CP Pump

Customer Product Manual
Document Number 104373-10
Issued 01/25

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

This document is subject to change without notice.
Check http://emanuals.nordson.com for the latest version.

NORDSON CORPORATION • 100 NORDSON DR, AMHERST, OHIO 44001 • USA

Contact Us
Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address:
http://www.nordson.com

http://www.nordson.com/en/global-directory

– Original document –

Table of Contents

Change Record

Revision	Date	Change
03	10/15	Removed O-rings from siphon ball check valve service kit.
04	2/17	Updated certification.
05	5/17	Added regulator cover.
06	2/18	Updated elbow.
07	7/18	Update cover part number for regulator.
08	10/21	Updated approvals and DOCs.
09	01/25	Changed PN 901254 to correct description
10	01/25	Updated Manufacturer Address on Manual, Label, DOCs,

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

See Figure 1-1 for the location of the safety labels. Figure 1-2 displays the main safety label (1). Table 1-1 describes the remaining safety labels (2, 3). Figure 1-3 displays the ATEX patent label.

Safety labels are provided to help you operate and maintain your equipment.

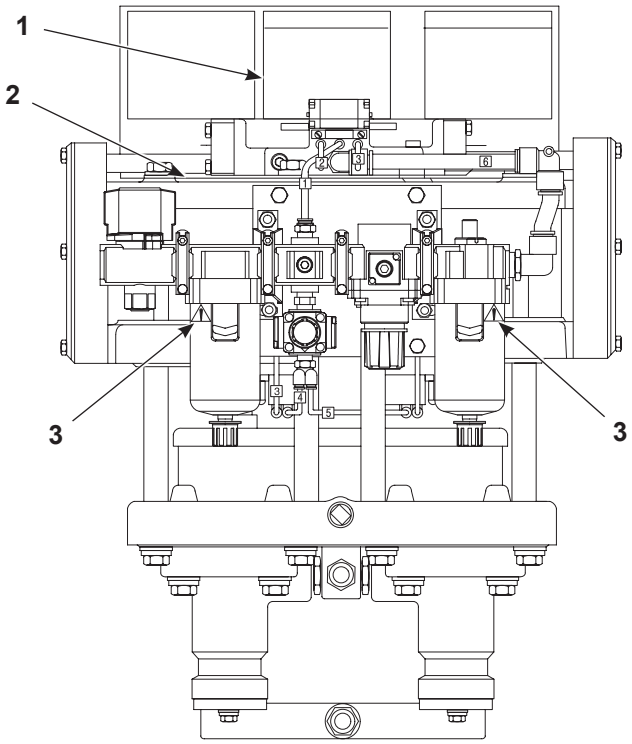


Figure 1-1 Safety Label Locations

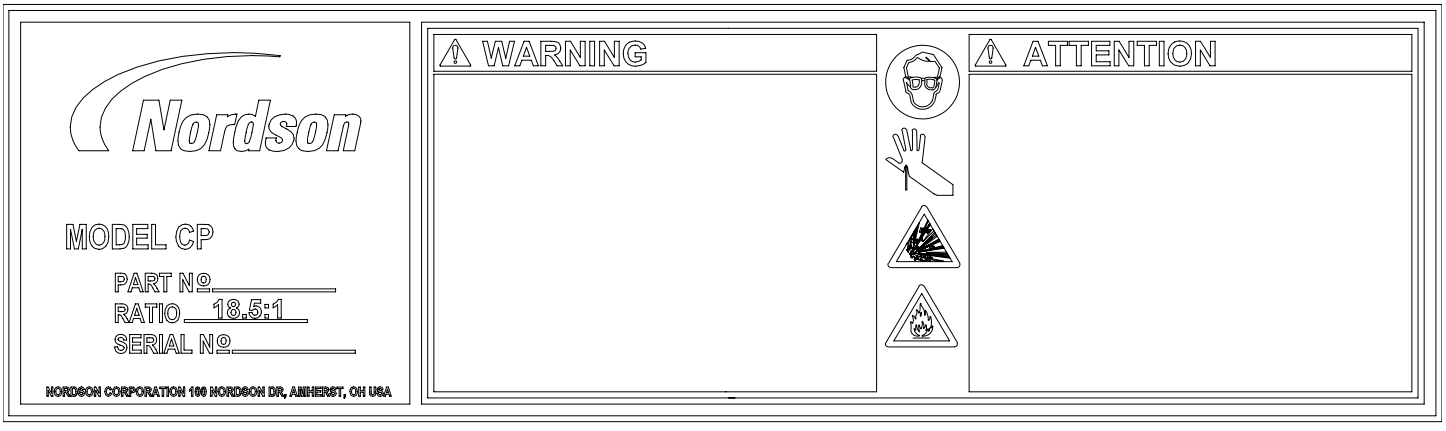


Figure 1-2 Main Safety Label

Table 1-1 Safety Labels

Item	Part	Description
2	- - - - - -	**WARNING:** Air motor section contains spring loaded pistons. Refer to manual for disassembly instructions.
3	- - - - - -	**WARNING:** General warning, caution, risk of danger.

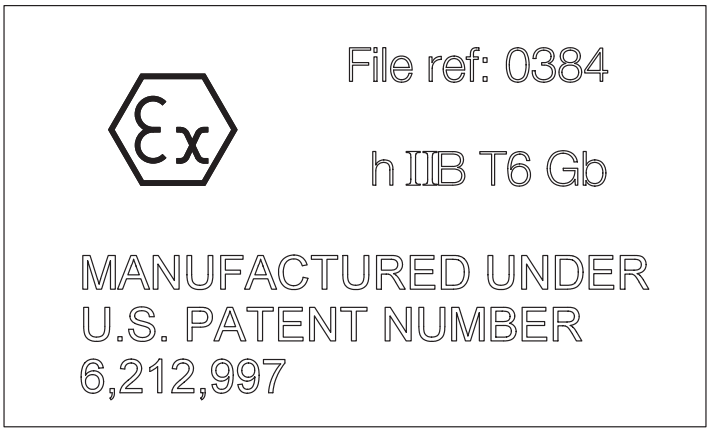


Figure 1-3 ATEX/Ex Patent Label

Section 2
Overview

Introduction

The Nordson Constant Pressure (CP) pump is an air powered, positive displacement, demand-type, reciprocating dual piston pump.

Table 2-1 CP Pump Versions

Part Number and Type	Description
130697 General Finishing	Used with solventborne coating materials. TFE/leather packings, Buna-N O-rings.
112246 Solventborne	Used with solventborne coating materials. Spring-loaded PTFE U-cup packings, Buna-N O-rings.
170494 Solventborne EPR	Used with high-ketone (such as MEK) solvent-borne coating materials. Spring-loaded PTFE U-cup pack- ings, Ethylene/ Prophylene/Rubber O-rings.
249351 Waterborne	Used with waterborne coating materials. Spring- loaded PTFE U-cup packings, Buna-N O-rings.
1004016 Abrasive-Resistant Waterborne	Used with abrasive waterborne coating materials. Polyurethane U-cup packings, Buna-N O-rings, and carbide high-pressure ball check seats.

The fluid output pressure to air input pressure ratio of the pump is 18.5:1, producing 104 bar (1500 psi) of fluid pressure with 5.5 bar (80 psi) air pressure, and a flow rate of 3.8 lpm (1.0 gpm) at 60 strokes/minute.

The pump is mounted vertically on a stand or wall. It can be supplied with coating material through a siphon hose and strainer, or a pressure feed system. Optional circulation valve kits are available for circulating systems. Refer to the *Parts* section for ordering information.

Specifications

General

Height:	635 mm (25 in.)
Width:	483 mm (19 in.)
Depth:	330 mm (13 in.)
Weight:	48 kg (105 lbs)
Solvent chamber capacity:	480 ml (16 oz)

Fluid Pressures

Pump ratio:	18.5:1
Maximum fluid output pressure:	104 bar (1500 psi)
Maximum fluid delivery:	3.8 l/min. (1.0 gal/min.) at 60 strokes/min.
Maximum feed pressure:	1.4 bar (20 psi)

Figure 2-1 is a chart showing air input pressure to hydraulic output pressure ratios.

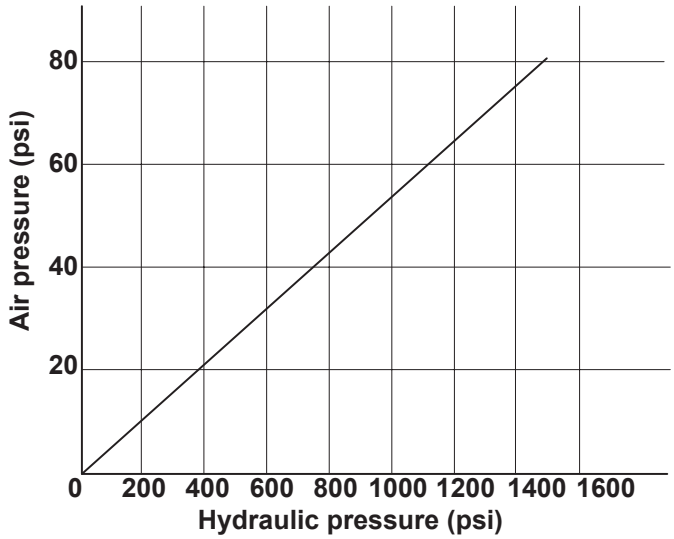


Figure 2-1 Air Pressure-to-Fluid Pressure Ratios

Fluid Hoses

All hoses must be Nordson or equivalent PTFE hoses with electrical continuity between the fittings, capable of withstanding 207 bar (3000 psi) pressure. Do not use pipe in the high pressure circuit.

Air supply hose:	1/2-in. ID minimum
Hydraulic fluid hose:	1/4-in. ID reinforced PTFE
Alternate tubing:	3/8-in. OD x 0.035 in. wall seamless stainless steel
Siphon hose	1/2-in. ID nylon
Drain-off hose	3/8-in. ID nylon

Air Pressure and Consumption

Input air pressure (maximum): 5.5 bar (80 psi)

Table 2-2 Air Consumption

Air Pressure	Strokes Per Minute		
	20	40	60
1.4 bar (20 psi)	0.059 m3/min (2.12 cfm)	0.119 m3/min (4.24 cfm)	0.178 m3/min (6.36 cfm)
2.7 bar (40 psi)	0.092 m3/min (3.32 cfm)	0.186 m3/min (6.64 cfm)	0.279 m3/min (9.96 cfm)
4.1 bar (60 psi)	0.124 m3/min (4.44 cfm)	0.249 m3/min (8.88 cfm)	0.373 m3/min (13.32 cfm)
5.5 bar (80 psi)	0.16 m3/min (5.72 cfm)	0.32 m3/min (11.44 cfm)	0.48 m3/min (17.16 cfm)

Sound Levels

Sound levels created by the CP pump are shown in decibels.

Air Pressure	Sound Level (dB A)	Sound Level (dB C)
7 bar (100 psi)	85	83
4.13 bar (60 psi)	82	81

Pump Components

Air Motor

See Figure 2-2. The air motor consists of two cylinders (4) containing two spring-return pistons. A modular air preparation system consisting of an air filter (12), regulator (6), and lubricator (5) conditions the compressed air used to control and operate the air motor.

The accumulator (1) stores and releases working air to smooth the flow of air to the cylinders and help prevent pressure fluctuations (wink) at the spray device. Pump operation is controlled by the roller valves (11), the double pilot valve (14), and the air valve (2).

Hydraulic Section

The hydraulic section consists of two separate hydraulic housings (9), a siphon manifold (10), and a solvent chamber (7). Fluid enters the pump through the siphon manifold and exits through the outlet manifold (8). The solvent chamber holds solvent chamber fluid, which lubricates the hydraulic plungers and reduces wear on the packings.

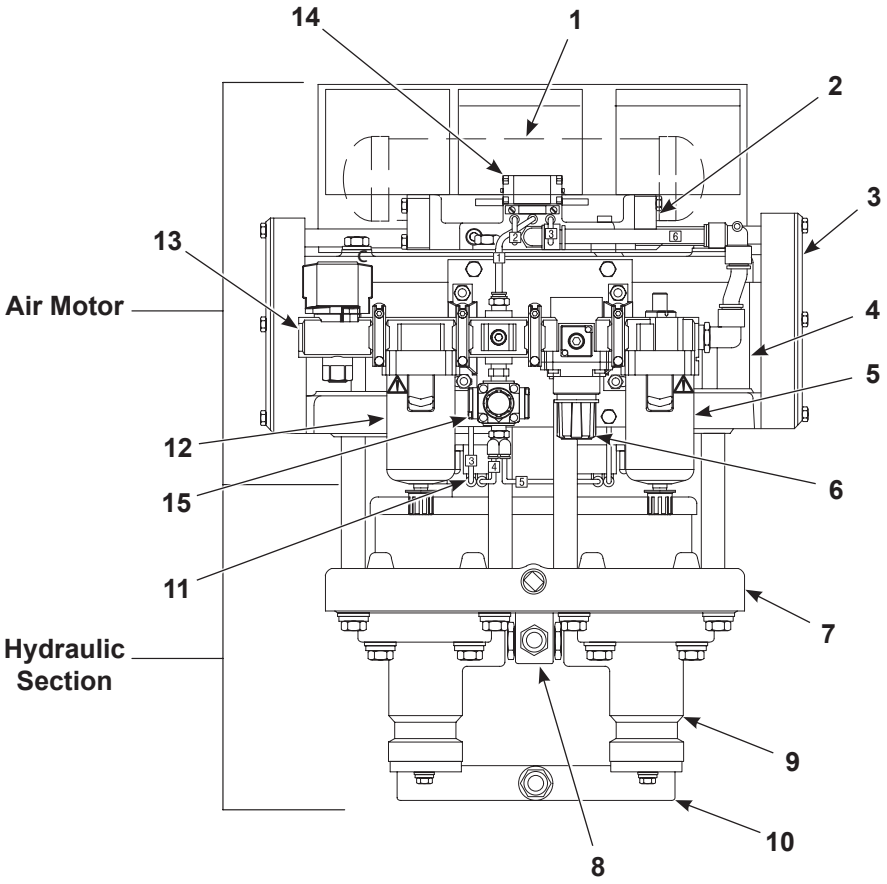


Figure 2-2 Air Pressure-to-Fluid Pressure Ratios

1. Accumulator
2. Air valve
3. Muffler
4. Cylinder
5. Lubricator
6. Pump control regulator
7. Solvent chamber
8. Outlet manifold
9. Hydraulic housing
10. Siphon manifold
11. Roller valve
12. Air filter
13. Air input fitting
14. Double pilot valve
15. Pilot air regulator

Theory of Operation

See Figure 2-3 and Figure 2-4.

Supply air enters the pump at the shutoff valve. The air is filtered and passes into a manifold block, where pilot air flows through Lines 1, 4, and 5 to the roller valves and double pilot valve. Working air is regulated and lubricated before flowing into the accumulator, air valve, and cylinders.

When the pump is started, the position of the air valve spool determines which piston/plunger begins its downward (pressure) stroke first.

NOTE: The air valve is an open-center type valve. If the valve spool stops in the center of the valve block when the pump is turned off, the pump will not restart because the spool will direct working air into both cylinders. To start the pump, press the manual override button on the double pilot valve. This directs pilot air to one side of the air valve and shifts the valve spool out of the center position.

The air valve directs working air into the left cylinder. The working air forces the left piston/plunger down. The siphon ball check valve closes and the coating material in the left hydraulic housing is pressurized and forced out of the housing, through the high-pressure ball check valve, outlet manifold, and fluid lines to the spray devices.

The right piston/plunger is forced up by the return spring. The air above the piston flows out of the cylinder, through the air valve, and into the right muffler. The right plunger draws new coating material into the siphon housing, through the siphon ball check valve, and into the right hydraulic housing. The high-pressure ball check remains closed, retaining the material in the housing.

Just before the left plunger reaches the bottom of its stroke, the chamfered land on the piston shaft depresses the roller valve lever on that side of the pump and actuates the valve.

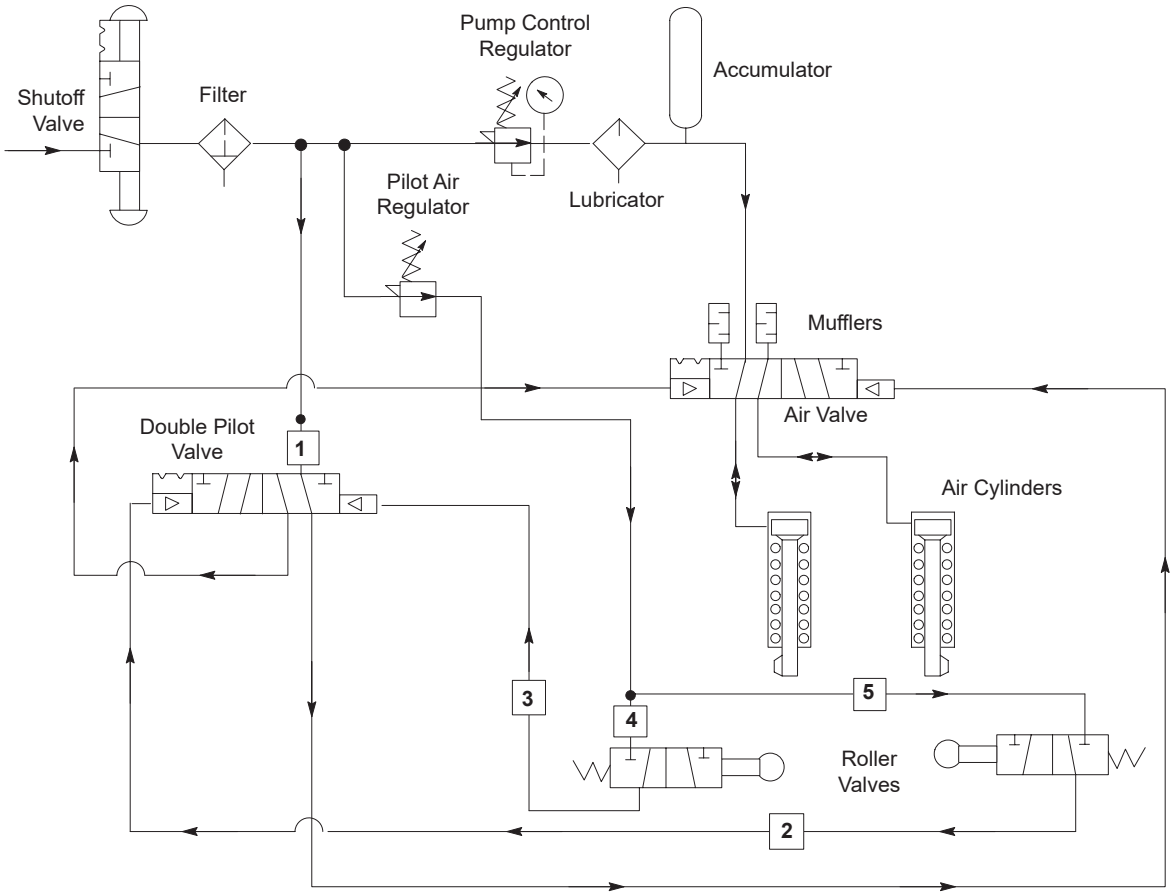


Figure 2-3 Pump Pneumatic Schematic Pump Pneumatic Schematic

Pilot air flows through Line 4, the roller valve, Line 3, and into the double pilot valve, shifting the valve spool and directing the pilot air entering the double pilot valve through Line 1 to the air valve, forcing the air valve spool to shift. The air valve directs working air to the right cylinder.

