## EP2 Pump System Customer Product Manual

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

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# **Change Record**

Revision	Date	Change	
03	9/21	Revised pump versions and configurations	
04	10/21	Updated relief valve	
05	12/21	Added internal motor couplings	
06	2/22	Updated system description	
07	3/22	Updated wiring diagram	
08	01/23	Corrected views of coupling assembly EP2 pump	
09	10/23	Removed PN 972517 from figures 1,2,10,&12, added fittings table and images	
10	01/25	Updated manual, labels, and DOCs with new address,	
11	01/25	Added new high-press manifold image and PN	
12	01/25	Clarified wiring diagram on pg 11 and added motor wiring details on pg 15	

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
	<ul> <li>making unauthorized modifications</li> </ul>
	<ul> <li>removing or bypassing safety guards or interlocks</li> </ul>
	<ul> <li>using incompatible or damaged parts</li> </ul>
	<ul> <li>using unapproved auxiliary equipment</li> </ul>
	<ul> <li>operating equipment in excess of maximum ratings</li> </ul>
Regulations and App	rovals

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 lessobvious 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:

<u>Element</u>	<u>Symbol</u>	Prefix
Fluorine	F	"Fluoro-"
Chlorine	CI	"Chloro-"
Bromine	Br	"Bromo-"
lodine	I	"lodo-"

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

## Action in the Event of a Malfunction

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

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

### Disposal

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

## Safety Labels

Table 1 contains the part number and description for each safety label on this equipment. Safety labels are provided to help you operate and maintain your equipment safely.

See Figure 1 for the location of safety labels.

Table 1	Safety	Labels
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Item	Part	Label	Description
1			WARNING: Disconnect main power supply before removing this panel.
			WARNING: Read instruction manual and observe all warnings.
			WARNING: High pressure device eye protection required.
			WARNING: INJECTION HAZARD
2		<u> </u>	Airless spray painting equipment can cause serious injury if the spray penetrates the skin. Do not point the gun at anyone or any part of the body. In case of penetration, adequate medical aid must be immediately obtained.
			WARNING: COMPONENT RUPTURE
			To avoid rupture or injury do not operate this pump at a pressure higher than the maximum working pressure.
			WARNING: FIRE
			Static voltage is developed by airless spraying. The pump, associated system, and object being sprayed must be grounded to prevent static discharge sparks which could start a fire.
3	242867	<u>/</u> 4	WARNING: Risk of electrical shock
4			WARNING: Rotating shafts. Do not operate without shroud.
			WARNING: HOT SURFACE
5			Operation of the pump causes surface to get hot. To avoid personnel injury, do not touch surface during or after operation.





Figure 1 Safety Label Location

## Description

See Figure 2. The Nordson EP2 Pump System is an electrically powered, positivedisplacement, constant-delivery fluid system. It consists of a

- panel with load switch and fluid system components.
- EP2 three-piston dual-diaphragm rotary pump driven by a constant-speed (1745 Rpm at 60 Hz, 1435 Rpm at 50 Hz) electric motor and gear reducer.

The system has a 380-460 VAC, 3 phase (Wye), 50/60 Hz, 5 HP (3.7 kW) electric motor.

NOTE: See Figure 3 for system version with frame only.

NOTE: Refer to the EP2 Three-Piston Pump manual for pump repair and parts lists.



Figure 2 EP2 Pump Assembly

- 1. Ground clamp
- 2. Load switch
- 3. Pressure relief valve
- 4. Pressure gauge (system)
- 5. Two-way ball valve (priming valve)
- 6. Three-way ball valve
- 7. Low pressure return from spray system (center port on 3-way on panel rear)
- 8. Drain rod

- 9. Fluid inlet (from supply)
- 10. Pump
- 11. Coupling and shroud
- 12. Gear reducer
- 13. Motor



Figure 3 EP2 Pump Assembly with Frame Only (Shown with Shroud Removed)

1. Motor

4. Coupling

5. Oil fill cap

6. Guard

7. Pump

- 2. Gear reducer
- 3. Shroud

### Pump Operation

See Figure 4. Coating material can be supplied by a pressure-feed, gravity feed, or siphon system. The coating material enters the pump through the fluid inlet (3) and a one-way inlet check valve (4) into the pump housing.

As the pump shaft turns, it rotates a wobble plate. The high spot on the wobble plate pushes on the three spring-loaded, oil-filled pistons. The pistons force the diaphragms to bow out, compressing coating material and forcing it through the outlet check valves and out of the pump.

After the high spot of the wobble plate passes the pistons, the piston springs force the pistons back and the piston refills with oil. The diaphragm flexes in, drawing coating material into the pump housing through the inlet check valves.



