DR-1676 Pump

Customer Product Manual
Document Number 237432-16
– English –
Issued 11/24

For parts and technical support, call the Industrial Coating Solutions Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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Change Record

Revision	Date	Change
04	10/24	Installation change.
05	9/15	Added O-ring part number 942206.
06	1/17	Added certifi cation and updated pressure relief specifi cations.
07	4/17	Updated elbow part number 971605.
08	5/17	Added regulator cover part number 1611468.
09	2/18	Updated elbow.
10	7/18	Update cover part number for regulator. Updated Hydraulic Packing Replacement.
11	1/19	Added screw and washer kit 1614780. Added VC-3 thread locking compound text to page 6−1 and step 5 on page 6−12.
12	7/19	Added new glide ring to assemblies and kits.
13	9/21	Updated approval labels and DOC.
14	1/24	Added Unpacking procedure.
16	11/24	PN 901254 change w/ correct description in Parts List & updated manufacturer address

Section 1
Safety

Introduction

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include:

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read Safety Data Sheets (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- Make sure the spray area is adequately ventilated. To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the SDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:

WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show them this card
- Tell them what kind of material you were spraying

MEDICAL ALERT — AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored. Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

Element	Symbol	Prefix
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check your material SDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Safety Labels

Table 1-1 contains the text of the safety labels on this equipment. See Figure 1-1 for their locations. The safety labels are provided to help you operate and maintain your equipment safely.

Item	Part	Description
1	600179	**WARNING** •HIGH PRESSURE DEVICE Read instruction manual before operation and observe all warnings. • INJECTION HAZARD - Airless spray painting equipment can cause serious injury if the spray penetrates the skin. Do not point the gun at anyone or any part of the body. In case of penetration, adequate medical aid must be immediately obtained. • COMPONENT RUPTURE - This system is capable of producing high pressure. Please refer to the data plate on the hydraulic section. To avoid rupture and injury, do not operate this pump at a pressure higher than the rated maximum working pressure of any component in the system (including but not limited to spray guns, hose, hose connections and heaters). • FIRE - Static voltage is developed by airless spraying. The pump, associated system, and object being sprayed must be grounded to prevent static discharge sparks which could start a fire. • SERVICING - Before servicing, cleaning, or removal of any part, set trigger lock on gun, and always shut off power source; then carefully release pressure in fl uid portions of the system.
2	246890	Do not use halogenated hydrocarbon solvents in this system, it contains aluminum parts and may explode. Cleaning agents, coatings, paints or adhesives may contain halogenated hydrocarbon solvents. Don’t take chances, consult your material supplier to be sure.
3	- - - - - -	MAXIMUM OPERATING PRESSURE 83 BAR (1200 PSI)
4	- - - - - -	MAXIMUM INPUT 5.52 BAR (80 PSI)

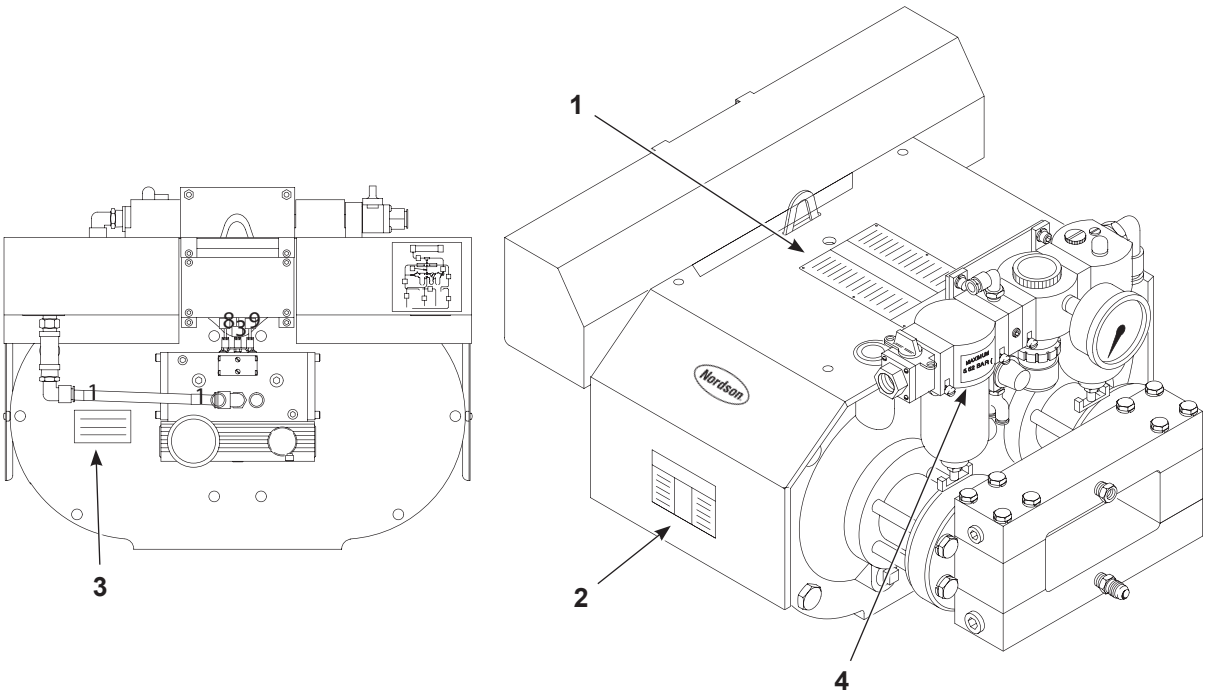

Figure 1-1 Safety Label Locations

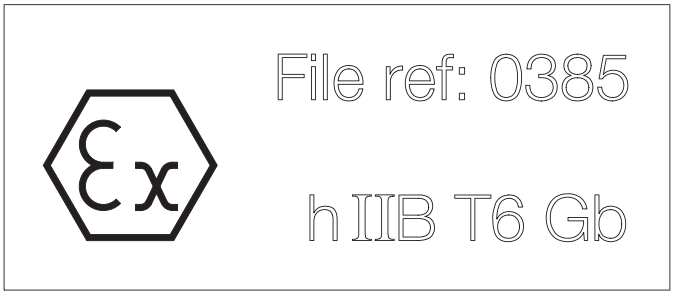

Figure 1-2 EX Label

Section 2
Overview

Introduction

The DR-1676 pump is an air-powered, positive displacement, demand-type, reciprocating dual piston pump designed for waterborne coating applications. The pump is designed to be mounted horizontally.

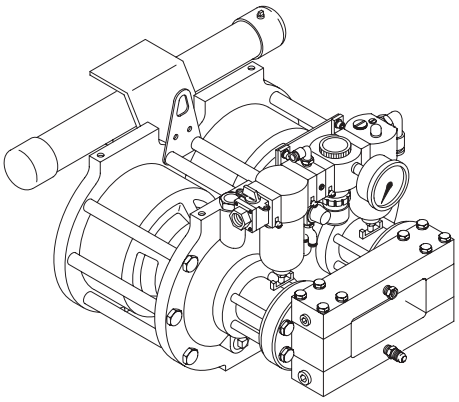

Figure 2-1 DR-1676 Pump (Covers Removed)

Specifications

Dimensions and Weight	
Height	469.9 mm (18.5 in.)
Width	610 mm (24 in.)
Depth	787.4 mm (31 in.)
Weight	93.5 kg (206 lb)
Inputs and Outputs	
Input air pressure (maximum)	5.33 bar (80 psi)
Air supply hose (minimum ID)	6 mm (1/2 in.)
Hydraulic fluid pressure output (maximum)	83 bar (1200 psi)
Hydraulic fluid delivery capacity (maximum)	7.6 lpm (2 gpm)
Pressure feed (maximum)	1.3 bar (20 psi)
Hydraulic fluid hose (ID)*	13 mm (1/4 in.)
Siphon hose (minimum ID)	13 mm (1/2 in.)
* Use only Nordson hoses or equivalent reinforced PTFE hoses with electrical continuity between fittings. All hoses must be capable of withstanding 207 bar (3000 psi).	

Air Consumption

Air Pressure Setting bar (PSI)	Air Consumption m3/min (ft/3 min)		
	@ 25 strokes/minute	@ 35 strokes/minute	@ 45 strokes/minute
5.2 (75)	0.4 (14)	0.6 (19.4)	0.7 (25)
3.5 (50)	0.3 (10)	0.4 (14)	0.5 (18)
1.7 (25)	0.2 (6.4)	0.2 (8.6)	0.3 (10)

Operating Sound Levels

Air Pressure bar (psi)	Sound Level dB A	Sound Level dB C
2.8 (40)	83	85
5.6 (80)	87	89

Major Pump Components

See Figure 2-2. The pump consists of air control components (1), an air motor section (2), and a hydraulic section (3).

Air Control Components

The air control components (1) include a filter/regulator/lubricator module (11), an accumulator (10), an air valve (8), a double pilot valve (9), and four roller valves.

Filter/Regulator/Lubricator—The filter/regulator/lubricator module (11) filters the incoming shop air, regulates its pressure to the set operating pressure, and lubricates the air with Vitalizer oil.

Accumulator—The accumulator (10) stores working air and adds to the flow of air to the cylinders to eliminate pressure fluctuations, or winking.

Air Valve—The air valve (8) is an open-center type valve. It controls the flow of working air to the cylinders and exhaust air from the cylinders. The air valve spool is shifted by pilot air from the double pilot valve.

NOTE: If the air valve spool stops in the center position when the pump is turned off, the pump cannot be restarted because working air will be directed into both of the cylinders The manual override button on the double pilot valve (9) directs supply air to one side of the air valve and shifts the valve spool out of the center position to start the pump.

Double Pilot Valve—The double pilot valve (9) shifts the air valve in response to pilot air signals from the roller valves. The roller valves are actuated by lands on the piston shafts.

Air Motor Section

The air motor section (2) consists of two cylinders, spring-returned pistons, and a solvent chamber (7). Solvent in the solvent chamber lubricates the hydraulic plungers to minimize wear on the packings located in the hydraulic section (3).

Hydraulic Section

The hydraulic section (3) consists of a siphon manifold (5) and a pressure manifold (4). Four ball check valves direct the flow of coating material in and out of the pump. Two ports (6) are provided on the siphon manifold for installing the optional circulation valve kit. Refer to the Parts section for ordering information about the circulation valve kit.

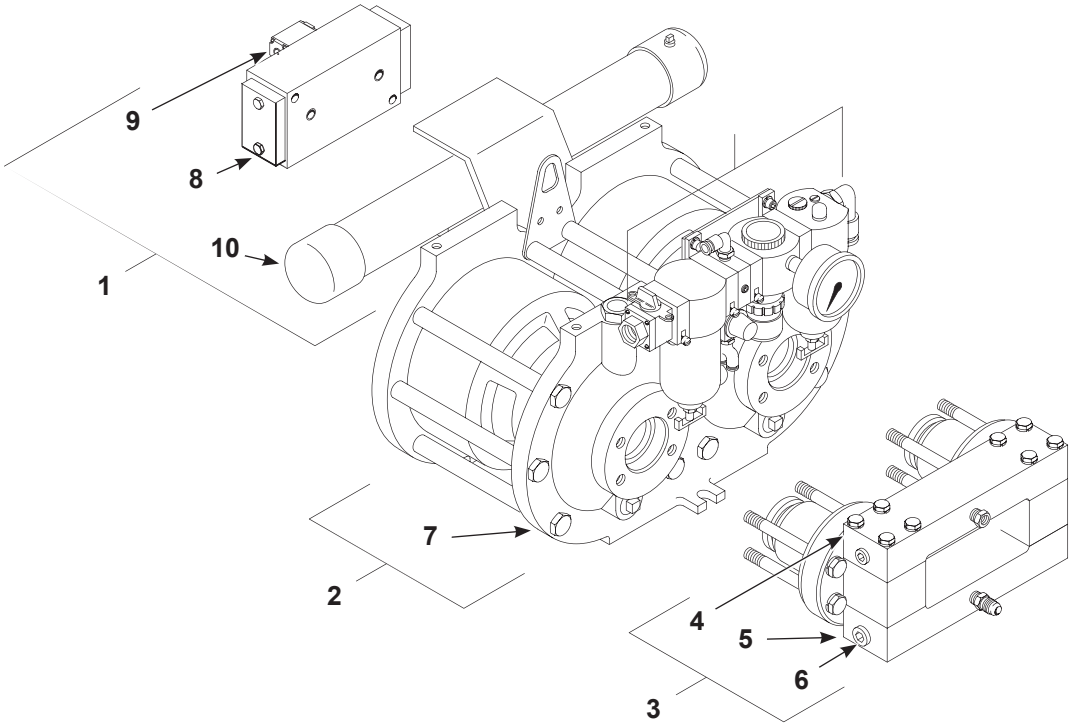

Figure 2-2 DR-1676 Pump Components

1. Air control components
2. Air motor section
3. Hydraulic section
4. Pressure manifold
5. Siphon manifold
6. Optional circulation valve connection
7. Solvent chamber
8. Air valve
9. Double pilot valve
10. Accumulator
11. Filter/regulator/lubricator module

Theory of Operation

See Figure 2-3. Supply air enters the pump at the shut-off valve before the filter. The air is filtered and passes into a manifold block. From the manifold block supply air:

- flows through line 3 to the double pilot valve. The double pilot valve uses this air to shift the air valve spool.
- flows through a small preset regulator which reduces the air pressure to 4.1 bar (60 psi) before it flows through lines 4 and 5 to the lower roller valves, through lines 6 and 7 to the upper roller valves, and lines 8 and 9 to the double pilot valve. This air is used to shift the double pilot valve spool.
- flows through the adjustable regulator and air lubricator before flowing through line 2 into the accumulator, and line 1 to the air valve and into the cylinders to operate the pump.

The position of the double pilot valve spool determines which piston/plunger begins its downward (pressure) stroke first when the pump is started. The strokes of the pistons overlap and keep the fluid pressure in the delivery lines to the spray guns constant.

Left Piston Down, Right Piston Up

While the left air motor piston is forced down by working air from the air valve, the right air motor piston is being forced upwards by the return spring, exhausting the air out of the right cylinder through the air valve. The left hydraulic plunger pressurizes the coating material in the hydraulic section and forces it out of the pump through a ball check valve, through the pressure manifold, and into the fluid lines to the spray guns.

Just before the left plunger reaches the bottom of its stroke, the lower left roller valve is actuated by the chamfered land on the air piston shaft. Air flows through line 5, the lower left roller valve, line 6 to the upper right roller valve, and line 9 into the double pilot valve.

The double pilot valve spool shifts, directing pilot air from line 3 to the air valve, shifting the air valve spool and directing air from line 1 to the right cylinder.

Left Piston Up, Right Piston Down

When the air valve spool shifts it allows air above the left piston to exhaust through the air valve as the piston is forced up by the return spring. The left hydraulic plunger is drawn out of the hydraulic section, siphoning coating material into the pump, where it is retained by a ball check until the next pressure stroke.

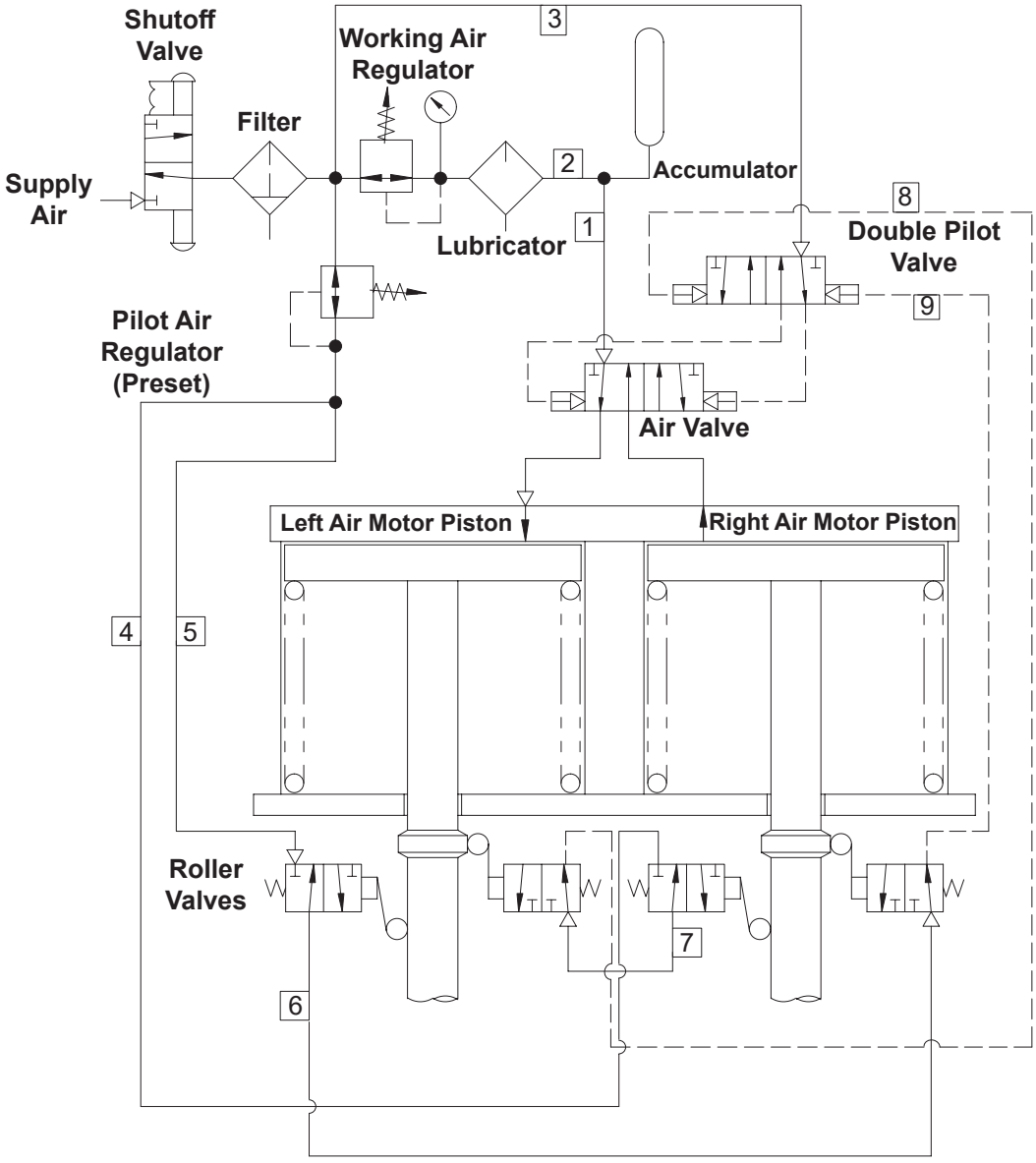

Figure 2-3 Pump Operation

Section 3
Installation

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Suitable for installation in Zone 1, Zone 2, or normal usage areas.

Unpacking

1. See Figure 3-1. Remove the siphon rod (1) from the tube on the pallet.
2. Remove the nuts (9), lock washers (8), and washers (7) securing the pump (2) to the pallet.
3. Remove the shipping bracket screws (6), lock washers (5), and washers (4) securing the shipping bracket (3) to the pump (2).

NOTE: The shipping bracket is only used to secure the pump to the pallet for shipment. Do not use the shipping bracket to secure the pump to a mounting surface.

