

Fluid Evacuation/Transfer Pump

Description

IMPORTANT: UL Listing for this pump is pending. UL listing allows delivery of waste oils and certain fuels.

This low-pressure pump (1:1 ratio) is designed to transfer all petroleum-based fluids including waste oil, automatic transmission fluid, diesel fuel, and kerosene.

The major components of pump assembly model 9920 consist of an air-operated motor and a four-ball check valve pump. The four-ball design allows the pump to deliver fluid on both strokes of the piston.

Mounting

The pump is equipped with a bracket for mounting to walls or directly onto bulk tanks.

The pump operates mounted in any direction. The fluid inlet and outlet can be set to either side.

NOTE: The factory positions the pump's valve body to allow fluid entry on the left side.

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)	125	8.6

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

Pump Assembly

Fluid Inlet	Fluid Outlet	Max. Fluid Pressure		Delivery/Minute (Approximate)*		Displacement per Cycle	
		psi	Bars	Gallons	Liters	In ³	Cm ³
1" NPTF (f)		125	8.6	19	72	40	655

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

Table 1 Fluid Evacuation/Transfer Pump Specifications

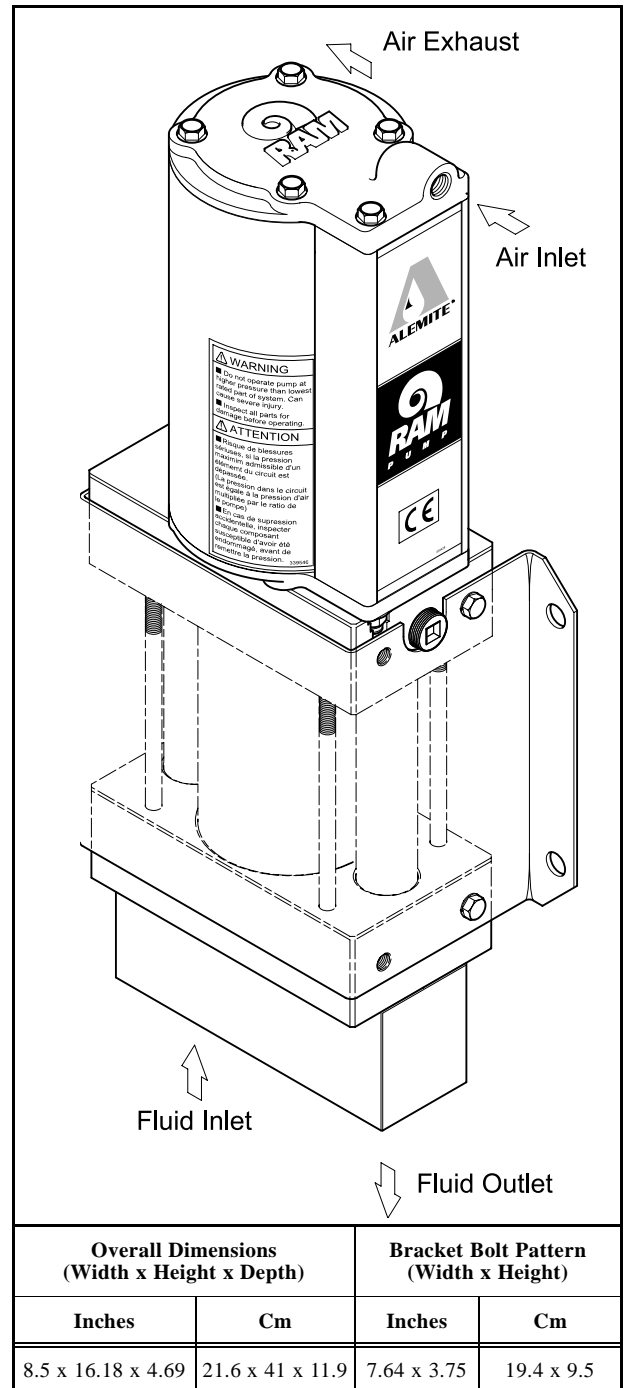