Figure 4 EP2 Three-Piston Pump Operation

1. Dual-diaphragm cartridge

3. Fluid inlet

4. Inlet check valve

2. Outlet check valve

## **System Operation**

See Figure 5. Coating material enters the pump inlet through a low-pressure gravity or siphon feed system. The pressurized coating material passes through the manifold and then is either routed to the spray system through the outlet fitting or, if the two-way ball valve is opened, through the drain rod to a waste container.

Fluid returning from the spray system flows through the return fitting on the rear side of the panel, through the 3-way ball valve, and back to the supply. The three-way ball valve can also route the return fluid flow to the drain rod.

All EP pump systems require a back pressure regulator (BPR) in the hydraulic circuit to regulate the flow of the positive displacement pump. The BPR is typically placed at the end of the hydraulic circuit.

The pressure relief valve protects the pump and system components from excessive pressure.

- It is set for lacquer coating systems to open at 89.6–91.4 bar (1300–1325 psi). This is the factory setting.
- For CleanSpray systems, it must be set to open at 51.7–55.2 bar (750–800 psi). Refer to *Pressure Relief Valve Adjustment* on page 21.



#### Valve Handle Positions



Figure 5 EP2 Pump System Hydraulic Diagram

## Specifications

These specifications are for standard systems. Engineered systems specifications may be different.

Category	Specification	
Output Fluid Pressure	83 bar (1200 psi) maximum	
Output Volume (nominal)	7.6 lpm (2.0 gpm) @ 400 rpm	
Pressure Feed	3.5 bar (50 psi) maximum	
Siphon Feed Vacuum	0.238 bar (7 in. Hg) maximum	
Inlet and Outlet Port Sizes	Inlet: 3/4 in. NPT	
	Outlet: 1/2 in. NPT	
Pump Oil Capacity	1.04 liter (1.1 qt) (use only Nordson EP2 pump oil)	
Electrical	380-460 volt, 3 phase (Wye), 50/60 Hz,	
Motor Speed	1745 rpm at 60 Hz, 1435 rpm at 50 Hz	
Drive Capacity	5 HP (3.7 kW)	
System Weight	68 kg (150 lb)	
Dimensions	Height, top of panel to base bottom: 28.46 in. (722.88 mm) Width, including motor: 40.74 in. (1034.80 mm) Width, panel: 31 in. (787.4 mm) Depth, base and panel: 13.25 in. (336.55 mm) Refer to Figure 6 for base dimensions and mounting dimensions.	
Sound Level Summary	Fluid Pressure: 83 bar (1200 psi) Sound Level (dB A): 67 Sound Level (dB C): 68	

## Installation



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

### **Oil Change Kit Installation**

The pump is shipped filled with oil. If you ordered an optional oil change kit, part 179490, install the quick-disconnect fitting included in the kit on the oil drain tube on the left side of the pump.

To do this without losing oil from the pump and making a mess, turn the system on its side with the oil drain tube up, unscrew the drain cap from the tube and install the quick-disconnect fitting on the tube.

## Mounting

See Figure 6 for mounting base dimensions. Mount the pump system on a sturdy, flat surface, such as a work bench or metal table.



Figure 6 Mounting Base Dimensions

## Pump Oil Level



**CAUTION:** To prevent damage to the pump, do not allow the oil to drop below the recommended level. Use only Nordson EP2 pump oil, part 1049265. Do not use EP1 pump oil, as it will damage the pump.

See Figure 3. Unscrew the oil fill cap (7) and check the pump oil level. The oil level should be within 6 mm (1/4 in.) from the top.

### **Electrical Connections**



**WARNING:** Electrical installation and wiring must be done by a qualified electrician, and must conform to all applicable regulations and codes.



**WARNING:** Disconnect and lock out power before connecting electrical wiring to the load switch box. Ground the pump base, load switch box (US versions) and all system components, including supply and waste containers, to prevent static discharges that could cause a fire or explosion.

### Wiring Guidelines

Motor: 380-460 volt, 3 phase (Wye), 50/60 Hz

- Use electrical wiring sized and rated for use with the motor. All electrical installations must conform to local regulations and codes.
- Use approved, properly sized, liquid-tight conduit connectors or strain reliefs to bring wiring into the load switch box.
- Refer to the wiring diagrams in this manual for proper voltage configuration and wiring connections.

**NOTE:** The pump can rotate in either a clockwise or counterclockwise direction, so phase wiring order is not critical.

• Connect the pump base ground clamp to a true earth ground.



