

HMS Series Applicators

Customer Product Manual

Part 106926F

Issued 9/05



NORDSON CORPORATION • DAWSONVILLE, GEORGIA • USA

www.nordson.com



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: Nonwovens Marketing Department
12 Nordson Drive
Dawsonville, GA 30534

Notice

This is a Nordson Corporation publication which is protected by copyright. Original copyright date 1994.
No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Nordson Corporation. The information contained in this publication is subject to change without notice.

Trademarks

AccuJet, AeroCharge, Apogee, AquaGuard, Asymtek, Automove, Baitgun, Blue Box, CanWorks, Century, CF, Clean Coat, CleanSleeve, CleanSpray, ColorMax, Control Coat, Coolwave, Cross-Cut, Cyclo-Kinetic, DispenseJet, DispenseMate, DuraBlue, Durafiber, Dura-Screen, Durasystem, Easy Coat, Easymove Plus, Ecody, Econo-Coat, e.dot, EFD, ETI, e.Stylized, Excel 2000, Fillmaster, FlexiCoat, Flexi-Spray, Flex-O-Coat, Flow Sentry, Fluidmove, FoamMelt, FoamMix, Heli-flow, Helix, Horizon, Hot Shot, iControl, iFlow, Isocoil, Isocore, Iso-Flo, iTRAX, Kinetix, Little Squirt, Magnastatic, March, MEG, Meltex, Microcoat, Micromark, MicroSet, Millennium, Mini Squirt, Mountaingate, MultiScan, Nordson, OptiMix, Package of Values, Pattern View, PermaFlo, Plasmod, Porous Coat, PowderGrid, Powderware, Printplus, Prism, ProBlue, Pro-Flo, ProLink, Pro-Meter, Pro-Stream, RBX, Rhino, Saturn, Scoreguard, Seal Sentry, Select Charge, Select Coat, Select Cure, Slatutterback, Smart-Coat, Solder Plus, Spectrum, Speed-Coat, SureBead, Sure Clean, Sure Coat, Sure-Max, Tracking Plus, Trends, Tribomatic, Ultrasaver, UpTime, Veritec, VersaBlue, Versa-Coat, Versa-Screen, Versa-Spray, Walcom, Watermark, and When you expect more. are registered trademarks of Nordson Corporation.

Accubar, Advanced Plasma Systems, AeroDeck, AeroWash, AquaCure, ATS, Auto-Flo, AutoScan, Blue Series, Check Mate, Classicblue, Controlled Fiberization, Control Weave, CPX, DispensLink, Dry Cure, DuraBraid, DuraCoat, DuraDrum, DuraPail, Easy Clean, EasyOn, Eclipse, E-Nordson, Equi-Bead, ESP, Fill Sentry, G-Net, G-Site, HDLV, iON, Iso-Flex, iTrend, Lacquer Cure, Lean Cell, Logicom, Maverick, Maxima, MicroFin, MicroMax, MiniBlue, Minimeter, Multifil, Myritex, OptiStroke, PatternPro, PCI, Powder Pilot, Powercure, Primarc, Process Sentry, Prodigy, Pulse Spray, Quad Cure, Ready Coat, Royal Blue, Select Series, Sensomatic, Shaftshield, SheetAire, Smart, SolidBlue, Spectral, Spectronic, SpeedKing, Spray Works, Summit, Sure Brand, SureSeal, Sure Wrap, Swirl Coat, Tempus, ThruWave, Trade Plus, Trak, TrueBlue, Ultra, Ultrasmart, Universal, Vantage, Vista, Web Cure, and 2 Rings (Design) are trademarks of Nordson Corporation.

Designations and trademarks stated in this document may be brands that, when used by third parties for their own purposes, could lead to violation of the owners' rights.

Loctite is a registered trademark of Loctite Corporation.
MAC is a registered trademark of Mac Valves, Inc.
Minimatic is a registered trademark of Clippard Minimatic.
Never Seez is a registered trademark of Bostik Corporation.
Parker is a registered trademark of Parker Hannifin Corporation.
Teflon is a registered trademark of the DuPont Company.
Viton is a registered trademark of DuPont Dow Elastomers.

Table of Contents

Safety	1-1
Safety Alert Symbols	1-1
Responsibilities of the Equipment Owner	1-2
Safety Information	1-2
Instructions, Requirements, and Standards	1-2
User Qualifications	1-3
Applicable Industry Safety Practices	1-3
Intended Use of the Equipment	1-3
Instructions and Safety Messages	1-4
Installation Practices	1-4
Operating Practices	1-4
Maintenance and Repair Practices	1-5
Equipment Safety Information	1-5
Equipment Shutdown	1-6
Relieving System Hydraulic Pressure	1-6
De-energizing the System	1-6
Disabling the Guns	1-6
General Safety Warnings and Cautions	1-7
Other Safety Precautions	1-9
First Aid	1-10
Safety Labels and Tags	1-10
Description	2-1
Introduction	2-1
About This Manual	2-3
Theory of Operation	2-4
Applicator Overview	2-5
Base Applicator	2-5
Filter	2-5
Modules and Nozzles	2-6
Cordsets	2-7
Solenoid Valves	2-8
Specifications	2-8
Explanation of the Applicator Configuration Code	2-10

Installation	3-1
Introduction	3-1
Unpacking	3-1
Items Needed	3-1
Applicator Installation	3-2
Install Solenoid Valves	3-2
Independent Air Actuation	3-3
Common Air Actuation	3-3
Mount the Applicator	3-4
Hose Installation	3-6
Air Supply Installation	3-8
Connect the Module-Actuating Air	3-8
Connect the Pattern Air	3-9
Electrical Installation	3-10
Connect the Solenoid Valves	3-10
Connect the Cordsets	3-12
Applicator Flushing	3-12
Prepare for Applicator Flushing	3-12
Flush the Hose	3-13
Flush the Filter	3-13
Flush the Manifold	3-14
Flush the Modules	3-14
Nozzle Installation	3-15
Applicator Testing	3-15
Operation	4-1
Introduction	4-1
Startup and Shutdown	4-1
Starting the Applicator	4-2
Shutting Down the Applicator	4-2
Adhesive Pattern Adjustment	4-2
Maintenance	5-1
Introduction	5-1
Required Tools and Supplies	5-1
Recommended Maintenance Schedule	5-2

Troubleshooting	6-1
Introduction	6-1
Troubleshooting Tables	6-1
Applicator Heating Problems	6-2
Adhesive Output Problems	6-3
Adhesive Leakage Problems	6-5
Air Supply Problems	6-6
Pattern Control Problems	6-6
Troubleshooting Procedures	6-7
Checking for Blockages	6-7
Checking a Module	6-9
Quick Check	6-9
In-Depth Check	6-10
Checking Solenoid Valve Mechanical Operation	6-11
Checking Solenoid Valve Electrical Operation	6-11
Checking an Air Pressure Regulator	6-12
Repair	7-1
Introduction	7-1
Location of Repair Procedures	7-1
Parts	8-1
Using the Illustrated Parts Lists	8-1
Applicator-Specific Reference Drawings	8-2
Location of Other Parts Lists	8-2
Solenoid Valve Parts	8-3
Air Regulators and Run-Up Kits	8-4
Pressure Regulators/Gauges	8-4
Air Run-Up Kits	8-5
Recommended Spare Parts and Supplies	8-6
Module	Refer to beginning of section for table of contents.
Filter	Refer to beginning of section for table of contents.
Electrical System	Refer to beginning of section for table of contents.

Section 1

Safety

Read this section before using the equipment. This section contains recommendations and practices applicable to the safe installation, operation, and maintenance (hereafter referred to as “use”) of the product described in this document (hereafter referred to as “equipment”). Additional safety information, in the form of task-specific safety alert messages, appears as appropriate throughout this document.



WARNING: Failure to follow the safety messages, recommendations, and hazard avoidance procedures provided in this document can result in personal injury, including death, or damage to equipment or property.

Safety Alert Symbols

The following safety alert symbol and signal words are used throughout this document to alert the reader to personal safety hazards or to identify conditions that may result in damage to equipment or property. Comply with all safety information that follows the signal word.



WARNING: Indicates a potentially hazardous situation that, if not avoided, can result in serious personal injury, including death.



CAUTION: Indicates a potentially hazardous situation that, if not avoided, can result in minor or moderate personal injury.

CAUTION: (Used without the safety alert symbol) Indicates a potentially hazardous situation that, if not avoided, can result in damage to equipment or property.

Responsibilities of the Equipment Owner

Equipment owners are responsible for managing safety information, ensuring that all instructions and regulatory requirements for use of the equipment are met, and for qualifying all potential users.

Safety Information

- Research and evaluate safety information from all applicable sources, including the owner-specific safety policy, best industry practices, governing regulations, material manufacturer's product information, and this document.
- Make safety information available to equipment users in accordance with governing regulations. Contact the authority having jurisdiction for information.
- Maintain safety information, including the safety labels affixed to the equipment, in readable condition.

Instructions, Requirements, and Standards

- Ensure that the equipment is used in accordance with the information provided in this document, governing codes and regulations, and best industry practices.
- If applicable, receive approval from your facility's engineering or safety department, or other similar function within your organization, before installing or operating the equipment for the first time.
- Provide appropriate emergency and first aid equipment.
- Conduct safety inspections to ensure required practices are being followed.
- Re-evaluate safety practices and procedures whenever changes are made to the process or equipment.

User Qualifications

Equipment owners are responsible for ensuring that users:

- receive safety training appropriate to their job function as directed by governing regulations and best industry practices
- are familiar with the equipment owner's safety and accident prevention policies and procedures
- receive, equipment- and task-specific training from another qualified individual

NOTE: Nordson can provide equipment-specific installation, operation, and maintenance training. Contact your Nordson representative for information

- possess industry- and trade-specific skills and a level of experience appropriate to their job function
- are physically capable of performing their job function and are not under the influence of any substance that degrades their mental capacity or physical capabilities

Applicable Industry Safety Practices

The following safety practices apply to the use of the equipment in the manner described in this document. The information provided here is not meant to include all possible safety practices, but represents the best safety practices for equipment of similar hazard potential used in similar industries.

Intended Use of the Equipment

- Use the equipment only for the purposes described and within the limits specified in this document.
- Do not modify the equipment.
- Do not use incompatible materials or unapproved auxiliary devices. Contact your Nordson representative if you have any questions on material compatibility or the use of non-standard auxiliary devices.

Instructions and Safety Messages

- Read and follow the instructions provided in this document and other referenced documents.
- Familiarize yourself with the location and meaning of the safety warning labels and tags affixed to the equipment. Refer to *Safety Labels and Tags* at the end of this section.
- If you are unsure of how to use the equipment, contact your Nordson representative for assistance.

Installation Practices

- Install the equipment in accordance with the instructions provided in this document and in the documentation provided with auxiliary devices.
- Ensure that the equipment is rated for the environment in which it will be used and that the processing characteristics of the material will not create a hazardous environment. Refer to the Material Safety Data Sheet (MSDS) for the material.
- If the required installation configuration does not match the installation instructions, contact your Nordson representative for assistance.
- Position the equipment for safe operation. Observe the requirements for clearance between the equipment and other objects.
- Install lockable power disconnects to isolate the equipment and all independently powered auxiliary devices from their power sources.
- Properly ground all equipment. Contact your local building code enforcement agency for specific requirements.
- Ensure that fuses of the correct type and rating are installed in fused equipment.
- Contact the authority having jurisdiction to determine the requirement for installation permits or inspections.

Operating Practices

- Familiarize yourself with the location and operation of all safety devices and indicators.
- Confirm that the equipment, including all safety devices (guards, interlocks, etc.), is in good working order and that the required environmental conditions exist.
- Use the personal protective equipment (PPE) specified for each task. Refer to *Equipment Safety Information* or the material manufacturer's instructions and MSDS for PPE requirements.
- Do not use equipment that is malfunctioning or shows signs of a potential malfunction.

Maintenance and Repair Practices

- Perform scheduled maintenance activities at the intervals described in this document.
- Relieve system hydraulic and pneumatic pressure before servicing the equipment.
- De-energize the equipment and all auxiliary devices before servicing the equipment.
- Use only new factory-authorized refurbished or replacement parts.
- Read and comply with the manufacturer's instructions and the MSDS supplied with equipment cleaning compounds.

NOTE: MSDSs for cleaning compounds that are sold by Nordson are available at www.nordson.com or by calling your Nordson representative.

- Confirm the correct operation of all safety devices before placing the equipment back into operation.
- Dispose of waste cleaning compounds and residual process materials according to governing regulations. Refer to the applicable MSDS or contact the authority having jurisdiction for information.
- Keep equipment safety warning labels clean. Replace worn or damaged labels.

Equipment Safety Information

This equipment safety information is applicable to the following types of Nordson equipment:

- hot melt and cold adhesive application equipment and all related accessories
- pattern controllers, timers, detection and verification systems, and all other optional process control devices

Equipment Shutdown

To safely complete many of the procedures described in this document, the equipment must first be shut down. The level of shut down required varies by the type of equipment in use and the procedure being completed. If required, shut down instructions are specified at the start of the procedure. The levels of shut down are:

Relieving System Hydraulic Pressure

Completely relieve system hydraulic pressure before breaking any hydraulic connection or seal. Refer to the melter-specific product manual for instructions on relieving system hydraulic pressure.

De-energizing the System

Isolate the system (melter, hoses, guns, and optional devices) from all power sources before accessing any unprotected high-voltage wiring or connection point.

1. Turn off the equipment and all auxiliary devices connected to the equipment (system).
2. To prevent the equipment from being accidentally energized, lock and tag the disconnect switch(es) or circuit breaker(s) that provide input electrical power to the equipment and optional devices.

NOTE: Government regulations and industry standards dictate specific requirements for the isolation of hazardous energy sources. Refer to the appropriate regulation or standard.

Disabling the Guns

All electrical or mechanical devices that provide an activation signal to the guns, gun solenoid valve(s), or the melter pump must be disabled before work can be performed on or around a gun that is connected to a pressurized system.