Figure 1 Pump Model 9920

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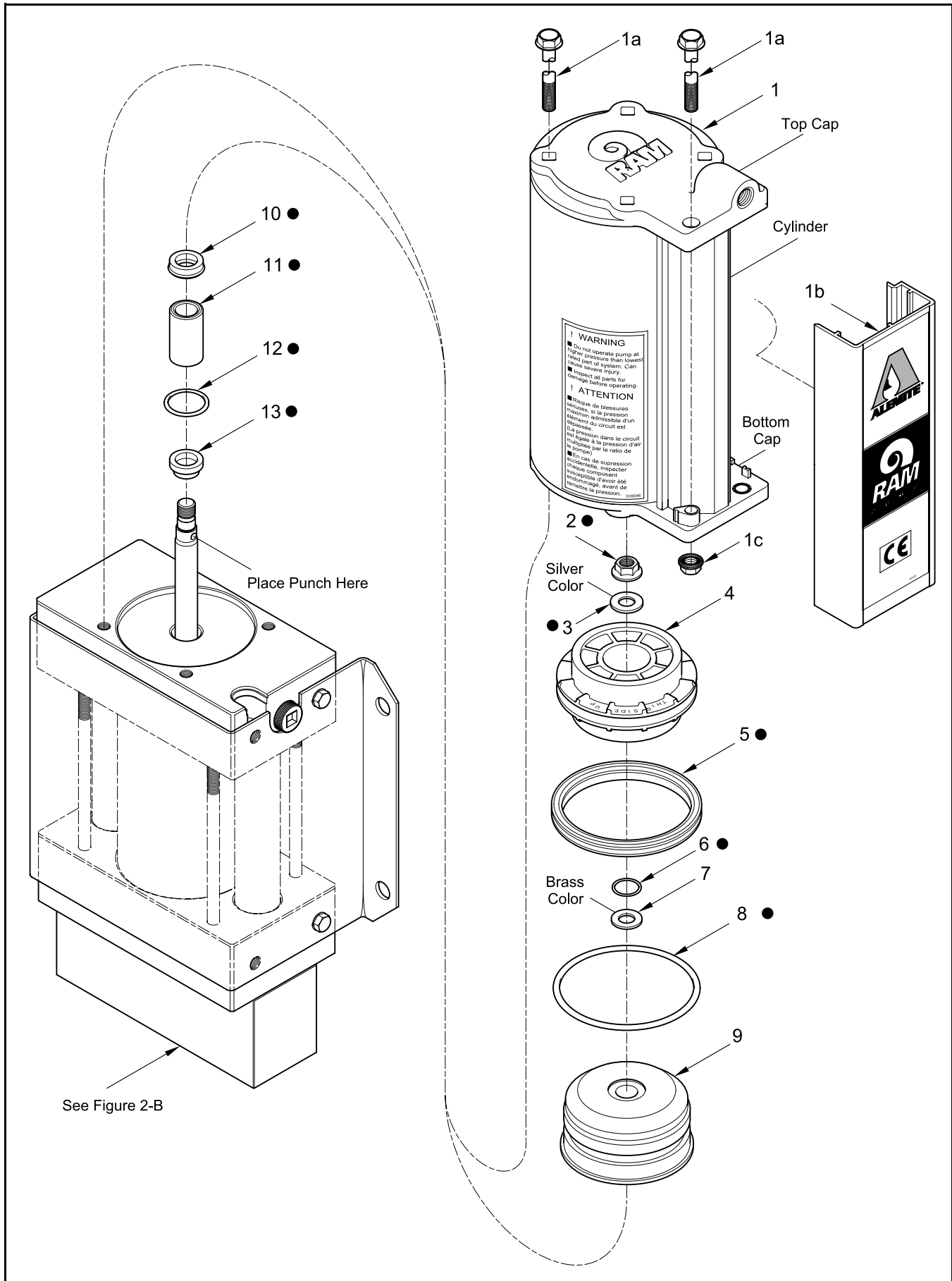


Figure 2-A Fluid Evacuation/Transfer Pump Model 9920 - Exploded View

Item No.	Part No.	Description	Qty	Notes	Numeric Order Part # (Item #)
1		Motor Assembly, Air	1	See SER 339413	14536 (3)
1a		Screw, Hex Head, 1/4 " -20 x 7-1/2 "	5	Included w/ Motor Assembly	X171003-10 (8)
1b	340053	Cover (w/o Decals)	1		X171008-37 (5)
1c		Nut, Serrated Flange, 1/4 " -20	1		172190-24 (10)
2	339513	Nut, Flange, 3/8 " -24	1	●	338109 (7)
3		Washer, 3/8 " ID x 7/8 " OD	1	●	338338 (13)
4	339429	Piston, Air	1		338699-1 (6)
5	X171008-37	Quad-Ring, 2-5/8 " ID x 3 " OD	1	●	Pack of Ten (10) 338699-3 (12)
6		O-Ring, 3/8 " ID x 1/2 " OD (Blue Dot)	1	●	339375 (1c)
7	338109	Washer, 3/8 " ID x 3/4 " OD	1		339413 (1)
8	X171003-10	O-Ring, 2-3/4 " ID x 3 " OD	1	●	Pack of Ten (10) 339429 (4)
9	339505	Body (Aluminum)	1		339505 (9)
10		Seal, 1/2 " ID x 3/4 " OD	1	●	339506 (11)
11		Bearing (Brass)	1	●	339513 (2)
12		O-Ring, 13/16 " ID x 1 " OD (Blue Dot)	1	●	340053 (1b)
13		Wiper, Rod (Polyurethane)	1	●	340348 (1a)
<p>Legend: Part numbers left blank (or in <i>italics</i>) are not available separately ● designates a repair kit item</p>					