**WARNING:** The load switch must be grounded. Failure to ground the load switch will create an electrical hazard that could result in severe shock and personal injury.



Wiring Diagram

### **Fluid System Installation**

### **Inlet and Outlet Connections**

See Figure 8. Use pipe thread adhesive/sealant (Nordson part 900431) on all fitting threads.

- 1. Pump Inlet: 1 1/16-12 JIC (use siphon hose supplied with system)
- 2. Outlet to Spray System: 1 1/16-12 JIC
- 3. Return to Fluid Supply: 1 1/16-12 JIC
- 4. Return from Spray System: 1 1/16-12 JIC



#### Figure 8 Fluid Connections (Top View)

#### Fluid System Installation Guidelines

- All tubing and fittings must be stainless steel. Liberally coat fitting threads with pipe joint adhesive to eliminate air and fluid leaks. Tighten fittings securely.
- Use flexible hose to connect the spray system and supply to the pump system. The flexible hose dampens vibrations.
- For both siphon and pressure-feed systems, use the specially designed 3/4 in. ID, 1.8 m (6 ft) siphon hose supplied with the system to connect the coating material supply to the pump inlet.
- The capacity of the supply line must be greater than 3 gpm. Restrictions will cause cavitation, resulting in abnormal wear of the gearbox section in the pump head, and damage to the diaphragm cartridges. Pressure fluctuations in the spray system are a sign of pump cavitation.
- For pressure feed systems, install an inline strainer/filter on the siphon side of the pump with a 350 micron element. The filter should be as close to the EP2 pump as possible but with a hose at least 1.5 m (5 ft) long between the filter and the pump.
- For troubleshooting supply line problems, a manifold with vacuum gauge is available. Connect the manifold to the siphon hose. Refer to Specifications on page 12 for maximum allowable vacuum pressure in the supply line.



**WARNING:** The system pressure relief valve opens if the fluid pressure exceeds the valve setting to protect the system and the operators from excessive pressure. Do not bypass this valve. Doing so could result in damage to the pump and possible personal injury. For lacquer coating systems the valve is typically set to open at 89.6–91.4 bar (1300–1325 psi). For Cleanspray systems the valve is set to open at 51.7–55.2 bar (750–800 psi). Refer to *Pressure Relief Valve Adjustment* on page 21.

## Operation



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



**WARNING:** SERVICING - Before servicing, cleaning, or removal of any part, set trigger lock on gun, and always shut off power source; then carefully release pressure in fluid portions of the system.

New systems must be purged of contaminates by flushing with a solvent compatible with the coating material before starting production.



**CAUTION:** Make sure your coating materials and solvents are compatible with the diaphragms and seals in the EP2 pump. Some coating materials and solvents can damage the diaphragms and seals. Your Nordson representative can provide you with information on compatible materials.

## System Startup

Step	Task	Procedure
1	Pump Priming	1. Place the drain rod in a waste container.
		2. Turn the back pressure regulator knob fully counter-clockwise.
		3. See Figure 9. Turn the ball valves to the priming position.
		4. Supply coating material to the EP2 pump.
		5. Turn on the EP2 pump.
		6. Watch the drain rod. When a solid stream of coating material is flowing from the rod with no air bubbles, perform the <i>Air Purge Procedure</i> .
2	Air Purge	7. See Figure 9. Turn the ball valves to the flushing position.
		8. Watch the drain rod. When a solid stream of coating material is flowing from the rod with no air bubbles, turn the ball valves to the <b>normal operation</b> position.
		<ol><li>Trigger the applicators to purge them of air. Air in the gun bodies and system will cause them to spit. When they stop spitting the system should be completely purged of air.</li></ol>
		<b>NOTE:</b> If the pump is operating roughly, air in the system is causing the pump to cavitate. Repeat the air purge procedure. If you cannot purge the system of air, check the siphon hoses and fittings supplying the pump with fluid. A leak in the supply line will suck air into the pump.
		Continued