NOTE: Pilot air pressure is factory set to 4.1 bar (60 psi). Do not change this pressure.

The strokes of the piston/plungers overlap. This keeps the fluid pressure in the delivery lines to the guns constant and reduces wink or spray pattern fading at the gun.

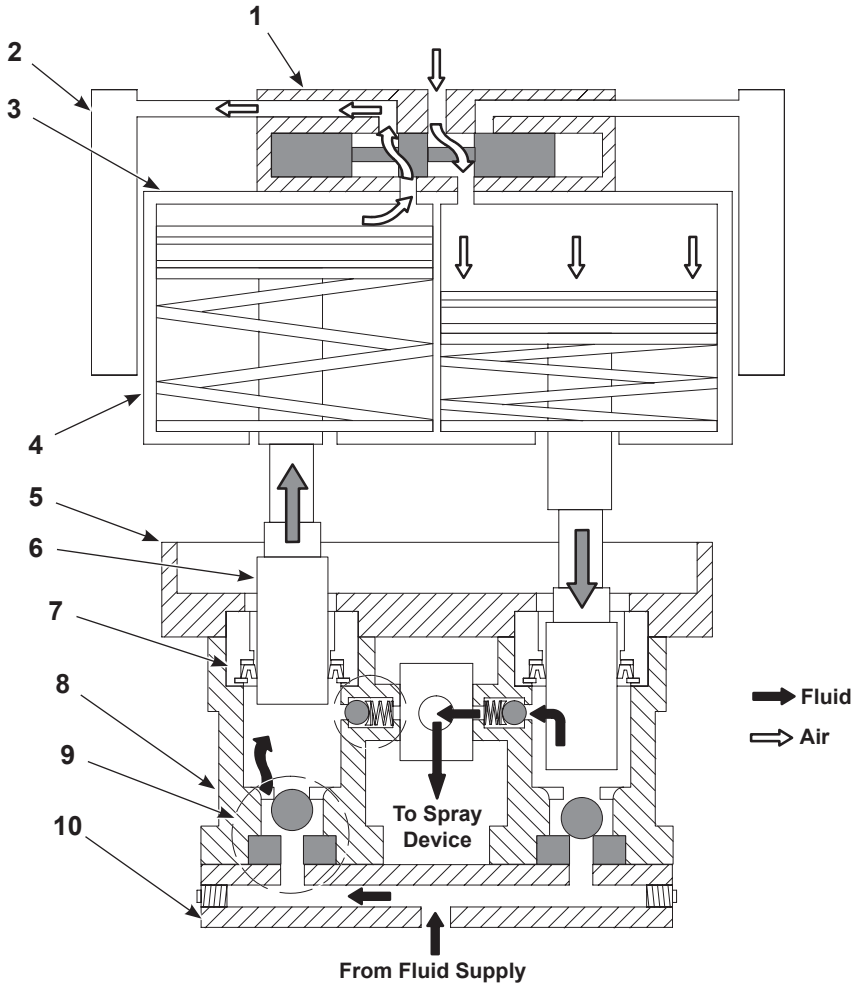


Figure 2-4 Pump Operation

1. Air valve
2. Muffler
3. Piston
4. Cylinder
5. Solvent chamber
6. Plunger
7. Packing gland
8. Hydraulic housing
9. Siphon ball check valve
10. Siphon manifold
11. High-pressure ball check valve
12. Outlet manifold

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.

Mounting and Grounding

1. Mounting slots are provided in the upper and lower heads. Install the pump in an area accessible for operation and maintenance. Use four hex head 1/2-in. bolts to mount the pump to the wall or to a vertical stand. See Figure 3-1 for mounting slot pattern.

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

2. Connect the pump to a true earth ground, using the ground strap and clamp provided.

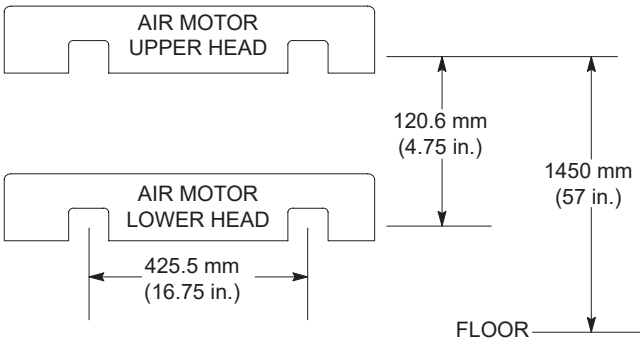


Figure 3-1 Mounting Slot Pattern

Pneumatic Connections

NOTE: An approved pressure relief device set at 5.52 bar (80 psi) must be installed in the air inlet line to this pump.

The pump requires 5.52-bar (80-psi) maximum input and 0.48 m3/min. (17.16 cfm) to operate at 60 strokes per minute. The air supply line should be 13-mm (1/2-in.) minimum ID. Use a length of hose between any hard plumbing and the pump. The hose will serve as a vibration damper.

1. Purge the air supply line of all contaminants.

NOTE: Make sure the shut-off valve is in the OFF position and the regulator is backed all the way out.

2. See Figure 3-2. Connect the air supply hose to the 1/2-in. NPT female air input fitting (13) at the shutoff valve.

Fluid Connections

Stainless steel fittings are recommended for all connections. Liberally coat all fitting threads with pipe joint adhesive. Tighten fittings securely to eliminate the siphoning of air.

If the installation is to be hard-plumbed, 10-mm (3/8-in.) ID, or 1-mm (0.035-in.) wall seamless stainless steel tubing is recommended. Install a high-pressure fluid hose at least 305-mm (12-in.) long from the pump outlet to any tubing to serve as a vibration damper.

Siphon Connections

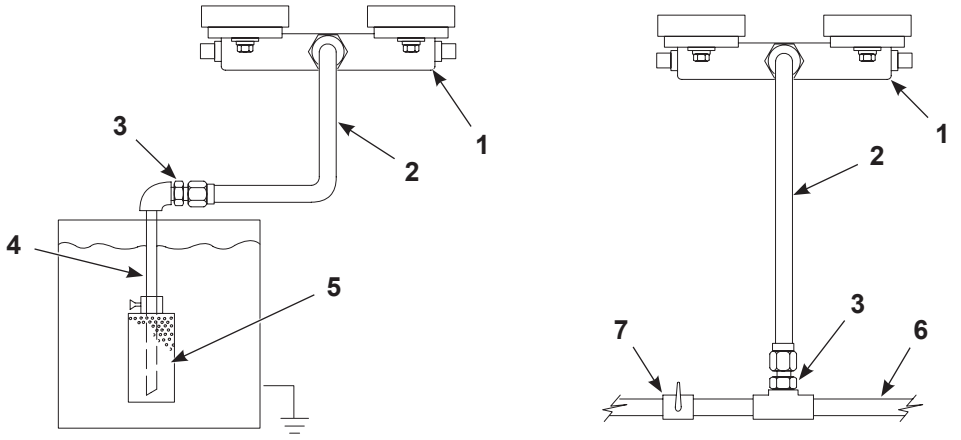
Siphon Rod and Strainer

1. See Figure 3-2. Install the siphon strainer (5) on the siphon rod (4). Tighten the thumb screw securely.
2. Install the 1/2-in. NPT male connector (3), provided with the pump, into the elbow of the siphon rod (4).
3. Connect the siphon hose (2) between the male connector and siphon manifold (1).

Pressure Feed Connection

See Figure 3-2. The coating material may be supplied to the pump by gravity pressure or by pressure feed from a pressure reservoir. Maximum feed pressure should be no more than 1.38 bar (20 psi).

1. Install the 1/2-in. NPT male connector (3), provided with the pump, to a fitting in the pressure feed line (4).
2. Install the siphon hose (2) between the pump siphon manifold (1) and the pressure feed line. The hose will serve as a vibration damper.
3. Install a shutoff valve (5) in the pressure feed line, ahead of the pump. Do not use a check valve or fluid regulator in the pressure supply line.



Siphon Connection **Pressure Feed Connection**

Figure 3-2 Siphon Rod and Pressure Feed Connections

1. Siphon manifold
2. Siphon hose
3. Male connector
4. Siphon rod
5. Siphon strainer
6. Pressure feed line
7. Shutoff valve

Optional Circulation Kit Installation

Figure 3-3 shows a typical dual circulation installation for circulating systems, using one of the circulation valve kits listed in the *Parts* section. Items 2−5 are included in the kits, along with the required fittings. Two circulation kits are required for a dual installation.

1. Remove the pipe plugs at each end of the siphon manifold (1). Connect the 1/2-in. NPT circulation valves (2) to these ports.
2. Connect the drain valves (3), drain hoses (4) and drain rods (5) to the circulation valves.

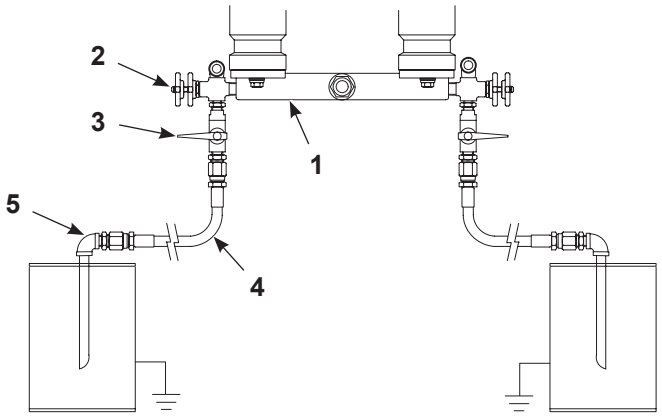


Figure 3-3 Dual Circulation Valve Installation

1. Siphon manifold
2. Circulation valves
3. Drain valves
4. Drain hoses
5. Drain rods

Fluid Hose Connections

Figure 3-4 shows a typical circulating system. Heaters and filters are optional.

1. Connect a 1/4-in. or 3/8-in. ID high-pressure fluid hose (1) between the pump outlet manifold and the heater (2). Refer to Options in the Parts section for Nordson hoses.
2. Install a high-pressure fluid filter (3) between the heater and the spray device (4).
3. If you installed a circulation valve, connect a fluid hose (5) from the spray device to the elbow fitting on the circulation valve (6).

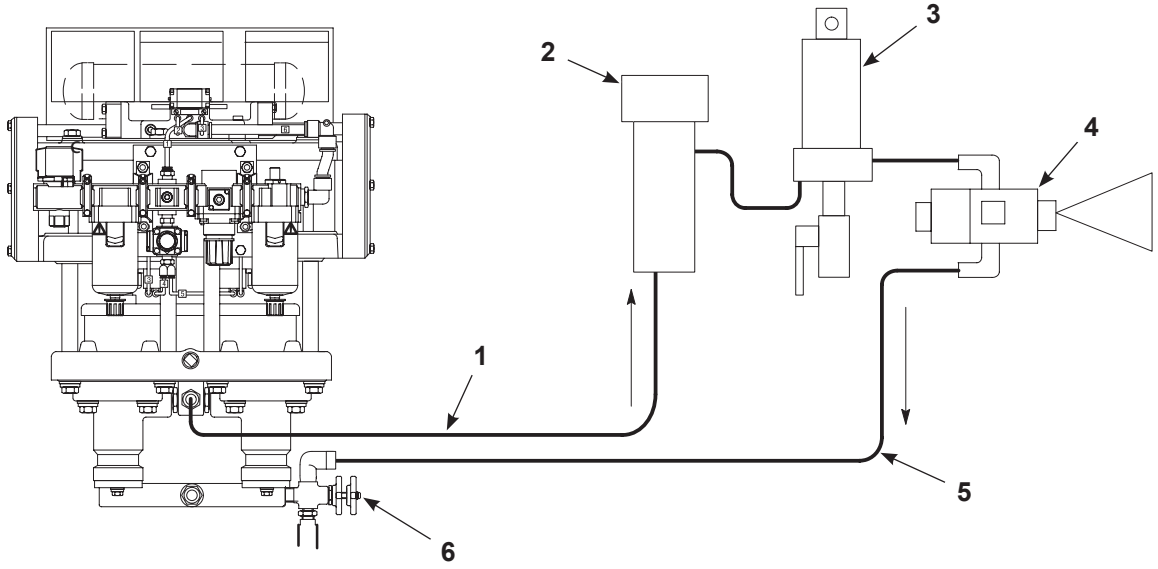


Figure 3-4 Typical Circulating System Connections

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.

Preparation

Before operating the CP pump, make sure:

- all fittings and connections are tightened securely.
- the shutoff valve, circulation valve(s) and drain-off valve(s), if used, are closed, and the air regulator is backed all the way out (zero pressure).
- all system components have been installed according to the instructions in their manuals.
- the proper fluid filter screen is installed and the filter housing is secure.
- the coating material is at ambient temperature.

Solvent Chamber Fluid and Vitalizer Oil

Use type-T solvent chamber fluid for waterborne coatings and type-K solvent chamber fluid for solventborne coatings. Use Nordson Vitalizer oil in the air lubricator.

1. Remove the cover halves below the air motor and the cover from the solvent chamber. Fill the solvent chamber to within 13 mm (1/2 in.) from the top.
2. Fill the air lubricator with the provided Nordson vitalizer oil. Do not adjust the lubricator at this time.

Solvent Flush

Perform a solvent flush to clean out any dirt, grease, and machining chips left in the hydraulic portion of the pump and other system components during manufacturing and installation. Flush the system when changing coating materials or if you will not be using the system for more than a few days.

The flush material can be the same solvent used in the coating material. For waterborne coatings use butyl cellosolve or soapy water.

1. Remove the gun nozzle, or, if using a circulation kit, insert the drain rod into a waste container.
2. If used, close the circulation valve and open the drain valve.
3. Insert the siphon rod into a container of suitable flush material or pressurize the feed line with flush material.

NOTE: Make sure the air regulator is backed all the way out. If the pump is started at full pressure with no coating material in the lines, it will operate erratically.

4. Pressurize the air supply line and open the air shutoff valve.
5. Slowly increase air pressure until the pump starts to operate. Adjust the air regulator until the pump is operating at 20 strokes/minute. If using a dead-ended system, trigger the spray device to allow the pump to start.

NOTE: If the pump does not start, push the manual override button on the double pilot valve.

6. When you first start flushing the system, air will be mixed with the flush material, causing the spray device to spit or bubbles to appear in the waste container. Operate the pump until all the air is out of the system.
7. Adjust the air lubricator to dispense 1 drop of oil every 15−20 strokes. Use a small screwdriver to turn the adjustment screw on the top of the lubricator.
8. If using a circulation kit, close the drain valve and slowly open the circulation valve until the pump strokes 20 strokes/minute. Allow the flush material to circulate through the system for 15 to 30 minutes.
9. Reduce the air pressure to zero to shut off the pump.
10. If used, close the circulation valve and open the drain valve.
11. Remove the siphon rod. If the pump is pressure fed, close the shutoff valve in the pressure feed line.
12. Increase the air pressure until the pump starts. Discharge the flush material into a waste container. If using a dead-ended system, trigger the gun until all flush material has been pumped out of the system.
13. Reduce the air pressure to zero and close the air shutoff valve.
14. Drain the fluid filter. Clean the filter screen.

Daily Startup

1. Place the siphon rod in the coating material, or pressurize the feed line with coating material.
2. Open the air shutoff valve and adjust the air regulator until the pump begins to operate slowly.
3. Allow coating material to flow from the filter drain. Close the drain.
4. Allow coating material to flow from the drain valve (circulating system). Close the drain valve.
5. Adjust the air regulator to the required pressure and adjust the circulation valve until the pump is operating at 8−10 strokes per minute.

WARNING: Always circulate fluid through the heater while it is on. Without proper circulation the heat limiter can fail, coating materials can cure inside the heater and plug it, or solvents can vaporize, expand, and damage the heater or other equipment. Failure to observe this warning could result in property damage, personal injury, or even death.

6. Turn on the fluid heater, if used. Allow 10−15 minutes for the coating material to reach the operating temperature. When the thermometer reads within 2 °C (5 °F) of the operating temperature, adjust the circulation valve to obtain the desired flow rate.
7. Start spraying.

Daily Shutdown

1. If a fluid heater is used, turn it off 10−15 minutes before shutting down the pump. This prevents coating material from curing inside the heater and plugging it.
2. Reduce the pump air pressure to zero.
3. Relieve the system fluid pressure by triggering the spray device or opening the drain valve.
4. Perform the daily maintenance procedures.

NOTE: Depending on the type of coating material used, you may be able to leave the system filled with material overnight. Do not leave the system open to air, as the coating material could cure and clog the system. If the material contains solids that easily settle out, circulate material through the system for several minutes the next morning before starting to spray. If the system will be shut down for more than a few days, flush it and leave it filled with flush material.

Maintenance

WARNING: High Pressure Fluid Hazard. Stop the pump and relieve air and fluid pressure before performing the following procedures. Failure to observe this warning could result in personal injury or even death.

Daily

1. Remove and clean the high pressure fluid filter screen, unless experience indicates less frequent cleaning is adequate. Install a clean screen and soak the dirty screen in solvent. Discard any ruptured or distorted screens.
2. Check the solvent chamber fluid level. Drain and replace the solvent chamber fluid when the level drops 32-mm (11/4-in.) below the top of the solvent chamber, or if the solvent chamber fluid becomes contaminated with coating material.

