Auto-Flo™ Zero-Cavity Automatic Dispensing Valve

Customer Product Manual
Part 303796D–02
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NORDSON CORPORATION • AMHERST, OHIO • USA

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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.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

Auto-Flo Zero-Cavity Automatic Dispensing Gun

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.

Personal Safety *(contd)*

- 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 him this card
- Tell him 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 Auto-Flo zero-cavity automatic dispensing valve is used in a variety of applications to dispense adhesives, sealants, and other materials. Made of aluminum, this valve is lightweight and versatile.

The Auto-Flo zero-cavity automatic dispensing valve is rated for a maximum pressure of 345 bar (5000 psi).

Theory of Operation

See Figure 1. When air is supplied to the valve-open air inlet (2), the piston is pushed upward, pulling the needle (4) away from the nozzle. Material flows in the material inlet (3) and out the nozzle. When air is shut off from the valve-open air inlet, a spring on top of the piston forces the needle back in the nozzle and stops material dispensing.

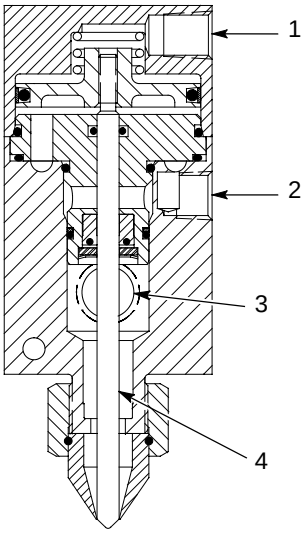

Figure 1 Cutaway View of Dispensing Valve

1. Valve-close air inlet
2. Valve-open air inlet
3. Material inlet
4. Needle

Specifications

Refer to the following paragraphs for the specifications.

Dimensions

Item	Specification
Length	1.75 in. (44.5 mm)
Width	1.75 in. (44.5 mm)
Height without cap	4.39 in. (111.5 mm)

Weight

15.8 oz (0.44 kg)

Static Fluid Pressure Rating

5000 psi (345 bar) maximum

Air Requirements

Item	Specification
Actuating air pressure	60–120 psi (4–8 bar)
Air Quality	Oil-free and filtered through 5-micron or finer particulate filter
Air Usage	0.04 scfm (0.0012 m^3)

Water Requirements for Temperature Conditioning

The temperature conditioning section is constructed of the following materials. Always refer to this list if different water, corrosion inhibitors or biocides other than those listed in the following sections are used.

Black Iron Pipe	Stainless steel	Nylon
Brass	PVC Plastic	Copper
Buna Rubber	Aluminum	Polyurethane
Steel	Viton	PTFE

Water Types

Refer to Table 1. To minimize the introduction of contaminants that may degrade system components, review these guidelines before selecting the type of water to use.

NOTE: Water types are listed in order of preference.

Corrosion Levels

To maintain proper performance, minimum levels of corrosion to aluminum and copper must be maintained. To maintain safe operation keep the corrosion levels of

- aluminum at or below 3 mil/year (0.003 in./yr).
- copper at or below 1 mil/year (0.001 in./yr).

When adding water to the system, corrosion inhibitor must be added. CorrShield MD405 corrosion inhibitor is shipped with temperature-conditioned systems. This is a Molybdate-based corrosion inhibitor that contains an Azole additive to protect copper and is used in the concentration of 1.5 ounces per gallon of water to maintain a concentration of 250–350 ppm.

The Ford Tox number for CorrShield MD 405 is 149163.

The GM FID number for CorrShield MD 405 is 225484.

Refer to the *Parts* section to order CorrShield MD 405.

Biocide Water Treatment

Do not use the following Biocides:

- oxidizers, such as chlorine, bromine, hydrogen peroxide, iodine, ozone, etc.
- cationic, or positively charged biocides.

Biocides for use with CorrShield MD405 are BetzDearborn Spectrus NX114. The recommended concentration of Spectrus NX114 is 150–PPM which is 0.017 oz./gal (0.5 ml/gal).

The Ford Tox Number for Spectrus NX114 is 148270.