1. Turn off or disconnect the gun triggering device (pattern controller, timer, PLC, etc.).
2. Disconnect the input signal wiring to the gun solenoid valve(s).
3. Reduce the air pressure to the gun solenoid valve(s) to zero; then relieve the residual air pressure between the regulator and the gun.

General Safety Warnings and Cautions

Table 1-1 contains the general safety warnings and cautions that apply to Nordson hot melt and cold adhesive equipment. Review the table and carefully read all of the warnings or cautions that apply to the type of equipment described in this manual.





Equipment types are designated in Table 1-1 as follows:

HM = Hot melt (melters, hoses, guns, etc.)

PC = Process control





CA = Cold adhesive (dispensing pumps, pressurized container, and guns)


Table 1-1 General Safety Warnings and Cautions

Equipment Type	Warning or Caution
HM	 <p>WARNING: Hazardous vapors! Before processing any polyurethane reactive (PUR) hot melt or solvent-based material through a compatible Nordson melter, read and comply with the material's MSDS. Ensure that the material's processing temperature and flashpoints will not be exceeded and that all requirements for safe handling, ventilation, first aid, and personal protective equipment are met. Failure to comply with MSDS requirements can cause personal injury, including death.</p>
HM	 <p>WARNING: Reactive material! Never clean any aluminum component or flush Nordson equipment with halogenated hydrocarbon fluids. Nordson melters and guns contain aluminum components that may react violently with halogenated hydrocarbons. The use of halogenated hydrocarbon compounds in Nordson equipment can cause personal injury, including death.</p>
HM, CA	 <p>WARNING: System pressurized! Relieve system hydraulic pressure before breaking any hydraulic connection or seal. Failure to relieve the system hydraulic pressure can result in the uncontrolled release of hot melt or cold adhesive, causing personal injury.</p>
HM	 <p>WARNING: Molten material! Wear eye or face protection, clothing that protects exposed skin, and heat-protective gloves when servicing equipment that contains molten hot melt. Even when solidified, hot melt can still cause burns. Failure to wear appropriate personal protective equipment can result in personal injury.</p>
<i>Continued...</i>	

General Safety Warnings and Cautions *(contd)*

Table 1-1 General Safety Warnings and Cautions *(contd)*

Equipment Type	Warning or Caution
HM, PC	 <p>WARNING: Equipment starts automatically! Remote triggering devices are used to control automatic hot melt guns. Before working on or near an operating gun, disable the gun's triggering device and remove the air supply to the gun's solenoid valve(s). Failure to disable the gun's triggering device and remove the supply of air to the solenoid valve(s) can result in personal injury.</p>
HM, CA, PC	 <p>WARNING: Risk of electrocution! Even when switched off and electrically isolated at the disconnect switch or circuit breaker, the equipment may still be connected to energized auxiliary devices. De-energize and electrically isolate all auxiliary devices before servicing the equipment. Failure to properly isolate electrical power to auxiliary equipment before servicing the equipment can result in personal injury, including death.</p>
HM, CA, PC	 <p>WARNING: Risk of fire or explosion! Nordson adhesive equipment is not rated for use in explosive environments and should not be used with solvent-based adhesives that can create an explosive atmosphere when processed. Refer to the MSDS for the adhesive to determine its processing characteristics and limitations. The use of incompatible solvent-based adhesives or the improper processing of solvent-based adhesives can result in personal injury, including death.</p>
HM, CA, PC	 <p>WARNING: Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others and can damage the equipment.</p>
<i>Continued...</i>	

Equipment Type	Warning or Caution
HM	 <p>CAUTION: Hot surfaces! Avoid contact with the hot metal surfaces of guns, hoses, and certain components of the melter. If contact can not be avoided, wear heat-protective gloves and clothing when working around heated equipment. Failure to avoid contact with hot metal surfaces can result in personal injury.</p>
HM	<p>CAUTION: Some Nordson melters are specifically designed to process polyurethane reactive (PUR) hot melt. Attempting to process PUR in equipment not specifically designed for this purpose can damage the equipment and cause premature reaction of the hot melt. If you are unsure of the equipment's ability to process PUR, contact your Nordson representative for assistance.</p>
HM, CA	<p>CAUTION: Before using any cleaning or flushing compound on or in the equipment, read and comply with the manufacturer's instructions and the MSDS supplied with the compound. Some cleaning compounds can react unpredictably with hot melt or cold adhesive, resulting in damage to the equipment.</p>
HM	<p>CAUTION: Nordson hot melt equipment is factory tested with Nordson Type R fluid that contains polyester adipate plasticizer. Certain hot melt materials can react with Type R fluid and form a solid gum that can clog the equipment. Before using the equipment, confirm that the hot melt is compatible with Type R fluid.</p>

Other Safety Precautions

- Do not use an open flame to heat hot melt system components.
- Check high pressure hoses daily for signs of excessive wear, damage, or leaks.
- Never point a dispensing handgun at yourself or others.
- Suspend dispensing handguns by their proper suspension point.

First Aid

If molten hot melt comes in contact with your skin:

1. Do NOT attempt to remove the molten hot melt from your skin.
2. Immediately soak the affected area in clean, cold water until the hot melt has cooled.
3. Do NOT attempt to remove the solidified hot melt from your skin.
4. In case of severe burns, treat for shock.
5. Seek expert medical attention immediately. Give the MSDS for the hot melt to the medical personnel providing treatment.

Safety Labels and Tags

Figure 1-1 illustrates the location of the product safety labels and tags affixed to the equipment. Table 1-2 provides an illustration of the hazard identification symbols that appear on each safety label and tag, the meaning of the symbol, or the exact wording of any safety message.

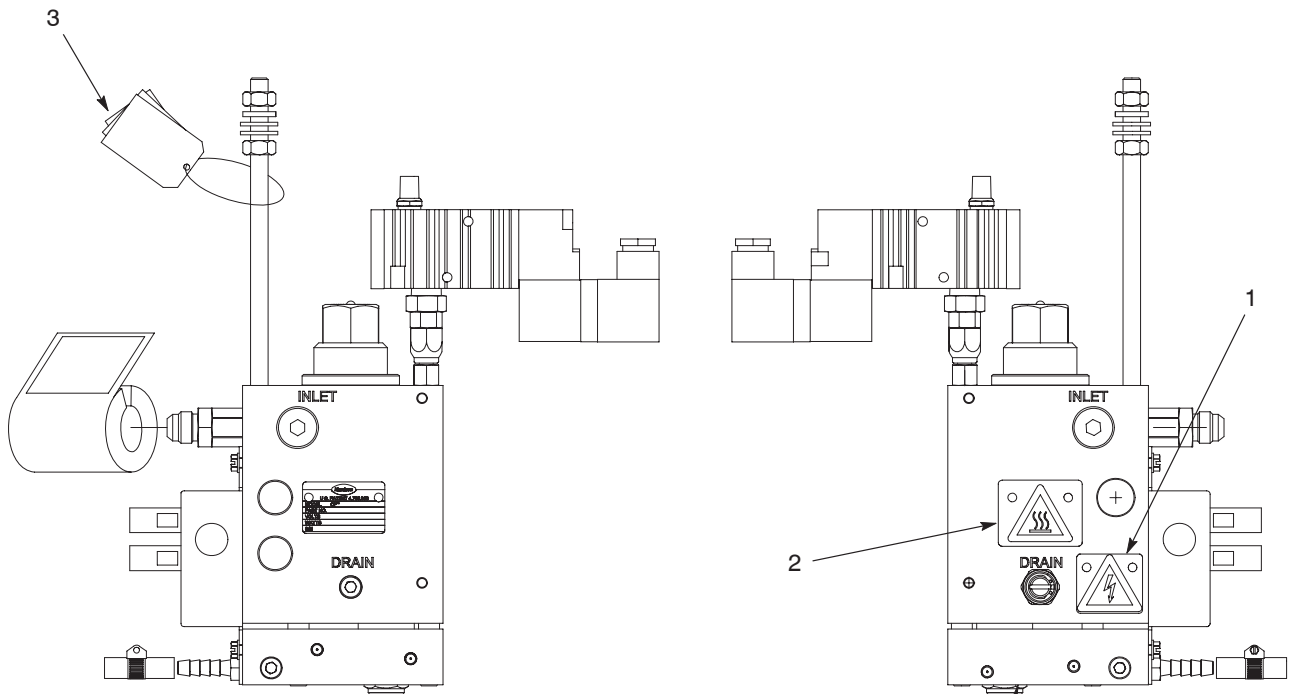







Figure 1-1 Safety labels and tags

Table 1-2 Safety Labels and Tags

Item	Part	Description
1.	181863	Plate, warning, CE, electrical shock
2.	181862	Plate, warning, CE, hot
3.	243352	 <p>WARNING: Fire, injury or equipment damage can result if cleanout materials do not meet the following requirements:</p> <ol style="list-style-type: none"> 1. Minimum flash point to be 550 °F (288 °C). 2. Liquid and vapor to be non-toxic at use temperature in equipment. 3. Chemical reactions with adhesive and equipment materials must not be violently heat producing. 4. Cleanout material must not corrode or otherwise weaken equipment materials.  <p>CAUTION: This equipment is factory tested with Nordson type R fluid containing Polyester Adipate plasticizer. Certain adhesives may react with the type R fluid residue to form solid gum which can be difficult to remove.</p> <p>To avoid equipment damage check with adhesive supplier regarding compatibility and cleanout procedure before putting adhesive into the system.</p>
	600103	 <p>CAUTION: This unit is equipped with _____ °F preset thermostat. Use only adhesive formulated for application at this temperature. Before changing adhesive consult instruction manual for changing operating temperature. Failure to follow instructions may result in personal injury or property damage.</p>  <p>CAUTION: This gun is RTD (resistance temperature detector) controlled. Prior to operation and before changing adhesive consult instruction manual for changing operating temperature. Failure to follow instructions may result in personal injury or property damage.</p>
	600137	 <p>WARNING: Disconnect power and remove system pressure before disassembly or maintenance. Failure to follow these instructions may result in serious personal injury.</p>

Section 2

Description



WARNING: Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.

Introduction

Nordson HMS Series spray applicators apply thermoplastic hot melt adhesive to various products. The applicators are configurable, which means each is constructed according to the specific choices made when the applicator was ordered. The key parts of a typical applicator are shown in Figure 2-2.

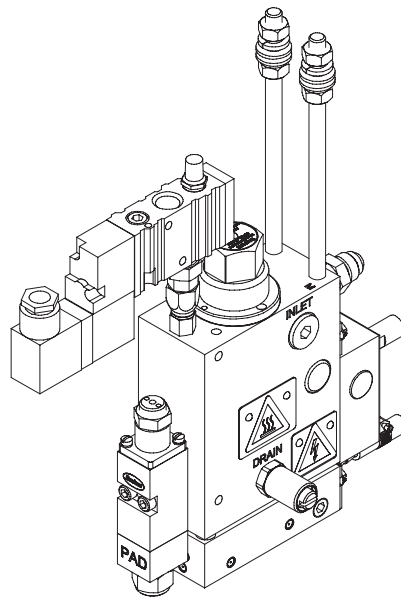


Figure 2-1 Typical HMS applicator (single-module applicator with CF200 module shown)

Introduction *(contd)*

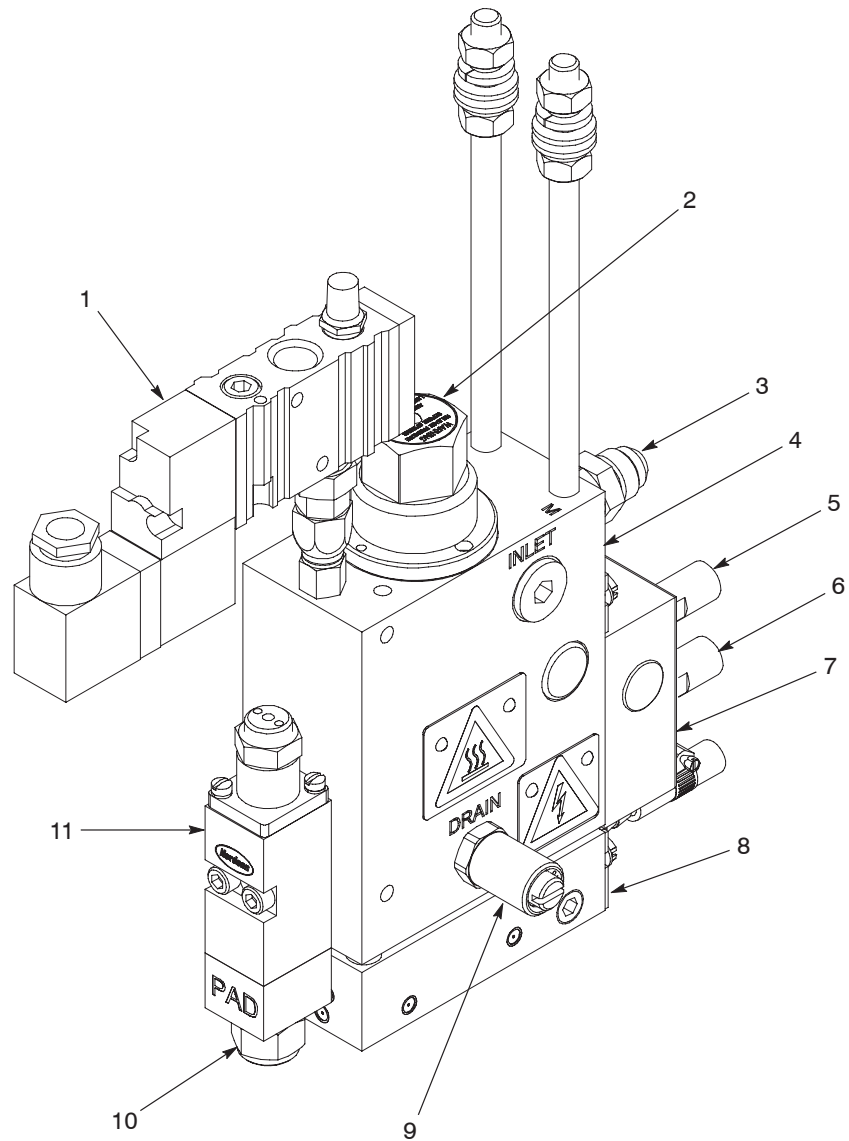


Figure 2-2 Key parts of a typical applicator (single-module applicator shown)

- | | |
|-----------------------------------|--|
| 1. Solenoid valve | 7. Electrical enclosure |
| 2. Filter (vertical filter shown) | 8. Heated air manifold |
| 3. Hose connection | 9. Drain valve |
| 4. Adhesive manifold | 10. Nozzle (CF nozzle shown) |
| 5. Adhesive manifold cordset | 11. Dispensing module (CF200 module shown) |
| 6. Heated air manifold cordset | |

About This Manual

Sections 1–7 of this manual apply to all configurations of the applicator. The illustrations are generic, in most cases showing a single-module applicator. Although your applicator may look different from the applicator shown in the illustrations, the information in Sections 1–7 still applies.