   Fill the solvent fluid chamber with new fluid to 12.7 mm (1/2 in.) from the top. Use type-T solvent chamber fluid for waterborne coatings and type-K solvent chamber fluid for solventborne coatings.
3. Drain the air filter. Remove the air filter bowl and dump out any remaining water. Remove the air filter element, unless experience indicates less frequent cleaning is adequate. Wash the element in soapy water, then rinse, dry, and reuse it.
4. While the pump is running, check the air lubricator oil level and delivery rate (1 drop every 15−20 strokes). Fill if necessary, using only Nordson vitalizer oil or an approved substitute.

Weekly

1. Clean the exterior of system components with a cloth dampened with solvent or soapy water. Do not soak any components in solvent. Hose coverings and seals may be affected by some solvents.
2. Check all ground connections with an ohmmeter. Make sure the resistance from pump to ground is less than one megohm.

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.

These troubleshooting 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.

Problem	Possible Cause	Corrective Action
1. Pump fails to start	Air supply turned off or inadequate	Make sure there is adequate air pressure at the pump inlet fitting and the air shutoff valve is turned on.
	Air regulator improperly adjusted, blocked air filter element, or faulty air regulator	Check the air pressure. A minimum of 1.38 bar (20 psi) is required to start the pump. Increase the air pressure to that required for the desired fluid pressure output. Refer to the *Description* section for air-to-hydraulic pressure ratios. If the pump fails to start after increasing the air pressure, remove the air filter element and clean it. If the pump still fails to start, disconnect the 1/2-in. tubing at the air valve inlet. If air does not flow out of the tubing, replace the air regulator.
	Hydraulic system blocked **NOTE:** If the circulation valve and drain valve are closed, the pump will not start, or will stop operating.	If sufficient air pressure is available to operate the pump, check the fluid pressure. If the fluid pressure is higher than the pressure generated by the pump at the current air pressure setting, the pump will not operate. Close the drain valve and open the circulation valve. If the pump fails to start, check for a faulty circulation valve. Refer to Problem 7. Check for a clogged spray device nozzle, fluid filter screen, siphon strainer, or fluid hose.
	Air valve spool centered, not allowing air in cylinders to exhaust	Push the manual override button on the double pilot valve. You should hear the air valve spool shift and the pump should start.
	Air valve spool binding	If pushing the manual override button does not shift the air valve spool, the spool may be jammed. Remove both end caps and push the spool back and forth. If it does not move or is extremely tight, disassemble the valve and lubricate all parts. Replace any worn parts. If the spool slides back and forth easily, reinstall the end caps.

Continued...

Problem	Possible Cause	Corrective Action
1. Pump fails to start (contd)	Air tubing improperly routed	Check all tubing connections against the pneumatic schematic located on the accumulator cover and in the *Repair* section. If the connections are correct and the pump still will not start, then either the double pilot valve or one of the roller valves are faulty.
	Faulty double pilot or roller valves	Disconnect the tubing from the roller valve to the double pilot valve and depress the roller valve actuating lever. If no air flows through the valve, replace it. If both roller valves function normally, replace the double pilot valve.
2. Pump stops during operation	Hydraulic system blocked	Refer to corrective actions for Problem 1.
	Ice in muffler boxes or exhaust tubes	Ice may form in the muffler boxes and exhaust tubes when the pump is running at high speeds with wet air or in an unusually cold location. The air valve will not operate if the exhaust ports are plugged. To eliminate icing, heat and/or dry the compressed air supply.
3. Air leaking continuously into muffler	Faulty air valve	Rebuild or replace the air valve.
4. 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 hydraulic housings may be leaking. Replace the O-rings.

Continued...

Problem	Possible Cause	Corrective Action
4. Pump strokes irregularly or fluid pressure fluctuates *(contd)*	Solvent vapor in the hydraulic system	During a siphon stroke, pressure inside the hydraulic housing 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 hydraulic chamber to drop to unusually low levels during the siphon stroke, aggravating the condition.
	Leaks in the pneumatic system	Check the pneumatic system schematic. Listen for continuous air leaks from partially opened valves, tubing connections, damaged tubing or gaskets.
	Ice in muffler or exhaust tubes	Formation of ice inside the muffler boxes, exhaust tubes, or air valve may restrict or prevent operation. Heat and/or dry compressed air supply.
	Faulty air valve	If the pump continuously double strokes and either plunger is taking less than a 51-mm (2-in.) stroke and then reversing, the air valve is faulty. Rebuild or replace the air valve.

Continued...

Problem	Possible Cause	Corrective Action
4. Pump strokes irregularly or fluid pressure fluctuates *(contd)*	Leaky siphon or high-pressure ball check valves	If the pump continuously double strokes and the plungers are taking a full 51-mm (2-in.) stroke, close both the circulation and drain-off valves, if used, or shut off the spray device. Both plungers should stop. Quickly open and close the drain-off valve (open for 1/2-second or less), or trigger the spray device. If one plunger does not stop each time the valve is closed, or when the trigger is 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.
	No coating material	Fill the coating material supply.
5. Gradual loss of fluid pressure while air supply pressure remains constant	Worn hydraulic packings	Replace the hydraulic packings.
6. Coating material mixing with solvent chamber fluid	Worn hydraulic packings	Replace the hydraulic packings.
7. Pump strokes when circulation and drain-off valves are closed	Leaks in hydraulic system	Look for fluid leaks in the hydraulic system and repair them.
	Faulty drain valve	If fluid leaks out of drain rod when the drain valve is closed, repair or replace the valve.
	Faulty circulation valve	Disconnect the circulating system return hose at the valve. Blow compressed air into the circulation valve through the open fitting. If air escapes from the siphon rod when both the circulation and drain-off valves are closed, the circulation valve is faulty. Rebuild or replace the valve.
	Leaking siphon or high pressure ball check valves	Refer to Problem 4.

Continued...

Problem	Possible Cause	Corrective Action
8. Fluid pressure drops when the spray devices are triggered	Insufficient air supply	Refer to *Specifications* in the *Description* section for air pressure requirements.
	Heavy viscous coating material causing inadequate flow rate	An inadequate flow rate can be caused by attempting to siphon a heavy viscous coating material. Correct by pressure feeding the coating material. Pressure should not exceed 13.8 bar (20 psi).
	Partially blocked fluid hoses or fluid filter screen	The fluid hoses may be partially blocked. Clean the fluid filter screen, if necessary. Flush the fluid lines.
9. Fading or narrowing of the spray pattern after the spray device is triggered	Inadequate air supply	Refer to Specifications in the Description section for air pressure requirements. The air supply hose must have at least a 13-mm (1/2-in.) ID.
	Clogged fluid filter screen	Clean the fluid filter screen.
10. Spray device nozzle plugging	Fluid filter screen size too large or screen damaged	Make sure the filter screen is the proper size for your coating material. Check the filter screen for damage. Refer to the filter manual.
	Contaminants in the fluid hoses	Check the hoses. Cured coating materials may be breaking away from the inner hose wall and plugging the nozzle.
11. 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.
	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	Increase the fluid pressure.
12. Temperature drops after spray devices 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	One of these changes could cause the problem: • Switching to larger flow-rate nozzles. • Adding spray devices to the system.

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

WARNING: High Pressure Fluid Hazard. Close the air shutoff valve stop the pump, and relieve hydraulic pressure prior to servicing. Shut off the pressure feed system, if used. Failure to observe this warning could result in personal injury or even death.

Keep a spare set of packing gland assemblies and an air valve on hand. Pump downtime can be reduced by replacing the packing glands and the air valve on-line. Refer to the *Recommended Spare Parts* lists in the *Parts* section.

Replace all O-rings affected by any disassembly procedure. Lubricate all O-rings with O-ring grease before installing.

Cover Removal

The cover halves shield the moving parts of the pump, to protect operators from injury. Always keep the covers installed when not servicing the pump.

1. See Figure 6-1. Loosen the screws (2) securing the pump cover halves (1) to the pump. Remove the pump cover halves from the pump.
2. After repairing the pump, use the screws to reinstall the pump cover halves. Tighten the screws securely.

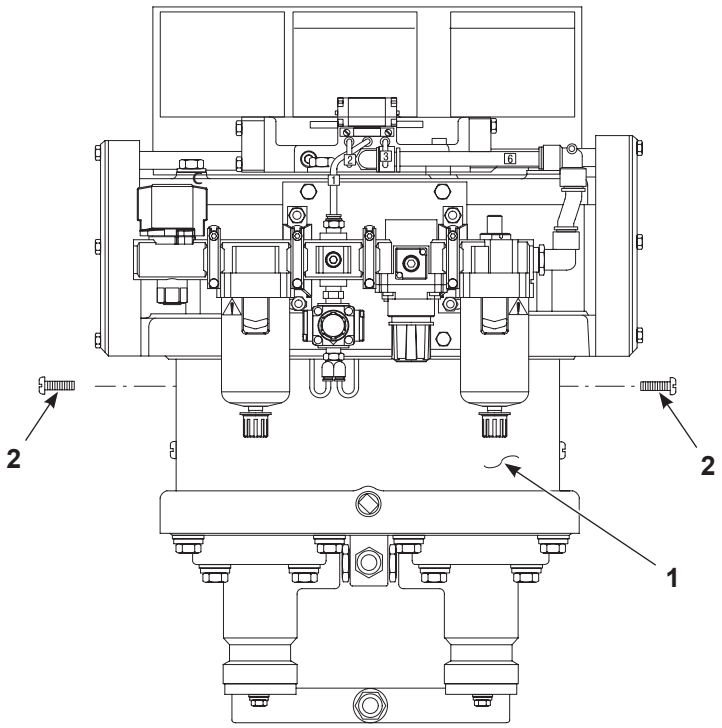


Figure 6-1 Cover Removal

1. Cover half
2. Screws

Hydraulic Section Repair

Packing Gland Replacement

Replace the packing glands if the pump cannot maintain a constant fluid pressure or when excessive amounts of coating material leak past the packings into the solvent chamber. Replace both packing glands at the same time.

1. Place a bucket under the pump to catch excess fluid.
2. See Figure 6-2. Remove the plug (2) and drain the solvent chamber fluid into the bucket.
3. Remove the eight screws, lock washers, and flat washers (1) securing the hydraulic housings (3) to the solvent chamber (4).
4. Pull the hydraulic housings away from the solvent chamber and rest them on the bucket. Pour the remaining fluids into the bucket.

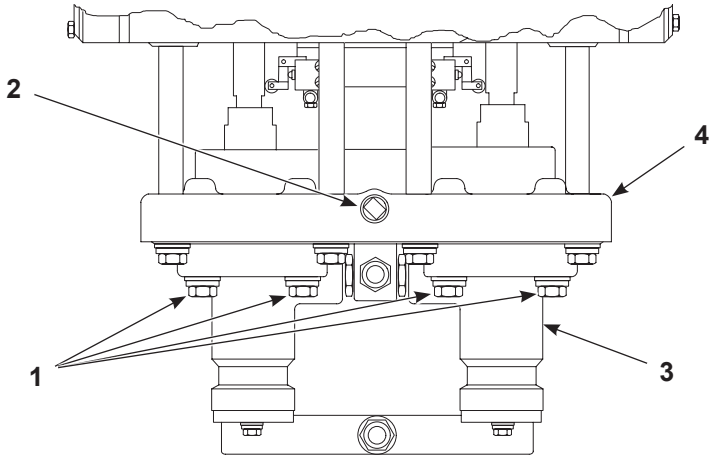


Figure 6-2 Removing Hydraulic Housings

1. Screws and washers
2. Plug
3. Housings
4. Solvent chamber

5. See Figure 6-3. Remove the packing glands. When you separate the hydraulic housings (2) from the solvent chamber (6), the packing glands (5) may remain in the chamber or in the housings.

   a. Perform these steps if the packing glands remain in the **solvent chamber**:

      Insert the packing gland tool (1) around the plunger (3). Place a hand under the solvent chamber to catch the packing gland.

      Press down on the packing gland tool to force out the packing gland.

b. Perform these steps if the packing glands remain in the **hydraulic housings**:

Insert a 6-mm (1/4-in.) diameter rod or screwdriver through the holes in the side of the packing glands.

Twist and pull the packing glands out of the housings.

Packing glands can be replaced with new ones. Packing glands with U-cups or spring-loaded seals can be rebuilt as described in *Solventborne, EPR, or Waterborne Packing Gland Rebuild* in this section.

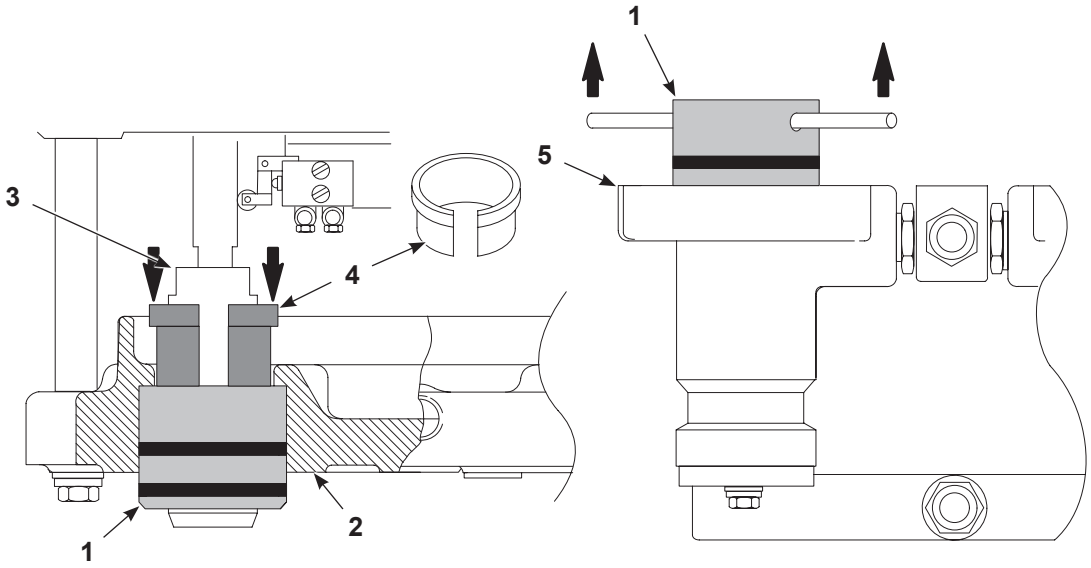


Figure 6-3 Removing Packing Glands

1. Packing gland
2. Solvent Chamber
3. Plunger
4. Packing gland tool
5. Hydraulic housing

6. Inspect the plunger (3) for wear. If it is worn or damaged replace it as described in *Plunger Replacement* in this section.
7. Install a new packing gland:
   a. Lubricate the new packing gland O-rings and the plunger with O-ring grease.
   b. Install the packing gland on the plunger and press it up into the solvent chamber.
8. To continue rebuilding the hydraulic section, go to *Plunger Replacement* or *Siphon- or High-Pressure Ball Check Valve Rebuild* in this section. To return the pump to service, perform the following step.
9. Install the hydraulic housings over the plungers and packing glands. Use the screws, lockwashers, and washers to secure the housings to the solvent chamber. Tighten the screws to 20−27 N•m (15−20 lb-ft).

Packing Gland Rebuild

NOTE: Only packing glands containing spring-loaded seals or U-cups, used on solventborne, waterborne, EPR, and abrasive-resistant pumps can be rebuilt. TFE/leather packing glands used on general finishing pumps cannot be rebuilt.

Rebuild both packing glands at the same time.

1. See Figure 6-4. Remove the retaining ring (6), spacer (5), U-cup or seal (4), and bearing (3) from the housing (1).
2. Remove the two O-rings (2) from the housing. Discard the the old parts.
3. Lubricate and install new O-rings (2) on the housing.
4. Install the new bearing, U-cup or seal, and spacer in the housing in the order shown.

   NOTE: The open end of the U-cup packing or seal must face the spacer.
5. Install the retaining ring with the sharp edge away from the spacer.

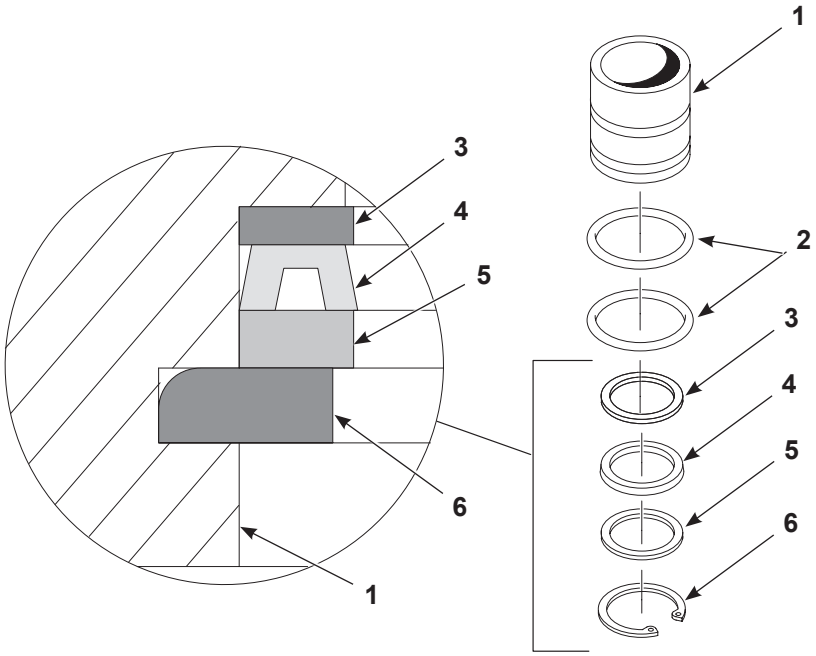


Figure 6-4 Packing Gland Rebuild

Plunger Replacement

1. See Figure 6-2 and Figure 6-3. Remove the hydraulic housings and the packing glands.
2. See Figure 6-5. Use two wrenches to unscrew the plunger (3) from the piston shaft (1).
3. Remove and discard the piston shaft O-ring (2).
4. Lubricate a new piston shaft O-ring and install it on the piston shaft.
5. Install a new hydraulic plunger on the piston shaft . Use two wrenches to tighten the plunger on the piston shaft securely.