Step	Task	Procedure
3	System Relief Valve Setting and Fluid Pressure Setting	10. Check the pressure relief valve operation by adjusting the back pressure regulator until the valve opens.
		For lacquer coating systems the valve is typically set to open at 89.6–91.4 bar (1300–1325 psi). For Cleanspray systems the valve is set to open at 51.7–55.2 bar (750–800 psi). Do not increase the pressure more than 1.7 bar (25 psi) over the relief valve setting.
		If increasing the pressure to 1.7 bar (25 psi) over the relief valve setting does not open the relief valve, then the relief valve is either not adjusted correctly or the valve is defective and must be replaced. Do not exceed 93 bar (1350 psi). Refer to <i>Pressure Relief Valve Adjustment</i> on page 21.
		<b>WARNING:</b> Do not operate the system if the pressure relief valve does not open at the correct setting. The valve protects the pump and system components from excessive pressure. A malfunctioning or improperly adjusted relief valve can cause pump damage, component failure, and personal injury.
		11. Adjust the back pressure regulator to the desired production pressure.
		12. Trigger the applicators to purge any remaining air from the system.
4	Fluid Temperature Setting	<b>WARNING:</b> Coating material must be circulating through the fluid heaters before they are turned on. Operating the heaters without circulation can result in heater plugging and heat limiter failure.
		13. Turn the fluid heaters on. Allow 12–15 minutes for the coating material to heat to the desired operating temperature.
		14. Check the system thermometer. If the coating material is not within 5 degrees of the desired temperature, adjust the heater thermostats. Refer to your heater manual for procedures.

#### Valve Handle Positions



Figure 9 Ball Valve Handle Positions

## **Changing Coating Materials/Flushing the System**

Use the tasks in the System Startup chart as required when changing materials.

Depending on your coating materials and application, you may be able to change coating materials by letting the new coating material push the old material out of the system, or you may have to flush the system with solvent before introducing the new material.

If the new coating material is not compatible with the old material, flush the system two times with solvent:

- First solvent flush: Use a solvent that is compatible with the old material.
- · Second solvent flush: Use a solvent that is compatible with the new material.

Refer to the System Startup procedures on page 17.

- 1. Turn the back pressure regulator knob fully counterclockwise to de-pressurize the system.
- 2. Turn off the EP2 pump.
- 3. If used, shut off the pressure feed.
- 4. Trigger the applicators.
- 5. Supply the system with solvent or new coating material.
- 6. Turn the ball valves to the priming position and start the pump. When air stops flowing from the drain valve, turn the ball valves to the flushing position and flush the old material and air out of the system.
- 7. Trigger the applicators to purge them of old material and air.
- 8. Set the fluid pressure and temperature as necessary.

### Shutdown



**CAUTION:** To prevent coating material failure and damage to the system, do not operate the pump at a high rpm for long periods of time without actuating the applicators.

### **Short-Term Shutdown**

- 1. If used, turn off the fluid heaters 12–15 minutes prior to shutdown. Refer to the heater manual for procedures.
- 2. Turn the back pressure regulator knob fully counterclockwise to de-pressurize the system.
- 3. Turn off the EP2 pump.
- 4. If used, shut off the pressure feed.

#### Long-Term Shutdown



**CAUTION:** To prevent damage to the fluid diaphragms and seals, consult a Nordson representative for types of solvents that can be left in the system for long periods of time.

- 1. If used, turn off the fluid heaters 12–15 min prior to shutdown. Refer to the heater manual for procedures.
- 2. Flush the system with a solvent compatible with the coating material.
- Turn the back pressure regulator knob fully counterclockwise to de-pressurize the system.
- 4. Turn off the EP2 pump.
- 5. Remove and clean the applicator nozzles.

### **Pressure Relief Valve Adjustment**



**WARNING:** System pressurized! Use extreme care when making adjustments. The system pressure relief valve opens if the fluid pressure exceeds the valve setting to protect the system and the operators from excessive pressure. If the relief valve fails to operate correctly, replace it immediately. Do not operate the system without a correctly functioning relief valve.

#### Pressure relief valve opening pressure (factory setting)

- lacquer coating systems: 89-91.4 bar (1300-1325 psi)
- CleanSpray systems: 51.7-55.2 bar (750-800 psi).

Use this procedure to adjust the valve opening pressure and check the valve operation.

- 1. Adjust the back pressure regulator until the system fluid pressure is at the factory setting given above.
- 2. See Figure 10. Cut and remove the lock wire (2).
- 3. Loosen the locknut (3).
- 4. Rotate the adjustment cap (1) until the relief valve opens. Fluid will be routed to the waste container.
- 5. Tighten the locknut (3) against the adjustment cap (1).
- 6. Adjust the back pressure regulator until the relief valve opens. Do not exceed 93 bar (1350 psi ).
  - If the relief valve does not open, repeat steps 1 through 5.
  - If the relief valve opens, secure the adjustment cap (1) with lock wire.
- 7. Adjust the back pressure regulator to reduce the system pressure.
- 8. Test the relief valve by increasing the system pressure with the back pressure regulator to the valve opening pressure so the valve opens, then decreasing the pressure. Repeat this three times. If the relief valve fails to open at the pressure setting, replace it.
- 9. Install a new lock wire (2).