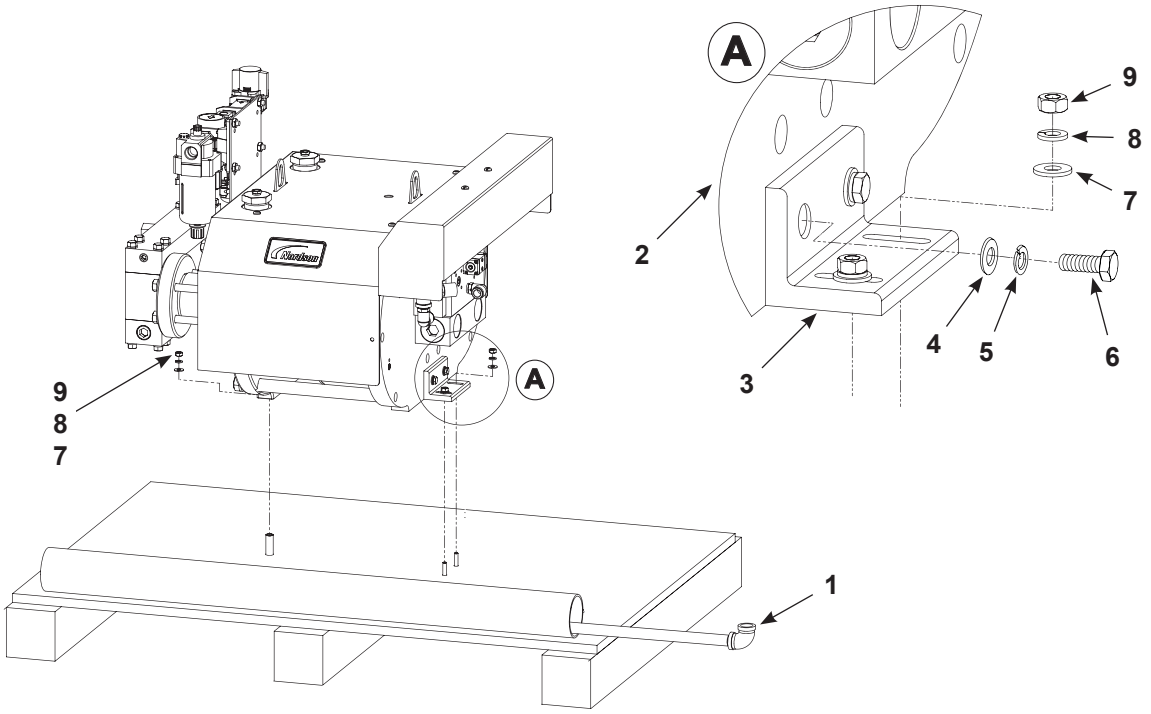

Figure 3-1 DR-1676 Pump Components

1. Siphon Rod
2. Pump
3. Shipping bracket
4. Shipping bracket washer
5. Shipping bracket lock washer
6. Shipping bracket screw
7. Washer
8. Lock washer
9. Nut

Mounting

1. See Figure 3-2. Install the pump on a horizontal surface, in an area accessible for operation and maintenance. Use three 1/2−13 bolts, washers, and lockwashers to mount the pump.
2. Install one bolt into the mounting slot (2) on the solvent chamber (1). Install the two remaining bolts into the threaded mounting holes located on the bottom surface of the upper head (3).

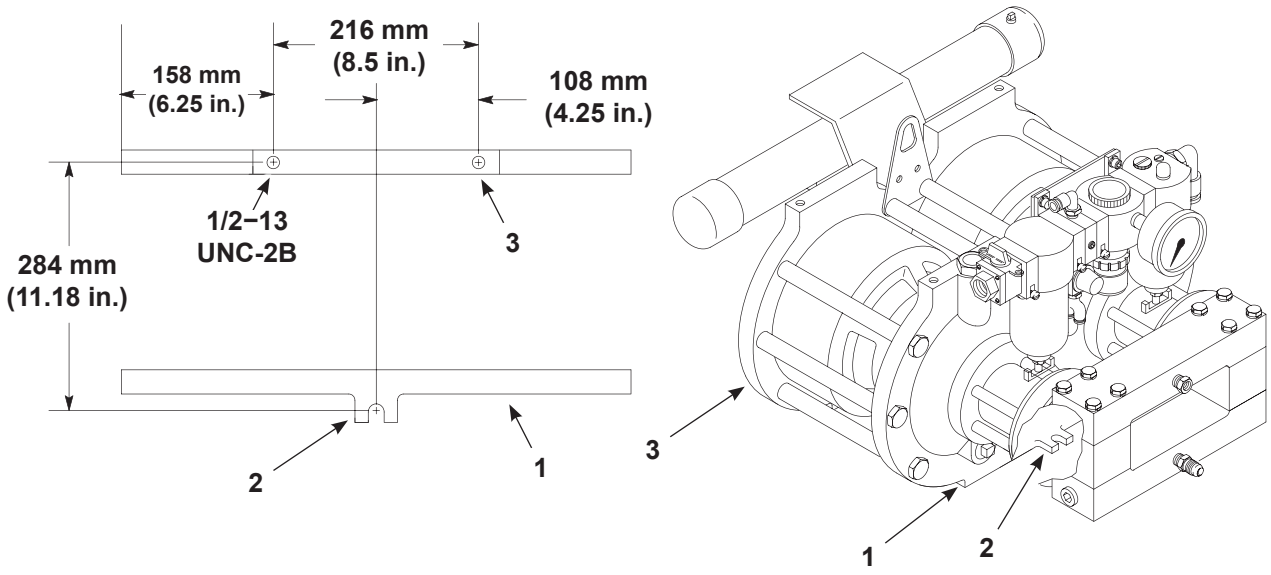

Figure 3-2 DR-1676 Pump Components

1. Solvent chamber
2. Mounting slot
3. Upper head

Air Supply Connection

Refer to Specifications in the Overview section for air supply requirements and air hose sizing.

1. See Figure 3-3. Use a flexible air hose at least 305-mm (12-in.) long with 1/2-in. NPT fittings to supply air to the pump. The flexible hose will serve as a vibration damper. Do not use rigid tubing.
2. Purge the air supply line and hose of all contaminants. Make sure that the shutoff valve is off and the regulator (4) is backed all the way out.
3. Connect the air hose to the shutoff valve (1).

NOTE: If operating in a humid environment the muffler and air valve can freeze up. To prevent this from happening, install a heater in the air line ahead of the pump. Nordson NH-4 heaters are typically used for this purpose.

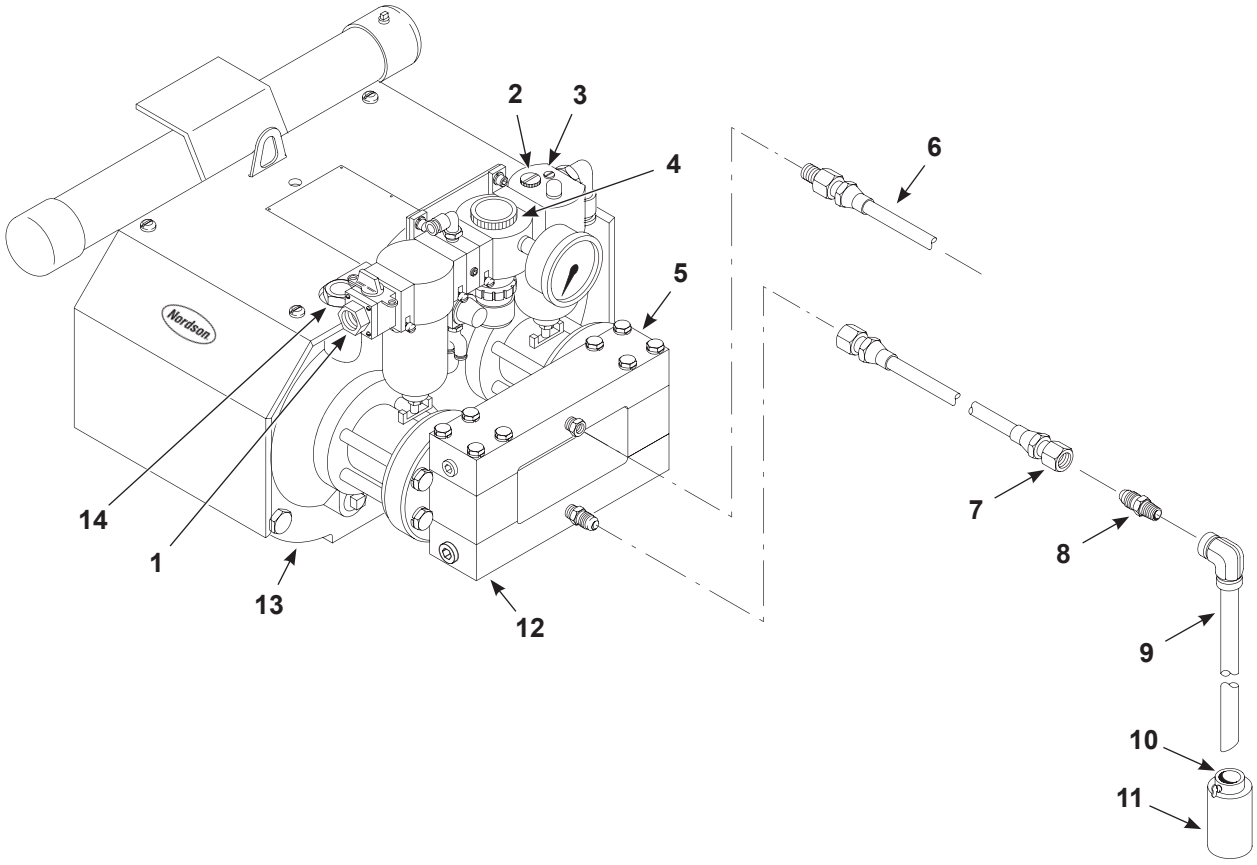

Figure 3-3 Air, Siphon, and High-Pressure Fluid Hose Connections, Solvent Chamber and Lubricator Fill

1. Shutoff valve
2. Lubricator cap
3. Lubricator adjustment
4. Regulator
5. Pressure manifold
6. Fluid hose
7. Siphon hose
8. Male connector
9. Siphon rod with elbow
10. Thumb screw
11. Siphon strainer
12. Siphon manifold
13. Solvent chamber
14. Solvent chamber cap (air filter)

Siphon and High Pressure Fluid Hose Connection

Refer to Specifications in the Overview section for additional specifications and hose sizing.

NOTE: Use only stainless steel fittings. Coat all NPT threads liberally with pipe joint adhesive. Tighten all fittings securely to eliminate siphoning of air.

NOTE: Connect a high-pressure fluid hose that is at least 305-mm (12-in.) long to the pump outlet to serve as a vibration damper. If the rest of the installation is to be hard plumbed, use only 10-mm (3/8-in.) ID seamless stainless steel tubing.

1. See Figure 3-3. Connect the siphon system, using the parts (items 7−11) shipped with the pump, to the siphon manifold (12).
2. Connect a high-pressure, reinforced PTFE, 6-mm (1/4-in.) ID fluid hose (6) to the pressure manifold (5) and heater inlet (if used).

Solvent Chamber Fluid and Vitalizer Oil Fill

1. See Figure 3-3. Use Nordson Type-T solvent chamber fluid for waterborne coatings. Remove the solvent chamber caps (air filter) (14) and fill the solvent chambers (13) to 102 mm (4 in.) from the top.
2. Reinstall solvent chamber caps (air filter) (14) hand tight. Do not over tighten.
3. Remove the lubricator cap (2) and fill it with the Vitalizer oil shipped with the pump.

NOTE: Do not adjust the lubricator until the pump is operating. Refer to the Operation section for adjustment instructions.

Optional Pressure Feed Siphon Installation

You can supply coating material to the pump by gravity pressure or pressure-fed from a pressure reservoir. Maximum feed pressure is 1.4 bar (20 psi). Install a shut-off valve in the pressure feed line ahead of the pump. Do not install a check valve or fluid regulator in the pressure feed line.

See Figure 3-4. Use the male connector (2) and siphon hose (1) provided with the pump. The hose will dampen pump vibration.

Optional Circulation Valve Kit Installation

See Figure 3-4. Use two kits for a dual circulation installation. Place the drain rod (11) in a grounded waste container.

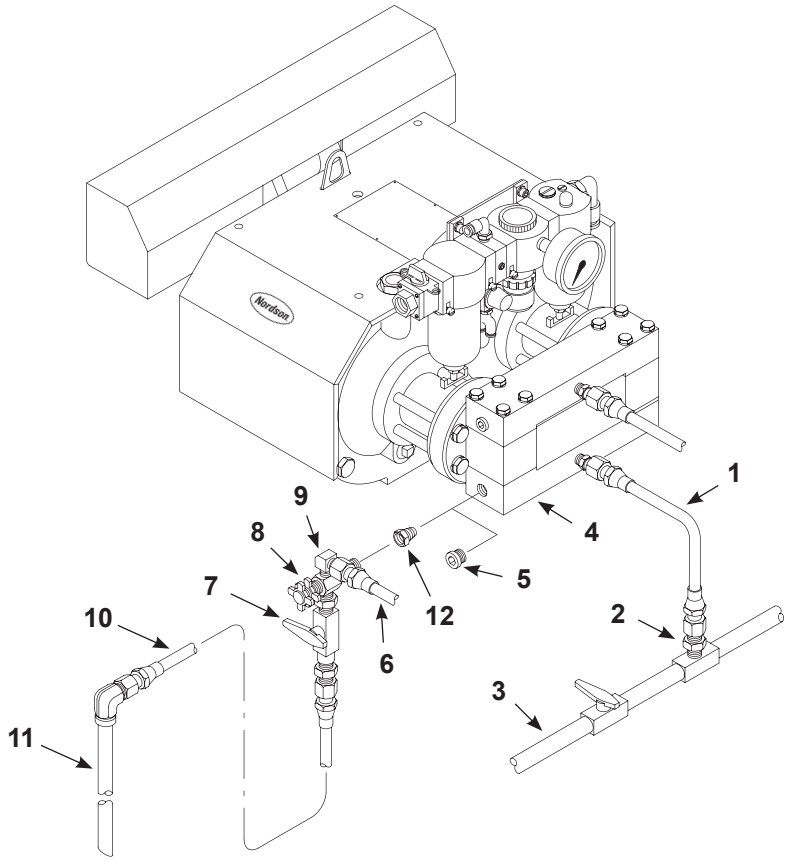

Figure 3-4 Air, Siphon, and High-Pressure Fluid Hose Connections, Solvent Chamber and Lubricator Fill

1. Siphon hose	5. Pipe plug	9. Elbow
2. Male connector	6. Return hose	10. Drain hose
3. Pressure feed line	7. Drain valve	11. Drain rod
4. Siphon manifold	8. Circulation valve	12. Bushing

NOTE: The bushing (12) is not included with the circulation kit. Refer to Optional Circulation Kit in Parts section for ordering information.

Section 4
Operation

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Before Startup

WARNING: To prevent static electricity build-up, ground the pump and all system components, including the coating supply and waste container. Ungrounded components can cause a fire or explosion.

Before starting the pump, make sure that

- all fittings and connections are tightened securely;
- the shut-off valve, circulation valve(s), and drain-off valve(s) (if used) are closed and that the air regulator is backed all the way out;
- the system components (heater, filter, etc.) have been installed according to the instructions in their respective manuals;
- the proper fluid filter screen is installed and that the filter housing is secure;
- the solvent chamber is filled with the proper fluid;
- the lubricator is filled with Vitalizer oil;
- the coating material is at the ambient temperature; and,
- all safety covers are in place, and that all personnel have read and understand the safety precautions in the Safety section.

Flushing the Pump

Flush the pump before putting a new pump into service, before rebuilding the hydraulic section, and when changing coating materials. The initial startup flush will clean out any residual dirt, grease, and machining chips left from manufacturing and installation.

NOTE: The solvent flush material can be a solvent used in the coating material or, if using waterborne coatings, butyl cellosolve or soapy water.

1. See Figure 4-1. Remove the applicator nozzle.
2. If using a circulation kit, insert the drain rod into a waste container. Close the circulation valve and open the drain valve.
3. Insert the siphon rod into a container of a suitable flush material. If a pressure feed system is used, pressurize the system with flush material.

NOTE: Make sure that you back the air regulator out completely. The pump will run erratically if started at full pressure without fluid in the lines.

4. Pressurize the air supply line.
5. Open the air shutoff valve (2).
6. Adjust the air regulator (3) until the pump strokes 20 strokes per minute. If using a non-circulating system, trigger the applicator(s) to allow the pump to operate.

NOTE: If the pump does not start, push the manual override button (1).

7. Observe the material fl owing from the applicator or drain valve. Run the pump until the material flows without air bubbles.
8. Using a small screwdriver, adjust the lubricator (4) to a rate of 1 drop per 5−10 strokes of the pump.
9. If using a circulation kit, close the drain valve and slowly open the circulation valve. Adjust the circulation valve until the pump strokes 20 strokes per minute. Allow flush material to circulate through the system for 15−30 minutes.
10. Reduce the air pressure to zero to stop the pump.
11. Remove the siphon rod from the flush material. If the pump is pressure-fed, shut off the pressure feed.
12. If using a circulation kit, close the circulation valve and open the drain valve.
13. Start the pump and discharge the flush material into a waste container. If using a noncirculating system, trigger the applicator(s) until all flush material has been pumped out of the system.
14. Reduce the air pressure to zero.
15. Close the air shutoff valve.
16. Open the fluid filter drain and clean the filter screen.

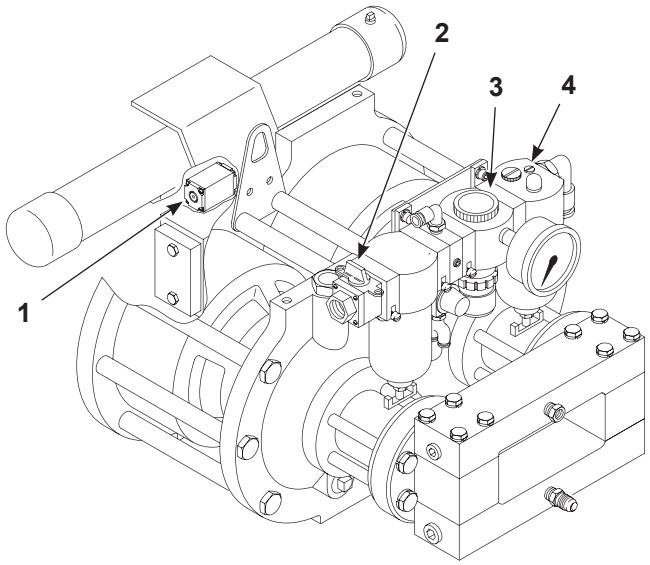

Figure 4-1 Pump Controls and Adjustments

1. Manual override button
2. Air shutoff valve
3. Air regulator adjustment
4. Lubricator adjustment

Normal Operation

1. See Figure 4-1. Place the siphon rod into the coating material. If a pressurized system is used, pressurize the feed line.
2. Open the air shutoff valve (2) and adjust the air regulator (3) until the pump begins to stroke slowly.
3. Allow coating material to fl ow out of the filter drain. Close the drain.
4. If using a circulation kit, open the drain valve and discharge coating material into a waste container. Close the drain valve.
5. Adjust the air regulator to the required pressure. Adjust the circulation valve, if used, until the pump is stroking 8−10 times per minute.