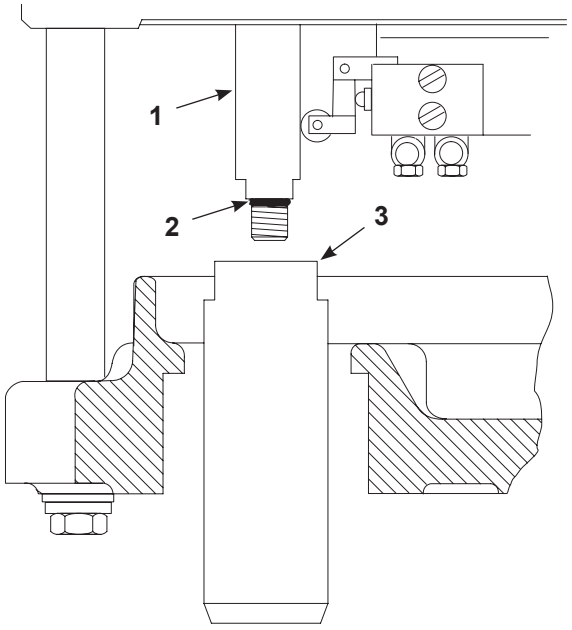


Figure 6-5 Plunger Replacement

1. Piston shaft
2. Piston shaft O-ring
3. Plunger

Siphon Ball Check Valve Rebuild

Rebuild both siphon ball check valves at the same time.

1. See Figure 6-6. Remove the four screws, lock washers, and flat washers (9, 10, 11) securing the siphon manifold (4) to the hydraulic housings (1). Separate the siphon manifold from the hydraulic housings.
2. Thread the seat tool (8), furnished with the pump, into the seats (2). Pull on the tool until the seat breaks loose from the hydraulic housing. Remove the balls (7).

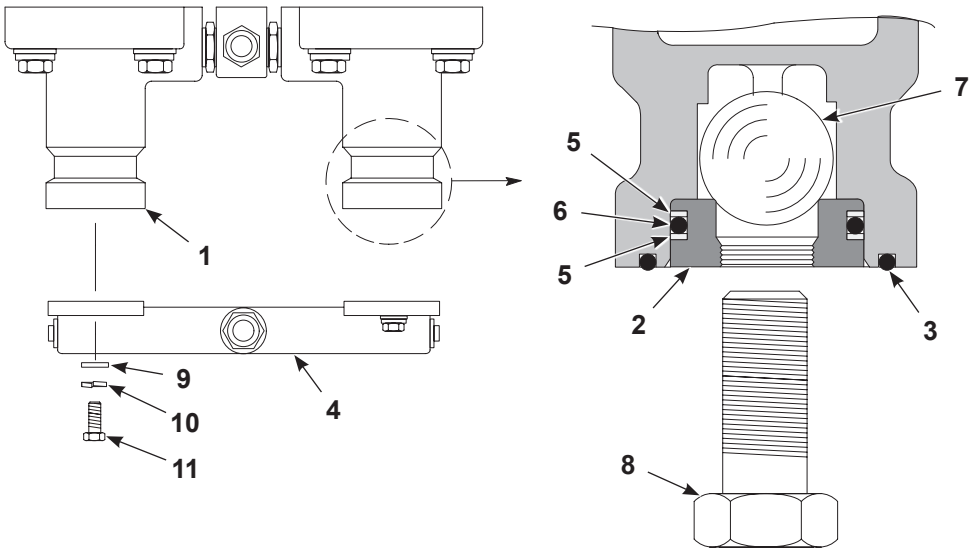


Figure 6-6 Siphon Ball Check Rebuild

1. Hydraulic housings
2. Seats
3. O-rings
4. Siphon housing
5. Back-up rings
6. O-rings
7. Balls
8. Seat removal tool (7/8-14 x 2.25 in. screw)
9. Flat washers
10. Lock washers
11. Screws

High-Pressure Ball Check Valve Rebuild

Rebuild both high-pressure ball check valves at the same time.

1. See Figure 6-2. Remove the hydraulic housings from the solvent chamber.
2. See Figure 6-6. Remove the siphon manifold from the hydraulic housings.

High-Pressure Ball Check Valve Rebuild (contd)

3. See Figure 6-7. Pull the hydraulic housings (1) apart and remove the outlet manifold (3) from the ball check cartridges (2).
4. Unscrew the cartridges from the hydraulic housings.
5. Thread the seat tool (4) into the seat (5). Slowly pull the seat out of the cartridge. Do not let the ball (8), ball cage (9), and spring (10) fly out.
6. Remove the spring, ball cage, and ball from the cartridge.
7. Place a new ball cage on a new spring.
8. Insert the spring and ball cage into the cartridge.
9. Place a new ball on top of the ball cage.

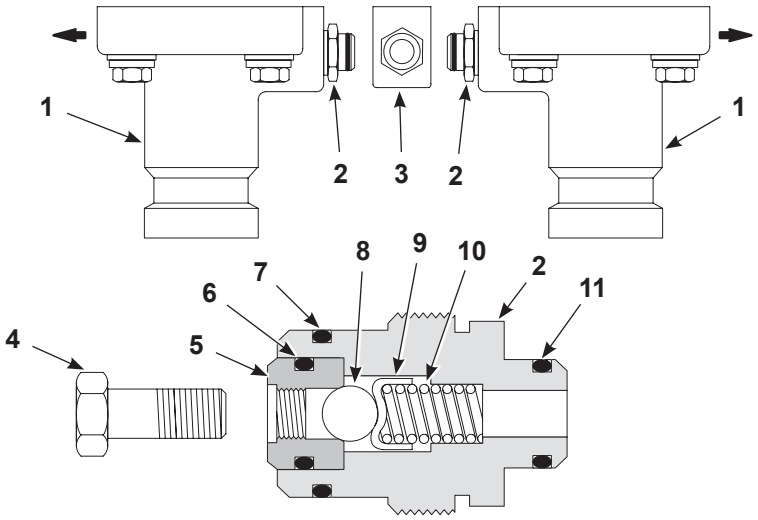


Figure 6-7 Siphon Ball Check Rebuild

1. Hydraulic housings
2. High-pressure ball check cartridges
3. High-pressure manifold
4. Seat removal tool (5/16-18 x 1.25 in. screw)
5. Seats
6. O-rings
7. O-rings
8. Balls
9. Ball cages
10. Springs
11. O-rings

10. Lubricate and install a new O-ring (6) on a new seat.
11. Install the new seat in the cartridge, with internal threads toward the outside, opposite the ball.
12. Remove the O-rings (2, 9) from the cartridge. Lubricate and install new O-rings.
13. Thread the cartridges into the hydraulic housings until they bottom out.
14. Assemble the outlet manifold and hydraulic housing assemblies.

NOTE: Make sure the manifold outlet port faces toward the front of the pump.

15. Install the hydraulic housings over the plungers and packing glands. Use the screws, lockwashers, and washers to secure the housings to the solvent chamber. Tighten the screws to 20−27 N•m (15−20 lb-ft).
16. Lubricate and install new O-rings into the groove on the bottom of hydraulic housings.
17. Install the siphon manifold on the hydraulic housings.

Air Valve Replacement

1. See Figure 6-8. Remove the three screws (5) and muffler cover (4) from one of the muffler boxes (2). Slide the exhaust tube (3) out of the air valve.
2. Disconnect the air tubing from the air valve. Remove the tube fittings (7).
3. Use a 1/4-in. hex wrench to remove the socket-head screws (1).
4. Slide the air valve off the opposite exhaust tube and remove it from the air motor.
5. Remove the O-rings (6) from the grooves in the upper head. Lubricate and install new O-rings into the grooves.
6. Install a new air valve on the air motor, inserting the exhaust tubes into the valve. Tighten the socket-head screws securely.
7. Install the tube fittings in the air valve. Connect the air tubing to the fittings. Reinstall the muffler cover.

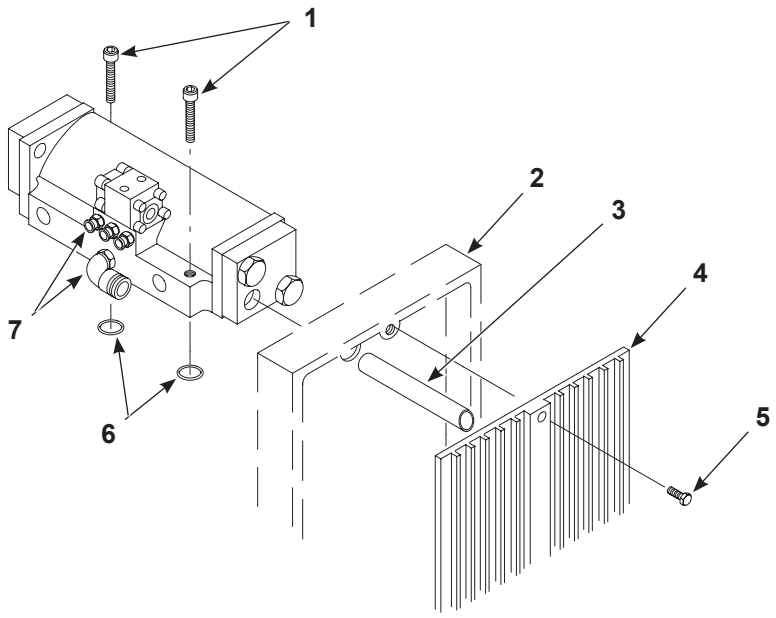


Figure 6-8 Air Valve Replacement

1. Screws
2. Muffler box
3. Exhaust tube
4. Muffler cover
5. Screws
6. O-rings
7. Tube fittings

Air Valve Rebuild

1. See Figure 6-8. Remove the air valve.
2. See Figure 6-9. Remove the screws (4) and end caps (7). Remove and discard the O-rings (3, 6).
3. Push out the spool (10).
4. Remove the spacers (1, 2, 8) and the O-rings (9).
5. Inspect the spool and spacers for wear or damage. Replace them if necessary.
6. Lubricate the new O-rings (9) with Vitalizer oil.
7. Hold the air valve vertically and install a red spacer (1) in the center of the valve bore. Hold the spacer in position with a finger.

NOTE: The air valve will not function properly if the spacers are installed incorrectly.

8. Install a new O-ring (9) on top of the red spacer. Install the remaining spacers and O-rings as shown. Install the end spacers (8) with the chamfered end facing out.
9. Lubricate the spool with Vitalizer oil and insert it through the spacers.
10. Lubricate new O-rings (3, 6) with O-ring grease and install them as shown.
11. Make sure the bumpers (5) are securely fastened to the end caps. Use removeable threadlocking compound on the screws (11).
12. Install the end caps. Tighten the screws securely.

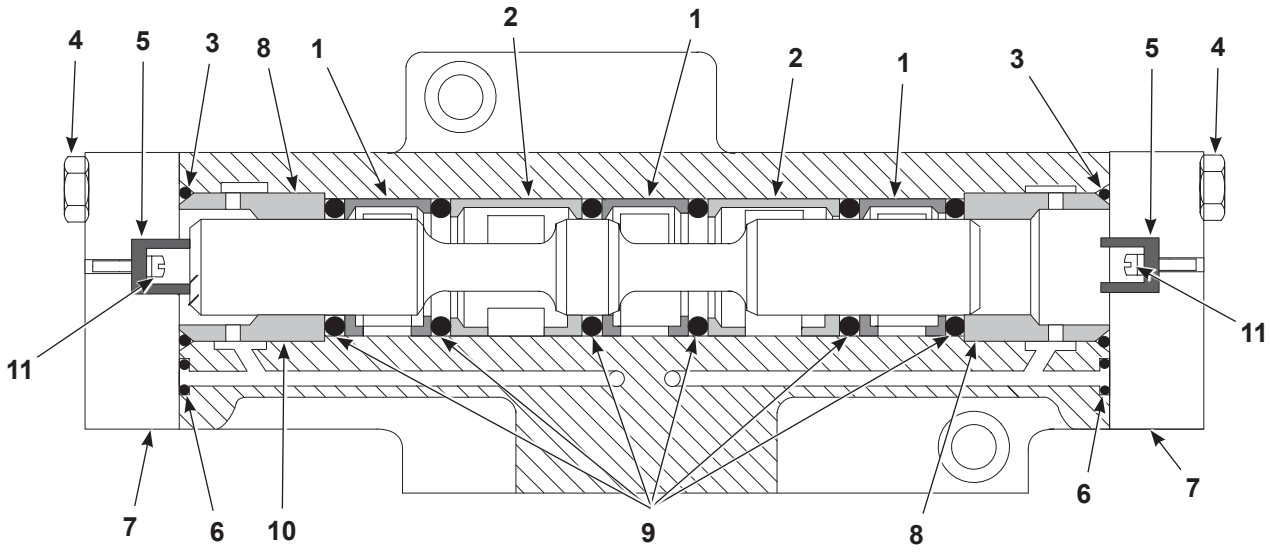


Figure 6-9 Air Valve Rebuild

1. Red spacer (quantity 3)
2. Silver spacer (quantity 2)
3. O-ring
4. Screws
5. Bumpers
6. O-rings
7. End caps
8. End spacers
9. O-rings
10. Spool
11. Fillet-head screws

Air Motor Rebuild

Air Motor Disassembly

1. Disconnect the air hose and siphon and high pressure fluid hoses from the hydraulic section.
2. Disconnect the ground strap from the upper pump head.
3. Drain the solvent chamber fluid.

CAUTION: The CP pump weighs 48 kg (105 lb). Get help when lifting the pump off its mounting.

4. Remove the pump from the wall or stand. If desired, the hydraulic section, air preparation system, and air control components may be removed first. Place the pump on a clean workbench.
5. Remove the air preparation system.
   a. Disconnect the air tubing from the roller valves and the air valve.
   b. Remove the four mounting bolts and the system from the pump.
6. Remove both muffler covers and slide the exhaust tubes out.
7. Remove the muffler boxes.

NOTE: The air valve does not have to be removed to service the air motor.

8. Disconnect the plunger from the piston shaft and remove the hydraulic section as an assembly from the air motor.
9. Disconnect the air tubing from the accumulator. Remove the accumulator from the cover.
10. Block the air motor in a vertical position.

WARNING: The pistons are spring loaded. To prevent personal injury, remove the upper head carefully.

11. See Figure 6-10. To remove the upper head (8):
    a. Remove six of the hex head screws, lock washers, and flat washers (9). Leave in two screws, one at each end, diagonally opposed to each other.
    b. While another person pushes down on the head to keep the springs compressed, remove the remaining two screws.
    c. Slowly release the pressure on the upper head. Remove the upper head.

NOTE: The general finishing version contains 2 springs per cylinder.

12. Remove the piston/shaft assemblies (4), springs (2), and cylinders (3).
13. Remove the square O-rings (1) from the upper head.
14. Remove the U-cup (7) and back-up ring (6) from the piston.

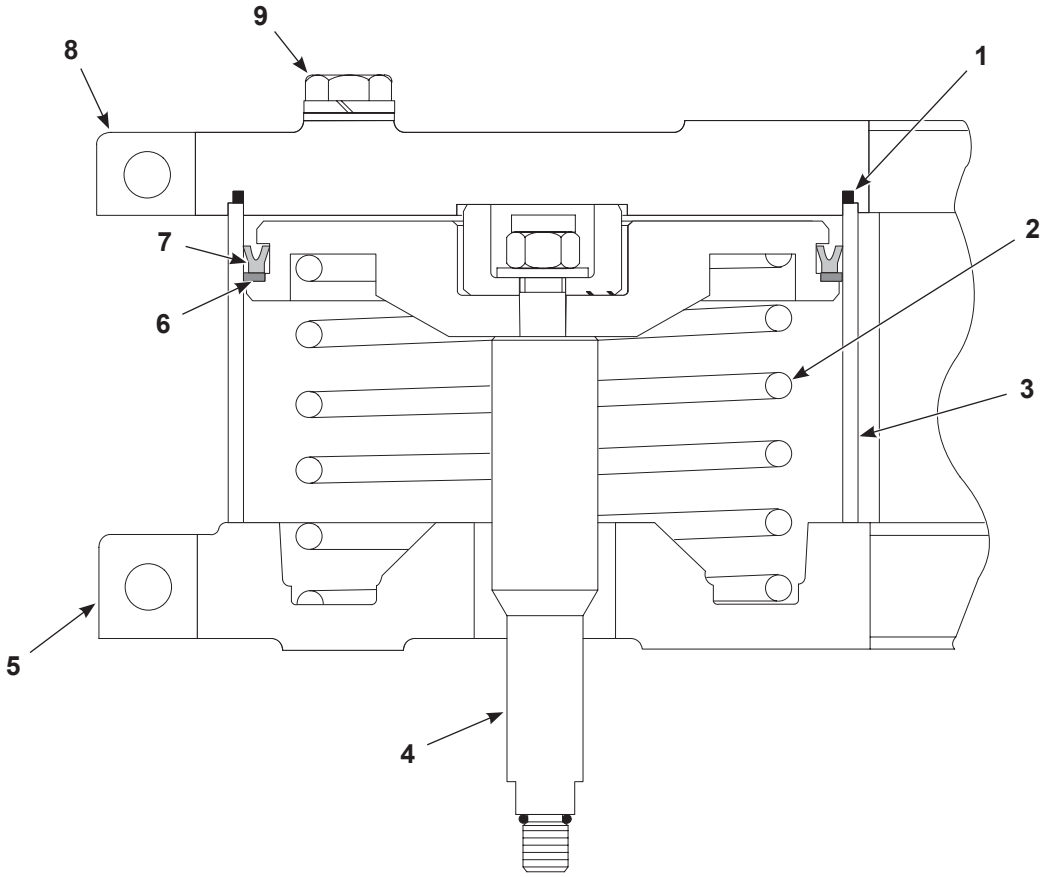


Figure 6-10 Air Motor Rebuild

1. Square O-rings
2. Spring(s)
3. Cylinders
4. Piston/shaft assemblies
5. Lower head
6. Backup rings
7. U-cups
8. Upper head
9. Screws and washers

Air Motor Assembly

1. Wipe all parts clean with a lint-free, dry cloth.
2. See Figure 6-10. Lubricate new square O-rings (1) and install them in the upper head (8).
3. Lubricate new U-cups (7) and backup rings (6) with Vitalizer oil and install them on the pistons.
4. Install the springs (2) and piston/shaft assemblies (4) in the lower head (5).
5. Lubricate the entire inside of the cylinder, and the top edges, with Vitalizer oil.
6. Place the lower head/piston assembly on blocks. The blocks must hold the lower head high enough so that the end of the piston shaft does not touch the top of the workbench.