Table 1 Water Types

Water	Description
1. Distilled	No minerals and chemicals Lacks the nutrients necessary to support biological growth and the minerals that wear away at system components Neutral nature reduces interaction with additives used to protect the system **NOTE** Distilled water is the best choice for use in the temperature conditioning section.
2. Well	Contains an abundance of minerals that can support plant and animal life Contains minerals like calcium and iron that are abrasive; accelerates wear and tear on components **NOTE** If well water is the only option available, it must be softened to reduce the mineral content.
3. City	Contains chlorine that can degrade all metals including stainless steel Hard on most non–metals Usually contains an abundance of minerals that are capable of supporting plant and animal life; accelerates wear on components
4. Weld (Tower)	Often heavily treated both for bacterial suppression and to make it more compatible with the welding and cooling tower processes Treatment process usually involves some aggressive chemicals that can degrade metals, plastics and other materials Usually contains an abundance of metals and other contaminants picked up from the welding and cooling tower processes that can interfere with the components of the temperature control system
5. DI	**! CAUTION !** Do not use DI water in this system. DI water draws free electrons from metal to normalize ion levels. This process causes degradation of metals.

Installation

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

Guidelines

See Figure 1. For optimal performance, supply air to the valve-close air inlet (1). The air forces the piston downward to return the needle to the nozzle quickly.

For faster dispensing response, install a quick-release valve in the air supply line near the valve-open air inlet (2).

Inspection

Inspect the dispensing valve for damage. If any damage is visible, contact a Nordson representative immediately.

Mounting

WARNING: System or material pressurized. Relieve pressure. Failure to observe this warning may result in serious injury or death.

NOTE: Mounting configurations may vary greatly. Consult your Nordson service representative for specific information on your application.

The Auto-Flo zero-cavity automatic dispensing valve can be mounted to fixed, mobile, and robotic fixtures.

See Figure 2 for the dimensions and specifications of the different ports and mounting holes drilled in the dispensing valve body.

Standalone Dispensing Valve

See Figure 2. To prepare the mounting plate or manifold surface, drill two holes into the mounting surface (3) to accept the hollow dowel pins. Two hollow dowel pins (5) are shipped with each dispensing valve.

The specifications for the mounting plate holes are

- drill 0.165 in. diameter x 0.63 in. deep, maximum
- counterbore 0.320–0.328 in. diameter x 0.187 in. deep
- tap for M5 x 0.8-6H threads 0.50 in. deep or #10-32 threads x 0.50 in. deep

Press the hollow dowel pins into the dispensing valve body (4).

Manifold Mount Dispensing Valve

See Figure 2. In addition to drilling the mounting holes (3), you must also drill holes for the material inlet (1) and the air inlet (2).

The specifications for the material inlet (1) are as follows:

- drill 0.230–0.240 in. diameter x the required depth
- counterbore 0.375–0.379 in. diameter x 0.050–0.052 in. deep

The specifications for the air inlet (2) are as follows:

- drill 0.201–0.211 in. diameter x the required depth
- counterbore 0.375–0.379 in. diameter x 0.050–0.052 in. deep

Temperature Conditioning Manifold Mount Dispensing Valve

See Figure 2. Two holes for temperature conditioning fittings are located below the mounting holes.

If your manifold mount dispensing valve needs to be temperature conditioned, drill the mounting surface holes (7) as follows:

- drill two 0.250 in. diameter through holes for water
- counterbore 0.437–0.441 in. diameter x 0.050–0.052 in. deep

Supply Air Connection

See Figure 1. Air must be supplied to the valve-open air inlet (2). Multiple valves can be activated with the single air supply. A spring will force the valve closed when air is shut off to the valve-open air inlet. To obtain quicker response:

- mount an air-operated, quick-release valve near the valve-open air inlet, or
- supply air to the valve-close air inlet (1).

Supply air must be taken from an oil-free shop air outlet that will maintain a pressure of at least 4 bar (60 psi). The dispensing valve will not operate properly without 4–8 bar (60–120 psi) air pressure. Dispensing performance will increase at higher pneumatic pressures.

Material Supply Connection Guidelines

Use the following guidelines to make the necessary material supply connection to the dispensing valve.

Standalone Versions

If a standard material fitting is required, use either a straight fitting or a 90-degree elbow with a JIC-6 hose connection ($^{9}/_{16}$-18 thread).

NOTE: The standalone dispensing valve has two material inlet ports located on opposite sides of the body. Use one port and plug the other.