Section 8 contains reference drawings and a bill of materials that are specific to your applicator. Section 8 also contains parts lists that apply to all configurations of the applicator.

Sections 9–11 are specific to your applicator. These sections are cross-referenced throughout Sections 1–8 as appropriate.

Theory of Operation

Adhesive is heated to application temperature, which is typically about 177 °C (350 °F), in a melter. The melter pumps the adhesive through a heated hose to the applicator. The applicator then dispenses the adhesive through dispensing modules onto a product. The type of nozzle used on the modules determines the type of adhesive pattern produced.

The applicator requires two air supplies: one to actuate the modules (module-actuating air) and one to supply the air that shapes or fiberizes the adhesive exiting the modules (pattern air). The module-actuating air is controlled through solenoid valves that are installed on the applicator and connected to a module-actuating air supply line with an air pressure regulator. The pattern air is usually controlled through an air pressure regulator installed in a pattern air supply line.

The adhesive manifold and heated air manifold are heated by cartridge-type heaters. Power is supplied to the heaters through a cordset, which is connected electrically to the hose or to some combination of splitter and extension cables. Resistance temperature detectors (RTDs) or thermocouples sense the temperature of the adhesive or air in the manifolds and relay the temperature through the cordsets, hoses, and/or cables to a melter control system or to a standalone temperature controller.

The pattern in which adhesive is dispensed onto the product is determined by:

- the number and spacing of the modules
- the choice of nozzle
- the distance at which the nozzle is placed above the product
- the production line speed
- the adhesive add-on weight (melter pump speed)
- the pattern air pressure
- the pattern air temperature
- the adhesive application temperature
- the type of adhesive used
- the viscosity of the adhesive used

Applicator Overview

The applicator has several major assemblies: the base applicator, the filter, the modules and nozzles, the cordsets, and the solenoid valves.

Base Applicator

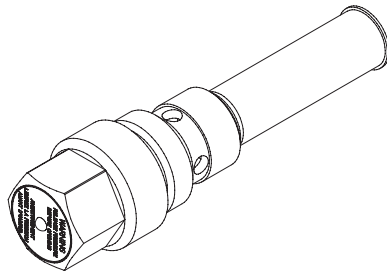
The base applicator is the part of the applicator into which both adhesive and pattern air enter. The size of the base applicator depends on the number of modules installed on the applicator (typically from 1–18), the spacing of the modules (even or uneven), and the type of filter used (right, left, or vertical).

Adhesive enters the applicator through the heated adhesive manifold and then passes through a filter, which removes any char or debris. The adhesive then splits into separate streams that flow to the modules.

Pattern air enters the applicator through the heated air manifold and then flows to the modules, which blow the heated air onto the adhesive exiting the modules.

Filter

The filter, which is located inside the adhesive manifold, removes char and debris from the adhesive before it is fed to the modules. Figure 2-3 shows a typical filter. For information specific to the filter on your applicator, refer to Section 10, *Filter*.



690100022

Figure 2-3 Filter (in-out filter shown)

Modules and Nozzles

Many types of modules are available, including, but not limited to, Controlled Fiberization (CF), Control Coat (CC), meltblown (MB), Summit (SM), and Universal (UM) modules. Figure 2-4 shows some example modules. An applicator may have one module or many modules. All modules are normally closed, opening to dispense adhesive only when module-actuating air is supplied to them. When the module-actuating air is removed, the modules close, cutting off the adhesive supply.

Adhesive exits the module through a nozzle. For most applicators, a variety of nozzle types and sizes are available. In general, the type and size of the nozzle affects the width and density of the adhesive pattern, the adhesive fiber size, and the type of edge control.

Pattern air from the heated air manifold also exits through the nozzle part of the module. The way the pattern air shapes or fiberizes the adhesive depends on the type of nozzle installed on the module. For example, when pattern air is blown through a CF nozzle, the adhesive exiting the nozzle forms a spiral pattern. For information specific to the modules and nozzles on your applicator, refer to Section 9, *Module*.

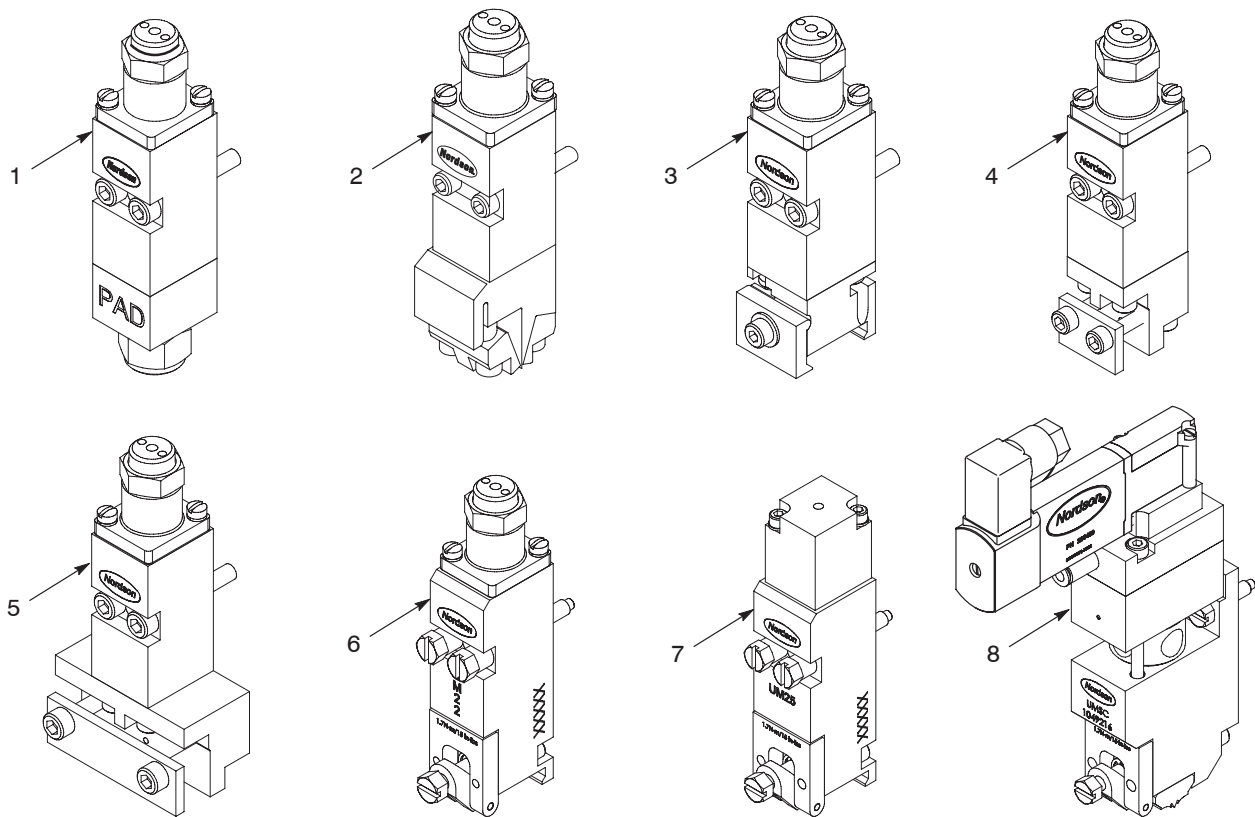


Figure 2-4 Modules

- 1. CF200PAD module
- 2. CC200 module
- 3. MB200 module

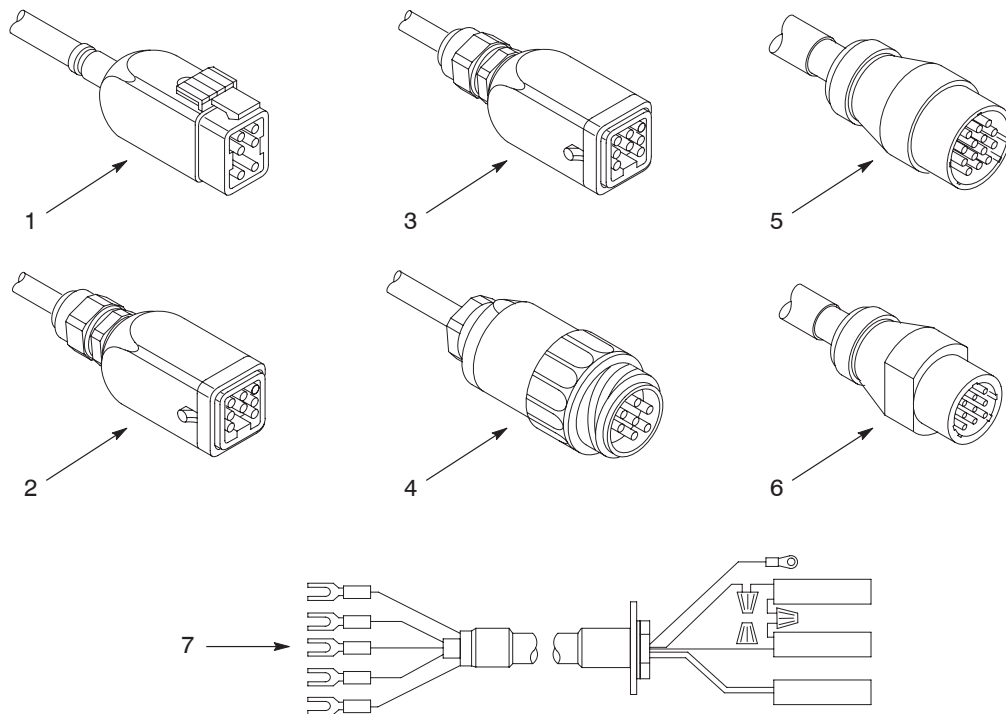
- 4. Summit module (standard)
- 5. Summit module (wide)
- 6. UM22 module

- 7. UM25 module
- 8. Universal Speed-Coat module

Cordsets

There are two types of cordset: adhesive manifold and heated air manifold. Depending on its size, an applicator may have one adhesive manifold cordset and one heated air manifold cordset, or many adhesive and heated air manifold cordsets. In combination with the hoses and any splitter or extension cables used, the cordsets serve two purposes: (1) to supply electrical power to the heaters in the adhesive and heated air manifolds and (2) to carry temperature-sensing information from the RTDs or thermocouples in the adhesive and heated air manifolds to a melter control system or to a standalone temperature controller. In addition, M-style and C-style cordsets supply power to solenoid valves.

The adhesive and heated air manifold cordsets on your applicator will be one of the following styles: T-style, M-style, C-style, K-style, J-style, or P-style. Figure 2-5 shows the connectors for the different styles. For information specific to the cordsets on your applicator, refer to Section 11, *Electrical System*.



690300005

Figure 2-5 Cordset connectors

- | | | |
|---|--|--|
| 1. T-style low power cordset (adhesive or heated air manifold) | 3. M- or C-style adhesive manifold cordset | 5. K- or J-style adhesive manifold cordset |
| 2. T-style high-power cordset (adhesive or heated air manifold) | 4. M- or C-style heated air manifold cordset | 6. K- or J-style heated air manifold cordset |
| | | 7. P-style adhesive or heated air manifold cordset |

Solenoid Valves

Nordson Corporation recommends the use of Saturn solenoid valves or Clippard Minimatic solenoid valves for applicators with any type of module except for Universal Speed-Coat modules, on which the solenoid valve is integral to the module. Figure 2-6 shows the solenoid valves.

Solenoid valves are used to control the module-actuating air. They are pneumatically connected to a clean, dry, unlubricated air supply and electrically connected to a triggering device. The triggering device causes the solenoid valves to open and close at the appropriate times, which in turn causes the modules to open and close to dispense adhesive in the desired pattern.

The number of solenoid valves used on your applicator (except for Universal Speed-Coat applicators) depends on the type of air actuation you use: common or independent. Further explanation of air actuation is provided in Section 3, *Installation*. To determine which type of solenoid valve is used on your applicator, refer to the applicator reference drawing and bill of materials in *Applicator-Specific Reference Drawings* in Section 8, *Parts*.

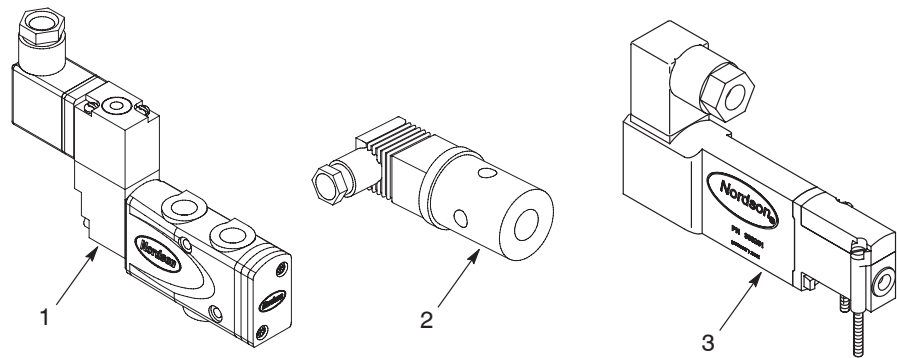


Figure 2-6 Solenoid valves

1. Saturn solenoid valve
2. Clippard Minimatic solenoid valve
3. Universal Speed-coat module solenoid valve

Specifications

The applicator specifications vary depending on the type of module installed on the applicator. Refer to *Applicator Specifications* in Section 9, *Module*, for the applicator specifications.