Figure 10 Pressure Relief Valve Adjustment

1. Adjustment cap

2. Lock wire

3. Locknut

## Maintenance



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



**WARNING:** SERVICING - Before servicing, cleaning, or removal of any part, set trigger lock on gun, and always shut off power source; then carefully release pressure in fluid portions of the system.

### **EP2** Pump Oil Change

**Frequency:** After the first 100 hours of operation, then every 1000 hours. **Capacity:** The pump holds between 1 and 2 quarts of oil. Oil is sold in 2 quart bottles. Refer to *Parts* for the part number.

**NOTE:** To reduce the oil change time, order the optional quick oil change kit. Refer to *Options* for the kit part number.

- 1. Turn the pump on and run it until the oil is warm.
- 2. Turn the pump off.
- 3. Place a pan under the pump drain tube.



**CAUTION:** To prevent losing the oil prime in the piston assemblies, do not rotate the pump shaft during routine oil changes.

#### 4. Drain the oil from the pump housing:

Without Optional Oil Change Kit	With Optional Oil Change Kit
a. See Figure 11. Remove the oil fill cap (1) from the pump.	a. See Figure 11. Remove the oilfill cap (1) from the pump.
<ul> <li>b. Remove the drain cap (2).</li> <li>c. Replace the drain cap after the oil has drained.</li> </ul>	<ul> <li>b. Connect the male quick- disconnect fitting (4) to the female quick-disconnect fitting (3) on the drain tube. The female fitting is included with the oil change kit and should be installed on the draintube in place of the drain cap.</li> </ul>
	c. Draw the oil out of the pump with the suction gun (5). Empty the oil into a waste container. Repeat until the pump is empty.
	d. Disconnect the suction gun fitting from the drain fitting.

5. Fill the pump with new EP2 pump oil to within 6 mm (1/4 in.) from the top. Install the fill cap.



2. Drain plug

- 4. Suction gun fitting

## **Daily Maintenance Procedures**

Part or Material	Procedure
High-pressure filters	1. Clean daily or per shift unless experience indicates otherwise.
	2. Inspect the filter screens for ruptures or distortion.
	3. Replace the filter screens if necessary.
Pump oil	1. Check the pump oil; add EP2 oil as necessary.
	2. If the oil appears contaminated, refer to <i>Troubleshooting</i> on page 24.
Fittings and hoses	Check the fittings, hose connections, and hoses for leaks.
Vacuum gauge on supply line (if used)	Check the vacuum gauge. The maximum vacuum allowed is 0.238 bar (7 in. Hg). If the vacuum exceeds 0.238 bar (7 in. Hg), clean the supplystrainer or inline filter.
Coating material	Check the coating material supply. Do not allow the pump to starve orsiphon air.
Applicator nozzles	Clean the applicator nozzles once per shift or as necessary.

## **Monthly Maintenance Procedures**

Part or Material	Procedure
Strainer or inline supply filter	Clean the strainer or inline supply filter.
Pump coupling	Check the pump coupling for loose hardware or wear.
Pressure relief valve	Check the pressure relief valve by following these steps:
	1. Turn off the applicators.
	2. Make sure the drain-off rod is in the waste container.
	WARNING: Do not exceed 93 bar (1350 psi).
	<ol> <li>Turn the back pressure regulator knob clockwise until the opening pressure (page 21) is reached. If the valve does not open, adjust it as described in <i>Pressure Relief Valve Adjustment</i> on page 21.</li> </ol>
	4. Turn the back pressure regulator knob counterclockwise to reduce the pressure.
	5. Repeat steps 4 and 5 a minimum of three times to ensure the valve is operating properly.

## **Annual Maintenance Procedures**

Refer to the *EP2 Three-Piston Pump* manual for disassembly and repair procedures:

- Examine the shaft seals and piston assemblies in the oil-filled section. Replace if worn.
- Examine the cam shaft bearings in the oil-filled section. Replace the pump if the bearings are worn.
- Replace the diaphragm cartridges and valve assemblies.

## Troubleshooting



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

**WARNING:** SERVICING - Before servicing, cleaning, or removal of any part, set trigger lock on gun, and always shut off power source; then carefully release pressure in fluid portions of the system.