7. Slip the cylinders (3) over the pistons at an angle.
8. Set the upper head on top of the cylinders. Insert the cylinders (3) up into the square O-ring grooves. Hold the assembly in place.
9. Install the eight hex head screws, washers, and lockwashers (9) in the upper head.
10. Have an assistant push down on the upper head to compress the springs.
11. Thread the screws into the lower head while the springs are compressed. Do not tighten the screws completely.
12. To align the upper head with the lower head, lay the pump on its back (on the mounting surface) on a flat surface. Adjust the head positions until there is no wobble between the upper and lower heads.
13. Cross tighten the screws to 41−47 N•m (30−35 lb-ft).
14. Install the accumulator on the cover. Connect the air tubing to the accumulator.
15. Install the muffler boxes on the air motors and insert the exhaust tubes, chamfered end out, through the muffler boxes and into the air valve end caps. Install the muffler covers.
16. Install the hydraulic housings. Tighten the screws to 20−27 N•m (15−20 lb-ft).
17. Make sure the O-rings are installed correctly on the end of the piston shafts. Apply a small amount of threadlocking compound to the piston shaft threads, then screw the piston shafts into the plungers and tighten securely.
18. Install the air preparation system and any other components that were removed.
19. Reconnect the air tubing. See Figure 6-12 for correct routing.
20. Mount the pump on the wall or stand and reconnect the air hose and siphon and high-pressure fluid hoses.

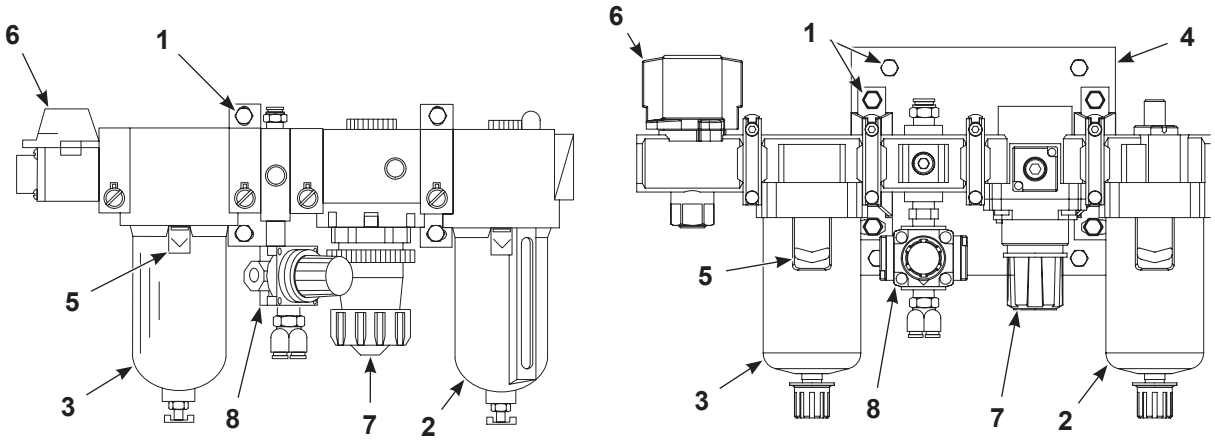
Air Preparation System

See Figure 6-11 and Figure 6-12.

The air preparation system can be removed from the pump as an assembly or in modules.

The air filter (3) and the lubricator (2) units have drain valves at the bottom of the bowls. The bowls can be removed for cleaning and service by pulling down on the lock buttons (5) then turning the bowl and pulling it off.

NOTE: The air gauge and tubing fittings are not components of the air preparation system. They must be ordered separately.



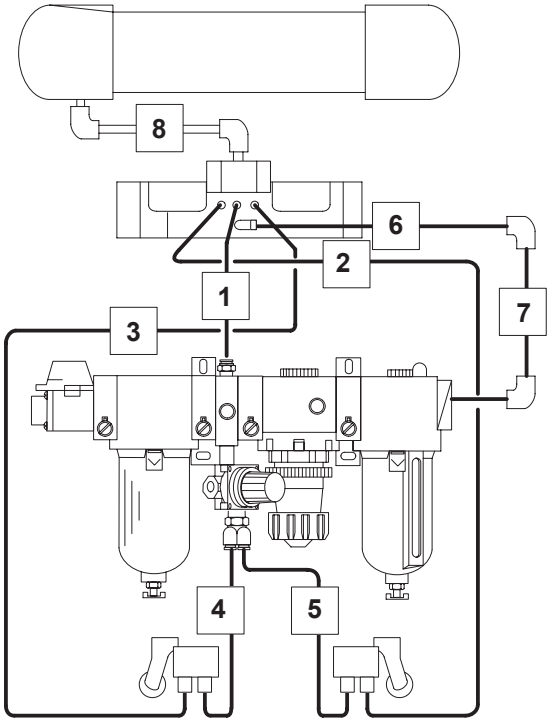
249332 Wilkerson Air Preparation System **1068742 SMC Air Preparation System**

Figure 6-11 Air Preparation Systems

1. Screws
2. Lubricator
3. Filter
4. Mounting bracket
5. Bowl lock buttons
6. Shutoff valve
7. Pump control regulator
8. Pilot air regulator

NOTE: Pilot air regulator is factory set to 4.1 bar (60 psi). Do not change this setting.

Air Tubing Diagram and Tube Chart



Tube	Size (in. OD)	Length mm (in.)
1	1/8	120 (4.75)
2	1/8	330 (13)
3	1/8	330 (13)
4	1/8	229 (9)
5	1/8	248 (9.75)
6	1/2	165 (6.5)
7	1/2	57 (2.25)
8	1/2	120 (4.75)

Figure 6-12 Air Tubing Diagram and Tube Chart

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 Lists Table of Contents

Quick Reference Lists

Pump Part Numbers

Part	Description	Note
249351	Pump, stainless steel, waterborne, CP	
112246	Pump, stainless steel, solvent-based, CP	
170494	Pump, stainless steel, solvent-based, CP, EPR	
1004016	Pump, stainless steel, abrasive-resistant waterborne, CP	

Replacement Assemblies and Service Kits

Part	Description	Used on Pumps				
		130697 GF	112246 Solvent	249351 Water	170494 EPR	1004016 Abrasiv
Replacement Assemblies						
106449	Valve assembly, air	X	X	X	X	X
131924	Gland, packing, TFE/Leather	X				
112242	Gland assembly, solvent packing		X	X		
179451	Gland assembly, solvent packing, EPR				X	
106452	Gland assembly, packing					X
Air Motor Service Kits						
106450	Service kit, air valve	X	X	X	X	X
106451	Service kit, air motor, CP pump	X	X	X	X	X
Packing Gland Rebuild Kits (See Note)						
112243	Service kit, packing gland repair		X	X		
179452	Service kit, solvent packing, EPR				X	
106453	Service kit, packing gland repair					X
Hydraulic Seal Kits						
106454	Service kit, hydraulic section	X	X	X		X
179449	Service kit, hydraulic section, EPR				X	
High-Pressure Ball Check Kits						
134665	Service kit, high-pressure check, CP	X	X	X		
179450	Service kit, high-pressure check, CP, EPR				X	
1004424	Service kit, high-pressure check, carbide, CP					X
Siphon Ball Check Kits						
106167	Service kit, ball check, standard	X	X	X		X
179448	Service kit, ball check, EPR				X	
NOTE: No packing gland rebuild kit for general finishing pumps. Replace with new TFE/leather packing gland assembly.						

Recommended Spare Parts

On-line Maintenance

Part	Description	Quantity
Packing Glands: Order by pump type and application		
131924	Packing gland assembly (general finishing pump)	2
112242	Packing gland assembly (solventborne and waterborne pumps)	2
112243	Packing gland repair kit (solventborne and waterborne pumps)	1
179451	Packing gland assembly (solventborne EPR pump)	2
179452	Packing gland repair kit (solventborne EPR pump)	1
106452	Packing gland assembly (abrasive-resistant waterborne pump)	2
106453	Packing gland repair kit (abrasive-resistant waterborne pump)	1
Air Valve: All pump versions		
106449	Air valve assembly	1
106450	Air valve repair kit	1
900214	Vitalizer oil, 1 pint	1
Solvent Chamber Fluid: Order by pump type and application		
140029	Fluid, type-T, pump chamber, 1 quart, waterborne	4
900255	Fluid, type-K, pump chamber, 1 quart, solventborne	4

Off-line Maintenance

Part	Description	Quantity
106451	Air motor kit (all pump versions)	1
Hydraulic Seal Kit: Order by pump type and application		
106454	Hydraulic seal kit (general finishing, solventborne, waterborne, abrasive-resistant waterborne pumps)	1
179449	Hydraulic seal kit (solventborne EPR pumps)	1
High-Pressure Ball Check Kits: Order by pump type and application		
134665	High-pressure ball check kit (general finishing, solventborne, waterborne pumps)	1
179450	High-pressure ball check kit (solventborne EPR pumps)	1
1004424	High-pressure ball check kit (abrasive-resistant waterborne pump)	1
Siphon Ball Check Kit: Order by pump type and application		
106167	Siphon ball check kit (general finishing, solventborne, waterborne, abrasive-resistant waterborne pumps)	1
179448	Siphon ball check kit (solventborne EPR pumps)	1
Pneumatic Valves: All pump versions		
901166	Air pilot 4-way valve	1
249327	Roller operated valve	2
Circulation Kits and Valves: Order by application		
105071	Circulation kit (general finishing, solventborne, waterborne, abrasive-resistant waterborne pumps)	1
179440	Circulation kit (solventborne EPR pumps)	1
179453	Circulation valve service kit (solventborne EPR pumps)	1
106244	Circulation valve carbide seat kit (abrasive-resistant waterborne pumps)	1
106251	Ball valve packing kit (all pumps)	1

Options

Circulation Kits

Refer to *Installation* section for kit contents and installation instructions. Order two kits for a dual circulation installation.

Part	Description	Note
105071	Service kit, circulation, stainless steel	A
179440	Service kit, circulation, stainless steel, EPR	B
179453	Service kit, circulation valve, EPR	C

NOTE: A. Use for general finishing, solventborne, waterborne, and abrasive-resistant waterborne pumps.

B. Use for solventborne EPR pumps.

C. Use this kit to repair the solventborne EPR circulation valve.

Solvent Chamber Feed Kit

Use this kit to add fluid to the solvent chamber quickly and easily.

Part	Description	Note
112322	Service kit, solvent chamber feed	

PTFE High-Pressure Fluid Hoses

These hoses have 1/2-20 JIC female swivel fittings. They are rated for 207 bar (3000 psi) working pressure and have a 1/4 in. inside diameter.

Part	Length mm (in.)
842012	305 (12)
842024	610 (24)
842036	914 (36)
842048	1220 (48)
842072	1830 (72)
842096	2440 (96)
842120	3040 (120)
842180	4560 (180)
842300	7610 (300)
842600	15200 (600)

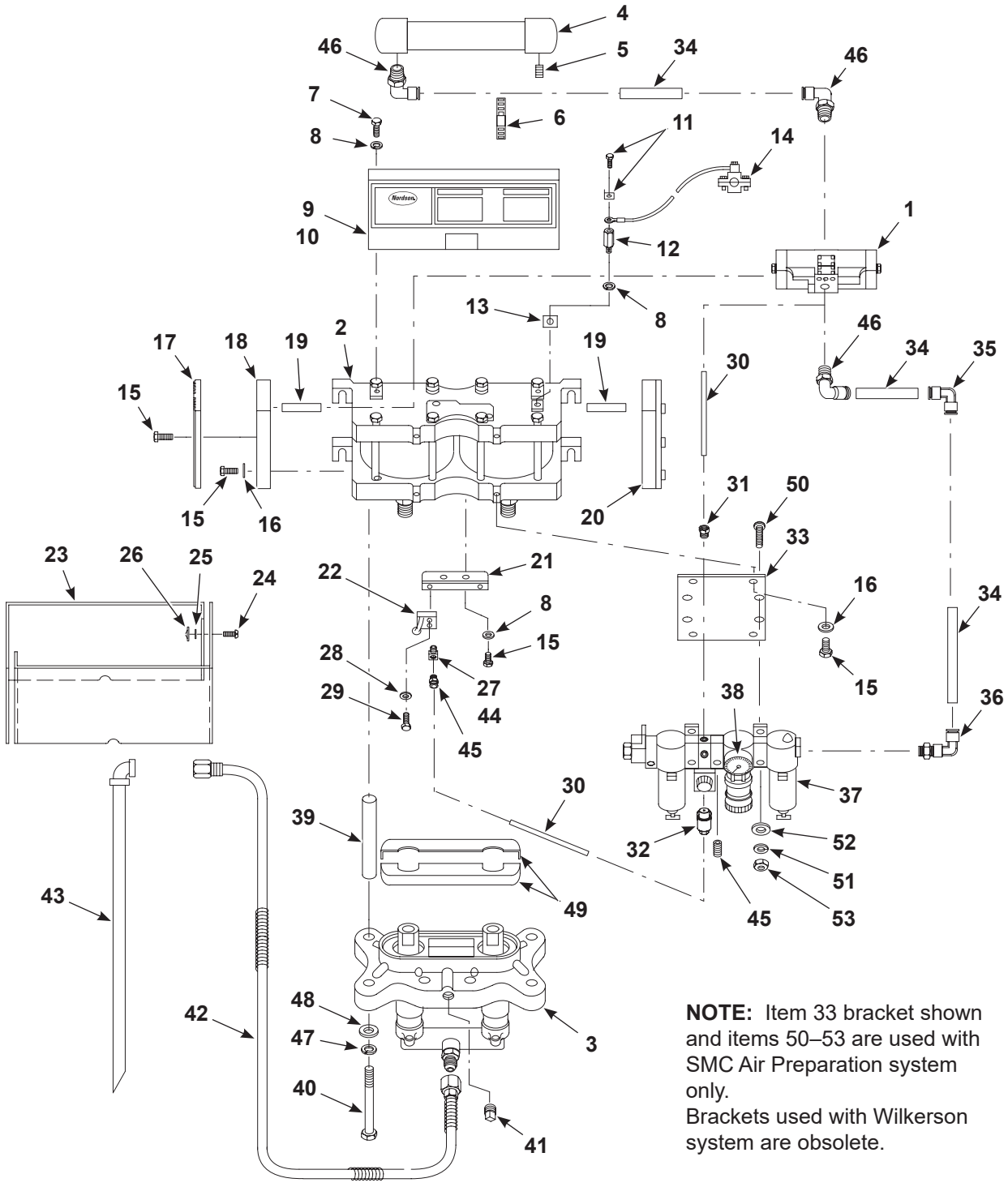
Rubber Air Hoses

These hoses have 11/16-12 JIC female swivel fittings. They are rated for 13.8 bar (200 psi) working pressure and have a 3/4 in. inside diameter.

Part	Length mm (in.)
802018	457 (18)
802060	1524 (60)

Common Parts

See Figure 7-1. These parts are used on all versions of the CP pump.



NOTE: Item 33 bracket shown and items 50–53 are used with SMC Air Preparation system only.
Brackets used with Wilkerson system are obsolete.

Figure 7-1 Common External Parts (1 of 2)

Item	Part	Description	Quantity	Note
1	106449	Valve assembly, air	1	A
2	- - - - - -	Air motor	1	B
3	- - - - - -	Hydraulic section	1	C
4	249417	Accumulator	1	
5	973401	Plug, pipe, 1/8 in. NPT, nylon	1	
6	970970	Clamp, hose, No. 52	2	
7	981239	Screw, hex head, 1/4−20 x 0.5 in., cap, zinc	2	
8	983140	Washer, lock, split, 0.20 in., steel, zinc	5	
9	- - - - - -	Cover, accumulator	1	
10	- - - - - -	Plate, data	1	
11	132054	Retainer, wire	1	
12	132154	Stud, ground	1	
13	240674	Tag, ground	1	
14	240976	Clamp, ground, w/wire	1	
15	981208	Screw, hex head, 1/4−20 x 0.625 in., cap, zinc	12	
15	981211	Screw, hex head, 1/4−20 x 0.75 in., cap, zinc	6	D
16	983041	Washer, flat, 0.25 x 0.5 x 0.049 in., zinc	10	
17	323773	Cover, muffler box	2	
18	249434	Housing, muffler, left	1	
19	249321	Tube, exhaust	2	
20	249433	Housing, muffler, right	1	
21	164418	Bracket, roller valve	1	
22	164419	Valve, roller operated	2	
23	148955	Cover, half, CP pump	2	
24	288145	Screw, captive, black	2	
25	141039	Retainer, captive screw, stainless steel	2	
26	984251	Nut, spring, type U, 10−24	2	
27	971605	Elbow, universal	4	
28	983111	Washer, lock, split, #8, steel, zinc	4	
29	981099	Screw, fillet head, 8−32 x 1 in., slotted, zinc	4	
30	900609	Tubing, nylon, 0.125 in. OD	AR	
31	972186	Connector, male, 1/8 in. tube x 1/4 in. NPT	1	
32	1611659	Elbow, universal branch, ⅛ T x ⅛ NPT, with seal	1	
33	1068359	Bracket, module	1	G
34	900610	Tubing, nylon, 0.50 in. OD	AR	
35	972187	Elbow, union, 1/2 in. tube	1	
36	972184	Elbow, male, 1/2 in. tube x 1/2 in. NPT	1	
37	1068742	Module, filter, regulator, lubricator, 1/2 in. NPT	1	E
38	901254	Gauge, air, 1/8 NPT, PSI-KPA-KG/CM	1	
39	249325	Spacer, tube	8	
40	981356	Screw, hex head, 1/2−13 x 7.5 in., cap, zinc	8	

Continued...

Common Parts *(contd)*

See Figure 7-1. These parts are used on all versions of the CP pump.

Item	Part	Description	Quantity	Note
41	973434	Plug, square head, 1/2 in. NPT, stainless steel	1	
42	827060	Hose, siphon, 1/2 in. ID, 5 ft, stainless steel fittings	1	
43	750256	Rod, siphon, 55 gal	1	
44	972185	Connector, male, 1/8 in. tube x #10-32	4	
45	973411	Plug, pipe, 1/4 in. NPTF	1	
46	972122	Elbow, male, 1/2 in. tube x 3/8 in. NPT	1	
47	983180	Washer, lock, split, 1/2 in.	8	
48	983007	Washer, flat, 0.531 x 1 x 0.063 in.	8	
49	118110	Cover, CP solvent chamber	1	
50	981307	Screw, socket, 5/16−18 x 0.75 in., zinc	4	G
51	983150	Washer, lock, split, 5/16, steel, zinc	4	G
52	983051	Washer, flat, 0.344 x 0.688 x 0.065 in., zinc	4	G
53	984449	Nut, hex, regular, 5/16−18, G8, zinc	4	G
NS	112244	Accessory group, SB-GF, CP	1	F
NS	105327	Accessory group, waterborne, CP	1	F
NS	179443	Accessory group, SB, EPR, CP	1	F
NS	105068	Decal, schematic	1	

NOTE: A. Refer to parts list on page 7-10.

