.
   - Replace as necessary.
3. Inspect Air Piston (**3**) for fatigue cracks.
   - Replace as necessary.
4. Inspect Nylon Piston (**16**) and Rod (**15**) 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 (**25**) into Foot Valve (**27**). Fill the Foot Valve with solvent. Make sure no leakage occurs.

Assembly

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

Foot Valve

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

1. Install O-Ring (**26**) onto Foot Valve (**27**).
2. Install Ball (**25**), Spring (**24**) [small diameter first], and Washer (**23**) into the Foot Valve.
3. Install Pin (**28**) into the Foot Valve.
   - Make sure the Pin retains the Washer properly and is flush with the Foot Valve.

Pump Tube Body

4. Install O-Ring (**5**) onto the upper groove of Body (**6**).
5. Install and seat Seal (**11**) [heel end first] into the bottom of the Body.
6. Install and seat Bearing (**12**) [small diameter first] into the Body.
7. Install and seat Seal (**13**) [heel end first] into the Body.

CAUTION

Make sure the hole in the Spacer aligns with the hole in the Body. Damage to components can occur.

8. Install Spacer (**14**) [small diameter first] into the Body.
9. Install O-Ring (**7**) onto Adapter (**8**).
10. Screw the Adapter into the Body.
    - Tighten the Adapter securely.

Pump Tube and Rod

11. Install and seat Nylon Piston (**16**) [openings upward] onto the bottom of Rod (**15**).
12. Install Ball (**17**) into the Rod.

    IMPORTANT: Do not tighten the Valve Seat more than 1/4-turn once it contacts the Nylon Piston. Distortion of the Nylon Piston can occur which causes excessive drag on the Tube.

13. Screw Valve Seat (**18**) [with Loctite 222] into the Rod. See **Figure 2.**
    - Follow the thread sealant manufacturer's recommendations.

CAUTION

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

14. Install the Rod assembly into the bottom of the Body.
    - Position the Nylon Piston flush with the bottom of the Body.
15. Install Back-Up Ring (**20**) [concave upward] onto Tube (**21**).
16. Install O-Ring (**19**) on top of the Back-Up Ring.
17. Screw and seat the Tube assembly into the Body.
    - Make sure both Rings are not visible.
18. Slide Bung Adapter (**22**) onto the Tube.
19. Screw the Foot Valve assembly into the Tube.
    - Tighten the Foot Valve assembly securely to the Tube and the Tube to the Body.

Item No. on **Figure 2**	Description	Item No. on **Figure 2**	Description
Clean Oil			
4	O-Ring, 2-5/8 " ID x 3 " OD	13	Seal, 1-5/16 " ID x 1-11/16 " OD
5	O-Ring, 2-3/4 " ID x 3 " OD	19	O-Ring, 1-7/8 " ID x 2 " OD
7	O-Ring, 3/4 " ID x 15/16 " OD	26	O-Ring, 1-11/16 " ID x 1-7/8 " OD
11	Seal, 1-5/16 " ID x 1-9/16 " OD		
Magnalube-G Teflon Grease			
Coat the Inside Diameter of the Air Motor Assembly			

