Ink-Dot Hydraulic System

Customer Product Manual

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

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Change Record

Revision	Date	Change
01	7/10	Initial Release
02	8/22	Added UKCA certification.

Safety

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 Material Safety Data Sheets (MSDS) 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 MSDS 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 MSDS 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 MSDS 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.

Description

The Ink-Dot hydraulic system is a part of the

Ink-Dot Identification System. This system applies a small dot of ink on the can to identify the line and spray machine where it was coated. The identifying mark saves time in correcting problems and provides a means of producing a better quality product.

This system can apply thermal sensitive can marking ink for quality control.

Two different versions of the Ink-Dot electric spray gun are available, depending on your application needs.

Setup

See Figure 1. Follow these guidelines to prepare the Ink-Dot hydraulic system for operation.

Spray Gun

- Leave the plastic cap on the gun nozzle until the setup process is complete.
- The spray gun should be on a 15−30° angle from the conveyor, approximately 4−6-mm (0.16−0.24-in.) above the rim of the can and 5-mm (0.19-in.) or closer to the can.
- The spray gun must be at least five feet from the spinning mechanism on the spray machine to allow for adequate ink drying time.
- Refer to the Ink-Dot Electric Spray Gun manual for more information.

Proximity Sensor

- The distance between the spray gun and the proximity sensor must be adjustable due to variations in the line speed.
- Position the sensor 3−5-mm (0.12−0.20-in.) from the can.
- If the cans are passing the Ink-Dot station at consistent rate, align the center of the sensor 12−45-mm (0.50−1.5-in.) away from the center of the nozzle.
- Erratic movement of the cans may cause false triggering of the spray gun. Correct this by adjusting the can regulating system or moving the proximity sensor closer to the spray gun leaving approximately 12-mm (0.50-in.) from center to center.

NOTE: Refer to the Ink-Dot Controller manual for proximity sensor connection information.

Infeed Conveyor Track-Work

- Adjust the track-work to minimize movement of the cans as they pass by the Ink-Dot spray gun.
- A can-stop should be located in the track-work prior to the index wheel. The can-stop will collect and maintain a stack of cans around the Ink-Dot spray gun area to help with the consistent and accurate placement of the ink dot.
- The can-stop sensor should be located so that at least 3−4 cans remain above the Ink-Dot spray gun during idle periods.