The troubleshooting procedures in this section 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
	Trapped air in pump or system	Purge air from the pump or eliminate system air traps. Refer to Operation.
	Clogged inlet strainer or supply filter	Clean the inlet strainer or the supply filter.
<b>1. Cavitation</b> Symptoms of cavitation:	Collapsed, damaged, or clogged pump supply line	Inspect the supply line for damage, leaks, or blockages. Clear the blockage or replace the inlet line.
<ul> <li>rough running pump</li> <li>excessive pump noise</li> </ul>	Pump supply line too small or too long	as short as possible. Use the 5 ft siphon hose shipped with the system.
low fluid volume"	Air leak in pump supply line	Inspect the supply hose, piping and fittings. Tighten the connections.
excessive pressure     drop	Fittings and/or valves too close to pump inlet	Move any supply line fittings and valves a minimum of 1.5 m (5 ft) from the pump inlet.
premature failure of	Low or empty supply	Refill the fluid supply.
the valve assembly, diaphragm, or bearing"	Air entrained in fluid supply	Check the supply tank. If an agitator is used, adjust the speed.
bouring	Coating material too hot	Reduce the temperature.
	Coating material too viscous	Check the viscosity.
	Coating material vaporizing	Pressurize the fluid supply.
	Cavitation	Refer to problem 1.
	Oil level low	Check the oil level and add oil as necessary.
	Foreign material in inlet or outlet check valves	Disassemble and clean the check valves.
	Worn check valves	Replace the check valves.
2. Pump runs rough	Damaged diaphragm cartridges	Replace the diaphragm cartridges.
	Broken piston return spring	Replace the piston assembly.
	Piston assemblies not primed	Refer to the <i>EP2 Three-Piston Pump</i> manual.
	Worn bearings	Disassemble the oil-filled section and inspect the bearings. Refer to the <i>EP2 Three-Piston Pump</i> manual.
		Continued

Problem	Possible Cause	Corrective Action
	Cavitation	Refer to problem 1.
	Loss of prime in piston assemblies	Frequently check the oil level and add oil as necessary.
	Worn or broken check valves	Replace the check valves.
	Foreign material in inlet or outlet check valves	Disassemble and clean the check valves.
	Damaged diaphragm cartridges	Replace the diaphragm cartridges.
3. Low fluid volume or excessive pressure drop	Broken piston return spring	Replace the piston assembly.
	O-rings forced out of their grooves from over- pressurization	Disassemble the pump and replace the O-rings.
	Warped valve plate from over-pressurization	Replace the pump.
	Cracked cylinder casting	Replace the pump.
	Worn spray nozzles	Replace the nozzles.
	Worn back pressure regulator	Rebuild back pressure regulator.
4. High oil	Cavitation	Refer to problem 1.
temperature− above 140 °F (60 °C)	Re-circulating too much material	Do not operate the system for long periods of time without spraying coating material.
	Cavitation	Replace the check valves.
5. Premature check valve failure	Foreign material in the inlet or outlet check valves	Disassemble and clean the check valves.
	Cavitation	Replace the diaphragm cartridges.
	Broken piston return spring	Replace the piston assembly.
6. Premature	Puncture by a foreign object	Replace the diaphragm cartridges.
failure	Excessive pressure	The operating pressure should not exceed 83 bar (1200 psi). Check the pressure relief valve setting.
	Diaphragm material incompatible with coating material or solvent	Contact your Nordson representative for compatibility information.
7. Broken piston return spring	Cavitation	Replace the piston return springs.
8. Premature bearing failure	Cavitation	Replace the pump.
		Continued

Problem	Possible Cause	Corrective Action
	Oil drain plug or fill cap loose	Tighten the plug and/or cap.
	Worn shaft seal	Replace the shaft seal.
9. Loss of oil	Diaphragm screw O-ring cracked or missing	Replace the O-ring.
	Valve plate and end plate bolts loose	Tighten the bolts to 74–81 N•m (55–60 ft-lb), following the torque sequence in the EP2 Three-Piston Pump manual.
	Damaged diaphragm cartridges	Replace the diaphragm cartridges.
10. Water or coating material in oil reservoir	Diaphragm screw O-ring cracked or missing	Replace the diaphragm screw O-ring.
	Damaged diaphragm cartridges	Replace the diaphragm cartridges.
	Cracked cylinder casting	Replace the pump.

## Repair



**WARNING:** SERVICING - Before servicing, cleaning, or removal of any part, set trigger lock on gun, and always shut off power source; then carefully release pressure in fluid portions of the system.