This page intentionally left blank.

Explanation of the Applicator Configuration Code

Spray applicators are configurable, which means each applicator is constructed according to the specific choices made when it was ordered. You can determine the configuration of an applicator in either of the following ways:

- Refer to the reference drawings and bill of materials in *Applicator-Specific Reference Drawings* in Section 8, *Parts*. These drawings and the bill of materials are specific to your applicator.
- Obtain the applicator configuration code from the MODEL portion of the applicator identification plate. The identification plate is usually located on the side of the applicator, as shown in Figure 2-7. Compare the applicator configuration code to Figure 2-8 and Table 2-1.

The example configuration code shown in Figure 2-8 represents a spray applicator that has

- four evenly spaced CF modules (CFE04)
- a T-style cordset (T)
- 240 VAC electrical service (2)
- a vertical filter (V)
- independent air actuation (I)
- Saturn solenoid valves (M)
- a 124-mm (4.88-in.) manifold (C)
- 22.3 mm module spacing (022.3).

Table 2-1 provides an explanation of the configuration code values.

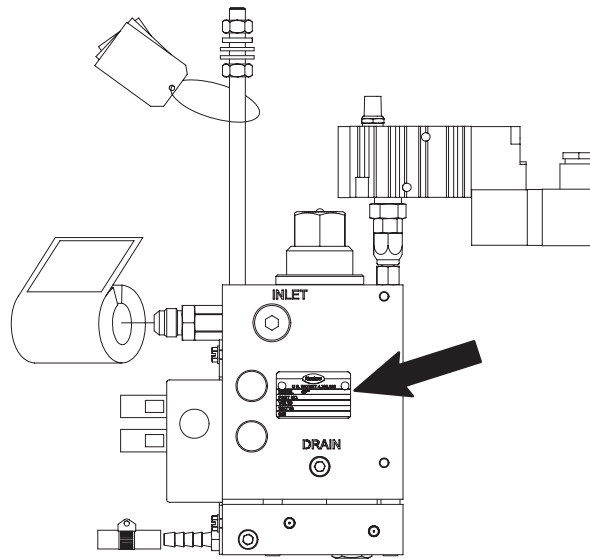


Figure 2-7 Typical location of the applicator identification plate

Section 3

Installation



WARNING: Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.

Introduction

This section provides procedures for installing the applicator and preparing it for operation. Before performing any installation procedures, review Section 1, *Safety*.

Unpacking

Exercise normal care to prevent equipment damage during unpacking. After unpacking the applicator, inspect it for any damage that may have occurred during shipping. Look for any dents and scratches and make sure all fasteners are tight. Report any damage to your Nordson representative.

Items Needed

You will need the following items to install the applicator:

- melter or temperature controller, hoses, and associated manuals
- electronic control device for solenoid valves
- air line tubing and fittings
- applicator mounting hardware
- device to lift and position the applicator
- personal protective equipment for working with hot adhesive
- toolkit, including wrenches and screwdrivers
- anti-seize lubricant
- drain pans and waste containers suitable for waste adhesive
- Teflon paste or tape

Applicator Installation

Follow these procedures to install the applicator. Applicator installation includes installing solenoid valves (if applicable) and mounting the applicator.

Install Solenoid Valves

If the solenoid valves for your applicator are not already installed, install them at this time. An installation configuration like those shown in Figure 3-1 is recommended.

The solenoid valves are used to control the module-actuating air. All modules are normally closed, requiring air to open them. Use the following guidelines:

- Use only clean, dry, unlubricated air.
- On multi-module applicators, install the solenoid valves for common or independent air actuation as appropriate. Refer to the solenoid valve reference drawing in *Applicator-Specific Reference Drawings* in Section 8, *Parts*, for installation instructions. To determine which type of air actuation your applicator is configured for, refer to *Explanation of the Applicator Configuration Code* in Section 2, *Description*. If you need to change the configuration, contact your Nordson representative for assistance. Refer to the next two parts of this section, *Independent Air Actuation* and *Common Air Actuation*, as needed.
- Install the solenoid valves as close as possible to the module-actuating air inlets to reduce the lag time between actuation and module opening.

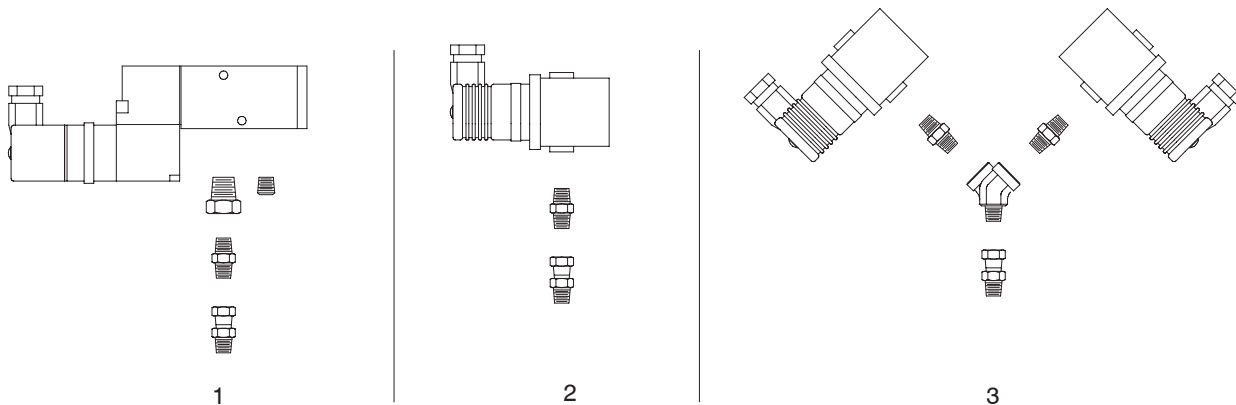


Figure 3-1 Typical solenoid valve installations

1. Saturn solenoid valve, common or independent air actuation

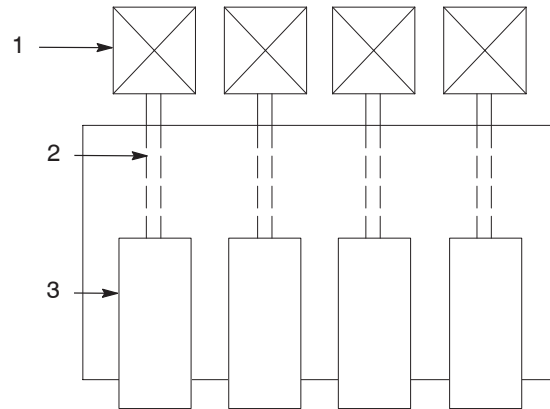
2. Clippard solenoid valve, common air actuation

3. Clippard solenoid valve, independent air actuation

Note: Refer to Section 8, *Parts*, for the part numbers of the components shown in this illustration.

Independent Air Actuation

A multi-module applicator has independent air actuation when a separate solenoid valve controls the actuating air to each module, as shown in Figure 3-2. Independent air actuation provides more pattern flexibility.



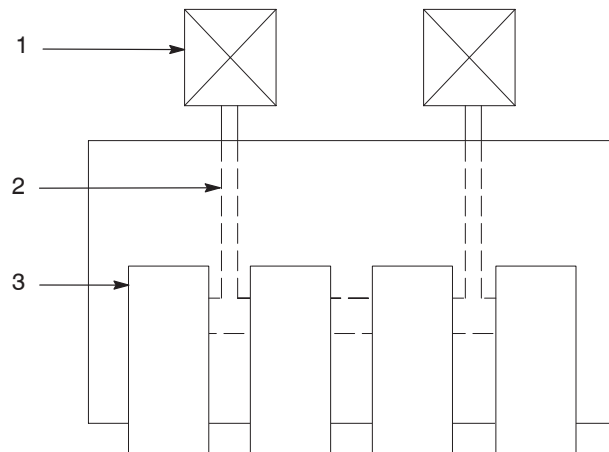
42000026

Figure 3-2 Independent air actuation

- | | |
|-------------------|-----------|
| 1. Solenoid valve | 3. Module |
| 2. Air passage | |

Common Air Actuation

A multi-module applicator has common air actuation when the module-actuating air to two or more adjacent modules is controlled with the same solenoid valve, as shown in Figure 3-3. On some applicators, a single solenoid valve is used to open all modules.



42000027

Figure 3-3 Common air actuation

- | | |
|-------------------|-----------|
| 1. Solenoid valve | 3. Module |
| 2. Air passage | |

Mount the Applicator

Mounting the applicator includes selecting an appropriate mounting location and installing any necessary mounting hardware on the production line.

1. Select a mounting location. Use the following guidelines:

- Make sure there will be enough clearance to
 - remove the filter from the adhesive manifold
 - drain adhesive from the drain valve
 - replace heaters, sensors, or thermostats
 - replace a solenoid valve, module, or nozzle
 - route and replace air tubing and hoses

NOTE: Refer to the applicator reference drawing in *Applicator-Specific Reference Drawings* in Section 8, *Parts*, for the applicator dimensions.

- Choose a location that will not subject the applicator to extreme temperature variations or equipment vibration. The ambient temperature should be 0–49 °C (32–120 °F).
 - Choose a location that will allow you to properly route the hoses from the applicator to the melter. Figure 3-5 provides hose routing guidelines.
 - Choose a location close to a supply of dry, regulated, unlubricated air.
2. See Figure 3-4. If applicable, install any hardware that will be required on the production line to accommodate the applicator mounting rods. If possible, use mounting hardware that will allow you to adjust the height of the applicator between 13–76 mm (0.5–3.0 in.) after it is mounted.

3. Move the applicator into position on the production line (use an appropriate lifting device if needed) and secure the applicator at the mounting location. Adjust the applicator height and angle as appropriate.

NOTE: The applicator should be perpendicular to the surface onto which the adhesive is to be applied. For applicators with Control Coat or meltblown nozzles, the surface should angle downward away from the nozzle to allow air to spill off.

NOTE: If your applicator will be used for an elastic thread application (Summit modules/nozzles), Nordson Corporation recommends installing an elastic guide roller assembly on the applicator to stabilize the elastic strands as the adhesive is applied to them. Refer to *Summit Elastic Guide Parts* in Section 9, *Module*, for the elastic guide part number and also to install the guide.

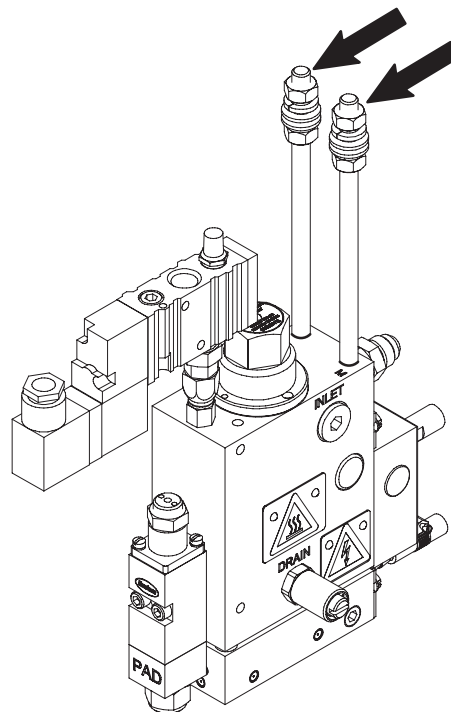


Figure 3-4 Location of the mounting rods on a typical applicator

Hose Installation

Follow this procedure for each hose hydraulic connection you are making. Do not connect the hose cordsets at this time.

1. Connect the hose to the adhesive supply port on the applicator, using a hose fitting as necessary. Use two wrenches to connect the hose as shown in Figure 3-5.

NOTE: The hose cordset should be located at the melter end (where adhesive enters the hose). This ensures that the hose sensor measures the temperature of the adhesive exiting the hose.

NOTE: Refer to the parts section of the melter manual for available hose fittings.

2. Install the insulation cuff from the ship-with kit over the hose connection.

CAUTION: Risk of equipment damage. Do not use nonconductive pipe compound or tape on hose fittings.

CAUTION: Improper routing and venting of hoses could result in overheating, damage, and poor adhesive flow. To ensure proper operation, do not bundle or tie-wrap hoses, do not bend hoses at sharp angles, and do not allow hoses to lay on concrete floors or other cool surfaces that could conduct heat away from the hoses.

3. Route the hose to the melter and connect it to the melter hydraulically and electrically as directed in the melter manual. Follow the hose routing guidelines shown in Figure 3-5.