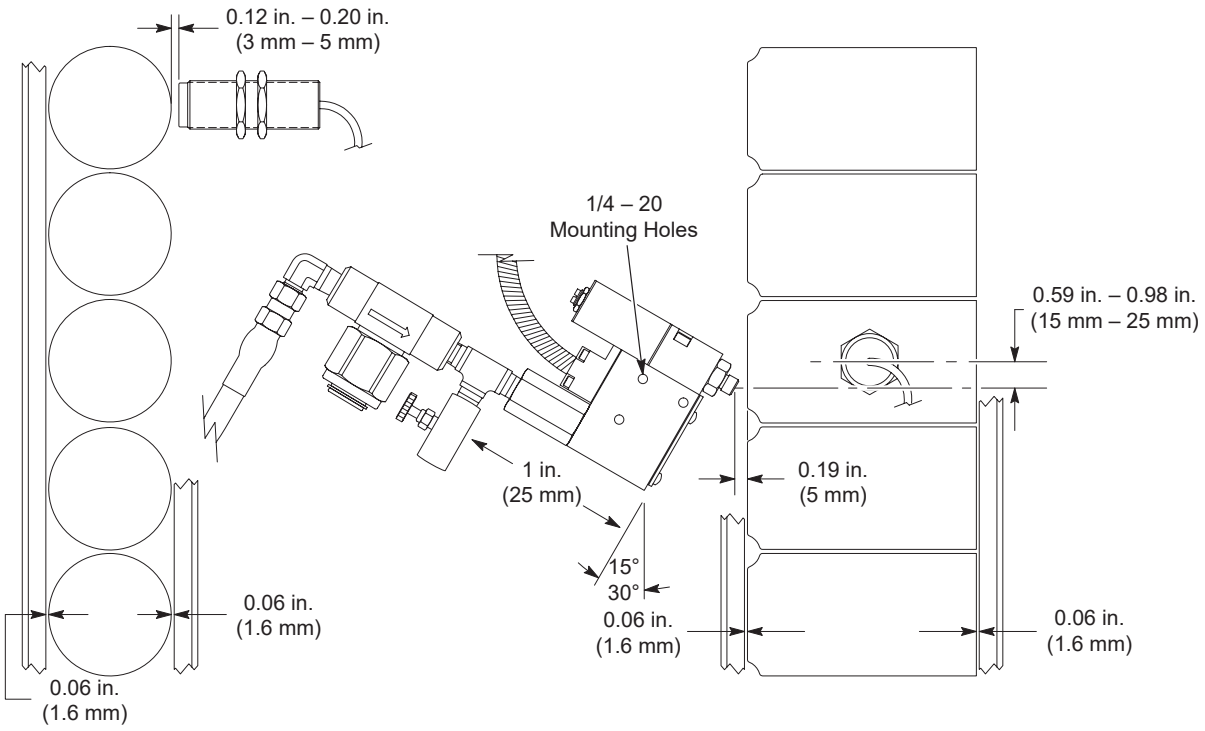

Figure 1 Ink-Dot Hydraulic System Setup Dimensions

Operation

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

Initial Startup

See Figure 2.

Before putting the Ink-Dot system into service for the first time you must flush the system with a compatible solvent and then fill it with ink.

1. Close the air shut-off valve (14).
2. Set the air pressure regulator (4) to 0 bar/psi. Pull the relief valve lanyard (5) to relieve system air pressure.
3. Make sure that the drain valve (8) is closed.
4. Remove the cap (6) from the reservoir (7).
5. Fill the reservoir with a compatible solvent. Install the cap onto the reservoir.
6. Open the air shut-off valve.
7. Set the air pressure regulator to 0.4−0.7 bar (5−0 psi).
8. Place a waste container under the bleeder valve (9). Open the bleeder valve and allow the solvent to flow through the system. This will also purge any air from the system. Close the bleeder valve.
9. Manually trigger the Ink-Dot spray gun (10) to purge contaminants from the spray gun.
10. Close the air shut-off valve.
11. Pull up on the relief valve lanyard to relieve system air pressure.
12. Place a waste container under the drain valve. Open the drain valve to drain the solvent from the reservoir.
13. Fill the reservoir with ink. Refer to ““Filling the Reservoir” on page 6.

Filling the Reservoir

See Figure 2.

1. Repeat steps 1−8 of Initial Startup using ink instead of the compatible solvent.
2. Manually trigger the spray gun (10) to purge any remaining solvents from the gun.
3. Adjust the dot size. Refer to refer to Dot Size Adjustment.

NOTE: The break-in period for the valve seat is the first 10−24 hours of operation. If the dot size increases, refer to Dot Size Adjustment.

Daily Startup

See Figure 2.

1. Open the air shut-off valve (14).
2. Set the air pressure regulator (4) to 0.4−0.7 bar (5−10 psi).
3. Turn on the Ink-Dot controller power switch (3).
4. Turn on the driver power switch (1).
5. Set the RUN/OFF/TEST switch (2) to RUN.
6. If desired, adjust the dot size. Refer to Dot Size Adjustment.

Dot Size Adjustment

See Figure 2.

1. Set the RUN/OFF/TEST switch (2) in the Ink-Dot control unit to OFF.
2. Set the air pressure regulator (4) to 0.5 bar (7 psi) at the ink reservoir.
3. Loosen the locknut (13).
4. Carefully screw in the armature sleeve (12) until it stops or bottoms out.
5. Unscrew the armature sleeve approximately 1/12 of a turn or 30°.
6. Hold a piece of paper by the bottom of the can and in line with the nozzle (11).
7. Set the RUN/OFF/TEST switch (2) in the Ink-Dot control unit to TEST. Adjust the armature sleeve (12) until the dot is the desired size, typically 0.1 in. (2−3 mm).