WARNING: Fluid must be circulating through the fluid heater while it is operating. Without circulation, solvents used in many coating materials can expand and cause an extreme pressure increase and possible heater rupture. Failure to circulate material through an operating heater can result in heater plugging, heat limiter failure, property damage, or personal injury.

6. If a fluid heater is used, turn it on. Allow 10−15 minutes for the system to reach operating temperature. When the thermometer reads within 2 °C (5 °F) of the operating temperature, adjust the circulation valve to the desired pump stroke rate. The maximum fl ow rate is 7.6 lpm (2.0 gpm).

The system is now ready to start production.

Daily Maintenance

WARNING: Make sure that all system components are grounded. Ungrounded components can cause electrical sparking, fire, or explosion.

1. Place a clean, spare screen in the fluid filter and soak the dirty screen in a solvent that is compatible with your coating material.
2. Inspect the filter screen and discard it if ruptured or distorted.

Solvent Chamber Fluid

Inspect the solvent chamber fluid condition.

1. If the solvent chamber fluid appears to be contaminated with coating material, drain the fluid and replace with new fluid.
2. Fill the solvent chamber to 102 mm (4 in.) from the top of the casting. Use only Nordson Type-T solvent chamber fluid for water-based coatings.

Air Lubricator

Inspect the air lubricator oil level and rate of delivery.

1. If necessary, adjust the rate to approximately 1 drop of oil per every 5−10 strokes of the pump.
2. Refill the air lubricator with Vitalizer oil or an approved substitute only. Refer to the Adjusting Air Line Lubricators instruction sheet for a list of approved replacement oils.

Air Filter Components

1. Drain the air filter, remove the air filter bowl, dump out any remaining water and remove the air filter element. This may be done less frequently if experience indicates that less-frequent cleaning would be adequate.
2. Wash the parts in soapy water, rinse, dry, and reuse. Replace the filter element if damaged.

High Pressure Fluid Filter

Clean the high pressure fluid filter daily unless experience indicates that less-frequent cleaning would be adequate. To prevent production downtime, use a dual filter assembly.

Consult your Nordson representative to see if a dual filter is appropriate for your application and material.

Section 5

Troubleshooting

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

Use the Air Tubing Diagram and the Pneumatic Schematic in this section to help you diagnose pump operation problems or replace air components.

Problem	Possible Cause	Corrective Action
1. Pump fails to start	Air valve spool centered, not allowing working air to exhaust	If sufficient air pressure is available to operate the pump, push the manual override button on the double pilot valve. After a smooth quick shift of the air valve spool, the pump should start.
	Air supply input not present or inadequate	Check for adequate air volume and pressure in the supply line. Make sure that the air supply and pump shutoff valves are turned on. **NOTE:** Refer to Specifications in the Overview section for air supply specifications.
	Improperly adjusted air regulator, blocked air filter element, or faulty air regulator	Check the air pressure gauge. The pump requires at least 1.4 bar (20 psi) to start. Increase the pressure if below the minimum. If increasing the pressure does not start the pump, remove and clean the air filter element. If the pump still does not start, disconnect line 2 at the lubricator and check for air flow. If no air flows out of the tubing, replace the air regulator.
	Blocked hydraulic system **NOTE:** If both circulation and drain valves are closed, the pump will not start. Closing both while the pump is operating will stop the pump.	**WARNING:** Always relieve fluid pressure before disconnecting any fittings or components in the fluid system. High pressure fluids are dangerous and can cause serious injury. If sufficient air pressure is available to operate the pump, check for pressure in the fluid system. If fluid pressure is maintained, the condition is outside the pump. Close the drain valve and open the circulation valve. If the pump fails to start, check for a faulty circulation valve. Refer to Problem 6. Check for a clogged applicator nozzle, fluid filter screen, or siphon strainer.
	Lubricator not properly adjusted, air valve spool binding	If pushing the manual override button does not shift the air valve spool, the spool may be jammed. Close the air shutoff valve. Remove both end caps and push the spool back and forth. If the spool moves easily, reinstall the end caps. If the spool does not move or is extremely tight, disassemble the valve and lubricate all parts. Replace any worn parts. Make sure the air lubricator is filled and adjusted correctly.

Continued...

Problem	Possible Cause	Corrective Action
1. Pump fails to start (con't)	Improper air line routing	Use Figure 5-1 and Figure 5-2 to check the pump air line routing. If all connections are correct and the pump still will not start, then the double pilot valve or the roller valves are faulty
	Faulty lower roller valves	Perform the following procedures to check the two lower roller valves: 1. Disconnect tube 6 from the roller valve on the lower left side of the pump. Air should flow when the valve is actuated and stop when released. 2. Disconnect tube 7 from the roller valve on the lower right side of the pump. Air should flow when the valve is actuated and stop when released.
	Faulty upper roller valves	Check the two upper roller valves by releasing the actuator (which is normally depressed when installed) while both air pistons are in their full returned position. 1. Remove the two retaining screws that secure the roller valve assembly to the lower head casting. 2. Disconnect tube 8 on the upper left valve assembly. 3. Activate the upper left roller valve. Air should not flow. 4. Activate the upper right roller valve. Air should not flow. 5. Activate the lower right and upper left roller valves together. Air should flow. Repeat the test by removing tube 9 and activating the lower left and upper right valves. Air should fl ow only when both valves are activated together and should stop when released.
	Faulty pilot valve	Replace the pilot valve if the roller valves are functioning properly (as determined in the procedures above).
2. Pump stops during operation	Blocked hydraulic system	Refer to Blocked hydraulic system in Problem 1

Continued...

Problem	Possible Cause	Corrective Action
3. Pump strokes irregularly or fluid pressure fluctuates	Air leak in the siphon circuit	Leaks in the siphon system may be checked by placing the drain rod in water. Close the circulation valve, open the drain valve, and operate the pump while watching for bubbles in the water. If bubbles occur, air is entering the pump through the siphon system. These are the possible leak locations: • Connections in the pressure feed system or siphon hose/rod assembly may be leaking. Tighten all fittings including those at the siphon manifold. Liberally coat all threads with pipe joint adhesive. • The siphon hose may have a small hole or crack in it. Replace the hose. • The two O-rings between the siphon manifold and the check housings may be leaking. Replace the O-rings.
	Solvent vapor in the hydraulic system	During a siphon stroke, pressure inside the high pressure cylinders falls below atmospheric pressure, lowering the boiling point of the solvents in the coating material. If the fluid temperature is close to the boiling point, the drop in pressure may permit solvent to begin boiling off, creating gas bubbles inside the hydraulic housing. The fluid temperature should be at least 12 °C (20°F) below the boiling point of the most volatile solvent used in the coating material. Lower the temperature of the coating material or pressure feed the coating material into the pump. **NOTE:** Viscous coating materials, long siphon systems, and blocked siphon strainers may cause pressure inside the cylinders to drop to unusually low levels during the siphon stroke, aggravating the condition.
	Leaks in the pneumatic system	See Figure 5-1 and Figure 5-2 for the tube routing and pneumatic system schematic. Listen for continuous air leaks from partially opened valves or tube connections. Check for pinched tubing. Check the air filter screen for clogging. Replace any faulty parts and clean the air filter element, if necessary.
	Faulty air valve	If the pump continuously double strokes, the air valve is faulty. Rebuild or replace the air valve.
	Leaky siphon or high pressure ball check valves	If the pump continuously double strokes, close both the circulation and drain-off valves, if used, or shut off the applicator. Both plungers should stop. Quickly open and close the drain-off valve (open for one half second or less), or trigger the applicator.
		If one plunger does not stop each time the valve is closed, or trigger released, but runs its full stroke and returns, the fault lies in the siphon ball check valve on that side of the pump or the high-pressure ball check valve on the opposite side. Rebuild or replace the faulty component.
	Out of coating material	Refill the coating material supply.

Continued...

Problem	Possible Cause	Corrective Action
4. Gradual loss of fluid pressure while air supply pressure remains constant	Worn hydraulic packings	Replace the hydraulic packings.
5. Coating material mixing with solvent chamber fluid	Worn hydraulic packings	Replace the hydraulic packings.
6. Pump strokes when circulation and drain-off valves are closed	Leaks in high-pressure fluid system	Look for leaks throughout the high-pressure fluid system and repair them.
	Faulty drain valve	If fluid leaks out of drain rod when the drain valve is closed, repair or replace the drain valve.
	Faulty circulation valve	Close the circulation and drain valves. Disconnect the return hose at the circulation valve and blow compressed air into the valve through the open fitting. If air escapes from the siphon rod when both the circulation and drain valves are closed, the circulation valve is faulty. Rebuild or replace the circulation valve.
	Faulty siphon and high pressure ball check valves	Refer to Leaky siphon or high pressure ball check valves in Problem 3.
7. Fluid pressure drops when applicators are triggered	Insufficient air supply	Refer to Specifications in the Overview section for air supply specifications.
	Heavy viscous material causing inadequate flow rate	Correct the flow rate by pressure feeding (not siphoning) the coating material. The pressure feed should not exceed 1.4 bar (20 psi).
	Partially blocked fluid lines or filter screen	Check and clean the filter screen. Flush all of the fluid lines.
	Nozzle not installed or nozzle nut leaking	Install nozzle, or tighten nozzle nut.
8. Fading or narrowing of spray pattern after applicator is triggered	Inadequate air supply	Refer to Specifications in the Overview section for air supply specifications.
9. Applicator nozzle plugging	Inadequate filter screen size or ruptured filter screen	Check the filter screen for proper size and for rupture or damage. Refer to the manuals provided with your filters and applicators.
	Contaminants in hoses	Check the hoses. Dirty or cured coating materials may be breaking away from the inner hose wall and plugging the nozzle.

Continued...

Problem	Possible Cause	Corrective Action
10. Tails appearing in a spray pattern that was normal **NOTE:** Tails are streams of unatomized coating material at the outer edges of the spray pattern	Inadequate circulation rate allowing coating material to cool at the spray device	Increase the circulation rate by opening the circulation valve. Contact your Nordson representative for help in determining the proper circulation rate for your system.
	Partially blocked fluid filter screen	Clean the fluid filter screen. Refer to the filter manual.
	Change in coating material viscosity	Check for a change of viscosity. If necessary, add solvent to the material, or change to a new material.
	Inadequate fluid pressure or air pressure to the pump.	Increase the fluid pressure to the applicator. Increase pump air pressure, make sure supply air is to specifications.
11. Temperature drops after applicators are triggered	Inadequate heater capacity	Make sure the heater capacity is adequate and that the heaters are functioning correctly. Refer to the heater manual.
	Changes to the system	Changing to larger flow-rate nozzles or adding more spray guns to the system may require adding more fluid heaters.

Air Tubing Diagram

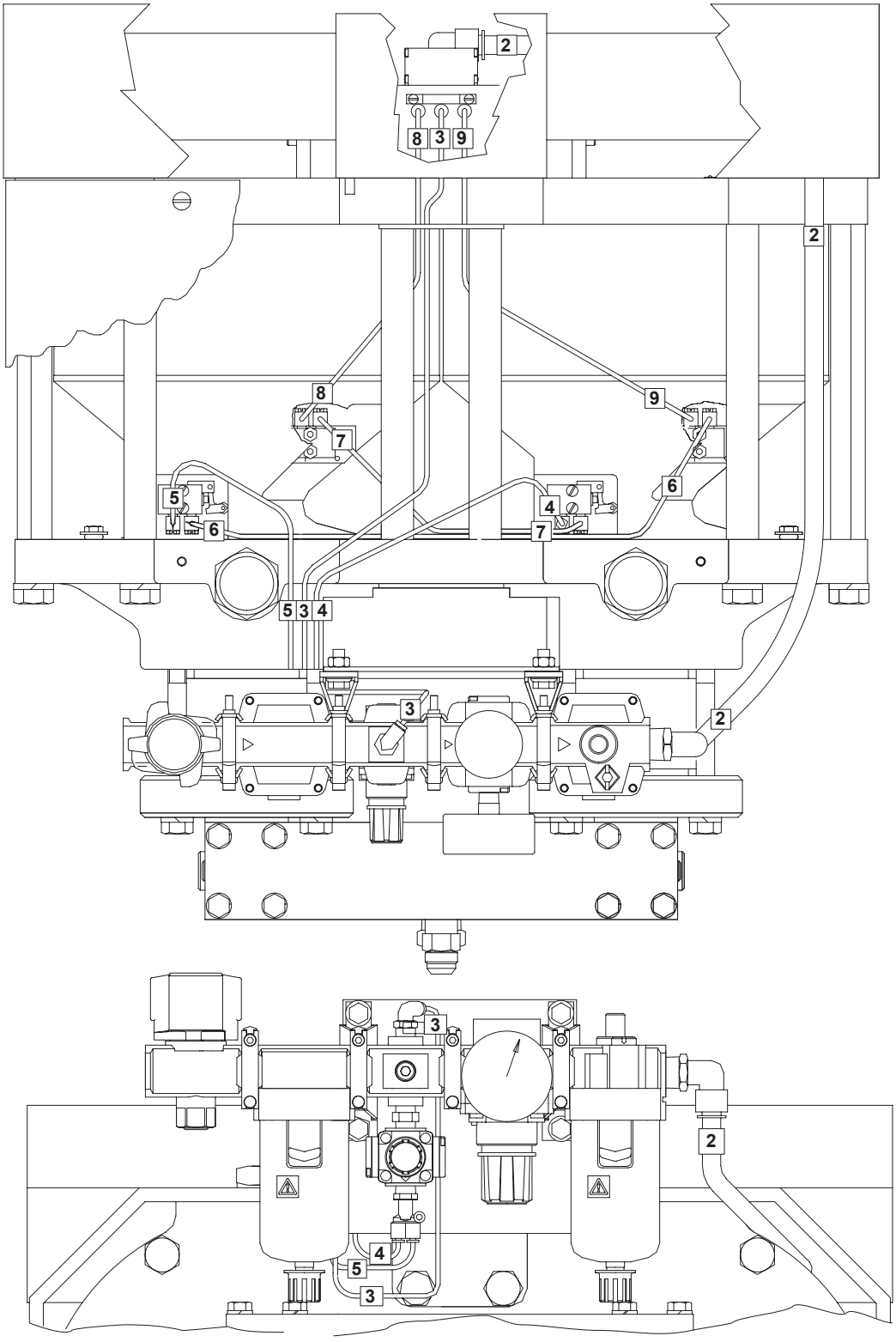

Figure 5-1 Tubing Diagram

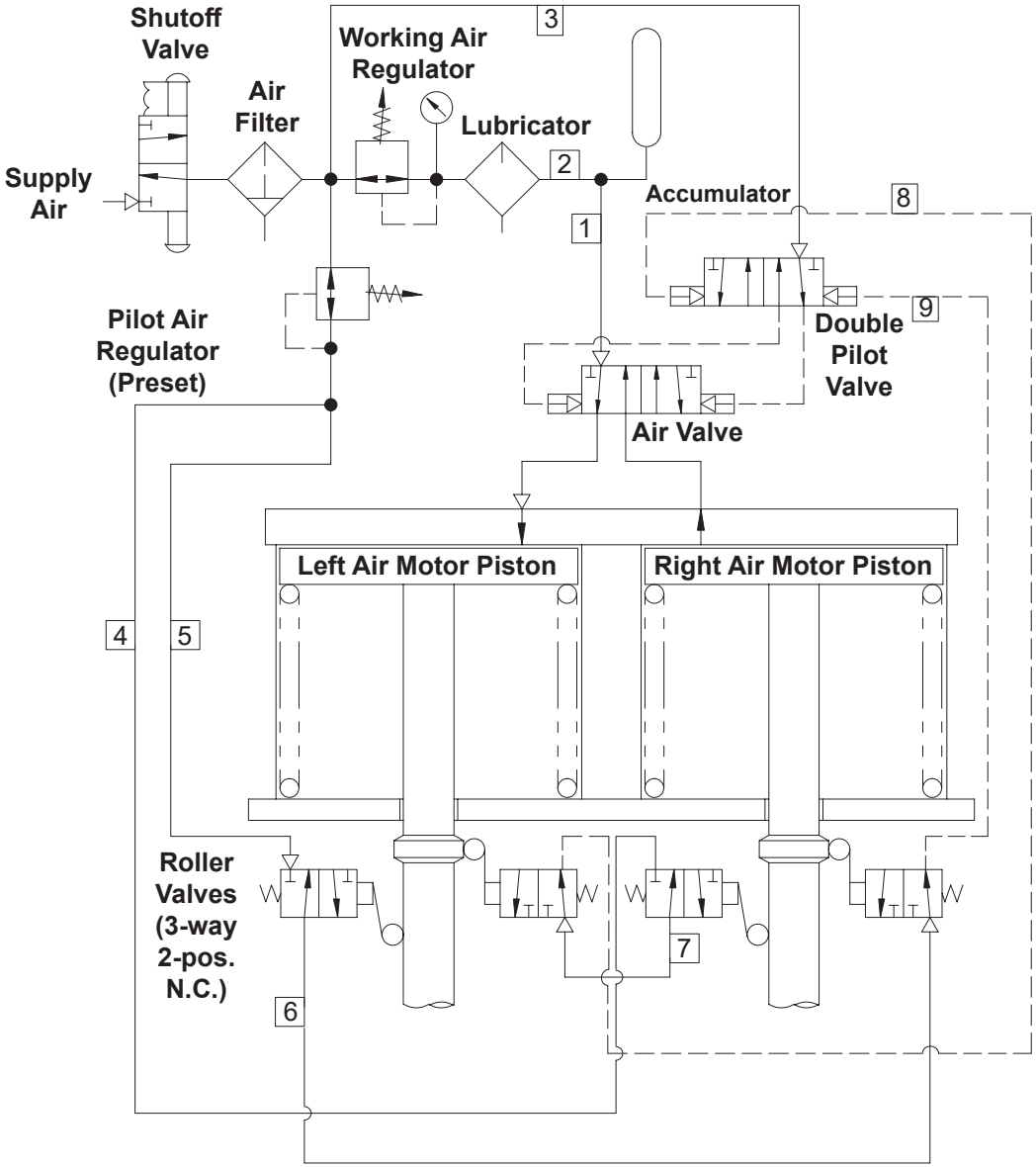

Figure 5-2 Pneumatic Schematic

Section 6

Repair

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Introduction

To prevent personal injury or equipment damage, shut off the pump air supply and relieve the system fluid pressure. Shut off the pressure feed system, if used. Relieve the pressure feed system pressure.

Hydraulic Section Repair

Use the following to repair the hydraulic section:

- Hydraulic section repair kit
- Hydraulic packing service kit
- High-pressure ball check kit
- Siphon ball check kit
- O-ring lubricant (Parker O-Lube or equivalent)
- VC-3 thread locking compound

Refer to the Parts section for kit parts lists and illustrations. Make sure you have the parts you need on hand before you start.

Hydraulic Section Removal

1. See Figure 6-1. Remove the screws and lock washers (2, 3) that secure the hydraulic section (1) to the pump.
2. Remove the high-pressure cylinders (5). Remove the O-rings (4) from the cylinders.