For EP2 pump assembly repair, refer to the pump manual:

EP2 Three-Piston Pump - Part 1049229

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## 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						
					Col	ntinued
NOTE	NOTE: A.					
	В.					
NS: 1	Not Shown					
AR: A	As Required					

## **EP2 Pump System**





Figure 12 EP2 Pump Parts (shown with panel and frame version)

ltem	Part	Description	Quantity	Note
	1615091	ASSEMBLY, EP2 PUMP, PANEL, 5HP MOTOR	1	
1	1615090	ASSEMBLY, EP2 PUMP, PANEL, HYDRAULIC	1	
2	981239	• • SCREW, HEX, 1/4-20 X 0.500, CAP, ZINC	4	
3	1614077	LOAD SWITCH 25A, 1 NO, 1 NC CONTACT	1	
4	1626277	• • HOSE, 0.406 ID, 11-IN LG, 3/4-16, SWIVEL, STAINLESS STEEL	1	
5	972108	• • CONNECTOR, MALE, 37, 3/4-16 X 1/2, STEEL	1	
6	1080267	VALVE, RELIEF, MF, 1/2 NPT, 1300 PSI	1	
7	972517	• • CONNECTOR, MALE, 37, 1 1/16-12 X 1/2, STAINLESS STEEL	1	
8	115135	GAUGE, HYDRAULIC PRESSURE WITH SEAL	1	
9	973971	NIPPLE, HEX, 3/8 X 1/4X 1.406, STAINLESS STEEL	1	
10	981441	• • SCREW, SOCKET, 1/4-20 X 2.000, BLACK	2	
11	327286	• • VALVE, BALL, 2-2, F, 3/8 NPT, 2000P, STAINLESS STEEL	1	
12	973617	• • NIPPLE, HEX, 1/2 X 3/8 X 1.625, STAINLESS STEEL	1	
13	1108050	• • VALVE, BALL, 3-WAY, 1/2 FEMALE NPT, STAINLESS STEEL	1	
14	972103	• • CONNECTOR, MALE, 37, 3/4-16 X 3/8, STAINLESS STEEL	2	
15	973059	• • NIPPLE, HEX, 3/8 X 3/8 X 1.45, STAINLESS STEEL	2	
NS	1617345	ACCESSORY GROUP, EP2 PUMP, PANEL, MOTOR	1	А
NS	1054527	ACCESSORY GROUP, EP 2 PUMP	1	А
16	1617336	ASSEMBLY, EP2 PUMP, FRAME, 5HP MOTOR	1	
17	1615012	• • ASSEMBLY,MOTOR, 5HP, REDUCER, 2.62:1, C-FACE	1	
18	981315	• • SCREW, HEX, 5/16-18 X 1.000, CAP, ZINC	8	
19	983150	• • WASHER, LOCK, E, SPLIT, 5/16, STEELL, NICKEL	8	
20	983123	• • WASHER, FLAT, E, 0.219 X 0.500 X 0.049, ZINC	8	
21	981995	• • SCREW, FLAT, 10-32 X 0.500, STEEL, ZINC	4	
22	345977	• • WASHER, LOCK, E,SPLIT, 1/4, STEEL, ZINC, 14451-GA	4	
23	1612182	COUPLING ASSEMBLY, EP2 PUMP	1	
NS	1621714	COUPLER, GEARMOTOR, REDUCER	1	
24	981408	• • SCREW, HEX, 3/8-16 X 1.250, CAP, ZINC	4	
25	983160	• • WASHER, LOCK, E,SPLIT, 3/8, STEEL, NICKEL	4	
26	983515	• • WASHER, FLAT, E, 0.406 X 1.000 X 0.063, ZINC	4	
27	972110	• • CONNECTOR, MALE, 37, 1 1/16-12 X 3/4, STAINLESS STEEL	1	
28	972517	CONNECTOR, MALE, 37, 1 1/16-12 X 1/2, STAINLESS STEEL	1	
29	972757	• • ADAPTER, FEMALE, 1/2-14 X 3/8-18, STAINLESS STEEL	1	
NS	1617344	ACCESSORY GROUP, EP2 PUMP, FRAME, MOTOR	1	А
NOTE: A. Refer to Accessory Groups part lists for items in each accessory kit.				
NS: I	Not Shown			

## **Accessory Groups**

## Panel Assembly

See Figure 12.