NOTE: Do not hold the armature sleeve screw with the screwdriver while you are tightening the locknut.

8. Use a 1/2-in. wrench to tighten the locknut. The dot size will become slightly larger when tightening the locknut.
9. If desired, change the fluid pressure to make fine adjustments to the dot size:
   - Increase the pressure for a larger dot.
   - Decrease the pressure for a smaller dot.

NOTE: Refer to the *Ink-Dot Series II Driver* manual to make additional adjustments to the dot size using the dip switches.

Shutdown

See Figure 2.

CAUTION: Failure to turn off the RUN/OFF/TEST switch can cause damage to the gun nozzle and ball and seat assembly.

1. Set the RUN/OFF/TEST switch (2) to OFF.
2. Turn off the driver power switch (1).
3. Turn off the controller power switch (3).
4. Turn off the air supply link to the reservoir by closing the air shut-off valve (14).
5. Set the air pressure regulator (4) to 0 bar/psi. Pull on the relief valve lanyard (5) to relieve system air pressure.

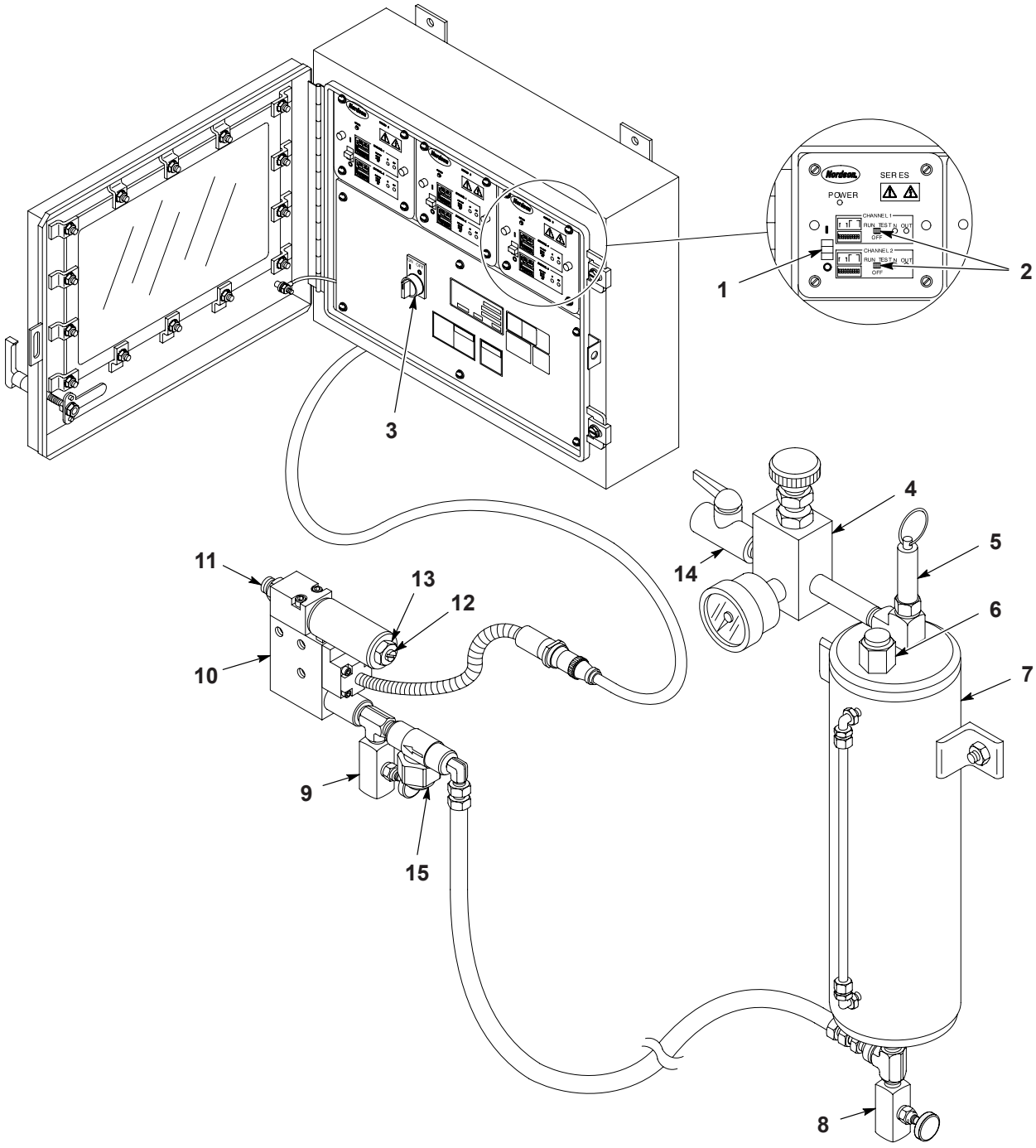

Figure 2 Typical Ink-Dot System

1. Driver power switch
2. RUN/OFF/TEST switch
3. Controller power switch
4. Air pressure regulator
5. Relief valve lanyard
6. Cap
7. Reservoir
8. Drain valve
9. Bleeder valve
10. Ink-Dot spray gun
11. Nozzle
12. Armature sleeve
13. Locknut
14. Air shut-off valve
15. Inline filter

Maintenance

Frequency	Task
Daily	Wipe or brush the nozzle once per shift with a solvent that is compatible with the ink. A nozzle brush is included with the spray gun.
Weekly	1. Refer to the Ink-Dot spray gun manual to check the gun mounting angle. 2. Check the distance between the • proximity sensor and can conveyor • spray gun and can conveyor • gun nozzle and proximity sensor 3. Make sure that the proximity sensor is perpendicular to the side of the can.
Periodically	Check the ink level in the reservoir.
Three−Six months	Flush the system with a compatible solvent and replace the inline filter element.