If your application requires using a swivel, refer to the *Nordson High Pressure Swivel Connections* manual for appropriate swivel part numbers, connector sizes, and configurations. *Nordson High Pressure Swivel Connections* also contains more detailed information about installing swivels and the swivel lock key.

If additional assistance is needed, contact your Nordson representative.

Use the following procedure to install a swivel and swivel lock key.

1. Install the O-ring plug shipped with the dispensing valve into the port on the side of the dispensing valve that displays the Nordson nameplate.
2. Connect a Nordson swivel to the material inlet on the opposite side of the Nordson nameplate.
3. See Figure 3. Install the swivel lock key (6) and screw (5) using either of the two holes located above the material inlet swivel. The swivel lock key will hold the swivel's nut in place while allowing the swivel to rotate when the dispensing valve or material inlet line is moved.

Manifold Mount Versions

Manifold mount versions have a single material inlet port on the mounting face of the dispensing valve. Install the O-rings shipped with the dispensing valve into the material inlet and air inlet before mounting the dispensing valve onto a manifold.

Temperature Conditioning

The dispensing valve can be temperature conditioned using a fluid system to heat the material between 15–65 °C (60–150 °F). The temperature-conditioned material is then pumped to the dispensing valve.

Use the following steps and the elbows and pipe plug shipped with the dispensing valve to modify the dispensing valve to accept the temperature conditioning material.

See Figure 3.

1. Screw in the two $^{1}/_{8}$ NPT elbows into the temperature conditioning ports (8).
2. Screw in $^{1}/_{16}$ NPT pipe plug into the pipe plug port (7).

Nozzles

The nozzle and packing cartridge are a matched set. For example, if you have a 3-mm zero-cavity dispensing valve, you may only order a 3-mm replacement nozzle. Using the wrong size nozzle may affect dispensing valve operation. Refer to the *Parts* section for replacement part ordering information.