Item	Part	Description	Quantity	Note
	1617345	ACCESSORY GROUP, EP2 PUMP, PANEL, MOTOR	1	
29	829072	HOSE, SIPHON, 3/4 ID, 6 FT.	3	
30	750250	ROD, DRAIN OFF	1	
31	240976	CLAMP, GROUND WITH WIRE	1	
NS	1084959	HOSE, NYLON, STAINLESS STEEL INS, 0.375 X 72, 3/4-16 FTG	1	
NS	141445	TOOL KIT, REPAIR, EP	1	
NS	1049265	• OIL, EP2, 2 QT	1	
NS		ADHESIVE, PIPE/THREAD/HYD SEALANT	1	
NS		RETAINER,WIRE	1	
_	1054527	ACCESSORY GROUP, EP 2 PUMP	1	
29	829072	HOSE, SIPHON, 3/4 ID, 6 FT.	3	
30	750250	ROD, DRAIN OFF	1	
NS	1084959	HOSE, NYLON, STAINLESS STEEL INS, 0.375 X 72, 3/4-16 FTG	1	
NS	141445	TOOL KIT, REPAIR, EP	1	
NS	124630	REMOVAL TOOL, EP VALVE/SEAT	1	
NS		• BAR, ROUND, C-1215, 0.688	1	
NS		TOOL KIT, EP (PARTIAL)	1	
NS	981492	• SCREW,HEX, 7/16-14 X 3.00, ZINC	3	
NS	984193	NUT, HEX, REG, 7/16-14, STEEL, ZINC	3	
NS	1049265	• OIL, EP2, 2 QT	1	
NS	900431	ADHESIVE, PIPE/THREAD/HYD SEALANT	1	
NS		WIRE GROUP, SHIELDED, EP2 PUMP	1	
NS	1076333	ELBOW, 37 DEGREES, 1/2 TX 3/8 NPT, STAINLESS STEEL	1	
NS: N	Not Shown			

### Frame and Motor Assembly

Item	Part	Description	Quantity	Note
—	1617344	ACCESSORY GROUP, EP2 PUMP, FRAME, MOTOR	1	
31	240976	CLAMP, GROUND WITH WIRE	1	
NS	141445	TOOL KIT, REPAIR, EP	1	
NS	1049265	• OIL, EP2, 2 QT	1	
NS	900431	ADHESIVE, PIPE/THREAD/HYD SEALANT	1	
NS		RETAINER, WIRE	1	
NS: N	NS: Not Shown			

### Fittings

See Figure 13, Figure 14 and the following parts list below.

**NOTE:** The following fittings are sold separately for the locations shown.

ltem	Part	Description	Quantity	Note
1	972517	CONNECTOR, MALE, 37, 1 1/16-12 X 1/2, STAINLESS STEEL	1	
2	1608882	CONNECTOR, MALE, 37, 3/4 TX 1/2-14 NPT, STAINLESS STEEL	1	



Figure 13 EP2 Pump System



Figure 14 EP2 Pump System with Panel

## Options

## **Oil Change Kit**

Part	Description	
179490	GUN, suction, oil change	

## **PTFE High-Pressure Fluid Hose Assemblies**

These hose assemblies feature:

- 1/2-20 JIC female swivel fittings
- 6.3-mm (1/4-in.) ID hose
- 207 bar (3000 psi) working pressure rating

Part	Length
842012	305 mm (12 in.)
842024	610 mm (24 in.)
842036	914 mm (36 in.)
842048	1.22 m (48 in.)
842072	1.83 m (72 in.)
842096	2.44 m (96 in.)
842120	3.04 m (120 in.)
842300	7.61 m (300 in.)

## Inline (Supply) Filter

**Lacquer Coating Systems:** The size of the filter element must be 350 microns. Use this filter with pressure-feed systems.

CleanSpray Systems: Check with the filter manufacturer for element replacements.

# **EU DECLARATION of CONFORMITY**

Product: Electric Pumping System

Models: EP2

**Description:** This system is used in the container industry for supplying water base can lacquer to the coating system.

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

Applicable Directives: 2014/35/EU - Low Voltage Directive 2006/42/EC - Machinery Directive

Standards Used for Compliance: EN809: 1998+A1:2009 EN60204 EN/ISO 12100

#### Principles:

This product has been designed and manufactured to the directive and standards / norms described above.

Certificates: DNV ISO9001 (Houston, Texas)

Inon

Date: 01Jan25

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

Nordson Authorized Representative in the EU Person authorized to compile the relevant technical documentation. Contact: Operations Manager Industrial Coating Systems Nordson Deutschland GmbH

Heinrich-Hertz-StraBe 42-44 D-40699 Erkrath



Nordson Corporation • 100 Nordson Drive, Amherst, Ohio, 44001 • USA

DOC12007-05

# **UK DECLARATION of CONFORMITY**

Product: Electric Pumping System

Models: EP2

**Description:** This system is used in the container industry for supplying water base can lacquer to the coating system.

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

Applicable UK Regulations:

Supply Machinery Safety 2008 Electrical Equipment Safety Regulations 2016

Standards Used for Compliance:

EN809: 1998+A1:2009 EN60204 EN/ISO 12100

#### Principles:

This product has been designed and manufactured to the directive and standards / norms described above.

Certificates: DNV ISO9001 (Houston, Texas)

Iran

Date: 01Jan25

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



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