Nine−12 months	Replace the ball and seat, seals, O-rings and inline filter element in the spray gun. Refer to the *Ink-Dot Electric Spray Gun* manual.

Flushing the System

See Figure 2.

1. Close the air shut-off valve (14).
2. Set the air pressure regulator (4) to 0 bar/psi. Pull the relief valve lanyard (5) to relieve system air pressure.
3. Place a waste container under the drain valve (8) and open the drain valve. Allow the ink to drain from the reservoir (7) into the container. When the ink has drained from the reservoir, close the drain valve.
4. Remove the cap (6) from the reservoir.
5. Fill the reservoir with a compatible solvent and install the cap.
6. Open the air shut-off valve.
7. Set the air pressure regulator to 0.4−0.7 bar (5−10 psi).
8. Place a waste container under the bleeder valve (9), and open it to purge the air from the system. Allow the solvent to flow through the system until there are no signs of ink within the solvent.
9. Close the bleeder valve and flush the spray gun by manually triggering it.
10. Close the air shut-off valve.
11. Pull up on the relief valve lanyard to relieve pressure in the system.
12. Place a waste container under the drain valve (8) and open it. Allow the rest of the solvent to exit the reservoir. Close the drain valve.

Unplugging the Nozzle

See Figure 2.

1. Close the air shut-off valve (14).
2. Set the air pressure regulator (4) to 0 bar/psi. Pull on the relief valve lanyard (5) to relieve system air pressure.
3. Set the RUN/TEST/OFF switch (2) to OFF.
4. Remove the nozzle (11) and clean with flushing thinner and the nozzle brush.
5. Loosen the locknut. Back out the armature sleeve (12) one turn.
6. Install the nozzle.
7. Make sure the relief valve is closed.
8. Open the air shut-off valve. Set the air pressure regulator to 0.2 bar (3 psi).
9. Open the bleeder valve (9) to bleed air out of the hose. Close the bleeder valve.
10. Set the air pressure regulator to 0.4−0.7 bar (5−10 psi).
11. Set the RUN/OFF/TEST switch to RUN.
12. Adjust the dot size. Refer to Dot Size Adjustment on page 6.