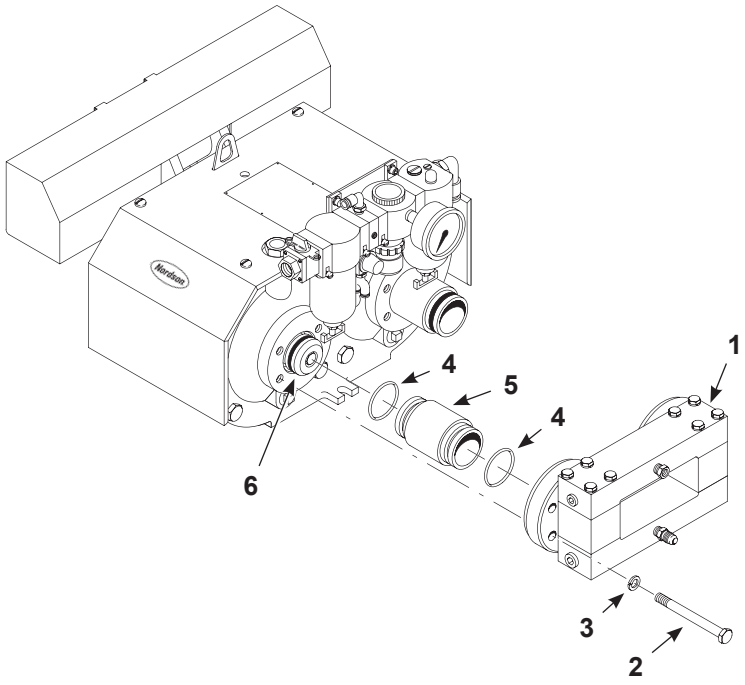

Figure 6-1 Hydraulic Section Removal

1. Hydraulic section
2. Screws (8)
3. Lock washers (8)
4. O-rings (4)
5. High Pressure cylinders (2)
6. Plunger assemblies

Hydraulic Packing Replacement

See Figure 6-2. The Hydraulic Packing Service Kit contains items 4, 5, 7, and 8, plus the high-pressure cylinder O-rings.

NOTE: Coat all O-rings, U-cups, and backup rings with O-ring lubricant before installing.

1. Remove the hex-head screws and lock washers (1, 2). Pull the plunger assemblies off the piston shafts (9).
2. Separate the hydraulic seal retainers (3) and hydraulic seal holder (6).
3. Remove and replace the O-rings (4, 7), U-cups (5), and backup rings (8).
4. Install the plunger assemblies onto the piston shafts, with the open end of the U-cups facing away from the air motor.
5. Apply medium strength threadlock adhesive (1A) (removable) to screws (1). Install the lock washers (2) and screws (1) and tighten to 34−41 N•m (25−30 ft-lb).

If you are not making any other repairs to the hydraulic section, re-install it as described in Hydraulic Section Installation in this section.

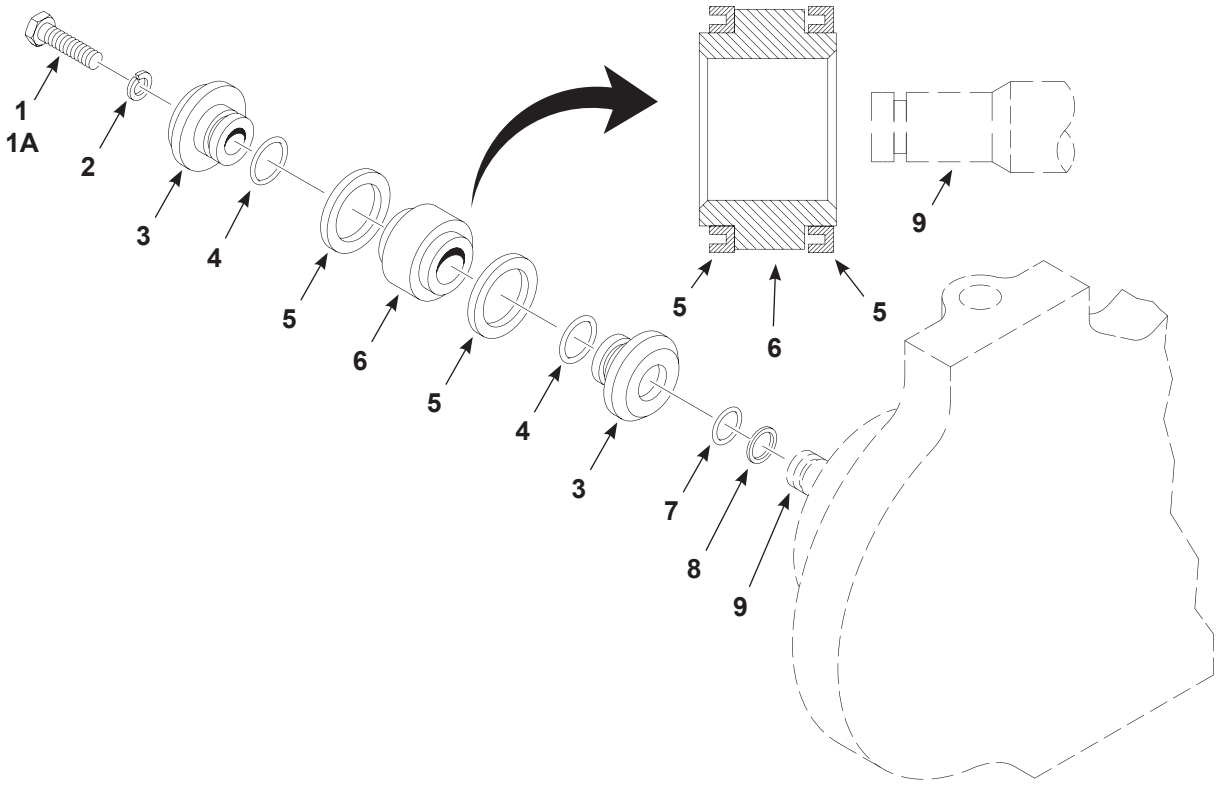

Figure 6-2 Hydraulic Section Removal

1. Screw (2)
1A. Threadlock adhesive
2. Lock washer (2)
3. Hydraulic seal retainer (4)
4. O-ring (4)
5. U-cup (4)
6. Hydraulic seal holder (2)
7. O-ring (2)
8. Back-up ring (2)
9. Piston shaft (2)

High-Pressure Check Rebuild

Use the Pressure Ball Check Service Kit to rebuild the pressure ball checks. One kit will rebuild both pressure ball checks. The kit contains items 4, 5, 6, 7, and 8.

NOTE: Coat the O-rings with O-ring lubricant before installing.

1. See Figure 6-3. Remove the screws and lock washers (1, 2) that secure the pressure manifold (3) to the check housings (9).
2. Remove and replace the ball cages (4), balls (5), O-rings (8), ball seats (7) and O-rings (6).

NOTE: Do not tighten the manifold screws until you install the hydraulic section on the solvent chamber to allow for proper alignment of the hydraulic section to the solvent chamber.

3. Install the pressure manifold on the check housing. Install the screws and lockwashers and tighten the screws finger-tight.
4. If you are not rebuilding the siphon ball checks, install the hydraulic section on the air motor. Refer to the Hydraulic Section Installation in this section.

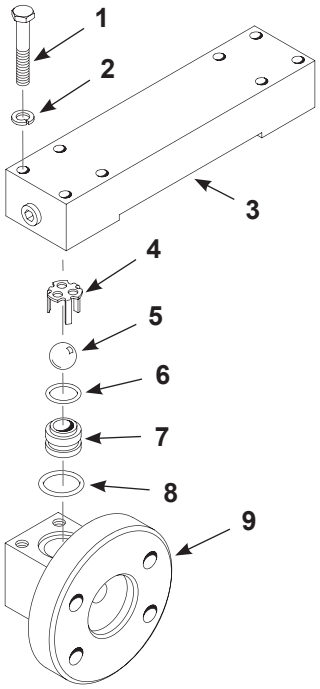

Figure 6-3 High-Pressure Check Pressure

1. Screws (8)
2. Lock washers (8)
3. Pressure manifold
4. Ball cages (2)
5. Balls (2)
6. Ball seat O-rings (2)
7. Ball seats (2)
8. Check housing O-rings (2)
9. Check housings (2)

Siphon Check Rebuild

Use the Siphon Ball Check Service Kit to rebuild the siphon ball checks. One kit will rebuild both siphon ball checks. The kit contains items 4, 5, 6, and 7.

NOTE: Coat the O-rings with O-ring lubricant before installing.

1. See Figure 6-4. Remove the screws (10) and lock washers (9) that secure the siphon manifold (8) to the check housings (1).
2. Remove and replace the O-rings (5, 7), ball seats, (6), balls (4), Do not lose the ball guide pins (3).

NOTE: Do not tighten the manifold screws until you install the hydraulic section on the solvent chamber. Keep the manifold screws loose to allow for proper alignment of the hydraulic section to the solvent chamber.

3. Install the check housings on the siphon manifold with the lock washers and screws. Do not tighten the screws at this time.
4. Install the hydraulic section on the air motor. Refer to Hydraulic Section Installation this section.

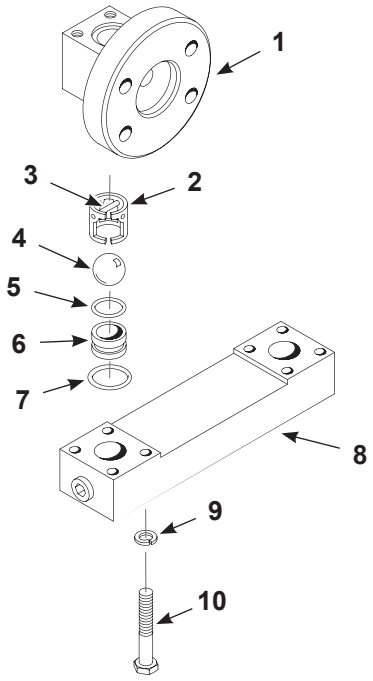

Figure 6-4 Siphon Check Rebuild

1. Check housings (2)
2. Ball guides (2)
3. Pins (2)
4. Balls (2)
5. Ball seat O-rings (2)
6. Ball seats (2)
7. Check housing O-rings (2)
8. Siphon manifold
9. Lock washers (8)
10. Screws (8)

Hydraulic Section Installation

1. See Figure 6-5. Thoroughly coat new O-rings (4) with O-ring lubricant and install them onto the high-pressure cylinders (5). New O-rings are included in the hydraulic packing service kit and in the hydraulic section repair kit.
2. Install the high-pressure cylinders (5) over the plunger assembly and into the solvent chamber.
3. Install the hydraulic section (1) on the cylinders. Install the lock washers (3) and screws (2) and tighten to 41−47 N•m (30−35 ft-lb).
4. See Figure 6-3 and Figure 6-4. Tighten the pressure manifold screws (1) and siphon manifold screws (9) to 27−34 N•m (20−25 lb-ft).

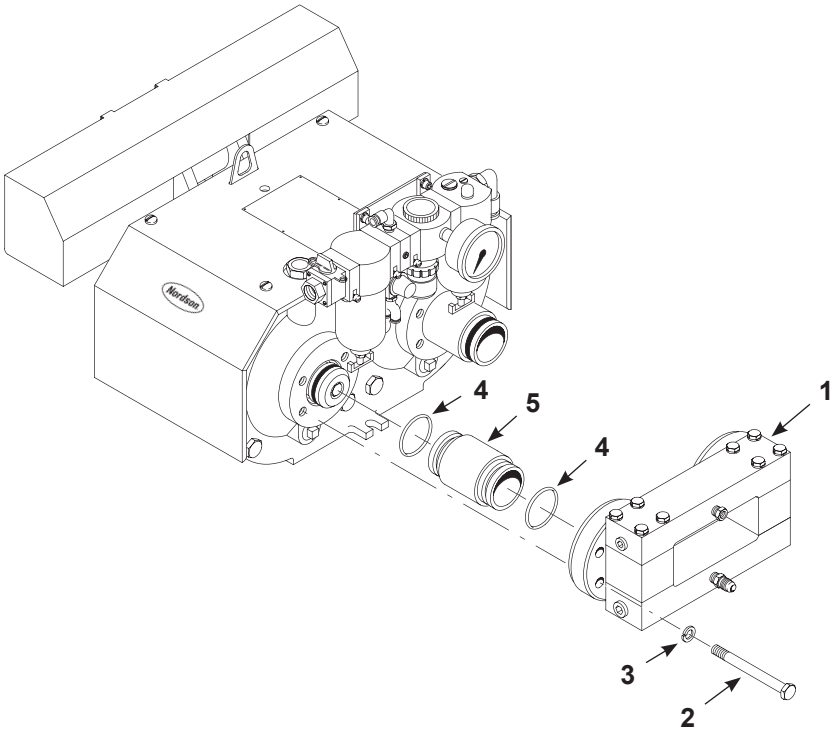

Figure 6-5 Siphon Check Rebuild

1. Hydraulic section
2. Screws (8)
3. Lock washers (8)
4. O-rings (4)
5. High pressure cylinders (2)

Air Motor Repair

Use the following to repair the air motor:

- Air motor repair kit
- Solvent seal service kit
- Low-temperature lithium grease

It will be necessary to disconnect the air tubing from the valves to repair the air motor and air valve. Refer to the Air Tubing Diagram page 5-7 in the Troubleshooting section when reconnecting the tubing.

Air Motor Disassembly

1. See Figure 6-6. Remove the screws (1, 3) that secure the cover plate (4) and accumulator cover (2) to the pump. Remove the two side covers (6, 14).
2. Remove the hydraulic section and plunger assembly. Refer to Hydraulic Section Removal in this section.

WARNING: The air motor springs are under tension. To prevent personal injury and equipment damage, perform the following steps exactly as numbered.

3. Remove two screws and lock washers (7, 8) from the solvent chamber (12), as illustrated. Do not remove the remaining screws at this time.
4. Thread the spring removal studs and fl at washers (10, 11) through the solvent chamber (12) and into the upper head (5). Tighten the nuts (9) until snug.
5. Remove the remaining screws and lock washers that secure the solvent chamber (12) to the upper head (5)
6. Carefully back off the spring removal stud nuts (9), in alternating turns, until the tension in the air motor springs is released.

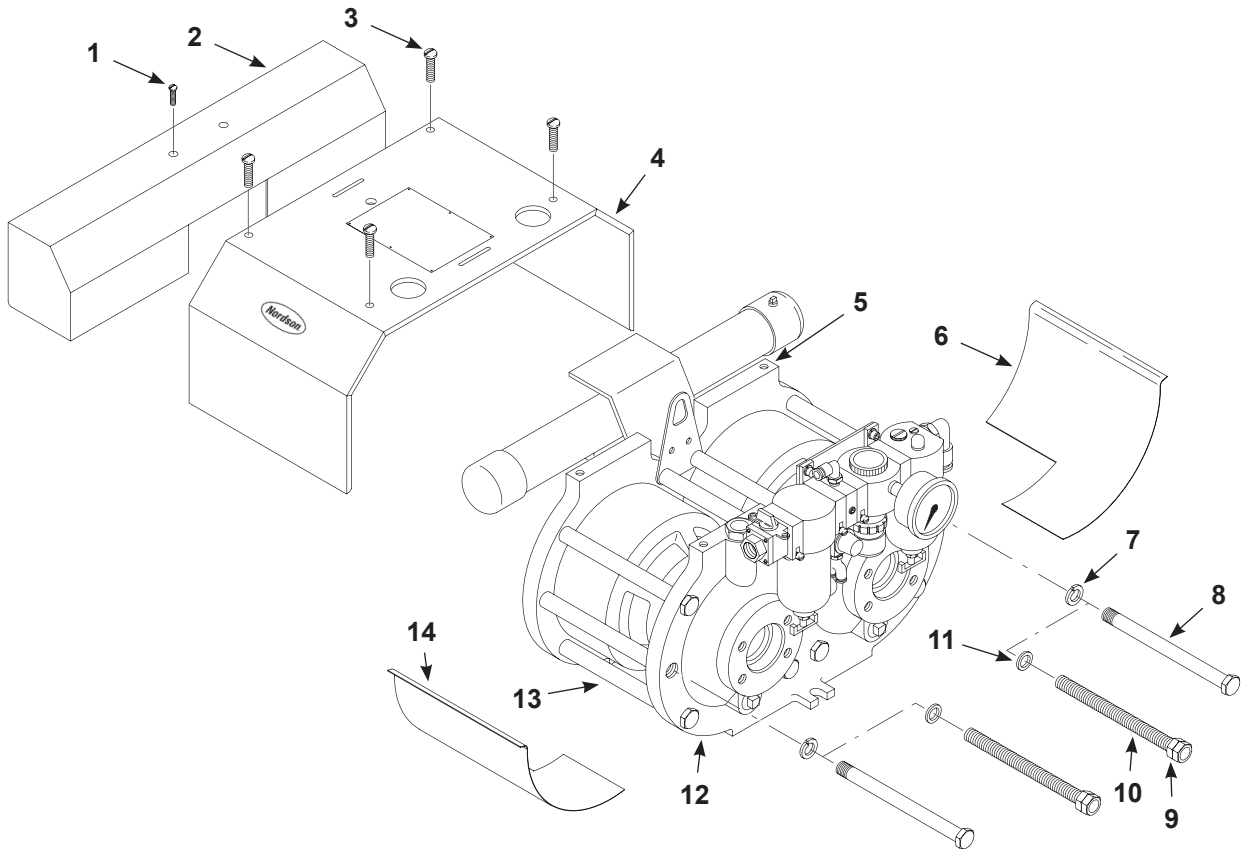

Figure 6-6 Air Motor Disassembly − Removing Covers and Releasing Spring Tension

1. Accumulator cover screws
2. Accumulator cover
3. Cover plate screws (4)
4. Cover plate
5. Upper head
6. Side guard
7. Lock washers (8)
8. Screws (10)
9. Nuts (4)
10. Spring removal studs (2)
11. Flat washers (2)
12. Solvent chamber
13. Spacers (10)
14. Side guard

7. See Figure 6-7. Remove the upper head (8), air motor springs (3), air cylinders (9), and piston assemblies (2).
8. Remove the screws, flat washers, and nylon washers (10, 11, 12) that secure the lower heads (13) to the solvent chamber (1).
9. Remove the solvent seal packing glands (15) from the lower heads.