Table 3 *Lubricated Components*

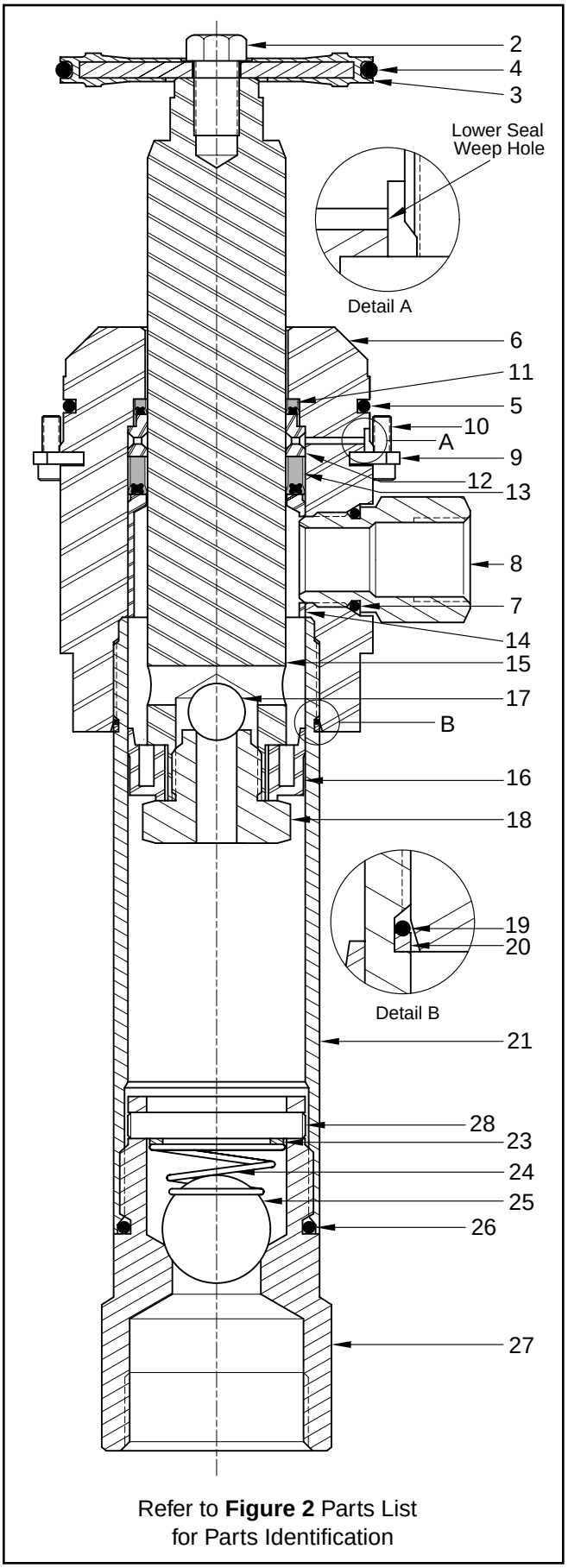


Figure 4 *Pump Tube Assembly 338067-B - Section View*

Air Piston

20. Install O-Ring (**4**) onto Air Piston (**3**).

21. Place the Air Piston (observe THIS SIDE UP) on top of the Rod.

22. Install Screw (**2**) that secures the Air Piston to the Rod.
    - Tighten the Screw securely.

Attach Air Motor to Pump Tube

23. Clamp the Body securely in a soft-jaw vise.

24. Install Air Motor Assembly (**1**) squarely onto the Body.
    - Use care passing the O-Ring.
    - Make sure Outlet Adapter (**8**) orients properly with the inlet of the Air Motor.

25. Install Keepers (**9**) into the groove of the Body.
    - Make sure the holes align with the Air Motor Assembly.

26. Install Capscrews (**10**) that secure the Body to the Air Motor Assembly.
    - Tighten the Capscrews evenly and securely in a crisscross pattern.

Bench Test and Operation

1. Slowly supply air pressure [not to exceed 15 psi (1 Bar)] 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:

2. Connect a product hose to the pump's material outlet.
   - Direct the hose into an appropriate collection container.

3. Place the pump in oil.

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

5. Allow the pump to cycle slowly until the oil 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:

6. Attach a control valve to the outlet hose of the pump.
   - Make sure the nozzle on the control valve is open.
7. Slowly supply air pressure to the pump's motor.
8. Allow the pump to cycle slowly until the oil is once again free of air.
9. Set the air pressure to the normal operating pressure.
10. Operate the control valve into a container.
11. Shut off the control valve.
    - Visually inspect the pump for external leaks.
    - The pump should not cycle more than once or twice in one hour.

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 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	1. Air motor not operating properly 2. Pump tube jammed and/or contains loose components 3. Insufficient air pressure	1. Inspect air motor and rebuild or replace as necessary 2. Rebuild pump tube 3. Increase air pressure
Pump will not prime	1. Excessive cycling speed 2. Pump leaking internally 3. Extension not sufficiently tight and/or thread sealant missing or inadequate	1. Reduce air pressure 2. See **Internal Leaks** 3. Apply thread sealant* to male pipe threads and tighten extension
Pump cycles rapidly	1. Product source empty 2. Extension not sufficiently tight and/or thread sealant missing or inadequate	1. Replenish product 2. Apply thread sealant* to male pipe threads and tighten extension
Pump will not stall (cycles more than once or twice/hour)	1. Pump requires break-in period 2. Pump leaking internally 3. Pump leaking externally 4. Distribution system leaking 5. Extension not sufficiently tight and/or thread sealant missing or inadequate	1. Operate the pump against moderate fluid pressure for up to one hour 2. See **Internal Leaks** 3. See **External Leaks** 4. Correct leak 5. Apply thread sealant* to male pipe threads and tighten extension
External Leaks		
Product leakage visible at weep hole in Body (**6**)	1. Damaged Seal (**13**) 2. Damaged Rod (**15**)	1. Replace Seal (**13**) 2. Inspect Rod (**15**) and replace as necessary
Product leakage visible at bottom of Body (**6**)	1. Tube (**21**) not sufficiently tight 2. Damaged O-Ring (**17**)	1. Tighten Tube (**21**) into Body (**6**) 2. Separate Tube (**21**) from Body (**6**) and replace O-Ring (**19**)
Air leakage at weep hole in Body (**6**)	Damaged Seal (**11**)	Replace Seal (**11**)
Product leakage visible between Tube (**21**) and Foot Valve (**27**)	1. Foot Valve (**27**) not sufficiently tight 2. Damaged O-Ring (**26**)	1. Tighten Foot Valve (**27**) into Tube (**21**) 2. Separate Foot Valve (**27**) from Tube (**21**) and replace O-Ring (**26**)
Internal Leaks		
Pump does not prime or cycles continuously, or slowly (once or twice/hour)	1. Foreign material between Ball (**17**) and Valve Seat (**18**) 2. Foreign material between Ball (**25**) and Foot Valve (**27**) 3. Worn or damaged Ball (**17**) 4. Worn or damaged Valve Seat (**18**) 5. Worn or damaged Ball (**25**) 6. Worn or damaged Foot Valve (**27**) 7. Worn or damaged Nylon Piston (**16**)	Locate and eliminate source of foreign material Disassemble pump tube, clean, inspect, and replace worn or damaged components
* Do not apply thread sealant to the first two (2) threads. Contamination can occur.		

Changes Since Last Printing

New Format