Troubleshooting

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

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

Problem	Possible Cause	Corrective Action
1. Spray gun will not spray	Clogged nozzle	Clean the nozzle tip.
	Spray gun is out of adjustment	Adjust the stroke of the spray gun. Refer to the gun manual.
	No air pressure to the spray gun	Adjust the air pressure. Check for obstructions in the airline.
	Ink in reservoir has dried or is contaminated	Flush the system with a compatible solvent. Refer to Flushing the System on page 8.
	Clogged filter element	Replace the filter element.
2. Spray gun remains open	Contamination inside the spray gun seat	Disassemble the front of the Ink-Dot spray gun and clean. Refer to the gun manual.
	Broken spring in the spray gun	Replace the spring. Refer to the gun manual.

Parts

Ink-Dot Hydraulic System

See Figure 3.

Item	Part	Description	Quantity	Note
—	159900	SYSTEM, Ink-Dot hydraulic	1	
—	165746	SYSTEM, Ink-Dot hydraulic, 0.06 orifice	1	A
1	159901	• RESERVOIR, ink	1	
2	973304	• TEE, street, stainless steel, 1/4-in. NPT	1	
3	172142	• VALVE, flow control, drain, 1/4-in. NPT, stainless steel	1	
4	972029	• CONNECTOR, male, 37°, 1/2−20 m x 1/4-in. NPT, stainless steel	1	
5	828120	• HOSE, nylon, 0.188 x 120, 1/2−20 fitting	1	
6	172143	• VALVE, flow control, bleeder, 1/4-in. NPT, stainless steel	2	
7	973247	• TEE, pipe, male, 1/4-in. NPT, stainless steel	1	
8	1102825	• GUN, Ink-Dot	1	
8	165747	• GUN, Ink-Dot, 0.06 orifice	1	A
9	168016	• ADAPTER, 3/4−16 x 1/4-in. NPT with EPR	1	
10	179300	• T-FILTER, liquid, 15 micron, 1/4-in. NPT, stainless steel	1	
10A	159908	• FILTER ELEMENT, 15 micron	1	
11	972177	• ELBOW, male, 37°, 1/2−20 x 1/4-in. NPT, stainless steel	1	
12	972110	• CONNECTOR, male, 37°, 11/16-12 x 3/4 in., stainless steel	1	
13	973275	• TEE, pipe, 1/4-in. NPT, brass	1	
14	973238	• BUSHING, red, 1/4-in. NPT x 1/8-in. NPT, brass	1	
15	901240	• GAUGE, air, 0−30 psi, 0−2.2 kg/cm	1	
16	973027	• NIPPLE, brass, schedule 40, 1/4 x 0.87 in.	3	
17	901090	• VALVE, ball, shut-off, 2-way, 1/4 in.	1	
18	1107942	• REGULATOR, air, 2−10 psi, 1/4 in.	1	
19	973036	• NIPPLE, brass, schedule 40, 1/4 x 3.00 in.	1	
20	901114	• VALVE, relief, 1/4-in. NPT, 85 psi	1	
21	972397	• CAP, tube, 37°, 11/16−12, stainless steel	1	
NS	973157	• ELBOW, pipe, street, 1/4 in., brass	1	
NS	901905	• BRUSH	1	
NS	159917	• SENSOR, proximity	1	
NS	179375	KIT, driver adjustment	1	B
22	167959	KIT, ink sight tube	1	

NOTE: A. This system is used with Nordson nozzles, part 237XXX. Typically nozzle p/n 237003.