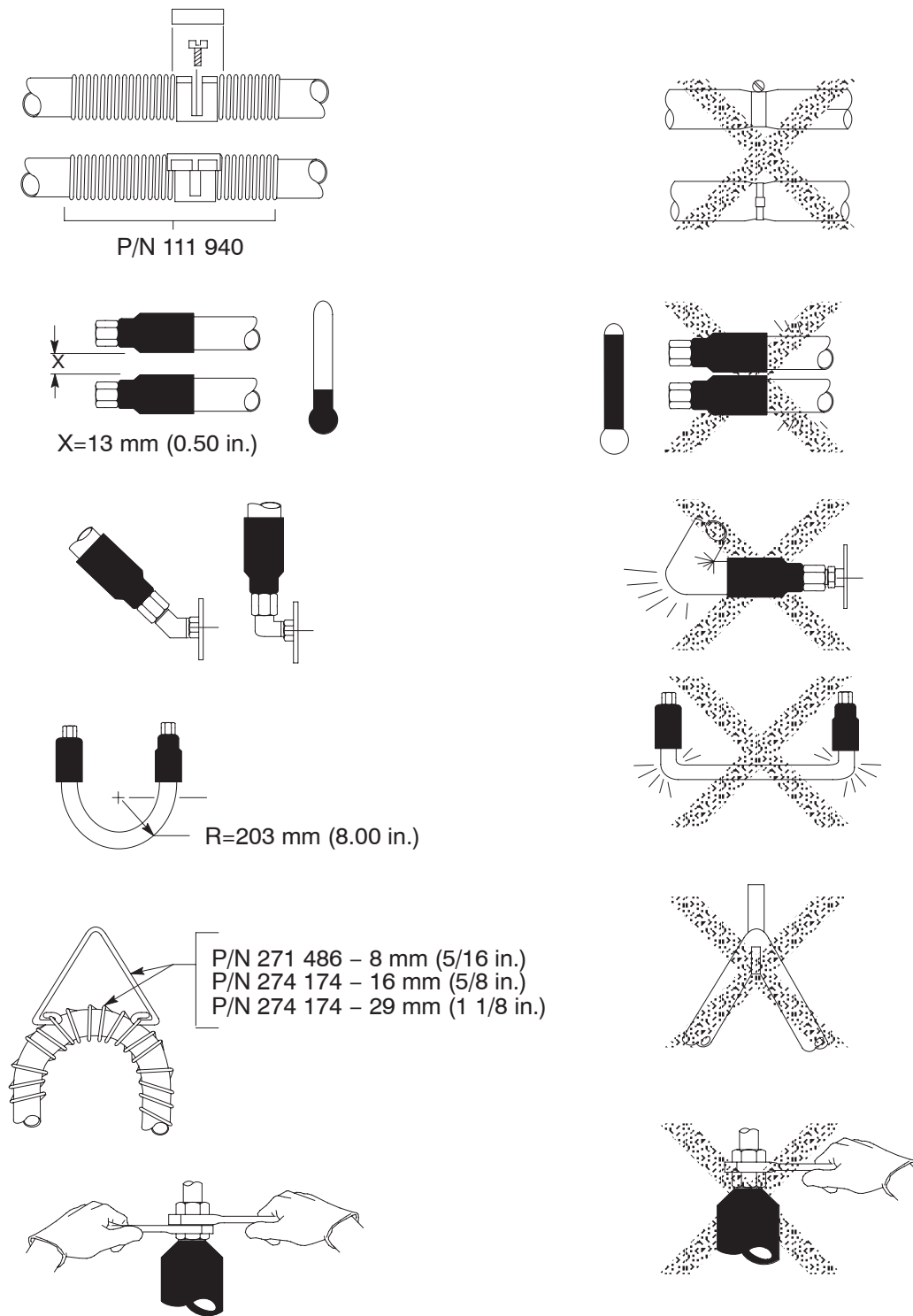


Figure 3-5 Hose installation guidelines

45000002

Air Supply Installation

Follow these procedures to connect air supplies to the applicator. Air is supplied to the applicator for two reasons: (1) to actuate the modules (module-actuating air) and (2) to supply the modules with the air that shapes or fiberizes the adhesive being applied by the modules (pattern air).

Connect the Module-Actuating Air

See Figure 3-6. Connect a supply of dry, regulated, unlubricated air to the module-actuating air inlet on the applicator solenoid valves.

Nordson Corporation recommends installing an air pressure regulator and filter in the module-actuating air supply line that is capable of regulating the air pressure up to 6.2 bar (90 psi). For the module-actuating air pressure range, refer to *Applicator Specifications* in Section 9, *Module*.

NOTE: To connect the module-actuating air supply to a Universal Speed-Coat applicator, refer to Section 9, *Module*.

NOTE: Nordson Corporation offers a selection of air pressure regulators/gauges. Refer to Section 8, *Parts*, for part numbers.

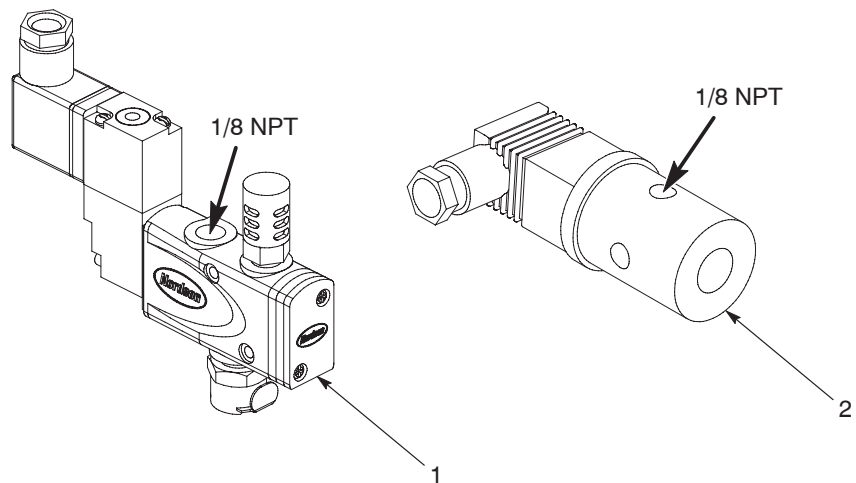


Figure 3-6 Location of the module-actuating air inlet on solenoid valves

1. Saturn solenoid valve
2. Clippard Minimatic solenoid valve

Connect the Pattern Air

See Figure 3-7. Use the clamp (2) and tubing (3) from the ship-with kit to connect a supply of dry, regulated, unlubricated air to the pattern air inlet fitting (1). To determine where the pattern air inlet on your applicator is located, refer to the applicator reference drawing in *Applicator-Specific Reference Drawings* in Section 8, *Parts*.

Nordson Corporation recommends installing an air pressure regulator and filter in the pattern air supply line that is capable of regulating the pattern air pressure up to a 56.6 nlm (2 scfm) flow rate per module. For the pattern air pressure operating range, refer to *Applicator Specifications* in Section 9, *Module*.

NOTE: Nordson Corporation offers a selection of pressure regulators and air run-up kits. An air run-up assembly allows the pattern-air flow to follow the production line speed. Refer to Section 8, *Parts*, for part numbers.

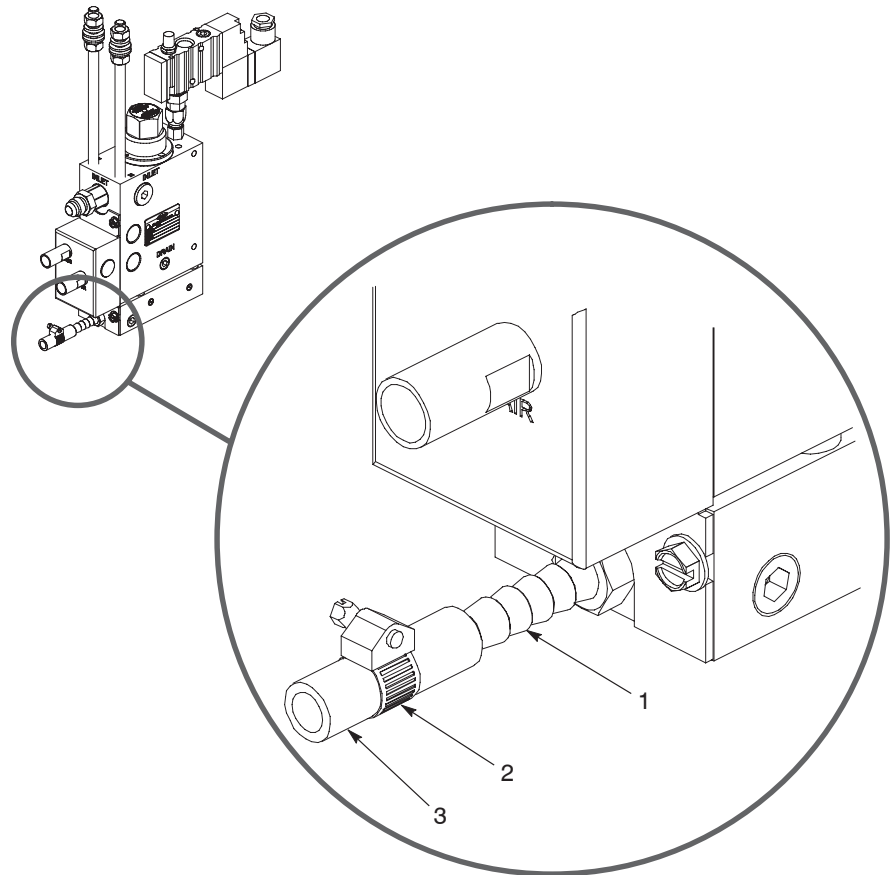


Figure 3-7 Pattern air supply connection (typical)

- | | |
|------------|-----------|
| 1. Fitting | 3. Tubing |
| 2. Clamp | |

Electrical Installation

Electrical installation involves connecting the solenoid valves to a triggering device and connecting cordsets. Before making any electrical connections, complete the procedures in *Applicator Installation*, *Hose Installation*, and *Air Supply Installation*.

Connect the Solenoid Valves

Electrically connect the solenoid valve to a triggering device so that the modules will open and close at the appropriate times.

NOTE: To connect the solenoid valves on a Universal Speed-Coat applicator to a triggering device, refer to Section 9, *Module*.

1. Ensure that the voltage ratings of the solenoid valves and the triggering device match. The following table provides the solenoid valve power requirements.

Type of Solenoid Valve	Power Requirement
Saturn	5.4 W, 24 VDC
Clippard Minimatic	0.44 W, 24 VDC

2. See Figure 3-8. Disconnect the quick-disconnect connector (3) from the solenoid valve coil. Save the gasket.
3. Separate the terminal block from the connector housing.
4. Loosen the connector strain relief nut (2).

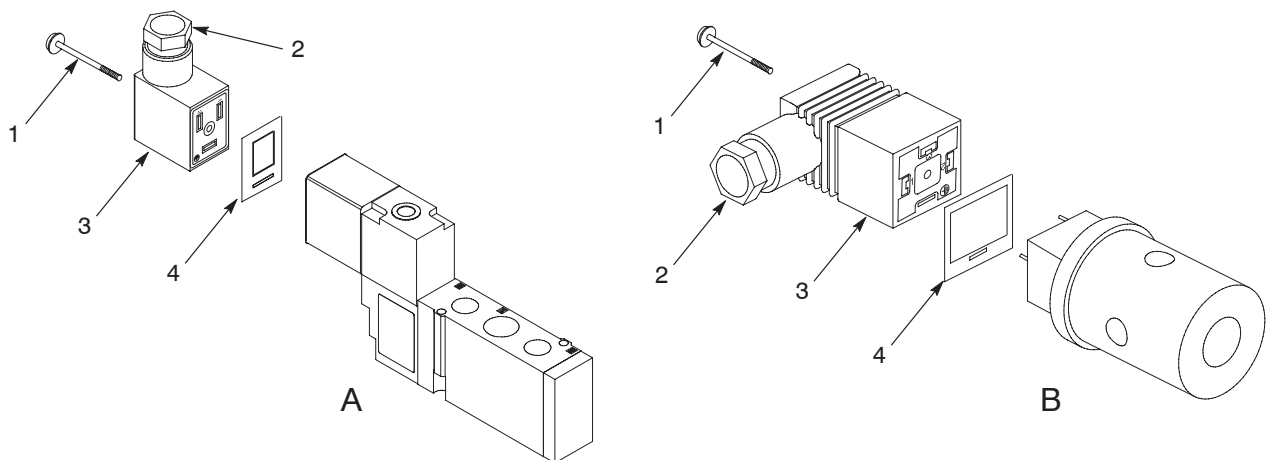


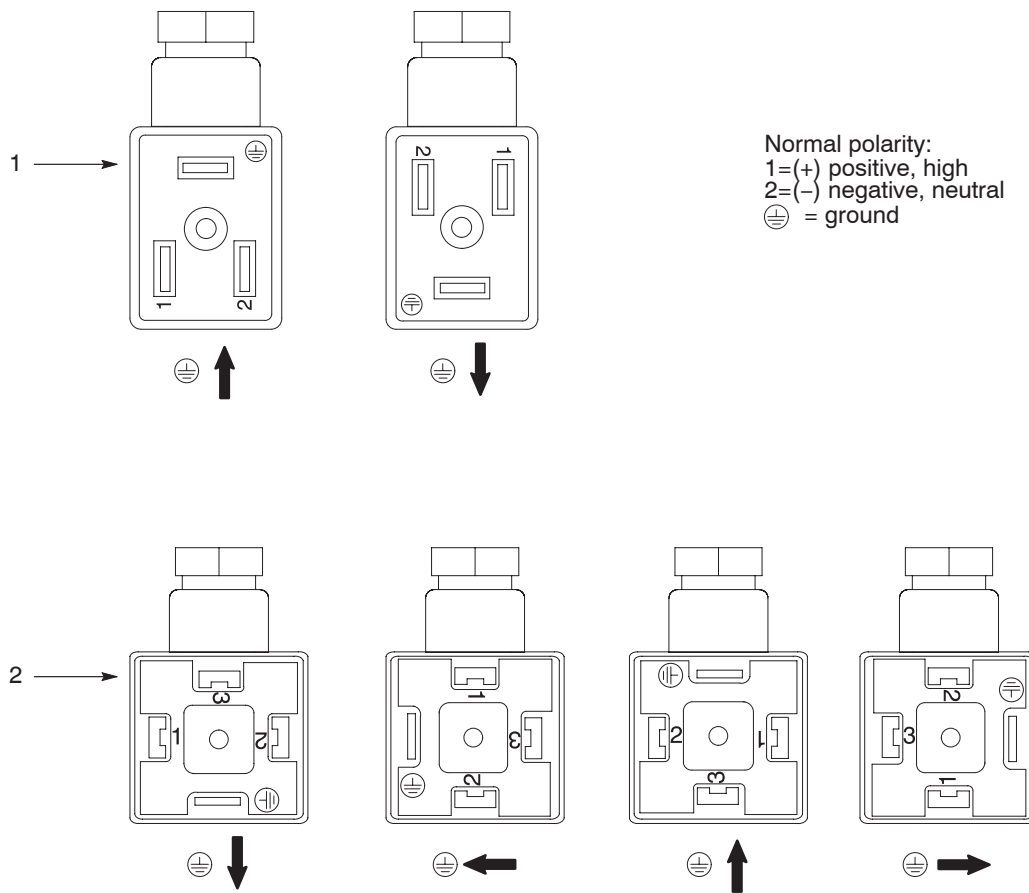
Figure 3-8 Removing the quick-disconnect connector from a Saturn (A) or Clippard (B) solenoid valve

- | | | |
|----------------------|-------------------------------|-----------|
| 1. Connector screw | 3. Quick-disconnect connector | 4. Gasket |
| 2. Strain relief nut | | |



CAUTION: Solenoid valves must be rated for the output voltage of the triggering device. Make sure the ratings match.