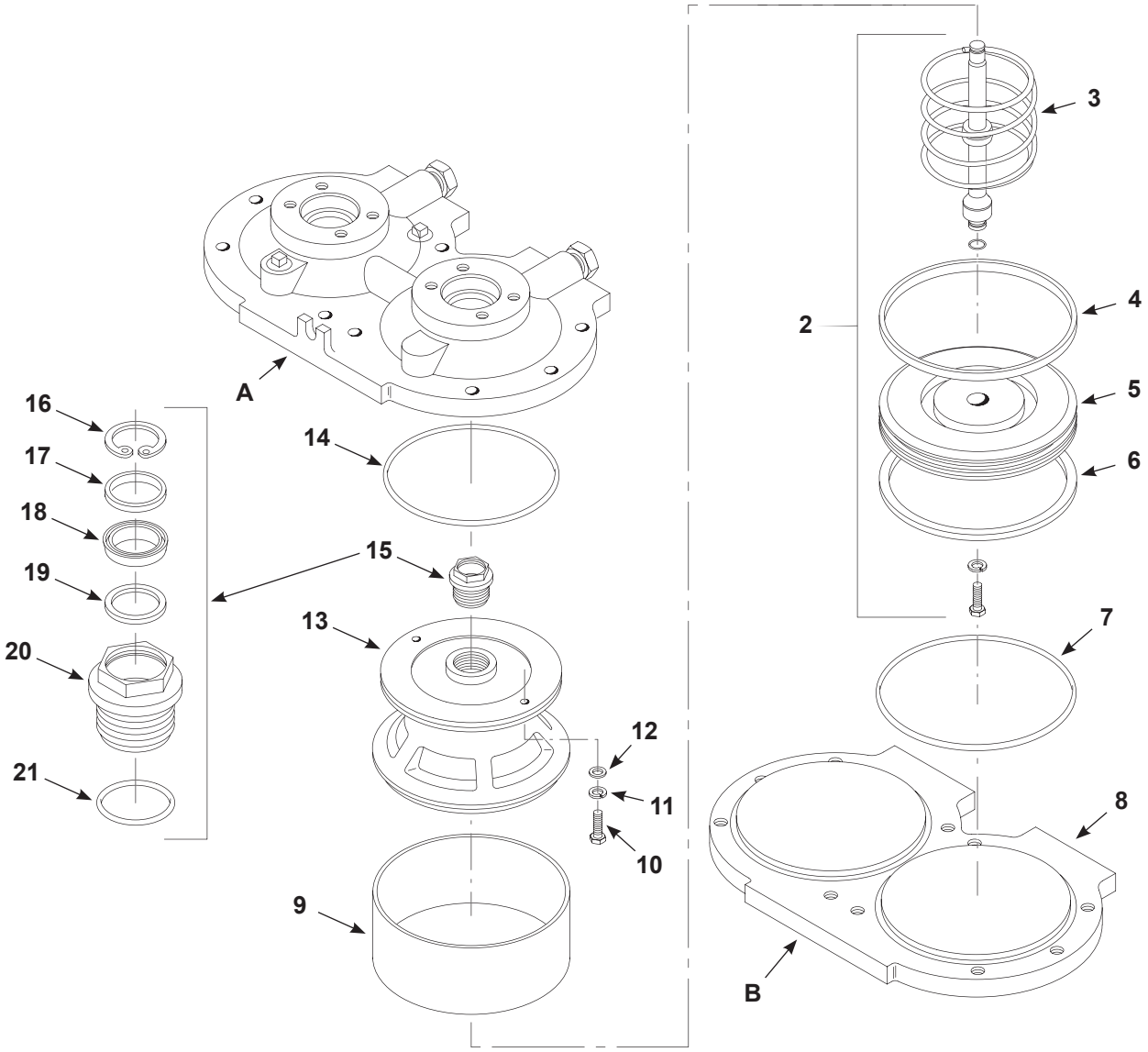

Figure 6-7 Air Motor Disassembly

1. Solvent chamber
2. Piston assemblies (2)
3. Air motor springs (2)
4. Glide rings (2)
5. Pistons (2)
6. U-cups (2)
7. Upper head O-rings (2)
8. Upper head
9. Air cylinders (2)
10. Screws (4)
11. Flat washers (4)
12. Nylon washers (4)
13. Lower heads (2)
14. Lower head O-rings (2)
15. Solvent seal packing glands (2)
16. Retaining ring
17. Spacer
18. U-cup
19. Bearing
20. Housing
21. O-ring

Air Motor Assembly

See Figure 6-7. Lay the pump on its side with surfaces A and B flat against a horizontal plane during assembly. This will help you to properly align the upper head with the solvent chamber.

1. Inspect the following parts for damage and replace as necessary:

   • U-cups (6), glide rings (4), and pistons (5)

   • lower head O-rings (14) and upper head O-rings (7)

   • solvent seal packing glands (15)—replace or rebuild

   • air cylinders (9)—no scratches on the inside walls of the cylinder are permissible

   NOTE: Coat all O-rings, U-cups, and glide rings with low-temperature lithium grease before installation.

2. Install the solvent seal packing glands (15) and O-rings (14) into the lower heads (13).
3. Install the lower heads on the solvent chamber (1) with the screws, flat washers, and nylon washers (10, 11, 12). Tighten the screws securely.
4. Install the O-rings (7) into the grooves in the upper head.
5. Coat the inside walls of the air cylinders (9) with low-temperature lithium grease. Install the air cylinders into the grooves in the upper head (8).
6. Install the pistons into the air cylinders (9).
7. Install the air motor springs (3) onto the pistons.
8. Install the lower heads onto the air cylinders (9), carefully guiding the ends of the piston shafts through the solvent seal packing glands.
9. See Figure 6-6. Install two spacers and the spring removal studs as illustrated. Turn down the stud nuts until they are snug against the solvent chamber.
10. Tighten the stud nuts evenly by alternating turns to draw the upper head and solvent chamber together until you can thread the screws (8) into the upper head.
11. Install the rest of the spacers, plus eight lock washers and screws (7, 8). Thread the screws into the upper head until they are up against the solvent chamber. Do not tighten the screws at this time.
12. Remove the spring removal studs (10) and install the remaining two lock washers and screws.
13. See Figure 6-8 for the torquing pattern. Tighten all screws to 41−47 N•m (30−35 ft-lb).
14. See Figure 6-6. Install the cover plate (4), accumulator cover (2) and side guards (6, 14) onto the air motor.
15. Install the plunger assembly and hydraulic section. Refer to Plunger Assembly Rebuild and Hydraulic Section Installation in this section.

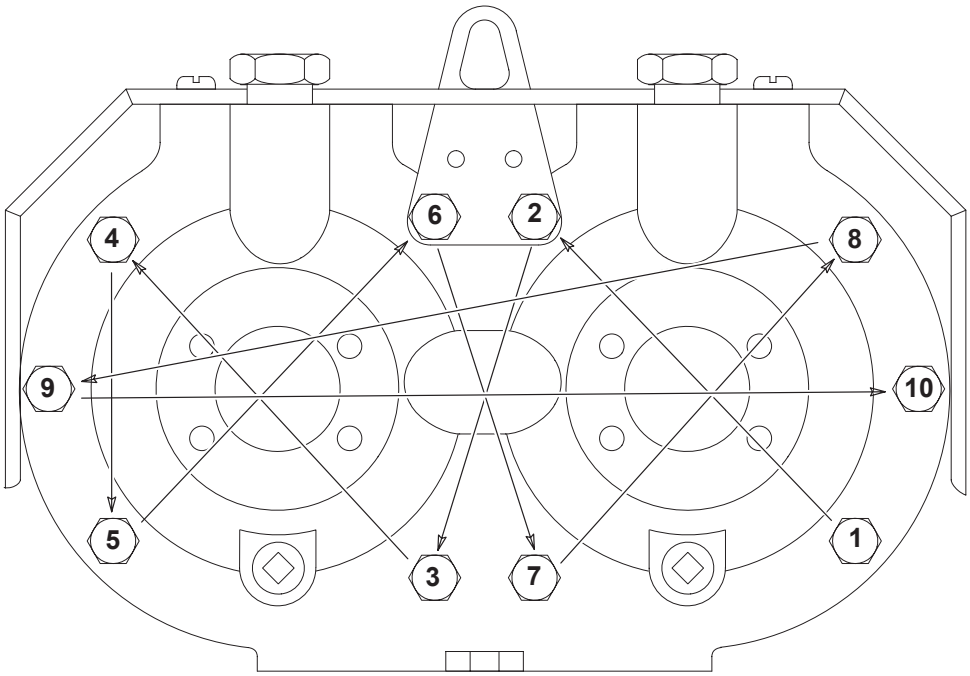

Figure 6-8 Air Motor Screw Torquing Pattern

Air Valve Repair

See Figure 6-9. Use the Air Valve Repair Service Kit to replace items 1, 5, 10, and 12. Other parts can be ordered separately, as needed.

Air Valve Disassembly

1. Disconnect the tubing from the connectors (2).
2. Remove the screws (1). Remove the air valve from the air motor.
3. Remove the valve mounting O-rings (12).
4. Remove the screws (3), end plates (4), and O-rings (5).
5. Carefully push out the spool (11) out of the valve body.
6. Remove the spacers (6, 7, 8, 9) and O-rings (10). Discard the O-rings.
7. Inspect the spool (11) and valve spacers (6, 7, 8, 9) for wear or damage. Replace if necessary.

Air Valve Assembly

NOTE: Coat the valve bore, O-rings, and spool with low-temperature lithium grease before installation.

1. Insert the spacers (7, 8, 9) and O-rings (10) into the valve body as illustrated. Install the red exhaust spacers (7) with the ID holes out.
2. Install the spool (11) through the spacers and O-rings.
3. Insert the end spacers (6) with the chamfered edge pointing out, as illustrated.

4. Install the end plate O-rings (5) into the groove formed by the end spacer and body chamfers.
5. Apply VC-3 threadlocking compound onto the screw threads. Install the end plates (4) and screws (3). Tighten the screws securely.
6. Install the mounting O-rings (12) in the valve body.
7. Install the air valve on the upper head. Tighten the screws (1) securely.
8. Connect the air tubing to the connectors (2).

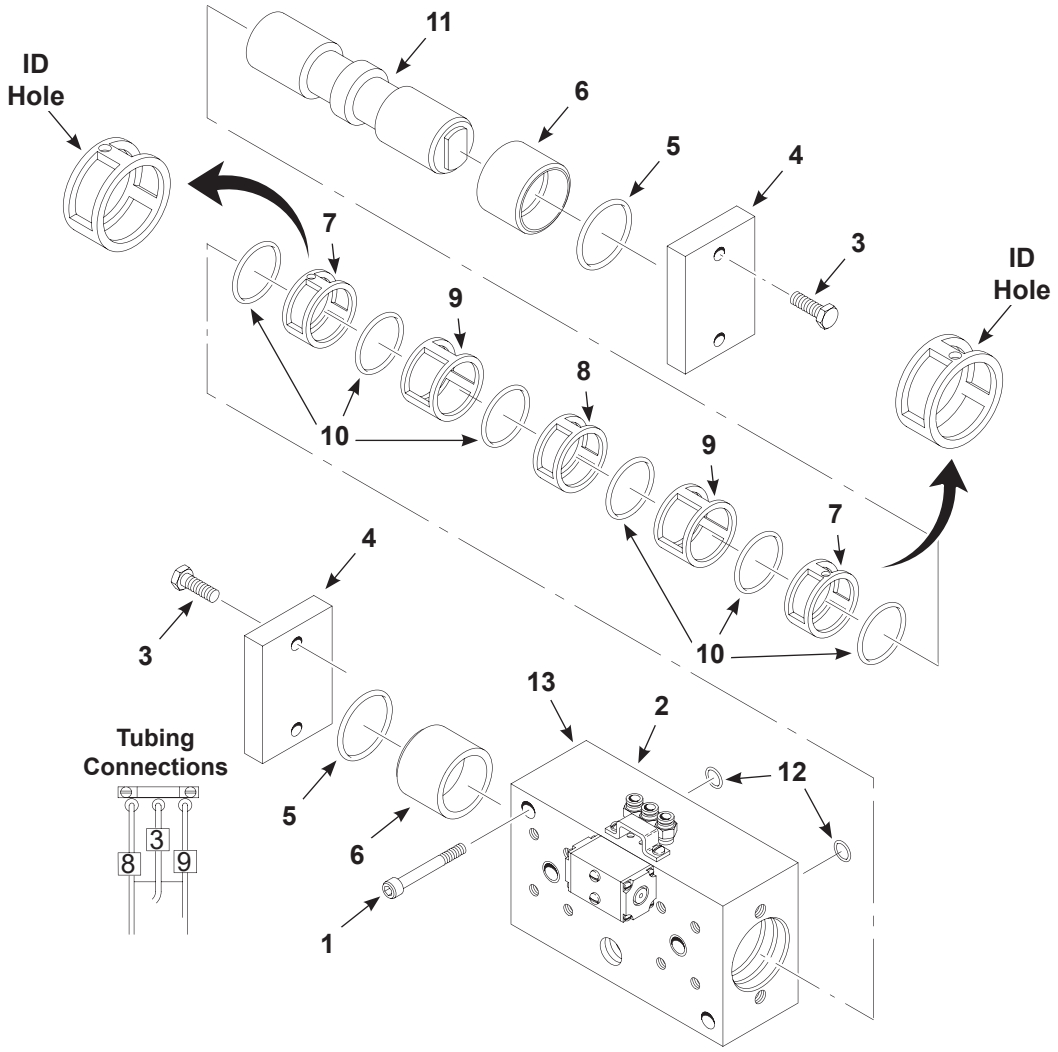

Figure 6-9 Air Valve Repair

1. Mounting screws (2)
2. Tubing connectors (3)
3. End plate screws (4)
4. End plates (2)
5. End plate O-rings (2)
6. End spacers (2)
7. Exhaust spacers (red) (2)
8. Middle spacer (aluminum, narrow) (1)
9. Spacers (aluminum, wide) (2)
10. O-rings (6)
11. Spool
12. Valve mounting O-rings (2)

Section 7
Parts

Parts

To order parts, call the Nordson Industrial Coating Solutions Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

Item	Part	Part	Part	Description	Quantity	Note
—	- - - - - -	—	—		—	
1	- - - - - -					
2						
						Continued...

NOTE: A.

B.

NS: Not Shown

AR: As Required

Parts List Table of Contents

Quick Reference Lists

Assembly Part Numbers

Part	Description	Note
179511	Pump, DR 1676	
139461	Valve, air	A
139477	Gland, packing, solvent seal	
NOTE: A. Air valve only. Does not include mounting screws or O-rings between valve and upper head. Refer to Service Kits for air valve assembly that includes valve and mounting parts.		

Service Kit List

Refer to the appropriate page for kit contents.

Part	Description	Note
1616434	Service kit, repair, air motor, green	7-15
141435	Service kit, repair, air valve	7-15
141436	Service kit, repair, air motor	7-15
141437	Service kit, solvent seal packing gland	7-16
141438	Service kit, hydraulic packing	7-16
141439	Service kit, high pressure check	7-16
141440	Service kit, siphon check	7-17
141441	Service kit, repair, hydraulic section	7-17
1614780	Service kit, screw and washer, hydraulic section	7-17
139496	Valve assembly, JP air	7-18
167538	Conversion kit, roller valve, DR-1676	7-18

Hydraulic Section Parts

See Figure 7-1 and the following parts list.

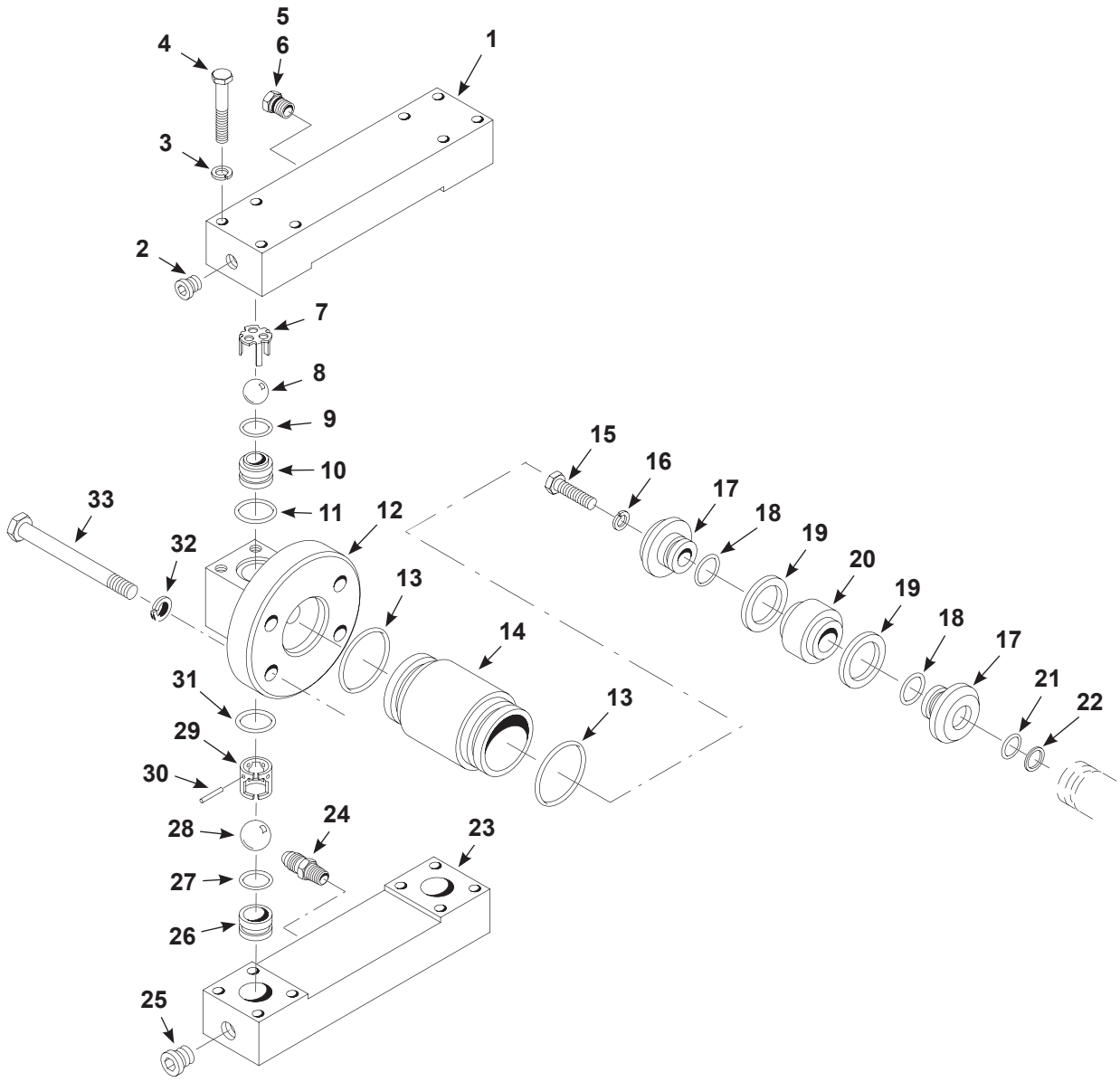

Figure 7-1 Hydraulic Section Parts

Item	Part	Description	Quantity	Note
1	139490	MANIFOLD, pressure	1	
2	973415	PLUG, pipe, socket, standard, 1/4 in., stainless steel	2	
3	983160	WASHER, lock, split, 3/8 in., steel, nickel	16	
4	981624	SCREW, hex head, 3/8-16 x 2.50 in., cap, zinc	16	
5	249356	FITTING, 3/8-in. NPT, with O-ring	1	
6	945017	• O-RING, hot paint, 3/8-in. tube	1	A, B
7	503574	CAGE, ball	2	A
8	900021	BALL, 440 stainless steel, 0.688-in. diameter, 100	2	A
9	940222	O-RING, hot paint, 1.00 x 1.125 x 0.063 in.	2	A,B
10	139483	SEAT, ball, 0.688-in. diameter	2	A
11	940260	O-RING, hot paint, 1.25 x 1.375 x 0.063 in.	2	A, B
12	139485	HOUSING, check	2	
13	941490	O-RING, hot paint, 2.81 x 3.00 x 0.094 in.	4	C, B, D, E
14	139458	CYLINDER, high-pressure	2	
15	981549	SCREW, hex, 5/16 x 1.50 in., stainless steel, G8	2	G
16	983441	WASHER, lock, split, 5/16 in., stainless steel	2	G
17	139488	RETAINER, hydraulic seal	4	
18	940280	O-RING, hot paint, 1.375 x 1.50 x 0.063 in.	4	C, B, D, E
19	119868	SEAL, spring, 23/16 x 21/2 x 3/16 in., UHM	4	C
20	139487	HOLDER, hydraulic seal	2	
21	940160	O-RING, hot paint, 0.625 x 0.75 x 0.063 in.	2	C, B, D, E
22	954045	BACK-UP RING, single, 5/8 x 3/4 in.	2	C, B, D, E
23	139491	MANIFOLD, siphon	1	
24	972112	CONNECTOR, straight, 3/4-in. NPT x 7/8-14	1	
25	711974	PLUG, pipe, socket, 3/4-in. NPT, stainless steel	2	
26	139484	SEAT, ball, 1.125-in. diameter	2	F
27	940250	O-RING, hot paint, 1.188 x 1.312 x 0.063 in.	2	B, F
28	900002	BALL, 440 stainless steel, 1.125 in., 100	2	F
29	503596	GUIDE, ball	2	
30	344802	PIN, ball guide, pump	2	
31	940292	O-RING, hot paint, 1.50 x 1.625 x 0.063 in.	2	B, F
32	983180	WASHER, lock, split, 1/2 in., steel, nickel	8	
33	981614	SCREW, hex head, 1/2-13 x 5.00 in., cap, zinc	8	

NOTE: A. Noted parts included in High Pressure Check Service Kit, part 141439.