B. Kit is not needed when system is used with Series II Driver module, part 245321.

NS: Not Shown

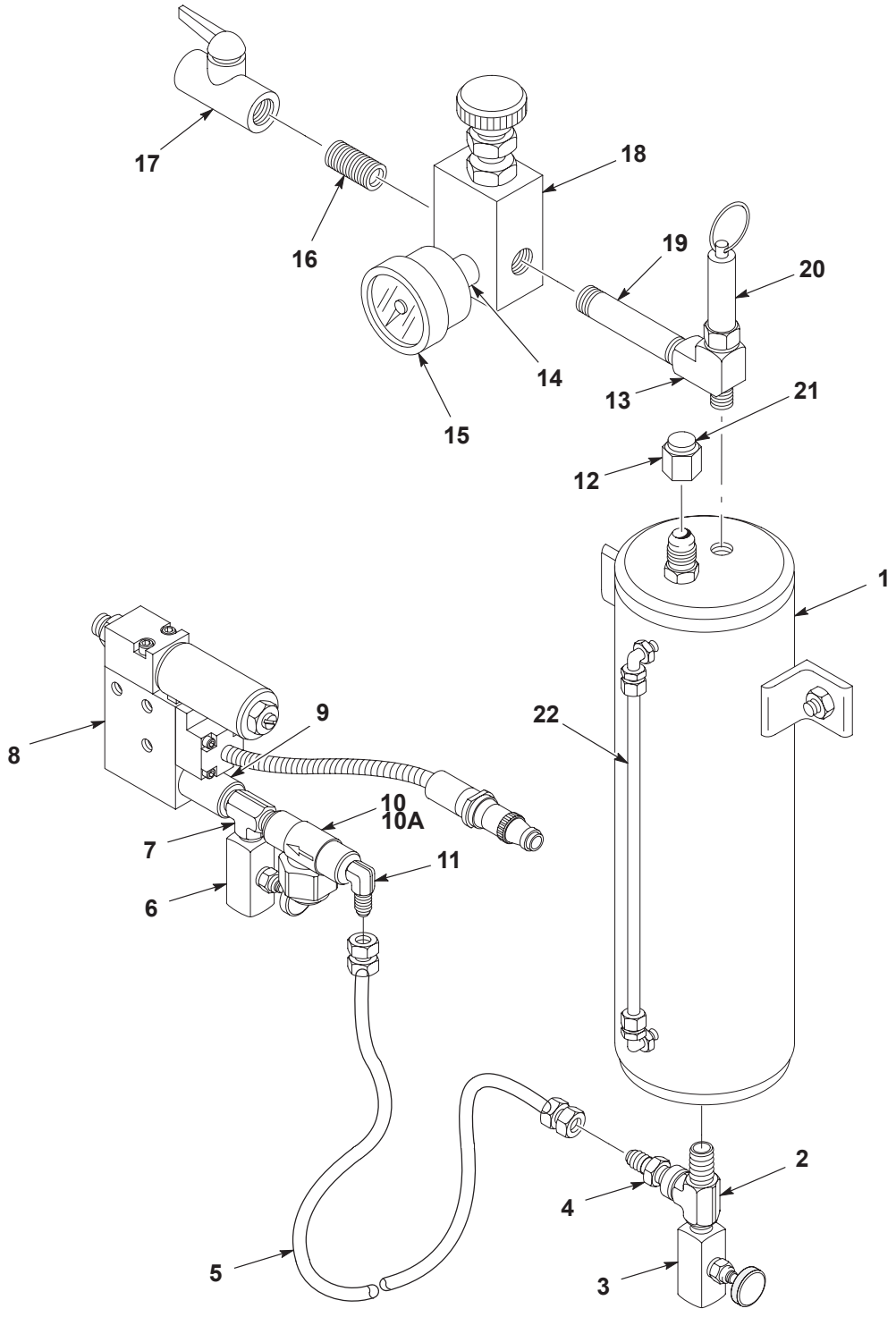

Figure 3 Ink-Dot Hydraulic System Parts

Replacement/Optional Components

Part	Description	Note
159908	FILTER ELEMENT, 15 micron	
112187	SYSTEM, filter/reg/coalescing	
901237	GAUGE, air, 0-100 psi, (0−7 kg/cm2)	
179375	KIT, driver adjustment	A
167959	KIT, ink sight tube	
NOTE: A. Kit needed only for Ink-Dot driver, part 159912.		