Repair Kits

Part No.	Kit Symbol	Description	Notes
393712	●	Kit, Repair [Includes tube of 393590 Teflon Grease]	Contains items on Figures 2-A and 2-B
393530-24		Kit, Seal [includes five (5) of item number 13]	

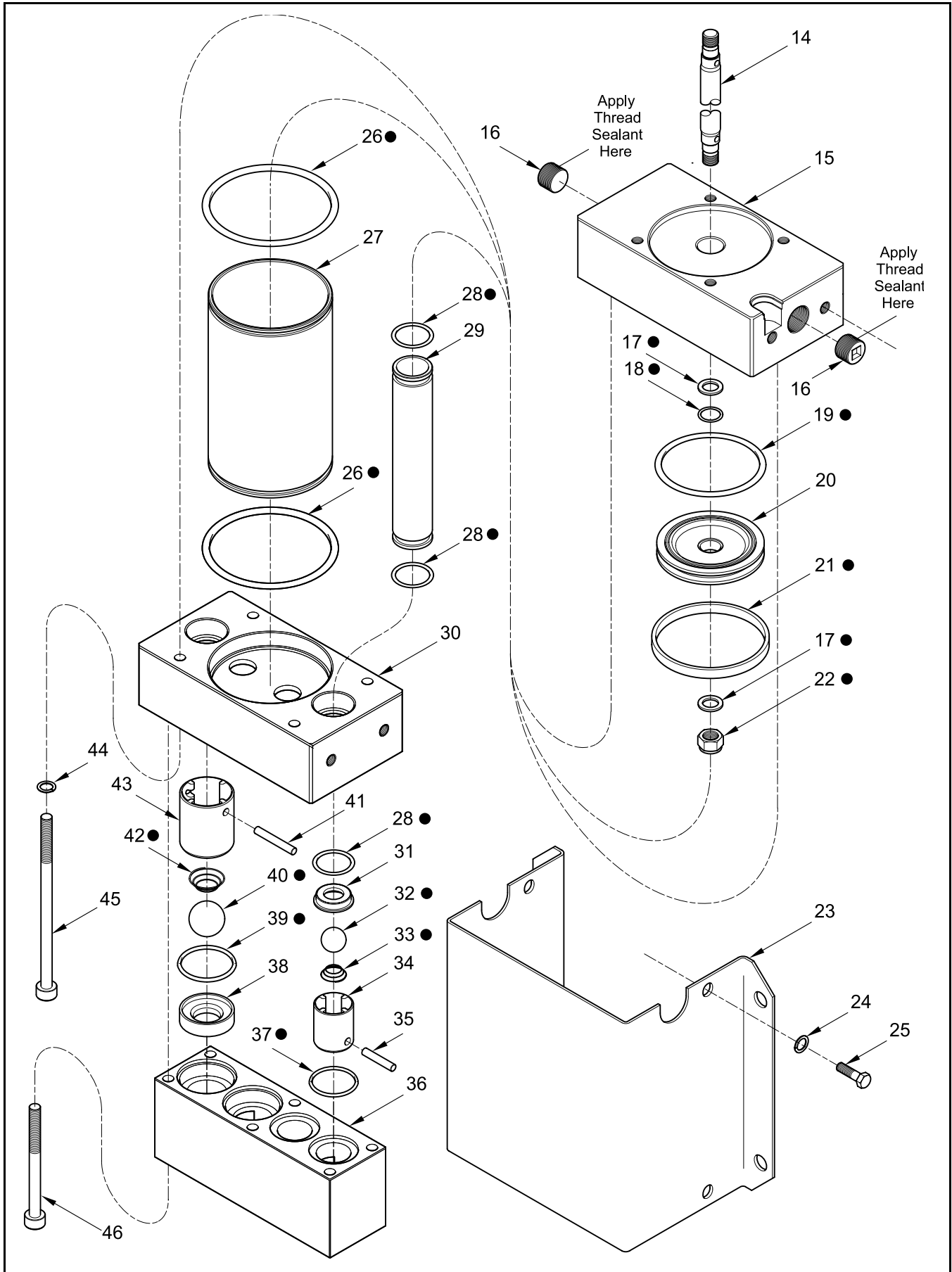


Figure 2-B Fluid Evacuation/Transfer Pump Model 9920- Exploded View

Item No.	Part No.	Description	Qty	Notes	Numeric Order Part # (Item #)
14	339497	Rod, Upper	1		12413 (24)
15		Block, Upper	1		51929 (22)
16		Plug, Pipe, Square Socket, 1/2 " NPT	2		77801 (25)
17	338109	Washer, 3/8 "	2	●	171580 (46)
18		O-Ring, 3/8 " ID x 1/2 " OD (Blue Dot)	1	●	171700-40 (32)
19		O-Ring, 2-1/2 " ID x 2-3/4 " OD (Blue Dot)	1	●	171700-56 (40)
20	339507	Piston, Pump	1		311740 (16)
21		Ring (Virgin Teflon)	1	●	338109 (17)
22	51929	Nut, Elastic Stop, 3/8 " -24	1	●	338341 (38)
23	339498	Shroud	1		338342 (43)
24		Washer, Lock, 5/16 "	4		338343 (34)
25		Screw, 5/16 " -18 x 5/8 "	4		338344 (31)
26		O-Ring, 3 " ID x 3-1/8 " OD (Blue Dot)	2	●	338345-1 (41)
27	339501	Cylinder	1		338345-2 (35)
28		O-Ring, 13/16 " ID x 1 " OD (Blue Dot)	6	●	338346 (36)
29	339502	Tube	2		338349 (33)
30		Block, Valve	1		338350 (42)
31	338344	Seat (Nylon)	2		338353 (21)
32		Ball, Check	2	●	338699-1 (18)
33		Spring	2	●	338699-2 (26)
34	338343	Guide	2		338699-3 (28)
35		Pin, 3/16 " Dia. x 31/32 " Long	2		338699-4 (37)
36	338346	Base	1		338699-5 (39)
37		O-Ring, 1-1/16 " ID x 1-1/4 " OD (Blue Dot)	2	●	338699-6 (19)
38	338341	Seat (Nylon)	2		339497 (14)
39		O-Ring, 1-1/4 " ID x 1-7/16 " OD (Blue Dot)	2	●	339498 (23)
40		Ball, Check	2	●	339499 (15)
41		Pin, 3/16 " Dia. x 1-1/4 " Long	2		339500 (30)
42		Spring	2	●	339501 (27)
43	338342	Guide	2		339502 (29)
44		Washer, Lock, 5/16 "	4		339503 (45)
45		Screw, 5/16 " -18 x 5-1/2 "	4		339504 (44)
46		Screw, 1/4 " -20 x 2 "	6		339507 (20)

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

Repair Kit

Part No.	Kit Symbol	Description	Notes
393712	●	Kit, Repair [Includes tube of 393590 Teflon Grease]	Contains items on Figures 2-B and 2-A

Accessories

Please refer to the Sales Catalog for details on these accessory items.

Part Number	Description
338556	Evacuation Valve
338557	Suction Wand Kit

Table 2 Pump Model 9920 Accessory Components

Performance Curves

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

This chart contains curves based on four 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 fluid discharge pressure in psi/Bars (left Y axis).