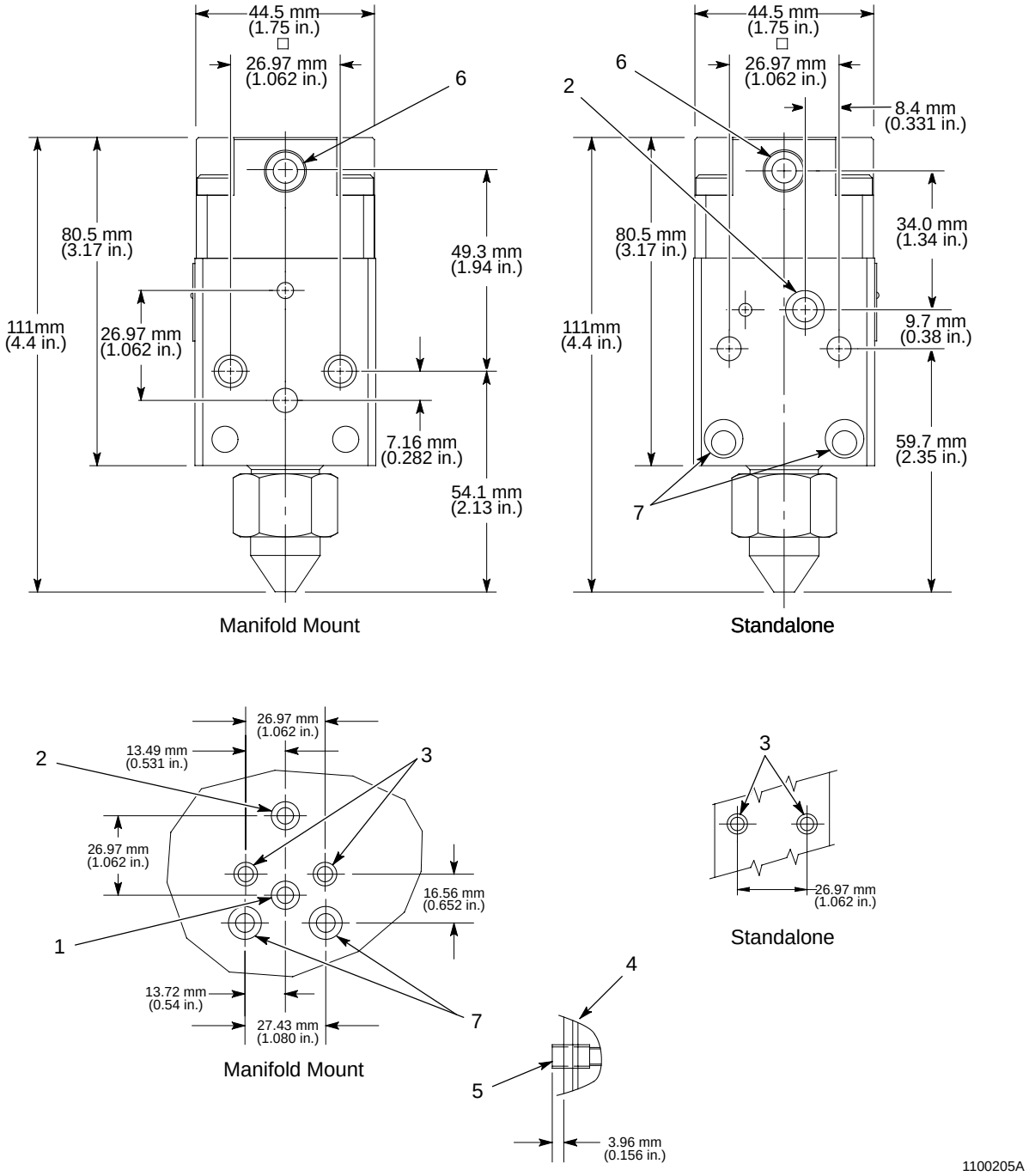

Figure 2 Mounting Dimensions for Standalone and Manifold Mount Dispensing Valves

1. Material inlet
2. Air inlet
3. Mounting surface holes
4. Dispensing valve body
5. Hollow dowel pin
6. Exhaust
7. Temperature conditioning holes/ports

Note: The material inlet (1) for the standalone gun is located 90 degrees from the surface shown.

Operation

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

Operation Function	Procedure
Begin dispensing material	Activate the valve-open air through the A port of the solenoid valve.
Stop dispensing	Turn off the air through the A port.
Use air-assisted closure	Activate the valve-close air through the B port of the solenoid valve.
Purge (remove) air from the material hose and nozzle after installation	1. Place a material waste container under the nozzle. 2. Purge the dispensing valve until material flows freely from the nozzle.

Maintenance

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

Follow a preventive maintenance schedule to keep your dispensing valves operating efficiently.

Frequency	Task
Daily	Check the nozzle for wear (leakage). Replace it when necessary.
Periodically	Check the air lines and the material supply hose for leaks or damage. Replace lines and hoses when necessary. Make sure that the dispensing valve is mounted securely. Clean the filter in the air supply line.

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.

NOTE: Some problems presented in this section may originate with other components in the system and not with the dispensing valve. If the corrective actions described here do not solve the problem, see the appropriate system manuals for further suggestions.

Problem	Possible Cause	Corrective Action
6. Leaks around nozzle or nozzle nut	Dirty or damaged metal sealing surfaces	Clean the nozzle.
7. Leaks through weep hole in valve body	Worn packing cartridge	Replace the packing cartridge.
8. Dispensing valve responds slowly	Air piston assembly worn or out of adjustment	Replace the packing cartridge.
	Low air pressure to solenoid	Increase the air pressure to the solenoid.
	Long air supply lines to valve	Mount the solenoid on the valve or as closely as possible.

Repair

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

WARNING: System or material pressurized. Relieve pressure. Failure to observe this warning may result in serious injury or death.

WARNING: Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage.

Disconnect, lock out, and tag electrical power at a disconnect or breaker in the service line ahead of electrical equipment before servicing.

Clearing a Blocked Nozzle

1. Shut off air pressure to the drum unloader.
2. Bleed off residual pressure through the in-line pressure relief valve in the material supply line. This valve should be located near the drum unloader.
3. Shut off and lock out all power to the system.
4. Remove the nozzle. Clean the nozzle thoroughly with an appropriate solvent.
5. Reinstall the nozzle.