B. Noted parts included in Hydraulic Section Repair Kit, part 141441.

C. Noted parts included in Hydraulic Packing Service Kit, part 141438.

D. Noted part included in Air Motor Repair Kit, part 141436.

E. Noted parts included in Solvent Seal Packing Gland Service Kit, 141437.

F. Noted parts included in Siphon Check Service Kit, part 141440.

G. Noted parts are included in Hydraulic Section Screw and Washer Kit, part 1614780

Air Motor Parts

See Figure 7-2 and the following parts list.

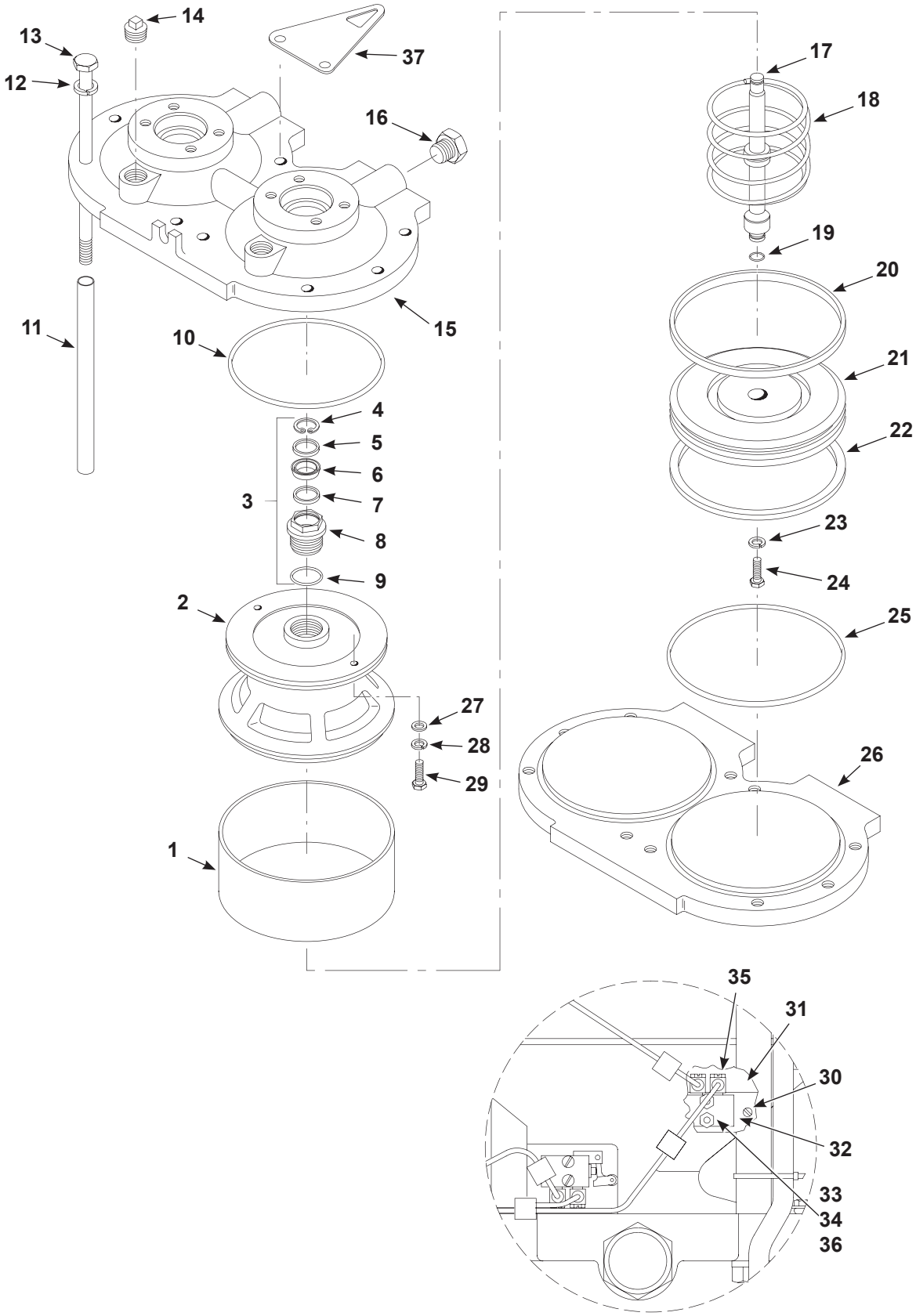

Figure 7-2 Air Motor Parts

Item	Part	Description	Quantity	Note
—	- - - - - -	MOTOR, air	2	
1	119876	• CYLINDER, air, glass	2	
2	139492	• HEAD, lower	2	
3	139477	• GLAND, packing, solvent seal	2	
4	986917	• • RETAINING RING, internal, #112, invert	1	A
5	139480	• • SPACER, solvent seal	1	A
6	139493	• • U-CUP, polyurethane, 7/8 x 1 2/8 x 1/4 in.	1	A
7	139481	• • BEARING, shaft, solvent seal	1	A
8	139478	• • HOUSING, packing gland	1	
9	945081	• • O-RING, hot paint, 1 1/4-in. tube	1	A, B
10	942711	• O-RING, hot paint, 9.25 x 9.50 x 0.125 in.	2	B
11	139479	• SPACER	10	
12	983440	• WASHER, lock, split, 5/8 in., steel, nickel	8	
13	981473	• SCREW, hex head, 5/8-18 x 11.00 in., zinc, G8	10	
14	973434	• PLUG, pipe, square, 1/2 in., stainless steel	2	
15	139489	• CHAMBER, solvent	1	
16	119872	• FILTER, air	2	C
17	139459	• SHAFT, piston	2	
18	139486	• SPRING, compression, 10.25 x 5.938 OD x 0.33 in.	2	
19	940205	• O-RING, Buna-N, 0.875 x 1.00 x 0.063 in.	2	B
20	1616180	• RING, glide, green, cut	2	B
21	139460	• PISTON	2	
22	119857	• U-CUP, 9 5/16 x 10.00 x 11/32 in.	2	B
23	983007	• WASHER, fl at, 0.531 x 1.00 x 0.063 in., zinc	2	
24	981470	• SCREW, socket 1/2-13 x 1.25 in., zinc, Nylok	2	
25	942742	• O-RING, Buna-N, 10.00 x 10.25 in.	2	B
26	139470	• HEAD, upper	1	
27	139497	• WASHER, Nylon, self-sealing	4	B
28	983504	• WASHER, flat, 0.281 x 0.734 x 0.063 in., zinc	4	
29	981472	• SCREW, hex head, 1/4-20 x 1.00 in., stainless steel, G8	4	
30	981770	• SCREW, fillister head, with lock washer, #8−32 x 0.50 in., zinc	2	
31	165745	• ADAPTER, roller valve	2	
32	164419	• VALVE, roller operated	4	
33	981469	• SCREW, fl at, #8-32 x 1.00 in., steel, zinc	4	
34	984112	• NUT, hex, lock, thin, #8-32 UNJC-3B	4	
35	972853	• ELBOW, banjo, 1/8 tube x 10-32, brass	8	
36	981063	• SCREW, fillister head, with lock washer, #8−32 x 0.875 in., zinc	4	
37	167480	• RING, lift, JP	2	

NOTE: A. Noted parts included in Solvent Seal Packing Gland Service Kit, 141437.

B. Noted parts included in Air Motor Repair Kit, part 1616434.

C. Install by hand. Do not over tighten

Air Valve Parts

See Figure 7-3 and the following parts list.

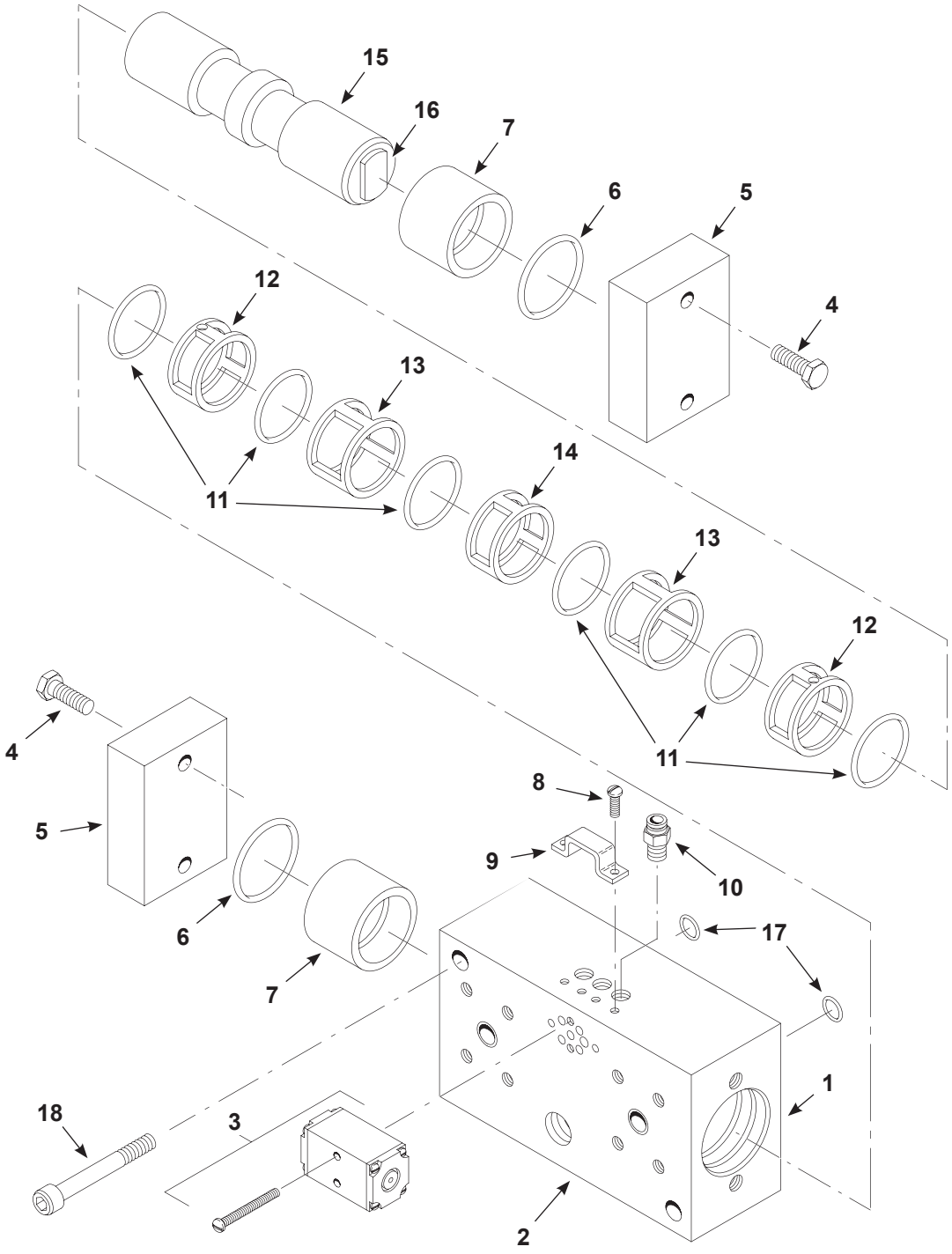

Figure 7-3 Air Valve Parts

Item	Part	Description	Quantity	Note
—	139461	VALVE, air	1	
1	139462	• BODY, air valve	1	
2	973422	• PLUG, pipe, socket, flush, 3/8 in., zinc	4	
3	901166	• VALVE, 2 position, 4-way, air pilot	1	
4	981233	• SCREW, socket, 1/4−20 x 1.00 in., zinc	4	
5	139469	• PLATE, end	2	
6	940311	• O-RING, Buna-N, 1.75 x 1.875 x 0.063 in.	2	A
7	139465	• SPACER, end	2	
8	981039	• SCREW, pan head, #6−32 x 0.312 in., steel, zinc	2	
9	249317	• DEFLECTOR	1	
10	972185	• CONNECTOR, male, 1/8 in. tube x #10−32	3	
11	942206	• O-RING	6	A
12	139466	• SPACER, exhaust (red, narrow)	2	
13	139467	• SPACER (aluminum, wide)	2	
14	139468	• SPACER, middle (aluminum, narrow)	1	
15	165731	• SPOOL, air valve	1	
16	139464	• BUMPER, spool	2	
17	940164	O-RING, Buna-N, 0.625 x 0.75 x 0.063 in.	2	A
18	981475	SCREW, socket, 5/16−18 x 2.75 in., zinc	2	A
NOTE: A. Included in Air Valve Repair Service Kit, part 141435.				

Miscellaneous Pump Parts

See Figure 7-4 and the following parts list.

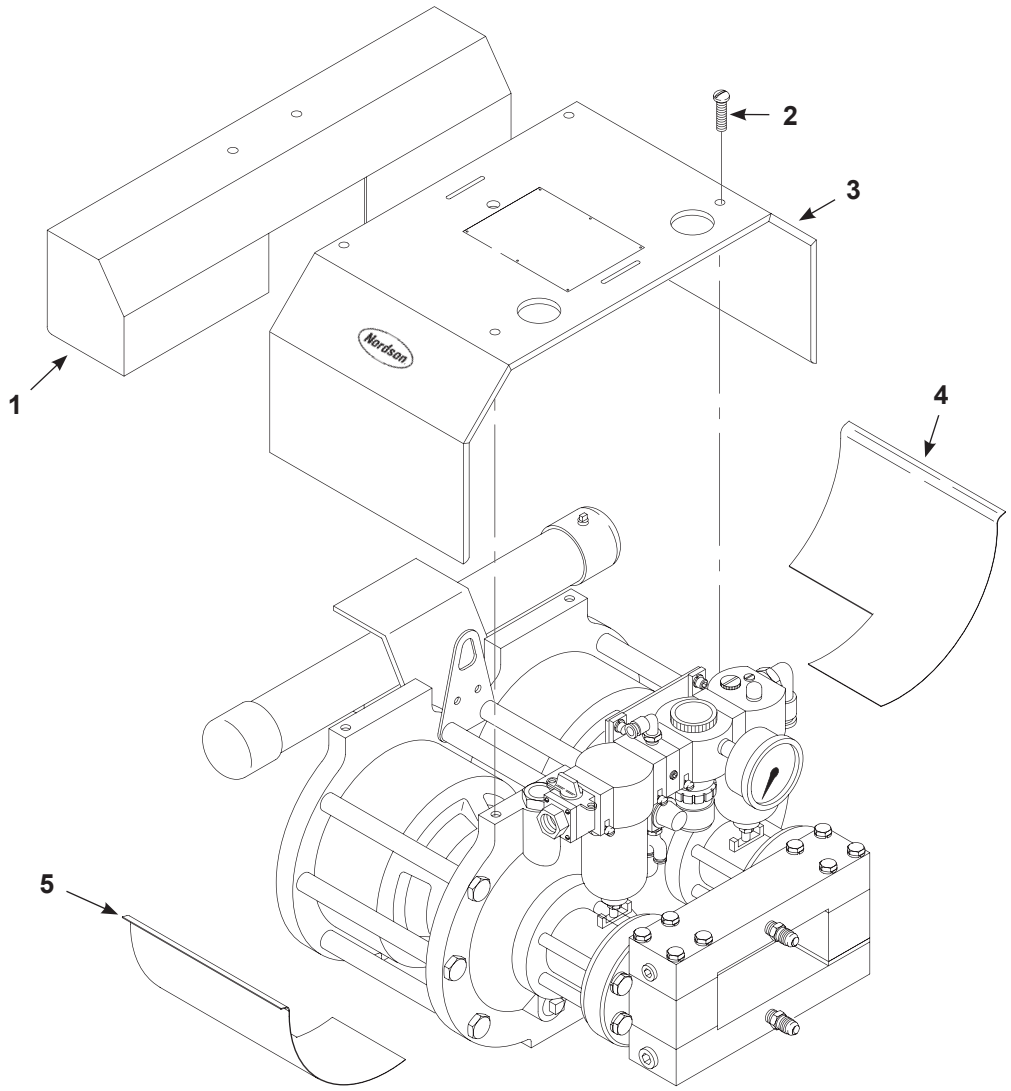

Figure 7-4 Miscellaneous Pump Parts (1 of 4)

Item	Part	Description	Quantity	Note
1	1069275	COVER, accumulator	1	
2	981565	SCREW, pan head, 1/4−20 x 0.50 in., steel, zinc	2	
3	- - - - - -	COVER, pump	1	
4	249967	GUARD, pump, right	1	
5	249966	GUARD, pump, left	1	

See Figure 7-5 and the following parts list.