5. See Figure 3-9. Thread a 0.75–0.34 mm² (18–22 AWG) three-conductor cable through the strain relief; then connect
 - the positive and negative leads to terminals 1 and 2 [normal polarity, 1 = (+) and 2 = (-)]
 - the ground wire to the ground terminal
6. Ensuring correct configuration of the terminal block (see Figure 3-9), snap the block back into the connector and tighten the strain relief nut.
7. Align the gasket on the connector and plug the connector into the solenoid valve, securing it with the screw removed earlier.
8. Connect the three-conductor cable to the triggering device. Refer to the instructions that came with the triggering device.



690200014

Figure 3-9 Solenoid valve terminal block configurations

1. Saturn solenoid valve

2. Clippard Minimatic solenoid valve

Connect the Cordsets

Go to *Cordset Connection* in Section 11, *Electrical System*, to connect the adhesive and heated air manifold cordsets. Return here to continue.

Applicator Flushing

Flushing the applicator removes cleaning solution, adhesive, and other contaminants from the equipment. The applicator should be flushed before initial use and anytime you change the adhesive in the hot melt system. This helps prevent clogging of the filter or nozzles and makes the applicator work more efficiently.

Prepare for Applicator Flushing

1. Determine whether you need to flush the applicator with adhesive or with cleaning fluid and then with adhesive. Refer to Table 3-2.

Table 3-2 Applicator Flushing Situations

Situation	Flushing Materials to Use
Initial startup	Adhesive only
Changing adhesive in the system	<ol style="list-style-type: none"> a. Cleaning solution compatible with both the old and new adhesives b. New adhesive (to remove the cleaning solution)

2. Heat the system to application temperature. Refer to the melter manual as needed.
3. Stop the melter pump(s).
4. Place drain pans under the applicator drain valves, the hose connections, and the modules.



WARNING: Risk of burns. Failure to relieve system pressure can cause hot adhesive to spray from a connecting point. Relieve system pressure before loosening or removing a hose, module, or any other part of the hot melt system. Wear heat-protective clothing, safety goggles (ANSI Z87.1 or equivalent), and safety gloves.

5. Relieve system pressure. Refer to *Relieving System Pressure* in Section 10, *Filter*.
6. Flush the applicator by performing the following procedures with each flushing material to be used:
 - *Flush the Hose*
 - *Flush the Filter*
 - *Flush the Manifold*
 - *Flush the Modules*

Flush the Hose

Follow this procedure to flush the hose. Refer to the melter manual as needed for instructions on starting and stopping the melter pump(s).

1. Disconnect the hose from the applicator and direct the end of the hose into a waste container.
2. Start the melter pump(s).
3. When the adhesive flowing from the hose is free of any solvent or contaminants, stop the melter pump(s).
4. Wipe any adhesive from the hose connector.
5. Reconnect the hose to the applicator.

Flush the Filter

Go to Section 10, *Filter*, and follow the filter flushing procedure located there. Return here to continue.

Flush the Manifold

Follow this procedure to flush the manifold. Refer to the melter manual as needed for instructions on starting and stopping the melter pump(s).

1. Set the pattern air pressure so that there is just enough pressure to prevent adhesive from entering the air ports on the heated air manifold.
2. Remove the modules from the manifold. Refer to the module removal procedure in Section 9, *Module*, as needed.
3. Place a drain pan under the manifold.
4. Start the melter pump(s).
5. Allow some adhesive to drain from the manifold. When the adhesive flowing from the manifold is free of any contaminants, stop the melter pump(s).
6. Wipe any adhesive from the manifold.
7. Reinstall the modules on the manifold. Refer to the module removal procedure in Section 9, *Module*, as needed.

Flush the Modules

Follow this procedure to flush the modules. Refer to the melter manual as needed for instructions on starting and stopping the melter pump(s).

1. Ensure that nozzles are removed from the modules.
2. Set the pattern air to 0.1–0.3 bar (2–5 psi).
3. Turn on the module-actuating air.
4. Start the melter pump(s).
5. When the adhesive flowing from the modules is free of any contaminants, stop the melter pump(s) and turn off the module-actuating air.
6. Wipe any adhesive from the modules.

Nozzle Installation

Install nozzles before placing the applicator into operation. Refer to Section 9, *Module*, for nozzle installation and removal procedures.

Applicator Testing

Perform tests as needed to ensure that the applicator output meets the requirements of your application. When testing, proceed systematically by changing only one production variable (such as the system pressure) at a time. If changing the variable does not produce the desired result, return it to its original state and try changing a different variable. Proceed in this manner until the desired applicator performance is achieved. Contact your Nordson representative for assistance as needed.

Section 4

Operation



WARNING: Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.

Introduction

This section provides procedures for operating the applicator. Before you operate the applicator for the first time, make sure you have

- completed the installation procedures in Section 3, *Installation*
- flushed the applicator by completing the applicator flushing procedure in Section 3, *Installation*
- optimized the applicator output for your application as described in *Applicator Testing* in Section 3, *Installation*

Before you perform any operating procedures, review Section 1, *Safety*.

Startup and Shutdown

Because the melter supplies the adhesive and the electrical power to the applicator, the procedures for starting and stopping the applicator vary depending on the type of melter you are using. Refer to the melter manual for complete startup and shutdown procedures.

Starting the Applicator

Starting the applicator involves starting the melter and enabling the module-actuating and pattern air supplies. Refer to the melter manual as needed to operate the melter.

1. Start the melter and heat the system to application temperature.
2. Turn on the pattern air.
3. Turn on the module-actuating air.
4. Start the melter pump(s).
5. Start the production line.

NOTE: Pneumatic and hydraulic pressure ranges are provided in *Specifications* in Section 9, *Module*.

Shutting Down the Applicator

Shutting down the applicator involves stopping the melter and disabling the air supplies. Refer to the melter manual as needed to operate the melter.

1. Stop the production line.
2. Stop the melter pump(s).
3. Shut off the module-actuating air.
4. Shut off the pattern air.
5. Relieve system pressure. Refer to *Relieving System Pressure* in Section 10, *Filter*.
6. Shut down the melter.

Adhesive Pattern Adjustment

Use the following techniques to modify the adhesive pattern:

- adjust the adhesive add-on weight (melter pump speed)
- adjust the electronic control device (timer or pattern controller)
- adjust the pattern air pressure
- adjust the pattern air temperature
- adjust the adhesive application temperature
- change the type of adhesive used
- change the nozzle type or size
- adjust the applicator height

If you experience problems obtaining the desired adhesive pattern, refer to the pattern control troubleshooting table in Section 9, *Module*.

Section 5

Maintenance



WARNING: Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.

Introduction

This section contains a list of recommended maintenance activities and a recommended schedule for performing those activities. Attempting any other maintenance procedures can result in equipment damage, improper system operation, or personal injury.

Before you perform any maintenance procedures, review Section 1, *Safety*.

Required Tools and Supplies

To perform maintenance or repairs, you will need:

- a set of metric socket wrenches
- a set of metric Allen (hex) wrenches
- a set of metric T-handle hex keys
- a set of metric open-ended wrenches
- flat-blade and Phillips-head screwdrivers
- drain pans and large waste containers
- other tools and supplies as noted

You will also need a sufficient inventory of spare parts and supplies. Each maintenance and repair procedure in this manual is preceded by a list of the parts and supplies you will need. Refer to Section 8, *Parts*, and to *Parts* in Sections 9–11 for the part numbers of parts and supplies.

Recommended Maintenance Schedule

Table 5-1 provides a list of recommended maintenance activities. Base how often you perform these activities on your specific operating needs. The frequency shown is for reference only.

Table 5-1 Recommended Maintenance Schedule

Frequency	Maintenance Activity
Daily	<ul style="list-style-type: none"> • Keep the supply of adhesive clean and free of contaminants. Foreign particles in the adhesive can clog the filter or nozzles. • Clean all exterior applicator surfaces. Accumulated adhesive can char and cause erratic operation. • Check the hose connections for leaks. If a leak is found, replace the hose fitting and/or O-ring as appropriate.
Weekly	<ul style="list-style-type: none"> • Clean nozzles. Refer to the nozzle cleaning procedure in Section 9, <i>Module</i>.
As needed	<ul style="list-style-type: none"> • Clean or replace the filter screen. Refer to the filter service procedures in Section 10, <i>Filter</i>. • Verify that all electrical connections are secure. Vibration and heating or cooling cycles can loosen wire nuts and terminal blocks. • Clean the air pressure regulator filter elements. Refer to the air pressure regulator documentation. • Clean the system. Refer to the system cleaning procedure in the melter manual.

Section 6

Troubleshooting



WARNING: Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.

Introduction

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 Nordson representative for assistance.

Troubleshooting begins when the flow of adhesive from the applicator stops or diminishes unexpectedly or when a control system alerts you of a problem through an alarm or visual display.

Troubleshooting Tables

The troubleshooting tables in this section describe the kinds of problems you may encounter and provide corrective actions for those problems. When necessary, the tables refer to more detailed troubleshooting procedures located in either the *Troubleshooting Procedures* part of this section or in Section 9, *Module*, or in Section 11, *Electrical System*.

Refer to the appropriate troubleshooting table for the type of problem you are experiencing:

- *Applicator Heating Problems*
- *Adhesive Output Problems*
- *Adhesive Leakage Problems*
- *Air Supply Problems*
- *Pattern Control Problems*

To troubleshoot melter or hose problems, refer to the melter manual.

Applicator Heating Problems

Refer to this troubleshooting table if the applicator does not heat, underheats, or overheats.

NOTE: Each heated component in a hot melt system (typically the grid, the reservoir, each hose, and each applicator) is referred to as a heated zone. The applicator's heated zones are the adhesive manifold and the heated air manifold. Some applicators may have multiple adhesive manifold and heated air manifold zones.



WARNING: Risk of personal injury or death. Allow only qualified personnel to perform electrical installation, troubleshooting, or repair procedures. Before performing any electrical procedure, review Section 1, *Safety*, and disconnect and lock out electrical power to the system.

Problem	Possible Cause	Corrective Action
<p>1. Applicator does not heat</p>	<p>System power not on</p> <p>Loose electrical connection</p> <p>Broken or missing electrical pins</p> <p>Adhesive or heated air manifold temperature setpoints too low</p> <p>Failed thermostat</p>	<p>Verify that the system power is turned on.</p> <p>Verify that all electrical connections (cordsets and cables) at the melter and the applicator ends of the hose are secure.</p> <p>Check for broken or missing pins at all electrical connections. Repair or replace damaged components.</p> <p>Adjust the temperature setpoints as necessary. Refer to the melter or temperature controller manual.</p> <p>Check the thermostat. Refer to <i>Resetting a Thermostat</i> and <i>Checking a Thermostat</i> in Section 11, <i>Electrical System</i>.</p>
<p>2. Applicator underheats or overheats</p>	<p>System in standby or setback mode</p> <p>Adhesive manifold, heated air manifold, or hose temperature setpoints too low or too high</p> <p>Failed heater, sensor (RTD or thermocouple), or cable</p>	<p>Take the system out of standby or setback mode.</p> <p>Adjust the temperature setpoints as necessary. Refer to the melter or temperature controller manual.</p> <p>Check the heaters, sensors, and cables for the problem zone. Refer to the appropriate procedures in Section 11, <i>Electrical System</i>.</p>

Adhesive Output Problems

Refer to this troubleshooting table if the adhesive output is too low or too high or if there is no adhesive output.

NOTE: Each heated component in a hot melt system (typically the grid, the reservoir, each hose, and each applicator) is referred to as a heated zone. The applicator's heated zones are the adhesive manifold and the heated air manifold. Some applicators may have multiple adhesive manifold and heated air manifold zones.