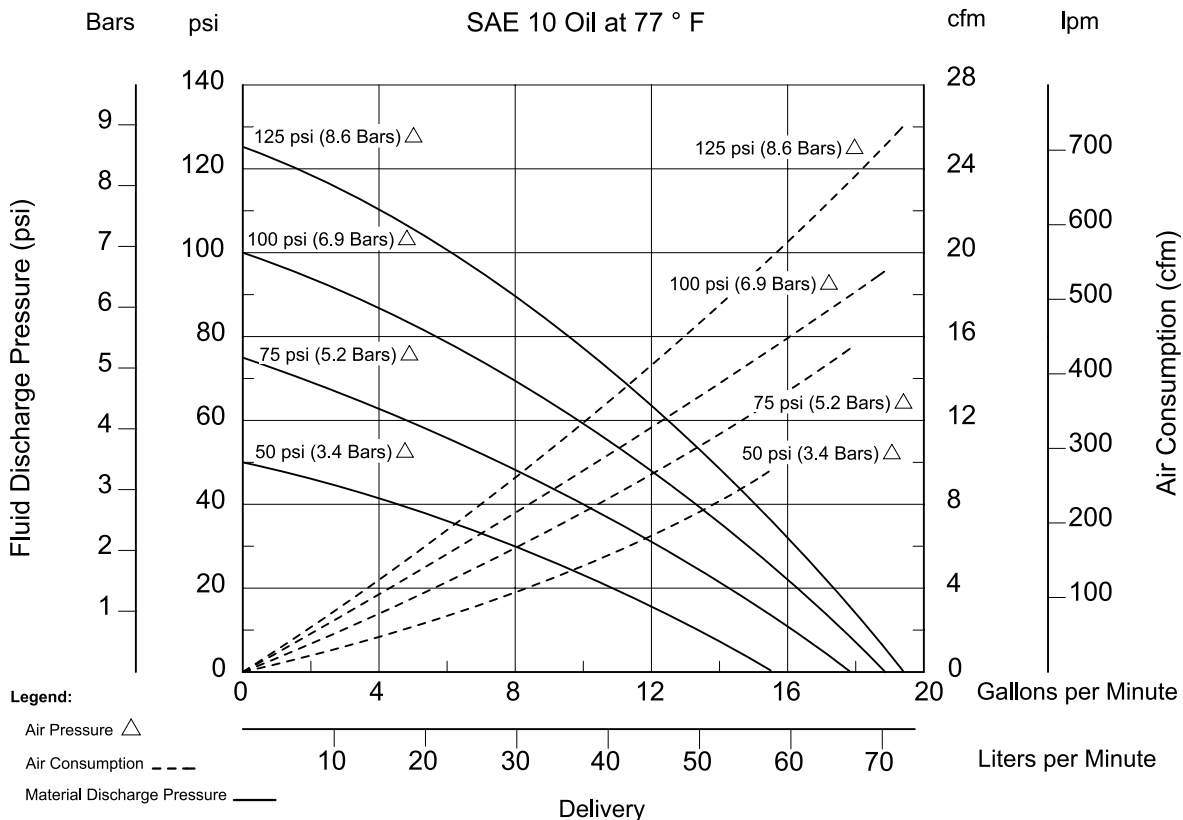


Figure 3 Delivery versus Discharge Pressure and Air Consumption

Overhaul

NOTE: Refer to **Figures 2-A** and **2-B** 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 Fluid 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 Assembly

1. Remove the four concentric Screws (**1a**) that secure Air Motor Assembly (**1**) to the pump assembly.
2. Remove Cover (**1b**).
 - Pry and swing the Cover sideways away from the **Cylinder**.
 - Refer to SER **339413** for details.
3. Remove remaining Screw (**1a**) from the **Top Cap**.
4. Remove the **Top Cap** from the **Cylinder**.

CAUTION

Remove the Cylinder with care. Damage to Quad-Ring (5) and/or O-Ring (8) can occur.

5. With a side-to-side motion, pull the **Cylinder** from Body (**9**).
6. Remove O-Ring (**8**) from the Body.
7. Remove the **Bottom Cap** from the Body.

Pump Assembly

Air Piston

8. Remove Nut (**2**) and Washer (**3**) that secures Air Piston (**4**) to Upper Rod (**14**).
 - Place a punch or similar tool into the Upper Rod to prevent its rotation. See **Figure 2-A**.
 - Remove the Air Piston from the Upper Rod.
9. Remove Quad-Ring (**5**) from the Air Piston.
10. Remove O-Ring (**6**) and Washer (**7**) from the Upper Rod.

Body

11. Remove the Body from the Upper Block and Upper Rod.
 - Remove O-Ring (**12**) from the Body.
12. Remove Seal (**10**) from the Body.
13. Remove Bearing (**11**) from the Upper Block.

Shroud

14. Remove Screws (**25**) and Lock Washers (**24**) that secure Shroud (**23**) to the Upper Block and Valve Block (**30**).
 - Remove the Shroud from the Blocks.

Upper Block and Upper Rod

15. Remove Screws (**45**) and Lock Washers (**44**) that secure the Valve Block to the Upper Block.
16. Remove the Upper Block from Cylinder (**27**), Tubes (**29**) and the Upper Rod.
17. Remove Rod Wiper (**13**) from the Upper Block.
18. Remove the Upper Rod assembly from the Cylinder.

Pump Piston

19. Remove Nut (22) and Washer (17) that secures Pump Piston (20) to the Upper Rod.
 - Place a punch or similar tool into the Upper Rod to prevent its rotation.
 - Remove the Pump Piston from the Upper Rod.
20. Remove O-Ring (18) and additional Washer (17) from the Upper Rod.
21. Remove Ring (21) and O-Ring (19) from the Piston.

Cylinder and Tubes

22. Remove the Cylinder and Tube assemblies from the Valve Block.
23. Remove O-Rings (26) from the Cylinder.
24. Remove O-Rings (28) from each Tube.

Base

25. Remove Screws (46) that secure Base (36) to the Valve Block.
 - Separate the Valve Block from the Base.

Inlet Ball Checks and Guides

26. Remove the Guide assembly and Ball (40) from Seat (38).
27. Remove Spring (42) from Guide (43).
28. Remove Pin (41) from the Guide as required.
29. Remove O-Ring (39) and the Seat from the Base.
30. Repeat steps 21 - 24 for the additional Guide assembly.