B. Refer to parts list on page 7-12.

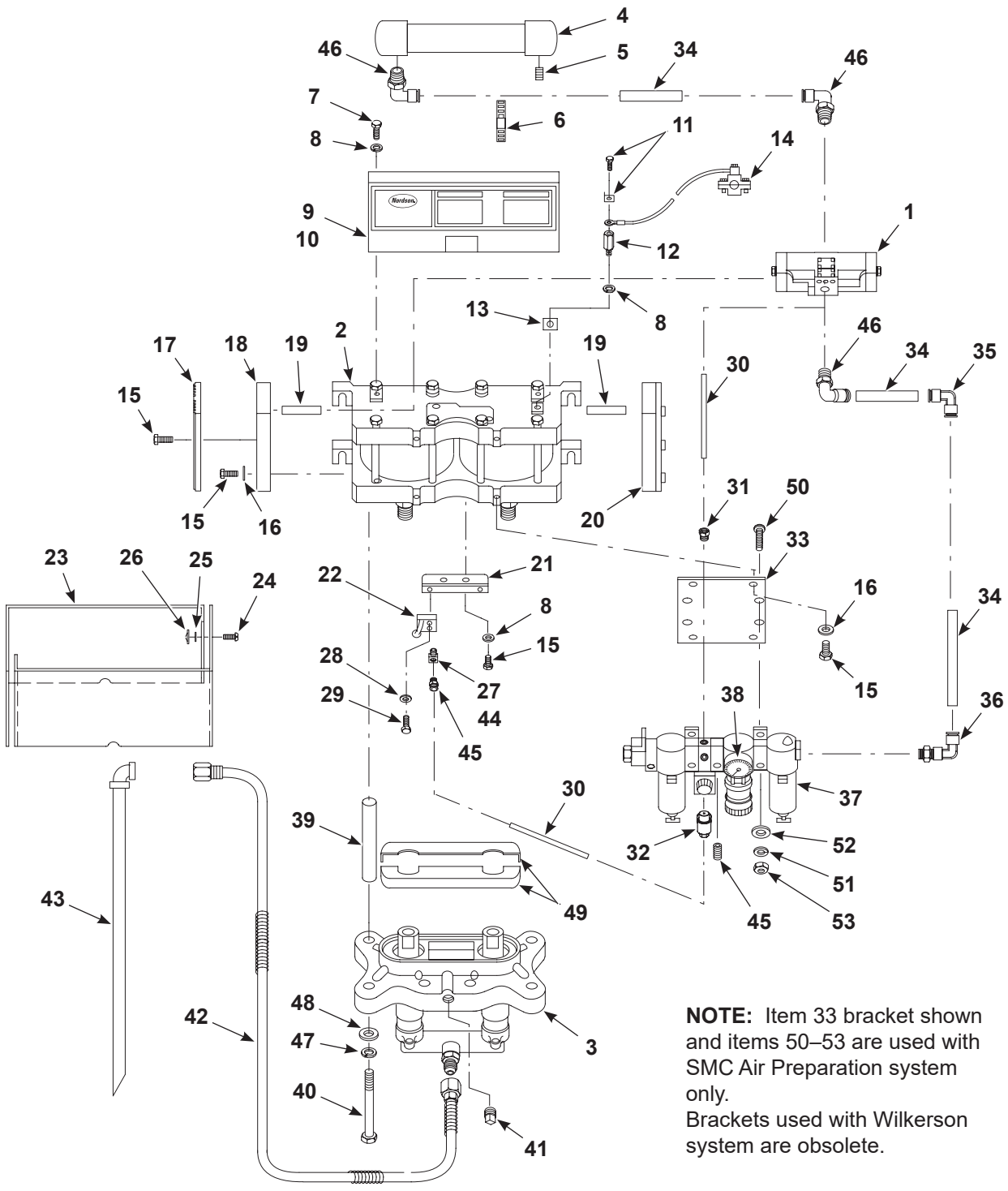
C. Refer to parts list on page 7-14.

D. Use these screws to secure item 18 to a waterborne pump.

E. Refer to Air Preparation System on page 7-19 or 7-20 for parts breakdown.

F. Refer to Accessory Groups on page 7-17 for parts breakdowns.

G. Bracket changed to accommodate SMC air preparation system. If your pump uses a Wilkerson system, re-use your old brackets. Items 50−53 added for SMC system.



NOTE: Item 33 bracket shown and items 50–53 are used with SMC Air Preparation system only.
Brackets used with Wilkerson system are obsolete.

Figure 7-1 Common External Parts (2 of 2)

Air Valve Parts

See Figure 7-2 and the following parts list.

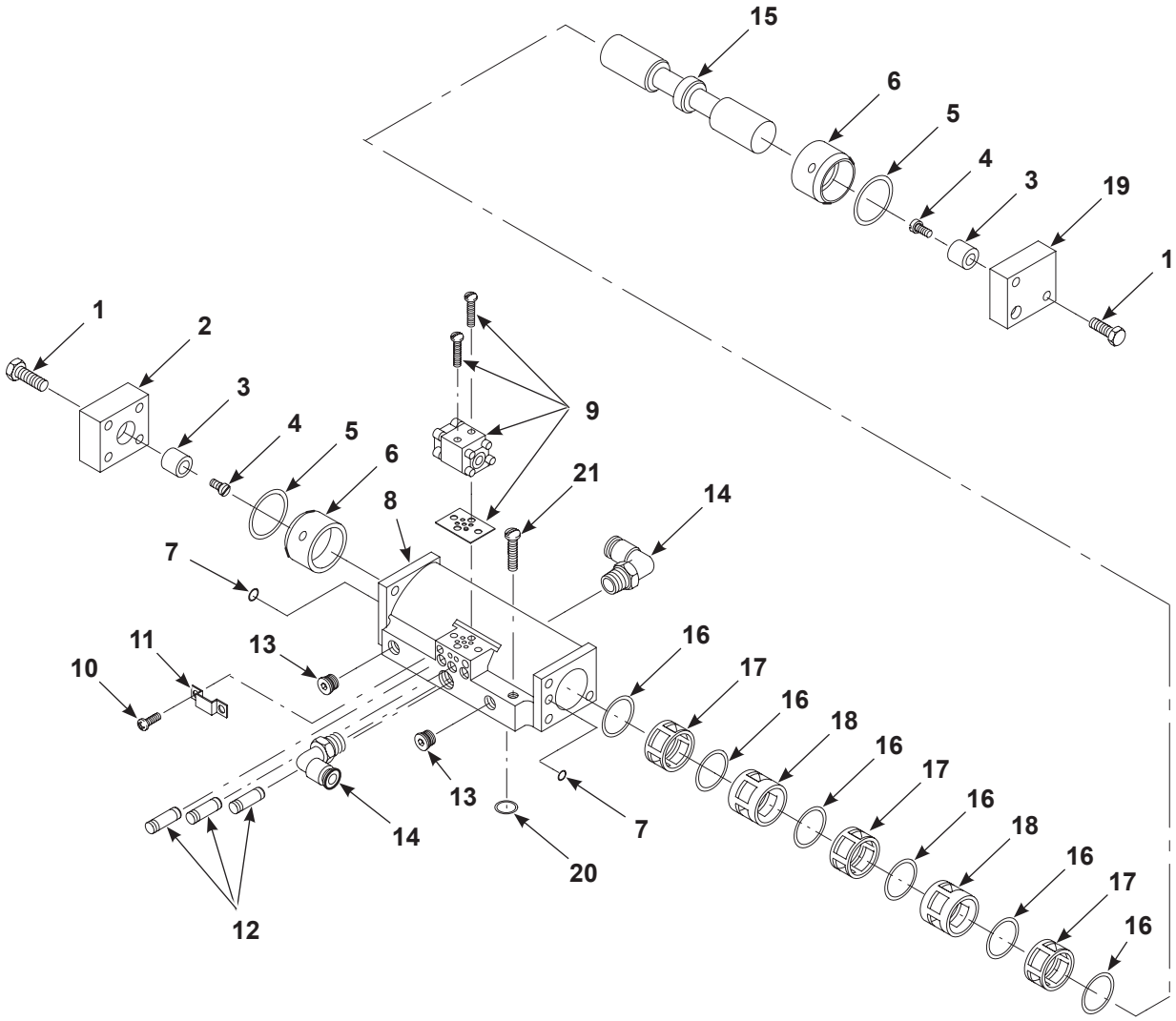


Figure 7-2 Air Valve Parts

Item	Part	Description	Quantity	Note
—	106449	Valve assembly, air	1	
1	981203	• Screw, hex head, 1/4−20 x 1.25 in., cap, zinc	4	
2	249319	• Cap, left end	1	
3	249323	• Bumper	2	
4	981770	• Screw, fillet head, w/lockwasher, 8−32 x 0.5 in.	2	A
5	940232	• O-ring, Buna-N, 1.063 x 1.188 x 0.063 in.	2	B
6	249309	• Spacer, end	2	
7	940074	• O-ring, Buna-N, 0.156 x 0.281 x 0.063 in.	2	B
8	249303	• Body, valve	1	
9	901166	• Valve, 2 position, 4 way, air pilot	1	
10	981039	• Screw, pan head, 6-32 x 0.312 in., zinc	2	
11	249317	• Deflector	1	
12	972185	• Connector, male, 1/8 in. tube x 10-32	3	A
13	973411	• Plug, pipe, socket, flush, 1/4 in. NPTF, zinc	2	
14	972122	• Elbow, male, 1/2 in. tube x 3/8 in. NPT	2	
15	249316	• Spool	1	
16	942104	• O-ring, molyfilled, 0.75 x 1 x 0.125 in.	6	B
17	249311	• Spacer, middle (red)	3	
18	249310	• Spacer (silver)	2	
19	249320	• Cap, right end	1	
20	940144	• O-ring, Buna-N, 0.5 x 0.625 x 0.063 in.	2	B
21	981445	• Screw, socket head, 5/16−18 x 1.5 in., Nylok	2	B

NOTE: A. Before installing, apply thread lock compound, part 900424 (VC-3).

B. Included in air valve service kit part 106450. Refer to page 7-21 for kit parts list.

Air Motor Parts

See Figure 7-3.

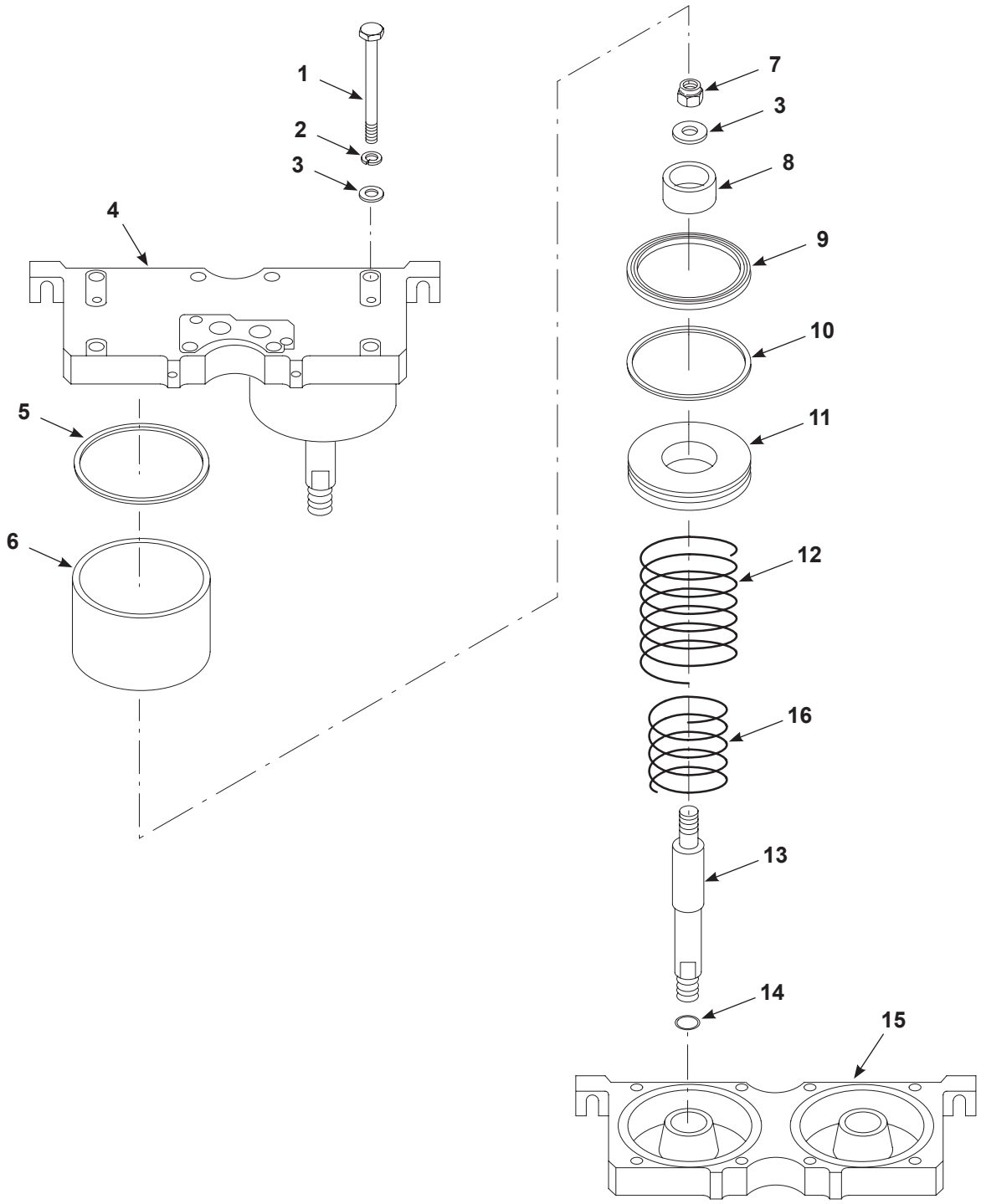


Figure 7-3 Air Motor Parts

Item	Part	Description	Quantity	Note
—	- - - - - -	Air Motor	—	
1	981355	• Screw, hex head, 1/2−13 x 6 in., cap, zinc	8	
2	983180	• Washer, lock, split, 1/2 in., steel, zinc	8	
3	983007	• Washer, flat, 0.531 x 1 x 0.063 in., zinc	10	
4	249301	• Head, upper	1	
5	942610	• O-ring, Buna-N, square, 6.75 x 7 x 0.125 in.	2	A
6	117717	• Cylinder, glass, air	2	
7	984138	• Nut, hex, lock, 1/2−20 UNJF-3B	2	
8	249324	• Bumper, piston	2	
9	952143	• Packing, U-cup, 0.313 x 6.375 x 7 in.	2	A
10	954042	• Ring, backup, single, 6.5 x 7 in.	2	A
11	249306	• Piston	2	
12	249328	• Spring, compression, 9.125 x 5.866 OD x 0.306 in.	2	
13	249318	• Piston (shaft)	2	
14	945014	• O-ring, hot paint, 5/16 in. tube	2	A, D
15	249299	• Head, lower	1	
16	119926	• Spring, inner	2	B

NOTE: A. Included in air motor service kit part 106451. Refer to page 7-21 for kit parts list.

B. Only used on general finishing pump.

C. Use 945064 O-ring, EPR, 5/16 in. tube with EPR pumps

Common Hydraulic Section Parts

See Figure 7-4 and the following parts list. These parts are used on all pump versions. Version-specific parts are listed on the following pages. Refer to *Service Kits* on page 7-21 for kit part numbers and contents.

Item	Part	Description	Quantity	Note
1	249297	Chamber, solvent	1	
2	249315	Plunger, hydraulic, stainless steel	2	
3	- - - - - -	Gland, packing assembly	2	A, B
4	249291	Housing, hydraulic	2	
5	983007	Washer, flat, 0.531 x 1 x 0.063 in., zinc	8	
6	983180	Washer, lock, split, 0.5 in., steel, zinc	8	
7	981354	Screw, hex head, 1/2−13 x 2.25 in., cap, zinc	8	
8	900002	Ball, 440 stainless steel, 1.125 in. dia, 100	2	C
9	- - - - - -	Seat, ball	2	C
10	954015	Ring, back-up, single, 1.375 in.	4	
11	- - - - - -	O-ring	2	A, C
12	- - - - - -	O-ring	2	A, C
13	249289	Manifold, suction	1	
14	973408	Plug, pipe, socket, standard, 1/2 in. NPT	2	
15	983051	Washer, flat, 0.344 x 0.688 x 0.065 in., zinc	4	
16	983150	Washer, lock, split, 5/16 in.	4	
17	981353	Screw, hex head, 5/16−18 x 1.125 in., cap, zinc	4	
18	972102	Connector, male, 37, 7/8−14 x 1/2 in. NPT, stainless steel	1	
19	- - - - - -	Seat, ball	2	C
20	- - - - - -	O-ring	4	C
21	900000	Ball, 440 stainless steel, 0.375 in. dia, 50	2	C
22	246021	Cage, ball	2	C
23	246022	Spring, compression, 0.75 x 0.375 x 0.02 in.	2	
24	- - - - - -	O-ring	2	A, C
25	249305	Cartridge, ball check	2	
26	249308	Manifold, check valve	1	
27	- - - - - -	Fitting, 3/8 in. NPTF, w/O-ring	1	A
28	- - - - - -	• O-ring	1	A

NOTE: A. See version-specific hydraulic section parts lists on page 7-16 for part numbers.

B. Service kits available for solvent-borne, solvent EPR, waterborne, and abrasive resistant waterborne packing glands. Refer to *Packing Gland Service Kits* on page 7-21.