Problem	Possible Cause	Corrective Action
<p>1. Adhesive output too low or too high</p>	<p>Heated zone temperature setpoints too low or too high</p> <p>Melter pump not supplying correct amount of adhesive</p> <p>Blockage in hose-to-applicator or hose-to-melter connection</p> <p>Clogged filter</p> <p>Blockage in module or nozzle</p>	<p>Adjust the temperature setpoints as necessary. Refer to the melter or temperature controller manual.</p> <p>Troubleshoot and correct the adhesive supply problem from the melter. Refer to the melter manual.</p> <p>Check for blockages in the connections. Check also for a cold connection. Install insulation around any cold connections. If the adhesive output does not improve, install a heated inline filter at the connection.</p> <p>Replace the filter screen. Refer to the filter screen replacement procedure in Section 10, <i>Filter</i>.</p> <p>Check for blockage in the module or nozzle. Refer to <i>Checking for Blockages</i> in the <i>Troubleshooting Procedures</i> part of this section.</p>
<p>2. No adhesive output</p>	<p>Adhesive not at application temperature</p> <p>Heated zone temperature setpoints too low or too high</p> <p>Adhesive level in melter low</p> <p>Blockage in hose-to-applicator or hose-to-melter connection</p> <p>Clogged filter</p>	<p>Wait for the system to reach application temperature.</p> <p>Adjust the temperature setpoints as necessary. Refer to the melter or temperature controller manual.</p> <p>Add adhesive to the melter. Refer to the melter manual.</p> <p>Check for blockages in the connections. Check also for a cold connection. Install insulation around any cold connections. If the adhesive output does not improve, install a heated inline filter at the connection.</p> <p>Replace the filter screen. Refer to the filter screen replacement procedure in Section 10, <i>Filter</i>.</p>

Continued on next page

Adhesive Output Problems *(contd)*

Problem	Possible Cause	Corrective Action
<p>2. No adhesive output <i>(contd.)</i></p>	<p>Blockage in module or nozzle</p> <p>Failed module or module loading screw not properly adjusted on adjustable modules</p> <p>Failed solenoid valve</p> <p>Failed or faulty solenoid valve triggering device</p>	<p>Check for blockage in the module or nozzle. Refer to <i>Checking for Blockages</i> in the <i>Troubleshooting Procedures</i> part of this section.</p> <p>Check the module. Refer to <i>Checking a Module</i> in the <i>Troubleshooting Procedures</i> part of this section. For adjustable modules, check the loading screw adjustment to ensure that the travel of the module-actuating spring has not changed. If this spring is tightened down too much, the module will not open. Refer to <i>Synchronizing Multi-Module Applicator Adhesive Output</i> in Section 9, <i>Module</i>.</p> <p>Check the solenoid valve. Refer to <i>Checking Solenoid Valve Mechanical Operation</i> and <i>Checking Solenoid Valve Electrical Operation</i> in the <i>Troubleshooting Procedures</i> part of this section.</p> <p>Troubleshoot the triggering device. Refer to the manufacturer's documentation.</p>
<p>3. Modules on multi-module applicator not triggering at same time</p>	<p>Not enough solenoid valves for the number of modules</p> <p>Solenoid valves too far from applicator</p> <p><i>(Adjustable modules only)</i> Modules not properly synchronized (loading screws not properly adjusted)</p>	<p>Add solenoid valves.</p> <p>Reinstall the solenoid valves so that they are as close as possible to the applicator.</p> <p>Refer to <i>Synchronizing Multi-Module Applicator Adhesive Output</i> in Section 9, <i>Module</i>.</p>

Adhesive Leakage Problems

Refer to this troubleshooting table if you find adhesive leaks.

Problem	Possible Cause	Corrective Action
1. Leaks between the adhesive manifold and the module	Insufficient torque on module socket-head screws Damaged or worn O-rings on back of module	Tighten the module screws to 3–4 N•m (25–32 in.-lb). Replace the O-rings.
2. Leaks at bleed hole on module (see Figure 6-1)	Adhesive seal failure	Replace or rebuild the module. To replace a module, refer to the module replacement procedure in Section 9, <i>Module</i> . To rebuild a module, order a module rebuild kit and follow the instructions in the kit. For kit part numbers, refer to <i>Module Service Kits</i> in Section 9, <i>Module</i> .
3. Leaks at nozzle	System pressure too high Damaged or worn O-ring in module seat	Decrease the system pressure. Refer to the melter manual. Replace the O-ring.
4. Leaks at hose connection	Loose hose connection Failed hose fitting O-ring	Tighten the connection. Replace the hose fitting O-ring. Refer to the procedure for replacing the O-ring in the melter manual.

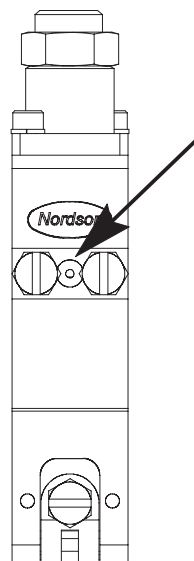


Figure 6-1 Location of the module bleed hole (typical)

Air Supply Problems

Refer to this troubleshooting table if you experience problems related to the air supply.

Problem	Possible Cause	Corrective Action
1. Air leaks from the top of a module	Air seal failure	Replace or rebuild the module. To replace a module, refer to the module replacement procedure in Section 9, <i>Module</i> . To rebuild a module, order a module rebuild kit and follow the instructions in the kit. For kit part numbers, refer to <i>Module Service Kits</i> in Section 9, <i>Module</i> .
2. No module-actuating air	Failed solenoid valve Failed air pressure regulator or insufficient air supply to the regulator	Check the solenoid valve and replace if necessary. Refer to <i>Checking Solenoid Valve Mechanical Operation</i> and <i>Checking Solenoid Valve Electrical Operation</i> in the <i>Troubleshooting Procedures</i> part of this section. Check the regulator and the air supply to the regulator. Refer to <i>Checking an Air Pressure Regulator</i> in the <i>Troubleshooting Procedures</i> part of this section.
3. No pattern air	Failed air pressure regulator or insufficient air supply to the regulator Clogged air passage in nozzle	Check the regulator and the air supply to the regulator. Refer to <i>Checking an Air Pressure Regulator</i> in the <i>Troubleshooting Procedures</i> part of this section. Clean or replace the nozzle. Refer to the nozzle cleaning procedure in Section 9, <i>Module</i> .

Pattern Control Problems

Refer to *Pattern Control Troubleshooting* in Section 9, *Module*.

Troubleshooting Procedures

Use these troubleshooting procedures as directed in the *Troubleshooting Tables* part of this section.

Checking for Blockages

1. Relieve system pressure. Refer to *Relieving System Pressure* in Section 10, *Filter*.
2. Place a drain pan under the applicator.
3. Decrease the pattern air pressure. Leave just enough air pressure to prevent adhesive from entering the pattern air outlet.
4. See Figure 6-2. Remove a module from the adhesive manifold.

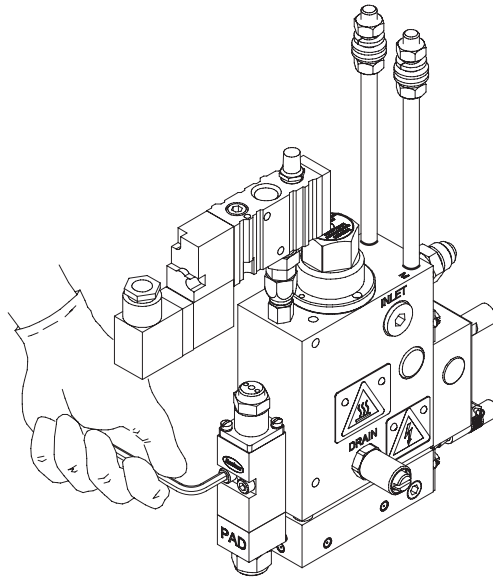


Figure 6-2 Removing a module

Checking for Blockages *(contd)*

5. Observe the adhesive opening (the lower opening) on the adhesive manifold:
 - If there is no adhesive flow from the adhesive opening, there may be blockage in the adhesive manifold. Clean the system or replace the applicator. Refer to the system cleaning procedure in the melter manual.
 - If adhesive is flowing from the adhesive opening, there is no blockage in the adhesive passage. Continue to the next step.
6. Trigger the applicator at the solenoid valve and observe the module-actuating air opening (the upper opening):
 - If no air flows from the module-actuating air opening, there may be blockage in the adhesive manifold. Clean the system or replace the applicator. Refer to the system cleaning procedure in the melter manual.
 - If air flows from the module-actuating air opening, there is no blockage in the air passage. Reinstall the module and return to the appropriate troubleshooting table.

NOTE: Tighten the module screws to 3.4 N•m (30 in.-lb), heat the system to application temperature, and tighten the screws again.

Checking a Module

Use one of the following procedures to check a module. The first procedure is the easiest to perform.

Quick Check

See Figure 6-3. Insert a pin or similar tool into the center hole on the top of the module and trigger the module at the solenoid valve. If the pin moves up and down and adhesive flows from the module as it is triggered, the module is operating properly. If the pin does not move up and down or if adhesive does not flow from the module, the module has failed. Replace or rebuild the module. To replace a module, refer to the module replacement procedure in Section 9, *Module*. To rebuild a module, order a module rebuild kit and follow the instructions in the kit. For kit part numbers, refer to *Module Service Kits* in Section 9, *Module*.

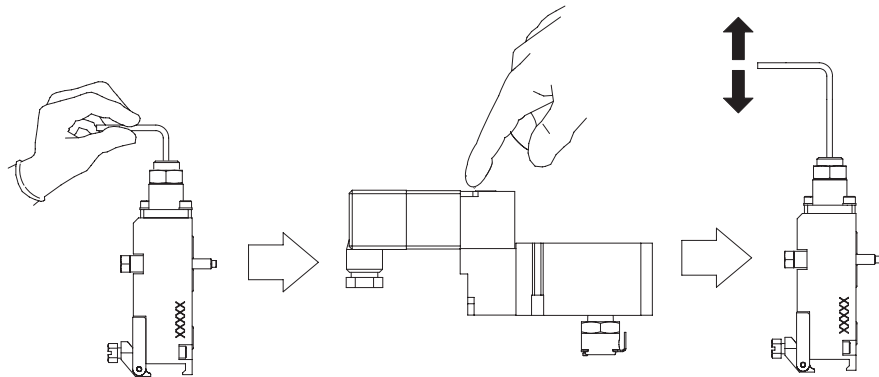


Figure 6-3 Quick check of module operation

In-Depth Check

1. Relieve system pressure. Refer to *Relieving System Pressure* in Section 10, *Filter*.
2. Remove the nozzle from the module. Refer to the nozzle removal/installation procedures in Section 9, *Module*, as needed.
3. Trigger the applicator at the solenoid valve and observe the output:
 - If no adhesive flows from the module, the module has failed. Replace or rebuild the module. To replace a module, refer to the module replacement procedure in Section 9, *Module*. To rebuild a module, order a module rebuild kit and follow the instructions in the kit. For kit part numbers, refer to *Module Service Kits* in Section 9, *Module*.
 - If adhesive flows from the module, it is operating properly. Reinstall the nozzle on the module and return to the appropriate troubleshooting table.

Checking Solenoid Valve Mechanical Operation

Solenoid valves are used to control the module-actuating air. Follow this procedure to check the mechanical operation of a solenoid valve. To check the electrical operation of a solenoid valve, refer to the next procedure, *Checking Solenoid Valve Electrical Operation*.

1. Turn on the air supply to the solenoid valve.
2. Trigger the applicator at the solenoid valve and check for adhesive flow:
 - If adhesive flows from the module, the solenoid valve is operating normally. Return to the appropriate troubleshooting table.
 - If no adhesive flows from the module, continue to the next step.
3. Manually trigger the solenoid valve and listen to its response:
 - If you hear a clicking noise, the valve is operating normally. Return to the appropriate troubleshooting table.
 - If you do not hear a clicking noise, the solenoid valve is not engaging. This could be caused by an electrical problem or by low air pressure to the solenoid valve. To check the solenoid valve electrically, go to the next procedure, *Checking Solenoid Valve Electrical Operation*. To check the air pressure regulator, go to *Checking an Air Pressure Regulator* later in this section.

Checking Solenoid Valve Electrical Operation

Solenoid valves are used to control the module-actuating air. Follow this procedure to check the electrical operation of a solenoid valve. To check the mechanical operation of a solenoid valve, refer to the previous procedure, *Checking Solenoid Valve Mechanical Operation*.

1. Disconnect and lock out electrical power to the solenoid valve.
2. Disconnect the solenoid valve wires.
3. Connect a standard ohmmeter across the solenoid valves wires to check the solenoid valve coil for electrical continuity:
 - If the resistance is excessively high, there is no continuity. Replace the solenoid valve.
 - If the resistance is normal, return to the appropriate troubleshooting table.

NOTE: Make sure the solenoid valve meets high-temperature specifications. For the part numbers of solenoid valves that can be used with the applicator, refer to Section 8, *Parts*.

Checking an Air Pressure Regulator

An air pressure regulator is used to control the air pressure to the solenoid valves for the module-actuating air and to control the pattern air. Follow this procedure to check a regulator.

1. Relieve system pressure. Refer to *Relieving System Pressure* in Section 10, *Filter*.
2. Reduce the air pressure to 0 bar (0 psi) at the regulator.
3. Disconnect the regulator air line that is connected to the solenoid valve or to the pattern air inlet.
4. Slowly increase the regulator air pressure:
 - If no air flows from the regulator, it is faulty. Replace the regulator.
 - If air flows, the air pressure may be low. Continue to the next step.
5. Determine the pressure of the air being supplied to the regulator:
 - If the air pressure is below 2.1 bar (30 psi), there is an input air pressure problem. Troubleshoot and correct the air pressure problem.
 - If the air pressure is 2.1 bar (30 psi) or greater, the input air pressure is okay. Return to the appropriate troubleshooting table.

Section 7

Repair



WARNING: Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.

Introduction

Repair procedures for the applicator are located in Sections 9–11 as shown in Table 7-1. Follow these guidelines when making any repair:

- Review Section 1, *Safety*, before beginning the repair.
- Have the required tools, supplies, and replacement parts on hand. They are listed at the beginning of each repair procedure. Refer to Section 5, *Maintenance*, for a list of required tools and supplies. Refer to Section 8, *Parts*, or to *Parts* in Sections 9–11 for replacement part numbers.
- Relieve system pressure and disconnect and lock out electrical power to the system before performing any repair.

Location of Repair Procedures

Because applicator configurations vary, repair procedures are located in Sections 9–11, which are specific to your applicator. Table 7-1 shows the location of the repair procedures in this manual.