Outlet Ball Checks and Guides

31. Remove the Guide assembly and Ball (32) from Seat (31).
32. Remove Spring (33) from Guide (34).
33. Remove Pin (35) from the Guide as required.
34. Remove O-Ring (28) and the Seat from the Valve Block.
35. Remove O-Ring (37) from the Base.
36. Repeat steps 26 - 30 for the additional Guide assembly.

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 (4) and Pump Piston (20) for fatigue cracks.
 - Replace as necessary.
4. Inspect Upper Rod (14) closely. Use a magnifying glass to detect any score marks.
 - Replace as necessary.
5. Inspect the bore of Cylinder (27) for score marks.
6. Closely inspect the mating surfaces of all check valve components for any imperfections. Ensure a smooth and clean contact is obtained when assembled.

Assembly

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

Item No.	Description	Item No.	Description
Clean Oil			
6	O-Ring, 3/8 " ID x 1/2 " OD (Blue Dot)	19	O-Ring, 2-1/2 " ID x 2-3/4 " OD (Blue Dot)
10	Seal, 1/2 " ID x 3/4 " OD	26	O-Ring, 3 " ID x 3-1/8 " OD (Blue Dot)
12	O-Ring, 13/16 " ID x 1 " OD (Blue Dot)	28	O-Ring, 13/16 " ID x 1 " OD (Blue Dot)
18	O-Ring, 3/8 " ID x 1/2 " OD (Blue Dot)	37	O-Ring, 1-1/16 " ID x 1-1/4 " OD (Blue Dot)
		39	O-Ring, 1-1/4 " ID x 1-7/16 " OD (Blue Dot)
Magnalube-G Teflon Grease *			
5	Quad-Ring, 2-5/8 " ID x 3 " OD	8	O-Ring, 2-3/4 " ID x 3 " OD
Coat the Bore of the Air Motor Assembly			
* Part number 393590 is a 0.75 ounce (21.8 gm) tube of Magnalube-G Teflon grease			