C. Included in hydraulic seal (pages 7-23 and 7-23) and ball check (pages 7-23 and 7-25) service kits.

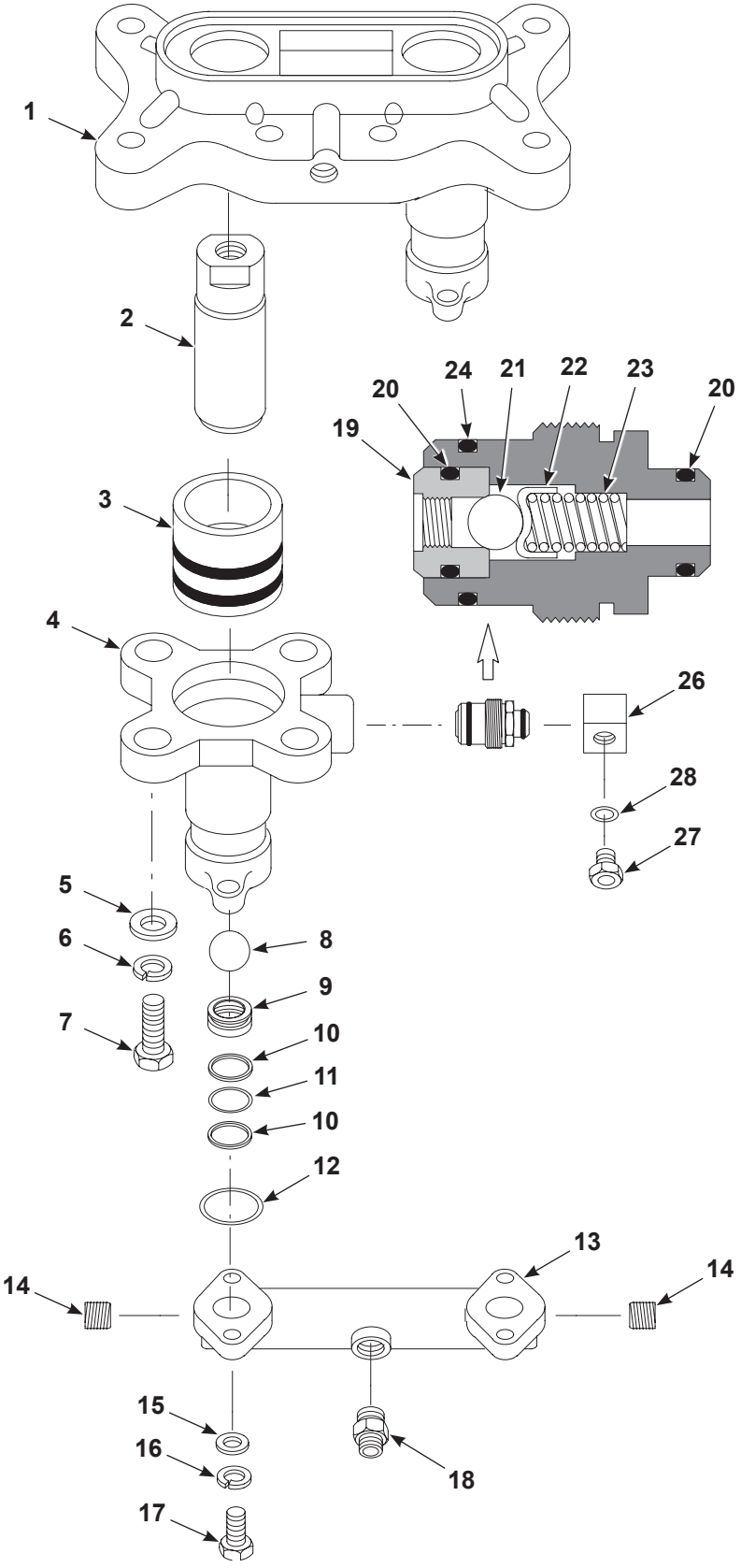


Figure 7-4 Common Hydraulic Section Parts

Version-Specific Parts for Hydraulic Section

See Figure 7-4 and the following parts lists.

General Finishing Pump (130697)

Item	Part	Description	Quantity	Note
3	131924	Gland, packing, TFE/leather GF	1	
11	942200	O-ring, hot paint, 1.375 x 1.625 x 0.125 in.	2	A
12	940330	O-ring, hot paint, 2.00 x 2.125 x 0.063 in.	2	A
20	940160	O-ring, hot paint, 0.625 x 0.75 x 0.063 in.	4	A
24	940222	O-ring, hot paint, 1.00 x 1.125 x 0.063 in.	2	A
27	249356	Fitting, 3/8 in. NPTF, w/O-ring	1	
28	945017	• O-ring, hot paint, 3/8 in. tube	8	

NOTE: A. Included in hydraulic section and ball check service kits. Refer to Service Kits.

Solventborne and Waterborne Pumps (249351, 112246)

Item	Part	Description	Quantity	Note
3	112242	Gland assembly, solvent packing	1	B
11	942200	O-ring, hot paint, 1.375 x 1.625 x 0.125 in.	2	A
12	940330	O-ring, hot paint, 2.00 x 2.125 x 0.063 in.	2	A
20	940160	O-ring, hot paint, 0.625 x 0.75 x 0.063 in.	4	A
24	940222	O-ring, hot paint, 1.00 x 1.125 x 0.063 in.	2	A
27	249356	Fitting, 3/8 in. NPTF, w/O-ring	1	
28	945017	• O-ring, hot paint, 3/8 in. tube	8	

NOTE: A. Included in hydraulic seal and ball check service kits. Refer to *Service Kits*.

B. Packing gland service kit available. Refer to page 7-21.

EPR Pump (170494)

Item	Part	Description	Quantity	Note
3	179451	Gland assembly, solvent packing, EPR	1	B
11	942208	O-ring, EPR, 1.375 x 1.625 x 0.125 in.	2	A
12	940335	O-ring, EPR, 2.00 x 2.125 x 0.063 in.	2	A
20	941163	O-ring, EPR, 0.625 x 0.75 x 0.063 in.	4	A
24	940226	O-ring, EPR, 1.00 x 1.125 x 0.063 in.	2	A
27	179441	Fitting, 3/8 in. NPTF, w/O-ring	1	
28	945099	• O-ring, EPR, 3/8 in. tube	8	

NOTE: A. Included in hydraulic seal and ball check service kits. Refer to *Service Kits*.

B. Packing gland service kit available. Refer to page 7-21.

Abrasive Resistant Waterborne Pump (1004016)

Item	Part	Description	Quantity	Note
3	106452	Gland assembly, packing	1	B
11	942200	O-ring, hot paint, 1.375 x 1.625 x 0.125 in.	2	A
12	940330	O-ring, hot paint, 2.00 x 2.125 x 0.063 in.	2	A
20	940160	O-ring, hot paint, 0.625 x 0.75 x 0.063 in.	4	A
24	940222	O-ring, hot paint, 1.00 x 1.125 x 0.063 in.	2	A
27	249356	Fitting, 3/8 in. NPTF, w/O-ring	1	
28	945017	• O-ring, hot paint, 3/8 in. tube	8	

NOTE: A. Included in hydraulic seal and ball check service kits. Refer to *Service Kits*.

B. Packing gland service kit available. Refer to page 7-22.

Accessory Groups

Accessory groups are shipped with the pump.

General Finishing and Solventborne Accessory Group

Part	Description	Quantity
112244	Accessory group, CP pump, SB−GF	1
163031	• Strainer, siphon, 0.009 screen	1
941160	• • O-ring, hot paint, 0.75 x 0.938 x 0.094 in.	1
981205	• • Screw, thumb, 1/4−20 x 0.5 in.	1
105069	• Tool, packing gland	1
981353	• Screw, hex head, 5/16−18 x 1.25 in., cap, zinc	1
981552	• Screw, hex head, 7/8−14 x 2.25 in., cap, zinc	1
900255	• Fluid, type-K, pump chamber, 1 quart	1
900214	• Oil, vitalizer, 1 pint	1
900431	• Adhesive, pipe/thread/hydraulic sealant, 6 ml	1
972102	• Connector, male, 37, 7/8−14 x 0.50 in., stainless steel	1

Waterborne and Abrasive-Resistant Waterborne Accessory Group

Part	Description	Quantity
105327	Accessory group, CP pump, (waterborne)	1
713186	• Strainer, siphon, stainless steel, 0.006 in. screen	1
941160	• • O-ring, hot paint, 0.75 x 0.938 x 0.094 in.	1
981279	• • Screw, thumb, 1/4−20 x 1 in., stainless steel	1
105069	• Tool, packing gland	1
981353	• Screw, hex head, 5/16−18 x 1.25 in., cap, zinc	1
981552	• Screw, hex head, 7/8−14 x 2.25 in., cap, zinc	1
140029	• Fluid, type-T, pump chamber	1
900214	• Oil, vitalizer, 1 pint	1
900431	• Adhesive, pipe/thread/hydraulic sealant, 6 ml	1
972102	• Connector, male, 37, 7/8−18 x 0.50 in., stainless steel	1

Solventborne EPR Accessory Group

Part	Description	Quantity
179443	Accessory group, CP pump, SB, EPR	1
179442	• Strainer, siphon, 0.006 screen, stainless steel, EPR	1
941164	• • O-ring, EPR, 0.75 x 0.938 x 0.093 in.	1
981279	• • Screw, thumb, 1/4−20 x 1 in., stainless steel	1
105069	• Tool, packing gland	1
981353	• Screw, hex head, 5/16−18 x 1.25 in., cap, zinc	1
981552	• Screw, hex head, 7/8−14 x 2.25 in., cap, zinc	1
900255	• Fluid, type-K, pump chamber, 1 quart	1
900214	• Oil, vitalizer, 1 pint	1
900431	• Adhesive, pipe/thread/hydraulic sealant, 6 ml	1
972102	• Connector, male, 37, 7/8−14 x 0.50 in., stainless steel	1

Air Preparation Systems

Wilkerson Air Preparation System

See Figure 7-5. The air preparation system can be ordered through Nordson only as a unit. Individual modules and service parts can be ordered from the manufacturer or its distributors:

Wilkerson Corporation
Englewood, Colorado 80150

Item	Part	Description	Quantity	Note
—	249332	Compressed air preparation system	—	A
1	GPA-95-098	• Shutoff valve, 2-way, 1/2 in. NPT	1	B
2	GPA-95-969	• Sleeve mounting unit	4	B
3	F26-04-M00	• Air filter, 10 oz bowl, 1/2 in. NPT	1	B
NS	FRP-95-115	• Filter element	1	B, C
4	GPA-95-968	• Bracket, sleeve wall mounting	2	B
5	GPA-95-919	• Manifold block	1	B
6	R26-04-000	• Regulator, 5−125 psig, 1/2 in. NPT	1	B
7	L27-04-600	• Lubricator, 10 oz, 1/2 in. NPT	1	B
8	ROD-02-000	• Regulator	1	B
9	- - - - - -	• Nipple, close, 1/4 in. NPT x 1 in. long	1	

NOTE: A. Nordson part number.

B. Wilkerson part number.

C. The O-ring for the bowl is included with the filter element.

NS: Not Shown

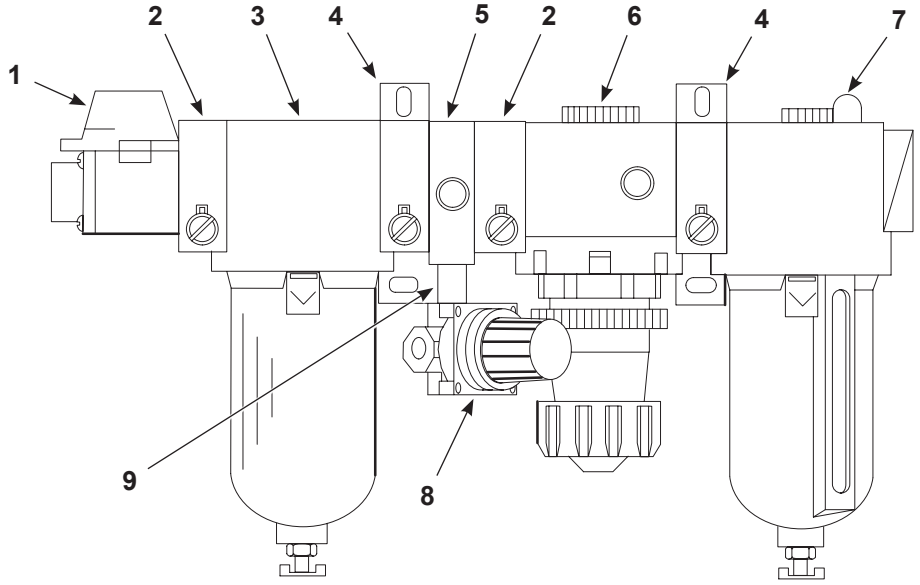


Figure 7-5 Wilkerson Air Preparation System Parts

SMC Air Preparation System Parts

See Figure 7-6. The air preparation system can be ordered through Nordson only as a unit. Individual modules and service parts can be ordered from SMC or its distributors.

NOTE: To retrofit a CP pump with this air preparation system, you must also order the mounting bracket listed here.

Item	Part	Description	Quantity	Note
—	1068742	Compressed air preparation system	—	A
1	VHS40-N04-Z	• Shutoff valve	1	B
2	Y400	• Coupler	2	B
3	AF40-N04-2Z	• Air filter	1	B
NS	AF40P−060S	• Filter element	1	B
4	Y400T	• Coupler, w/mounting bracket	2	B
5	Y44-N02	• Cross spacer	1	B
6	AR40K-N04-Z	• Regulator	1	B
7	AL40-N04-23Z	• Lubricator	1	B
8	AR20K-N02-Z	• Regulator	1	B
9	KV-113-B2	• Nipple, long	1	
10	1068359	Bracket, module, CP FRL	1	C
11	1613132	Cover, regulator, lockout, AR20 series	1	A

NOTE: A. Nordson part number.

B. SMC part number.

C. Bracket must be ordered separately. If ordering an SMC system to replace a Wilkerson system you must order the bracket also.

NS: Not Shown

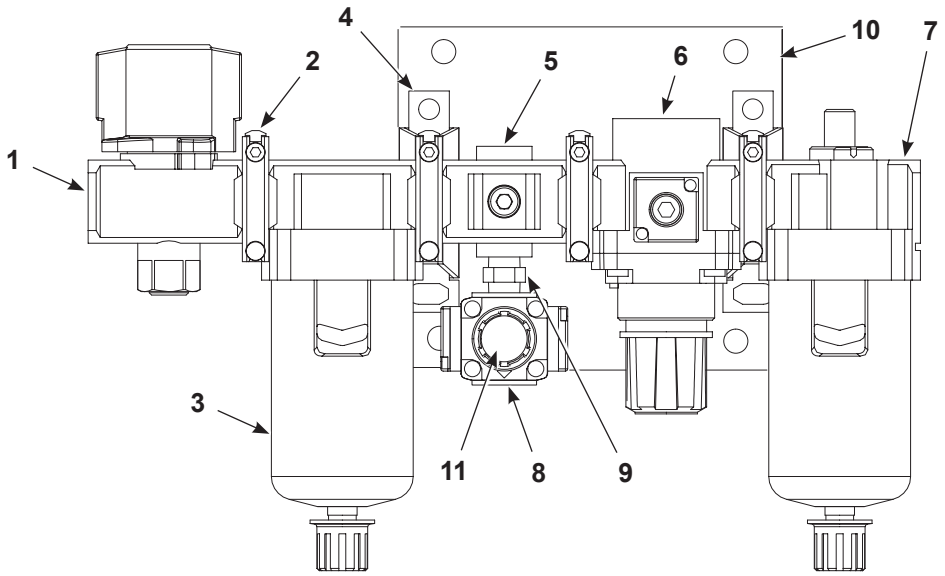


Figure 7-6 SMC Air Preparation System Parts

Service Kits

Refer to the Quick Reference Lists on page 7-2 for service kit charts showing part number and usage.

Parts breakdowns for the service kits are listed on the following pages. Use the parts breakdowns to make sure the kits you order contain the parts you need to service your pump.

For parts not included in the service kits, refer to the Common and Version-Specific parts lists on the preceding pages.

Air Valve Service Kit

Item numbers are shown in Figure 7-2 in this section.

Item	Part	Description	Quantity	Note
—	106450	Service kit, air valve	1	
5	940232	• O-ring, Buna-N, 1.063 x 1.188 x 0.063 in.	2	
7	940074	• O-ring, Buna-N, 0.156 x 0.281 x 0.063 in.	2	
16	942104	• O-ring, molyfilled, 0.75 x 1.00 x 0.125 in.	6	
20	940144	• O-ring, Buna-N, 0.50 x 0.625 x 0.063 in.	2	
21	981445	• Screw, socket head, 5/16−18 x 1.5 in., Nylok	2	

Air Motor Service Kit

Item numbers are shown in Figure 7-3 in this section.

Item	Part	Description	Quantity	Note
—	106451	Service kit, air motor, CP pump	1	
5	942610	• O-ring, Buna-N, square, 6.75 x 7.00 x 0.125 in.	2	
9	952143	• Packing, U-cup, 5/16 x 6 3/8 x 7.00 in.	1	
10	954042	• Ring, backup, single, 6.50 x 7.00 in.	2	
14	945014	• O-ring, hot paint, 5/16 in. tube	2	

Packing Gland Service Kits

Item numbers are shown in Figure 7-7 in this section.

The kits contain parts to repair two packing glands. The housing is only available as part of a packing gland assembly. Refer to V*ersion-Specific Parts* in this section for packing gland assemblies.

Solventborne and Waterborne Packing Gland Service Kit

Item	Part	Description	Quantity	Note
—	112243	Service kit, packing gland repair	1	A
1	942300	• O-ring, hot paint, 2.50 x 2.75 x 0.125 in.	4	
2	112238	• Bearing, plunger	2	
3	112239	• Seal, w/spring, 2.00 x 1.60 x 0.21 in.	2	
4	112237	• Spacer, packing gland	2	
5	986026	• Ring, retaining, internal, 200, spiral	2	

NOTE: A. Pumps manufactured before June 1992 use type-G (polyurethane U-cup) packing glands, part 106452. To repair type-G packing glands order kit 106453. To replace type-G packing glands with packing glands with spring-loaded seals, order packing gland assembly, part 112242.