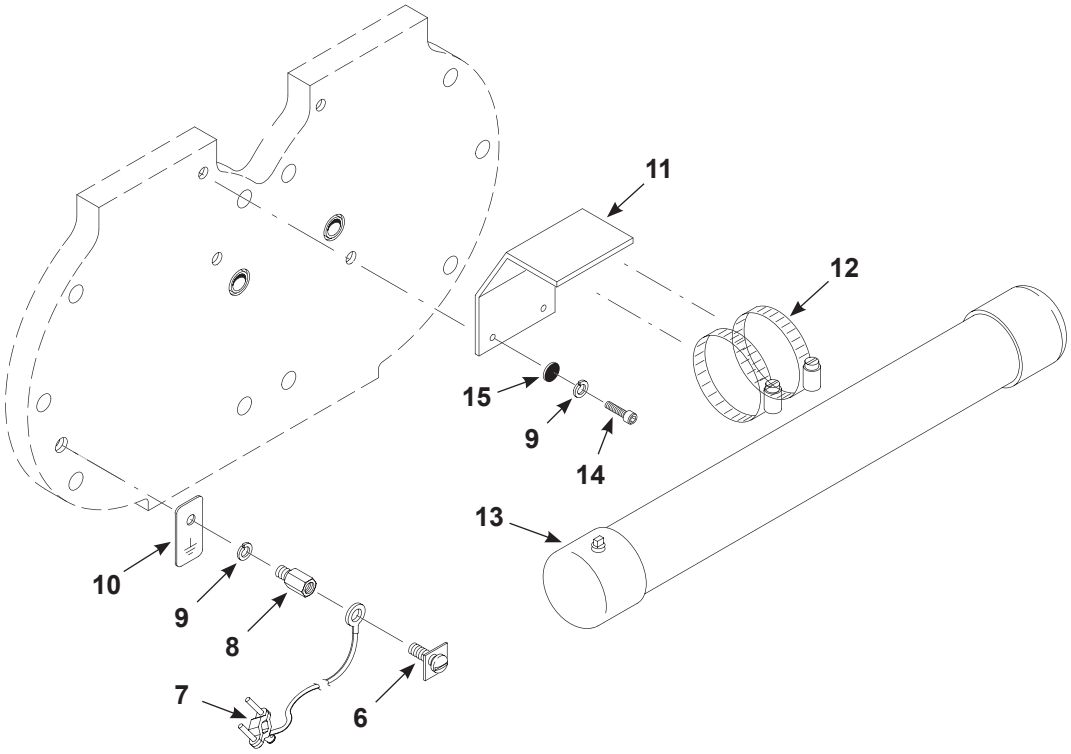

Figure 7-5 Miscellaneous Pump Parts (2 of 4)

Item	Part	Description	Quantity	Note
6	132054	RETAINER, wire	1	
7	240976	CLAMP, ground with wire	1	
8	132154	STUD, ground	1	
9	983140	WASHER, lock, split, 1/4 in., steel, nickel	3	
10	240674	TAG, ground	1	
11	1069272	BRACKET, accumulator, DR pump	1	
12	970970	CLAMP, hose, No. 52	2	
13	139474	ACCUMULATOR, JP	1	
14	981211	SCREW, hex, 1/4−20 x 0.75 in. zinc	2	
15	345913	WASHER, fl at, regular, 1/4 in., zinc	2	

Miscellaneous Pump Parts (con't)

See Figure 7-5 and Figure 7-6 and the following parts list.

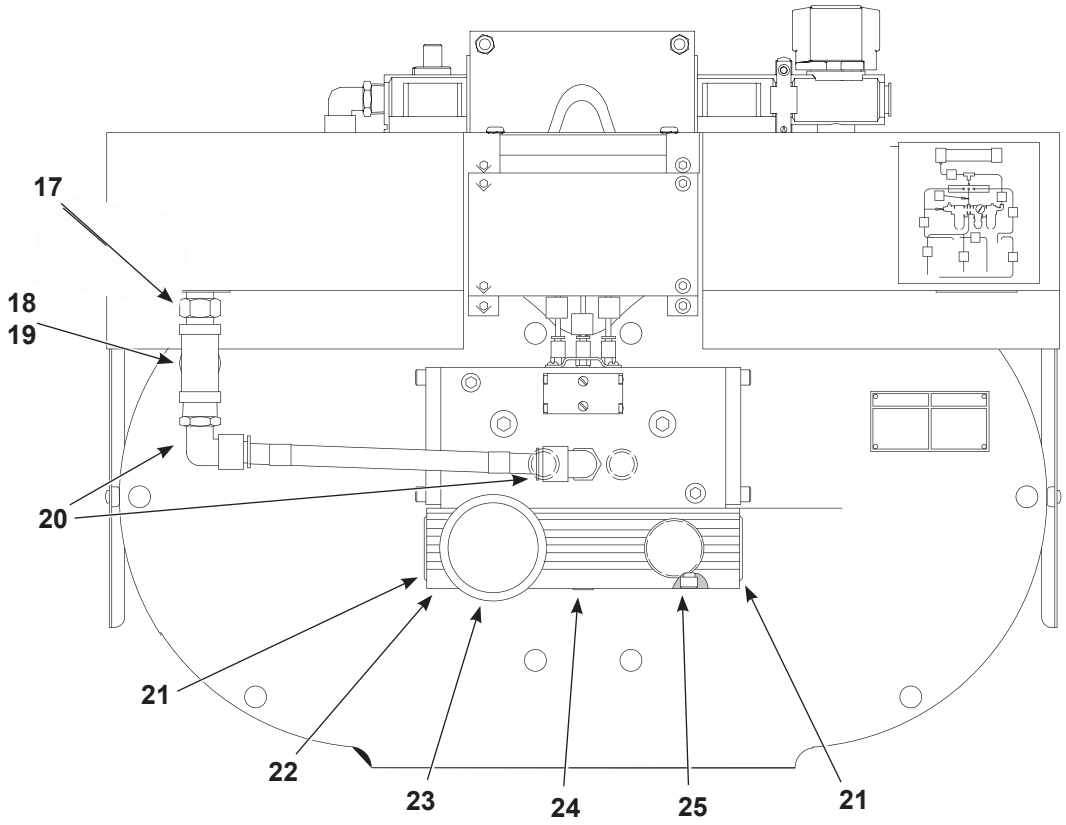

Figure 7-6 Miscellaneous Pump Parts (3 of 4)

Item	Part	Description	Quantity	Note
17	973073	NIPPLE, hex, 3/8 x 3/8 x 1.45, steel, elbow	1	
18	973272	TEE, pipe, class 150, 3/8-in. NPT, steel, zinc	1	
19	971659	CONNECTOR, male, 1/2 tube x 3/8-in. NPT	1	
20	972122	ELBOW, male, 1/2 tube x 3/8-in. NPT	2	
21	973447	PLUG, pipe, socket, standard, 1 1/4 in., zinc	2	
22	249963	MANIFOLD, muffler	1	
23	1079957	MUFFLER, 1 1/4-in. NPT	2	
24	973411	PLUG, pipe, socket, flush, 1/4 in., zinc	1	
25	982292	SCREW, socket, M6 X 55, black	3	

See Figure 7-7 and the following parts list.

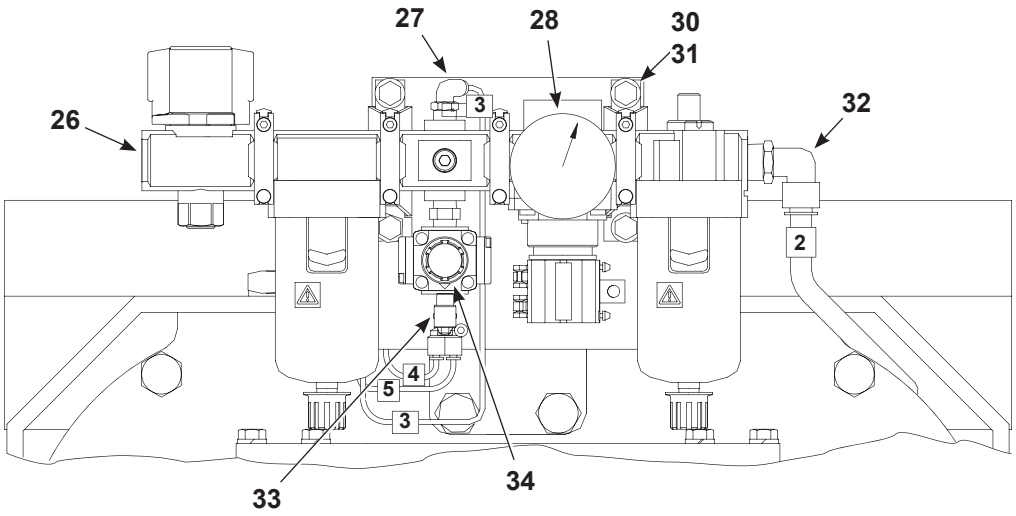

Figure 7-7 Miscellaneous Pump Parts (4 of 4)

Item	Part	Description	Quantity
26	1068742	MODULE, filter, regulator, lubricator, 1/2-in. NPT	1
27	971519	ELBOW, male, 1/8 in. tube x 1/4-in. NPT	1
28	901254	GAUGE, air, 1/8 NPT, PSI-KPA-KG/CM	1
30	984449	NUT, hex, regular, 5/16−18, G8, zinc	4
31	336282	SCREW, hex, serrated, 5/16−18 x 0.75 in., zinc	4
32	972184	ELBOW, male, 1/2-in. tube x 1/2-in. NPT	1
33	1611659	ELBOW, universal branch, ⅛ T x ⅛ NPT, with seal	1
34	1613132	COVER, regulator, lockout, AR20 series	1

Pump Air Tubing

Tube NO.	Part	Size OD (in.)	Length (+/- 1/16 in.)
1	900610	1/2	8 3/4
2	900610	1/2	22 1/2
3	900609	1/8	25 1/2
4	900609	1/8	10 5/8
5	900609	1/8	15 1/4
6	900609	1/8	19
7	900609	1/8	10
8	900609	1/8	15
9	900609	1/8	20

Pump Accessories

See Figure 7-8. These accessories are shipped with new pumps.

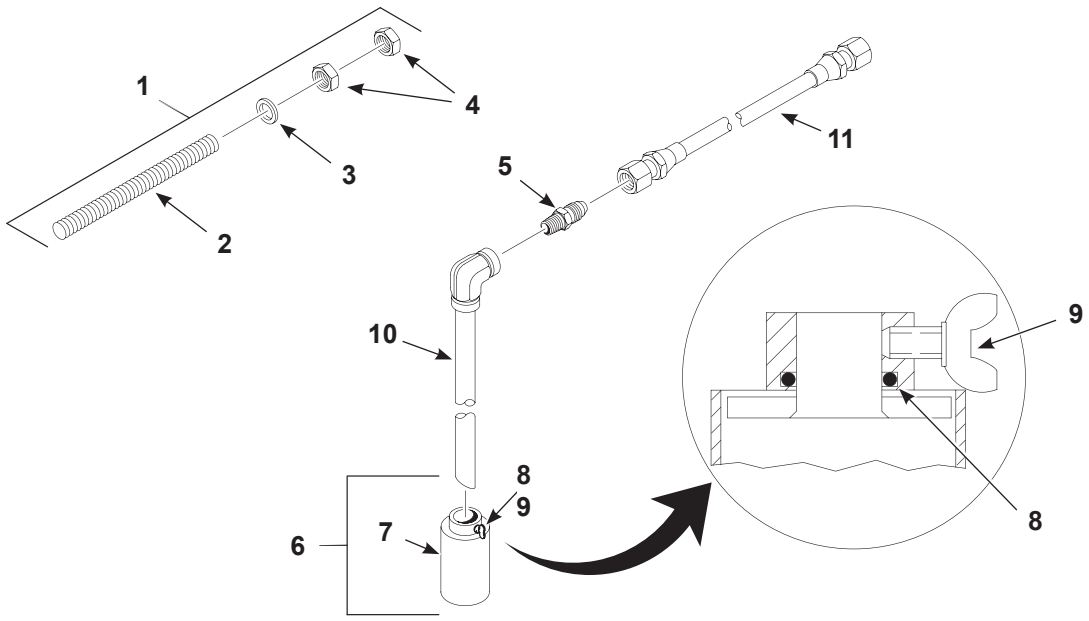

Figure 7-8 Pump Accessories

Item	Part	Description	Quantity	Note
—	1600760	ACCESSORY GROUP, JP, Type−T	1	A
1	141443	• TOOL KIT, repair, JP	1	
2	- - - - - -	• • STUD, 5/8−8 x 16 in., steel	2	
3	983090	• • • WASHER, flat, 0.656 x 1.312 x 0.095 in., zinc	2	
4	984194	• • • NUT, hex, regular, 5/8−18, zinc-plated steel	4	
5	972102	• CONNECTOR, male, 37, 7/8−14 x 1/2 in., stainless steel	1	
6	713186	• STRAINER, siphon, stainless steel, with 0.006-in. screen	1	
7	713198	• • STRAINER, siphon, stainless steel	1	
8	941160	• • O-RING, hot paint, 0.75 x 0.938 x 0.094 in.	1	
9	981279	• • SCREW, thumb, 1/4−20 x 1.00 in., stainless steel	1	
NS	140029	• FLUID, type-T concentrate, 1 quart	1	
NS	900214	• OIL, vitalizer, 1 pint	1	
NS	900431	• ADHESIVE, pipe/thread/hydraulic sealant	1	
10	750256	ROD, siphon, 55-gallon	1	
11	827060	HOSE, siphon, 1/2-in. ID, stainless steel, 5 ft	1	

NOTE: A. For an optional accessory group with Type-Q solvent instead of Type-T, order 141428 Accessory Group. To order just Type-Q solvent fluid, order 244854 Fluid, Type-Q concentrate. Refer also to the Solvent Chamber Fluid Guide included with this manual.

NS: Not Shown

Service Kits

Air Valve Repair Kit

See Figure 7-3 for component location.

Item	Part	Description	Quantity	Note
—	141435	SERVICE KIT, repair, air valve	1	
6	940311	• O-RING, Buna-N, 1.75 x 1.875 x 0.063 in.	2	
11	942206	• O-RING	6	
18	981475	• SCREW, socket, 5/16−18 x 2.75 in., zinc	2	
17	940164	• O-RING, Buna-N, 0.625 x 0.75 x 0.063 in.	2	
NS	900337	• GREASE, lithium, low temperature, 1.75 oz	1	
NS: Not Shown				

Air Motor Repair Kit

Kit repairs both air cylinders. See Figure 7-1 and Figure 7-2 for component location.

Item	Part	Description	Quantity	Note
—	1616434	KIT, repair, air motor, green	1	
—	141436	SERVICE KIT, repair, air motor	1	
9	945081	• O-RING, hot paint, 1 1/4-in. OD tube	2	A
10	942711	• O-RING, hot paint, 9.25 x 9.50 x 0.125 in.	2	A
19	940205	• O-RING, Buna-N, 0.875 x 1.00 x 0.063 in.	2	A
20	1616180	• RING, glide, green, cut	2	A, C
	119858	• RING, glide	2	A, D
22	119857	• U-CUP, 9 5/16 x 10.00 x 11/32 in.	2	A
25	942742	• O-RING, Buna-N, 10.00 x 10.25 in.	2	A
27	139497	• WASHER, nylon self-sealing	4	A
18	940280	• O-RING, hot paint, 1.375 x 1.50 x 0.063 in.	4	B
21	940160	• O-RING, hot paint, 0.625 x 0.75 x 0.063 in.	2	B
22	954045	• BACK-UP RING, single, 5/8 x 3/4 in.	2	B
NS	900337	• GREASE, lithium, low temperature, 1.75 oz	1	

NOTE: A. See Figure 7-2, Air Motor Parts, for component location.

B. See Figure 7-1, Hydraulic Section Parts, for component location.

C. Part of service kit 1616434.

D. Part of service kit 141436.

Solvent Seal Packing Gland Service Kit

Kit rebuilds both solvent seal packing glands. See Figure 7-1 and Figure 7-2 for component location.

Item	Part	Description	Quantity	Note
—	141437	SERVICE KIT, solvent seal	1	
4	986917	• RETAINING RING, internal, #112, invert	2	A
5	139480	• SPACER, solvent seal	2	A
6	139493	• U-CUP, polyurethane, 7/8 x 1 1/8 x 1/4 in.	2	A
7	139481	• BEARING, shaft, solvent seal	2	A
9	945081	• O-RING, hot paint, 1 1/4 in. OD tube	2	A
13	941490	• O-RING, hot paint, 2.81 x 3.00 x 0.094 in.	4	B
18	940280	• O-RING, hot paint, 1.375 x 1.50 x 0.063 in.	4	B
21	940160	• O-RING, hot paint, 0.625 x 0.75 x 0.063 in.	2	B
22	954045	• BACK-UP RING, single, 5/8 x 3/4 in.	2	B
NOTE: A. See Figure 7-2, Air Motor Parts, for component location. B. See Figure 7-1, Hydraulic Section Parts, for component location				

Hydraulic Packing Service Kit

Kit repairs both air cylinders. See Figure 7-1 for component location.

Item	Part	Description	Quantity	Note
—	141438	SERVICE KIT, hydraulic packing	1	
13	941490	• O-RING, hot paint, 2.81 x 3.00 x 0.094 in.	4	
18	940280	• O-RING, hot paint, 1.375 x 1.50 x 0.063 in.	4	
19	119868	• SEAL, spring, 2 3/16 x 2 1/2 x 3/16 in., uhm	4	
21	940160	• O-RING, hot paint, 0.625 x 0.75 x 0.063 in.	2	
22	954045	• BACK-UP RING, single, 5/8 x 3/4 in.	2	

High-Pressure Check Service Kit

Kit rebuilds both high-pressure check valves. See Figure 7-1 for component location.

Item	Part	Description	Quantity	Note
—	141439	SERVICE KIT, high-pressure check	1	
6	945017	• O-RING, hot paint, 3/8 in. tube	1	
7	503574	• CAGE, ball	2	
8	900021	• BALL, 440 stainless steel, 0.688 in., 100	2	
9	940222	• O-RING, hot paint, 1.00 x 1.125 x 0.063 in.	2	
10	139483	• SEAT, ball, 0.688 in. diameter	2	
11	940260	• O-RING, hot paint, 1.25 x 1.375 x 0.063 in. 2	2	

Siphon Check Service Kit

Kit rebuilds both siphon check valves. See Figure 7-1 for component location.

Item	Part	Description	Quantity	Note
—	141440	SERVICE KIT, siphon check	1	
26	139484	• SEAT, ball, 1.125-in. diameter	2	
27	940250	• O-RING, hot paint, 1.188 x 1.312 x 0.063 in.	2	
28	900002	• BALL, 440 stainless steel, 1.125 in., 100	2	
31	940292	• O-RING, hot paint, 1.50 x 1.625 x 0.063 in.	2	

Hydraulic Section Repair Kit

See Figure 7-1 and Figure 7-2 for component location.

Item	Part	Description	Quantity	Note
—	141441	SERVICE KIT, repair, hydraulic section	1	
9	945081	• O-RING, hot paint, 11/4-in. OD tube	2	A
6	945017	• O-RING, hot paint, 3/8-in. tube	1	B
9	940222	• O-RING, hot paint, 1.00 x 1.125 x 0.063 in.	2	B
11	940260	• O-RING, hot paint, 1.25 x 1.375 x 0.063 in.	2	B
13	941490	• O-RING, hot paint, 2.81 x 3.00 x 0.094 in.	4	B
18	940280	• O-RING, hot paint, 1.375 x 1.50 x 0.063 in.	4	B
21	940160	• O-RING, hot paint, 0.625 x 0.75 x 0.063 in.	2	B
22	954045	• BACK-UP RING, single, 5/8 x 3/4 in.	2	B
27	940250	• O-RING, hot paint, 1.188 x 1.312 x 0.063 in.	2	B
31	940292	• O-RING, hot paint, 1.50 x 1.625 x 0.063 in.	2	B

NOTE: A. See Figure 7-2, Air Motor Parts, for component location.

B. See Figure 7-1, Hydraulic Section Parts, for component location.

Hydraulic Section Screw and Washer Kit

See Figure 7-1.

Item	Part	Description	Quantity	Note
—	1614780	SERVICE KIT, screw and washer, hydraulic section	1	
15	981549	• SCREW, hex, 5/16 x 1.50 in., stainless steel, G8	2	
16	983441	• WASHER, lock, e, split, 5/16 in., stainless steel	2	
NS	900200	• ADHESIVE, Loctite 242, blue, removable, 0.5 ml	AR	

AR: As Required

NS: Not Shown

Air Valve Assembly

See Figure 7-3.