Removing the Valve from the Fixture

1. Shut off the drum unloader.
2. Purge the dispensing valve to relieve the pressure in the hose and valve.
3. Shut off and lock out all power to the system.
4. Disconnect the material supply hose from the material inlet fitting on the valve.
5. Disconnect the air lines from the valve.
6. Remove the valve from the fixture.

Dispensing Valve

See Figure 3. Disassemble the dispensing valve:

1. Remove the four screws (1) and air cylinder cap (2) from the body (10).
2. Remove the spring (3).

CAUTION: Do not damage the dispensing valve body while removing the packing cartridge.

3. Use a small screwdriver to pry the packing cartridge (4) from the body.

Assemble the dispensing valve:

1. Insert the packing cartridge into the dispensing valve body.
2. Place the spring on top of the packing cartridge.
3. Place the air cylinder cap on top of the dispensing valve body.
4. Orient the cap so that the air exhaust port is on the same side as the air inlet port. Install the screws and tighten to 9.5–10.8 N•m (7–8 ft-lb).

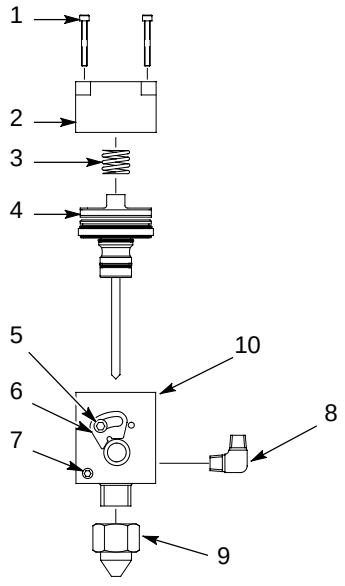

Figure 3 Auto-Flo Automatic Dispensing Valve

1. Screws
2. Air cylinder cap
3. Spring
4. Packing cartridge
5. Socket screw
6. Swivel lock key
7. Pipe plug port
8. Elbows—Temperature Conditioning Ports
9. Nozzle
10. Body

Parts

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

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 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.

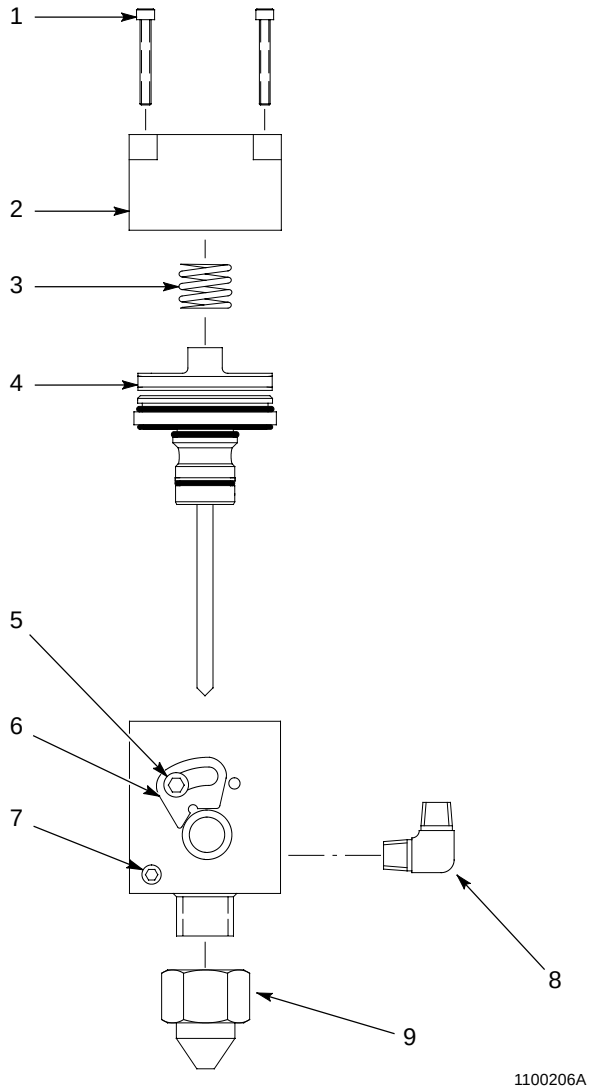

Figure 4 Auto-Flo Automatic Dispensing Valve Parts

Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

Standalone Dispensing Valves and Kits

See Figure 4.

The dispensing valves are shipped with mounting screws and two hollow dowel pins.