Table 3 Lubricated Components

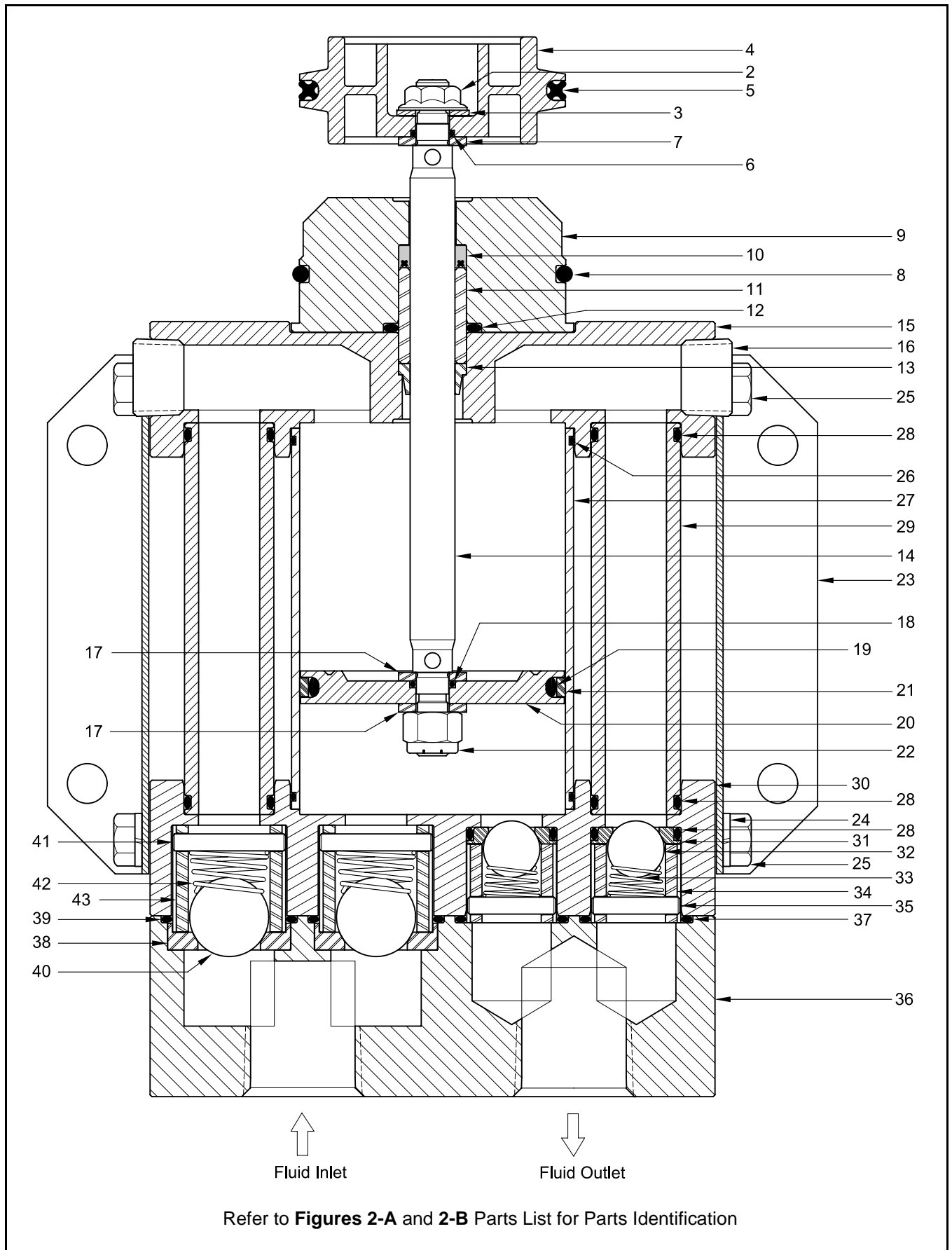


Figure 4 Fluid Evacuation/Transfer Pump (w/o Air Motor) - Section View

Valve Block

1. Position Valve Block (30) bottom side upward.
2. Install each Pin (41) into each Guide (43).
 - Make sure the ends of the Pin are flush with the Guide.
3. Install each Guide assembly (pin end first) into the large diameter holes of the Valve Block.
4. Install Spring (42) {large diameter first} and Ball (40) into each Guide.
5. Install O-Rings (28) onto each Seat (31).
6. Install and seat each Seat assembly (O-Ring first) into the Valve Block.
7. Install Ball (32) and Spring (33) [small diameter first] into each Valve Block opening.
8. Install each Pin (35) into each Guide (34).
 - Make sure the ends of the Pin are flush with the Guide.
9. Install each Guide assembly (pin end upward) onto the Spring and into the Valve Block.
 - Make sure the assembly seats properly.
10. Install O-Ring (39) over Guide (43).
11. Install O-Ring (37) over Guide (34).
12. Install each Seat (38) [counterbore first] over Guide (43).

Base

13. Install the Base assembly onto the Valve Block assembly.
14. Install each Screw (46) that secures the Base to the Valve Block.
 - Tighten the Screws evenly and securely in a crisscross pattern.

Cylinder and Tubes

15. Install O-Rings (26) onto each end of Cylinder (27).
16. Install O-Rings (28) onto each end of both Tubes (29).
17. Install and seat the Cylinder assembly and each Tube assembly into the Valve Block assembly.

Upper Block and Body

18. Install and seat Rod Wiper (13) [tapered end first] into the top of Upper Block (15).
19. Install and seat Bearing (11) into the Upper Block.
20. Install and seat Seal (10) [heel end first] into the bottom of Body (9).
21. Install O-Ring (12) into the Body.