Item	Part	Description	Quantity	Note
—	139496	VALVE ASSEMBLY, JP air	1	
NS	972522	• TEE, branch, 1/2 tube x 3/8-in. NPT	1	A
NS	981475	• SCREW, socket, 5/16-18 x 2.750 in., zinc	2	
NS	139461	• VALVE, air	1	B
NS	940164	• O-RING, Buna-N, 0.625 x 0.750 x 0.063 in.	2	

NOTE: A. Not used on DR-1676 pump. Discard and use 972122 Elbow, male at valve inlet.

B. Refer to the Air Valve Parts List on page 7-8 for a detailed parts breakdown.

Roller Valve Conversion Kit

Use this kit on older pumps to upgrade roller valves to the current configuration shown in Figure 7-2.

Item	Part	Description	Quantity	Note
—	167538	CONVERSION KIT, roller valve, DR-1676	1	
31	165745	• ADAPTER, roller valve	2	
32	164419	• VALVE, roller-operated	4	
33	981469	• SCREW, flat, #8-32 x 1.000 in., zinc-plated steel	4	
34	984112	• NUT, hex head, lock, thin, #8-32 unjc-3b	4	
35	972853	• ELBOW, banjo, 1/8 tube x 10-32, brass	8	
36	981063	• SCREW, fillister head, with lock washer, #8-32 x 0.875 in., zinc	4	
NS	900424	• COMPOUND, threadlocking, VC-3	AR	

AR: As Required

NS: Not Shown

Options

Optional Circulation Kit

Refer to the instruction sheets furnished with the kit for parts and repair instructions. See Figure 3-3 for circulation kit installation.

Part	Description	Quantity	Note
105071	KIT, circulation, stainless steel	A	
973389	BUSHING, pipe, hydraulic, 3/4 x 1/2-in., stainless steel	B	

NOTE: A. Kit contains one circulation valve and one ball valve, plus fittings, drain hose, and drain rod. Order two kits for dual circulation installation.

B. This bushing is not included with the circulation kit and must be ordered separately. See Figure 3-3 for the location of the bushing.

EU DECLARATION of Conformity

Product: **Dual Piston Pump**

Models: DR-1676 Series Pumps

This Declaration is issued under the sole responsibility of the manufacture.

Description: This is an air operated, vertically mounted pump for liquid materials.

Applicable Directives:
2006/42/EC - Machinery Directive
2014/34/EU - ATEX Directive

Standards Used for Compliance:
EN/ISO12100 (2010)
EN/ISO80079-36 (2016)
EN/ISO80079-37 (2016)
EN1127-1 (2019)
EN809: 1998+A1:2009

Flammable Atmosphere Marking: Ex h IIB T6 Gb
Tech File: Sira / CSA Group, NB 2813 (Arnhem, Netherlands)
DNV - ISO9001
ATEX Quality Notification – SGS Fimko Oy, NB 0598 (Helsinki Finland)

Quality System DNV – ISO9001 Certified

Date: 22Jan2024

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Person authorized to compile the relevant technical data.
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UK DECLARATION of Conformity

Product: **Dual Piston Pump**

Models: DR-1676 Series Pumps

This Declaration is issued under the sole responsibility of the manufacture.

Description: This is an air operated, vertically mounted pump for liquid materials.

Applicable UK Regulations:
Supply Machinery Safety Regulation 2008
Equipment & Protective Systems Intended for use in Potentially Explosive Atmosphere Regulation 2016

Standards Used for Compliance:
EN/ISO12100 (2010)
EN/ISO80079-36 (2016)
EN/ISO80079-37 (2016)
EN1127-1 (2019)
EN809 : 1998+A1:2009

Flammable Atmosphere Marking: Ex h IIB T6 Gb
Tech File: Sira / CSA Group, NB 0518 (Hawarden, UK)
DNV - ISO9001
Quality Notification – SGS Baseefa, NB 1180 (Buxton, Derbyshire, UK)

Quality System DNV – ISO9001 Certified

Date: 22Jan2024

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Pump Packing and Solvent Chamber Fluid Guide

This guide covers the following:

- Packing and Solvent Chamber Fluid Compatibility
- Packing Material and Application
- Solvent Chamber Fluid Composition and Application
- Solvent Chamber Fluid Parts List
- Type Q Concentrate Mixing Instructions

Packing and Solvent Chamber Fluid Compatibility

MATERIAL TYPE	SOLVENT FAMILY	ABRASIVE QUALITY	PACKING TYPE	SOLVENT FLUID
Waterborne	Water	Mild	D	T, Q
		Medium	G	T, Q
		High	U	T, Q
	Alcohols	Mild	D	T, Q
		Medium	G	T, Q
		High	U	T, Q
Solventborne	Ketones (e.g., acetone, MEK, MAK, etc.)	Mild	F	K, S
		Medium	F	K, S
		High	U	K, S
	Aromatic Hydrocarbons (e.g., xylene, toluene, etc.)	Mild	F	K, S
		Medium	F	K, S
		High	F, U(1)	K, S
	Alcohols	Mild	D	K, Q
		Medium	G	T, Q
		High	U	K, Q
	Aliphatic Petroleum Naphthas	Mild	D	K, S
		Medium	D	K, S
		High	G	T, Q
	Chlorinated Solvents	Mild	F	K, S
		Medium	F	K, S
		High	F	K, S

Note 1: Type U packings may swell slightly when exposed to aromatic hydrocarbon solvents.

Packing Material and Application

Packing Type	Material	Application
A	Cotton duck saturated with buna-nitrile and coated with graphite	Good for less abrasive applications where strong solvents are not used. Contains graphite coating to reduce friction.
D	Cotton duck and synthetic fabric saturated with buna-nitrile and PTFE	Good for less abrasive applications where strong solvents are not used. Contains PTFE to reduce friction.
F	PTFE V-rings stacked with leather V-rings	Most commonly used packing in the finishing industry. Use for strong solvents and abrasive materials.
G(1)	Polyurethane U-cups	Frequently used with waterborne materials. Not compatible with some solvents.(1)
U(2)	Ultra-high molecular weight polyethylene (UHMWPE)	Good for highly abrasive materials. Compatible with waterborne and most solventbornes.(2)
NOTE 1: Do not use Type G packing glands with aromatic hydrocarbon solvents or with Type K or S solvent chamber fluids. **NOTE 2:** Type U packings may swell slightly when exposed to aromatic hydrocarbon solvents.		

Solvent Chamber Fluid Composition and Application

Solvent Type	Material	Application
T	Mixed propylene glycol	Use for waterborne systems. (Thinner than Type-Q and best used on smaller pump models.)
Q	Liquid anionic flocculant mixed with distilled water.	Use for waterborne systems. (Thicker than Type-T and best used on larger pump models.)
K	Epoxidized soybean oil	Use for solventborne applications. Do not use for waterborne and catalyzed alkyd urea applications.
S	Mixed aliphatic dimethyl esters	Use for solventborne applications.
NOTE: Type K solvent is highly viscous. At room temperature, it is not appropriate for use in Model 25B or 64B pumps where the solvent must flow through a filler cup and small ID passage into the solvent chamber.		

Solvent Chamber Fluid Parts List

Part	Description
248831	FLUID, type-S, pump chamber, one quart
900255	FLUID, type-K, pump chamber, one quart
140029	FLUID, type-T, pump chamber, one quart
244854	FLUID, type-Q concentrate (2.6 fluid ounce, makes one gallon)

Type Q Concentrate Mixing Instructions

WARNING: Do not take internally. For industrial use only. Avoid direct contact. Eye and skin irritant. Refer to the MSDS shipped with the solvent chamber fluid for more information.

Mix one gallon of distilled water with 2.6 fluid ounces of Type Q concentrate as follows:

1. Fill a 1-gallon-(3.8-liter) round container $^3/_4$ full of distilled water at 70–100 °F.
2. Use a rotating agitator to mix the water until it forms a whirlpool at the container's center.
3. Slowly pour one full bottle (2.6 oz.) of Type Q concentrate into the whirlpool.
4. Add the remaining distilled water to make one gallon, and mix for an additional 15 minutes.

NOTE: The mixture may separate after prolonged shelf time. If it does, mix again before using.

Issued 10/03

Air Lubricator Adjustments and Oils

Adjustments

Air lubricators are shipped with Nordson pumps or are optional equipment. Refer to your pump manual for lubricator installation instructions.

Lubricators are not pre-adjusted at the factory. To properly adjust the lubricator, follow the instructions below:

1. Fill the lubricator bowl with Nordson Vitalizer oil.

   NOTE: Use only Nordson Vitalizer oil or an oil recommended by your Nordson representative. Disregard any oil recommendations in the OEM instruction sheet shipped with the air lubricator.

2. Start the pump and run it at the desired operating speed.
3. Adjust the lubricator to deliver oil at the rate given for your pump in the following table.

Pump Model	Strokes per drop of oil
180D	10–15
360D	10–15
25B	17–25
64B	15–20
32/64	17–25
CP	15–20
JP	5–10

Ordering Nordson Vitalizer Oil

To order parts, call the Nordson Finishing Customer Support Center at (800) 433–9319 or your local Nordson representative.

Quantity	Part Number
1 Pint (0.47 liters)	900214
1 Quart (0.95 liters)	900215
1 Gallon (3.79 liters)	900216
5 Gallons (18.93 liters)	900217

Vitalizer Oil Specifications

API Gravity:	31.7
Pour Point:	25 °F (-3.9 °C)
Flash Point 1:	430 °F (221 °C) (See Note 1)
Viscosity @ 100 °F (38 °C):	153
Viscosity @ 210 °F (99 °C):	43
Viscosity Index:	95
Neutralization No.	0.12
Toxicity (Refer to Notes 2 and 3)	

Specification Notes

1. As oil is heated various fractions will boil off in succession, starting at 430 °F (221 °C).
2. The toxicity of this oil is not classified as a hazardous material by the U.S. Department of Labor Health and Safety Regulations. There is a possibility of dermatitis. Effects of overexposure are presently unknown.
3. Antidote: If eyes are exposed to this oil, flush with plain water. Skin that has been exposed to this oil should be washed with soap and water, as with any lubricating oil.

Issued 1/04

DR-1676 Pump

Refer to the DR-1676 Pump manual 237432 for complete service and parts information.

For parts and technical support call (800) 433-9319.

Hydraulic Section Service Kits

A - Hydraulic Section Repair Kit 141441

B - High-Pressure Check Service Kit 141439

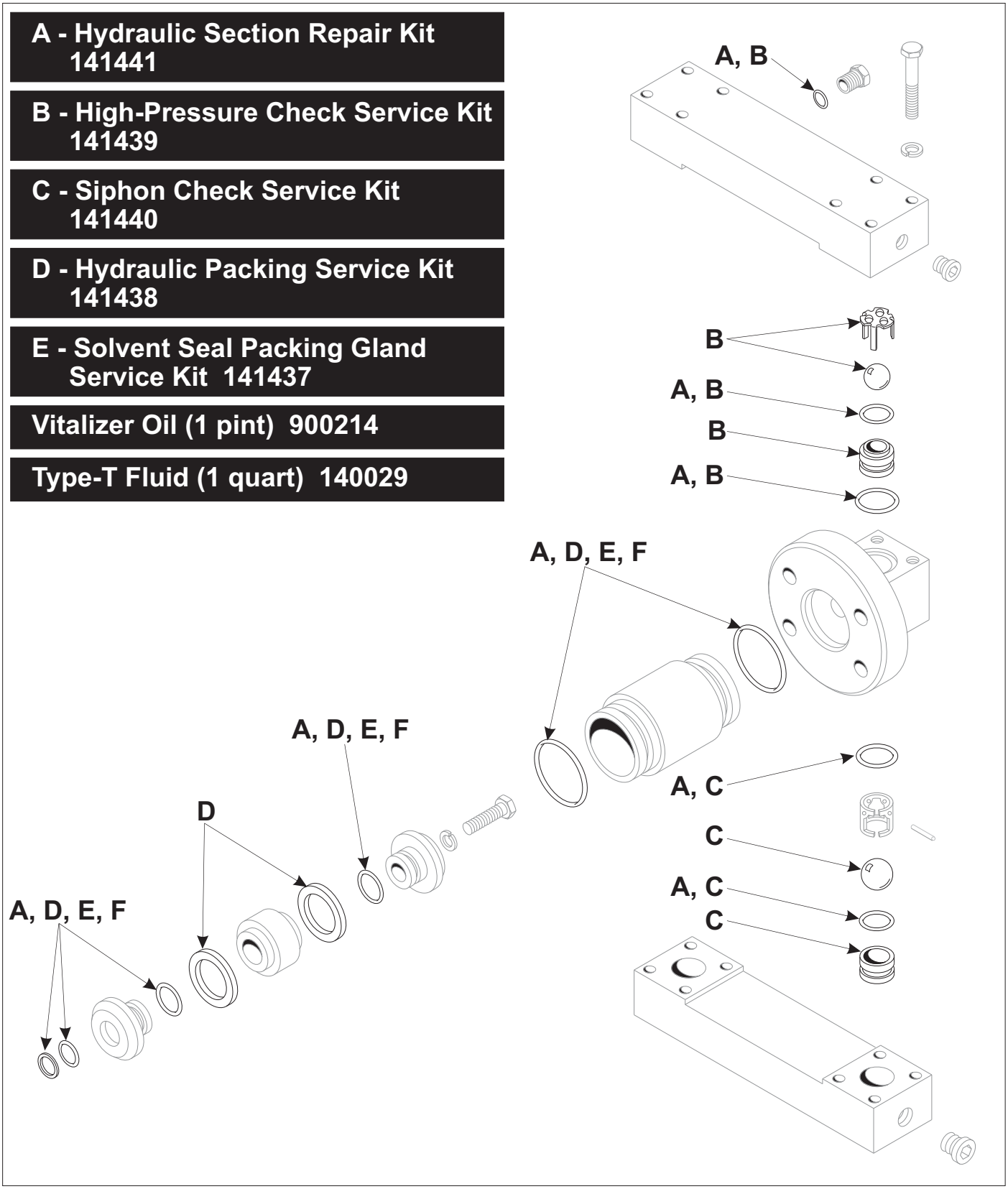
C - Siphon Check Service Kit 141440

D - Hydraulic Packing Service Kit 141438

E - Solvent Seal Packing Gland Service Kit 141437

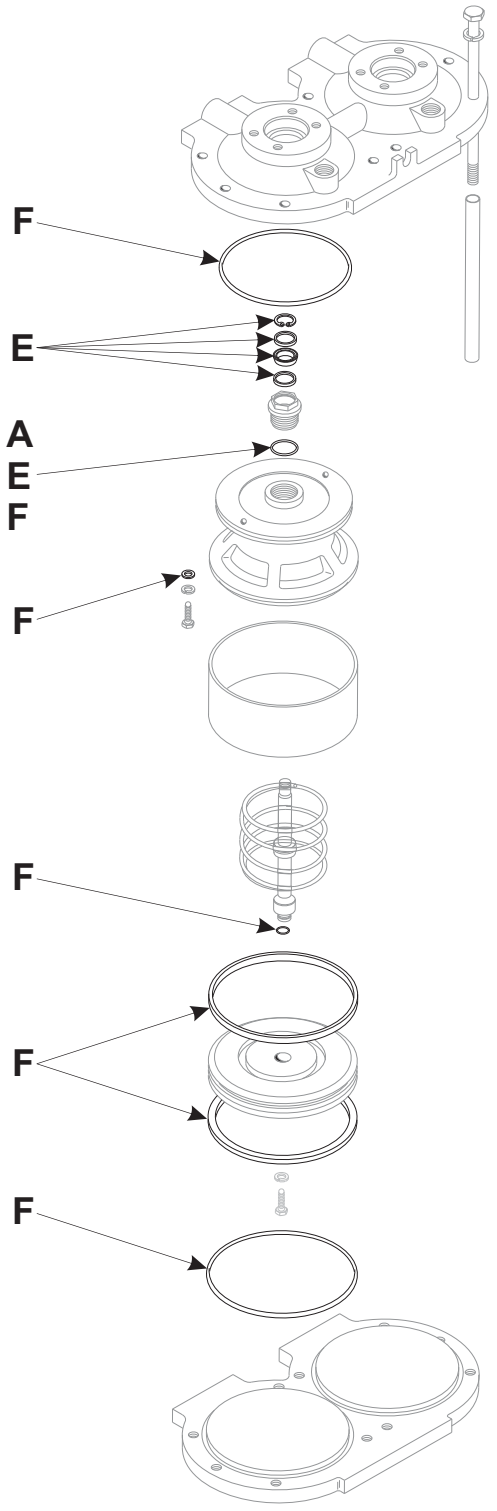
Vitalizer Oil (1 pint) 900214

Type-T Fluid (1 quart) 140029

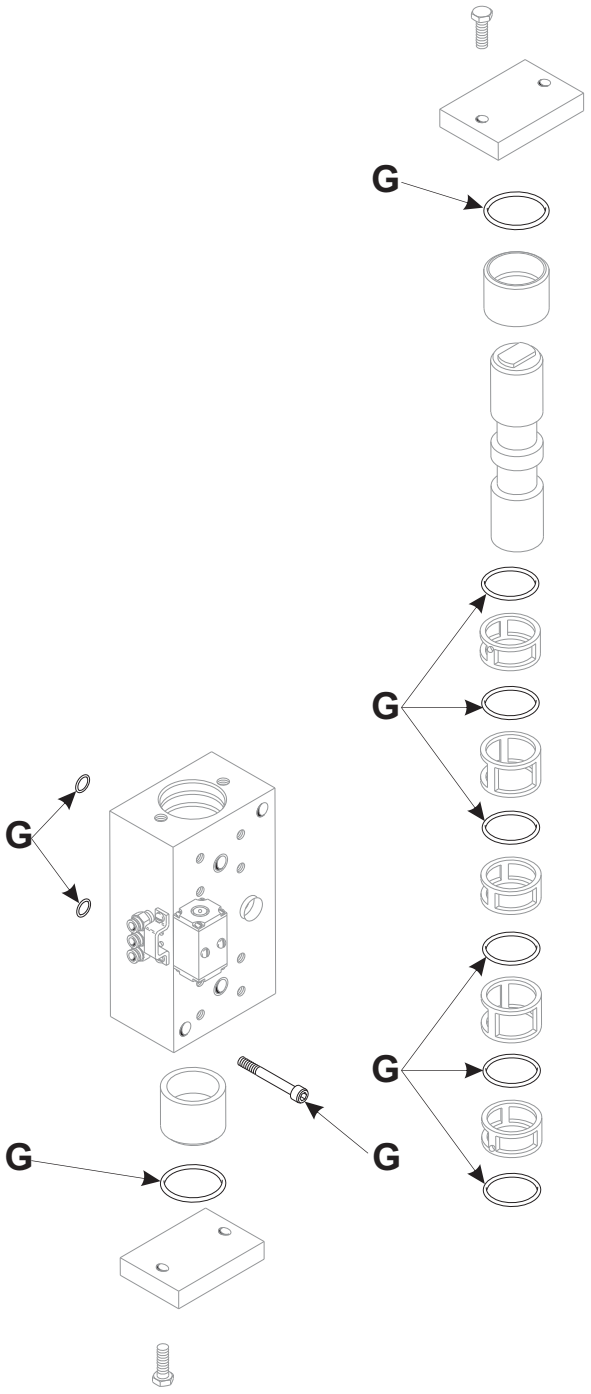


Air Section Service Kits

F - Air Motor Repair Kit
1616434 (Green, cut)
141436 (optional)



G - Air Valve Repair Kit
141435



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