Solvent EPR Packing Gland Service Kit

Item	Part	Description	Quantity	Note
—	179452	Service kit, solvent packing, EPR	1	A
1	942305	• O-ring, EPR, 2.50 x 2.75 x 0.125 in.	4	
2	112238	• Bearing, plunger	2	
3	112239	• Seal, w/spring, 2.00 x 1.60 x 0.21 in.	2	
4	112237	• Spacer, packing gland	2	
5	986026	• Ring, retaining, internal, 200, spiral	2	

Abrasive-Resistant Packing Gland Service Kit

Item	Part	Description	Quantity	Note
—	106453	Service kit, packing gland repair	1	A
1	942300	• O-ring, hot paint, 2.5 x 2.75 x 0.125 in.	4	
2	105066	• Bearing, plunger	2	
3	952281	• U-cup, polyurethane, 1.62 x 2.25 in.	2	
4	105065	• Spacer, packing	2	
5	345318	• Ring, retaining, internal, 225, spiral, stainless steel	2	

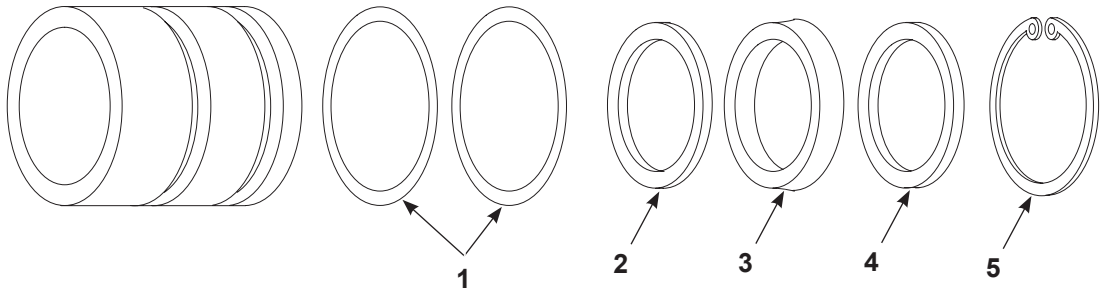


Figure 7-7 Packing Gland Service Kits

Hydraulic Seal Kits

Hydraulic Seal Kit for Waterborne, Solventborne, and Abrasive-Resistant Pumps

See Figure 7-7 for item 1 and Figure 7-3 for item 14. See Figure 7-4 for remaining items.

Item	Part	Description	Quantity	Note
—	106454	Service kit, hydraulic section	1	
1	942300	• O-ring, hot paint, 2.50 x 2.75 x 0.125 in.	4	
10	954015	• Ring, backup, single, 1.375 in.	2	
11	942200	• O-ring, hot paint, 1.375 x 1.625 x 0.125 in.	2	
12	940330	• O-ring, hot paint, 2.00 x 2.125 x 0.063 in.	2	
14	945014	• O-ring, hot paint, 5/16 tube	2	
20	940160	• O-ring, hot paint, 0.625 x 0.75 x 0.063 in.	4	
24	940222	• O-ring, hot paint, 1.00 x 1.125 x 0.063 in.	2	

Hydraulic Seal Kit for Solventborne EPR Pumps

See Figure 7-7 for item 1 and Figure 7-3 for item 14. See Figure 7-4 for remaining items.

Item	Part	Description	Quantity	Note
—	179449	Service kit, hydraulic section, EPR	1	
1	942305	• O-ring, EPR, 2.5 x 2.75 x 0.125 in.	4	
10	954015	• Ring, backup, single, 1.375 in.	2	
11	942208	• O-ring, EPR, 1.375 x 1.625 x 0.125 in.	2	
12	940335	• O-ring, EPR, 2 x 2.125 x 0.063 in.	2	
14	945064	• O-ring, EPR, 5/16 tube	2	
20	941163	• O-ring, EPR, 0.625 x 0.75 x 0.063 in.	4	
24	940226	• O-ring, EPR, 1 x 1.125 x 0.063 in.	2	

High-Pressure Ball Check Valve Service Kits

All ball check valve service kits contain parts to rebuild two valves.

High-Pressure Ball Check Service Kit for General Finishing, Solventborne, and Waterborne Pumps

See Figure 7-7 for item 1. See Figure 7-4 for remaining items.

Item	Part	Description	Quantity	Note
—	134665	Service kit, high-pressure check, CP	—	
1	942300	• O-ring, hot paint, 2.50 x 2.75 x 0.125 in.	4	
12	940330	• O-ring, hot paint, 2.00 x 2.125 x 0.063 in.	2	
19	- - - - - -	• Seat, ball, stainless steel	2	A
20	940160	• O-ring, hot paint 0.625 x 0.75 x 0.063 in.	4	
21	900000	• Ball, 440 stainless steel, 0.375 dia, 50	2	
22	246021	• Cage, ball	2	
23	246022	• Spring, compression, 0.720 x 0.375 OD x 0.02 in.	2	
24	940222	• O-ring, hot paint, 1.00 x 1.125 x 0.063 in.	2	
NOTE: A. Pumps manufactured before June 1992 used nylon seats, which are interchangeable with the new stainless steel seats.				

High-Pressure Ball Check Service Kit for Solventborne EPR Pumps

See Figure 7-7 for item 1. See Figure 7-4 for remaining items.

Item	Part	Description	Quantity	Note
—	179450	Service kit, high-pressure check, CP, EPR	—	
1	942305	• O-ring, EPR, 2.50 x 2.75 x 0.125 in.	4	
12	940335	• O-ring, EPR, 2.00 x 2.125 x 0.063 in.	2	
19	- - - - - -	• Seat, ball, stainless steel	2	A
20	941163	• O-ring, EPR, 0.625 x 0.75 x 0.063 in.	4	
21	900000	• Ball, 440 stainless steel, 0.375 dia, 50	2	
22	246021	• Cage, ball	2	
23	246022	• Spring, compression, 0.720 x 0.375 OD x 0.02 in.	2	
24	940226	• O-ring, EPR, 1.00 x 1.125 x 0.063 in.	2	
NOTE: A. Pumps manufactured before June 1992 used nylon seats, which are interchangeable with the new stainless steel seats.				

High-Pressure Ball Check Service Kit for Abrasive-Resistant Waterborne Pumps

See Figure 7-7 for item 1. See Figure 7-4 for remaining items.

Item	Part	Description	Quantity	Note
—	1004424	Service kit, high-pressure check, carbide, CP	—	
1	942300	• O-ring, hot paint, 2.50 x 2.75 x 0.125 in.	4	
12	940330	• O-ring, hot paint, 2.00 x 2.125 x 0.063 in.	2	
19	- - - - - -	• Seat, ball, pressure, carbide	2	
20	940160	• O-ring, hot paint 0.625 x 0.75 x 0.063 in.	4	
21	900000	• Ball, 440 stainless steel, 0.375 dia, 50	2	
22	246021	• Cage, ball	2	
23	246022	• Spring, compression, 0.72 x 0.375 OD x 0.02 in.	2	
24	940222	• O-ring, hot paint, 1.00 x 1.125 x 0.063 in.	2	

Siphon Ball Check Valve Service Kits

All ball check valve service kits contain parts to rebuild two valves.

Siphon Ball Check Service Kit for General Finishing, Solventborne, Waterborne, and Abrasive-Resistant Pumps

Item numbers are shown in Figure 7-4.

Item	Part	Description	Quantity	Note
—	106167	Service kit, ball check, standard	—	
8	900002	• Ball, 440 stainless steel, 1.125 dia, 100	2	
9	- - - - - -	• Seat, ball, stainless steel	2	A
10	954015	• Ring, backup, single, 1.375 in.	4	
11	942200	• O-ring, hot paint, 1.375 x 1.625 x 0.125 in.	2	
12	940330	• O-ring, hot paint, 2.00 x 2.125 x 0.063 in.	2	

NOTE: A. Pumps manufactured before June 1992 used nylon seats, which are interchangeable with the new stainless steel seats.

NS: Not Shown

Siphon Ball Check Service Kit for Solventborne EPR Pumps

Item numbers are shown in Figure 7-4.

Item	Part	Description	Quantity	Note
—	179448	Service kit, ball check, EPR	—	
8	900002	• Ball, 440 stainless steel, 1.125 dia, 100	2	
9	- - - - - -	• Seat, ball, stainless steel	2	A
10	954015	• Ring, backup, single, 1.375 in.	4	
11	942208	• O-ring, hot paint, 1.375 x 1.625 x 0.125 in.	2	
12	940335	• O-ring, EPR, 2.00 x 2.125 x 0.063 in.	2	

NOTE: A. Pumps manufactured before June 1992 used nylon seats, which are interchangeable with the new stainless steel seats.

NS: Not Shown

EU DECLARATION of Conformity

Product: **Dual Piston Pump**

Models: CP Series Pumps

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

Description: This is an air operated, horizontally mounted, dual pump for high speed operations.

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: 16Dec2024

Jeremy Krone
Engineering Manager
Industrial Coating Systems
Amherst, Ohio, USA

Nordson Authorized Representative in the EU
Person authorized to compile the relevant technical data.
Contact: Operations Manager
Industrial Coating Systems
Nordson Deutschland GmbH
Heinrich-Hertz-StraBe 42-44
D-40699 Erkrath

UK DECLARATION of Conformity

Product: **Dual Piston Pump**

Models: CP Series Pumps

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

Description: This is an air operated, vertically mounted, piston pump for high speed operations.

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: 16Dec2024

Jeremy Krone
Engineering Manager
Industrial Coating Systems
Amherst, Ohio, USA

Nordson Authorized Representative in the UK
Contact: Technical Support Engineer
Nordson UK Ltd.; Unit 10 Longstone Road
Heald Green; Manchester, M22 5LB.
England

CP Pump

Refer to the CP Pump manual 104373 for complete service and parts information.

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

Hydraulic Section Service Kits

A - High-Pressure Ball Check Service Kits

134665 General Finishing, Solventborne, and Waterborne

179450 Solventborne EPR

1004424 Abrasive-Resistant

B - Hydraulic Seals Service Kits

106454 General Finishing, Solventborne, Waterborne, and Abrasive-Resistant

179449 Solventborne EPR

C - Packing Glands

General Finishing

131924 - Assembly

Solventborne and Waterborne

112242 - Assembly

112243 - Service Kit

Solventborne EPR

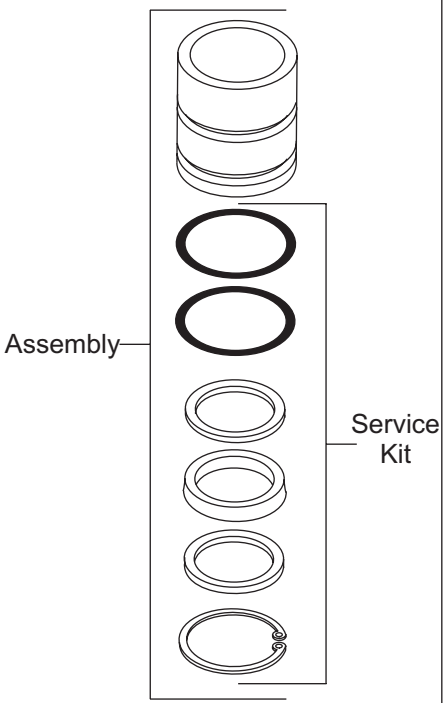
179451 - Assembly

179452 - Service Kit

Abrasive-Resistant

106452 - Assembly

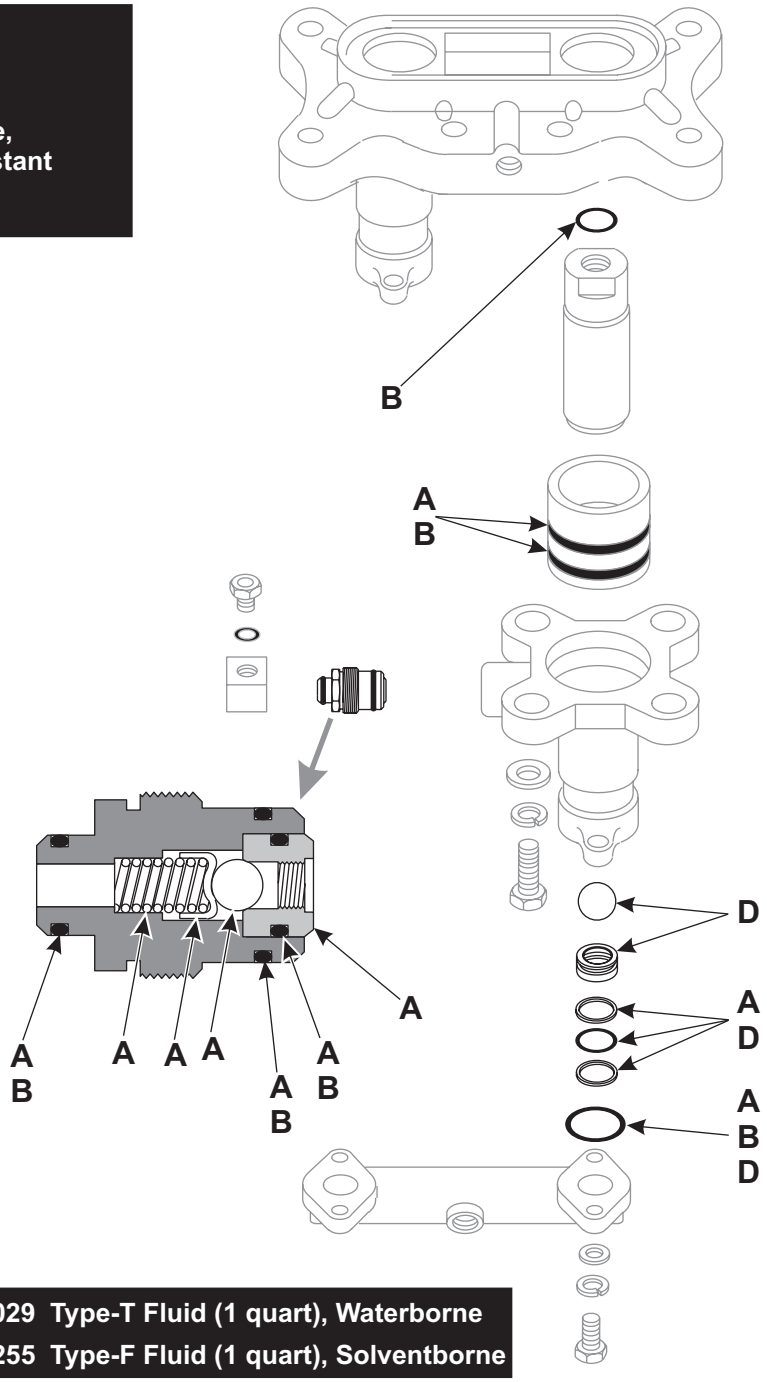
106453 - Service Kit



D - Siphon Ball Check Service Kits

106167 General Finishing, Solventborne, Waterborne, and Abrasive-Resistant

179448 Solventborne EPR

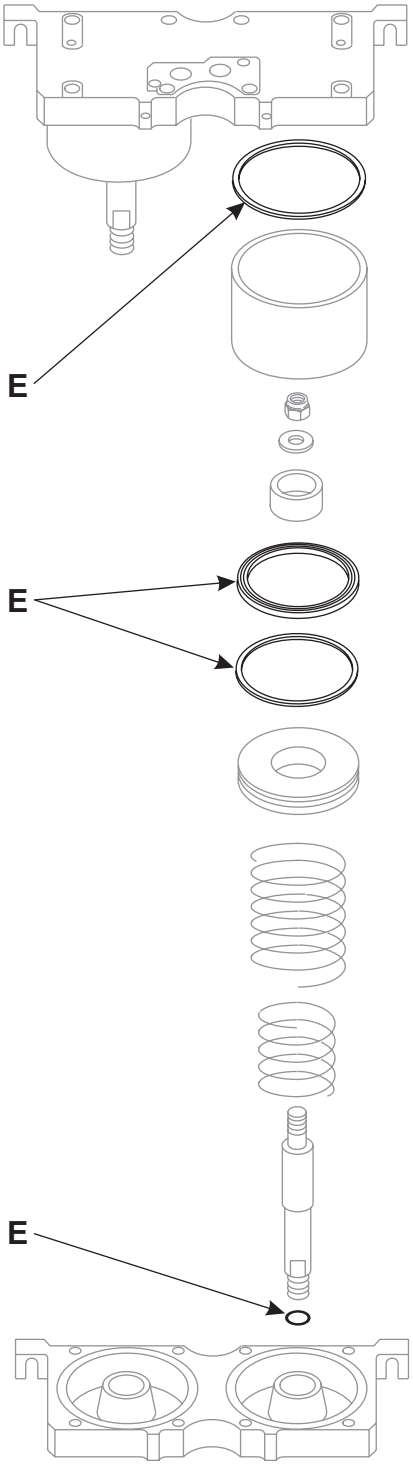


140029 Type-T Fluid (1 quart), Waterborne

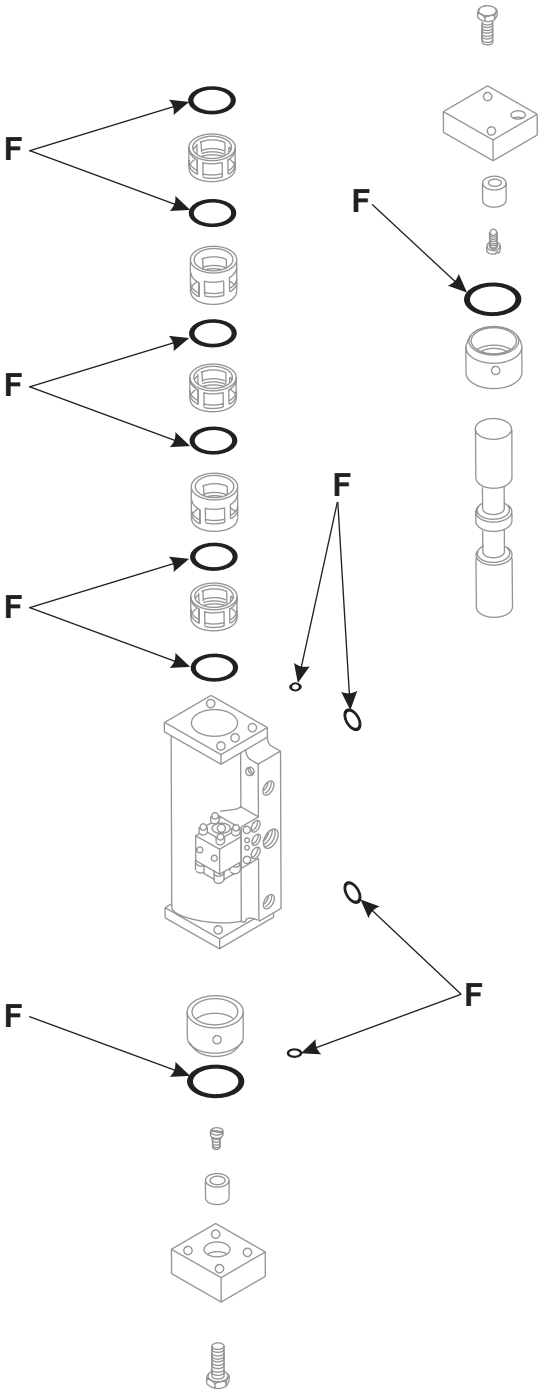
900255 Type-F Fluid (1 quart), Solventborne

Air Section Service Kits

E - Air Motor Service Kit 106451



F - Air Valve Service Kit 106450



900214 Vitalizer Oil (1 pint)

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

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