22. Install the Body assembly onto the Bearing and Upper Block.
23. Install O-Ring (8) onto the upper groove of the Body.

Upper Rod and Pistons**CAUTION**

Install the Upper Rod into the Body with a twisting motion. Use care not to damage the Seal and Rod Wiper.

24. Install Upper Rod (14) into the Body until it protrudes from the bottom of the Upper Block.

CAUTION

Use care not to switch Washers (3 and 7). Component damage can occur.

25. Install Washer (7) [brass color], O-Ring (6), and Air Piston (4) onto the top of the Upper Rod.
26. Install Washer (3) [silver color] and Nut (2) onto the Upper Rod.
 - Tighten the Nut securely. Place a punch or similar tool into the Upper Rod to prevent its rotation. See **Figure 2-A**.
27. Install Quad-Ring (5) onto Air Piston (4).
28. Install Washer (17), O-Ring (18), and Pump Piston (20) [ribbed-side first] onto the bottom of the Upper Rod.
29. Install additional Washer (17) and Nut (22) onto the Upper Rod.
 - Tighten the Nut securely. Place a punch or similar tool into the Upper Rod to prevent its rotation.
30. Install O-Ring (19) and Ring (21) onto Pump Piston (20).

CAUTION

Install the Upper Rod and Pistons assembly into the Cylinder and onto the Tubes with care. Prevent possible damage to Rings.

31. Insert the Pump Piston of the Upper Rod and Pistons assembly into the Cylinder.
 - Push downward until the Cylinder and both Tubes are seated in the Upper Block.
32. Install Screws (45) and Lock Washers (44) that secure the Base and Valve Block assembly to the Upper Block assembly.
 - Tighten the Screws evenly and securely in an alternate pattern.

33. Position Shroud (23) onto the pump assembly.
34. Install Screws (25) and Lock Washers (24) that secure the Shroud to the Blocks.
 - Tighten the Screws securely.