Table 7-1 Location of Repair Procedures

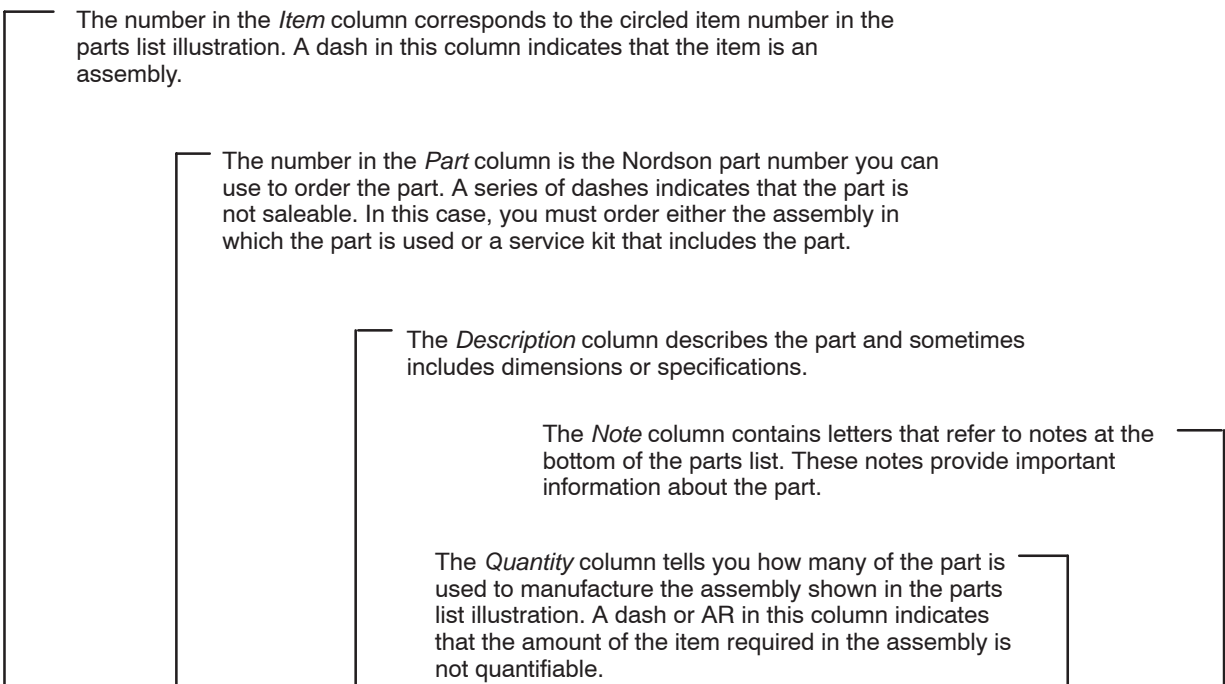
Procedure	Location
Replacing a module Rebuilding a module Removing or installing a nozzle	Section 9, <i>Module</i>
Replacing or cleaning a filter screen	Section 10, <i>Filter</i>
Replacing a heater Replacing an RTD or thermocouple Replacing a thermostat	Section 11, <i>Electrical System</i>

Section 8

Parts

Using the Illustrated Parts Lists

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use these five-column parts lists, and the accompanying illustrations, to describe and locate parts correctly. The following chart provides guidance for reading the parts lists.



Item	Part	Description	Quantity	Note
—	0000000	Assembly A	—	
1	000000	• Part of assembly A	2	A
2	-----	•• Part of item 1	1	
3	0000000	••• Part of item 2	AR	
NS	000000	•••• Part of item 3	2	

NOTE A: Important information about item 1
 AR: As Required
 NS: Not Shown

Applicator-Specific Reference Drawings

For a parts list specific to your applicator, refer to the reference drawings and bill of materials provided with this manual. The item numbers on reference drawings correspond to the numbers in the *Item* column on the bill of materials. If you have any questions about how to read the reference drawings or the bill of materials, contact your Nordson representative.

Location of Other Parts Lists

Because applicator configurations vary, most of the parts lists in this manual are located in Sections 9–11, which are specific to your applicator. Table 8-1 shows the location of the other parts lists in this manual.

Table 8-1 Location of Other Parts Lists

Parts Lists for...	Are located in...
Modules and nozzles	Section 9, <i>Module</i>
Filters	Section 10, <i>Filter</i>
Cordsets, splitter and extension cables, heaters, sensors (RTDs or thermocouples), and thermostats	Section 11, <i>Electrical System</i>

Solenoid Valve Parts

See Figure 8-1. One of three types of solenoid valve may be installed on your applicator: Saturn, Clippard Minimatic, or the integral solenoid valve that is supplied with Universal Speed-Coat modules. Refer to the applicator-specific reference drawings to determine which type of solenoid valve is used on your applicator.

This parts list also includes part numbers for some commonly used solenoid valve components. Refer to the applicator-specific reference drawings to determine if and how these parts are used.

NOTE: For the part numbers associated with Universal Speed-Coat modules, refer to Section 9, *Module*.

Item	Part	Description	Quantity	Note
1	1055483	Valve, solenoid, Saturn, 24 VDC, 5.4 W, 1/4 NPT	AR	
2	220918	Valve, solenoid, Clippard Minimatic, 24 VDC, 0.44 W, 1/8 NPT	AR	
3	973402	Plug, pipe, socket, flush, 1/8 in.	AR	
4	973372	Bushing, pipe, hydraulic, 1/4 x 1/8 in.	AR	
5	972215	Connector, male, 37, 7/16-20 x 1/8 NPT	AR	
6	148534	Adapter, union, swivel, 1/8 x 1/8 NPT	AR	
7	973187	Ell, pipe, hydraulic, 45-degree, 1/8 in.	AR	
NS	233055	Cordset, S-style, with fitting, 1 ft, 3 wire	AR	
NS	233056	Cordset, S-style, without fitting, 1 ft, 3 wire	AR	
NS	984155	Nut, panel-mounting	AR	
NS	973411	Pipe, plug, socket, flush, 1/4 in.	AR	
NS	170269	Muffler, exhaust, 1/8 NPT	AR	
NS	973002	Nipple, steel, schedule 40, 1/8 in., 1.5 in. long	AR	
NS	973130	Ell, pipe, hydraulic, 90-degree, 1/8 in.	AR	
AR: As Required				
NS: Not Shown				

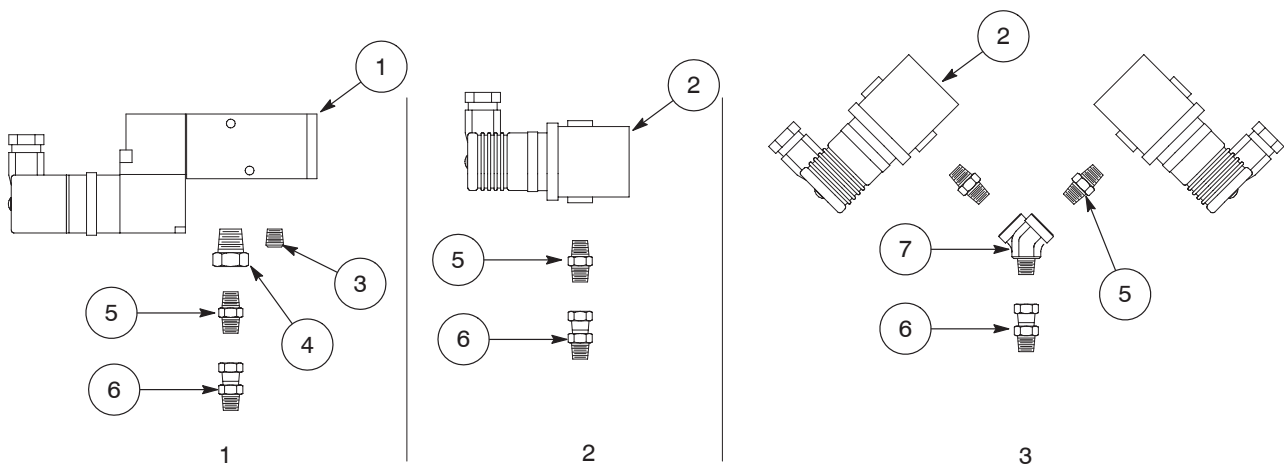


Figure 8-1 Solenoid valve parts

1. Saturn solenoid valve, common or independent air actuation

2. Clippard solenoid valve, common air actuation

3. Clippard solenoid valve, independent air actuation

Air Regulators and Run-Up Kits

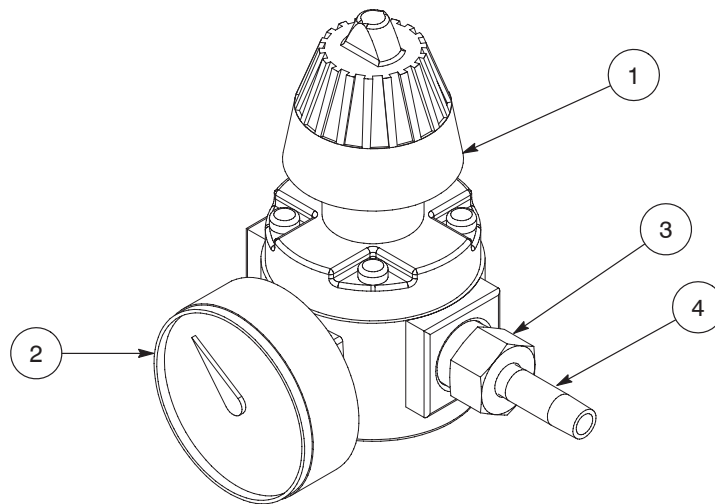
To optimize the performance of your system, Nordson Corporation recommends these optional accessories.

Pressure Regulators/Gauges

See Figure 8-2.

Item	Part	Description	Quantity	Note
—	1020683	Pressure regulator/gauge assembly, 0–15 psig	AR	
—	1020684	Pressure regulator/gauge assembly, 0–30 psig	AR	
—	1020748	Pressure regulator/gauge assembly, 0–50 psig	AR	
1	-----	• Regulator, pressure	1	
2	-----	• Gauge, pressure	1	
3	-----	• Bushing, pipe, hydraulic, $\frac{1}{2} \times \frac{1}{8}$ in.	1	
4	-----	• Nipple, steel, schedule 40, $\frac{1}{8}$ in., 1.5 in. long	1	

AR: As Required



690201004

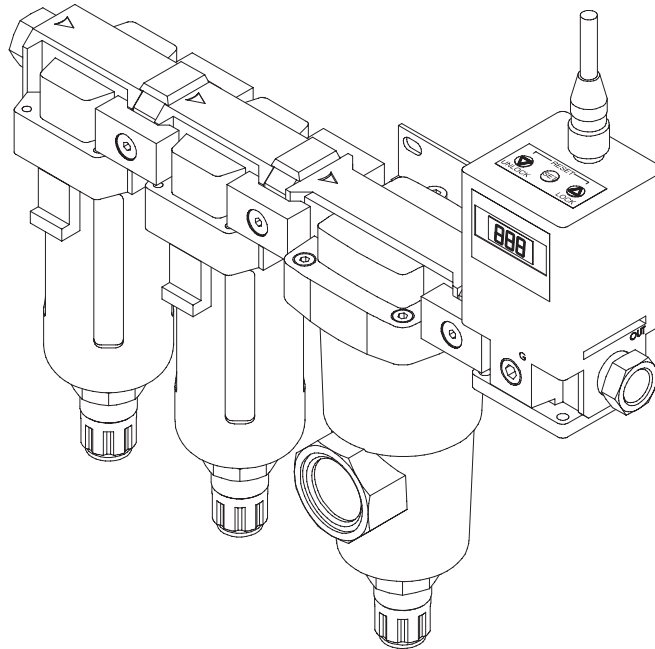
Figure 8-2 Pressure regulator/gauge assembly parts

Air Run-Up Kits

See Figure 8-3.

Part	Description	Note
1036518	Kit, air run-up, 4–20 mA, 0–3.5 bar	A
1036520	Kit, air run-up, 0–10 VDC, 0–3.5 bar	A

NOTE A: Refer to the instructions provided with the kit for a complete parts list.



69020008

Figure 8-3 Air run-up assembly

Recommended Spare Parts and Supplies

The following tables provide part numbers for commonly used spare parts and supplies. A recommended stocking quantity is provided in the *Quantity* column of the recommended spare parts table, but you should base your parts-stocking decisions on your specific operational needs. The quantity of each item you stock will vary depending on the number of hours you operate each day, the size and number of applicators you have, and the number of modules installed on each applicator.

Table 8-2 Recommended Spare Parts

Item	Part	Description	Quantity
Modules	See Note A	Replacement modules	1
	See Note B	Module rebuild kits, service kits, mounting screws, O-rings, and other applicable spare parts and tools	As required
Filter	See Note A	Replacement filter assemblies	1
	See Note A	• Replacement filter screens	1
	See Note A	• Replacement filter O-rings	6
Nozzles	See Note A	Replacement nozzles	2
	901915	Kit, nozzle cleaning, small orifice	1
	231100	Kit, nozzle cleaning, large orifice	1
Solenoid valves	See Note A	Replacement solenoid valve assemblies	1
Electrical system	See Note A	Replacement adhesive manifold cordset assemblies/parts	1
	See Note A	Replacement heated air manifold cordset assemblies/parts	1
	See Note A	Replacement thermostat for adhesive manifolds	1
	139671	Tool, pin crimping	1
	100586	Tool, pin extraction (gold amp-style pins)	1
	254647	Tool, pin extraction (silver pins on high power connectors)	1
Electrical system	933056	Wire nut, ceramic	2
	251041	Connector, porcelain, 2-station (terminal block)	2
NOTE A: Refer to the applicator-specific reference drawings to determine part numbers. Refer also to <i>Parts</i> in Sections 9–11.			
B: Refer to <i>Module Service Kits</i> and <i>Recommended Spare Part and Supplies</i> in Section 9, <i>Module</i> .			

Table 8-3 Recommended Supplies

Part	Description	Note
900223	Lubricant, O-ring, Parker, 4 oz (for lubricating O-rings)	
900344	Lubricant, Never-Seez, 8 oz can (for lubricating threads)	
165415	Lubricant, heater (for lubricating heaters)	
900298	Compound, heat-sink, 5 oz tube (for lubricating sensors)	