Item	Part	Part	Part	Part	Description	Quantity	Note
—	308502				Gun, Auto-Flo, 3 mm, zero-cavity, standalone	1	
—		308511			Gun, Auto-Flo, 4 mm, zero-cavity, standalone	1	
—			1022588		Gun, Auto-Flo, 0.025, zero cavity, standalone	1	
—				1034257	Gun, Auto-Flo, 4 mm, UHMW, zero-cavity, standalone	1	
1	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Screw, socket, M5, with O-ring	4	
2	237942	237942	237942	237942	• Cap, air, cylinder, Auto-Flo	1	
3	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Spring, compression	1	
4	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Cartridge, packing	1	A
5	982372	982372	982372	982372	• Screw, socket, M5 x 12 mm	1	
6	323872	323872	323872	323872	• Key, lock, swivel	1	
7	973466	973466	973466	973466	• Plug, pipe, $^{1}/_{16}$ NPT	1	B
8	971521	971521	971521	971521	• Elbow, $^{1}/_{8}$ NPT	2	B
9	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Nozzle	1	C
NS	973574	973574	973574	973574	• Plug, O-ring, straight thread, $^{9}/_{16}$-18	1	
NS	308510				Kit, cartridge, packing, polymyte, 3 mm	1	D
NS		308518			Kit, cartridge, packing, polymyte, 4 mm	1	D
NS			1022626		Kit, cartridge, packing, polymyte, 0.025	1	D
NS				1034260	Kit, cartridge, packing, 4 mm, UHMW	1	D
NS	308507				Kit, nozzle, 3 mm, zero cavity	1	
NS		308515		308515	Kit, nozzle, 4 mm, zero cavity	1	
NS			1023084		Kit, nozzle, 0.025, zero cavity	1	

NOTE A: Replacement packing cartridges are available only in the packing cartridge kits.

B: Fitting used for temperature conditioning.

C: Replacement nozzles are available only in the nozzle kits.

D: Packing cartridge kits include packing cartridge, piston, and all seals.

NS: Not Shown

Manifold Mount Dispensing Valves and Kits

See Figure 4.

The dispensing valves are shipped with mounting screws and two hollow dowel pins.

Item	Part	Part	Part	Part	Description	Quantity	Note
—	308503				Gun, Auto-Flo, 3 mm, zero-cavity, manifold mount	1	
—		308512			Gun, Auto-Flo, 4 mm, zero-cavity, manifold mount	1	
			1034259		Gun, Auto-Flo, 4 mm, UHMW, zero-cavity, manifold mount	1	
				1036052	Gun, Auto-Flo, 0.025 zero-cavity, manifold mount	1	
1	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Screw, socket, M5, with O-ring	4	
2	237942	237942	237942	237942	• Cap, air, cylinder, Auto-Flo	1	
3	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Spring, compression	1	
4	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Cartridge, packing	1	A
7	973466	973466	973466	973466	• Plug, pipe, $^1/_{16}$ NPT	1	B
8	971521	971521	971521	971521	• Elbow, $^1/_8$ NPT	2	B
9	- - - - - -	- - - - - -	- - - - - -	- - - - - -	• Nozzle	1	C
NS	940101	940101	940101	940101	• O-ring, Viton, 0.239 ID x 0.070	2	
NS	940 111	940 111	940 111	940 111	• O-ring, Viton, 0.301 ID x 0.070	2	
NS	308510				Kit, cartridge, packing, polymyte, 3 mm	1	D
NS		308518			Kit, cartridge, packing, polymyte, 4 mm	1	D
NS			1034260		Kit, cartridge, packing, 4 mm, UHMW	1	D
NS				1022626	Kit, cartridge, packing, polymyte, 0.025	1	D
NS	308507				Kit, nozzle, 3 mm, zero cavity	1	
NS		308515	308515		Kit, nozzle, 4 mm, zero cavity	1	
NS				1023084	Kit, nozzle, 0.025, zero cavity	1	

NOTE A: Replacement packing cartridges are available only in the packing cartridge kits.

B: Fitting used for temperature conditioning.

C: Replacement nozzles are available only in the nozzle kits.

D: Packing cartridge kits include packing cartridge, piston, and all seals.

NS: Not Shown