Attach Air Motor to Pump Assembly

35. Install the **Bottom Cap** squarely onto the Body.
 - Check to ensure it is properly oriented to the pump.

CAUTION

Install the Cylinder with care. Damage to Quad-Ring (5) and/or O-Ring (8) can occur.

HINT: Angle the **Cylinder** onto the Quad-Ring.

36. Install the **Cylinder** over the Body's O-Ring and seat it properly onto the **Bottom Cap**.
37. Install the **Top Cap** onto the **Cylinder**.
 - Use care passing the O-Ring.

CAUTION

Do not overtighten Screws (1a). Component damage can occur.

38. Install four concentric Screws (1a) that secure the Air Motor Assembly to the pump assembly.
 - Torque the Screws in an alternate pattern to 60 to 70 inch-pounds (6.8 - 7.9 Nm).
39. Install remaining Screw (1a) into the **Top Cap**.
 - Tighten the Screw into Nut (1c) to 50 inch-pounds (5.6 Nm).
40. "Snap" Cover (1b) onto the **Cylinder**.

Bench Test and Operation

1. Slowly supply air pressure [recommended minimum of 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:

2. Connect a hose (with thread sealant) to the pump's fluid outlet as required.
 - Direct the hose into an appropriate container.
3. Connect an inlet hose (if required) to the pump.
 - Make sure to apply thread sealant.

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 shut-off valve to the outlet hose of the pump as required.
 - Make sure the 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. Allow the pump to operate momentarily.
11. Close the shut-off 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 air motor for leakage.

If the motor leaks air, 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	<ol style="list-style-type: none"> 1. Air motor not operating properly 2. Pump assembly 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 assembly 3. Increase air pressure
Pump will not prime	<ol style="list-style-type: none"> 1. Excessive cycling speed 2. Pump leaking internally 3. Inlet hose not sufficiently tight and/or thread sealant missing or inadequate 	<ol style="list-style-type: none"> 1. Reduce air pressure 2. See Internal Leaks 3. Apply thread sealant* to male pipe threads and tighten connection
Pump cycles rapidly	<ol style="list-style-type: none"> 1. Fluid source empty 2. Inlet hose not sufficiently tight and/or thread sealant missing or inadequate 	<ol style="list-style-type: none"> 1. Replenish fluid 2. Apply thread sealant* to male pipe threads and tighten connection
Pump will not stall (cycles more than once or twice/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 5. Inlet hose not sufficiently tight and/or thread sealant missing or inadequate 	<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 5. Apply thread sealant* to male pipe threads and tighten connection
External Leaks		
Fluid leakage visible at top of Upper Block (15)	<ol style="list-style-type: none"> 1. Screws (1a) not sufficiently tight 2. Damaged O-Ring (12) 	<ol style="list-style-type: none"> 1. Tighten Screws (1a) onto Air Motor (1) 2. Remove Air Motor (1) and replace O-Ring (12)
Fluid leakage visible at top and/or bottom of Tube(s) (29)	<ol style="list-style-type: none"> 1. Screws (45) not sufficiently tight 2. Damaged O-Ring(s) (28) 	<ol style="list-style-type: none"> 1. Tighten Screws (45) into Upper Block (15) 2. Replace O-Ring(s) (28)
Fluid leakage visible at top and/or bottom of Cylinder (27)	<ol style="list-style-type: none"> 1. Screws (45) not sufficiently tight 2. Damaged O-Ring(s) (26) 	<ol style="list-style-type: none"> 1. Tighten Screws (45) into Upper Block (15) 2. Replace O-Ring(s) (26)
Fluid leakage visible between Valve Block (30) and Base (36)	<ol style="list-style-type: none"> 1. Screws (46) not sufficiently tight 2. Damaged O-Ring(s) (39 and/or 37) 	<ol style="list-style-type: none"> 1. Tighten Screws (46) into Valve Block (30) 2. Replace O-Ring(s) (39 and/or 37)
Fluid escaping at exhaust in Air Motor Assembly (1)	Worn or damaged Seal (10)	Replace Seal (10)
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(s) (40) and Seat(s) (38) 2. Foreign material between Ball(s) (32) and Seat(s) (31) 3. Worn or damaged Ball(s) (40) 4. Worn or damaged Seat(s) (38) 5. Worn or damaged Ball(s) (32) 6. Worn or damaged Seat(s) (31) 7. Worn or damaged Ring (21) 8. Worn or damaged O-Ring(s) (28) 9. Worn or damaged O-Ring(s) (39) 10. Worn or damaged O-Ring (18) 	<p>Locate and eliminate source of foreign material</p> <p>Disassemble pump assembly, clean, inspect, and replace worn or damaged components</p>
* Do not apply thread sealant to the first two (2) threads. Contamination can occur.		

Changes Since Last Printing

Changed Air Motor