Specifications

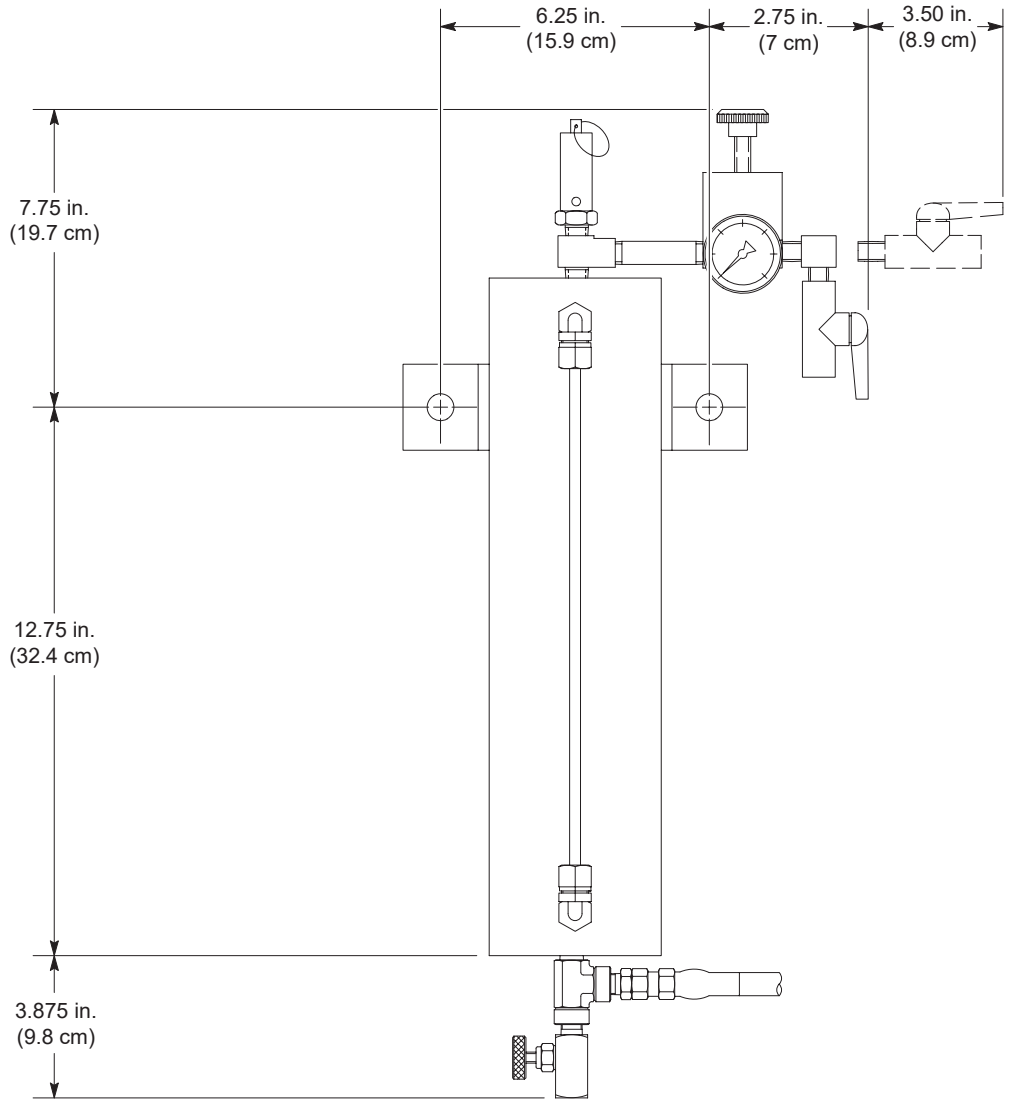

Figure 4 Ink-Dot Hydraulic System Dimensions